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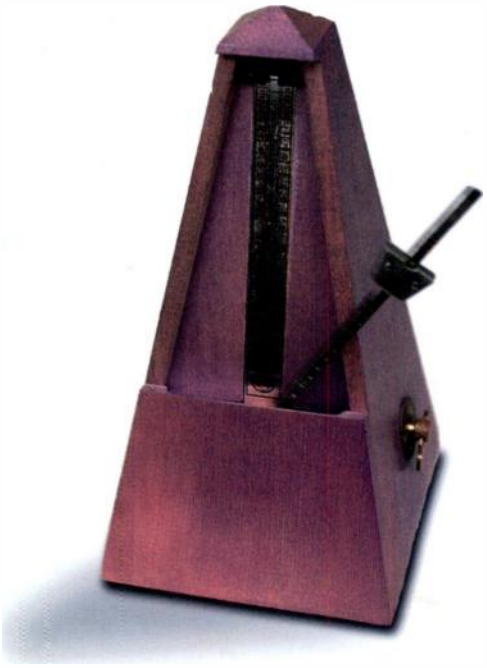

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leader

I have to say that I'm a little puzzled by the number of software plug-ins appearing on the market. Not that they aren't a great idea from a practical point of view, but do they make commercial sense, either for the manufacturer or the end user? Most software plug-ins are designed to work either with specific hardware platforms (such as Digidesign's Pro Tools) or with host editing software packages on the PC or Power Macintosh — Steinberg's *WaveLab* or Sonic Foundry's *Sound Forge* for Pentium PC being a good example (see review of the latest version of *Sound Forge* starting on page 150 this month). Digidesign have attracted by far the greatest amount of third-party involvement to date, but the reality is that plug-ins are perceived by most end users as being very expensive, and they take a lot of hardware power to run. I don't know how well Pro Tools systems have sold worldwide, but in the UK, it's a pretty up-market package, and of the existing owners, how many have got more than a basic system?

88
Roland SC88 Pro

Unless you upgrade the system to include more DSP cards, you're quite limited as to how many plug-ins you can run at one time. Yet the plug-in manufacturers still expect to be able to charge upwards of £300 for most of these add-ons, and if their overall market is limited to one platform, then to be fair, they probably have to charge these prices to break even. But as far as the user is concerned, a compressor on a floppy disk doesn't have the same feeling of substantiality as the hardware equivalent. Hardware has a perceived second-hand value, yet software is somehow seen as ephemeral. What's more, poorly thought-out disk protection systems often leave the user feeling vulnerable. I can see the attraction of high-power plug-in features (such as the excellent de-noising and de-clicking *WaveLab* plug-ins I reviewed last month), or the lure of one of the many TDM spatial processes that has no obvious hardware equivalent, but I can't quite subscribe to the idea of paying out a lot of money for a digital emulation of a classic analogue EQ or compressor. Very often, even the original designers don't know exactly what it is that makes these old analogue boxes sound so good, so what chance does a software designer have of making anything more than a good caricature of the real thing? And no matter how stylish the on-screen virtual front panel, there's still no substitute for feeling the controls of the real thing.

Perhaps what the plug-in market needs to give it a broader base is an 'out-of-computer' DSP box using a standardised operating system, and capable of running *everybody's* plug-ins, no matter what the host computer platform. This would shift the limitations away from the number of available computer slots, and would also minimise the computer's processor overheads. For greater power, the boxes could be cascadable.

Because everybody would be writing plug-ins for the same operating system, the unit price of plug-ins could come down to more attractive levels, the potential for conflicts and incompatibilities would be reduced, and end users would still be able to use the computer platform of their choice. The only computer-specific component would be the interface card that allowed the external box to talk to the PC or Mac. I don't know if this will ever happen, but I do know that there's still more kudos in having a rack full of shining gear than a cardboard box full of floppy disks!

Paul White *Editor*

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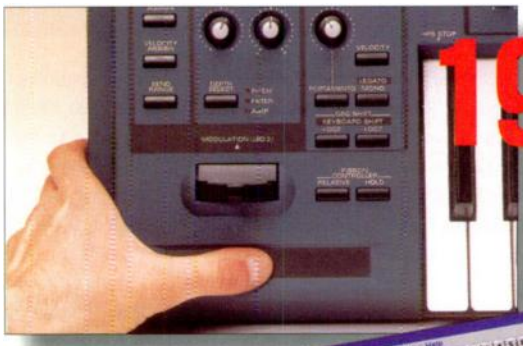

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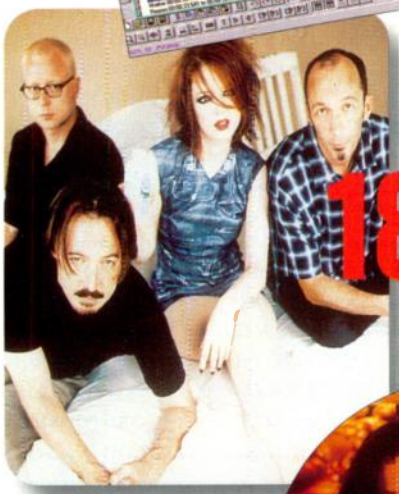

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Get Interactive

I'm trying to get a copy of *M*, the interactive algorithmic composition software from a few years ago. Any idea whether it's still available?

S Osborne
Leamington Spa

Derek Johnson replies: *Thanks to reader David Stevens, who directed us to the Electronic Music Foundation in New York. David Zicarelli's* M *software was originally released by Interval Music back in 1987; Dr T's took on the software in 1990 and it ceased publication in 1995. EMF then decided to make the Macintosh version of* M *(currently at v2.2.8) available as historically-important software; the single disk comes with a printable manual, for an entirely user-friendly US$30 (postage to Europe is an additional US$4 for the first disk, and US$2 for each additional copy in the same order). EMF's web site (http://www.emf.org) does offer some warnings about possible incompatibilities and bugs when the program is used with recent Mac operating systems, but workarounds are suggested. Let's have a quote from the EMF: "We recommend that everyone experience* M. *It is the first example of commercially-available interactive composing software. We believe that* M *is an extraordinary program and that your electronic musical life will be incomplete without it."*

Incidentally, Sound On Sound *reviewed* M *back in August 1988. EMF can be reached at: 116 N Lake Ave, Albany, NY 12206, USA. Tel: 00 1 518 434 4110; fax 00 1 518 434 0308; email emf@emf.org.* ❑

This Way Up

Emu Systems produce the Darwin hard disk recording system, which includes an optional Iomega Jaz drive. We have been receiving phone calls for clarification on Jaz drive installation following Paul White's article in the February issue (page 38) where Paul said that "the Jaz must be mounted flat — it can't be used on its side". We here at Emu have performed extensive testing of the Jaz drive technology, and continue to work closely with Iomega to ensure that it is a reliable solution for hard disk recording. The mounting configuration of the Jaz drive in the Darwin is not only an approved configuration by the manufacturer, but is in fact optimal, due to the minimisation of gravitational and accidental impact forces. This configuration also allows the best air flow around the device, to ensure long-term reliability. The Jaz drive is capable of being operated on either side, or of lying flat (right side up, cartridge door opening on top) without any degradation in performance.

Perhaps the confusion stemmed from the fact that it is not recommended to operate an *external* version of the Jaz drive on its narrow side, since the case does not adequately protect the drive from being accidentally knocked over — something hazardous to the health of *any* hard drive!

In summary, the Jaz drive must be mounted properly to ensure long-term satisfaction. In the Darwin, the Jaz drive is mounted optimally, but for those using external Jaz drives, just make sure they can't fall over!

George Bell
European Service Manager
Emu Systems Inc

Editor Paul White replies: *George is absolutely right — I was referring to the external version only, as the picture accompanying the Jaz review suggested. (This showed the external version, lying flat, of course). In mentioning the importance of orientation, I was merely passing on Iomega's recommendations — unlike the late-'70s Weebles toys, a precariously-balanced external Jaz drive can wobble* and *fall down!* ❑

Taking the Hiss

I recently purchased a Sony MZ R3 MiniDisc recorder and their ECM909A mic, which I'm using mainly to record speech. Unfortunately the mic sets up a slight hiss when connected, which is recorded when using either manual or automatic level control. I'm a complete novice at recording and electronics, but I do know that I need to record without hiss and that the MZ R3 is presumably capable of this.

Any advice you could give about alternative mics or any other solutions would be gratefully received. I do not want to make the same relatively expensive mistake as I did when purchasing the ECM909A mic.

John Mahoney
via email

Paul White replies: *The microphone amplifiers built into most consumer equipment are not great, and low budget mics also tend to be low on sensitivity and a little high on noise. The only way to be sure of a good-quality recording is to use a separate mic preamplifier (stereo, if you need stereo) and a more professional microphone(s). Unfortunately, a decent mic preamp and microphone will cost you more than you paid for the recorder itself, though if you want to discuss this further, please give me a call.*

You say you are a newcomer to this game, so before changing anything, try turning off the automatic gain control, then use the input level meter and record level control to make sure that the recording level peaks at close to its maximum level when you speak. You'll also find it virtually impossible to record close speech without getting microphone pops, unless you use a pop shield. Don't rely on the foam cap that comes with most mics, since these are of very little use; instead, use a piece of nylon stocking material stretched over a wire frame (coat hangers are favourite) and place this between the mic and the person being recorded. Try to keep the mic distance to between 6 and 12 inches — any further than this and you'll lose level, and that, in turn, results in more hiss.

For a few upmarket tips on recording speech, check out the article 'Recording the Spoken Voice' that appeared in our January 1997 issue. ❑

ALESIS

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The Alesis Nano Series is growing. The NanoCompressor is an incredibly affordable yet sonically powerful solution for full featured stereo compression. Professional features include complete compression controls, RMS and peak signal detection, hard and soft knee curves and a sidechain input.

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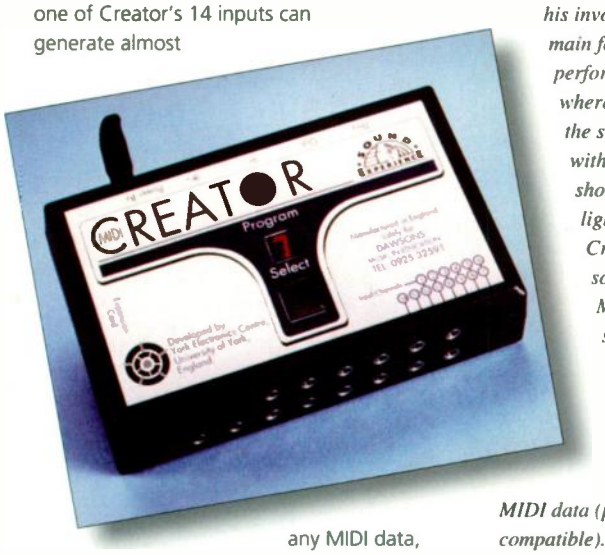
Crosstalk

Keeping Out of Touch

With reference to the discussion of non-contact controllers in last month's Crosstalk, I would like to bring your attention to Sound Experience's MIDI Creator and Gesture. I have used both these devices in professional theatre performances and in interactive music sculpture installations and can testify wholeheartedly to their usefulness and cost-effectiveness. MIDI Creator was developed at The University of York and is distributed by Dawson's Music in this country.

The essential beauty of Creator lies in in the ease of connectivity with the system, which uses extremely cheap sensors: for example, a £1.20 light-dependent resistor plugged into one of Creator's 14 inputs can generate almost



any MIDI data, simply by varying the light falling on the sensor. Any device or component that has a variable resistance can connect to Creator to produce MIDI output. Another example could be two pieces of conductive foam — the type used to pack electronic components, and usually thrown away — which, sandwiched together, make a wonderful pressure sensor. Gesture is an ultrasonic sensor which simply plugs into one of the Creator's inputs, and offers a range of up to three metres.

Mark A Bromwich
Studio Manager
University of Huddersfield

Derek Johnson replies: *We're more than happy to give this system a plug; as Mark notes, the MIDI Creator is capable of using almost anything as an input, and the start-up costs for the system are actually quite low — £379 for the MIDI Creator controller. The Gesture ultrasonic sensor costs £259, and for those of you who want to customise the system, there's Windows-based software, together with an expansion card, for £129.*

MIDI Creator has two points in common with the SoundBeam mentioned in last month's Crosstalk: it needs to be attached to MIDI hardware of some kind in order to produce sound; and it's found a particular niche in the special needs world, where individuals who otherwise wouldn't be able to interact with instruments can excercise some form of musical control, no matter how limited their movement. The system also has particular relevance to experimental musicians and dancers, performance artists and the creators of interactive installations; a visit to Mark Bromwich's personal web site (http://www.hud.ac.uk/schools/music+humanities/music/navigatorfront.html) provides plenty of details of his involvement with the technology. The main focus of Mark's site is on a performance piece called The Navigator, where two MIDI Creators are used to turn the stage into an interactive musical set, with the performers driving the whole show — including music, effects and lights. In this instance, the MIDI Creators are interfaced to a sophisticated MIDI rig that includes a Mac computer, MIDI controllers, synths, samplers and MIDI Show Control hardware and software.

The basic MIDI Creator unit offers eight preset programs, which configure the 14 inputs in various ways, and generate a wide range of MIDI data (patch changes are General MIDI-compatible). There is a surprising amount of variety in these basic configurations, and a good selection of switches and proportional sensors can be supplied in various formats, including mercury tilt switches, capacitance detectors, light sensors, and so on. But you're not restricted to off-the-shelf components: users with basic electronic knowledge and soldering skills can build sensors from scratch, since instructions, technical data and wiring information are supplied in the manual. Using the optional software and expansion card allows the user to customise the system further. Further details can be obtained from Dawson's Music, 65 Sankey Street, Warrington WA1 1SU. Tel: 01925 632591; fax: 01925 417812. You can email them at proaudio@dawsons.co.uk, or visit their web site at http://www.dawsonsmusic.demon.co.uk.

The world of alternative controllers doesn't even begin to end here. Using Mark Bromwich's web site as a jumping off point, we found a link to STEIM (Studio for Electro Instrumental Music), Amsterdam's state-funded electronic music studio. STEIM has a very definite live performance bias, and the facility offers research residencies, assistance with custom software and instrument design, studio facilities and other forms of support to composers of experimental music. The creation of unconventional instruments and the adaptation of existing ones to fit new ideas are part of STEIM's daily work, and they are able to offer expertise when it comes to working with embedded microprocessor systems, DSP, and hybrid analogue/digital designs.

Various bizarre controllers have been developed at STEIM, including Michel Waizvisz's Hands and Ray Edgar's Sweatstick, and the institute are also behind various software packages. LiSa *(Life Sampling) is a real-time audio manipulation environment that runs on a Power Mac and uses the machine's 16-bit AD/DA converters to turn the computer into a versatile audio sampling machine, able to generate up to 16 voices on a PPC604-equipped Mac. Complete program control is possible via MIDI, thus allowing the user to work with this system in a performance environment.* Lick Machine, *for Mac or Power Mac, is a so-called 'MIDI Performance Machine' that offers the facility to record and manipulate many short sequences (licks) in response to a range of performance parameters. Lastly,* BigEye *is a video-to-MIDI package that has been designed to take real-time video information and convert it into MIDI messages. It runs on any Mac with System 7 or later, with QuickTime 1.6 and the Apple MIDI Manager or OMS; it's available in both 68000 and Power PC versions and supports all QuickTime-compatible video digitisers. Demos of all three packages are downloadable from STEIM's web site (http://www.dds. nl/~steim/index(eng).html), and each costs the equivalent of US$199 in your local currency. Contact STEIM at Achtergracht 19, 1017 WL Amsterdam, Holland. Tel: 00 31 20 622 8690; fax 00 31 20 626 4262; email steim@xs4all.nl.*

Two other sites were also found as a result of browsing Mark's page: the Troika Ranch (http://www.art.net/studios/performance/dance/troika_ranch/troikahome.html, or email troika@art.net), a New York-based dance company, have a lot to say about using electronics. Sensors worn by the dancers transmit information which is processed by a computer to provide control over synthesizers, lighting, digital audio effects, video and robotic set pieces. A peek at Troika Ranch's 'geek page', for those interested in the technological side of their work, leads the browser to Dan O'Sullivan's Physical Computing home page (http://www.itp.tsoa.edu/~alumni/dano/physical/physical.html). Here you'll find all you need to know about rolling your own sensors. This page is a virtual textbook of hard data that also manages to be fun; novices get basic electronics information, and there's loads of circuits and advice, all illustrated with idiosyncratic pictures. ❑

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- **All inputs & outputs fully balanced** (except RCA tape inputs & outputs).
- **Each channel** has rear panel XLR mic & TRS line in jacks, insert with separate send & return (balanced), & direct out.

Phantom Power switch & LED. DC phantom power is supplied separately to each mono channel.

Trim Control. –20dB to 40dB line gain, 0dB (Unity) to 60dB mic gain. (Mono chs.)

Polarity switch.

Aux sends 1-4 level controls & pre/post switch. Separate level controls for each Aux. Pre/post switch for Auxes 1-4 selects pre-fader/pre-EQ or post-fader/post-EQ operation.

Aux sends 5-8 level controls & pre/post switch. Again, separate level controls for each of Auxes 5-8. Different, though, is the pre/post switch. On Auxes 5-8, you can select pre-fader/post-EQ or post-fader/post-EQ.

12kHz Hi Shelving EQ. ±15dB of boost/cut.

Hi Mid EQ. Sweepable from 500Hz to 15kHz, with a 1.5 octave bandwidth. Separate controls for ±15dB boost/cut and frequency. (Fixed at 3kHz on stereo aux return channels.)

Lo Mid EQ. Sweepable from 45Hz to 3kHz, with generous 1.5 octave bandwidth. Separate controls for ±15dB boost/cut and frequency center. (Fixed at 800Hz on stereo aux return chs.)

80Hz Lo Shelving EQ. ±15dB of boost/cut.

EQ In switch.

Low Cut Filter. Sweepable from 30Hz to 80Hz, 12dB/octave. (Fixed at 150Hz on stereo aux return channels.)

Constant-loudness Pan control. For consistent signal level across the stereo panorama, whether it's cranked hard left, right, or center.

Mute button and LED. Mutes channel and all aux sends. LED lights when channel's in mute, as well as when it's being muted or previewed by Ultra Mute™.

Submix 1-8 assign switches. Assign a channel to any or all of the 1-2, 3-4, 5-6 and 7-8 submixes.

L-R & Center assign switches. Ditto for L-R and Center mixes.

100mm log-taper channel fader. New logarithmic faders provide consistent fades throughout their travel, and feature a dust-shielded super smooth design.

Solo button and LED.

- **Center-mounted master section** includes fader link L/R switch, center master fader, center solo + LED, L&R/L-R master level faders, L&R solo switches + LED indicators.
- **Independent L/R/Center bus assignment.**
- **On-board snapshot group muting** with external computer control capabilities.
- **12x4 matrix mixer** w/Center, L & R input controls, matrix mute button + LED, matrix master level control, and matrix solo + LED.
- **40 (or 56) mono channel strips** with Mackie's renowned high-headroom/low-noise discrete mic preamps, polarity switches & sweepable 30–800Hz low cut (high pass) filters at 12dB/octave.
- **Flip switch** for stage monitor applications exchanges the master control of any selected aux send with the corresponding subgroup fader and routes the aux send to the sub insert jacks, slide master fader, "Air" EQ, and balanced output connectors.
- **UltraMute section** has 99 mute groups and 99 snapshots capability, mute select switch + LED indicators, Store/Preview/Snapshot/Clear/Do It switches + LEDs, 10-unit snapshot indicator, group indicator, Mode/Up/Down switches.
- **Talkback section** includes talkback mic input (phantom powered), assign switches for Matrices A-B-C-D/Aux 1-4/Aux
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shape of things to come

by Derek Johnson

The hard line according to Akai

Akai's MPC series of sampling, sequencing drum pad-equipped workstations continue to be popular with many musicians and producers, so it should come as no surprise that there's been a new addition to the range. The MPC2000, priced at £1199 including VAT, features the familiar bank of 16 pads, with sophisticated transport and editing controls. Standard memory is 2Mb, expandable to a creditable 32Mb using standard SIMMs; a fully expanded machine provides six minutes of mono sampling at 44.1kHz (stereo sampling, naturally, halves this). Many features from the MPC3000 (reviewed *SOS* October 1994) have been retained, including 32-voice polyphony; 16-bit sampling; dynamic low-pass filter and envelope for each voice; and storage of up to 24 drum sets in memory, each containing 64 sound assignments from a common bank of 128 sounds. Improvements on the sampling front include a new Beat Loop function which loops samples and automatically calculates the tempo, the ability to determine the pitch of playback with pad velocity, and a waveform dispay in 'trim' mode. There are no on-board effects, SMPTE or digital audio connections, but all these can be added as options, as can eight individual audio outputs. Expect an *SOS* review soon.

Akai have also announced a few updates for their DR8, DR16 and DD8 digital recorders: the IB809E Ethernet interface (£199), the IB808G general-purpose I/O (£249), the IB-D8MA 8-channel AES/EBU I/O (£349) and IB-D8TDIF 8-channel Tascam TDIF I/O (£249) are available for all three machines; the IB-804AEX 16-channel ADAT board — £399 — will be available for the DR16 only.

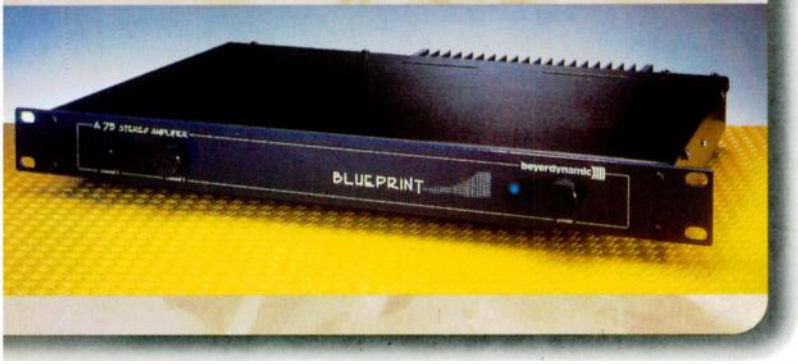
A Akai UK, Haslemere Heathrow Estate, The Parkway, Hounslow, Middlesex TW4 6NQ.
T 0181 897 6388.
F 0181 759 8268.
E sales@turnkey.demon.co.uk
W http://www.akai.com/akaipro/index.html

Beyer's Blueprint for success

When we bring you Beyerdynamic news, it's usually of a new mic or pair of headphones. Not this month: Beyer have launched a new series of power amplifiers, going by the family name of Blueprint. First in the family is the A75, a 1U-high rackmounting stereo amp capable of producing 50W a channel into 8Ω (or 75 watts a channel into 4Ω) and designed specifically for studio monitoring and high-quality sound contracting installations. A large heatsink for convection cooling of all critical semiconductors "ensures optimum performance is maintained at all output levels." Balanced and unbalanced inputs are provided, and speakers are connected via a 4-pole Speakon connector. The A75 costs £410 including VAT.

If you can't bear the thought of a month without some mic news from Beyerdynamic, how about this: Phil Collins, a long-time user of the classic M88 mic, was recently presented with a Classic Limited Edition M88. The M88 Classic has a limited run of 999 and is supplied, as was the original, in a wooden case with individual documentation.

A Beyerdynamic, 17 Albert Drive, Burgess Hill, RH15 9TN.
T 01444 258258.
F 01444 258444.
E sales@beyerdynamic.co.uk



Zobel Prize

Zobel may be a new name to many of you, but the company have an eye on your wallet, especially if you're in the market for a pair of portable, powered near-field studio monitors — and producer Stephen Hague has already beat you to it, with two pairs currently in his possession. The Active One portable reference monitors have been designed specifically for engineers who travel from studio to studio. The monitors are internally tri-amped, and offer two mid/bass drivers and a hand-doped soft-dome tweeter. Zobel claim that the dual mid/bass driver design helps to create a "directivity window", so that the tone stays exactly the same off-axis. The monitors have been built to be honest and unflattering, with maximum clarity and minimum fatigue; frequency response is 55Hz-20kHz, and pairs are carefully matched to within 1dB SPL over the frequency range. Balanced line inputs, together with cables, are provided. Pricing is £1169 including VAT a pair, or £1404 for the producer version with top-quality carry bags.

A Zobel, Unit 8, Brickfields Business Park, Gillingham, Dorset SP8 4PX.
T 01747 820536.
F 01747 826065.
E zobel@fullerton.demon.co.uk
W http://www.fullerton.demon.co.uk/zobel/index.htm

Yamaha score hat-trick at NAMM

Months of rumours from the Yamaha camp have finally ended with the official announcement, at the US NAMM show in January, of three new hi-tech products. First to be available will be the MU90R, a £599 General MIDI/XG sound module. The new rackmount module features 64-note polyphony and 32-part multitimbrality; the sound engine is based on existing technology, as used in XG instruments such as the CS1x, QY700 and MU80. However, there are several changes: in addition to 779 normal voices and 30 drum kits, a Performance memory holds 100 preset and 100 user Performances, 4-voice splits, layers and combinations, while a new effects stage delivers six simultaneous digital effects — that's reverb, chorus, variation, EQ and two insert effects. Via the two quarter-inch jack plugs on the front of the unit the effects can be used to treat an external source, while maintaining complete MIDI control over the effect parameters. Yamaha have also provided the MU90R with a pair of individual audio outputs, in addition to the main stereo out. The rear panel also sports two MIDI Ins and a serial port interface which enables direct connection to Mac or PC-compatible computers.

A few more months away from general availability, but likely to generate even more excitement is the AN1x 10-note polyphonic 'Virtual Analogue' synthesizer. The AN1x uses a new proprietary Yamaha DSP chip — the VOP3 — which is responsible for the 10-note polyphony plus a Unison mode, where two timbres can be combined to produce accurate analogue-style synth sounds. Just like a traditional synth, the AN1x virtually offers two VCOs, ring modulation, noise, two LFOs, PEG, VCF and VCA. The synth engine is complemented by an effects stage which delivers four simultaneous effects with 36 effect types.

On the control front, the AN1x offers eight real-time knobs, a velocity- and aftertouch-sensitive keyboard, an assignable, pressure-sensitive ribbon controller and sockets for up to three foot-control pedals. The control knobs also double as the control surface for a 16-step loop sequencer; each knob can represent a specific beat, and once the beat has been selected the knobs can then control velocity, gate time and control-change values, allowing complex looping patterns to be created and altered in real time. There are 24 preset patterns and memory locations for up to 144 user patterns. The knobs can be further used in the so-called 'Free EG' Mode, where up to 16 seconds of data can be generated by knob movements and recorded in real time; this user-created EG curve can then be applied to a voice. The effect is similar to that available with vector control-equipped instruments such as the SY22 and SY35. However, the AN1x's Free EG allows for four tracks of control data. An on-board arpeggiator — which can transmit arpeggiated events over MIDI — boasts 30 patterns and 10 different tempo subdivisions, while a Key Split mode allows half the keyboard to be arpeggiated, leaving the other half unaffected. The AN1x will be available in the UK from June, with a target price of £999.

One sector of the hi-tech marketplace that has been strangely Yamaha-less for many years is sampling; the company's TX16W of 1988 was highly regarded by many, but was criticised for its rather obscure operating system. Until the cheap and cheerful SU10, released last year, that was it for Yamaha samplers — until now, with the imminent release of the A3000 'Control Sampler'. The basic A3000 is 64-note polyphonic and comes with 2Mb of on-board RAM, two analogue inputs and four analogue audio outs. The RAM is user expandable, with four 72-pin SIMMS, to an extremely respectable 128Mb. Sampling rates include 44.1kHz, 22.05kHz and 11.025kHz via the analogue inputs, and 48kHz, 44.1kHz, and 32kHz with the digital connection option. The new sampler is equipped with three independent effects blocks for sample processing; these processors not only feature traditional reverb, chorus and delay-type effects but special, sample-specific, effects such as real-time timestretch (which can be clocked over MIDI) and 'Lo-Fi' EQ curves. These effects can also be applied to any audio input. The EQ section provides a 4-band EQ system (Lo-pass, Hi-pass, Band-pass and Band-eliminate) along with a parametric EQ which can be applied to each sample.

The 'Control' aspect of the A3000 comes into play with a front panel that contains five multi-function knobs for real-time control and fast editing; four of the five knobs are fully user assignable, so can be used to control any parameters within the A3000 and can also transmit MIDI controller data.

Yamaha have been away from the sampler market for quite a while, which means that a lot of other manufacturers have been able to build up mature sound libraries for users to access. Yamaha have thus wisely given the A3000 the ability to read Akai and Emu samples, as well as computer-based AIFF and WAV files, which can be loaded via the internal DD/HD disk drive or over SCSI.

Other features include an Auto Sequential recording mode wherein the sampler can continuously create isolated samples from an audio phrase sample CD, plus a facility to control an external CD-ROM from the front panel. Options include the AIEB1 I/O board that adds six assignable audio outputs, bringing the total to 10, and also provides coaxial and optical digital in/out, and the ASIB1 SCSI interface. With the SCSI option in place, an internal hard drive can also be installed. Expect the A3000 to debut in June, with a retail price in the vicinity of £1299.

A Yamaha Kemble Music (UK), Sherbourne Drive, Tilbrook, Milton Keynes MK7 8BL.
T Product Info Line 01908 369269.
F 01908 368872.
W http://www.yamaha.co.uk/

The MICS that came in from the Cold

A new range of truly affordable studio condensor mics from Russia is now available, via mail order, in the UK. The Elation 201, priced at £282 including VAT, is said to provide "outstanding clarity and warmth, coupled with impressive tolerance and low noise..." and offers a frequency response of 20Hz-20kHz and a cardioid polar pattern. Hypercardioid, supercardioid and even omnidirectional capsules are available separately, should you require them, priced at £76.37 each. The Elation 201 itself is supplied in a velvet-lined box, complete with mic stand clip.

A Mytex UK, 122 Wigmore Street, London W1H 9FE.
T 0171 486 6337.
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SOS can be reached on CompuServe; our email address is 100517,1113.

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shape of things to come

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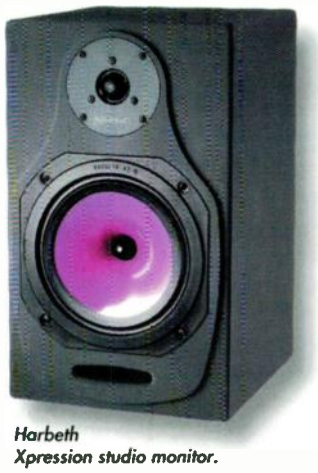
Turnkey take on the world!

This is a busy month for Turnkey: the most interesting news follows our announcement of the new Quasimidi Q309 Rave-O-Lution sequencer/sound source last month. For quite a while, potential customers interested in Quasimidi products have had to go direct to Germany, but now you can stay in the UK, because Turnkey have been appointed distributors in this country for Quasimidi products. Apart from handling the established product line, Turnkey have now been able to set a price for the Q309: £649 including VAT. Watch this space for the exclusive *SOS* review.

Turnkey have also been appointed UK distributors for the Bellari range of valve-based dynamics processors. The range includes:

- RP583 dual-channel stereo compressor limiter.
- RP533 mic preamp, compressor and exciter.
- RP562 stereo aural exciter.
- RP520 dual-channel studio mic preamp.
- ADB3 stereo tube DI box.
- MP110 direct-drive mic preamp.

The Bellari range claims to bring the quality sound of pro valve gear to "the rest of us": prices range from £129 to £499 including VAT, with the RP583 stereo compressor/limiter weighing in at £499 and the RP562 aural exciter costing just £299.



Harbeth Xpression studio monitor.

Turnkey have also been appointed exclusive central London dealers for the Turbosound range of sound-reinforcement products, and can also supply Harbeth Acoustics' Xpression Studio Monitors. Harbeth Acoustics are perhaps better known within TV and radio circles, but their new DPM1 near/midfield monitor "achieves a crystal clear and dynamically accurate sound and performance that is normally only associated with active monitors costing many times the price". The DPM1's cabinets are constructed from seamlessly-welded MDF, providing a rigid, low-resonance platform for the drivers. Low and mid frequencies are entrusted to an 8-inch injection-moulded polymer driver, with high frequencies handled by a large-diaphragm 28mm tweeter; a matched subwoofer is also available. Price is £379 including VAT.

New from an established Turnkey range is Waldorf's Xpole (£439), a dual-channel, fully programmable analogue filter/VCA module which includes two cascade filters, both of which can be modulated separately. It boasts two VCAs for processing either a stereo or two independent mono signals, and the input stages can be overdriven to give additional bite to the processed sound. As with the successful 4-Pole analogue filter, edits can be stored to a computer via MIDI. Other features include: two ADSR envelopes per filter with multiple trigger modes; two LFOs with sine, triangle, sawtooth, pulse, and sample & hold; two 4-unit modulation matrices; two CV inputs; and two trigger/gate inputs.

Waldorf Xpole.

Bellari RP583.

A Turnkey, 114-116 Charing Cross Road, London WC2H 0DT.
T 0171 379 5148.
F 0171 379 0093.
E sales@turnkey.demon.co.uk
W http://www.turnkey.uk.com

Our feature on library music, which appeared in the February issue of *SOS*, stated that the composer of the *Match of the Day* theme tune earns a "six-figure" sum in royalties every year. It's actually the composer of the *Grandstand* theme who's blessed with this annual income; the *Match of the Day* composer just *wishes* he was! Apologies to everyone concerned for the mix-up.

Drummer Omar Hakim, who has spent three years with Weather Report, two years with Sting, recorded with Miles Davis and David Bowie, and toured with Madonna, has chosen a TL Audio VI1 8-channel valve interface to add warmth to digital recordings made in his own New York studio. "The VI1 is the absolute best hardware solution for warming up the digital signal path. It's wonderful on drums, bass and vocals as well." Hakim also uses the optional VIS switcher unit, which "makes the system even more convenient!"
T 01462 490600.

Following many years of support for the Macintosh range of computers as a platform for MIDI, audio and video pursuits, TSC are moving into the PC market, and can now offer a range of packages to suit all applications.
T 0171 258 3454.

A new UK-based manufacturing company, RED Sound Systems, has recently been formed by Brian Nunney (formerly of Roland UK) and Novation co-founder Mark Thompson. The new company plans to market a range of "innovative products for the music/DJ industry", with the first release due in June of this year.
T 01494 429321.

Korg have released v2.0 software for the Trinity workstation. New features include the ability to audition sounds when selecting by category, enhanced MIDI track solo functions, compatibility with Akai S3000 sample data and S1000/S30000 CD-ROM libraries, compatibility with WAV files and a free recording time display.
T Brochure Line 01908 857150.

606: Box of Tricks

Symetrix's 600 series of digital processors has just grown by one with the addition of the 606 Delay FX Machine, introduced at the recent NAMM show. The 606 merges 'vintage' controls with state-of-the-art features: rotary knobs allow live function adjustment and eliminate hidden menu scrolling. Control is provided over delay, delay time diffusion, filter, feedback and room simulation. MIDI control is available for all the 606's parameters, and echos can be sync'd to MIDI clock. Two separate delay sections allow signal processing in either stereo, dual mono or series mode. Six separate modulation sections are available for use with either delay section, or both. On a technical level, the 606 features 20-bit convertors and 24-bit internal processing, balanced ins and outs and an internal power supply.

A Fuzion plc, 2 Lyon Road, Walton-on-Thames, Surrey KT12 3PU.
T 01932 882222.
F 01932 882244.

We made the console,

...you wrote the ad.

- "I just sold my Mackie 8-bus and purchased the new Ghost console. The difference is amazing. The Ghost is the warmest sounding board I've ever used." - Mike Perkin (The Lab Recording Studio, Emmaus, Pa)

- I replaced a console that was more than 3 times the price, and got a quieter, more transparent, and sweeter sounding console! Big console feel, with an amazing price!" - Kurt Bevers, Brownell Sound, Oregon.

- "An incredibly musical console, ultra flexible with a real usable EQ. It is absolutely the best sounding project studio board that I've heard". - Howard Givens, Spotted Peccary Studios."

- "I love the desk, the EQ is just marvellous. Ghost is the best 8 bus recording desk on the market." - Lee Hamblyn, Engineer.

- "Intuitive handling, flexible routing, great Soundcraft sound." - Melvin Fernandes, Recording Engineer, CMM Studios, India.

- "I use the Ghost for several radio shows doing live performances. The EQ is amazing, I'm on air in 5 minutes! Doing dance stuff is one, doing live stuff is another. But I use only one board for both of them, The Soundcraft Ghost." - Barney Broomer, Sonic One Rotterdam.

- "Base of operation and the numerous in-line inputs for my synthesizers and samplers is why I purchased the Soundcraft Ghost console." - says President of Saban Entertainment and producer of Mighty Morphin Power Rangers Shuki Levy.

- "I didn't know how useful mute groups could be and how good the EQ had to be until we used the Soundcraft Ghost." - Stefaan Windey, La Linea Musicproductions b.v.b.a., Belgium.

- "It sounds great and the EQ is very precise which makes it very easy to pin-point the frequencies I need to work on. Ghost enables me to finish mixes on the console at home, without having to use any other studio." - Phil Kelsey (Remix Engineer)

- "The console is very user-friendly and is constructed so well that it can easily withstand the rigors of even the most hectic of production schedules." - Corey Dissin, Producer at Paul Turner Productions.

- "Both myself and our Production Director Jeff Thomas used the console for PowerStation and were equally very, very impressed. For the money, the console is fantastically versatile, has good headroom and a very impressive EQ." - Alex Lakey (Engineer for PowerStation)

Ghost

"Let us know what you think about the Soundcraft Ghost by visiting our web site at **http://www.soundcraft.com** or via e-mail to **info@soundcraft.com**"

SOUNDCRAFT, HARMAN INTERNATIONAL INDUSTRIES LTD., CRANBORNE HOUSE CRANBORNE RD.
POTTERS BAR, HERTFORDSHIRE, EN6 3JN, UK TEL: +44 (0)1707 665000 FAX: +44 (0)1707 660742
SOUNDCRAFT US, HARMAN PRO NORTH AMERICA, INC., AIR PARK BUSINESS CENTER 12, 1449 DONELSON PIKE
NASHVILLE, TN 37217, USA TEL: 1-615-399-2199 FAX: 1-615-367-9046

Soundcraft

H A Harman International Company

shape of things to come

The Win Bin

In the July, August and September 1996 issues of *SOS* we ran a competition for new or renewing subscribers, with a Tascam 488 MkII Portastudio as the rather tasty prize. The lucky winner is Oxfordshire-based Bill Tustain, who was apparently just sitting down with a copy of *SOS* to choose which cassette multitracker to buy when he received our call with the good news. Bill, who can be seen in the photo sitting next to his trusty Atari computer, is a big Kurzweil fan, and manages to scrape a living playing in a covers band. Next purchase? A sync box so that he can integrate the audio tracks from the 488 MkII with his software sequencer.

Speaking of competitions, we also recently drew the winner for the Audio Technica 6-pack mic competition which ran in our June 1996 issue. Come on down, Dave McCourt of Liverpool (above), it's your lucky day! Thanks to all who entered, and to Tascam (01923 819630) and Audio Technica (0113 277 1441) for donating the prizes.

Another synth, another planet

Emu Systems, which celebrates its 25th anniversary this year, has launched two new sound modules. Planet Phatt (sub-titled 'The Swing System') is aimed squarely at the dance market and offers 16-part multitimbrality, 32-note polyphony, 640 presets, 17 different 6-pole filter types, MIDI-sync'd LFOs and an enhanced Beats Mode, a version of which first appeared on the Orbit the Dance Planet module. The new Beats Mode now features 100 drum loops that can be synchronised to internal or external MIDI clock; there are 28 user songs and 28 factory songs available, and a new transpose feature (called X-Factor) allows new Beats to be created around a single drum loop.

Version 2 of the aforementioned Orbit has also just been released by Emu. Planet Phatt's enhanced Beats Mode is included, as are 128 more presets (for a new total of 640) and new filter and re-trigger functions. Existing owners shouldn't panic: original Orbits can be brought up to v2 spec with a user-installable upgrade.

Yet another upgrade comes in the shape of the v2.0 software for Emu's Darwin digital audio disk recorder. The new software provides full support for the Darwin's new SMPTE and DSP option cards, while adding more software features. The DSP option card, in conjunction with the v2.0 software, offers facilities such as time stretching, pitch change, and gain/fade control. The v2.0 software additions, many of which were suggested by users, include the ability to control the Darwin's internal digital mixer via MIDI controllers and a new auto-record option. Improvements to S/PDIF transfers and audition modes have also been made.

One particular surprise from the Emu camp is that the company have become the exclusive distributor for KAT electronic percussion products.

A Emu UK, Suite 6, Adam Ferguson House, Eskmills Park, Musselburgh, East Lothian EH21 7PQ.
T 0131 653 6556.
F 0131 665 0473.
W http://www.emu.com

SPIRIT DEALER LIST

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ALTRINCHAM	Concert Systems	0161-927 7700
BARNET	Digital Village	0181-440 3440
BARNSTAPLE	Soundpad	01271-23686
BELFAST	Marcus Music	01232-322871
BINGLEY	Spectre Sound	01274-568843
BIRMINGHAM	Musical Exchanges	0121-236 7541
BIRMINGHAM	Q Music	0121-643 4655
BIRMINGHAM	London Microphone Centre (LMC)	0121-359 4535
BLACKPOOL	Tower Music	01253-27359
BOURNEMOUTH	Eddie Moore's Music Ltd	01202-395135
BRIGHTON	Rainbow Sound	01273-624048
BRISTOL	X Music	0117-9734 734
BURNLEY	Dawsons Music	01282-425829
CAMBRIDGE	Music Village	01223-316091
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CARLISLE	AVI	01228-45599
CHESTER	Dawsons Music	01244-348606
COLCHESTER	Axe Music	01206-765 652
CORK	Russell's Music	00353-21 273 912
COVENTRY	Musical Exchanges	01203-635766
CREWE	Music Control	01270-883779
DERBY	Play It Again Sam	01332-348156
DONCASTER	Electro Music Services (EMS)	01302-369999
DOUGLAS	Ken Mitchell Music	01624-611919
DUBLIN	Control Techniques Ireland (CTI)	003531-4545400
DUNDEE	Sound Control	01382-225619
DUNFERMLINE	Sound Control	01383-732273
EASTBOURNE	Bonners Ltd.	01323-639335
EDINBURGH	Sound Control	0131-557 3986
EDINBURGH	The Warehouse	0131-555 6900
EARLHAM	The Audio Connection	01329-235566
GLASGOW	The Warehouse	0141-950 1757
GLASGOW	Sound Control	0141-204 0322
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LEICESTER	Carlsbro	0116-2624183
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LONDON	Turnkey	0171-379 5148
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LONDON	The Synthesizer Company (TSC)	0171-258 3454
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MANCHESTER	Sound Control	0161-877 6262
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PETERBOROUGH	B&H Sound Services	01733 223 535
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STEVENAGE	Music Solutions	01438-750751
ST.HELENS	Dawsons Music	01744-730424
ST. HELIER	East Coast Music (ECM)	01534-80575
STOCKPORT	Axis Audio Systems	0161-474 7626
STOCKPORT	Dawsons Music	0161-477 1210
STOKE-ON-TRENT	Carlsbro Academy of Sound	01782-205100
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WIGAN	M A Amplification	01257-426923
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SPIRIT By Soundcraft

Absolute Power

SPIRIT

THERMAL POWER PROTECT

Absolute 4P Active

PROFESSIONAL ACTIVE MONITOR SYSTEM

Integral HF and LF 100W amplifiers

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True Phase Linear System

Absolute 4P

£799*

PROFESSIONAL MONITOR SYSTEM

100 Watts RMS/8Ω

50Hz – 20kHz [+2dB/-3dB]

High Definition Design

Full Magnetic Compensation

Bi-Wirable

Absolute 2

£272*

COMPACT MONITOR SYSTEM

95 Watts RMS/8Ω

60Hz – 18kHz [+1dB/-3dB]

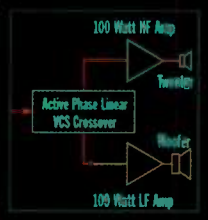
High Definition Design

Absolute Zero

£206*

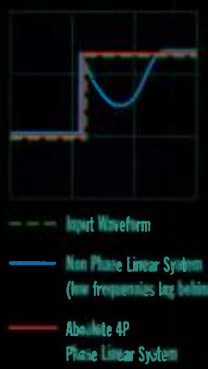
*UK RRP per pair including VAT

At just £799 a pair*, Spirit's new Absolute 4P powered monitor has no comparable peers.



At the heart of Absolute 4P is a true phase linear active VCS crossover that completely eliminates phase delay and low frequency lag, so that on- or off-axis listening becomes a joy, not a chore.

The name 4P is explained by four 100 Watt power amplifiers driving the first active monitors in the Absolute range. Each is precisely tuned to the tweeters and woofers which means smooth recreation of source signals with almost nil distortion, even at high SPLs. The drivers are actively monitored by a "music signal friendly" protection circuit that progressively limits very high signal levels but allows transients through, so you can drive Absolute 4P to the limit.



Words won't tell you just how good Absolute speakers sound - only your ears can. Visit your Spirit stockist today and experience Absolute Power for yourself.

They said it, not us...

Since its launch, the Absolute Monitor Series has won praise from reviewers and users alike. Here are just a few examples:

"This (Absolute 2) is a very good monitor, and simply has to be auditioned"
The Mix

"A surprisingly well extended bottom end, and fairly clean with it – not at all bad for the money!"
Absolute 2, Audio Media

"The power handling is spectacular and they sound great at high volumes"
Rating: 80% overall
Absolute Zero, Future Music

"Lovely transparent sound and a great bass response" (Absolute 2)
James Reynolds
Engineer

"The Absolute 2s are really good to work with - they let me hear what I want to - they have an excellent, transparent sound and a great bass response"
Tony Taverner
Producer/Engineer

"The Absolute 2s combine a neat bottom end with an attractive, curvaceous top"
John Leckie
Producer

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http://www.spirit-by-soundcraft.co.uk

I'm power hungry.
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Absolute 4P ☐ Absolute 2 ☐ Absolute Zero ☐ The Range ☐

Name: .....

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.....

What will you use your speakers for? .....

What magazines do you read? .....

SOS

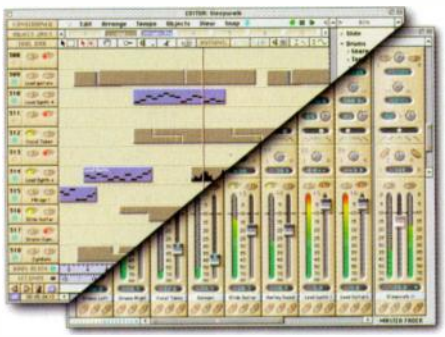
shape of things to come

Ensoniq's PARIS Match

The PARIS hardware control surface.

New from Ensoniq is PARIS, the Professional Audio Recording Integrated System. PARIS is a cross-platform 128-track 24-bit disk-based digital recorder. Using Ensoniq's EDX1000 PCI card and a cross-platform CD-ROM loaded with software, MacOS or Window 95/NT users will have access to an expandable audio recording, editing, mixing, and processing environment. The PARIS software provides an "intuitive and highly responsive graphic interface" for the system's integral automated 128-track digital mixer, complete with dynamics processing, 4-band parametric EQ, auxiliary sends and real-time effects, including reverb. A plug-in architecture supports third-party development of additional effects and software; PARIS also supports the use of multiple cards to further extend real-time processing power and input/output capability.

The EDS1000 is equipped with connectors for an expandable I/O system and a dedicated hardware control surface, which "dramatically improves user ergonomics by providing immediate physical access to all of the most important control features." Features include 16 channel faders; a master stereo fader; rotary controls for EQ, aux sends, pan and control-room monitor level; a high-resolution jog/shuttle wheel; transport controls with autolocate; numeric keypad; and mute and solo buttons. Input/output options include a basic 2-channel external audio interface, as well as an expandable modular mainframe. The mainframe's basic configuration provides a set of analogue and digital connections, as well as video and word clock synchronisation, plus expansion slots for a range of modules that will include analogue I/O on XLR and TRS jacks, S/PDIF and AES/EBU, ADAT optical and Tascam TDIF digital options, and SMPTE timecode.



PARIS software.

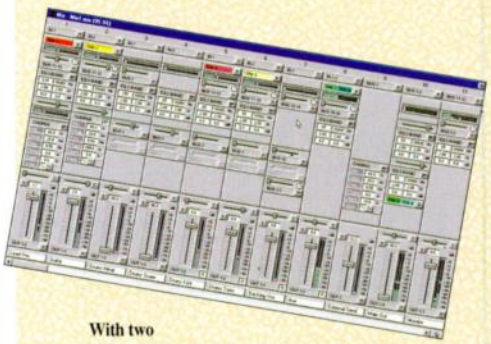
No-one could accuse Ensoniq of flooding the market with signal processors: first, back in 1992, the company released the DP/4, which had the potential to be configured as four individual processors, then there was the DP/2 (essentially half a DP/4), and then came an upgraded DP/4. Now Ensoniq are finally launching a brand-new unit, the 24-bit DP/Pro true stereo effects processor. The DP/Pro is powered by two of Ensoniq's new ESP-2 digital signal processors running at sample rates of up to 48kHz, with a dynamic range of more than 100dB. The new machine is equipped with high-resolution 20-bit converters and low-noise circuitry, and can be upgraded with a user-installable professional 24-bit digital I/O option supporting both S/PDIF and AES/EBU formats. The convertors can also be upgraded: the ADC-24 convertor kit, not yet available, will provide a complete 24-bit analogue input/output path.

The DP/Pro offers more than 35 custom algorithms, which deliver "dense and sophisticated reverbs, accurate and flexible delays, smooth and warm compression, sweet and rich chorusing, wild and growling flangers, swirling phasers, intuitive pitch shifters, plus expanders, gates, de-essers, equalisers, limiters, filters, tremolo, vibrato, and several Ensoniq exclusive algorithms". There are 128 factory presets on board, plus room for 256 user effects. The front panel of the 1U device offers two displays and 20 clearly-labelled buttons; audio connections are available on both XLR and balanced jack sockets.

A Key Audio Systems Ltd, Unit D Chelford Court, Robjohns Road, Chelmsford CM1 3AG.
T 01245 344001.
F 01245 344002.

Soundscape widens Horizons

Soundscape Digital Technology have released version 2.0 software for their SSHDR1 digital audio recording and editing system. This 32-bit operating system expands the SSHDR1 with new software and DSP technology, and currently runs under Windows 95, although plans are afoot for an Windows NT version. Note that the SSAC-1 Accelerator Card (retrofittable to older systems and featuring extra inputs and outputs) is required to run version 2.0, and increases the number of playback tracks to 12 per unit (with recommended drives). The new mixer page has a user-definable routing/channel structure with configuration presets that can be saved to disk. Each channel can have any number of real-time processes running (EQ, compressor, reverb, and so on) limited only by the available DSP processing power. In fact, you can have as many mixing channels as you need, with internal busses and effects processes, and external aux send loops, all using the original 2-in/4-out facilities of the SSHDR1, plus the Tascam DA88-compatible 8-in/out TDIF port on the SSAC-1. The number of ins and outs could be further expanded using the new SS8IO-1 analogue/digital interface which connects to the SSAC-1's TDIF interface.



With two units, the TDIF connection on the SSAC-1 allows eight channels of audio to be interconnected, meaning that audio from one unit could be routed through the real-time effects on the other and then back into a mix, making full use of both DSPs; new for 1997 will be real-time effects algorithms from third-party vendors. The accelerator card also includes an expansion port which connects to a 512-channel external audio buss from a 3U expansion chassis. The expansion chassis will allow multiple units to be connected together to form bigger systems and multiple DSP and I/O cards to be installed for increased mixing capability and effects-processing power. Punch in/out recording is featured in v2.0, as are a MIDI tempo map and play looping; several other software improvements requested by existing users, including general editing and user interface additions, will appear throughout 1997.

A Soundscape Digital Technology Ltd, Crichton House, Mount Stuart Square, Cardiff Bay, Cardiff CF1 6DR.
T 01222 450120.
F 01222 450130.

SOS can be reached on CompuServe; our email address is 100517,1113. Our full Internet address is 100517.1113@compuserve.com.

“a stunningly powerful monophonic analogue synthesizer....

...the best I've ever owned.”

Paul Nagle SOUND ON SOUND

Paul Nagle is a seasoned writer, producer and self-confessed synth-fanatic, as well as being a respected industry journalist. He's owned or used a huge list of synths, including the obligatory Minimoog, so he was well placed to evaluate the latest machine from Waldorf's famous stable:

“tremendous bass end”

The Waldorf **Pulse** features 3 analogue oscillators, each of which deliver square, triangular and saw-tooth waveforms. You can modulate the square wave's pulse widths separately for each oscillator, as well as synchronise and cross-modulate oscillators and then mix with the noise generator.

“direct control of every patch parameter via MIDI”

You can manipulate every parameter via MIDI controllers, allowing you to record “live edits” into your sequencer.

“two fast, snappy envelopes”

For modulation, 2 ADSR envelopes and 2 LFOs are available, with LFO1 featuring sine, triangular, saw tooth, square and sample + hold waveforms. There are 18 internal modulation sources eg: LFO1, LFO2 + modulation wheel, Envelope 1, Velocity, Pitch Follow.

“Integrated arpeggiator with MIDI clock synchronisation”

The 10 octave range arpeggiator is selectable from whole to 32nd notes, with triplets and dotted values. There are 16 preset pattern variations and both note and MIDI clock data are sent via the MIDI out. All settings are memorised on a patch-by-patch basis.

NEW PULSE PLUS FEATURES

PULSE PLUS has all the features of the Pulse, with 2 great new additions:

The comprehensive CV/GATE interface with 8 parameters to fine tune control all but the most obscure old synths. A discrete MIDI channel can be assigned so that it can be addressed independently of the Pulse.

The audio input allows external signals such as another synth, guitar or even voices to be routed through the excellent filter and amplifier sections.

It is possible to vary the signal level dynamically via MIDI, as well as move around in the stereo field via the twin outputs.

Pulse SYNTHESIZER

PULSE
NEW LOW RRP
£499.95

waldorf

PULSE PLUS
RRP
£699.95

Pulse SYNTHESIZER

For further details contact **ARBITER GROUP PLC** Wilberforce Rd. London NW9 6AX Tel: 0181 202 1199 Fax: 0181 202 7076 Web site: http://www.demon.co.uk/arbiter

shape of things to come

Peavey's Double Bass

Peavey have introduced the Spectrum Bass II, an enhanced version of their dedicated bass sound module. Features include 12-voice polyphony (with 24 oscillators), 4-part multitimbrality, 192 presets and 64 programmable patch locations. All manner of bass sounds are included, from bass guitar (fretted and unfretted, picked, fingered or slapped) to acoustic bass, plus many analogue and digital synth basses. The Spectrum Bass II also features an improved synth engine, with additions such as multiple filter types with resonance (including 2-pole low-pass, 4-pole low-pass, band-pass and high-pass), hard sync, oscillator offset, portamento and legato. Patches can edited with a variety of computer-based editing software, or using Peavey's own PC1600 MIDI controller. The Spectrum Bass II is expected to retail at around £350 including VAT.

A Peavey Electronics Ltd, Great Folds Road, Oakley Hay, Corby, Northants NN18 9ET.
T 01536 461234.
F 01536 747222.
W http://www.peavey.com

HHB get Sony!

As you might already have gathered from the contact details appearing at the end of last month's exclusive review of the new Sony MDMX4 MiniDisc 4-track recorder, HHB Communications have been appointed sole UK distributor for a range of Sony Professional Audio products. In addition to the MDMX4, the distribution arrangement includes Sony's DPSV77 multi-effects processor, the CDLP3 pro CD player and three pro DAT machines — the DTCA6, DTCA7 and DTCA9. HHB have had a long association with Sony digital products, going back to PCM F1 systems and the dawn of DAT. Other, non-digital, products covered by the new deal are the SMS1P 15W self-powered monitors, the SRPE100 graphic EQ and three pairs of headphones (the MDR7502, MDR7504 and MDR7506).

A HHB Communications Ltd, 73-75 Scrubs Lane, London NW10 6QU.
T 0181 962 5000.
F 0181 962 5050.
E sales@hhb.co.uk
W http://www.hhb.co.uk

Book 'em, Danno

The new *Showcase International Music Book* for 1997 has grown to 544 pages, with several new sections, including regional chapters for South Africa and Australia. Another new feature is the inclusion of web sites and email addresses for entries, where available; links to advertisers' web sites can be found on Showcase's own site (http://www.showcase-music.com); and keeping up with the hi-tech '90s, the company will release the guide on CD-ROM in April. The exhaustive listings include sections for concert venues, equipment, recording services, and business services including agencies and management. The *Showcase* guide is available from *SOS* Bookshop, order code B192, priced at £35 plus p&p.

John Braheny's *The Craft and Business of Songwriting* is a workbook full of songwriting advice, music business tips and anecdotes, examples and exercises. Generating ideas, arranging, dealing with publishers, and many other topics are dealt with in the book's 322 pages. It costs £14.99 plus p&p; please quote order code B339 when ordering and check our mail order pages for postage rates.

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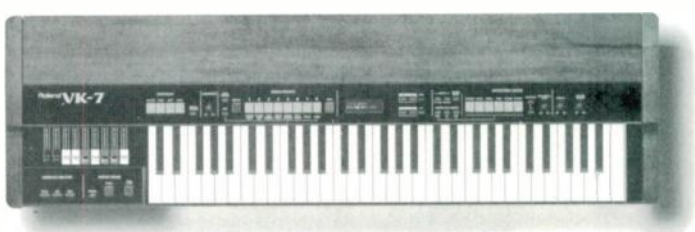
Roland's Victory Vs

The steady flow of major additions to Roland's product line shows no sign of abating: the rumour mill turned up both the JP8000 (full review this issue) and JV2080 sound module a few months ago, and the Sound Canvas range has had a shot in the arm with the powerful, yet accessible, SC88 pro (also in this issue), but the recent NAMM show in the States saw several other launches. For a start, there's the V-Drum system, which hopes to do for drums and drum sounds what the VG8 V-Guitar did for guitars last year. The V-Drum system, which uses Roland's COSM (Composite Object Sound Modelling), consists of a choice of 'basic' or 'pro' kits built from a range of pads (also available separately) plus the TD10 percussion module and stand. The module offers 56-voice polyphony and uses sophisticated modelling technology to imitate the way various materials would behave as drum heads, as well as how those materials would behave at various points on their surface and at different velocities. The TD10 also has a built-in 8-track sequencer, 12 stereo triggers, eight output jacks configured as four stereo pairs, a hi-hat control jack, a wave expansion board for future expansion, and a memory card slot. Incidentally, the pads themselves were developed in conjunction with percussion specialists REMO Inc in the States.

Roland's new Virtual ToneWheel technology is at the heart of the new VK7, a 61-note combo organ simulation that also uses COSM technology to simulate rotary speakers and tube-amp distortion. In addition to a wide range of organ presets, there's a collection of 'orchestral' voices, plus eight user presets. The virtual tonewheels are in constant oscillation, and nine 'harmonic bars' are available, together with key-click noise, vibrato effects and 'leakage' sounds; interestingly, the keyboard offers *full* polyphony.



The new MBD1 bass and drums module and SR-JV80-10 bass and drum expansion board for XP- and JV-series instruments both offer the same sound set, configured slightly differently: it's a new collection of bass and drum samples provided by name players such as John Patitucci, Marcus Miller, Abraham Laboriel, and Bob Wilson. The module allows users to add 'personality' by varying nuances, including bass string noise, slides, harmonics, slaps and picks; with drum samples, velocity and crossfade parameters can be used together to simulate different drum and cymbal characteristics. In addition, the MBD1 features ready-made acoustic drum phrase loops; the spec is rounded off with 28-note polyphony, eight reverbs, three choruses, and stereo input and output jacks.

Last of all, the VS880 digital recorder has had a bit of an upgrade, and has been dubbed the V-Xpanded VS880. New features include mix automation, 10 new effects algorithms (including a classic mic simulator, voice transformer and 19-band vocoder), new EQ and insert capabilities, and expanded editing functions for faster audio edits. The new effects features require the installation of the VS8F1 effects expansion board.

A Roland (UK), Atlantic Close, Swansea Enterprise Park, Swansea, West Glamorgan, SA7 9FJ.
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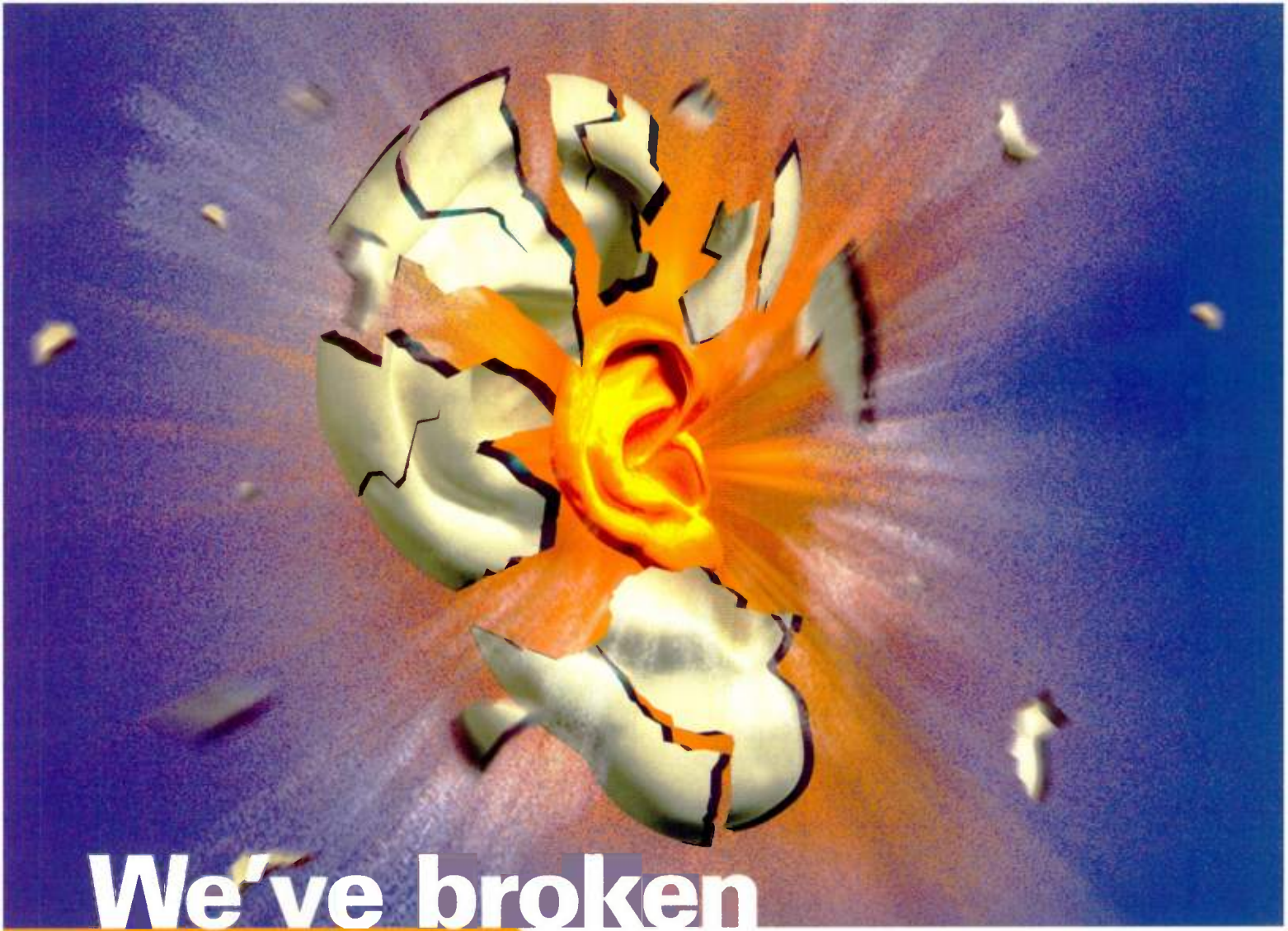

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	AWE64 Gold
EMU8000 Synthesiser	Yes
Creative WaveSynth/WG	Yes
SP/DIF digital output	Yes (-120 db signal/noise ratio)
Gold plated RCA output	Yes (-90 db signal/noise ratio)
Onboard RAM	4MB (upgradeable to 12MB)

AWE 64 Gold

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news from NAMM

by Paul White & Dave Lockwood

The Los Angeles NAMM show is an important landmark in the *SOS* calendar, because it's where most of the new products for the coming year are announced (or sometimes leaked!). Those that don't make it to NAMM usually surface at the Frankfurt Musikmesse a month or so later. As you might expect, a vast number of new products came to our attention, and you'll find details on many of these in our extended NAMM news coverage, but it's interesting to look beyond the products themselves to see where the industry is heading. Nevertheless, there was a handful of products worthy of special note, specifically because they looked set to define new trends.

Mackie's digital mixer, which was first revealed to the world in *SOS*'s exclusive Mackie interview (November 1996), just managed to make it off the R&D bench in time — and it was the sensation of the show. Digital mixers have been done before, but this one seems to have got everything right, from lightning-fast automation to a slick user interface, complete with mouse and SVGA monitor port, for those who want computer-style displays without having to add a computer. It even has a built-in Internet connection that dials up Mackie's computer system to receive software updates or enhancements! We've already put in our request for a review model when the production line starts to roll later in the year.

The other showstopper was Roland's V-Drum system, which applies physical modelling concepts to drum sounds and performance. The trouble with sampled drums is that they don't have the nuances of real drums — they can get louder, they can get brighter or they can crossfade, but they don't change timbre depending on where on the drum pad you hit, and you certainly can't play a sampled snare with brushes.

V-Drum changes all that by providing accurately modelled drum sounds played from pads with positional sensing. Now cymbals do change tone properly as you move from the bell to the edge, snares can be played with brushes, you can do authentic press rolls, and tom fills sound like real toms, not like somebody machine-gunning a suitcase. All editing is graphical, drum dimensions can be changed, virtual mics can be placed at virtual positions around the kit, and drums may be placed in virtual environments ranging from the beach to a glass house.

To get the most from this system, you have to buy the sound module and the drum pads — and you need a good drummer. However, you can use the module on its own and play it from a keyboard, presumably using controllers to simulate the drum positional aspects. The whole setup is fairly expensive (probably costing around the same as a traditional drum kit plus a set of mics), but it should go down a bomb in busy studios where drummers want instant access to high-quality sounds

Those two key products aside, we also saw physical modelling being applied to analogue synthesis emulation, both by Roland in their new JP8000 (see review in this issue) and Yamaha in their AN1x. Of course, the Korg Prophecy was there first, but these new machines are polyphonic, and in Roland's case, covered in user-friendly knobs and sliders.

Over the past year, I've had innumerable phone calls from readers concerning hard disk recording systems. Most people seem to want one, but they also want separate track outputs, something budget systems don't provide. Until now, expensive hardware, usually from Digidesign, was the only way to get multiple outs. But now it seems as if everybody is coming out with low-cost multi-channel PCI cards or expander boxes — which has to be good news for computer users. Emagic have announced their AudioWerk PCI card, for use with its own bundled multitrack recorder software or with *Logic Audio*, and this provides two analogue inputs and eight analogue outputs, with a 92dB dynamic range. Event Electronics also have a rack-mount audio interface with eight inputs and 10 outputs, all at 20-bit resolution, and Ensoniq have their own multi-channel system, complete with a dedicated hardware, mixer-like control interface (see our main news for more on this system, called PARIS). Other impressive systems popped up from previously unheard-of manufacturers, and doubtless the best will find British distribution. The most staggering thing, though, is the price — the majority of these systems have a projected US price of under $1000.

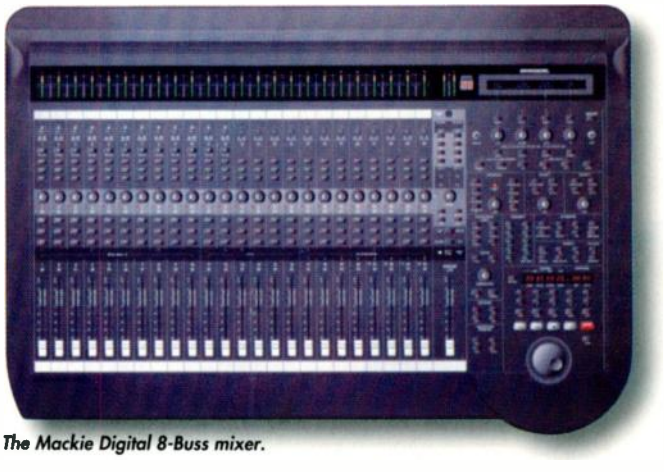
Virtually every major new product at the show was digital, and more and more functions are becoming possible inside the computer — Steinberg's *Cubase VST* integrated MIDI + Audio studio will shortly be available for the PC, more systems are supporting third-party software plug-ins, and I even saw on-screen emulations of the Roland TB303 and TR808, complete with authentic-looking front panels.

However, the limited power and limited number of expander slots provided by the present generation of computers places a limit on what can be achieved through working in this way, so I think the conventional hardware-based studio will be the preferred choice for serious users for many years to come. Digital mixers bring a lot of traditional outboard functions (such as compression, gating and effects) into the mixer itself, digital interfaces to multitrack recorders cut down on wiring, and if this trend continues, the hardware studio of the future is going to be a lot tidier than it is now.

Integration with video is going to become more important as more sound/vision productions are demanded, but because of the differing requirements of audio and video, I don't see the audio specialist becoming extinct in the foreseeable future. The audio engineer will need to be more aware of how his work relates to video, however, and a thorough understanding of sync issues will be required, but I don't think we'll see many people with the necessary skills to handle recording, filming, mixing, video editing and multimedia production on their own. Rather the audio engineer of the future will function as part of a team with other engineers and artists who have expertise in specific areas of media production.

SELECTED PRODUCT HIGHLIGHTS

The eagerly anticipated digital desk from **Mackie** (Key Audio Systems 01245 344001) managed to create quite a stir, despite being shown in non-functioning prototype form! The spec on the Digital 8-Buss looks sensational,



The Mackie Digital 8-Buss mixer.

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Ghost LE-24 (Standard version, no automation) £Mmmm!
Ghost LE-32 (Standard version, no automation) £Corrrr!
Ghost 24 (with MIDI Mute Automation & Machine Control) £Phew!
Ghost 32 (with MIDI Mute Automation & Machine Control) £What!

APOGEE ADAT TO DA88 INTERFACE

New from Apogee, here's a real problem solver for you. The FC8 Digital Format Converter allows cost-effective transfer of 8 channels of audio between ADAT & DA88/DA38 recorders. Either machine can act as master or slave. With an FC8, an ADAT and a DA88 will perform as if they were two ADATs or two DA88s. Transparently. And for modest cost.

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2 NEW MiniDisc PORTASTUDIOS

Yamaha & Tascam, the inventor of the cassette Portastudio, have now taken the concept onto the MD (MiniDisc) format. With the triple advantages of digital multitrack recording on cheap and very small, portable media, these two 4-track machines are set to become the new face of entry level recording.

Less than £1099

Less than £899

Both units allow up to 37 minutes of 4-track recording per disc (more than a C60 cassette), and provide comprehensive mixing and MIDI features. The are the basics - Tascam 564: 8-inputs, 3-band sweep EQ, Shuttle search, Bounce Forward, MTC out & MIDI Clock. Yamaha MD4: 4-inputs, 3-band EQ, MTC out, Quick Locate, flexible editing, clear LED control display. Only the Tascam has a digital out. Official costs are £1099 for the Tascam 564 and £899 for the Yamaha MD4.

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tc's WIZARDS SELLING WELL

Wizard £1999 Studio

tc's Wizard M2000 digital multi-effects processor and Finaliser Mastering Dynamics processor are simply flying out of the door at R&W.

The finaliser is based on the legendary MD2 Dynamics Package for tc's flagship M5000 Digital Mainframe, so it will let you do things you didn't think were possible to your final mix.

Wizard M2000 is now the number one in serious multi-processors because it incorporates many of the tc M5000's virtues, including its much sought-after C.O.R.E.™ reverbs - unique to tc electronic - as well as tc's new Dynamic Morphing™ effect.

Wizard M2000 and Wizard Finaliser - 2 great new ways to clean up a muddy sounding mix. And they're both available now at R&W.

Wizard £1639 M2000

ALL 3 OF THEM ARE HERE

First there was the ProMix-01 - still selling, still a great little problem solver. Then there was the magnificent 8-buss 02R. Undoubtedly the most sought-after console of the decade, and destined to be on every one's wish list well into the future. And now comes the new, smaller 4-buss 03D, the affordable solution to virtually every project studio's mixing problems. A fully automated, programmable mini-console with 26 inputs (8 of them digital), two on-board effects processors and in-built mouse-driven LCD computer screen.

01

02R

03D

Whichever of these amazing digital desks fit your bill you can be sure R&W will have it in stock.

TWO GREAT NEW EMU SAMPLERS

Say the magic word "Sampler" down the 'phone and our resident sampler guru, Simon Sampler (yes), will give you the word on the new E4X and E4X-Turbo Emulators from E-mu Systems. Very tasty beasts, these. The cream of the sampler crop. And there at R&W now.

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news from NAMM

and in keeping with Mackie tradition, so does the preliminary price. The desk offers 48 full-spec channels as standard, all with EQ, dynamics and effects, plus total dynamic and snapshot automation. With motorised faders and Mackie's V-Pot virtual rotaries, the interface looks efficient and familiar, augmented by tons of analogue I/O, a range of options on digital I/O, and a hard disk for storage of automation data and effects libraries.

Akai (0181 897 6308) added a new member to their MPC series. The new MPC2000 (see the main news pages for more details) features a 32-voice, 16-bit sampler, with 2Mb of RAM on board, expandable to 32Mb with SIMMS, plus 16Mb flash ROM capacity. The MPC2000 is compatible with Emu and Roland sound libraries (not to mention Akai, of course!). The stereo outputs can be augmented with an 8-way expander, making a total of 10. other options include S/PDIF digital I/O and on-board effects. Also new to the sampler range is the S20, a compact, desktop console-style 16-bit stereo sampler with up to 18Mb of RAM and an on-board 4-track sequencer.

A new Auto Harmony card, for **Lexicon**'s (Stirling Audio 0171 624 6000) PCM80 and 90 effects processors offers four new algorithms: Auto Harmony; Pitch Correct; MIDI Chords; and Auto Chords. Pitch Correct provides a set of tools for correcting out-of-tune performances — the pitch-detect display shows the pitch of the incoming signal in real time. A MIDI keyboard can then be used to 'force' the pitch of the chosen note to whatever you want it to be. And stunningly well it works too!

Best known for their keyboard products and effects, **Ensoniq** (Key Audio Systems 01245 344001) have utilised their digital expertise, in conjuction with Intelligent Devices, to develop their first digital audio workstation. Dubbed PARIS (Professional Audio Recording Integrated System), the core system consists of a PCI card and CD-ROM loaded with software that can be run under either Mac or Windows 95/NT operating systems (see the main news pages for more spec). The system looks to be a real contender in the serious music workstation market. Easy expandability and a software plug-in architecture for third-party support ensure a flexible upgrade path.

Ensoniq PARIS mix screen.

Emu (0131 653 6556), celebrating their 25th anniversary, launched Planet Phatt — "not your basic tone module", but "a groundbreaking tool in the latest sound design technology, combining many different 6-pole filter types, MIDI-synchronised LFOs and an intensely interactive groove mechanism called Beats mode". The unit is aimed at the hip hop, rap, acid jazz and trip hop markets. Emu's Orbit dance music tone module received an upgrade to Version 2 status, as did the Darwin hard disk recorder, adding significant new features and enhancements. See main news for more.

One of the leading names in the Digidesign plug-ins market, **Waves** (Natural Audio 0181 207 1717) announced a number of attractive software bundles, as well as the Renaissance Compressor, the first in a series designed to recreate the sound and operation of classic analogue hardware.

In addition to their 20/20p, low-cost, powered, 2-way, direct-field monitors, the **Event Electronics** (Key Audio Systems 01245 344001) stand displayed the highly impressive Layla 20-bit multitrack hard disk recorder/editor for PC or Mac. Attractively priced, Layla comprises a PCI card (with DSP courtesy of Motorola's new 56301 chip) and a rackmount breakout box, handling I/O, sync and MIDI.

Australian manufacturer **Rode** (HHB 0181 962 5000) have been creating quite a stir in the microphone market with their excellent NT2 and valve Classic models. Their newly-launched NT1 looks (and sounds) likely to follow the same path.

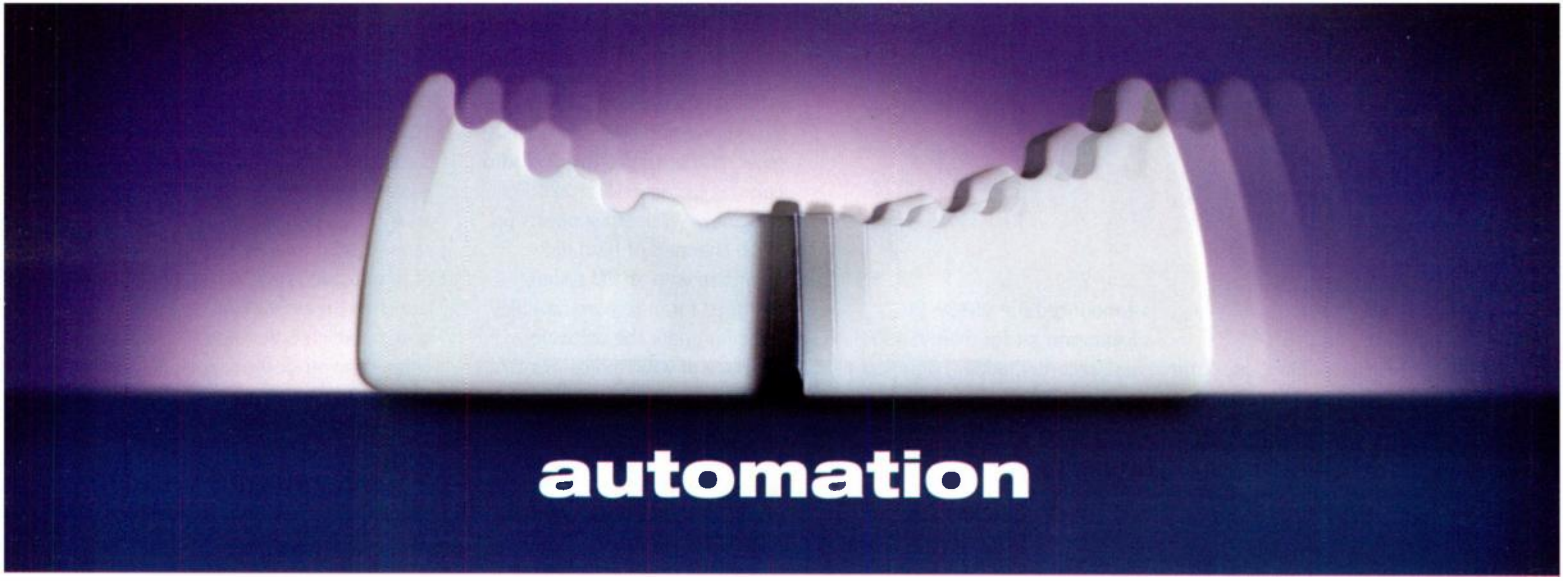
As always, there was a stack of new products from **Yamaha** (01908 369269). Top of the list, perhaps, is the new A3000 sampler (64-note poly, 12 outs and expandable to up to 128Mb), which is said to have an "analogue-like control interface for that familiar organic feel". Continuing the analogue theme, the AN1x 'Virtual Analogue Synthesizer' uses DSP-based modelling of analogue circuitry to recreate the currently-fashionable sounds and effects of early analogue synths. Yamaha's popular XG MIDI format received another boost with the launch of the MÜ90R high-performance XG tone generator. Yamaha's latest digital mixer, the compact O3D, offers comparable performance and facilities to the acclaimed O2R, at an even more affordable price. On the effects front, the REV500 Digital Reverberator (see review in this issue) offers an easy to use interface, and utilises the same DSP chip as Yamaha's flagship ProR3 reverb, with 20-bit conversion and 32-bit internal processing.

Following the success of their 505 and 506 preamp/processors, **Zoom** (Exclusive Distribution 01462 481148) continued the theme with the introduction of the 507 reverb unit and 508 delay pedal. Seamless switching offers uninterrupted audio whilst changing between the 24 user-programmable presets. The 507 offers 16 reverb types, based on plates, halls and rooms, plus chorus, whilst the 508 offers four different varieties of delay.

Opcode (MCM 0171 723 7221) announced the release of the Studio 64X, a Mac and PC-compatible MIDI interface/patchbay/synchroniser (see last month's news pages for deatils). Also out is v2 of *Overture*, the scorewriting package.

The progress of Pro Tools 4 was naturally the principal focus of attention on the **Digidesign** (01753 653322) stand. Version 4 represents another major evolutionary step, on a par with the introduction of TDM, with PowerPC native code to enhance speed and a wealth of new features. The mixing environment, in particular, has been enhanced with a new look and total dynamic automation, including almost all parameters of plug-ins. Automation data can now be graphically edited in the Playlist, allowing it to be referenced against the waveform displays. Pro Tools systems also have a new

Yamaha O3D digital mixer.



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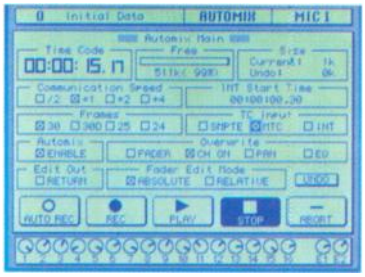

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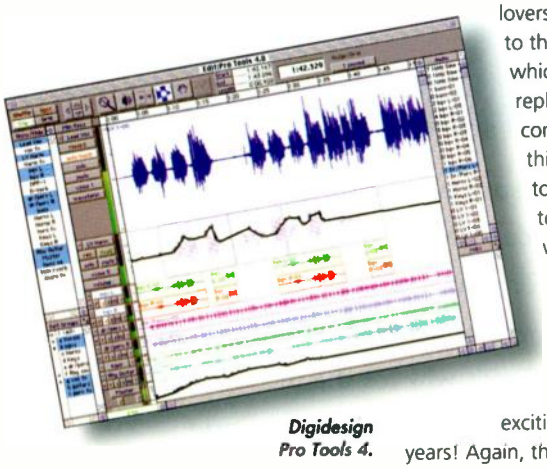
Visit the Yamaha Pro Audio Web site at http://www.yamaha.co.jp/product/proaudio/homeenglish/index.html

news from NAMM

plug-In specification in *AudioSuite*. A range of Digidesign's own *AudioSuite* 'core processes' (reverse, normalise, gain, pitch shift, time



Digidesign Pro Tools 4.

compression/expansion, invert, DC offset removal, dither, and duplicate) will now be included free of charge, and there is a range of products planned from the growing list of Digidesign Development Partners.

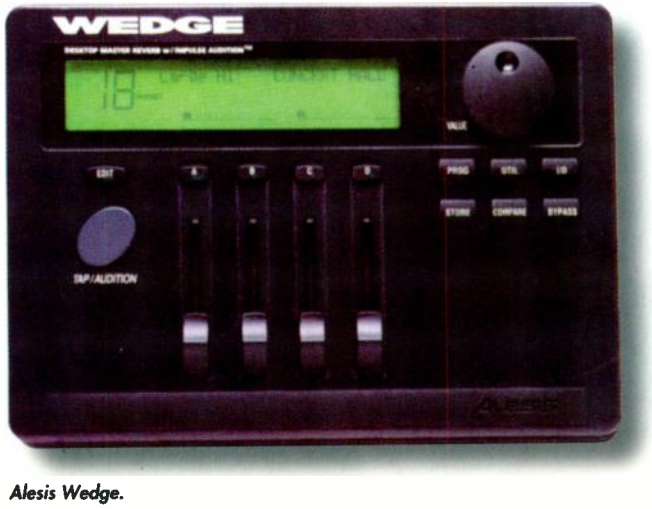
New DAT recorders are pretty thin on the ground these days, but **Sony** (HHB 0181 962 5000) had one at NAMM in the form of the PCM-R500. Featuring a variable-speed cue/shuttle knob, the rackmountable unit employs Sony's SBM (Super Bit Mapping) technology, as well as a four-motor, direct-drive transport mechanism. The PCM-R500 features both AES/EBU and SPDIF digital interfacing, with balanced XLR and unbalanced phono analogue connection.

Roland (01792 515005) launched products in almost all of their fields. The highlight for many people was the V-Drum system, with the TD-10 sound module using their COSM (Composite Object Sound Modelling) technology to produce some stunningly realistic drum sounds. When combined with the range's 'V-Pads', the system is apparently able to respond to subtleties of touch and playing style just like an acoustic kit. Other Roland highlights included the eagerly-anticipated JP8000 synthesizer, reviewed in this issue. Roland also announced the VS880-S1 Expansion Kit for their VS880 hard disk recorder, adding significant new functionality (and fixing a limitation or two). Organ lovers will look forward to the new VK7 organ, which promises to replicate the tonal complexity of the real thing using 'virtual tonewheel technology'. There was also a new bass and drums expander module shown (MBD1) and much more. Roland's most exciting presence for years! Again, there's more detail in our main news this issue.

New from **Alesis** (Sound Technology 01462 480000) is The Wedge, a dedicated, high-quality reverb in a desktop format. Its "unique physical design" is said to allow the user to interact with it "in ways that are not possible with rackmount devices". On the synth front, the new QSR makes the sounds of the QS8 keyboard available in rack form, whilst Alesis are now addressing the low-cost module market via the NanoPiano, NanoSynth and NanoBass tone generators, projected for shipping this spring. Also new from Alesis is the Studio 32 16-channel, 4-group in-line recording mixer, offering 16 high-quality, low-noise mic amps and 16 tape returns in a compact package with a full complement of EQ, aux and master facilities.

On the PC platform no-one is trying harder than **Digital Audio Labs** (Et Cetera 01706 228039). Their new V8 board supports up to 16 channels of hard disk recording with an I/O system designed for maximum flexibility. Running under the software interface of your choice, the DAL V8 board adds enough DSP muscle to turn any PC into an effective integrated recorder/editor/mixer, for the system also incorporates real-time routing/mixing capability.

Microphone giant **AKG** (Harman UK 0181 207 5050) announced a new low-cost line. Although aimed primarily at live performance, the Emotion Series utilises a number of patented new technologies in its manufacture that are sure to find their way into other products, significantly improving the performance of low-cost microphones. AKG also debuted their 'thumbnail-sized' MicroMic Series II clip-on instrument mics, featuring a new transducer element and an expanded range of dedicated mounting options.



Alesis Wedge.

3D audio pioneers, **QSound Labs** (+1 403 291 2492) revealed a major upgrade for their QSYS/TDM plug-in for Pro Tools 4, featuring full dynamic automation of all significant parameters. They also announced new Windows-based plug-ins for *Cakewalk Pro Audio* and other applications that support the Microsoft ActiveX standard.

Korg (01908 857100) introduced another element in their SoundLink system, the DRS 1212 I/O multichannel PCI audio card. Configured as a pair of analogue I/Os, SPDIF digital I/O and an ADAT optical interface, the card can muster a total of 12 channels of simultaneous I/O. Korg also launched the iX300 keyboard system, which is described as an 'interactive music workstation' using Korg's AI2 synthesis system.

New from **ART** (Key Audio Systems 01245 344001) was the 2-channel version of their electro-optical Levelar compressor (see review in this issue). The new Dual Levelar, like the equally new Pro VLA compressor and the rest of ART's 'Vactrol' based products, seeks to offer the vintage compression characteristics' of classic models of the past, but without the noise generally associated with older technology. ART's Quadra/FX effects processor uses two proprietary ASIC DSP chips to process up to four independent channels of audio, drawing on over 120 effects algorithms.

Focusrite's (01494 462246) highly-successful Green range continues to grow, with the announcement of two new models

Focusrite Channel Strip.

— a 2-channel dynamics processor (the Dual Compressor/Limiter) and a full-function Channel Strip, incorporating mic amp, EQ and dynamics.

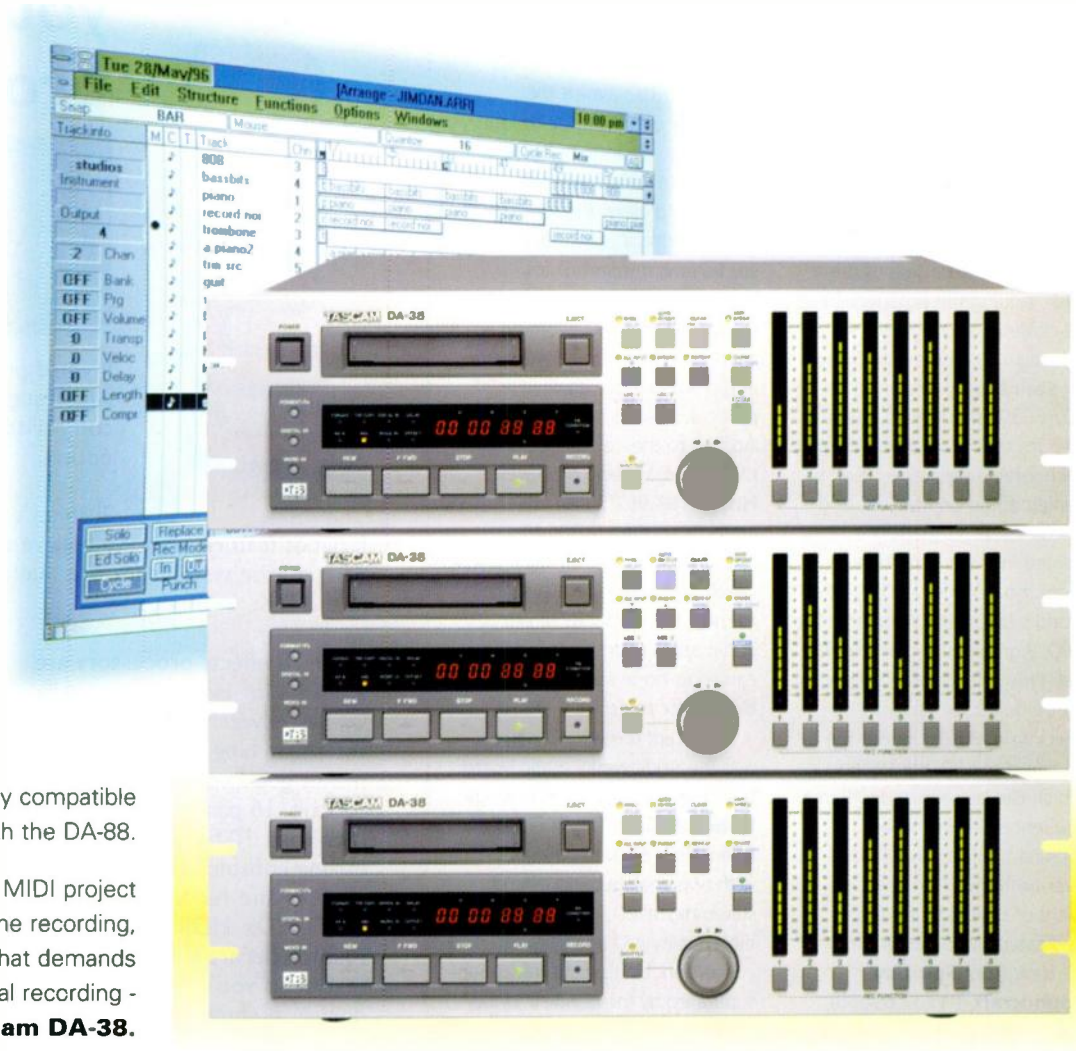
The 786 mic preamp from **dbx** (Harman UK 0181 207 5050) has a transformer-coupled discrete component front end to offer low-noise, low-distortion, wide-bandwidth performance. A variable high-frequency EQ, via Spectrum and Detail controls, allows the high-end content of the signal to be adjusted without disturbing the phase integrity of the signal. Digital converter and high-drive analogue cards are an option.

Version 2.1 software (available on EPROM) for the DMT8 hard disk recorder from **Fostex** (SCV Electronics 01923 1892) adds new features such as the ability to slave multiple DMT8s together to form 16- and 24-track systems. The D80 also received a software upgrade, adding new machine control functionality. Users can now also upgrade the on-board 850Mb to a

inspired
TASCAM

Welcome to the Premier Division

TASCAM's DA-88 is the **number one** digital multitrack format for professional studios and producers around the world. The new **TASCAM DA-38** brings you the same **advanced digital recording technology** at a new highly affordable price.



With a host of **new recording features**, the DA-38 is fully compatible with the DA-88.

For recording studios, MIDI project suites and home recording, or any situation that demands **premier** digital recording - **you need the Tascam DA-38.**

- fully professional 16 bit digital multitrack tape format; up to 115 minutes recording time
- unique internal digital patchbay: allows any digital/analogue input to be routed to any track; any track to be routed to any digital/analogue output; any track to be digitally bounced to any other track; any track on one DA-38 to be digitally bounced to any track on another DA-38
- up to 16 DA-38s can be synchronized to provide up to 128 track recording

DA-38

One Professional Digital Multitrack Format for all.

- advanced digital cross-fading and shuttle-wheel provides seamless punch-in/punch-out and frame accurate search capability
- new high performance 18 bit analogue to digital converters and 20 bit digital to analogue converters
- 24 bit capable digital i/o with full dithering to 16 bit signal onto tape
- sample accurate synchronization capability and internal digital patchbay, enables an infinite tracking capability using just two units and the required number of tapes (anything recorded on one tape will remain perfectly in sync with anything recorded or bounced onto any. other tape)
- frame accurate search capability

- optional MMC-38 time code/synchronizer unit provides MIDI and SMPTE Time Code outputs and MIDI Machine Control capability, enabling synchronization of or to sequencers and other MIDI based automation devices

TASCAM 5 Marlin House, The Croxley Centre, Watford, Herts, WD1 8YA. Call Gill Walker on the **Brochure Hotline 01923 819630**

news from NAMM

▶ 2.55Gb drive interface, allowing up to 60 minutes of 8-track audio storage.

Soundcraft (01707 65000) unveiled a 24-input expander module for their popular Ghost consoles (as mentioned in last month's news). Offering the same channel-strip functionality as the desk, the module connects to mix and aux busses as well as solo-detect and solo-in-place functions, allowing it to act as a true extension of the desk. Adding the expander to a 32-channel Ghost gives a system offering 120 inputs on mixdown.

Steinberg (Harman UK 0181 207 5050) announced the next step for their VST (Virtual Studio Technology) software, now implemented on Mac, PC and Silicon Graphics platforms. Something of a departure for them, however, is *XPOSE*, "the world's first visual sampler". The *XPOSE* graphics engine allows real-time effects to be utilised on the full-screen playback of Quicktime Movies, under the direction of MIDI controllers which can be recorded within a sequencer, allowing the musician full creative control over both music and picture without having to invest in dedicated video hardware.

New from **Spirit by Soundcraft** (01707 65000), the compact Folio PowerPad mixer features four mono mic/line inputs, two stereo inputs and a 30W-per-channel stereo power amp.

Beyerdynamic (01444 258258) showed their innovative MCD1000 digital condenser mic, first seen at the AES in November. Preamplification and A/D conversion takes place right next to the capsule, inside the microphone housing, with output in AES/EBU format via 3-pin XLR. This avoids the possibility of losses due to long cable runs. A range of power supplies and accessories is available to allow the MCD1000 to be used in a conventional studio environment or for remote location recording.

The MiniDisc is becoming an ever-more important part of the audio world these days, particularly in its MD Data form. Adding to their extensive range of pro audio media products, **HHB** (0181 962 5000) announced their MDD140 high-performance MD Data disc, developed and tested specifically to meet the demands of pro audio applications, with a high carrier-to-noise ratio and low block error rates.

Best kept pre-NAMM secret was the Audiowerk8 audio board from **Emagic** (Sound Technology 01462 480000). This PCI card offers eight discrete outputs, with two analogue inputs and stereo digital I/O, and features high-quality A/D and D/A conversion. Up to eight tracks are supported by the bundled *Virtual Multitrack Recorder software*. Naturally, the board can be used with *Logic Audio*, allowing up to 20 tracks of audio. Watch out for this one at an extremely attractive price!

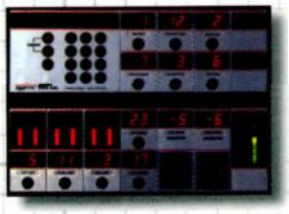
Without turning the whole magazine over to the NAMM report, there can never be enough space for more than edited highlights from the vast array of products on show. Apologies to those we have omitted from this listing, either through editorial decision or error — we'll be happy to redress the balance in our Frankfurt report coming up all too soon!

Emagic's Audiowerk 8.

dynaudio lexicon dbx

turnkey

If you want to look at equipment we'll send you some brochures...



If you'd prefer to listen and evaluate a wide range of products by strict A/B comparison there is currently only one option.

Turnkey's revamped and enlarged demo facilities feature what we believe to be the world's largest digital comparator systems for pro audio* and the only one of its type in the U.K.

Over 70 effects processors are available for instantaneous A/B via relay switching, eliminating the repatching time which makes good comparisons so difficult. 16 pairs of studio monitors, 10 power amps, 16 mixing consoles and around 30 sources and recorders from DATs, CDs, HDRs and Multitracks are on the same matrix so you can instantly configure complete systems.

One side of the switcher-equipped recording room.

Compare 6 mics. by recording simultaneously to ADAT.

Take 8 bus consoles - hundreds are bought each year on recommendation. Bearing in mind the sums involved it's hard to believe that the opportunity to properly compare the various brands for EQ and noise has not previously been offered.

Pro-Tools III and Soundcraft DC2020 in Studio 1.

We've taken the same innovative approach to demonstrating all our products from CD Rom samples to analog synthesizers.

Most dealers will tell you which products best suit your needs. Only one can show you.

Huge range across Mac, PC and Acorn platforms.

* The leading manufacturer of this equipment tells us that the Turnkey systems are the largest ever supplied worldwide.

soundhouse 0171 379 5148

Fax: 0171 379 0093 114, Charing Cross Road, London WC2H 0D

Authorised Dealer | Soundcraft | DRAWMER | MACKIE | Roland | SONY | TASCAM | FOSTEX | digidesign

Focusrite GREENS ARE GO!

Focusrite have long represented the pinnacle of audio achievement, but sadly their products have always been out of reach for most of us. Now, specifically with the high quality project studio in mind, they have designed the Green range of processors. The first 3 products are:

- *Pristine Audio Quality Throughout*
- *Expanding Range of Innovative Processors*
- *EQ & Voicebox Also Accept Instrument Level*
- *Superb Focusrite Build Quality*
- *Stunning Design Looks Great in any Rack!*

The Focus 4 band parametric EQ with filters.

The Dual Mic Pre, an audiophile quality dual channel mic preamp.

The Voicebox - this combines a mic/instrument preamp, compressor, de-esser and parametric EQ in a single unit - the ultimate signal path for digital recording!

All 3 are on permanent demo at Turnkey.

DUAL MIC PRE £819 CALL FOR A DEMONSTRATION turnkey PROFESSIONAL Tel 0171 240 4036

FOCUS EQ £939 CALL FOR A DEMONSTRATION turnkey PROFESSIONAL Tel 0171 240 4036

VOICEBOX £989 CALL FOR A DEMONSTRATION turnkey PROFESSIONAL Tel 0171 240 4036

digidesign

FREE MIDI INTERFACE & MICROSOFT OFFICE

NEW

ProTools IV Package

- 8200/120 24/1.2/CD c/w keyboard
- 17" MultiSync Display
- ProTools Core & 882 Interface
- 2Gbyte Hard Disk
- Any Audio Sequencer

BUNDLE PRICE £8295 INCLUDING INSTALLATION turnkey PROFESSIONAL Tel 0171 240 4036 £9746 INC VAT

ProTools Plug-ins

To add to the collection of burgeoning TDM plug-ins is the new Waves Truverb reverb processor, Syncro Arts Tool Belt processor & Q-Sounds QX/TDM 3D spacial enhancer using the Qsound patented expansion algorithm.

Truverb Q-sound ToolBelt

Audio Media III Package

- 8200/120 24/1.2/CD & Keyboard
- 15" Colour Monitor
- AudioMedia III card
- Any Audio Sequencer

FREE MIDI INTERFACE & MICROSOFT OFFICE

ProTools Project Package

- 8200/120 24/1.2/CD & Keyboard
- 17" Colour Monitor
- 2 Gbyte Hard Disk
- ProTools Project Core
- 882 I/O Interface
- Any Audio Sequencer

FREE MIDI INTERFACE & MICROSOFT OFFICE

AUDIOMEDIA III

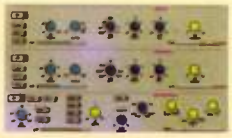
BUNDLE PRICE £2795 INCLUDING INSTALLATION turnkey PROFESSIONAL Tel 0171 240 4036 £3285 INC VAT

BUNDLE PRICE £4895 INCLUDING INSTALLATION turnkey PROFESSIONAL Tel 0171 240 4036 £5750 INC VAT

BIG by Langley

AMEK

As newly appointed Amek dealers we now have on demonstration a fortyfour input Big by Langley console. The Big's SuperTrue Version 3.1 VCA automation compatible with all other Amek desks up to the flagship Neve 9098 series console. With the Virtual Dynamics on-screen processing plus Rupert Neve voice recall, this is a console that is packed with facilities, over and above what it offers as a fully featured inline console: 4 band EQ, 8 auxiliaries, 12 bus, 24 outputs available in frame sizes from 28 to 44 with or without bantam patchbay.



Call for an appointment.

- *4 band EQ, 8 Auxiliaries*
- *SuperTrue V3.1 VCA Automation*
- *Virtual Dynamics on-screen editing*
- *Unique Rupert Neve Voice Recall*
- *12 bus, 24 output*
- *Frame sizes from 28 to 44 inputs*

INCREDIBLE VALUE £POA CALL FOR A DEMONSTRATION turnkey PROFESSIONAL Tel 0171 240 4036

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lexicon

LEXICON PRICE/QUALITY BREAKTHROUGH

MPX 1

For those of us who need top quality reverb & multi FX but cannot stretch to the expense of the PCM80 & PCM90, Lexicon have released the MPX-1. Featuring the famous 'Lex' chip for reverb and separate DSP processor for multi FX, the MPX-1 brings you all that is good in signal processing for an incredible £1199 inc VAT!

- *Superb Quality Reverb*
- *Up To 5 Effects At Once*
- *Midi Controllable Morphing of Effect*
- *On-Line Help Built-In*
- *SPDIF digital i/o*

Up to 5 simultaneous effects are available including pristine quality stereo pitch shifting, and effects can be "morphed" from one algorithm to another, as pioneered in the Vortex. An all new operating system which includes on-line help and a databasing system for sorting presets, means that achieving quality results is as stress free as possible.

Initial supplies of this exciting new product will be very limited - get your order in now to avoid disappointment.

NEW PRODUCT £1199 CALL FOR DETAILS turnkey PROFESSIONAL Tel 0171 240 4036

1066

dbx

DBX build on the success of their highly acclaimed dynamics processing range with the flexible new 1066.

In addition to all the professional features expected from this respected brand, the 1066 offers switching between their patented "Overeasy" soft-knee and hard-knee modes, sidechain switching, ultra-low distortion "Peak Stop Plus" limiting and meticulous US hand-built quality.

A/B this product at Turnkey to hear why DBX remains an industry standard in signal processing.

NEW PRODUCT £479 CALL FOR DETAILS turnkey PROFESSIONAL Tel 0171 240 4036

NEW FILTER

waldorf

The 4 Pole is the legendary Microwave/Wave 24 dB lowpass filter. You are free to apply this filter to any audio signal that you patch into the Filter. So if your favourite sampler or sampleplayer lacks that special quality, you can give it a sonic boost via the 4 Pole Filter. It is the most powerful (and quite possibly the only) analog filter available today!

NEW PRODUCT £299 NEW BOXED

VTP-1

DigiTech

Digitech have already taken the pro market by storm with the introduction of the Studio Vocalist, and now the 2 channel VTP1 tube mic amp / EQ looks set to do the same. It combines four bands of semi parametric EQ with a high definition mic amp based around a proprietary valve design. The usual phase reverse, high pass filter, 20dB pad (line inputs also available) and 48v phantom power are provided, together with high quality balanced analog outputs, and AES/EBU and SPDIF digital outputs at either 44.1 or 48 kHz. The ideal front end to any digital recording system.

NEW PRODUCT £999 CALL FOR DETAILS turnkey PROFESSIONAL Tel 0171 240 4036

EQ1 Parametric EQ

TL Audio

TLA's range of outboard must be the best selling valve gear ever! Their classic warm valve sound, combined with the low noise floor that modern digital recording demands have made them a huge success story. Our tremendous buying power now allows us to offer the superb EQ1 at this incredible price.
The EQ1 is a dual 4 band (or single channel 8 band) parametric EQ - a high performance transformerless pre amp is followed by four valve stages per channel, which provide a fine and gradual overdrive characteristic, and a frequency response which is virtually flat from 20Hz to 40kHz.
Limited quantities only at this price!

RRP £821 £499 CALL FOR DETAILS turnkey PROFESSIONAL Tel 0171 240 4036

Bellari

PREMIUM QUALITY VALVE OUTBOARD EQUIPMENT

If you've previously used valve equipment, you'll be well aware of the magical quality that tube circuitry produces, and if you haven't used it - try it now! Valve equipment is a little more expensive to build than standard solid state devices, but many manufacturers have used this as an excuse to charge grossly inflated prices for their product. Bellari manage to make top quality processors for more reasonable prices though, and our factory direct exclusive cuts out a profit margin, and makes the range unbelievable value for money!

- Full Range of Processors
- All Valve Circuit Design - Not Bolted On
- Incredible Factory Direct Pricing
- Superb Sound Quality - Must be Heard

The RP583 Studio Tube Compressor / Limiter is bound to be one of the best sellers of the range, offering as it does two channels (stereo linkable) of some of the finest sounding compression money can buy, with a smooth and natural compression characteristic. Ratio is continuously variable from 2:1 to infinity (not switched like some models), and there are separate controls for attack, release, threshold and make up gain. Dual VU metering is provided, as well as jack and balanced XLR ins and outs, and sidechain access is fully catered for. Ideal for a variety of instruments, vocals and complete mixes.

NEW PRODUCT £499 FACTORY DIRECT

RP533 Studio Tube Multi-Processor

Whilst mixers these days are of a better quality than they used to be, to get the best possible signal to tape or disk, you can't beat a dedicated unit - and for value for money, you can't beat the Bellari RP533 Studio Tube Multi-Processor. The all tube 2u box, features a premium quality transformer balanced mic pre amp with switchable 30dB pad, phase reverse and true 48V phantom power. The compressor has all the features of the RP583, and the exciter section adds a wonderful sheen to virtually any sound, as well as beefing up the bottom end. Each stage has it's own bypass switch, sidechain access is provided, and the large VU meter can monitor input, output, or gain reduction. No serious recordist should be without one!

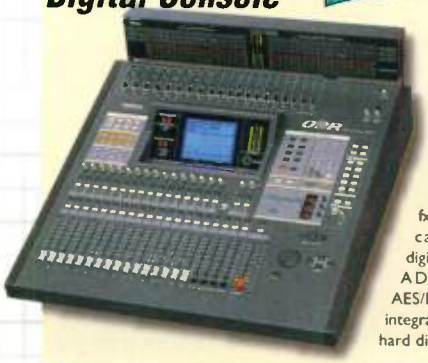
NEW PRODUCT £499 FACTORY DIRECT

Other processors in the Bellari range:

RP520 Studio Mic Pre Amp	2 channel rack mount tube mic pre amp	£399
RP562 Stereo Exciter	rack mount stereo tube exciter with VU meters	£299
ADB3 Stereo Direct Box	stand alone 2 channel tube DI box	£129
MP110 Direct Drive Mic Pre Amp	stand alone single channel tube mic pre amp	£169

02R Digital Console

YAMAHA



The fully digital 40 input 8 bus console with total automation and moving faders. 4 band parametric eq and dynamics for every input and 2 comprehensive on-board fx processors with a range of reverbs, delays and other standard fx. Optional interface cards allow full digital connection of ADAT, T-DIF and AES/EBU formats for integration of MTR and hard disk systems.

RRP £6999 £POA turnkey tel 0171 240 4036

DTC-ZE700 DAT Machine

SONY

We have exclusively secured a small supply of the Sony DTCZE700 to bring you the cheapest full size DAT machine on the market, but this is not at the expense of features: SPDIF coaxial input and optical in and out, digital and analog recording at all three sampling rates (32 kHz, 44.1 kHz, 48 kHz), as well as all the usual ID functions and a full function infra red remote control. Also features Sony's exclusive Super Bit Mapping technology for incredible recording quality. Another DAT exclusive from Turnkey!

RRP £729 £499 NEW BOXED

DA 38 Digital MTR

TASCAM

The DA88 has become the industry standard digital MTR in professional film, and audio recording. The new DA-38 looks set to build on this with features that include 18bit x 64 oversampling A/D's, 20bit x 8 D/A's plus via T-dif 24bit digital recording at 48 or 44.1 kHz. An internal electronic patchbay allows any input to be routed to any track and output. Plus up to 16 DA-38 units can be connected together and with the optional MMC-38 allows for sequencer and timecode control. Incredible price reduction only at Turnkey.

RRP £2999 £POA NEW BOXED

DA 20 DAT Machine

TASCAM

If you need a 19" rack mount DAT machine, they don't come any cheaper than this! But that's not at the expense of a quality machine: reliable tray-loading mechanism, SCMS is switchable in or out, both analog and digital recording at all 3 sample rates and coaxial SPDIF in and out. High sound quality is guaranteed by 1-bit DAC playback, and there is a special 'Table-of-Contents' feature. Our price includes 10 free branded 90 min DAT tapes.

RRP £799 £699 INC 10 FREE 90min DATs

YAMAHA

ProMix 01

DIGITAL MIXING FOR THE MASSES

Yamaha's ProMix 01 revolutionised the mixer market overnight when it was introduced around 18 months ago, bringing digital mixing to the masses.

16 line inputs (8 have mic amps with phantom power), and 1 stereo input each have their own motorized fader, as does the master fader and a dedicated send / return fader. Each channel features 3 band fully parametric EQ, 2 external auxiliary sends, as well as 2 internal sends to the built in multi FX processors. There are also 3 'floating' stereo dynamics processors, with their own library of gates, limiters and compressors - you can even key them from adjacent channels!

As if all this wasn't enough, all parameters are fully automatable, either via MIDI, or using the built in snapshot system. Superb audio quality throughout is ensured, with 20 bit AD / DA convertors and a master digital output for direct connection to DAT machines, HDR's etc. This incredible price only at Turnkey makes the ProMix 01 even better value than ever!

~~RRP £1999~~
£1649
NEW BOXED

- 18 Channels of 20bit Digital Mixing
- Full Dynamic Automation
- Built-In FX Processors & Assignable Dynamics
- 3 Band Fully Parametric EQ with Library

DMT-8 VL
DIGITAL MULTITRACKER

FOSTEX

The personal digital multi-track is here at last, and at a price you won't believe! 8 separate tracks of CD quality audio recorded to half-gig hard-disk (up to 12 minutes). Record 2 tracks simultaneously, jog-shuttle audio and sync to MIDI without losing a track. The 8 channel mixer accepts 2 mics, with a 2 band EQ and 2 aux sends. Separate outputs and S/PDIF optical output. Why buy 4 tracks when you can have 8 ?!

~~RRP £1499~~
£999
NEW BOXED

MPC 2000
Sampling Drum Machine

AKAI

Ever since the launch of the Roger Linn MPC60, Akai have led the way in sampling drum machines. It's latest evolution, the MPC2000, is a lot more than a glorified drum machine however - the 64 track sequencer is a development of what most people consider to be the only real alternative to computer based setups (32 MIDI channels are available), the sampling section is virtually identical to the best selling S2000, SCSI is standard, and the outputs can be expanded from 2 to 10 and digi i/o for only £249! There are far too many other features to mention here - on demo now at Turnkey.

8 meg RAM expansion free!

NEW PRODUCT
£1299
INC FREE 8MEG RAM

JV2080
Synth Module

Roland

The Roland JV1080 has been become the industry standard sound source for home studios and professionals alike. It's superb sound quality, 64 note polyphony and expandability were a winning combination.

Now the new JV2080 builds on that success by offering a giant editing screen, three independent effects processors as well as reverb / delay and chorus, and room for 8 of Roland's renowned expansion boards - the potential is virtually limitless! Judging by the success of the JV1080, these will be in strong demand - call us now! Turnkey price includes free "Experience" sound expansion board.

NEW PRODUCT
£1399
INC FREE EXPERIENCE BOARD

XP50
Workstation Keyboard

Roland

All the power and flexibility of the JV1080 in a keyboard, together with what has to be the best on sequencer around, and a built in disk drive. The XP50 has a 5 octave keyboard and 2 outputs, whilst the XP80 has a 7 octave keyboard, 4 outputs and the king size display as featured in the new JV2080. We have limited stocks only at these staggering prices - don't delay - order today!

XP80
Workstation Keyboard

~~RRP £1499~~
£999
NEW BOXED

~~RRP £1799~~
£1299
NEW BOXED

turnkey 0171 379 5148 soundhouse 0171 379 5148

Fax: 0171 379 0093 114 Charing Cross Road London WC2H 0DT E-mail: sales@turnkey.demon.co.uk Web site: www.turnkey.uk.com

KORG ensoniq ALESIS Steinberg Technics Vestax ROLAND FATAR

Soundcraft

MIXER MAYHEM!

There have always been cheap mixers around, but in return for the low price tag, you've had to put up with little known manufacturers, poor build quality, and noisy lo-fi sound without the features you really need.

To remedy this situation, we have negotiated an exclusive deal with Soundcraft Spirit - probably the world's largest mixer manufacturer - to bring you their quality mixers at incredible discounts of 40% to 57% off RRP!

Stocks are limited however, so get your order in early to avoid missing out on this once in a lifetime opportunity to own a professional quality mixer at a bargain basement price.

SPIRIT Folio Lite

- Up to 16 inputs to mix
- 2 Aux sends, 1 switchable pre/post
- 4 mic inputs with phantom power

RRP £312 £149 NEW BOXED

Soundcraft's Spirit Folio Lite must have more features per square inch than any other mixer.
Ideal for any small recording or live setup, it has up to 16 inputs including 4 mono mic/line channels (with phantom power), 4 stereo channels and 2 returns, 2 band EQ and 2 aux. sends - 1 switchable pre or post fade. If you need to rack it, optional ears are available.

SPIRIT Folio 10 & 12

- 6 or 8 Mic Inputs
- 2 Aux sends, 1 Switchable Pre/post
- 3 Band EQ with Mid Sweep
- Folio 12 Also Available in Rack Format

RRP £380 £229 NEW BOXED
RRP £447 £269 NEW BOXED

The Folio 10 and 12 revolutionised the compact mixer market when they were released, offering previously unheard of levels of quality and features in their price bracket: 3 band mid-sweep EQ, 2 auxiliaries (1 switchable pre/post fade), professional grade Neutrik connectors, superb clean signal path and typical Soundcraft build quality. Get the 12 in either desktop or rackmount format.

SPIRIT Folio RacPac

- 28 Inputs at Mixdown
- 6 Auxiliary Sends
- 4 True Subgroups
- 3 Band EQ with Mid Sweep

RRP £826 £399 NEW BOXED

This excellent member of the Folio range combines superb sound quality with a fantastic list of features in only 8U of rack space: 3 band EQ with mid sweep, 6 auxiliary sends, high-pass filters, rackmountable (includes swivelling connector field) up to 28 inputs on mixdown, 4 true subgroups plus separate mix bus, insert points and direct outs on every channel. Incredible flexibility.

QUASIMIDI

Rave-O-Lution 309
Dance Workstation

If you're into dance music, then Quasimidi has to be the first manufacturer to look to for your equipment - everything they make is dedicated to dance music production!
The Rave-O-Lution 309 is undoubtedly their best and most innovative product to date. Imagine the raw powerful sound quality of Roland's TR909 and TB303, give them 50 times as many sounds, add resonant filters to the drums, and you've still only got half the instrument that is the Quasimidi 309!
Knobs for all functions all send out MIDI controllers, built in real-time and step-time sequencer, 3 on board effects processors, optional rack ears, typical German build quality - far too many features to mention here!
The ultimate dance production workstation - must be heard to be believed. Turnkey exclusive!

- Huge, Powerful Dance Drum & Synth Sounds
- All Knobs Send MIDI Controllers
- 3 Onboard FX Processors
- Exclusively Available at Turnkey

NEW PRODUCT £649 FACTORY DIRECT

FAT

FREEBASS
TB303 CLONE

If you need the unique sound of an original Bass Line™, but can't afford the inflated prices that go with it, then Freeform Analog Technologies' Freebass is the product for you!

It's the only authentic sounding TB303™ clone on the market, and it's got MIDI! 1U rack with 1 knob per function, all the sound controls of the 303 are duplicated, Cutoff, Resonance, Envelope Mod, Accent, Tune and Decay. Waveform is continuously variable from square wave to sawtooth, and an auto tune button is included to retune the oscillator - no more continual drifting!
On top of this, there's an audio input to the filter stage, allowing you to process any external signal with the FB383's powerful synthesis. The ultimate analog bass machine - this incredible price means these will fly out of the door! Another Turnkey exclusive.

- Superb Sounding TB303™ Clone
- Fraction of the Price of an Original
- External Input to the Filter
- Exclusively Available at Turnkey

NEW PRODUCT £199 FACTORY DIRECT

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emagic

Audiowerk8

- 2 Ins, 8 Outs and Digital I/O on 1 Card
- Use 2 Cards in the Same Computer
- Optional Multichannel Digital Interfaces
- Comes with VMR Software Bundled Free

HARD DISK RECORDING BREAKTHROUGH

Every now and again products like Tascam's first portastudio and the Alesis ADAT come along and revolutionise the recording market. Emagic's new Audiowerk 8 is now set to bring multichannel computer hard disk recording within reach of everyone.

For an incredible £499 including vat, you can now buy a PCI card for Mac or PC, which gives 2 analog inputs, 8 analog outputs, and SPDIF digi I/O as standard! You even get Emagic's new Virtual Multitrack Recorder software thrown in!

Virtual Multitrack Recorder

The bundled VMR software gives a clear virtual representation of an 8 track tape recorder, making operation incredibly straightforward. Multiple takes can be recorded per drop, and your favourite version selected afterwards. The large smooth scrolling waveform display makes editing a doddle!

This is just the start of the good news though - the Audiowerk 8 integrates seamlessly with Logic Audio on either platform, you can use 2 cards in the same computer to give 24 track recording with 16 outputs, and a daughter board socket will allow future options like an ADAT 8 channel optical digital i/o, or 4 extra stereo SPDIF outs! The card is only 7" long, so it fits in virtually any machine, and uses state of the art bitstream convertors for pristine sound quality. The card is on permanent demonstration at Turnkey, and the first 50 purchasers will receive a free loom for connection to your mixing desk. Call us now!

NEW PRODUCT
£499
INC FREE 8 WAY LOOM

Roland

MC-303 Groovebox

The enduring popularity of the TB303, MC202 and TR909 has just refused to go away but increasing rarity has meant that secondhand prices have been driven up to ridiculous levels. Roland, the creators of these machines, now bring you the MC303 Groovebox which combines all their classic drum machine sounds, a step time / real time sequencer, 303 'acid' bass sounds complete with front panel filter controls and a whole host of other useable sounds (it's 16 part multi-timbral!). This box is an all in one dance music solution, and believe us, it sounds the business! Initial supplies will be very limited, order now to avoid disappointment!

NEW PRODUCT
£POA
NEW BOXED

NEW PRODUCT
£629
WITH MK149 CONTROLLER KEYBOARD

NEW

Microwave II

waldorf

The Microwave II combines all the famous features of the original Microwave together with today's requirements for user interface, signal to noise ratio and sonic purity. Outside, it's simplicity of use is obvious through the use of just 5 rotary dials and a 2x40 character back lit LCD. The complete value range of each parameter can be reached with only one turn. On the back the Microwave II has two fully modulatable stereo outputs (configurable as 4 monos with panning). The basis of the tone generation is a powerful DSP generating wavetables, the 10 voices each feature two oscillators, two wave generators, a mixer, two filters in series, a stereo amplifier, four envelopes, two LFOs, a modulation matrix with 16 slots and several 'modifiers', more than enough to keep even the most demanding programmer satisfied! Per sound the Microwave II sports a neat arpeggiator and powerful envelope and voice trigger modes. There's even a powerful chorus effect that is capable of producing the classic 'ensemble' effect.

Initial stocks of this fine instrument will be very limited, so order early to avoid the waiting list!

NEW PRODUCT
£999
NEW BOXED

Red

Although Waldorf are not associated with Focusrite in any way, we cannot deny that this Wave is red.

waldorf

Waldorf Wave

We now offer a new custom range of Wave synthesizers with 76-note keyboards in four colour options - standard blue, red (as shown), Sahara and black. Totally unique sound.

EXCLUSIVE FROM
£6299
CALL FOR DETAILS
turnkey
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CS1x

YAMAHA

Here's another fantastic addition to this year's slew of equipment specifically designed for dance music. Not only does it look great, it sounds great too! As well as 480 XG format voices and 11 different drum kits, the CS1x also has 128 special performance sounds especially designed for dance and techno music. Front panel knobs allow instant access to crucial editing parameters like the filter, and 2 are assignable to anything you like. Round this off with top quality effects and an arpeggiator, and you have what has to be the best value keyboard of the year!

RRP
£599
NEW PRODUCT

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YOUR INTERFACE WITH THE OUTSIDE WORLD!

- 128 Channel MIDI Interface for Macintosh & Windows
- 8 Independent MIDI In/Out
- Control ADATs with MIDI Machine Control
- Converts LTC to Digidesign Superclock (replacing the SMPTE Slave Driver)
- Genlocks to Video/blackburst

MIDI TIMEPIECE AV

The Midi Timepiece AV is a breakthrough in MIDI/SMPTE interfaces for professional music providing all the features needed for your Mac or PC in one box. Purchasing a MIDI Timepiece II, Digidesign SMPTE Slave Driver, and a JL Cooper Datasync would only give you some of the facilities that the MTP AV offers. Where as owning these three products would set you back at least £1,700, the MTP AV is only £645! As an introductory offer we will take your old Studio 4 or MTP II and £399 for an MTP AV.
Call for more details of this totally comprehensive product.

RRP £645 turnkey Tel 0171 240 4036

- 128 Channel MIDI Interface for Macintosh & Windows
- 8 Independent MIDI In/Out
- SMPTE To MIDI Sync at all Frame Rates
- MIDI Machine Control Support
- 8 Factory and 8 User Presets
- Use 2 Computers Simultaneously!

MIDI EXPRESS XT

The Midi Timepiece XT offers a price breakthrough for multi channel MIDI interfaces, giving you 128 channels for under £400 - around £3 a channel! If that wasn't enough, you also get full SMPTE to MIDI synchronisation at all frame rates, MMC compatibility, 16 presets, audio click to MIDI conversion and a MIDI panic button. What's more, you buy the same product for Macintosh and Windows so you are free to move between the two platforms, in fact, you can have them both connected at once!

RRP £399 NEW BOXED

ZIP

JAZ

EZ-FLYER

SyQuest & IOMEGA

Removable Disk Drives

There was a time when hard disks were a luxury for sampler owners, but with the advent of the ultra cheap Iomega Zip and Jaz drives, and the new Syquest EZ Flyer, this has become a thing of the past. For under £200 the Zip drive stores 100Mb (94Mb formatted) on each cartridge and the EZ Flyer 230Mb (224Mb formatted). If you want greater capacity the Jaz's 1Gbyte will suit any large fx library and is ideal for many dedicated hard disk audio systems like the Emu Darwin or Akai DR series.

ZIP RRP £219 £149 INC DISK & SCSI CABLE

JAZ RRP £649 £429 INC DISK & SCSI CABLE

NEW EZ-FLYER £239 INC DISK & SCSI CABLE

JP8000
Analog Modelling Synth

Roland

Roland's Jupiter 6 and Jupiter 8 are some of the most sought after keyboards on the second hand market, and with good reason - they sound huge! So far, modelling technology has been used to recreate acoustic timbres, but Roland are the first to specifically model true analog synthesis with their new Analog Modelling technology, and believe us, the results are spectacular! Analog Modelling not only produces superb emulations of the great synths of the 60's and 70's, but also totally unique timbres never before heard. The need for realtime control has been taken very seriously, and all the knobs, sliders, buttons and the ribbon controller send out Continuous Controller messages - even the effects and EQ are covered! For instant creativity, a powerful arpeggiator and real time phrase synthesizer are included, which can be easily synchronised to an external MIDI clock. This is very likely to be the hottest synth of '97 - order now!

NEW PRODUCT £1499 NEW BOXED

SU10
Sampling Unit

YAMAHA

RRP £299 £269 INCLUDES 2 FREE TIME & SPACE CDs

Yamaha's SU10 is a ground breaking unit, making professional quality stereo sampling available to everyone. Up to 54 seconds of sampling is available and 48 samples can be held in memory at any one time. Samples can be filtered, reversed, scaled, crossfaded, pitchshifted and even scratched using the ribbon controller.
The built in sequencer means you can produce your own tunes using just this unit!
The SU10 comes bundled with 2 free Time & Space CDs containing almost 800 samples.
Also available with 4 octave MIDI keyboard for only **£349**.

05R/W
Sound Module

KORG

Best selling General MIDI module from Korg. Features 32 note polyphony, 'direct to host' computer connection and special 'Combi' mode for stacking presets up for some truly huge sounds! Compact 1/2 U rack design with a clear backlit display for easy parameter editing. Over 500 sounds of typical Korg quality!

RRP £499 £299 NEW BOXED

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EUROPE'S LOWEST PRICES GUARANTEED*

Sound Modules

E-MU Orbit Synth Module

16 DIFFERENT FILTER TYPES!

Emu have taken their wealth of experience in making modules such as the Proteus, Vintage Keys and Planet-x, combined it with the filters from the incredible Emulator 4, and mish their usual inovation, come up with the Orbit - especially built for dance music. The Orbit is stacked full of classic drum sounds, pulsating basses, ambient pads, as well as a huge variety of hits and effects. The inclusion of the E4's 16 different types of 6 pole filters mean that this module has more powerful filtering than any other synth. Finally the BEATS MODE includes a wide selection of loops and grooves, which can have their pitch changed without tempo change and vice-versa, and even their sounds too !

HOT! RRP £869 **£799** NEW BOXED

NOVATION DRUM STATION

BUILT AT LAST !

Someone had to build this eventually! Despite being discontinued for at least 10 years, Roland's TR-808 and TR-909 drum machines have remained indispensable popular classics ever since. Now, Novation bring you these classic sounds with the original editing parameters and in the convenience of a 1U rack, with MIDI and 8 outputs. Initial supplies will be limited and demand, high. We have been guaranteed a significant quantity of the first stock available. Call for further details

RRP £499 **£419** NEW BOXED

NOVATION BASS STATION

BUDGET MONO SYNTHS

If you need to get into analog synths on a budget, then the Bass Station rack or keyboard is for you. But this is no mere toy! Two oscillators, pulse width modulation, two LFO's and knobs that send out MIDI information make this a versatile sound creation tool, capable of a wide range of bass sounds and effects. The ideal addition to any MIDI setup!

FROM ONLY **£329** NEW BOXED

ACCESS PROSYNTHESISER

FOR MATRIX 1000 OR MICROWAVE

There's no doubt that the Oberheim Matrix 1000 and Waldorf MicroWave deliver powerful analog sounds. However, when it comes to programming your own sounds, top producers have tended to go for older synths like the Minimoog and Super Jupiter, because their knobs and sliders make for easy creation of new sounds. The Access programmer gives you the best of both worlds - now you can freely experiment with your modern analog synth using the same intuitive front panel, and better still, record every tweak of a parameter into your sequencer.

SCOOP EXCLUSIVE **£369** NEW BOXED

WALDORF PULSE

ALL NEW ANALOG MONO SYNTH

Waldorf quality at a previously unheard of price! Their first venture into the burgeoning monosynth minimal has been universally acclaimed, and rightfully so. The Pulse's three oscillators provide some of the fattest sounds around, and it's modulation matrix allows a far higher degree of programming complexity than anything else in its range. Add to that the fact that editing any parameter sends out a MIDI controller and you have a fantastic all round performer.

NEW PRODUCT **£599** NEW BOXED

WALDORF PULSE PLUS

ALL NEW ANALOG MONO SYNTH

The Pulse Plus has all the features of the Pulse but with audio input, CV and gate control. You can even play your guitar through it !

NEW PRODUCT **£699** NEW BOXED

BOSS DR-660

THE BEST EVER DR. RHYTHM

BOSS have been making DR. RHYTHM drum machines since the early eighties, combining value for money and ease-of-use with the latest drum and percussion sounds. The DR-660 builds on the success of the DR-550 Mk2, but offers 16 full velocity and aftertouch sensitive pads, 4 separate outs (unheard-of at this price), and 255 drum sounds including the best of TR808 / 909. The 660 also boasts the 'human feel' control first introduced on the R8 which allows velocity to control a full time crossfade between several waveforms (for example, whereabouts the cymbals are hit). Process your sounds with on-board digital reverb and chorus - fully editable, with individual effect-send control for each drum sound.

RRP £499 **£299** NEW BOXED

ALESIS SR-16

DRUM MACHINE

The SR-16™ Stereo Drum Machine is an excellent tool for songwriting and performance. It features a great selection of 233 realistic, natural drum sounds, offered both in dry form and sampled with our incomparable digital reverbs. Alesis's exclusive Dynamic Articulation™ feature enables a drum sound to change its tonal content as it's played harder for truly realistic performances. The SR-16 features 50 preset patterns that were actually played in by top studio drummers - not just programmed and quantized. You'll find enough built-in rhythmic variations (with A, B and two Fill sections) for composing complete arrangements. Of course, the SR-16 also provides complete MIDI implementation, a footswitch input, flexible programming and editing features and velocity-sensitive pad buttons. Plus, it's so easy to use that you'll be up-and-running and composing new music in minutes.

RRP £299 **£199** NEW BOXED

ALESIS DM5

The DM5™ 18 Bit High Sample Rate Drum Module offers superb performance features and an excellent selection of drum, percussion and special effect samples putting over 540 all-new and classic studio drum sounds into a 1u rack space, many recorded in true stereo and with ambient effects. Plus, its Expanded Dynamic Articulation™ feature allows drum sounds to change volume, tone, and pitch according to MIDI velocity. The Random Sample feature realistically varies the sound of the drum as you play. The DM5 includes an ultra-fast trigger-to-MIDI converter with 12 trigger inputs, with 5 programmable parameters for each. 21 programmable drumsets, four audio outputs and a custom backlit LCD display. Whatever your application is - the drum sound for you is waiting right here! Another Turnkey megadeal!

RRP £599 **£299** NEW BOXED

OBERHEIM MATRIX 1000 EXCLUSIVE

Now almost 10 years old, and still sounding as fresh as the day it was released. The Matrix 1000 is essentially a Matrix-6 in a rack - 6 note polyphonic, 2 oscillators per voice, true analog VCF filters with 8 modes. 'Matrix™' modulation with 20 sources and 32 destinations, raw gutsy analog sounds. Why 1000? The 1000 presets were generated by Matrix6 owners worldwide in response to a competition to find the best analog sounds on the planet. You're sure to find the perfect patch for virtually any application. Group mode allows chaining of up to 6 units to create a true monster! Fully editable via MIDI, Mac, PC or Atari editor (available for only £49)

FACTORY DIRECT RRP £599 **£399** NEW BOXED

HAMMOND XM1 & XM1

ORGAN MODULE

Amazing sounding all new organ module with famous drawbar controller. Based on the guts of the £8000 XB3, there is nothing as realistic as this on the market. Built in Leslie simulator and overdrive, up to 3 registrations simultaneously, variable release envelopes, percussion and too many more features to list here. Exclusively supplied by CKK.

EXCLUSIVE **£1085** NEW BOXED

KURZWEIL MicroPiano

SPECIAL PURCHASE

The MicroPiano is the most highly regarded piano module on the market, featuring Kurzweil's breathtakingly realistic true stereo samples - 32 note polyphony means you won't suffer from note-stealing and the wide range of other keyboard sounds and strings make it useful in many other situations. Built in effects including very high quality reverb mean there's no need to tie up another effects unit. Strictly limited quantities at this price mean that stocks won't last long. Order today - you won't be disappointed !

RRP £599 **£369** NEW BOXED

NEW, USED & EX DEMO

Yamaha RY8	£159	Ob'heim Matrix1000	£499
Access MATRIX Prog	£369	Oberheim M1000	£249
Access MicroW Prog	£369	Oberheim OBMX2	£1799
Akai S6010K	£299	Peavey Spectrum Org.	£359
Akai S6010P	£299	Peavey Spectrum Syn.	£359
Akai S6010V	£299	Peavey SpectrumBASS	
Alesis DM5	£350	£299Roland MC303	£545
Alesis SR16	£199	Roland MDC1	£299
Boss DR5	£299	Roland MGS64	£599
Boss DR660	£459	Roland MKS70	£649
Dream GMX 1	£69	Roland MOC1	£499
Emu CLASSIC KEYS	£549	Roland MS1	£399
Emu MORPHEUS	£799	Roland MSE1	£249
Emu Orbit	£699	Roland MVS1	£249
Emu Procussion	£645	Roland P55	£495
Emu Proformance	£359	Roland SC55ST	£365
Emu Proteus 2	£810	Roland SC88VL	£649
Emu Proteus FX	£469	Studio Elec SE1	£1526.33
Emu UltraProteus	£1139	Technics SXWSA1R	£2199
Emu Vintage Keys+	£799	Waldorf Microwave	£1199
Kawai GMega LX	£129	Waldorf PULSE	£599
Korg 05R/W	£299	Yamaha MU10	£189
Korg X5	£449	Yamaha MU5	£169
Korg X5DR	£439	Yamaha MU50	£299
Kurzweil K2000XB	£1899	Yamaha MU80	£739
Kurzweil KMP1	£299	Yamaha QY22S	£329
Marion PRO SYNTH	£699	Yamaha QY300	£949
Novation BassStation	£349	Yamaha QY8	£129
Novation Drumstatn	£449	Yamaha RY20	£299

ROLAND MOC1 MSE1 MVE1

LESS THAN HALF PRICE!

Spectacular end of line clearance deal on this selection of superb Roland specialist sound modules - buy a stand alone module for less than the price of a JV1080 expansion card! All are 8 part multitimbral, 28 note polyphonic, have dual 20 bit FX processors, and are compatible with any JV80/90 editing software. The MOC1 Orchestral module features the complete range of solo and ensemble orchestral sounds, the MVE1 Vintage module has all the classic analog sounds of the 70's from Jupiters to ARPs to Moogs, and the MSE1 String module has the lushest pads and clearest solo string sounds you're likely to hear anywhere, and even incorporates RSS processing! These incredible prices mean stocks will not last long - get your order in now!

RRP £499 **£199** MOC1 WITH ACCESS

RRP £499 **£199** MSE1 STRINGS

RRP £469 **£269** MVE1 ORCHESTRAL

Keyboards

ROLAND PC 200-II keyboard

IDEAL ENTRY-LEVEL MIDI CONTROLLER KEYBOARD

RRP £199 **£149** NEW BOXED

ROLAND AX-1

STRAP-ON STAGE KEYBOARD

Poseurs, look no further! For famous MIDI keyboard controllers, there's nothing better than Roland's AX1, and now with this amazing deal, there's nothing cheaper either. The 4 octave keyboard features full size velocity sensitive keys, pitchbend ribbon and expression bar. An array of program change buttons means quick and easy patch changes, and the bright red panel job doesn't (quite) glow in the dark! Very limited stocks - order now to avoid a lifetime of female rejection!

RRP £399 **£249** NEW BOXED

ROLAND E28

INTELLIGENT KEYBOARD

RRP £499 **£399** FREE MIDI INTERFACE

KORG TRINITY

INCREDIBLE NEW LOW PRICE!

When it comes to workstation keyboards, the Korg name is legendary. Their current flagship product, the Trinity not only features the customary range of exemplary sounds, but also touchscreen technology to make it one of the most intuitive instruments on the market, and a range of options to turn it into a fully fledged recording studio, sample playback (Akai compatible), Prophecy expansion board, and even hard disk recording! Plus, Pro and Pro X versions also available at incredible discounts - call for details.

RRP £2349 **£1599** NEW BOXED

The UK 4 track Centre

THE turnkey 4 TRACK PACK

Our famous 4 track pack includes everything you need to start making music. Mixer, headphones, microphone with cable, chrome tapes, cables, head-cleaning kit and the best book we've yet seen on multitrack recording, taking you through basic track laying, mixdown etc., with sections of everything from mic placement to synchronisation and MIDI! We've obtained some great 4 track pricing, AND for a limited period we will give you the 4 track pack (normal price £59.95) absolutely free with the units featured herein.

PORTA 03 Mk2

only £199

INC 4 TRACK PACK

New version of a classic portastudio. Improved styling and metering (!)

RRP £229 **£199**

FOSTEX XR-3Multi-tracker

INC 4 TRACK PACK

High speed machine at £249 ! New auto-bounce facility and built in mic - ideal for 4 track recording on the move

NEW PRODUCT **£249**

FOSTEX XR5 Personal Studio

INC 4 TRACK PACK

Stunning new digital mixer / Fostex machine with individual EQ, up to 2 aux sends and 2 stereo returns, inserts & 4 sep. tape outs allowing use with an external mixer.

RRP £420 **£335**

FOSTEX XR7 Personal Studio

INC 4 TRACK PACK

The XR7 breaks new ground in price and performance - 6 inputs (2 mics), 2 separate aux sends, levels + sweep mid EQ. Records up to 4 tracks at once - double speed transport, Dolby C.

RRP £499 **£449**

NEW, USED & EX DEMO

Fostex 380S	£799	Tascam 424MKII	£499
Fostex DMT8	£1199	Tascam 464	£599
Fostex XR3	£219	Tascam 488MKII	£995
Fostex XR5	£319	Tascam Porta03 MK2	£199
Fostex XR7	£419	Tascam PORTA07	£269
Roland VS880	£1499	Yamaha MT4X	£399
Roland VS8F1	£340	Yamaha MT50	£279
Tascam 424	£379	Yamaha MT8X	£600

TASCAM 414

INC 4 TRACK PACK

All new Portastudio from Tascam! Records to all 4 tracks at once using DBX noise reduction. Double speed recording for better bandwidth, 2 band EQ, 4 mic inputs and full LED metering make it great value for money. Includes free four track pack!

NEW **£349**

TASCAM 424 Mk 2 PortaStudio

INC 4 TRACK PACK

A brand new version of the best selling 424 from Tascam, a member of the portastudio. Features include 3 band EQ, with a mid sweep, records to all 4 tracks at once, 2 indepdent auxiliary sends (1 switchable pre/post fade). Logic controlled 2 speed transport with built-in memory location points, DBX noise reduction, initial supplies limited.

NEW PRODUCT **£499**

YAMAHA MT50 Multi-tracker

INC 4 TRACK PACK

High Speed, record on all 4 tracks simultaneously, dbx noise reduction, 2 band EQ on each track, as well as auxiliary send/return.

RRP £389 **£299**

YAMAHA MT4X Multi-tracker

INC 4 TRACK PACK

Stunning deal on this quality four tracker from Yamaha. Records all 4 tracks at once, logic controlled transport, 2 autolocate points, rehearsal mode, 3 band EQ, 2 aux sends, individual track outputs, normal and double speed operation, DBX noise reduction and full LCD metering. Buy now while stocks last!

RRP £549 **£399**

Sampling

TIME & SPACE

THE BEST EVER DR. RHYTHM

We have two Time & Space Jukeboxes in store, each fully loaded with the current top 100 CDs. There are choices to cover everything from straight instrumental sounds through sound effects, to loops and breaks. We carry virtually the full range in stock and can also supply most disks in CD-ROM format for direct loading into your sampler. Come and check out the latest sounds today.

From as little as £29.95

EMU E6400

COME FRO A DEMO AND HEAR THE DIFFERENCE!

Building on the success of the E64 comes the E6400 from EMU. As well as coming with 4 meg of RAM as standard, and all the features of version 2 software, expandability is unrivalled with options including an extra 8 outputs, 32 MIDI channels, 18 bit dual stereo FX processors, and up to 128 note polyphony! Huge EMU CD ROM library available at Turnkey.

NEW **£2499** WITH FREE ZIP DRIVE & 16 MEG

AKAI S3000XL

WORKHORSE SAMPLER

Akai continues it's tradition of supplying workhorse samplers to the studio market with this sturdy offering. The compact 2U rackmount machine features 32 note polyphony, 10 outputs, 2 meg expandible to 32 with SIMMS, SCSI as standard, MESA editing software, and a whole range of expansion abilities including digital i/o and an extra filter board. Buy from us and get 16 meg and a ZIP drive free!

16 MEG & ZIP DRIVE FREE **£1799** NEW BOXED

EMU ESI-32 • SCSI

SAMPLER 2.0 SOFTWARE

Featuring 32 note polyphony, 4xpolyphonic G-Slip resistant filters, huge quality library, (Akai and Emaxii compatible) Time-stretch, doppler FX, parametric EQ, exciter etc. All E-mu samplers come with free access to our enormous sample library (we have all the EMI library on CD-ROM) and excellent tech support (many staff are owners)

WEST END EXCLUSIVE RRP £1199 **£899** NEW BOXED

Now bundled with SCSI cable, CD-ROM drive, ZIPdrive and 32Mb of RAM plus a CD for the incredible price of only: **£1199**

PIONEER CLUBMAC

QUAD SPEED CD-ROM DRIVE

MULTI SAMPLER COMPATABILITY

If you want access to large amounts of sample library in a hurry, then there's no better way to do it than via CD-ROM. Hundreds of discs are now available full of everything from orchestral instruments to hip hop loops, all ready prepared to load into your sampler. Although in theory SCSI is SCSI, anyone with any practice in the black art will tell you that it's not the case, particularly when it comes to samplers. Drives that function perfectly with one machine will often flatly refuse to work with another. So we've taken the guesswork out, and come up with a bargain priced CD-ROM drive that works with all current Akai, Emu and Roland machines, and what's more, it runs at 4x normal speed, for ultra quick loading. Guaranteed to work! (Please specify which sampler when ordering.)

RRP £279 **£149** NEW BOXED

NEW, USED & EX DEMO

Yamaha SU10	£260	Emu E4 Keyboard	£3499
Akai EXM003	£189	Emu E64	£2649
Akai EXM006	£129	Emu ESI32 SCSI	£799
Akai EXM008	£499	Kurzweil K2500	£2799
Akai EXM01	£99	Kurzweil SMP R	£893.99
Akai EXM3002	£199	Kurzweil SMPK	£893.99
Akai EXM3008	£549	Roland DA400	£420
Akai IB208P	£399	Roland JS30	£850
Akai IB3015	£99	Roland OP760 IP	£330
Akai IB302D	£349	Roland S760	£1445
Akai IB303T	£149	SIMM 1 MEG 30 PIN	£29
Akai IB304F	£349	SIMM 16 MEG 30 PIN	
Akai MPC3000	£2799		£499
Akai S1100	£1199	SIMM 16 MEG 72 PIN	
Akai S2000	£849		£449
Akai S3000XL	£1299	SIMM 4 MEG 30 PIN	£129
Akai S3200XL	£3499	SIMM 4 MEG 72 PIN	£129
Emu E4	£4799	SIMM 8 MEG 72 PIN	£299

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*We will beat any genuine quote from a UK or European dealer. We must be able to substantiate the quote and the goods must be available and in stock.

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Outboard

LA AUDIO GCX2

NEW PRODUCT

The new LA Audio GCX2 offers 2 channels of high quality Compression and Gating for a mere £189 inc. VAT. Soft Knee Compression Circuitry features fully variable Threshold, Ratio and Gain controls plus Attack and Release modes. A Side-Chain Insert provides Frequency Conscious Compression. 2 fully featured Gates have variable Threshold and Release controls, an ultra fast Attack rate plus a Side Chain Insert for triggered gating effects.

Dual mono and Stereo modes make the versatile an extremely versatile processor for ALL Studios.

One of the hottest outboard products of the year - order now to avoid disappointment!

NEW PRODUCT **£189** NEW BOXED

SPL STEREO VITALIZER

BULK PURCHASE

The Vitalizer is the Rolls Royce of enhancer / exciter processors. Using a significantly different process to other such products, the effect deals with the full frequency range and is substantially smoother and richer. Also included is a "surround" effect which varies the width of the stereo field, massive bulk purchase allows this unbelievable price - check one out now - we guarantee you'll be impressed.

RRP £589 **£329** NEW BOXED

ALESIS MIDIVERB 4

PRO QUALITY EFFECTS UNIT

The MidiVerb 4 is the perfect stereo processor for professional project studios and musicians who require great sounding, fully-programmable effects. Its excellent Alesis effects algorithms produce dense, natural Reverberation, rich Chorus and Flange, Delay and Pitch effects that are designed for professional use. There are thirty-two effects algorithms, 128 Preset and 128 User Programs (256 total) to choose from, or you can create your own custom programs from scratch. Large backlit LCD, online help, MIDI controller routing and programmable footswitch give you complete creative control over every aspect of your sound. Choose £50 worth of cables absolutely free - only at Turnkey!

RRP £399 **£299** INC £50 OF CABLES FREE

DIGITECH STUDIO QUAD

4 CHANNEL STUDIO EFFECTS PROCESSOR

At last - Multi effects as they should be! The new Digitech Studio Quad features not only their ... design and ultra-powerful '5-DISC' chip, but also 4 independent inputs and outputs, which using the built-in sub-mixer, can be configured as 4 mono ins feeding 4 effects processors, feeding 4 stereo outputs. Huge screen, and new intuitive operating system make editing a breeze. 20 bit convertors give greater than 90 dB signal to noise ratio. Effects include reverbs, delays, detuning, chorus, flanging etc. Hundreds of other features too numerous to mention.

RRP £499 **£POA**

ZOOM 1204

TRUE STEREO EFFECTS PROCESSOR

Our tremendous buying power makes this the only sub £200 effects unit to look at ! True stereo and the quality of the reverb alone make it worth the price, but there's lots more : If one of the 512 presets doesn't suit exactly then using the two parameter knobs will allow you to tweak the program until it does. The addition of 2 band EQ will further tailor the sound to your mix. Other effects include delay, chorus, phasing, flanging, as well as more 'of the wall' effects like vocoding... and all this in a full 19" 1U rack. No need to look elsewhere !

RRP £199 **£179**

dbx 266

DUAL COMPRESSOR GATE

Two channels of classic dbx compression with new Auto-Dynamix™ Attack and Release controls, program-adaptive expander gates, balanced inputs, precision LED metering and sidechain insert. Front panel selection of stereo or dual mono operation, all in a standard 1U rack design. Entire dbx range on demo at Turnkey!

RRP £229 **£199** NEW BOXED

ALESIS NANOVERB

NEW REVERB

To create the NanoVerb™, Alesis created sixteen powerful new preset effects algorithms, added 18 bit digital converters, and fit them into a compact, easy-to-use and incredibly affordable package. Lush Hall, Plate and Room Reverb, rich true stereo Chorus, Flange, Delay and useful Multi-effect programs are all offered. The NanoVerb's powerful assortment of programs offers enough variety that you can use it on your guitar rig, author a multi-media presentation the next day, and mix bands at the coffee house the following night. The Adjust knob allows you to tweak its great-sounding programs until they're just right for your music, while the Input/Output levels and Mix controls ensure proper effect levels for a wide variety of applications. And since the NanoVerb is so affordable, you can put two or three in your rack for dedicating to multiple sources.

RRP £189 **£POA** NEW BOXED

BEHRINGER Compressor

WORKHORSE COMPRESSOR

A natural sounding and fully featured compressor at a give away price ! Built-in gate removes any unwanted noise, while knee action makes compression much less obtrusive, "auto" mode makes quick setup a doddle and side-chain access means it can also be used for de-essing etc.

RRP £249 **£199** NEW BOXED

LEXICON Alex and Reflex

SPECIAL OFFER

If You're looking for a straight reverb unit, Lexicon have a reputation that's hard to beat! These are the cheapest units to offer the famous Lexicon sound - The Reflex has the additional benefit of dynamic MIDI, allowing real time control of multiple effects parameters. Huge discount at Turnkey!

RRP from £309 **£299**

Monitoring

ABSOLUTE 2

Studio Monitors by SPIRIT

PHONE FOR BEST PRICE

Here at last ! Stunning sounding, full spec monitors from the UK's leading mixer manufacturer. Incredible bass extension and power handling at a killer price. In stock now, come in and audition them ASAP !

RRP £300 **£POA**

CONTROL 5 JBL

NEW LOW PRICE

These classic monitors from JBL have been a standard in studios for several years and still stand up very well against more recent competition. The solid build quality you can expect from JBL comes as standard and the ported design gives fantastic bass response. Internal fuses help to prevent blown tweeters and a separate sub-woofer is also available for only £249. Exclusive to Turnkey.

RRP £499 **£249** PAIR

ABSOLUTE ZERO SPIRIT

NEW NEARFIELDS

The latest additions to Soundcraft Spirit's monitor range are the Absolute Zero's. For those of us with slightly less demanding monitoring applications, they make the ideal choice.

RRP **£199**

SAMSON SERVO 150

NEW LOW PRICE

Samson's Servo 150 is specifically designed for use with nearfield monitors, and does an excellent and unobtrusive job, sticking as close as possible to the "wire with gain" ideal for an amplifier. It offers a power rating of 75 Watts per channel RMS, making it an ideal partner for most of today's nearfield studio monitors. The standard 2u design means it fits neatly into your rack system, independent left and right volume controls are given, and there are built in signal and clip indicators, together with protection circuitry to help prevent blowing your speakers. At this price stocks won't last long - another Turnkey exclusive!

RRP **£169**

CONTROL 1c JBL

NEW LOW PRICE

These superb compact monitors (RRP £289) are ideal for accurate monitoring on a budget. Sturdy impact resistant casing makes them the only choice for location work. Bundle them with the Denon PMA250 power amp for only £299.

RRP £199 **£139**

NEW, USED & EX DEMO

Alesis 3630	£169	Furman QN44	£399
Alesis MEQ230	£225	Joe Meek Voice Chan.	£589
Alesis MICROVERB3	£165	Klark Teknik DN300	£939
Alesis MICROVERB4	£199	Klark Teknik DN301	£939
Alesis MIDIVERB4	£299	Klark Teknik DN320	£611
Alesis Nanoverb	£159	Klark Teknik DN330	£646
Alesis QUAD2	£519	Klark Teknik DN332	£891
Aphex 720	£1818	Klark Teknik DN360	£1479
APHEX-104	£239	Klark Teknik DN3600	£2345
APHEX-105	£399	Klark Teknik DN3601	£1820
APHEX-106	£399	Klark Teknik DN3698	£1880
APHEX-107	£549	Klark Teknik DN405	£727
APHEX-108	£269	Klark Teknik DN410	£1175
APHEX-320A	£1818	Klark Teknik DN500	£939
APHEX-720	£1818	Klark Teknik DN501	£979
BBE 322	£149	Klark Teknik DN510	£939
Behringer EX2100	£99	Klark Teknik DN5146	£856
Behringer EX3100	£189	Klark Teknik DN6000	£3237
Behringer MDX1100	£199	Klark Teknik DN716	£1232
Behringer MDX2400	£249	Klark Teknik DN726	£1749
Behringer MX8000	£2199	Klark Teknik DN728	£2100
Behringer XR2400	£399	Klark Teknik DN7730	£2130
BOSS GX700	£369	Klark Teknik DN775	£1999
BOSS RV70	£229	Klark Teknik DN800	£1433
BOSS SX700	£359	LA 4C2	£399
BOSS VT1	£399	LA 4G2	£399
BSS DPR402	£849	LA 4X4	£349
BSS DPR901	£849	LA C8	£699.13
DBX 150X	£149	LA CX2	£249
DBX 160A	£504	LA GX2	£249
DBX 165A	£1426.45	LA MX2	£249
DBX 166A	£548.73	LA V8	£816.63
DBX 168A	£1028.13	Lexicon 300L	£4644
DBX 266	£351.33	Lexicon 480L	£10569
DBX 274	£539.33	Lexicon ALEX	£299
DBX 290	£410	Lexicon DUALFX	£249
DBX 296	£417.13	Lexicon JAMMAN	£359
DBX 760X	£383.05	Lexicon LARC	£1512
Denon DRM550	£159.98	Lexicon LXP15II	£479
Denon DRM640	£209.99	Lexicon PCM80	£1799
Denon DRS810	£309.99	Lexicon PCM90	£2585
Denon DRW580	£199.99	Lexicon REFLEX	£339
Denon DRW760	£259.99	Lexicon VORTEX	£189
Digitech DHP33	£699	Massenb. GLM8200	£3319
Digitech DHP55	£999.95	Massenb. GLM8900	£5046
Digitech MIDIVocalist	£449	Neve 33609C	£2,192
Digitech RPM1	£549.95	P+R DB 1 DI	£29
Digitech StudioVocalist	£999	Peavey Analog Filter	£359
Digitech TSR12	£399	PHONIC PCL3200	£179
Digitech TSR24S	£799	Roland RSS10	£2199
Digitech VOCALIST H	£549	Roland SDE330	£856
DOD 231	£449.95	Roland SDX330	£799
DOD 830	£259.95	Roland SRV330	£856
DOD 834	£249.95	Samson E30	£219
DOD 835	£199.95	Samson E62	£299
DOD 866	£249.95	Sony DPSV77	£1399
Drawmer 1960	£1182.13	Sony HRGP5	£499
Drawmer 1961	£1169.13	Sony HRMP5	£499
Drawmer DF320	£499.37	SPECK EQ316	£699
Drawmer DL231	£558.13	SPL CVXLR	£822
Drawmer DL241	£440.63	SPL EQMAGIX	£1175
Drawmer DL251	£558.13	SPL MIKEMAN	£468.82
Drawmer DL441	£616.88	SPL OPTIMIZER	£1173
Drawmer DS201B	£405	SPL SVLXLR	£645
Drawmer DS301	£616.88	SPL Vitalizer Stereo	£299
Drawmer DS404	£616.88	SSL 834	£2350
Drawmer LA12	£287.88	Summit DCC2000	£1313
Drawmer LX20	£229.13	Summit EQF100	£2526
Drawmer M500	£910.63	Summit EQP200	£2345
Ensoniq DP/4+	£1299	Summit TLA100A	£1610
Ensoniq DP2	£799	Summit TPA200	£2229
Eventide DSP4000	£4694	Symmetrix 402	£699
Eventide H3000B	£3401	Symmetrix 420	£380.7
Eventide H3000SE	£2696	Symmetrix 421	£499
Eventide H3000SX	£1991	Symmetrix 422	£599
Eventide H3500DFX	£3701	Symmetrix 425	£499
Focusrite BLUE 230	£2932	Symmetrix 488	£599
Focusrite BLUE315	£1932	Symmetrix 501	£329
Focusrite BLUE324	£2879	Symmetrix 501/01	£379
Focusrite BLUE315	£4653	Symmetrix 528	£649
Focusrite BLUE330	£5076	Symmetrix 564E	£995
Focusrite RED0	£1137.5	Symmetrix 571	£799
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Focusrite RED3	£2579	Symmetrix 602	£1938.75
Focusrite RED4	£2344	Symmetrix 620	£1095.1
Focusrite RED5	£2056	Symmetrix SC1	£20
Focusrite RED6	£1675	Symmetrix SC2	£30
Focusrite RED7	£1757	Symmetrix SX201	£258
Focusrite RED8	£1440	Symmetrix SX202	£258
Frontline DDS 20	£99	Symmetrix SX204	£258
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Furman PL8 PLUS	£235	TC 2290 22D24	£2080
Furman PL8E	£175	TC M5000 SADF	£3496

NEW, USED & EX DEMO

AKG LSM50	£89	JBL CONTROLS+	£575
Alesis monitor 1	£399	JBL CONTROLSBI	£269
Alesis MONITOR 2	£799	JBL CONTROLSBS	£319
Alesis RA100	£349	KRK 6000	£699
AR Powered Partners	£149	KRK 6000S	£817
ATC SCM10	£995.23	KRK 7000B	£1169
ATC SCM100	£4033.78	KRK 7000B/S	£1287
ATC SCM100A	£5659	KRK 9000B	£1874
ATC SCM20	£1505.18	KRK 9000B/S	£1992
ATC SCM200A	£11207.15	KRK KROK	£351
ATC SCM300A	£11994	KRK KROKS	£469
ATC SCM50	£3480.35	Omnijh Footprint	£259
ATC SCM50A	£4864.5	Otis power station x 2	£199
Behringer HA4000	£299	Peavey CS200X	£389
Chameleon 1100S	£922	Quested H108	£904
Denon PMA250MK3	£159	Roland MA20	£99
Dynaudio BM10	£734.37	Roland MA7	£150
Dynaudio BM15	£998.75	Samson SERVO150	£229
Dynaudio BM5	£493.5	Samson SERVO240	£299
Dynaudio M1	£1761.32	Samson SERVO500	£399
Dynaudio M2	£3758.82	Sndcrft Absolute 0	£189
Furman HA6	£389	Sndcrft Absolute 2	£199
Genelec 1030A	£1334	Tannoy PBM 6.5 MII	£245
Genelec 1031A	£2322	Tannoy Sys 10MK2	£569
Genelec 1032A	£2935	Tannoy Sys 12MK2	£802
Genelec 1092A	£1308	Tannoy Sys 215MK2	£2689
Genelec 1094A	£2196	Tannoy Sys 6MK2	£232.65
Goodmans ACTIVE7S	£99	Tannoy Sys 8MK2	£350.15
JBL 4206	£351	TannoySys 15MK2	£1442
JBL 4208	£259	Waldorf EMES Red	£939
JBL 4412A	£586	Waldorf EMES White	£579
JBL CONTROL 5	£531.82	Yamaha A100	£159
JBL control micro	£99	Yamaha A100A	£289
JBL control one	£149	Yamaha MS101II	£116
JBL CONTROL1+	£399	Yamaha MS202II	£205
JBL CONTROL1C	£175	Yamaha NS 10M	£150

Computer Music

MUSICTIME DELUXE

Notation Arranger

NEW VERSION JUST RELEASED

MusicTime has been our best selling music package for 4 years. Now Passport have just released MusicTime Deluxe. You get both CD-ROM and floppy versions in the box, and a much more powerful program including part extraction, cross-staff beaming, correct playback of complex repeats (DC, Coda etc) and automatic part extraction. (We have small remaining quantities of the old version at £99

NEW VERSION PASSPORT **£129** WINDOWS95

SOUND FORGE4

PRICE CRASH £200 OFF !!

ALSO SOUND FORGE XP £149

Sound Forge 4 (nuw with AVI support) is a full featured sound editor intended for musicians, sound designers, and multimedia developers using the Windows platforms (16-bit or 32-bit Windows). Allows sound file editing, effects, loops and regions, playlists. External samplers and sync to MIDI and SMPTE Time Code. Multiple window environment allows more than 50 sound files to be open at one time. Supports WAV, AIFF, Creative VOC, VOX, and Sound Designer SDI files. Drag-and-drop, auto-snap to zero-crossings or time units for seamless, glitch-free editing.

RRP £489 **£269** WINDOWS 95

MIDIQUEST 6.0

Universal PC Editor Librarian

OVER 300 DIFFERENT EDITORS

MIDIQuest is the most powerful, flexible and comprehensive editor librarian around, with support for the widest range of MIDI devices including XQ50, JV1080 series, Morpheus, UltraProteus, MU50, MU80, Quadraverb Plus ! GT, Classic Keys, TD-7, KT76 / KT88, Korg X5, DPM3 and many others. Driver upgrades are generally free of charge, so MIDIQuest will last for as long as MIDI is around ! It's a really good investment. New version comes on CD-ROM and is fully Windows 95 native (ie 32 bit).

RRP £285 **£199** NEW PRICE

MIDI WORKSHOP

64 track MIDI sequencer

GREAT FOR BEGINNERS

Based on Passport's award winning Mastertracks Pro 6 (which scooped "Best Buy" in Future Music round-up, MIDI Workshop is the perfect sequencer for beginners, featuring a clear uncluttered user interface which conforms to windows 95 guidelines, so it's ideal for people who've been using PCs for years. MIDI Workshop features a graphic arrange page, Key Editor, Step Editor and reassignable volume faders for each track. MIDI support for playing WAV files. Also includes basic notation editor - (users wanting proper scoring should look at MusicTime instead).

We're bundling MIDI Workshop with a free SoundBlaster™ type MIDI cable - everything you need to get started!

RRP £149 **£49** WINDOWS 95

EMAGIC Logic Audio "Discovery"

FAST PC OR POWER MAC

Based on the highly evolved Logic Audio software (rrp £799), the new Discovery version leaves out some of the more esoteric audio processing facilities, the Fridays system, and has version of Logic Machine audio processing - other than that, it's exactly the same! Save yourself £150 today! Minimum spec pc is Pentium 90, Windows 95, 16 meg RAM. Macintosh - any 33 MHz 68040 16 meg RAM. Call the experts.

NEW PRODUCT **£249** NEW BOXED

CUBASIS YAMAHA MU10

INCLUDES CABLES AND CUBASIS SOFTWARE

The Yamaha DB50XG daughter-board puts the market by storm, bringing the sounds of their professional synthesizers to PC desktops for a fraction of the cost. Its astonishing realistic sounds went light-years ahead of even today's wavetable cards. AND NOW, Yamaha release the MU10 external sound-card ! No more screw-drivers, no IRQ conflicts, no DMA problems, just connect to the serial-port (cable included) and install the software. This beats even the easiest plug-n-play cards. FOR SOFTWARE, Yamaha wouldn't settle for the mucky mouse software often thrown in with lesser products. MU10 includes the CD-ROM version of Steinberg's brand-leading Cubasis, (not Cubase Lite). Buy the MU10, and you won't need to shell out on extra software 2 weeks later! Also features m'chine audio inputs - route any sound through the MU10 effects !

NEW **£199** NEW BOXED

ROLAND SC-7 GM sound module

COMES WITH FREE SERIAL CABLE

The Roland SC-7 General MIDI sound module is basically a Sound Canvas 24 voice poly, 16 part multi-timbral, 8 drum kits, and on-board reverb & chorus unit available for each channel separately. A great money saver is the built-in MIDI interface for Mac or fast PC (please specify), which works via the computer serial port (cable included). For little more than the price of a separate MIDI interface - get a professional sounding synthesizer thrown in! Also ideal for laptop owners. Strictly limited quantities 1st come first served!

EXCLUSIVE MEGADEAL RRP £349 **£89** NEW BOXED

BAND-IN-A-BOX

Intelligent Arranger version 7

FOR PC OR MAC (Atari v6.0)

NEW VERSION highly sophisticated composition and which combines editable styles and a chord list to provide computer generated backing tracks in seconds. Export into Cubase too!

#1 SELLER **£89** NEW BOXED

SIBELIUS 7

EXCLUSIVE LONDON SHOWROOM

Why do so many music academies use a program which doesn't work on the PC or Mac? Because for professional notation typesetting, nothing else comes close. "It's totally different league from anything else" - Paul Pilotti-son, Royal Academy of Music. Future Music Platinum award.

We are now an Acorn Authorised Dealer, so stock and demonstrate the exciting new RiscPC computer, running RiscOS 3 powered by the ARM Processor, and with optional 486 or 586 board for running Microsoft Windows software.

Call Geoff for DEMO. One to one tuition also available upon request.

FROM ONLY **£499** PLUS VAT

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ALL MODELS NOW WINDOWS COMPATIBLE

Pinnacle - 20 bit HD recording - up to 48 Meg of Sampledstore & Kurzweil Synthesizer	£479
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Tropez Plus - Tropez with better synth & FX	£269
TBS2000 - Tropez without Sampledstore	£169

Call us for our best recommendation to suit your needs.

VOYETRA Digital Orchestrator Plus

DESIGNED FOR WINDOWS95

"D.O.P." allows recording or playing of independent digital audio tracks synchronised with MIDI tracks. The number of digital tracks is limited only by a user's hardware. Full drag and drop digital audio editing features are provided as well as unlimited bouncing of tracks and support for multiple sample rates. Import & export of WAV files. Audio Transforms include digital delay, chorus and flange to fatten up tracks, noise gate, limiter and compressor controls to remove unwanted noise and alter dynamics, and echo, reverb, reverse and time-stretch/edit.

NEW PRODUCT **£129** WINDOWS 95

DIGIDESIGN AudioMedia II

STEREO HD RECORDING CARD

Turn your Mac into a Pro-Tools recording system with the AudioMedia II, which comes with Sound Designer II now-destructive editor software. Features stereo In and out (both digital and analog), and SMPTE sync, as well as real-time compression / Parametric EQ / Pitch Shift and Time Stretch.

R.R.P. £1,000 **£399** APPLE MAC

DIGIDESIGN Sample Cell II

EXPANDABLE TO 32 MEG OF RAM

If you have a PC this has to be the ideal sampling system. 32 note polyphony, up to 32 Meg of RAM, 8 outputs, multiple cards can be used in one machine, standard file formats supported, SDII, AIFF, WAV, comes with 2 CD-ROMs stuffed full of library and of course ease-of-use is unrivalled, with all editing is done on computer screen incredible value for money when compared to similar features 19" rack samplers, with the added convenience of an all-in-one system solution. (Additional hardware may be required to record new samples). Add 32 Meg for only £199.

R.R.P. £1499 **£399** PC WINDOWS

NEW, USED & EX DEMO

ALTECH MACLX	£49.95	MIDI transprosync	£230
APPLE Performa 450	£399	MIDIMAN Syncman	£99
Cakewalk Audio	£339	MOTU FREESTYLE	£149
Cakewalk Audio CD	£399	MOTU MIDI EXP PC	£349
Cakewalk Express	£69	MOTU MIDIEXP	£349
Cakewalk Home St.	£99	Musicware PIANO 2	£89
Cakewalk Pro	£169	Opcode STUDIO3	£299
Cubase 2.8 MAC	£335	Opcode STUDIO4	£549
Cubase 2.8 PC	£275	Opcode STUDIOSLX	£1099
Cubase Audio MAC	£675	Opcode VISIONPC	£249
Cubase Score Mac	£425	Passport Alchemy	£499.95
Cubasis	£149	Passport Encore	£449.95
Cubasis Audio	£249	Passport MT Pro	£149.95
Emagic AV Extn.	£75	Passport MusicTime	£99
Emagic EXPORT	£85	Passport Rhapsody	£249
Emagic LOG2 MAC	£65	Peavey PC1600	£329
Emagic Logic Audio	£250	Ricoh Scanner	£149
Emagic Logic AudioP	£649	Roland CM U 800 R	£28
Emagic LogicMac	£399	Roland MCS0MK2	£780
Emagic LogicPC	£399	Roland RAP10ATB	£198
Emagic MicroLogicPC	£99	Setinberg Wave Lab	£299
Emagic Notator SL	£199	Steinb Cubase Score	£379
Emagic UNITORII	£285	Steinb Cubasis	£109
EmagTDM exten.	£149	Steinb Cubasis Audio	£149
Fostex Mixtab	£99	Steinberg Cubase 3.	£249
Goldstar GSE X21	£60	Steinberg Midex +	£479
JLC syncmaster MAC	£29	Steinberg MUSICPC	£149
Key MP128N	£179.95	Steinberg ReCycle	£199
Key MP128S	£299	Steinberg Time Bandit	£32
Key MP128X	£179.95	Steinberg WAVE	£19.95
Key MS101	£119.95	Studio Vision PRO 3	£799
Key MS124	£149.95	Turtle Beach Maui	£7
M Quest MQX32M	£230	Turtle Beach Tahiti	£28
MIDI EXP PC NOTE	£379	Turtle Beach Tropez +	£239
Midi Time Piece II	£699	Viscount RD 800	£449
MIDI TRANPRO	£229.95	Voyetra Sound Suite	£139

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UK mainland carriage £9.99

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Alesis NanoCo

Stereo Compressor/Limiter

PAUL WHITE plugs in the smallest compressor he has ever encountered, and finds that there's nothing small about the sound.

Though it's little larger than a DI box, the new NanoCompressor has a wealth of features, some of which you don't get even on many full-size units — a side-chain insert point, a choice of soft- or hard-knee operation and even a choice of peak or RMS side-chain sensing. Attack and release times are fully controllable using rotary controls, ratio is variable from 1:1 right up to hard limiting, and threshold is also fully variable. In RMS mode, you get the benefit of program-dependent attack and release times too. On top of that there's separate gain reduction and metering, switchable input/output level metering and an output level control. Though I don't know too much about the circuitry used here, I'd guess that, at least in part, it's a spin-off from the full-rack 3630.

So how is all this possible in a box so small? The external PSU helps, but that hardly accounts for all the space-saving — the real trick is that the NanoCompressor is a dedicated stereo unit, so each control actually relates to both channels. This feature combined with truly tiny, flat buttons, results in one of the most compact yet uncluttered front panels I've ever come across. The audio connections are on unbalanced jacks on the rear panel with a TRS jack handling the side-chain insert point. Some people think that unbalanced gear is rather unprofessional, but when it comes to gates and compressors unbalanced connections can be a real bonus, as the vast majority of project studio desks have unbalanced insert points. Connecting balanced equipment often results in a significant gain loss, and the noise incurred by restoring this gain far overshadows any benefits that balancing might have to offer.

Most of the controls will be familiar to anyone who has used a basic compressor before, but having a choice of hard- or soft-knee operation on such a low-cost unit is, to my knowledge, unprecedented. Switching from hard- to soft-knee operation in some compressors can cause a significant change in output level, but Alesis have obviously arranged things so that the threshold is linked to the Soft/Hard switch, in order to allow the user to flip between both modes without experiencing a noticeable change in level, even though the amount of gain reduction being applied will change.

Having side-chain access means that an equaliser can be patched into the side-chain for de-essing (simply boost the frequency at which the problems are occurring and the compressor will respond more to those frequencies), or you can patch in a control signal for ducking the level of one signal by another.

IN USE

Because this is a dedicated stereo compressor, it can be used for processing either stereo signals or a single mono signal, but it can't be used as two independent mono channels. The control range is actually quite wide — Ratio is continuously variable from 1 to infinity. Attack can be varied from 0.1 to 200 milliseconds, and Release goes all the way from 50 milliseconds to 3 seconds. As in most compressors, the faster the attack, the less chance transients have of overshooting, but this can also lead to a dulling of the sound, so in situations where a brief overshoot is acceptable it's more normal to increase the attack time to a few milliseconds.

Knowing that this unit is likely to be bought by people inexperienced in using compressors, Alesis have wisely arranged things so that if all the knobs are set to their 12 o'clock positions, the resulting settings will give good results on most material. However, a little experimentation pays dividends.

Budget compressors often disappoint because they tend to rob the sound of clarity and

pros & cons

ALESIS NANOCOMPRESSOR £149

pros

- Flexible, but easy to use.
- Good sound quality.
- Inexpensive.

cons

- Non-standard packaging requires adaptor for rack mounting (holds three units).
- Dedicated stereo format precludes 2-channel mono operation.

summary

At the price, this is a supremely proficient little compressor with a tight, punchy sound.

SOUND ON SOUND

COMPRESSION AND DETECTION

• **COMPRESSION KNEES:** During hard-knee compression, no gain reduction occurs until the signal level reaches the threshold, and then gain reduction occurs abruptly at whatever ratio is set up on the Ratio control. Soft-knee compression, on the other hand, usually involves gain reduction coming in at a low ratio — around 5dB — before the signal level reaches the threshold, and by the time the threshold is reached, the ratio has increased to that set by the user. This progressive approach to compression usually results in more benign gain control, with fewer side effects than hard compression.

(For a comprehensive explanation of compression and limiting, see our April '96 issue.)

• **DETECTION PEAKS:** While most people know the difference between soft- and hard-knee compression, the difference between peak and RMS detection is less well known. Peak detection, as its name suggests, causes the compressor to respond to peaks in the input signal — even very short peaks. RMS, on the other hand, responds more to the average signal level (short peaks tend to be ignored), and in this mode the attack and release controls are overridden and the time constants controlled by a program-dependent circuit. As a rule, peak detection is more suitable for use with transient sounds such as drums or aggressively played bass, whereas RMS detection would be used with voice, rhythm guitar and so on.

mpressor

definition, but the NanoCompressor is an exception. It isn't totally 'invisible', but instead you hear the sound gaining attack, density and punch — which, after general gain control, is why most people want a compressor in the first place. Drum sounds become harder and more solid, while rhythm guitars seem to swell to fill the spaces between strums with warm, even sustain. Vocals can either be compressed gently just to keep their level in check, or you can treat them more harshly to get that dense, mildly pumping 'rock vocal' sound. Even bass-guitar recordings are improved. It's invariably necessary to set the attack time so as to allow the leading edge of the sound to pass through without being clobbered, but this is normal practice, and in RMS mode seems to happen automatically.

SUMMARY

I'd rather expected not to like the NanoCompressor, because I'm a pathological hater of anything that isn't full rack size, and I feel that having a dedicated stereo unit is rather restrictive on those occasions when you want to compress two independent mono sources at the same time. These observations aside, however, I was more than a little impressed by both the flexibility and the sound quality of this tiny unit. Not only can it be used on a variety of different programme material, both single sounds and mixes, but it also manages to add an appreciable amount of punch without wrecking transient sounds. At increased levels of gain reduction, the NanoCompressor asserts its authority without fuss or tantrums, and though the side effects of compression do start to show up at medium and high levels of gain reduction, they are in the main benign and musically interesting.

Given the extremely low price of this unit, it would be churlish for me to complain too much about either its size or its dedicated stereo nature, as these are the very factors that have enabled Alesis to build such a good performer for such a low price. The package may be nano but the sound is most definitely mega, and though it's been some months coming it's been well worth the wait. SOS

> "... you hear the sound gaining attack, density and punch — which, after general gain control, is why most people want a compressor in the first place."

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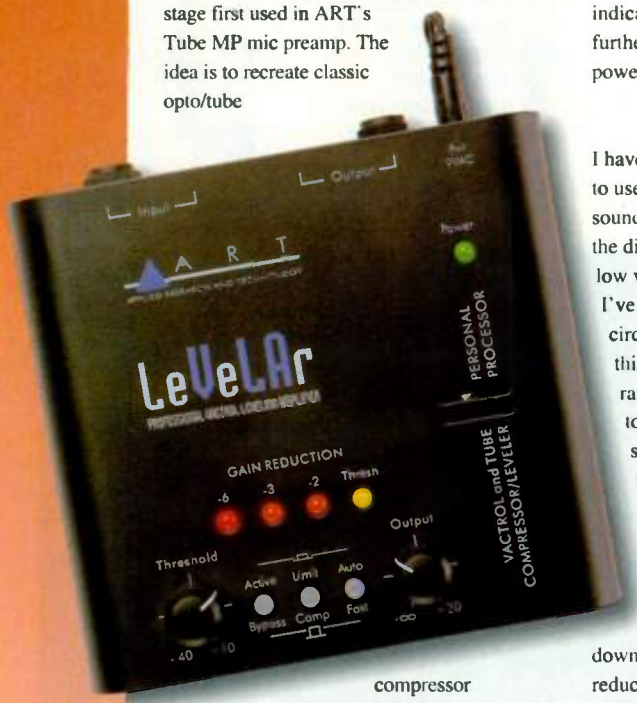
QSOUND

ART Levelar

Vactrol Levelling Amplifier

PAUL WHITE puts the squeeze on ART's new baby valve compressor.

It doesn't take much guessing to realise that Levelling Amplifier is a euphemism for compressor/limiter, but Vactrol isn't, as you might imagine, a designer drug designed to help you relax. Vactrol are actually an electronic components manufacturer specialising in opto-electronic devices, and ART's new baby comp/lim combines a Vactrol LED/photo-resistor with the low-voltage tube stage first used in ART's Tube MP mic preamp. The idea is to recreate classic opto/tube compressor characteristics at a relatively low cost, and at the same time make the unit very easy to use.



Packaged in the same tiny box as the Tube MP, the Levelar is a single-channel processor with both balanced jack and balanced XLR audio connections, though you can also use it unbalanced simply by patching in an unbalanced jack lead. Power comes from the familiar, but nonetheless infuriating, external adaptor, though the designer has at least included a little U-shaped punch-out in the metalwork which allows you to secure the cable, making inadvertent disconnection less likely.

The only controls on the Levelar's front panel are two knobs and three buttons, and there's also a 4-section LED gain-reduction display. Threshold is variable from -30 to +10dB and the other rotary control, Output, supplies make-up gain to a maximum of 12dB. Whereas most compressors have further knobs for attack, release and ratio, the Levelar rationalises this to a 2-position Limit/Compress switch, an Auto/Fast release switch and a Bypass button. Limit/Compress switches the compression ratio between 2.3:1 and 6:1. Attack is preset to a comfortable 6.5ms, and in Fast mode the release time is 200ms, making this a good general-purpose setting. Auto release brings in a program-dependent release time of between 70ms and 1 second.

The gain-reduction meter comprises four LEDs, the first of which comes on when the level hits threshold, and the remaining three indicate 3, 6 and 12dB of gain reduction. A further green LED shows that the unit is powered up.

IN USE

I have to say that this compressor is the easiest to use I've ever come across, and it actually sounds quite sweet. Much has been said about the disadvantages of running valves at very low voltages to 'fake' the valve sound, but I've heard a number of so-called starved tube circuits that actually sound rather nice — and this is one of them. In Compress mode, the ratio is fairly low, so you wouldn't expect to hear too many side effects. In fact, this setting provides very smooth compression with no loss of transient detail: the tube circuit adds in a little 'thickness' to the sound, but not enough to make it seem treated.

Limit starts to knock the sound around a little if you pull the threshold down far enough to initiate a lot of gain reduction, but in many cases this is exactly the effect you want, to harden up rock vocals or add snap to basses and drums. Indeed, if you really pile on the compression, things start to pump quite nicely, but the sound always stays musical. At lesser settings, the limiter is reasonably transparent, though to me it seems best when it's just starting to sound as if it's working for a living. Having an output gain control makes it easy to balance up the levels so that you can use the Bypass button to compare the processed and unprocessed sound.

I suppose what I have to decide is whether the simplification of facilities has gone too far, and I guess that, being really honest, I have to say that more control over ratio would have been useful. For some material, the Comp setting is a little too gentle, whereas Limit is just a hint too tough, but on the whole the Levelar is rather more flexible than it first appears. Interestingly enough, I didn't find the lack of attack and release controls at all limiting — the Auto setting in particular is very flexible.

SUMMARY

Obviously, the Levelar isn't going to give you the same pedigree of sound as one of the high-end, all-tube compressors, and it doesn't have the flexibility of a typical studio compressor, but what it does deliver is a warm, musically attractive sound that works well on vocals, bass guitar, drums, and even complete submixes. The simplicity of the controls is generally more of a help than a limitation, though I'd have liked a third ratio setting somewhere between the two on offer — a variable ratio control would have been even better.

Because the Levelar is a single-channel device, it isn't able to process stereo mixes, but it is well suited to project studio applications where you need to add a little valve warmth and vintage compressor thickness to the odd vocal or instrument line. It's also an ideal compressor for people who don't have much previous experience with compressors, as it's very easy to set up and use. Given its low cost (for a valve processor), and its ability to produce musically satisfying results very easily, I wouldn't be at all surprised to see the Levelar appealing to a wide range of users. SOS

pros & cons

ART LEVELAR £167

pros
- Affordable.
- Easy to set up.
- Warm, classic sound.

cons
- Limited controllability, especially Ratio.
- No stereo linking facility for two units.

summary
A simple compressor based on valve and photocell technology which combines gain control with subtle tonal enhancement.

SOUND ON SOUND

info

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Westlake BBSM4

Nearfield Monitors

PAUL WHITE finds that all things bright are not necessarily beautiful.

Westlake Audio have been in the monitor business a long time, and those who use their monitors do so because of their distinctive sound rather than because they are the most accurate speakers on the market. The BBSM4 is a nearfield monitor of the type normally found perching on the meter bridges of studio consoles; so that they don't intrude too much, the cabinets have been designed to be used horizontally. To achieve this, the centrally ported cabinet is fitted with a pair of identical 4-inch bass/mid drivers and a ¾-inch diameter soft-dome tweeter. With a rated continuous power handling of around 50W continuous, the BBSM4s can produce an SPL of up to 89dB at 1m and have -3dB frequency points of 65Hz and 20kHz. The surprisingly solid MDF cabinet is finished in black textured paint and the drivers are recessed into the baffle so as to be flush with the surface. There are no time-alignment steps between the bass/mid drivers and the tweeter as there are in the case of the LC 6.75s.

Though passive, the monitor is fed from a 4-way terminal strip to facilitate bi-wiring (unlike some bits of hi-fi black magic, bi-wiring often results in a demonstrable improvement in sound quality). Short link cables are supplied for conventional, non bi-wired operation. The nominal impedance is 4Ω but, as always, there will be dips, so an amplifier capable of driving lower impedances without flinching is essential for optimum operation. I used my AVI integrated hi-fi amp delivering around 60W per channel, and found that, because the speakers are quite efficient, I could get plenty of level without clipping. Even so, for serious studio use I'd probably go for an 150W-per-channel amplifier, just to keep the peaks clean at higher listening levels.

The well-damped bass/mid unit employs a doped paper cone in a roll surround, and the voice coil seems to be approximately one inch in diameter. The tweeter is a fabric dome design and the bass port is mounted directly below the tweeter. With overall measurements of 15 x 8 x 10 inches, these speakers are slightly smaller than the LC 6.75s and weigh 31lb each.

LISTENING TESTS

When testing unfamiliar near-field monitors, I use a set of familiar CDs, some of which I know to be well recorded, and I also compare the speakers under test with a pair of ATC10s or ATC20s. Like the LC 6.75s, these BBSMs have excellent stereo imaging with a usefully wide sweet spot and plenty of detail. There's also a surprisingly deep, tight bass end, but for me the sound is marred by being unrealistically bright to the point of harshness. This is evidently part of the Westlake trademark, and I can accept that a certain amount of coloration is acceptable in the name of fashion, but I feel they've gone too far — these speakers sound fatiguing almost from the word go.

At the low-frequency end, the handling of transients was definitely better than from the LC 6.75s, and you get the kind of kick normally associated with rather larger monitors. There's also plenty of mid-range detail, but the voicing makes even well-recorded material sound on the scratchy side — which is a pity, because I get the impression that, with just a little work on the crossover, these could be really excellent-sounding monitors.

SUMMARY

The BBSM4s provide the necessary level for near-field work, as did the LC 6.75s reviewed in last month's issue, and have irreproachable stereo imaging, but their voicing is too bright for my comfort. I've speculated that the voicing might be designed to appeal to users of the original NS10s, but my own view is that studio monitors should provide an accurate record of what's going on. An engineer using coloured monitors is rather like a fisherman using a ruler with 13 inches to the foot, just so he can make his catch seem bigger!

Ultimately, these are quite expensive as passive near-field monitors go, and, to be ruthlessly honest, the excessive brightness makes them very unpleasant to work with. I appreciate that Westlake have their own sound, and I know some engineers like to work with that sound, but my advice would be to listen very carefully before you buy. There are plenty of other far more accurate monitors in this price range — you can even get a well-specified active system for the same price — so unless you specifically want the Westlake sound, I'd recommend that you shop around. SOS

pros & cons

WESTLAKE BBSM4 £1295

pros
- Excellent stereo imaging.
- Good bass end.

cons
- Expensive.
- Excessively bright.

summary

The BBSM4s have a similar family sound to the LC 6.75s' but have a tighter bass response and better mid-range clarity. They are, however, voiced to sound very bright.

SOUND ON SOUND

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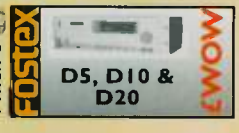

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Soundtracs Topaz

4-Buss Compact Mixer

STEVE BRODIE checks out Soundtracs' latest addition to the increasingly-crowded compact mixer market.

The emergence of relatively powerful compact 2- and 4-buss mixers over the last few years has done much to elevate the status of the home studio, and other areas have benefited from the change too — such mixers are now used in theatres, churches, clubs, and even video post-production. The other side of this coin is that with consumer choice comes confusion — the market is now flooded with compact mixers from various manufacturers, all offering slightly different features at slightly different prices, and with new models constantly becoming available, it's more difficult than ever to make a purchase decision in this field. Fortunately, the mixer under scrutiny here, the new Soundtracs Topaz 14:4, promises to handle a variety of applications *without* being crammed full of confusing features.

APPEARANCE & CONNECTIONS

The 14:4 is one of three new 4-buss additions to the Topaz range (the others being 12:4 and 24:4 versions). Initial impressions of the middle of the range model are good, if not too exciting; the steel casing and dominance of metal jack sockets, along with the chunky pots, lend the 14:4 a solid appearance, and the colour scheme is restrained; the casing is dark grey with very clear white legending, while the caps of the pots are colour-coded according to function. A stripe continues down the side of each knob, so it is easy to see your settings at a glance. Around the back, the rear panel accommodates just the master outputs on balanced XLRs, the power socket and on/off switch, and an external earth connection. The power socket mates via a secure screw thread which is unlikely to be dislodged by inadvertent tugs or snagging; sadly, though, the PSU itself is external and non-rackmounting (unlike the 14:4 itself, which can fit into your rack with the aid of the rack ears supplied). The back panel also sports a handy table detailing the wiring conventions of all the connectors, which is excellent — but I can imagine having to contort my body somewhat in order to read it once the mixer is installed!

Moving over the back edge of the folded steel chassis brings us to the main array of connectors, located on the rear of the 14:4's top panel. The 10 mono mic/line channels may be accessed via either balanced XLRs or balanced line-level jack inputs, and there's also a post-EQ insert point on a three-pole jack, wired ring-return/tip-send. To the right of the mono channels are the two stereo input channels which, being line-level only, have no XLR or insert points, just a pair of unbalanced jack sockets; connecting a jack to the left input only provides a mono channel. Above the stereo inputs, there are two stereo effects returns (increasing the possible number of mixer inputs to 18), and adjacent to these are two mono aux sends and two group outputs, again all on unbalanced jacks. Beneath these are two pairs of phono connectors allowing for input from and output to a stereo recorder.

This leaves just two connectors; the headphone socket which nestles next to the two-track phonos, and an unbalanced mono output, ideal for dressing room cue systems and the like in theatre installations.

pros & cons

SOUNDTRACS TOPAZ 14:4 £529

pros
- Straightforward yet flexible design.
- Reasonable cost.
- Solid construction.
- Excellent sound quality.

cons
- No dedicated monitor outputs.
- Basic EQ section.
- No clip LEDs.
- No channel status LEDs.

summary

Good sound quality, good construction, and a good price! Some features are missing which would make multitrack applications simpler, but whether these limitations will present a problem depends on your intended uses for the 14:4. If you need a mixer that can cope with basic studio recording *and* live use, check out the 14:4.

SOUND ON SOUND

CHANNEL STRIP

At the top of the mono channel strip is the gain control, providing mic gain of +10dB to +60dB or -20dB to +30dB at line level. Next down is the straightforward 3-band EQ section, providing 15dB of cut or boost at 12kHz, 2.5kHz and 80Hz. Each band has its own pot with a centre detent. I could bemoan the lack of a sweepable mid-band, but the frequencies are well-chosen, so the EQ should be adequate for the less experienced operator.

The last two pots are for the two stereo auxiliary sends. Aux 1 is switchable either pre- or post-fader, so it could be used to set up a monitor mix (in pre-fade mode) or be employed as a conventional effects send. Aux 2 is fixed post-fader. Both sends have a Solo switch located in the master section alongside the pre/post fade switch for aux 1.

Next we have a conventional pan pot, followed by the pre-fade listen Solo button. This is vital for the setting of input gain controls in conjunction with the bargraph meters, which show the level of any solo'ed channel. You'll need to set level with particular care, as the channels have no clip warning LEDs, which I found rather disconcerting. To hear the solo'ed channel, you will have to use headphones, as there are no monitor outputs, and the master outputs naturally continue to carry the programme material. This is a drawback for most home recording applications, particularly any form of multitracking, but it's not insurmountable.

Beneath the Solo button is a channel mute.

14:4

which is a welcome inclusion. Neither the solo or mute buttons have status LEDs in the channel, so you might find yourself peering along the surface of the mixer trying to see which button is depressed, although there is a master warning light.

A routing switch toggles between L/R or groups 1/2; you can't send a signal to the groups *and* the master outputs other than by assigning the whole group to the master outputs, which is far less flexible. A 60mm channel fader completes the mono input channel.

The stereo channels lose the gain control in favour of toggling between input sensitivities of +4dBu or -10dBV. There is no mid-range EQ, and the pan is replaced by a Balance control, which changes the relative level of the left and right inputs.

Facilities in the master section are basic; there's a single fader for the groups, but one each for the left and right outputs. A switch selects whether the 10-segment LEDs monitor the masters or the groups. A 20dB pad is available, which can be applied to the masters while leaving the tape outputs unaffected. The two effects returns each have a level control, with that for aux 2 doubling as a level control for the tape returns. A global phantom power switch and a headphones level control complete the master section.

IN USE

So — what does it sound like ? As part of my assessment, I took the Topaz 14:4 along to a live band recording I was due to make. It was a fairly simple recording setup, with a main stereo mic pair and some spot mics all mixed straight onto DAT. The results were strikingly transparent and clean — the absence of noise was particularly noticeable, even with the gain wound up to cope with very quiet acoustic instruments. In short, the sound quality is very good.

During the session, everything seemed to fall neatly to hand; at no point did I struggle to find anything, although the lack of status LEDs for mutes, clipping and PFL was disconcerting, to say the least. I didn't use the EQ during recording (I always treat it as a last resort), but trying some pre-recorded material revealed some contrasts. The HF was crisp and open, verging on edgy, whereas the LF was less well-defined — warm rather than punchy. I found the mid section well suited to boosting, providing some nice added presence, but less effective when cutting — which is what I would normally be looking to do with mid EQ!

CONCLUSIONS

I was delighted with the sound quality of the Topaz 14:4, but it's as well to remember that there are a number of handy features missing, such as sweepable mid EQ, monitoring facilities, and clip/status LEDs. There are also no insert points on the groups and masters (so you can't patch in a compressor/limiter or external EQ for that extra bit of control over the final mix), the two groups share a fader, and there are no individual channel outputs. I feel that these omissions (particularly the last one) are going to be more problematic for those wishing to record with a multitrack — whether you need those features really boils down to how you work.

The simplicity of design makes this a very flexible mixer, and for the musician who just wants good recordings without having to become a sound engineer, the Topaz has much to commend it, particularly the modest asking price. SOS

info

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Samson Q5

Headphone Amplifier

If you can keep your head when all around you are losing theirs, the chances are you're not monitoring loud enough! PAUL WHITE listens in on Samson's Q5 headphone amp.

You must have seen that TV ad — the one where you watch paint dry for 30 seconds, then a message comes up telling you that's about as exciting as house insurance gets? Well, that ad is Oscar-nomination material compared with headphone amplifiers. In the fun stakes, headphone amps rate right alongside mic stand clips — but just like mic stand clips, they're a vital part of any recording studio.

Virtually every mixing desk ever made has a headphone outlet, but unless you're a solo musician recording your own material this probably won't be enough. A dedicated headphone amplifier, on the other hand, allows you to take the output of a foldback send (or any other line source), and route it to a number of headphone outlets, each with its own volume control. This is clearly essential when two or more people are playing at the same time.

There are lots of fancy tricks you can do to extend the flexibility of a headphone amplifier, but the half-rack, 1U-high Samson Q5 delivers just the basic necessities in order to keep the price down. Indeed, this is one of the cheapest headphone amps I've come across. As is the case with most headphone amps, the Q5 is stereo and features balanced TRS jack inputs. If you were to use a single aux send to feed the unit, this would result in only one side of the phones being fed, so a global mono switch is fitted to the front panel, allowing both phones to be fed from the same source (or from a mono mix of the two inputs if a stereo feed is available).

Five separate headphone-output TRS jacks, each with its own level control, are accessible from the front panel, and a master input gain control, doubling as a power switch, provides a means of matching the incoming signal level. However, there's no input clip LED — a facility that I would have found useful.

Power for the Q5 comes from a hefty mains adaptor included in the price, and sharing the rear panel is a pair of balanced linking jacks that allow two or more Q5s to be hooked together and fed from the same source.

The audio performance of the amplifiers is actually very good, featuring a full 20Hz-20kHz frequency response, accurate to within 1dB, and a worst-case total distortion figure of less than 0.006%. The maximum output level is +24dB, to accommodate high-Z headphones, and the power supply includes a voltage-doubling circuit to maximise the available headroom.

SHEER IMPEDANCE

One potential problem when designing a headphone amplifier is that headphones come in a wide range of impedances, from less than 50Ω to over 600Ω. The circuitry used in the Q5 is based around a 500mW stereo amplifier per outlet, and is designed to run into virtually any conventional headphone, down to 8Ω impedance, without mismatch. However, low-impedance phones will produce a much higher sound level than high-impedance phones, so if you do have an odd assortment of cans in your studio, be prepared for the front-panel gain controls to end up in totally different positions.

IN USE

In general, the sound quality available from the Samson Q5 is comparable with what you'd expect from the phones output of a typical hi-fi system, and for most home recording purposes, or for overdubbing, the level is adequate. However, when I tested the Q5 with 150Ω headphones, I found the maximum level before distortion to be a little short of what I'd anticipate needing in a recording session involving drums. Lower-impedance headphones would help, of course, but probably not by a huge amount. What's more, I found that if the input gain was advanced too far, overload distortion was evident regardless of the settings of the individual output levels. This is a perfectly normal 'gain structure' problem, but without the benefit of a clip LED it takes a little longer to figure out where the distortion is coming from. To be perfectly fair, some of the distortion may have been due to pushing the headphones too hard, but without clip LEDs there's simply no way to tell.

SUMMARY

In the Q5 headphone amp, Samson have produced a cost-effective solution to multiple headphone monitoring in situations where each performer needs to hear the same mix, but where the level requirements might differ. The build quality of the unit is good, and the ease of use is compromised only by the lack of a peak clip LED. Having a mono button and link sockets to add further units is useful, and, other than the possible lack of sufficient level when using some less-sensitive high-impedance 'phones in a high sound-level environment, the sonic performance is as good as you could ask for. In a home studio, where most of the work involves vocals, MIDI instruments and DI'd instruments, the Q5 is a practical and cost-effective headphone monitoring solution. If, however, you need to feed different mixes to different performers, be prepared to spend more money on a more flexible unit. SOS

pros & cons

SAMSON Q5 £149

pros

- Very good value.
- Nicely built.
- Good sound quality.
- Five outputs.

cons

- Lack of input clip indicator.
- May be insufficiently loud when used with less sensitive, high-Z 'phones.

summary

An ideal headphone amplifier for use in project studio situations where all the performers are happy receiving the same mix.

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TL Audio Crimson C3021

Tube Compressor

PAUL WHITE studio tests the Crimson C3021 to see how favourably it compares with its Indigo counterpart.

TL Audio's Crimson range is basically a lower-cost version of their Indigo range of hybrid tube processors, but using solid-state circuitry in place of the tube sections. The Crimson C3021 reviewed here is a dual-channel compressor limiter and, like its Indigo counterpart, it is fitted with both unbalanced jacks and balanced in/out XLRs. The pair of front-panel instrument jacks (with switchable Hi/Lo sensitivity) has been retained for use with high-impedance sources such as guitars. It is possible to use both the XLR and jack inputs simultaneously, but the lack of any independent means of controlling the various levels limits the usefulness of this feature. However, you never know when it might help you out of a tight spot.

As far as I can tell, the controls are exactly the same as those on the Indigo C2021, with switched fast and slow attack and release times in place of the more usual variable controls. This arrangement works surprisingly well, no doubt in part due to the programme-dependent circuitry that automatically varies the time constants to suit the dynamics of the incoming material. Gain, threshold, ratio and makeup gain are fully variable via rotary controls, and a Stereo Link button links the channel side-chains for stereo operation; in stereo link mode, channel A's controls affect both channels. Each channel has its own Bypass switch and the two bargraph meters to the right of the front panel may be switched to show either gain reduction or output level. Side-chain access is provided by means of a TRS insert jack, and the integral mains PSU may be switched for 230V or 110V operation.

IN USE

Though there is a difference in sound between the Crimson and Indigo versions of this compressor, the lack of tube stages isn't as serious as you might imagine — this is still a nice-sounding, well-behaved compressor. At one extreme you can add just a hint of gentle compression; or, by cranking up the ratio to maximum, you can apply true limiting. Having an input gain control as well as an output gain control means that you can bypass the compressor, then use the output level meter to help you optimise the input gain setting. After that, it's a matter of setting suitable ratio and threshold values, and selecting fast or slow attack and release times. In fact, setting up this compressor is so simple that it could do very well in the sound-reinforcement market, where processors need to be very intuitive and straightforward.

As I pointed out earlier, I half-expected to find the lack of fully adjustable attack and release times restricting in some way but, providing you don't want to do anything too far out of the ordinary, there's really no problem. The abundance of headroom and bandwidth lends the unit an expensive, transparent sound, and I was pleased to find that I could set up both 'invisible' level control compression and more obvious 'compression as an effect' settings. I would imagine that most people will buy a compressor like this to handle vocals, acoustic guitars, bass guitars, drums and so on, and in this capacity it gives no cause for complaint.

SUMMARY

Though the Crimson C3012's feature set is fairly basic, this is still a surprisingly flexible and sweet-sounding compressor. It lacks a little of the valve warmth of its Indigo counterpart, but still manages a rich sound with no tendency towards thinness. It can also be used to apply fairly heavy compression without stifling all the detail out of a sound.

Given the choice, I'd probably still pay the extra and go for the Indigo version, but at a saving of around £200 on the Indigo the Crimson competes well on price with some of the other serious non-valve compressors, and it sounds a lot better than many of them. As a marketing move, introducing the Crimson range gives more private studio owners the ability to afford TL Audio products, and that can only be a good thing. Don't be put off too much by the 'tubeless' design, because there's a lot more to making a good-sounding compressor than simply putting tubes in it. The high-quality solid-state circuit components and circuits used here are exactly the same as those found in the Indigo range and the result is a compressor that sounds very nice indeed. TL Audio have built their reputation on affordable tube-hybrid processors, so it's a brave move to introduce a range with no valves inside at all. However, I think they've pulled it off here — and without doing their reputation any harm whatsoever. If you can afford an Indigo, great; but if you have to settle for a Crimson, I can guarantee that you won't feel like a second-class citizen! SOS

pros & cons

TL AUDIO CRIMSON C3021 £469

pros
- Distinctive design with clear graphics.
- Affordable.
- Classy, transparent sound.

cons
- Not quite as warm-sounding as the Indigo version, but then it's only two thirds of the price.

summary

The Crimson range in general performs very well, and even without the valve coloration the sound is smooth and detailed.

SOUND ON SOUND

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Alesis Point

Shielded Nearfield Studio Monitor

Affordable, compact and with magnetic shielding, the new Point Seven monitors are sure to cause a stir. CHRISTOPHER HOLDER determines whether serious reference monitoring has taken another price dip.

The art of making monitors has been refined and honed to the point where these days you can spend as little as a couple of hundred quid and have yourself a top-grade monitor with a flat frequency response, that'll take all sorts of stick, and come back asking for more.

Err... Not quite.

For a studio monitor manufacturer the design brief is simple: build a speaker with a perfectly flat frequency response where what 'comes in' goes out — nothing added or subtracted — at any level, all the way from the threshold of hearing to the threshold of pain. Unfortunately, even the very best speakers don't quite meet this ideal, and when you're faced with the constraints of size, weight and cost, the compromises tend to be harder to balance. Nevertheless, it's unquestionably true to say that that in recent years budget speakers are being built that are performing to far higher standards than, say, a decade ago.

Enter the Alesis Point Seven monitors.

They're compact, cheap, and competent performers. They don't pretend to sound absolutely accurate, but given their size and cost, neither would you expect them to.

AT THE POINTY END OF INNOVATION

As I extricated these monitors from their packaging, the cliché 'small but perfectly formed' sprang to mind. They are very compact, with the main driver (a 5.5-inch cone made from a proprietary non-woven carbon-fibre material) sharing space with a 1-inch silk dome tweeter in a cabinet only some 11 inches high and 7 inches deep. The actual box pays no homage to the irregular cabinet designs that are all the rage at present, with set-square corners thoughout. To protect you from puncturing an eyeball or opening a vein, though, the pointy bits are adorned with extra rubber corners. The cabinet is reassuringly solid in build and weight, while the MDF has a 'come stroke me' rubbery coating to it. In a departure from Alesis' previous monitor style, the cabinets are dual-ported, with the ports built into the front facia rather than the rear.

To continue in 'spec mode', the Point Sevens have a quoted frequency response extended from 85Hz to a canine-exciting 27kHz, with a passive crossover operating at 2kHz. As far as quoted power is concerned, the Point Sevens are built to happily operate at 50W RMS and 100W peak. Alesis quote a sensitivity of 86dB SPL (1W @ 1 metre). Interestingly, the Point Sevens have a nominal impedance of 4Ω, rather than the more common 'hi-fi' 8Ω, which should allow you to squeeze the maximum power from your amplifier.

US OF ADAT

Alesis strike me as being a canny company, and if I was to write a trashy coffee table book entitled *Home of the Brave, Land of the Rich — Great American Corporate Success Stories*, Alesis would be somewhere in the first few pages, along with Mackie and the company that makes double-sided sticky tape. As with many great success stories, Alesis launched a new product for a new market, first with affordable digital reverb, then with the ADAT 8-track digital tape recorder. Since then Alesis have always been in our faces, with their high-spec packages selling at prices that shouldn't be possible.

Applying similar principles, the question "to whom can we sell studio monitors that hasn't already got a pair?" was probably asked, and the laconic response "plenty of people" was probably the answer. In fact, anyone who has bought a synth workstation, 4-track recorder, multimedia computer setup with a soundcard, or GM module for the first time is a potential customer. "What do they want out of their monitors, then?" is the next question that might have been posed at Alesis HQ. People in home and project studios starting out are usually strapped for cash, while their studios are almost always cramped (the attic or the box room are favourites), acoustically fraught, and definitely not sound-proofed. The monitors they buy need to be easy on the pocket, and, because they will be placed wherever there's space, they need to be forgiving in their ability to produce quality nearfield stereo sound.

PUNCHLINE

Out of the hypothetical realms of R&D labs, where men silently shuffle about in big white space-suits, and in the gloomy, unglamorous reality of my studio, the Point Sevens soon began to show their true colours. If I had to chose two words to describe these little workhorses, they would be 'bright' and 'punchy'. I banged on my usual eclectic array of CD material: jazz, rock, techno, orchestral, Acker Bilk... each one revealing a different quality or deficiency in the monitors, as well as

pros & cons

ALESIS POINT SEVENS £249

pros
- Price.
- Video shielding.
- Punchy bass.

cons
- Can be a little harsh in the high end.

summary
Very good value for money, with a crisp, revealing response.

SOUND ON SOUND

Seven

revealing what a broad-minded man of the world I am — or something. I generally liked what I heard. There's a lot of detail in the mid range, and this is a quality which is particularly evident when you're listening for reverb tails or the extent of delay regeneration. The bottom end drops off at 85Hz, and the 5.5-inch carbon fibre woofers are happily unencumbered with the duties of deep bass reproduction. Consequently the bass end is extremely punchy and responsive — if lacking in low-frequency extension. (I could say something corny here like, um, "more punch than a Don King staff party", but that would belittle an otherwise classy speaker characteristic). The silk-dome tweeter has a slight problem in dealing with the high end: there's plenty of definition and crispness, but this sometimes borders on the marginally harsh, as is so often the case with US-designed monitors, especially those from the west coast (Elvin Jones' crash cymbal gave my fringe a trim with its energy). If there is an area where the Point Sevens show some 'peakiness', it's in the high mids, particularly prevalent in some vocal material (Björk sounded even more disconcerting than usual).

The Point Sevens deliver a good stereo image, but without the expansive soundstage you might expect from more expensive monitors. The image doesn't show any sign of degradation, regardless of the speakers' orientation (upright or on its side are the main ones, although in a face-down orientation you may experience a certain loss of frequency content). I was also impressed at how balanced and useful the output was at low levels. Conversely, when the speakers are pushed quite hard you'll find that the slight brightness of their response turns into a really quite strident high end. This was particularly evident when the Point Sevens were hooked up to a low-output hi-fi power amp (such as the 35W-a-side Denon model I was using). Naturally, the monitors were altogether happier being fed by a beefier amp, and that just underlines the fact that you should never under-power your speakers, otherwise transients will invariably clip.

GET TO THE POINT

The Alesis Point Sevens are good all-round performers, and though there is little in the way of finesse here, they do provide a fair representation of what's actually going on in your mix— as long as you bear in mind that you won't hear what the bottom octave is doing. As for their size, in most of the likely applications, I can only see this as an advantage. If your studio is in a block of flats or a bedsit, you need adequate level, tonal neutrality, and not too much bass, otherwise the room response will conspire to create a misleading bass end. You also don't want to have to worry over whether the bass end is shaking the three flying porcelain ducks off your neighbour's wall. The magnetic shielding is a critical inclusion and helps make the Point Sevens suitable for most multimedia applications where the computer monitor needs to be placed close to your speakers. (Using non-shielded speakers often results in colour and picture distortion if they're placed too close to a monitor.)

Put simply, the Point Sevens are ideal for anyone needing a quality pair of reasonably honest monitors at a nice price, though they aren't without strong competition from budget-priced British-built monitors. If you're monitoring at home on a pair of crackling, wheezing, and complaining hi-fi bookshelf speakers you were given on your 14th birthday, here's your chance to enter the world of real nearfield monitoring without breaking the bank.

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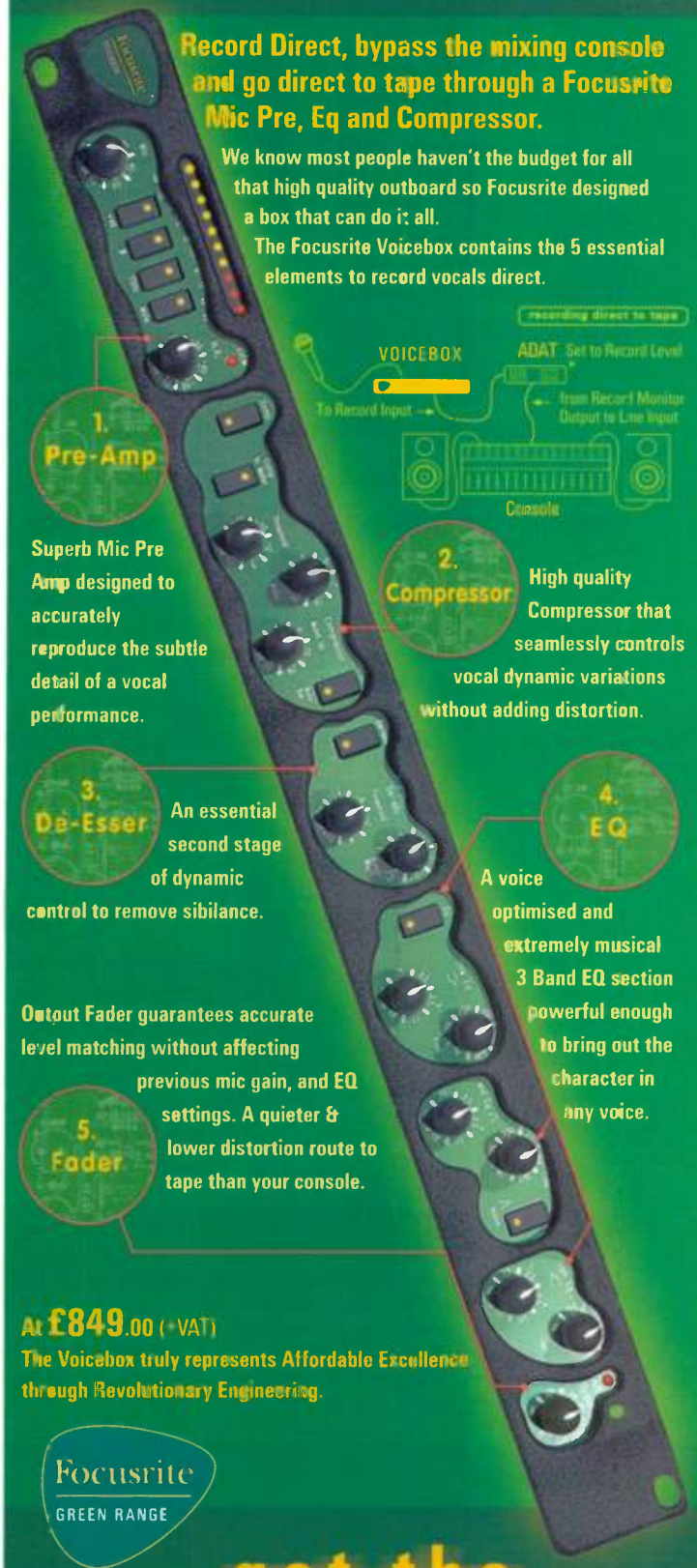

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Cheap & Cheerful?

WHAT TO LOOK OUT FOR WHEN BUYING BUDGET GEAR

With so many low-cost recording products coming onto the market every month, you might be tempted to ask what, if anything, is to be gained by buying more expensive models. PAUL WHITE attempts to answer.

When recording was in its infancy, everything was expensive — there was no home-recording market, so there was no economy of scale. Now a significant percentage of musicians have their own home studio setups and a whole industry has sprung up supplying the equipment needs of these people — and, because the worldwide market is large, equipment can be sold at near-consumer prices. But problems sometimes arise when semi-pro musicians buy very low-cost equipment, then expect it to produce professional results in a hard-working environment. Sometimes you're lucky, and an inexpensive piece of gear will behave the way you want it to, but as a rule you need to buy above the low-budget bracket if you want something really worthwhile. The purpose of this article is to look at some of the more common categories of budget equipment and to examine in what way they are compromised compared with their professional counterparts.

MIC PREAMPS

The mic preamps found in most mixing consoles are pretty competent, but sending a signal to a recorder via a console means passing the signal through a lot of circuitry, not just the mic amp. A cleaner way of working is to use a separate, higher-quality mic amp so that you can pipe your signal directly to your recorder.

Cheap mic amps often have a limited audio bandwidth and introduce distortion; and although they may have impressive noise figures quoted at maximum gain, in the middle of the gain range — where you're likely to be working most of the time — the noise figure might actually be quite poor.

Esoteric mic amps tend to offer bandwidths in excess of 40kHz so as to avoid phase artifacts, have an acceptable noise performance over the entire gain range, and introduce very little distortion. This isn't just down to good micamp circuit design, though: the power supply needs to be especially clean, and a lot of care has to be paid to the design of the phantom power circuitry. The difference between an average mic amp and a really good one is a revelation. The best analogy is to say that it's like comparing a dirty window with an open window — you get a much clearer and more natural sound where detail and spatial information really shine through.

Preamps involving valves are also popular, the idea being to give non-valve mics something of a valve-mic character. However, not all valve circuits are created equal, and many impart a very obvious thickness to the sound rather than adding subtle low-end warmth and gently bringing detail to the front. Some circuits use the valves at very low voltage, and — with the exception of Aphex, who've patented a system to make a low-voltage valve behave like one being run at high voltage — these low-voltage stages have a different tonal ▶

DIGITAL MULTITRACKS

Most project studios using digital multitrack tape opt for either the Alesis ADAT or Tascam DA88 (or DA38) machines and, in all honesty, both these machines offer superb value insomuch as their sound quality rivals that of far more expensive 16-bit digital tape recorders. What you lose out on by paying less, other than the expectation of instant response servicing, is mechanical robustness and convenience. Whereas a professional digital multitrack may use purpose-built hardware and even a specially-designed tape format, semi-pro machines rely on inexpensive, easy-to-obtain tape cassettes based on commercial video formats. Occasionally, you will get a dropout or a jammed tape — and because the error monitoring on semi-pro machines is so rudimentary, you don't really get any clear indication that the machine needs cleaning or servicing. A semi-pro machine is likely to be less rugged than a professional machine, so regular servicing is essential for a relatively trouble-free life.

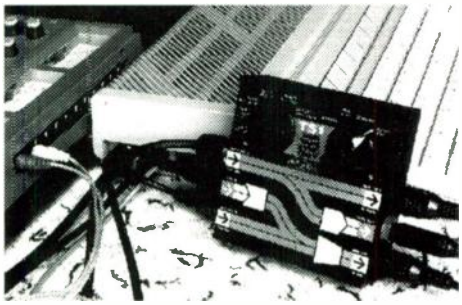
On the convenience front, modular digital multitrack machines take a certain amount of time to lock up when two or more are used within the same system, and if you're trying to patch up a vocal track that requires extensive punching in and out, this can be very frustrating. A practical way around this is to make a rough mix from each multitrack onto one track of the tape being used to record the vocals, then work with just this 'slave reel' until the vocals are finished. When all the punching in and out is done, you can then load up the original tapes, mute or re-use the guide tracks on the vocal tape and mix as normal. Admittedly, this is a bit of a chore, but it's pretty inconsequential compared with the vast cost-saving over pro gear. What's more, if you have a commercial system based on three modular digital multitrack machines, it's not unreasonable to keep a properly-serviced spare.

Tascam's DA38 — great value for a digital multitrack.

Talented tape sync

You can use the ***TS1*** to sync your MIDI sequencer to any decent tape machine. When you start, stop or shuttle your tape back and fore, ***TS1*** tells your sequencer to play in time, just as if your MIDI voices were extra tracks on the tape.

The ***TS1*** can generate and recognise the usual four SMPTE formats. The ***TS1*** will convert SMPTE to MIDI Time Code (MTC). Alternatively, you can use the ***TS1*** by way of Song Position Pointer/SRT format.



The ***TS1*** merges MIDI data received with its own sync data. You won't need to swap around the MIDI wiring, as ***TS1*** has four MIDI ports and automatic signal routing.

The ***TS1*** has a built-in mains power supply.

TS1 **MIDI Tape Sync Unit £99.00**

Amazing MIDI to CV

For an amazingly ultra-low price, the ***Little MCV*** lets your MIDI system control your analogue synths with their great sounds and friendly knobs.

This versatile interface unit can generate control voltages for the 'one volt per octave' (logarithmic) or the so-called 'volts per hertz' (linear) systems.

The gate output can be set to five volts positive, ten volts positive or S-trig.

High resolution sixteen-bit conversion allows accurate pitch across the full 128 note MIDI range with smooth modulation, pitchbend and portamento. The CV output also has a wide bipolar voltage swing and a tuning preset is provided.

The MIDI sustain commands are comprehensively implemented. MIDI reception can be set to any channel, using the straightforward front panel rotary control.

There are MIDI IN, CV OUT and GATE OUT sockets. The mains power supply is built-in.

Little MCV **MIDI to CV Converter.. £75.95**

Smarter merge units

You can't combine MIDI signals by joining wires together, so you may need a merge unit. The ***2M*** merges two sources, the ***3M*** merges three, the ***5M*** merges five, while the ***9M*** impressively merges nine! They can handle all types of MIDI data, including Time Code and SysEx. Many automatic features enhance performance and convenience.

These units ***2M*** and ***3M*** have built-in mains power supplies. The ***5M*** and ***9M*** require external dc power.

2M **MIDI Merge Unit £69.95**
3M **MIDI Merge Unit £99.00**
5M **MIDI Merge Unit £125.95**
9M **MIDI Merge Unit £169.95**

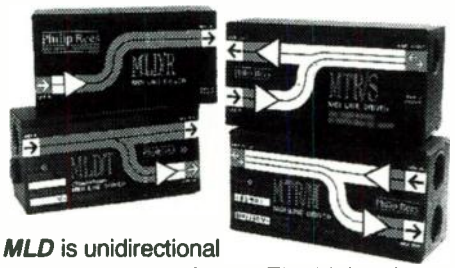
MIDI to DIN Sync box

When connected up via ***MDS***, slave devices equipped with Sync24 ("DIN Sync") inputs should start, play in time, and stop automatically by remote control from your MIDI master equipment. The unit is compact and contains an integral mains power supply.

MDS **MIDI to Sync24 Converter.. £69.95**

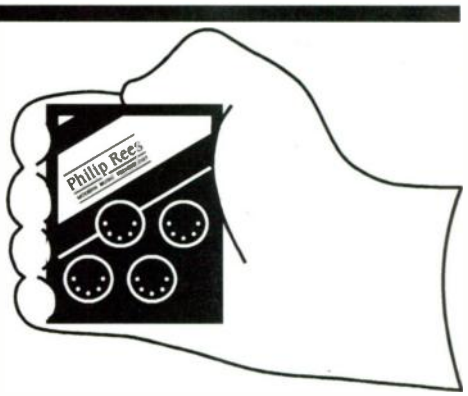
MIDI line driver choice

Our line drivers overcome the 15m limit of standard MIDI hardware, by converting the signal to a differential (balanced) format.



MLD is unidirectional and has a range of 1km. The bidirectional ***MTR*** system has a range of 150m. Both systems are mains-powered.

MLD **MIDI Line Driver £89.95**
MTR **MIDI Line Driver £99.00**



Functional Simplicity

Select a selector

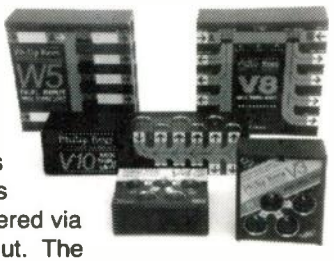
These handy low cost switch-in-a-box gadgets solve many MIDI routing problems and avoid the inconvenience of recabling.

The ***3B*** is a novel changeover switch, which will let you bypass your computer or sequencer without moving cables.

2S **MIDI Selector £11.95**
5S **MIDI Selector £29.95**
3B **MIDI Selector £29.95**
9S **MIDI Selector £39.95**

Low cost thru units

Some MIDI gear may lack thru sockets. Chains of more than three MIDI devices can suffer from data corruption. You can solve these problems at low cost with *Philip Rees'* MIDI thru units.



The ***V3*** is a battery powered 1-into-3 thru box. The ***V4*** has four outputs and is powered via its MIDI input. The ***V8***, which has two inputs and eight outputs, requires an external power source. The ***V10*** is a mains-powered 1-into-10 unit. The mains-powered ***W5*** has independent source selection for each of its 5 outputs.

V3 **MIDI Thru Unit £11.95**
V4 **MIDI Thru Unit £19.95**
V8 **MIDI Thru Unit £27.95**
V10 **MIDI Thru Unit £39.95**
W5 **Dual Input Thru Unit £55.95**

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character to traditional high-voltage valve circuits. Valve circuitry can be noisy, too, so check the spec and then confirm it with your ears.

Finally, circuits incorporating high-quality mic transformers tend to perform well, but good mic transformers are expensive. Many engineers claim that transformers, like valves, add a benign character to the sound, but beware of cheap transformers, as these can actually make things much worse.

MICROPHONES

A microphone is a simple device — you put sound in one end and an equivalent electrical current comes out of the other. So why are there literally thousands of models to choose from, ranging in price from a few tens of pounds up to a few thousand? And, more importantly, what is the practical difference between a £50 mic and a £1000 mic?

The classic Shure SM58 dynamic mic — useful as a yardstick when deciding what to buy.

It would be nice to be able to say that the more you pay for a mic, the quieter it is, the more accurate it is, and the more sensitive it is — but it's not quite that simple. For dynamic models, the specifications can be very confusing, because on paper many models seem to be very similarly specified. Even many cheaper models tend to be reasonably well engineered, but the subjective difference in sound can vary enormously from model to model.

Most dynamic vocal mics have a presence peak in their frequency response to help them project, and because different designers use boost of different amounts and at different frequencies, some tonal difference is inevitable. In some ways, the user's job is to pick a mic that suits their voice, but what sets a good mic apart from a bad one is harder to pin down.

I've often used the analogy that a microphone is like the lens of a camera — it defines the quality of what comes into the system, and any imperfections in the mic are carried right through the recording process. A poor mic may have a wide bandwidth, a reasonable-looking frequency plot and adequate sensitivity, yet still sound bad. This may be due to narrow peaks and dips in the frequency response that have been conveniently averaged out by the measuring process used to create the frequency plot, or there may be undesirable phase anomalies caused by the porting of the capsule, or even by the design of the basket surrounding the capsule.

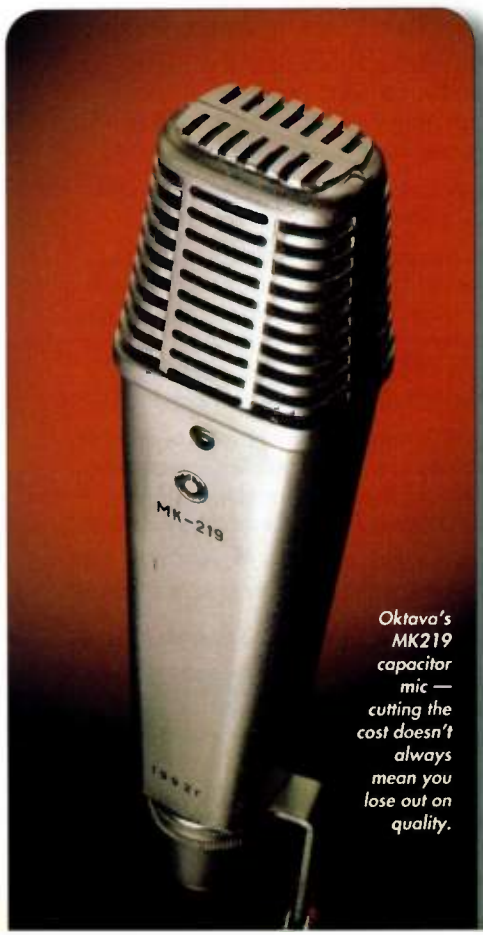
The best way to describe it is to say that poor dynamic mics often suffer from a honky or nasal quality; or, in the other direction, they may lack detail and projection. If you try to use such a mic, you'll find that you're always fiddling with the EQ trying to fix the problem, but this rarely works. Microphone problems are too complex to fix properly with equalisation and, to make matters worse, if you can't afford a decent mic, you probably can't afford a decent equaliser either!

Part of the problem of choosing a mic is that unless you hear two mics side by side, you quite often can't pinpoint what's wrong. If you don't know exactly what model you want, insist on doing a side-by-side comparison with a known reputable model, such as the ubiquitous Shure SM58. Even mics chosen for non-vocal uses should be capable of producing a fairly natural vocal sound.

Other things to watch out for with budget mics are excessive handling noise, lack of sensitivity, and proneness to popping. Popping and handling noise are less of a problem in the studio, where the mic can be stand-mounted and a pop shield placed between the mic and the singer, but a low sensitivity can mean excessive noise if you're not working with close or loud sources.

Capacitor mics and back-electret mics tend to be somewhat more expensive than dynamic models, but their extra sensitivity and extended high-end response make them the preferred choice for the serious recording of vocals and acoustic instruments. Expect to pay high prices for industry-standard models or any mic with valve circuitry, especially sought-after vintage models. As with dynamic mics, you should look for a natural, smooth character that sounds both warm and detailed. Some capacitor mics sound detailed and accurate, but somehow manage to lack warmth and weight, resulting in a cold, clinical sound, and again this isn't always evident from the frequency response plot.

> "What you lose out on by paying less is mechanical robustness and convenience."



Oktava's MK219 capacitor mic — cutting the cost doesn't always mean you lose out on quality.

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Gear On A Budget

There are several current valve mics that offer excellent value — you've probably read the reviews in *SOS* — and, just occasionally, there's a budget bargain when a low- to mid-price capacitor or back-electret mic happens to perform really well. It's even possible to buy Russian-made mics that come very close in sound to their Western counterparts, but the trade-off here is generally poor build quality and slightly more background noise.

Large-diaphragm capacitor mics are generally chosen specifically for their sound character rather than for their accuracy, but they should still sound comfortable and natural — the whole idea of a mic with character is that it enhances the natural aspects of sound: it shouldn't introduce coloration that's perceived as being unnatural. When testing a mic, listen for signs of raggedness at sibilant frequencies, and try to weigh up whether the sound feels comfortable. A comfortable sound is usually a natural sound; though it may be coloured in some way, the colouring will be benign rather than aggressive.

The noise performance of capacitor mics varies greatly from model to model, and how important this is depends on how you intend to use the mic. If you're working with close vocals, noise is rarely, if ever, a problem, but if you're working with acoustic ensembles, choirs, or particularly quiet instruments, then you may run into difficulties. A number of extremely accurate and quiet microphones are available from top manufacturers for discerning jobs such as orchestral recording, but — as you might imagine — these tend to be fairly expensive.

As a rule, the most expensive mics are the ones that have the best combination of sensitivity, noise performance, wide bandwidth, and smooth frequency responses; if colorations are present, they must be both subtle and flattering. But if you only need some of these attributes, you may be able to save quite a lot of money by choosing carefully. For example, you may be able to find a great-sounding mic that is a little insensitive or slightly noisy, but for close studio vocals this is something you can live with. However, always buy the best mic you can afford — once the signal has left the mic, the sound can only get worse, not better!

COMPRESSORS

The whole compressor market is a bit of a minefield, because a lot of users buy compressors for their side effects rather than just their ability to control gain. It is possible to build compressors that control gain in a fairly unobtrusive way (this is something that American company Aphex are keen on pursuing), and in situations where you just want to stop a vocal level from wandering around in a mix, unobtrusive compression is exactly what you need. However, if you want to add character at the same time, you need a compressor that also adds coloration, both dynamically and possibly in terms of harmonic distortion too. Several vintage compressors are cited as having classic sounds, and this is often due to the use of photocell gain-control elements, FET gain-control circuits or our old friend the valve. Modern designs have adopted all these technologies alongside the more technically advanced VCA.

Whichever type you choose, a good compressor should be able to control the gain of a signal without dulling the transient detail, and without making the sound seem squashed and lifeless. If the compressor adds coloration, the sound should still remain natural and transparent. You'll find that an up-market compressor will do all these things effortlessly, whereas you might have to spend a lot more time fine-tuning the controls of a budget model, and even then the result won't have as much life and presence as it should.

Aphex's recent 661 compressor can produce the high-voltage valve sound at low voltages.

HARD DISK RECORDERS

I may be wrong, but the way I see it is that semi-pro hardware-based tapeless recorders tend to suffer from being brought to market before all the bugs have been ironed out of them. At one time this was a 'feature' only of software-based products, but now it seems to afflict anything that involves digital circuitry; EPROM updates are becoming a way of life. When it comes to sonic quality, low-cost tapeless recorders are limited mainly by the accuracy of the converters and the implementation of the circuitry in which those converters are used. Even so, low-cost converters have got a whole lot better over the past couple of years, so unless you go to more than 16 bits, the difference in sound quality between a pro system and a semi-pro system might be less than you think.

Computer-based hard disk recording systems suffer from being — well, computer-based systems! The problem with computers is that, in a private environment, people expect more of them than simply running MIDI and audio software. They put on screen savers, games, spreadsheets, an Internet connection and so on, and then wonder why everything starts to behave in a somewhat flaky manner.

The other major problem is traceable back to software that isn't debugged properly — but instead of fixing what already exists, commercial pressures force manufacturers to add more features, and hence more bugs, every time a revision is made. Add to this the non-standard nature of computers, especially so-called PC clones, and it's no wonder that problems arise. The most professional thing you can do is buy a complete system ready configured, and then leave it alone! It might cost more, but if there are problems you only have one supplier to deal with, not a group of buck-passers.

The sound quality of computer-based systems is determined not only by the A/D and D/A converters, but where those converters are. If they're on a board inside the computer, the noise performance is likely to be significantly substandard by professional terms; if they're in an external box, or if you communicate with your soundcard digitally, then the sound quality can be excellent. Because the systems are in the main relatively cheap, the manufacturer is hardly likely to jump to attention every time you call up with a problem, though some are better than others in this respect.

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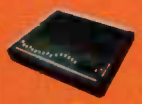

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Gear On A Budget

> "Cheap EQs can introduce noise, distortion and undesirable phase shifts."

EQUALISERS

Equaliser designs can sound hugely different, and I've never found the EQ on any low- to mid-price recording console to be completely satisfactory. The same is true of virtually all budget graphic equalisers and low-cost outboard EQ boxes. Adjust a cheap EQ and the sound either becomes dull, boomy or nasal, depending where you apply the cut or boost. But it shouldn't — EQ should behave as a volume control that works over only a specified part of the audio spectrum; when you boost the EQ, all the frequencies in that part of the spectrum should be lifted. Sadly, cheap EQs can also introduce noise, distortion and undesirable phase shifts, which is why the sound takes on unnatural characteristics, often described as nasal, boxy, scratchy and so on.

A high-quality equaliser will facilitate precise control over the areas of the spectrum being treated, and the circuitry is likely to have a very wide bandwidth, lots of headroom and very low distortion so as to maintain integrity when high levels of cut or boost are used. The result is quite different to what you'd hear when using a cheap equaliser — if you add treble with a well-designed EQ unit, the sound gets brighter as you'd expect, but it should still sound natural rather than peaky or forced. Conversely, if you turn up the bass end, you end up with more low-frequency energy, but the overall character doesn't change to become boomy or out of control. And why should it, when you're only turning up gain in one part of the spectrum, after all?

Valve equalisers command high prices, as do most valve-based circuits, but there are plenty of engineers who feel that the gentle enhancements provided by a well-implemented valve design are worth the extra cost. To test an equaliser, use a well-recorded voice or acoustic instrument as the sound source, and confirm that you can make quite radical tonal changes without spoiling the natural character of the sound. What you should find is that budget EQs are OK when used to add just a decibel or two of adjustment, but a high-quality EQ can be used to make much bigger changes without your having to worry about undesirable side effects.

REVERB PROCESSORS

Reverb units are very interesting boxes, because their purpose is to fool us into believing that what we're hearing is occurring in a real three-dimensional space. How convincingly this works has little to do with frequency response, distortion and noise, and everything to do with how cleverly the reverb algorithm is devised. Furthermore, the more sophisticated the reverb algorithm, the more powerful a digital processor is needed to run it, so the more expensive the box. Of course it's important to have low noise and distortion too, but what makes the reverb sound either real or not is the algorithm used to create the effect.

Lexicon's flagship PCM90 has the realistic reverb sound that many budget reverbs aspire to.

Most budget reverbs sound acceptable when creating medium- to long-decay hall and plate sounds, though compare these with a top-end unit and you'll probably be surprised at how much more convincing the better units are. It's also true that with the really good reverb units, you can add an enormous amount of reverb to the original signal without its seeming to become swamped or overwhelmed — with a cheap reverb, on the other hand, the sound usually deteriorates into a reverberant cacophony.

There are many factors that make a good reverb algorithm, including the details of the early reflection patterns, the density of the ensuing reverberation, and the shape of the decay. It's also important that the algorithms don't 'ring' (aside from plate settings, which are supposed to sound a little metallic), but you'll find that some of the cheaper units have metallic overtones, no matter what type of room you choose. This kind of problem is particularly evident on percussive sounds — vocals are rather more forgiving of ringing.

While long reverb times might be impressive, the true test of a reverb unit is to see whether it can recreate convincing small-room and ambient-space environments. Most budget units become hard- ▶

SERVICE AND SUPPORT

One factor that most people fail to appreciate until they need it is that of service and support. If you've just spent £30,000 on a professional digital multitrack recorder and it goes down in the middle of a session, it's not unreasonable to expect the manufacturer to send a service engineer to fix it the same day. However, if you've bought a semi-pro digital multitrack for about half the price of the VAT you'd expect to pay on the professional machine, you can't expect the same treatment, even if your career does hinge on it. More often than not, you'll have to send your machine away and wait days or even weeks for it to be fixed — and it does little good to protest that you're in the middle of a life-or-death session, because the bottom line is that the machine you've bought doesn't make enough profit for the manufacturer or dealer to be able to offer that kind of support. If you're working with semi-pro gear and you can't afford to have down-time, then budget for a spare machine, or try to arrange for a fast-response service contact. There are also a number of excellent freelance studio service engineers who will fix things on site, but relatively few of these have the specialised equipment needed to fully align and test digital multitrack machines. These comments on service apply to virtually all budget equipment, so next time you beat a retailer down in price to the point that they're making virtually no profit at all, don't be surprised if they don't treat your service problems with as much urgency as you do.

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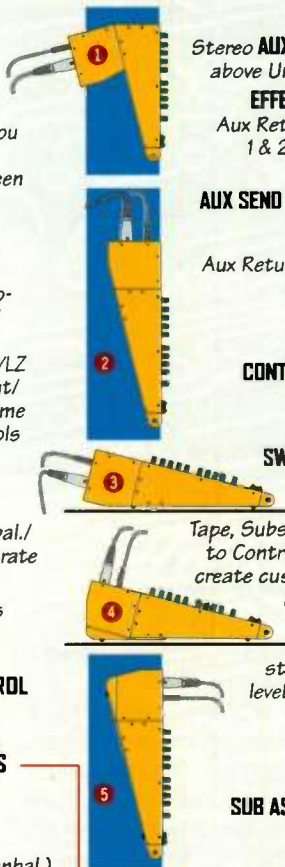

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WRH

sounding and metallic at short decay times, whereas a really good unit such as the top-end ones from Lexicon or TC Electronic will conjure up a convincing mental vision of the type of room being emulated. This is particularly important in contemporary pop music, as long reverb times seem to have given way to cleaner, more ambient treatments.

MONITOR SPEAKERS

Loudspeakers are fascinating things, and what's more fascinating is that some expensive studio monitors sound significantly worse than well-chosen budget hi-fi speakers. The problem is that a studio monitor has to try to do several incompatible things at the same time, so compromises have to be made; how well those compromises work out is inevitably linked to cost. Ideally, a speaker will cover the entire audio range, will go incredibly loud without distortion, will have a perfectly flat phase and frequency response, and has to be affordable — and pigs will apply for landing clearance at Heathrow!

"Some expensive studio monitors sound significantly worse than well-chosen budget hi-fi speakers."

Spirit's Absolute Zeros (above) are fine budget passive monitors, while Genelec's 1029As (left) represent good value for active monitors.

In most cases, designing a loudspeaker system to reproduce very high sound levels compromises the other parameters needed to keep the distortion within acceptable limits, and the problem is compounded if you want high levels of low-frequency energy, because then you need larger drivers, bigger boxes and more amplification. And, with cost being a factor, mass-produced lightweight drive units tend not to perform as well as precision-built devices with more substantial magnetic systems.

Fortunately, most project studio monitors are either near- or midfield types, so an immensely deep bass response isn't necessary. Indeed, unless you have a large acoustically designed studio, high levels of bass end simply result in a misleading, very inaccurate sound.

Given the same design budget, a 2-way speaker is likely to work better than a 3-way model, which is why most home studio speakers are 2-way systems. Three-way systems can offer a wider frequency range, but the cost of three drivers and a more complex crossover network is not insignificant. What's more, most of the sonic problems associated with monitor systems are focused around the crossover points, and in a three-way system there are two crossover points, as opposed to the single crossover point of a two-way system. Because the responses of the drivers on either side of a crossover point overlap to a significant degree, it is vitally important that the dispersion and phase characteristics of the two drivers are in step.

The subjective weaknesses of a poorly designed speaker system manifest themselves as a ragged, fatiguing quality around the upper mid-range, and possibly an uneven or inaccurate low-end response — if the cabinet has been tuned for quantity rather than quality.

Active speaker systems (those with separate amplifiers for the different drivers) can be built to sound much better then their passive equivalents, because the designer has far more precise control over exactly what signal is fed to each driver. Furthermore, because there are no crossover components between the amplifiers and drivers, the effective damping factor of the amplifier is much higher — in other words, the amplifiers are better able to prevent the speakers from overshooting due to mechanical inertia. Active systems are also better able to send more power to the least efficient speakers, so the designer does not have to attenuate the input to the most efficient speakers by means of resistive crossover components.

So what should you listen for? First you need some familiar test CDs, ideally with high-quality vocals and some acoustic instruments. Many CDs are not as nicely recorded as you might imagine, so take care to select well-recorded material that hasn't been processed to death. At sensible listening levels, sit between the speakers in the usual nearfield listening position, close your eyes, and listen carefully — not to the music itself, but to the sound, especially of the voice. Firstly, does the overall tonality seem okay: not too toppy and not too bassy? At the bass end, notes should be even in level, and the sound should be smooth, not boxy or tubby. What's more, the sound should seem controlled — it shouldn't disintegrate into a low-frequency jumble.

In the vital mid-range, you should be able to pick out individual instruments clearly, there should be no fatiguing roughness, and vocals should seem to hang in the air between the two speakers rather than stubbornly refusing to be placed. At the high end, there should be precision and detail, but without any annoying sizzle. After listening to the speakers at a comfortable

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monitoring volume for 10 minutes or so, you shouldn't be feeling an urge to turn them down — if you do, there's a likelihood that high-frequency distortion is irritating your hearing system.

Finally, try to listen to the stereo imaging. Do you hear sound coming from two speakers, or do you get a sense of each instrument and sound having its own position in space? Can you hear front-to-back perspective in the mix, or does everything seem flat? Once you're satisfied with tests, you're well on the way to picking a good set of monitors — but don't skimp on amplifier power, or you'll not get the best from them.

As a rule, cheap monitors will either be inaccurate, incapable of playing very loud or both; they're also more likely to incorporate cheap drivers that won't stand up to studio abuse. In the middle price bracket, there are some great-sounding monitors and some less great-sounding ones. The trade-off here is that the best speakers may be less electrically efficient than their less accurate counterparts, requiring more amplifier power — but this isn't always the case, by any means. A lot depends on how much money the manufacturer has spent on a fancy box and how much is left for the drivers and crossovers. You may also find that the best monitors don't go as loud as the less good ones — or at least they may not seem as loud. That's because distorted sound always sounds louder than clean sound, and some perfectly good monitors have been condemned for being too quiet simply because they don't hurt your ears!

Spending a little more gets you into the realms of active monitors, and here you should notice a much tighter sound. Again, the sound can vary a lot, not least because of fashions in different parts of the world, but if you do all the above tests and pick a speaker that feels comfortable to work with, you won't go too far wrong.

"As a rule, you get what you pay for, and in this era of digital recording and highly-specified budget mixing desks, any weak links in the audio chain soon show up."

SUMMARY

As a rule, you get what you pay for, and in this era of digital recording and highly-specified budget mixing desks, any weak links in the audio chain soon show up. Having said that, there are occasional gems that cost far less than you might think, and of course there are premium-priced turkeys out there too. After re-reading what I've just written — and don't expect me to make a habit of it — I'd sum up by saying that, once you've set aside reliability, after-sales support, and all the obvious technical stuff such as noise and distortion, what you're really paying for is a natural sound that's either completely uncoloured, or subtly coloured in such a way as to make it sound that little bit larger then life. In the case of monitors, I'd always advise going for the most accurate pair you can get your hands on, but when it comes to microphones or outboard gear, there's a strong case for buying both the most accurate, and whichever produces the most convincing illusion of naturalness. Whatever you decide, it's usually cheapest in the long run to buy the best you can afford, rather than buying cheap and having to upgrade every few months. SOS

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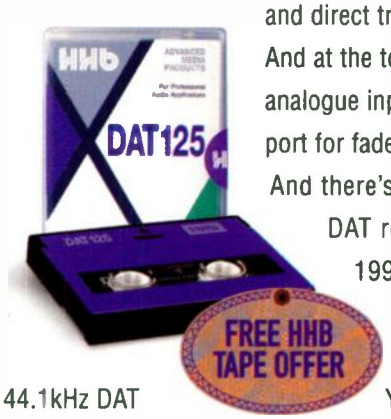

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WRH

People keep on making 'em, people keep on buying 'em. Is there no end to the appetite for TB303 clones? PAUL NAGLE checks out one of the cheapest yet, and concludes that FAT is good for you after all...

I have a strange, recurring dream which is set in a plush office somewhere in Japan. In it, an exasperated Roland salesperson declares: "You're the tenth person I've told today: there just isn't any demand for it!" and then slams down the phone. The enquiry concerns the legendary TB303, Roland's little silver plastic Bassline. Of course, the decision not to start making the 303 again is based on sound business strategy and years of experience. As to whether it's right or not — let's just say that numerous other companies depend on it, not least Freeform Analogue Technologies, who believe that there's room for yet another 303 clone in an already crowded market. So, without further ado, let me introduce the FB383 Analog Synthesizer, or Freebass. OK — it's not free, exactly, but, being priced at just under the £200 mark, it must rate a listen if Basslines are your thing.

FAT CITY

FREEFORM ANALOGUE TECHNOLOGIES FREEBASS ANALOGUE MONOSYNTH

The Freebass is the smallest rack-mounted synth I have ever come across, being just 2.5 inches deep and occupying a single rack space. With its silver and orange front panel, it definitely has a retro look — it would not be out of place alongside disco oil lamps and flared trousers! The knobs are all reassuringly smooth and chunky, with functions chosen to mimic the TB303.

The rear of the unit features a MIDI In socket (no Thru), the inevitable external power supply connector, standard quarter-inch jacks for the audio out and the external input to the filter, and four DIP switches which are used to set the MIDI channel. One flick with a tiny screwdriver to select the channel I wanted, and I was ready to go.

OPEN THAT BOX

First impressions are important. Before getting deeper into the Freebass, I was struck by the fact that if you play legato, an irritating preset portamento is introduced to the sound. Of course, I never had the opportunity to play my own TB303s via a keyboard (all programming being done in step time), so I switched on my Korg Prophecy and let the Prophecy's arpeggiator run frantically for a while as I twiddled knobs on the Freebass. Played in this manner, the Freebass took on an instant air of authenticity.

It's a strange business reviewing a synth whose sole purpose in life is to reproduce the characteristics — even the limitations — of another. There was no point in looking for second oscillator or, indeed, any feature that was not present on the original TB303. Instead, I simply assaulted it with as many acid/techno patterns as I could and conjured up lots of different sounds. There were more of these than I expected, but all very firmly in Bassline territory.

Although a MIDI implementation chart isn't included in the four-page manual, the FreeBass's spec is pretty easy to work out. It responds to Note On and Off information, but not much else, and if you want to manipulate the controls, this must be done live — exactly as you would on a real 303. On the whole, I prefer the approach of, for example, the Deep Bass Nine, which allows access to the filter or portamento settings via MIDI. It's not compulsory, after all; die-hard purists still have the option to do things the old way.

The synth has a playable range of four octaves which, given its intended use, is fine. With no octave selector or key shift, the notes you play are the ones you get.

WIGGLE THEM KNOBS

Since the Freebass is so uncomplicated, we can afford the luxury of looking at each knob in turn (very much as my wife does when attending a musical soirée with those lively young fellows the Chippendales). Two LEDs indicate the presence of power and MIDI information respectively. On power up, the MIDI light stays on until the auto-tune function has finished. This facility can be activated at any time from a front-panel switch, although it disables the synth for some 30-40 seconds while it does its calibrating. For this reason, perhaps it should have been positioned at the far left of the panel to prevent accidental and potentially embarassing silences!

Now for those knobs: the fine-tune knob allows transposition by a semitone up or down, which should be enough to tune to most modern instruments. It can also function as a crude pitch-bend function if you wish. The waveform knob is described in the manual thus: "The FB383 generates both square and sawtooth waveforms. This control is used to control the balance of these two waveforms." I must say I can't agree completely. It actually does a little *more* than that — or I've got something strange living in my ear. In fact this knob fades through several different timbres, from a fat-sounding square wave, to a more hollow and

pros & cons

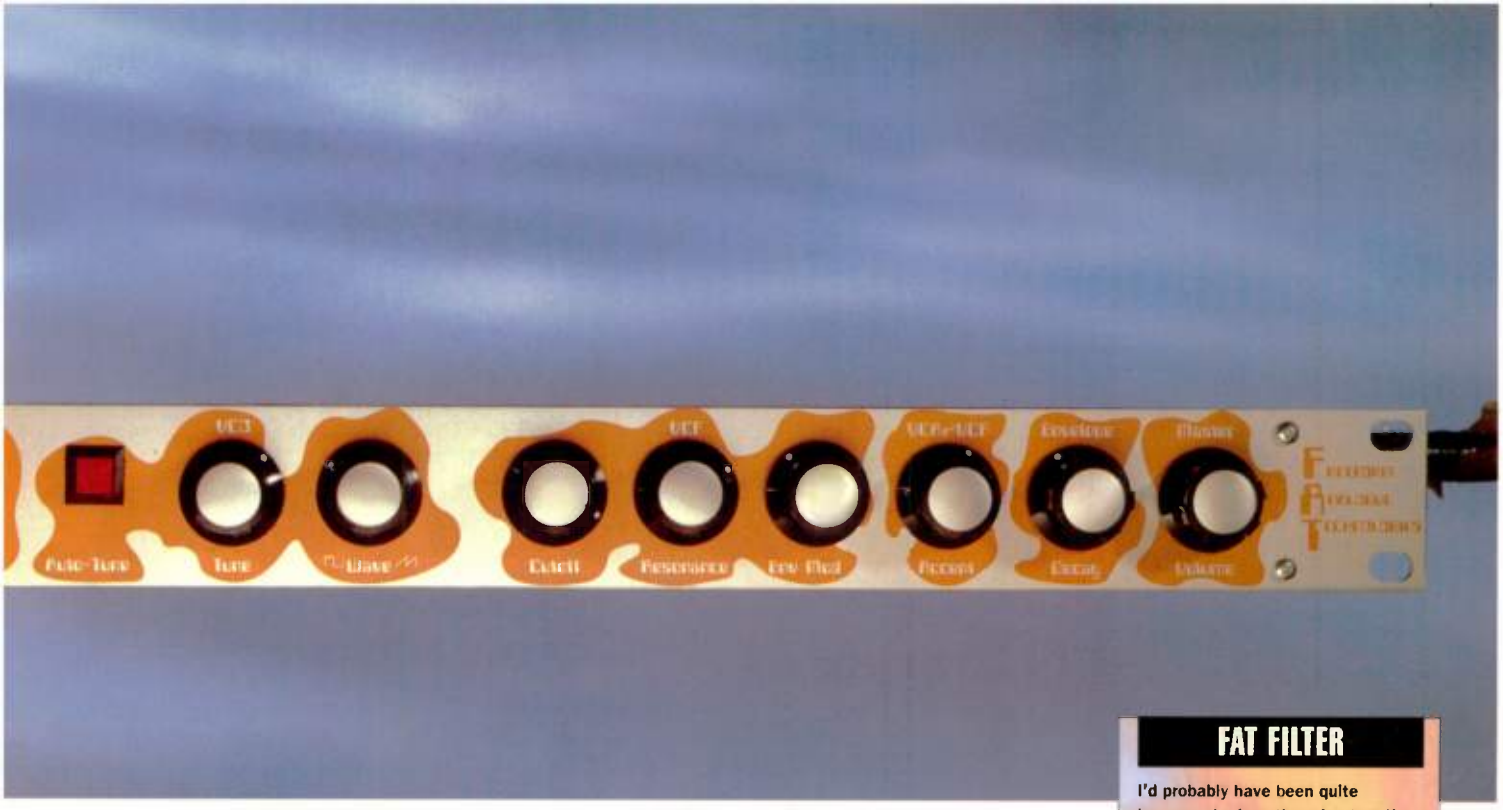
FAT FREEBASS £199

pros
- An affordable TB303 in a rack.
- External input to the filter.

cons
- MIDI implementation rather basic.

summary
With the Freebass in your arsenal, you have the same range of sounds as from the original Bassline but with an analogue filter unit thrown in. The MIDI spec is spartan, but remember that the original TB303 didn't have MIDI at all, so it could be argued that this is both a purist approach and a means of keeping down the price.

SOUND ON SOUND



pure square wave, then a mixture of square and sawtooth, a high, bright sawtooth and, finally, a deeper, fuller sawtooth. A setting at each extreme will give the closest match to the TB303's throbbing oscillator, but the small variations between are welcome and increase the versatility of the Freebass. To check out the differing characteristics, crank the resonance up to full and sweep the waveform knob all the way round.

The cutoff and resonance controls are extremely smooth, matching the range and operation of the 303. Resonance increases the electronic (or squelchy, if you want the technical term) nature of the sound, emphasising the frequencies around the cutoff. True to form, it doesn't significantly affect the bass components in the sound, unlike the resonant filters on many synths.

Accent comes into play with notes having a velocity of 120 or more, and adds a mixture of increased volume, cutoff and resonance settings, combined with a faster decay. Other than this, the synth doesn't respond to velocity, which is another reason why it sounds so similar to a TB303 right out of the box. Decay sets how quickly the filter is closed and is used in conjunction with Envelope Mod to produce sweeps and punchy attacks. Increasing the envelope modulation amount and shortening the decay time gives the characteristic filter blip that pervades most acid tracks.

A final knob is dedicated to overall volume control. I never found the need to change this from maximum, because I did most of my processing via the mixing desk. The Freebass has a strong, raw sound which responded particularly well to a selection of distortion, delay and other effects.

And that's really all there is to think about! A preset VCA envelope ensures that you'll never stray into unknown territory, and the sparse controls are all that's needed to extract all those beloved TB303 sounds with remarkable accuracy. Even though I haven't played every other clone on the market, this one is certainly close enough for most people who want the sound of a 303.

CONCLUSION

There's something reassuringly organic about a synthesizer with knobs whose positions aren't translated into absolute values on some form of display. Suddenly there seem to be more possibilities, endless combinations, and an almost infinite scope for subtle variation. The Freebass delivers TB303 sounds accurately enough for all but the most dedicated follower of fashion. The quality of the controls is superior to the original instrument's, and the style is a refreshing change from the drab black boxes that inhabit racks everywhere. 'Garish' is another (less kind) description. If Roland ever *do* start to make the 303 again, it is more likely to be in the form of a computer-modelled version. Everyone will discuss how closely it copies the real thing, totally forgetting to question just how far this programming feat has taken us! The FB383, though, is a purely analogue machine with all the natural warmth and control you'd expect. And if you're not using the Freebass for bass lines, its external input means that you can process other instruments with its distinctive filter — something I'd probably do a lot.

Reservations? Well, I wasn't exactly blown away by the MIDI spec and I worry that if the TB303 bubble ever bursts there will be a whole load of synths that no longer have a reason for existence. Despite being a single-oscillator monosynth, the Freebass manages to be both fat and a joy to tweak. After being initially sceptical, I found myself pretty convinced, and concluded that if I ever wanted another 303, this would do very nicely. SOS

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FAT FILTER

I'd probably have been quite impressed, given the price tag, if the Freebass had simply offered the features I've covered in the main body of this review, but there's an extra ingredient included to broaden the Freebass's appeal somewhat — an external input to the filter.

Connecting a succession of synths and drum machines to the filter input gave results ranging from good to superb. I was most impressed by the improvement to my JD800: for those of you who are interested, the JD has a digital filter which, although reasonable, has a rather nasty resonance which requires careful use. The filter on the Freebass added a warmth to my JD that alone almost justifies the synth's price tag. Pretty much any digital synth will benefit from a filter of this type, and even drum machines and samplers can take on a new lease of life when you give them a good resonant twang. I soon noticed that only a low level was needed or distortion crept in — not that this always sounded bad, especially with drums. As with most external filter units, you need to trigger the FB383's envelope section before you will hear any sound. This is independent of the triggering of your sound source and can be used creatively — as in pre-MIDI days before a note's pitch and gate signal became irrevocably bonded together. When an external signal is connected, the internal synth is disabled — meaning that you can't leave it plumbed into a patchbay, for example. Also, if you had the Freebass racked up, it might become rather inconvenient to keep stretching around to the back of the unit to connect and disconnect synths from the filter input.

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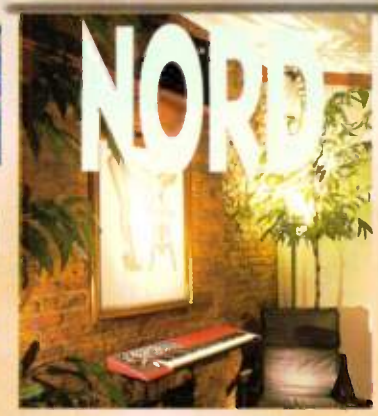

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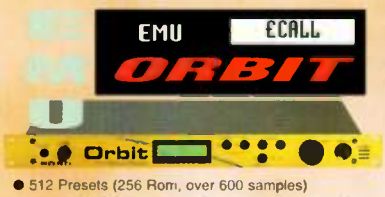

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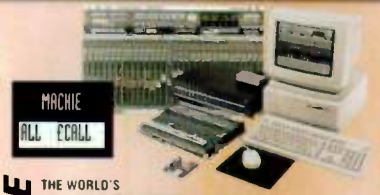

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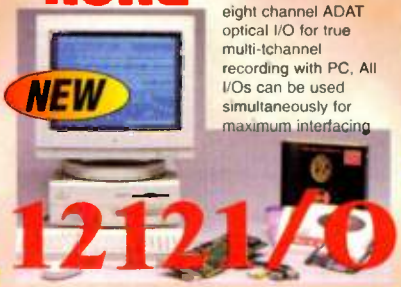

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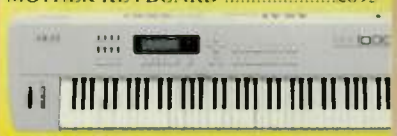

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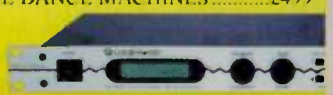

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RETAIL CHAIN IN THE UK TODAY

Christopher Fogel accepted an offer to mix an album by an unknown Canadian, and found himself caught up in the phenomenon that was Alanis Morissette. He tells NIGEL HUMBERSTONE how he went about recording her without losing the vibe and spontaneity.

Medicine Man

CHRISTOPHER FOGEL • ENGINEERING *JAGGED LITTLE PILL*

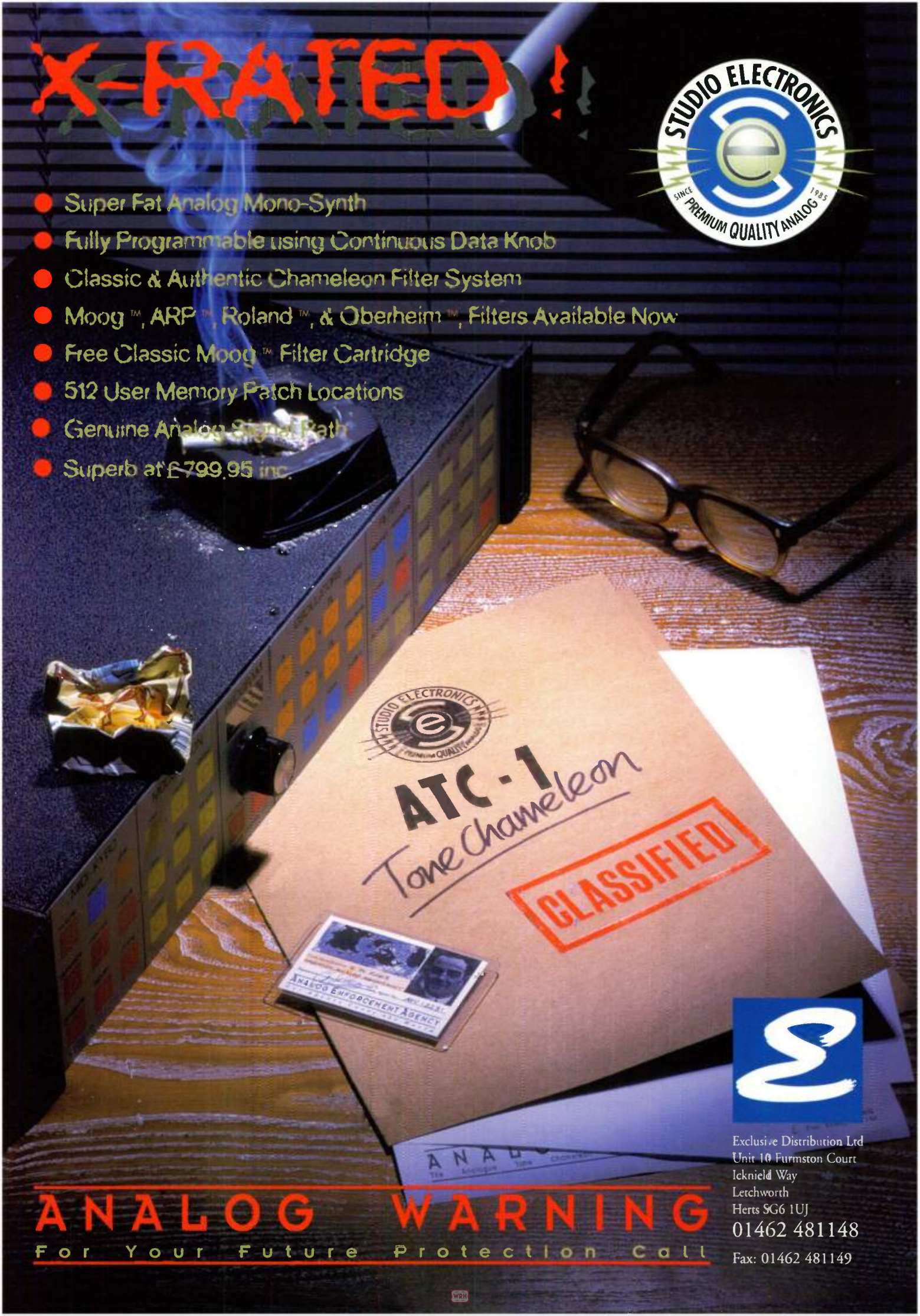
Strangely enough, Alanis Morissette got her first taste of international fame as an actor on a children's television series, *You Can't Do That On Television*, back in 1986 when she was only eleven years old. The very first episode in which she starred was all about music — and it was predicted then that Alanis would be a hit in the music industry.

The multi-million-selling and Grammy-bestowed *Jagged Little Pill* was preceded by two more forgettable albums, *Alanis* and *Now Is The Time*, which, although they established her in her native Canada, did little to raise her American profile. The breakthrough came when she met Glen Ballard, a songwriter, producer and arranger who'd worked with a string of artists, including Wilson Phillips, the Pointer Sisters, Celine Dion and Michael Jackson, and a magical co-writing partnership flourished. This dynamic collaboration resulted in the basics of the 1995 album being written in a staggering 13 days — a testament to the creative chemistry which also involved a third, less high-profile team member: engineer Christopher Fogel. Credited with mixing the majority of the *Jagged Little Pill* album, Fogel was undoubtedly an essential figure in the whole process. As the 28-year-old graduate of Fullsail, the Centre for Recording Arts in Orlando, awkwardly puts it: "The person that was there the next most was me."

ALTERNATIVE EDGE

Fogel had worked with Nine Inch Nails and other more alternative groups, before meeting up with Glen Ballard on the second Wilson Phillips record. His leaning towards projects with more edge obviously struck a chord with Ballard, who was moving into that area and away from pop. Offered his first full-length album engineering an unknown Canadian artist, Fogel had little idea that he was stepping into something special.

"At that point in my career, I knew that they were good songs, but I didn't know that it was ▶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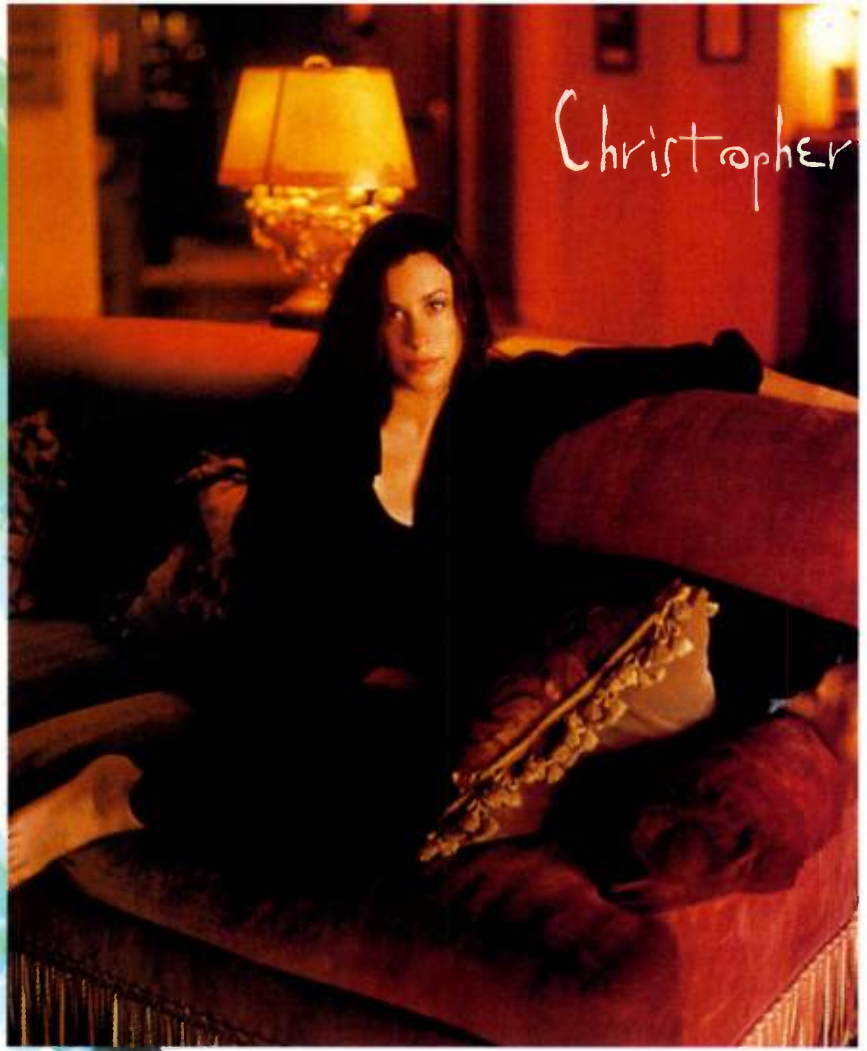

Alanis Morissette.

> "Alanis is so attuned that I could place a mic de-esser on her voice, and she would walk in with no meters showing and immediately know."

going to go any further. I latched onto the tracks — they weren't necessarily my taste, but I began to get attached to them. Then a buzz started in the LA recording community about what we were doing, and I remember saying as we were finishing the mixing that we'd be back next year, having sold two million copies, and everything would be great. That's the way we looked at it — and here we are now!"

Exactly: with sales of 22 million and counting, *Jagged Little Pill* has become the biggest-selling album by a female artist.

"I was brought in piecemeal at the beginning," admits Fogel. "Glen and Alanis wrote everything between them and they'd help each other; it was a very good partnership. Sometimes Alanis would get a lyric at two or three in the morning and they'd lay the track down real quick — just the basics: a loop, a couple of passes of guitar, a vocal — and then I would come in and add any embellishments on top of that. We'd re-do some guitars on occasions, but rarely, because most were done in a single pass, and Alanis had grown attached to them. We added real drums to five of the songs, and did organ on all of them. I'd say that on three-quarters of the songs I cut the vocals myself — the other quarter Glen did at the demo stage."

VOCAL SIMPLICITY

Bearing in mind the immediacy of the sessions, Fogel adopted a pretty standard vocal setup in preference to experimenting with different microphones.

"Prior to this record Glen had spent $25-30,000 on a mic collection. He bought an AKG C12, a pretty good Neumann U67, and a great U47 which we pretty much reserved for male vocals. We instinctively went for the C12 for Alanis, and ran it through a Demeter preamp and an old LA2A. We never tried anything else because there was a presence to the vocal that just vibed; so we kept it and there was no experimentation. Vocals were mostly single takes — except in the case of the first album track, 'All I Really Want', where we did 12 background parts. You can hear them all over the chorus, there's octaves and ninths. Most of the doubling sounds I did electronically with a doubling program on a Yamaha SPX990 and an AMS unit."

EUPHONIX CSII

The essential writing, recording and mixing of *Jagged Little Pill* took place at Glen Ballard's Encino-based home studio in LA, the centrepiece of which is a Euphonix CSII desk (now updated to a CS2000). This contributed much to the easy atmosphere that characterised the recording sessions.

"It's just such a fluid-thinking console," Fogel explains admiringly. "If I want to pan something I love being able to just hit a button and pan it automatically. Especially with the newer software versions — if I want to write something I can do it right then and there. If I was pulling up rough mixes and someone said 'Every time it goes by I wish you'd make it quieter at that point', I didn't have to remember it, I could just do it and the software remembered it every time.

"The fear surrounding recalls is virtually non-existent now — we recalled every one of the songs in *Jagged Little Pill* over a period of two days, just to do final tweaks before we went to mastering, and I can honestly say that the recalls were perfect every time. I got to the point at the end where I wouldn't even check them against the previous mix.

"For me, it's a very intuitive console: I grew up on Neves, and didn't spend much time on SSLs, but for me the Euphonix sounds like Neve circuitry with the thinking of SSL automation — but with an immediacy that neither of those has."

The Euphonix was used to digitally interface an array of ADATs (original and XT models), which was used almost exclusively for most recordings, although analogue tape was used afterwards when some drum parts were transferred.

"It was really to satisfy my own questions," admits Fogel. "I wasn't sure I'd made the right decision doing the drums initially on ADAT, as I thought maybe they were sounding a bit brittle, a bit harsh. And I still think to this day that they do — but that lends itself to the character of the record."

The ADAT is commonplace in the US recording world, but Fogel nonetheless has reservations over its reliability.

"I really ran into this on an Aerosmith project I worked on — ADATs just have some software bugs that have been there since the beginning. Some of the problems seem to have been sorted out, but

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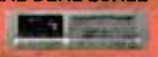

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▶ they're still buggy. You'd get one machine take off and snap tape, drop out bits in places; you'd have errors occur for no apparent reason — put them in another machine and they're gone, and put another tape in the machine that was giving you errors and there are no errors! But the key to using ADAT is safety, safety and safety. If I've got a brilliant organ part with Benmont Tench or something like that, the first thing I do is back it up, before I ever play the tape again. It makes producers mad at times, but if they want the cool features of the ADAT, they've got to put up with the reliability factor. And it's not so much that they're going to have a problem — it's just the chance that they might. I make sure that I'm backed up two or three times, all the time. Towards the end of this project some of these tapes had been running over the heads for maybe 25-30 hours' solid time, because with the XTs they don't release from the heads. Occasionally I'd hear dropouts, so I'd just throw in the safety and mix off that. But I still love ADATs — and I know the BRC like... driving a car, because it's so intuitive."

MIXING APPROVAL

Mixing was almost exclusively Fogel's domain, and his recollection of the process once again highlights the recall features of the Euphonix.

"As I recorded, I basically knew everything that was on tape and I kept snapshots going in the computer when things sounded good — so I could recall the snapshot and start from there. I'd begin with mutes and start from the ground up. I experimented with bringing the vocal up first and then building the track up underneath the vocal, but it didn't really work. So we ended up doing it the traditional way — building drums first.

"Starting at around 11am, I would take probably four hours to put the mix together. Then Glen would come in at 3 or 4pm, listen to it, and tell me what he did or didn't want to leave. I'd finish it, and if there was something that was really in-depth then he'd tell me exactly how he wanted things to play together — and then we'd print it and it'd be done. Nearly all the time Alanis would be there, so we got word-of-mouth artist approval; then we'd send it off to Guy Oseary at Maverick Records who would send us their comments. Glen also put together a comments list, following which we spent a couple of days going through some recalls, and that was it. I think the first thing that I mixed was 'Head Over Feet' and the whole process from then took about a month."

When it came to mastering, Fogel covered his options by using two formats. The first was DAT (recorded at 48kHz) through an Apogee 500 digital converter.

"The 1000s were available, but I use the soft-limit function as well on the Apogees — there's something about the crunchiness of 16-bit compared with the 18 or 20 bits of the 1000s which sounded better to me. There was better depth to the newer ones, of course, but I just happen to like that crunch. We also mastered to a stereo analogue machine on Ampex 499 half-inch tape at 15ips.

"The songs that were the heavy bottom-end ones, 'All I Really Want' and the loop on 'You Learn', we ended up taking from the DAT while the rest came from the analogue source. Our final word was Chris Bellman at Bernie Grundman Mastering — I trust that guy with my life."

ANDREW DORFF — *HINT OF MESS*

At the time of my interview with Fogel, he had just finished mastering the debut album *Hint Of Mess* (on Sony) by Andrew Dorff — the younger brother of actor Stephen Dorff, of *Backbeat* and *I Shot Andy Warhol* fame. Fogel describes it as, "A fun record, another one that's harsh and in-your-face, but more modern-sounding and avant-garde than Alanis. It's going to be an interesting record, because I'm starting to get the same buzz as I was getting with Alanis towards the end."

The project is significant because Fogel has experimented with new drum-recording techniques, and he plans to employ them in the forthcoming Alanis album which he begins in March.

"I'm now getting drum sounds in 10-15 minutes, and it's not because I'm lazy, it's just that I'm satisfied with what I've got and I've got to a point where I know how to get it.

"With drums I tend to stick with more dynamic mics rather than condensers. I'll use condensers or a two-mic setup on the overheads, and on the hi-hat and kick drums I'll use the Audio Technica ATM25 — and it's Shure SM57s everywhere else, basically. Occasionally I'll put an AKG 452 on the bottom of the snare or 57s on the toms, or maybe if I need a subtle touch, I'll use an AKG 414. ▶

> "I experimented with bringing the vocal up first and then building the track up underneath the vocal, but it didn't really work."

ENSNARED BY LOOPS

Despite having cut his teeth at the advent of digital, Fogel is no stranger to analogue technology, having worked with Trent Reznor of Nine Inch Nails, an unashamed analogue freak. The album *Downward Spiral*, from which Fogel remixed 'March Of The Pigs', was notable for its controlled use of feedback and distortion — elements that Fogel employs in his present-day work, in particular the drum and snare sounds for Morissette.

"There are combinations of snares — we didn't do much triggering, but as far as the sounds went, it was live ones playing in correlation with loops underneath, on songs that had loops (such as 'You Oughta Know'). 'Right Through You' didn't, but that was because we went after a bigger snare sound on that — generally, I wanted smaller snare sounds, so that they didn't get in the way of the loops."

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Christopher Fogel

Christopher Fogel with Andrew Dorff during the recording of Hint Of Mess.

"I'll compress heavily to try and get a real 'blatty' sort of sound — or sometimes I'll just use a ribbon mic placed at a 45° angle above the drummer's head and compress that as much as I possibly can in a Fairchild. That will give me this low-fi, almost vintage, Portishead-type drum sound which feels great. I've also been doing this thing where I run everything that's at the bottom end, like kick and low tom, into a powered 18-inch sub-woofer situated right behind the drummer. I've only just started experimenting with this on the Aerosmith and Andrew Dorff recordings, but basically it extends the bottom end on the kick drum, and when the drummer hits the kick, you really feel it: I have no problem pulling out that chest frequency.

"In fact, in some cases, I didn't have to EQ the drums at all — it was right where I wanted it." Fogel clenches a fist into his upper chest to demonstrate. "It was originally here," (he moves his fist up to his forehead); "it moved to here..." (to his neck); "and ended up here," (his chest) "...when I put the sub-woofer on it. I've told Glen about it and he's really into trying that with Alanis.

"I also did a lot of live drum-looping on the Andrew Dorff record, where we'd get the drummer, Matt Chamberlain, to play a pattern — pick the two best bars, and loop it in the ADAT, keeping all the tracks individual."

VIDEO

Fogel has also recently finished recording Alanis at two specially-staged live shows in New Orleans. The recordings are planned for a future European video release. Recording equipment took the form of six ADATs.

"Alanis is very into the way her voice sounds, so I didn't want to change anything. She's so attuned that I could place a mic de-esser on her voice, even before we had finished the record, and she would walk in with no meters showing and immediately know that I had a de-esser on the voice and say 'Take it off'. So I didn't want to change the Audix OM7 mic she had been used to holding and singing with — although I think she would have been better using the OM5. The OM7 has a very tight pattern, and if Alanis moves a little bit, all we've got is drums and audience, whereas the OM5 is a bit wider, and that's what the front of house had on the background vocals. I wasn't knocked out by the sound of the OM7, but there was no way that I could change it!"

"I also used the TL Audio 2051 vocal processor as I was dealing with a limited space" — a Mackie desk in a van, in fact — "and wanted something that was going to be good quality. I'd already used the C1 stereo compressor across every mix on the Alanis album and that was great, so I got the 2051 to record Alanis' live vocals.

"I recorded everything through some API mic preamps, although some gave out on me so I had to run them through the Mackie — and I can't believe I'm saying this, but the Mackie often sounded better. Particularly on the toms, on some of the percussion elements and on the guitars, they probably sounded 20% better than the APIs. Maybe I had a bum set of APIs, but the difference was like night and day.

"So it was basically the drums, her, the guitarist, bassist, audience tracks and that was it. It ended up being the best live recording I've ever done."

Three new tracks were recorded as part of the live show, but these will not be featured on the video release. Fogel insists that they are a crucial pointer to the direction for the next album.

> "The key to using ADAT is safety, safety and safety."

"The new tracks are in a progressive mould: in other words she's definitely moving forward. They don't sound as if it's not her — they're very well written, strong songs. And Alanis and Glen worked just as they did before: they wrote them in a day, we demo'd them, and for all I can see, they're pretty much done and ready to go on the next record."

However, expectations are high, and it wouldn't be the first time that such a monumental breakthrough has failed to deliver second time round.

"We'll see. She's been in a bubble for the last 18 months — all this kudos, all these awards and all these things happen to her while she's been on the road, and that's not a realistic way to live. So when she comes back we'll see what she's like in the studio. Glen's a little nervous already.

"I'm looking forward to combining the directions that we've each taken and seeing where we all are. I know she's advanced her songwriting — and she's had some experiences that she definitely will want to write about. So it's going to be a good project in that respect.

"If these new songs are any indication, then everything's going to be great — they'll get the songs written in two weeks, we'll spend three or four months doing the record, and it'll be done."

PRO TOOLS UPGRADE

By the time this article goes to print, Fogel and Ballard should be working on the next Morissette album, utilising Ballard's home studio, his new studio at Capitol Records and no less than three Pro Tools setups. "The Capitol studio is really going to be the cool studio now," says Fogel; "that's part of Glen's record deal."

The studio, on the twelfth floor with views of Hollywood and LA out to the ocean, will be fitted out with a Euphonix CS2000, six to eight ADAT XTs, and an analogue multitrack; it will also feature ISDN lines — as fitted in Ballard's home studio — and the new Pro Tools 3 system.

"I don't know to what extent they're going to be used, but Glen's a clever guy, and at this stage money is no object to him. If he's going to do something, he's going to do it all out. We've always used a Macintosh computer, so when Glen wanted to throw out his Linn and move over to *Cubase Audio* he thought, 'Well, I've got the Mac with the PCI slots — I might as well do the Pro Tools thing as well'. So now he's getting three full-blown Pro Tools 3 and *Cubase Audio* setups; one for each studio and one for his programmer — the whole shot!"

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dbx Model 760X

MICROPHONE PREAMPLIFIER

Thinking of buying a new microphone? Maybe you should consider investing in a dedicated mic preamp instead, to improve the clarity and definition of your recordings without breaking the bank. DOMINIC HAWKEN plugs in the mic he likes and checks out a new contender from dbx.

In a studio world dominated by synthesizer and sampling technology, the humble microphone is often forced to take a back seat. Most modern mixing consoles are equipped with microphone-level inputs and a phantom power supply as standard, and for many users these features deliver audio of a perfectly adequate quality. For the sonic purist, however, an external preamplifier can bring out the best in even the most basic of microphones. Depth and clarity are often improved, and the user is no longer left at the mercy of the console.

Mixing desks are designed to interface with any number of individual signals, all delivered at completely different levels, ranging from extremely quiet sources (a microphone, for instance) to very loud ones (the latest synthesizer or outboard output). In order to achieve this, the sound is first passed through a broad-band preamplifier, which is then adjusted to maintain a consistent input level. It is extremely difficult to design a circuit capable of working with such a varied range of inputs without affecting the overall quality of the sound in the process. Some preamplifiers are optimised to perform best with high levels, and some with low, but it is generally impossible to create a unit capable of producing a flat response across the entire dynamic range. During most mixes, a greater number of channels will be fed by high-level signals rather than low-level ones, and console manufacturers, in general, tend to optimise their preamp circuitry to cater for this type of signal. The audio quality of channels fed by microphones then suffers as a result.

Hence the need for a dedicated preamplifier. Connecting the microphone directly to the preamp transforms the low-level signal to a higher line-level, removing the overhead from the mixing console and improving quality. In some situations, it is possible to bypass the mixing desk completely and connect the output of the preamp directly to the recorder. This offers the best performance, removing any noise or coloration that would otherwise be introduced into the chain. The addition of a dedicated outboard equaliser can also improve the overall sound, offering control over any unwanted frequencies that can creep into the signal. Most top engineers have a favourite combination of equaliser and preamp that they use for every recording, with Focusrite and Neve among the most popular. The cost of these combinations can often run into many thousands of pounds — prohibitively expensive for most users — so it's good to see dbx entering the market with a unit at under £400. If its performance matches its specifications, the 760X could find its way into many mid-range studios and production suites.

DESIGN

Dbx have a 26-year history of making outboard equipment, concentrating in the main on compression and noise-reduction systems. The 760X follows their previous design standards, and is housed in a 1U black metal casing, taking up half the width of a normal rack bay. All external connections to the unit are via the rear panel, which offers balanced XLR sockets for signal input and output, as well as unbalanced jack connections as an alternative output source. Mains power is provided by an external supply shipped with the unit. Unfortunately — for the intrepid audio explorers amongst you — the supply delivers 18V AC, so running the unit from batteries with a portable DAT machine in the jungle is a definite no-no. On the plus side, however, removing the power components from the main circuit board reduces overall noise and helps improve the signal specifications.

The front panel offers basic control over the fundamental settings of the unit. 'Basic' is the operative word here (although preamplification circuitry in general is usually designed with the minimum of controls, signal purity being the priority). The 760X has two independent channels; each one is assigned a single Gain control and two switches offering phantom power and phase reversal. Two LED indicators on each channel display the current switch settings, and a third flashes to show clipping anywhere within the internal signal chain. Somewhat surprisingly there's no mute facility on either channel, which would have been a useful addition, though not vital for studio-based use. There is also no provision for any frequency control (some preamps offer a basic low-cut option to remove rumble and sub-bass from the audio), although this, again, should not compromise the effectiveness of the unit.

Internally, the 760X offers up to 60dB of gain, utilising servo-balanced outputs rather than any of the alternatives. Transformer- or valve-based technology is often used in modern preamplifier

designs to amplify the input signal, but both of these options can colour the sound. Although this is not necessarily a bad thing — valves, in particular, produce a warm, rich sound that can be used to great effect on vocals and guitars — for some recordings true sonic integrity is required. In cases where the recorded sound has to be as accurate as possible, the design of the 760X should help to achieve this.

The 760X can be used on a desk or table top, or can be rackmounted using the supplied mounting kit. As the preamplifier takes up only half a rack width, two individual units can be mounted side by side in a sing'e space; dbx supply a half-width blanking plate if only one unit is required. As a bonus, the system requires no special ventilation, and can therefore be mounted virtually anywhere without the need for a cooling system.

IN USE

With so few controls available, setting up the 760X is a simple task. I tested the system with a single microphone connected to the balanced input on channel 1, with the balanced output routed directly to a recording system. Once the phantom power supply had been switched on (introducing no discernible noise into the signal), it was a simple matter to adjust the gain to a suitable level for recording. The 760X provided a very quiet and clean signal, with a depth and clarity that certainly added a new dimension to the performance of the microphone.

Most of the tracks I'm involved with tend to evolve from a production session at home. Basic arrangements and ideas are sequenced and sampled, and the vocals are recorded using the studio's faithful Microtech Gefell mic, which is plugged directly into the inputs of a Mackie 8-buss console and routed to a Tascam DA88 digital 8-track. When it's time for the full production, much of the recorded audio is often kept and used on the final master, so a lot of work goes into achieving the best possible recording quality, even when working on basic demos. Using the Gefell through the desk has so far produced perfectly acceptable results, and I was pleasantly surprised at the difference that the dbx made. In the past, I've tested a number of other preamps, most of which have added their own sound to the mix, with pleasing, if not highly accurate, results. The dbx system, however, remains refreshingly neutral, introducing very little coloration and degradation to the sound.

More sonic improvements are noticeable when a pair of microphones are used to record in stereo. Much of the background ambience that contributes to the realism of a stereo recording are present only at very low levels, and these signals are often lost on systems lacking a suitable preamp. The 760X goes a long way towards retrieving this lost data, and the resulting audio takes on an added depth and a wider soundstage.

CONCLUSION

The dbx 760X is released at a time when many manufacturers are aware of a growing demand for low-priced, high-quality microphone preamplification, to match the current spate of digital recorders and compatible mixing consoles. Focusrite have launched their Green series — albeit at twice the price — to fill this gap (see last month's *SOS* review), and many other companies are no doubt working on competitive designs. The 760X utilises the same transformerless design as its competition, and this has resulted in an effective product that delivers a crisp and clean response way ahead of that which can be obtained using a standard console. It's unfortunate that the system lacks any form of muting, which can be especially useful in live or broadcast situations, where it is often necessary to cut the signal without changing any of the panel settings, but this should not have too much impact on its usefulness in the studio.

Dbx have a name for solid, workmanlike products that perform their function with the minimum of noise and fuss, and this preamp certainly continues that ethic. If you're looking to improve your current vocal sound on tape, or you're seriously into sampling acoustic instruments and rhythms, the 760X is a worthy investment. It's an ideal choice for the first-time buyer and makes a great entry point into the world of mic preamplification. While you're at it, hire some of the competition and compare the results for yourself — you may be pleasantly surprised. SOS

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pros & cons

DBX 760X £350

pros
- An inexpensive alternative to the competition.
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cons
- No muting facility.
- No level indication.

summary
A good, quiet preamplifier, especially well suited to DA88 and ADAT owners looking to improve their vocal quality at an affordable price.

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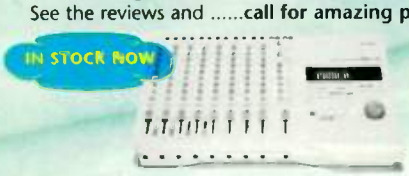

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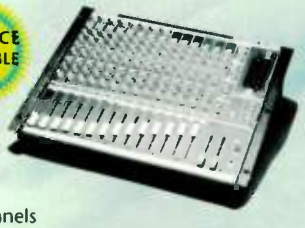

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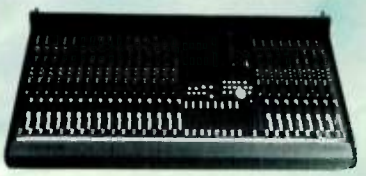

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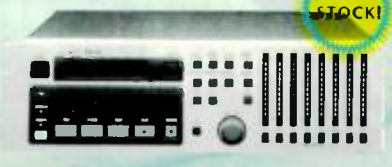

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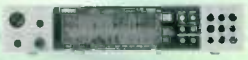

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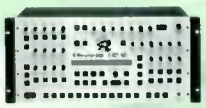

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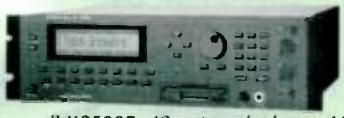

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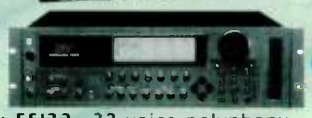

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Talking 'bout a

YAMAHA REV500 REVERB PROCESSOR

The modest £399 price tag on Yamaha's latest dedicated reverb belies the quality and controllability the unit offers. HUGH ROBJOHNS thinks it's up there with the best.

Many home studios have a Yamaha multi-effects unit stashed away in a rack somewhere. On a strictly value-for-money basis, Yamaha's earliest efforts, like the classic SPX90, were unbeatable, although their reverb programs often attracted criticism for their rather metallic qualities.

However, Yamaha showed that they could challenge the industry leaders in digital reverb with their professional products and inevitably, the technology and algorithms developed for these top-end products filtered down to more affordable units like the SPX990. The latest addition to Yamaha's family of reverb machines is the all-new REV500, which really takes the art of affordable digital reverb into the next generation.

This compact, 1U rackmounting machine comes with 100 factory programs, divided into four families (Hall, Room, Plate and Special) and there are a further 100 user memories for storing your own variants. The system's digital signal processing extends beyond 'mere' reverb to include such familiar effects as echo, tremolo, chorus, flanging, symphonic, dynamic filtering, resonator and gates.

One of the most interesting aspects of the REV500 is its new operational interface. The tedious push buttons used to locate and edit parameters, which became established with the SPX processors, have been replaced by a set of shaft encoders providing direct access to the fundamental reverb settings. The large LCD in the centre of the front panel normally displays details about the current program name and key parameters. However, when any of the four shaft encoders is adjusted, a symbolic graph of level against time is displayed to make the results of any adjustments very obvious indeed.

PLUGGING IN

The REV500 features the same kind of interconnection flexibility that has already proved successful on earlier products. The rear of the unit carries a fixed mains lead on the left-hand side (as viewed from behind), MIDI and remote control facilities in the centre, and audio inputs and outputs on the right.

The machine can be configured for a mono input (using the left channel socket) or a true stereo input. Connections are via a pair of XLRs or quarter-inch jacks, both wired for balanced signals, although the jack sockets will happily accept unbalanced leads too. A slide switch adjacent to the connectors determines input sensitivity to accommodate professional levels at +4dBu or semi-pro at -10dBu. The output side of the machine is similarly equipped with XLRs and jacks, again both balanced and with selectable output levels. There is no provision for digital interfacing.

Other connections include the obligatory pair of MIDI sockets, and a jack socket for an optional footswitch. The system may be configured such that the footswitch either recalls the next program memory or mutes the reverb output.

The internal analogue-to-digital conversion processes are carried out to an extremely high standard, with 64x-oversampled 20-bit A/Ds and 8x-oversampled 20-bit D/As (operating at 44.1kHz). As you might expect, these converters ensure that the REV500 is very quiet and the reverb tails descend smoothly to the point of silence.

The quoted specifications are all very respectable: frequency response flat between 20Hz-20kHz (within 3dB); dynamic range of 96dB; and distortion less than 0.03%. The only thing that might cause concern is the quoted output impedance, which the handbook claims to be 150kΩ! I'm sure that this is a simple misprint and that the 'k' symbol was added by mistake — in any case, I certainly experienced none of the interfacing problems that would be expected with such a high source impedance.

THE CONTROLS

The front panel of the REV500 is very clear and well laid-out. The left-hand side starts with a single input level control for both channels, complete with stereo LED bargraph meter. This is a little crude, with only two columns of four lamps, labelled Clip, -6, -12 and -24, but it is sufficient to match the machine's input levels with the output from a mixer's auxiliary send.

The next control block to the right consists of a group of four buttons labelled Type, Preset/User, and Number '+' or '-'. The functions of these buttons are self-explanatory, with the Preset/User button selecting which bank of 100 memories is being used, the Type button cycling through the Hall, Room, Plate and Special categories, and the '+' and '-' buttons navigating through the selected group.

The central LCD dominates the front panel and provides very clear information about the selected program type, program number, signal processing structure, key parameter values, program name, and mono or stereo input mode. Although there's a great deal of information shown on the display, it's not cluttered or confusing in any way.

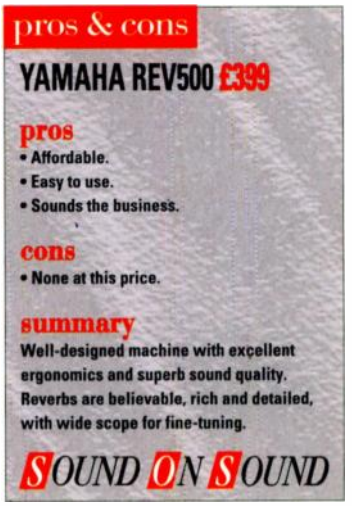
When one of the four parameter knobs is moved, the program name section of the LCD is instantly replaced with a representation of the current parameter values as a bar-chart. The left-hand side of the chart indicates the 'now time', and somewhere to the right is a column representing first reverb reflections. To the right of this are further columns illustrating the main body of reverb, gradually decreasing in amplitude. The display is quite intuitive and, although of no real practical use, is novel and fun to watch as the appropriate parameters are adjusted.

To the right of the display, four knobs edit the main reverb parameters: Pre-Delay, Decay Time, Hi-ratio and ER Level. The roles of the first two are quite straightforward: Pre-Delay can be set anywhere between 0 and 200ms, and Decay Time from 0.3 to 99 seconds. The Hi-ratio control sets the reverb decay time for high-frequency sounds as a proportion of the main decay time, a value of 1 meaning an equal decay and lower values simulating the absorbent effects of typical room furnishings. The ER control has nothing to do with the number of repeats of a certain medical soap opera shown on TV (sadly), but actually sets the relative amplitude of the early reflections generated by the reverb program, on a scale of 0 to 100.

The final operational controls are four more push buttons labelled Store, Audition, Eff Level and Utility. The Store function is used to initiate MIDI bulk data dumps, as well as to save an edited reverb program into a selected user memory. The Audition button is lots of fun, as it fires off an internal sound sample (selectable between snare drum or rim-shot and with single or repeating triggers) so that a reverb program can be easily auditioned.

The Eff Level switch has an associated LED and, when pressed, the ER Level control may be used to adjust the overall output level from the machine (or the wet/dry mix if the machine is suitably configured). The front-panel screening incorporates a graphic sensibly linking the control knob with the button.

The Utility button accesses all manner of ▶



Revolution!

Hugh Robjohns is a lecturer at the Centre for Broadcast Skills Training at BBC Wood Norton. The views expressed in this article are the author's own and are not necessarily those of his employer.

internal parameters and system functions, in the usual Yamaha way. Pressing this button allows you to navigate the available menus, using the Pre-Delay and Decay Time knobs, which provide left/right cursor and up/down functions respectively. Once again, the front-panel graphics provide a clear link between the controls and the Utility button so that operation is very obvious.

CONFIGURATION

The REV500 is set up through the Utility facility, which cycles through 12 functions. These are notionally grouped into Program Edit facilities, System Settings and MIDI Utilities.

The first step in the cycle of Program Edit functions accesses the internal parameters associated with the various reverb programs and the second allows the title of the Program to be altered before storing the effect in a user memory.

The System Settings determine mono or stereo input modes, Output mode (reverb effect only or wet/dry mix), Footswitch function (program increment or effect muting), and Audition sound sample (snare/rimshot and single/repeat triggers). The legend shown on the LCD during boot-up can be customised here, too.

MIDI utilities include configuring the send and receive channel numbers, setting the MIDI Out socket to operate as a true Out or a merged Thru, assigning reverb memories to MIDI Program numbers, and setting up a bulk data dump.

The only slightly unclear aspect of the Utility section is how to exit from it, since repeated button pressing merely cycles through the available options. The answer is to simply press any of the four program selection keys on the left-hand side of the unit.

Configuring the REV500 is actually very quick and easy, and the use of the shaft encoders to select and edit the appropriate settings works well. The LCD always provides such clear information about the current Utility mode, the selected parameter and its value that I never really needed to refer to the well-written manual at all.

PROGRAM PARAMETERS

Every reverb program on the REV500 provides the four basic parameters of Pre-delay, Decay time, Hi-ratio, and ER level — and each is controlled by its own dedicated knob on the front panel, as already discussed. These aspects of reverb are the ones which tend to be adjusted most often, of course, so it makes perfect sense to devote permanent controls to them. However, the reverb and effect algorithms employed in the REV500 feature many more sophisticated facilities for precise manipulation of the sound. These are called Internal Parameters, accessed via the Utility button. All reverb and effects parameters may also be adjusted in real time over MIDI.

"The REV500 is an extremely good digital reverb which can hold its head up in any company. In the light of its price, however, it really is something special..."

All programs share four standard internal parameters: Lo-ratio, Diffus, HPF and LPF. Lo-ratio adjusts the duration of low-frequency reverb relative to the overall Decay time value set on the front panel, in exactly the same way as the Hi-ratio control. Diffus is an abrieviation of diffusion and

ROOM SERVICE

Assessing the quality and suitability of a reverb unit is tricky because of the aesthetics involved — everyone has their own particular likes and dislikes, and no two sound engineers are ever going to agree on the 'perfect' reverb sound. I'm giving my personal opinions here, and you should always hear a unit such as this in action before buying, if at all possible.

The first collection of factory presets are grouped under the heading of Hall, with 17 true reverb programs, three gated reverbs, three chorus or flanged reverbs, one echo routine, and one setting which mixes the reverb with a chorused version of the direct signal. The majority of program titles give a good idea of their acoustic simulations, and where there are multiple versions of the same title (for example, Medium Hall 1 and Medium Hall 2), the first is bright and clear, while the second is softer and darker — in all but the two Church simulations which, for some bizarre reason, are the other way around!

These reverb programs replicate large acoustic spaces very well, with natural, airy qualities and a good sense of space. Some of the halls have a lovely warmth, others seem to shimmer with excited reflections, and all have interesting and recognisable characters which add a real three-dimensional aspect to any sound source when carefully balanced.

The second collection of factory programs come under the heading of Rooms, with 22 straight reverbs, one chorus/reverb mix program, one gate, and one dynamically filtered routine. Once again, many of these programs are superb — I particularly enjoyed using the 'Wood Room' and 'Room Ambience' presets, both of which worked well to add a natural acoustic to re-voiced dialogue in a television post-production session.

The next set of programs go under the generic title of Plate, with 20 reverb routines, a chorus/reverb mix program, an echo setting, one gated reverb and two symphonic/flanged reverbs. Having been fortunate enough to have used genuine plate reverbs on many occasions, I was very interested to see how close these replications would be and was pleased to find that many are very good indeed. The closest to my recollections of the real thing is somewhere between the 'Basic Plate' and the 'Beauty Plate'. All the Plate programs are eminently useable, and the wide variety of presets allows the perfect match to be made between source material and reverb, often without having to delve into the inner parameters at all — a tweak of the pre-delay, decay time and hi-ratio was all that was usually needed to extract excellent results.

The fourth set of factory programs is gathered under the title Special, all but one of which are combination effects. Limited time prevented me from a detailed exploration of these programs, but I was left with the impresson that some could be very useful in the right situations. One in particular captured my interest — the 'Pan Feedback' program. This algorithm applies reverb to the output of an echo process, but the intriguing thing is that the feedback has been arranged to increase for sources closer to the edges of the stereo image, giving a very interesting effect indeed.

simply controls the apparent spread and width of reverberant sounds, on a scale from 0 to 10. The high- and low-pass filters allow effective tailoring of the sound: the HPF turnover is adjustable between 20Hz and 1kHz (with a bypass) and the LPF between 500Hz and 20kHz (again, with bypass).

In addition to the parameters already described, pure reverb algorithms also offer Density (of reverb tails), Liveness (of early reflections) and ER delay parameters. The latter allows the time gap between the last of the distinct early reflections and the start of the reverb tail to be adjusted (between 0 and 100ms).

In total, every reverb program allows the user to adjust 11 different parameters — impressive flexibility by any standards, and especially so when the parameter ranges allow a very wide variety of acoustic effects to be simulated with a high level of realism.

The various combination reverb/effects programs are just as well specified in terms of internal parameters. For example, the Gate programs allow threshold level, hold time, release time, and even the side-chain signal source to be selected (input or reverb output). The Resonator provides controls for input sensitivity, feedback, fall-back time and reverb/resonator output balance. Comprehensive collections of appropriate internal parameters are similarly available to all of the other effects processes, so that the user always has total control of the complete effect if required.

In practice, I think it unlikely that many users would find themselves rummaging about within the Internal Parameter menus, simply because of the variety and usefulness of the vast collection of factory programs. Virtually every conceivable situtation has been catered for with the preset algorithms, and once you had become familiar with them, I suspect there would be very little impetus for internal tweaking!

IN USE

Operationally the REV500 is a joy to use. The factory presets are easy to access (although a data wheel would have made life slightly easier) and offer such well-chosen and wide-ranging reverbs that parameter editing almost becomes an option rather than an essential stage in setting the machine up. Recalling reverb programs took longer than I expected, but will not cause problems in normal studio use.

I recall being very impressed with the improvement in reverb quality offered by the SPX990 over its older siblings (like the first- and second-generation SPX90s) and although I was unable to make direct comparisons between the REV500 and the SPX990 on this occasion, I believe the new machine represents a further worthwhile enhancement of Yamaha's reverb algorithms. Virtually all the factory programs offer reverb settings which I could easily find myself using in conjunction with, or in place of, more expensive reverbs, and most without any significant tweaking of primary or internal parameters at all. The distinctive, metallic and almost aggressive sounds of the old SPX90s have long since been banished from Yamaha's range of reverbs, and the base algorithms in the REV500 have continued the trend in the direction of smooth, rich and, above all, realistic reverbs.

CONCLUSION

The REV500 is an extremely good digital reverb which can hold its head up confidently in any company. In light of its price, however, it really is something special and certainly worthy of an audition. It may not represent the ultimate in reverb simulations, but it's not very far off, and certainly offers an affordable and worthwhile upgrade from its ancestors.

The user interface is superbly intuitive and very quick to use. The four rotary controls are well designed, allowing fast and accurate parameter adjustment. On the rare occasions that I felt the need to explore the Internal Parameters, through the Utility button, the operational convenience of the four primary controls was very welcome.

The graphical reverb display is little more than a gimmick, really, and I found it rather distracting on several occasions, especially when the Hi-ratio is set to a high value, because the reverb tail no longer appears to die away! However, the numerical readouts of the four primary parameters are very clear and informative. The built-in snare drum sample was very handy and it acted as a reliable reference sound with which to to audition and compare different programs, establish the raw character of each preset, or to check on the effectiveness of parameter edits.

Lexicon might still be regarded by many as building the best reverb units currently available, but it seems to me that with the REV500, Yamaha are snapping at their heels! Overall then, 10 out of 10 (...and can I keep this one please?). SOS

info

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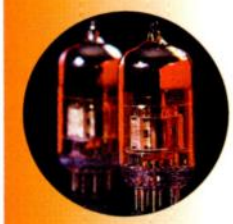

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Top Gear?

Roland's SC88 could be described as a Rolls-Royce in the world of General MIDI sound modules. So is the new upgraded SC88 Pro a luxurious stretch limo complete with mini-bar and luxuriant walnut veneer? DEREK JOHNSON dons his chauffeur's cap and takes it for a drive...

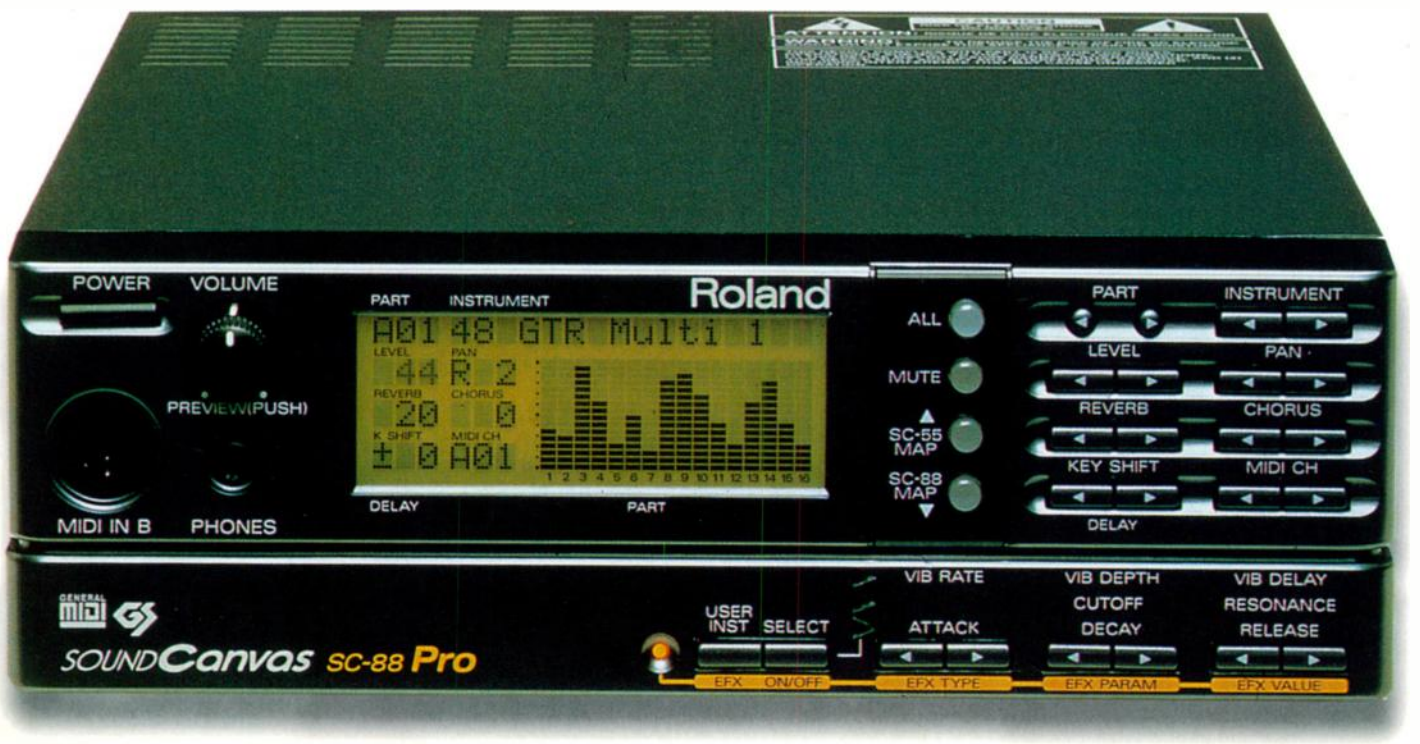
ROLAND SOUND CANVAS SC88 PRO GM SOUND MODULE

It hardly seems possible, yet it's nearly two and a half years since Roland released the SC88 Super Sound Canvas, the company's then-definitive statement of what a General MIDI sound module could be. What's even more surprising is that, in this age of fast turnover in the hi-tech music market, it's taken this long for Roland to come up with a successor. The intervening time has seen Roland cut and paste the Sound Canvas innards into a rackmounting module (the MGS64), and repackage the original as the grey-liveried SC88VL desktop music module. Given that the original SC88 was already a high-quality, and relatively high-priced, module, adding a 'Pro' tag to the new model should really promise something special. For some basic background on the SC88 ethos, take a look at the *SOS* review which appeared back in September 1994 (the MGS64 was reviewed in October 1995). For now, a quick recap is in order. In short, the SC88, housed in a half-rack package slightly taller than 1U high, offered 64-note polyphony, 32-part multitimbrality (via two MIDI In sockets, one duplicated on the front panel), a GM/GS sound set much enhanced by many extra banks of variation sounds, front-panel editing, three effects processors plus 2-band EQ, stereo audio input, a PC/Macintosh interface, and an internal power supply. The Pro has all this, and more — which is just as well, since such a specification is nothing out of the ordinary these days. Korg's NS5R and Yamaha's MU80 and forthcoming MU90R all offer something similar.

FROM THE OUTSIDE IN

Physically, you have to look closely to find differences between the SC88 Pro and its non-Pro predecessor, though front-panel labelling has been modified, so that apart from the word 'Pro' being added next to 'SC88', many of the buttons are re-named to reflect new features and functions.

One of the most significant enhancements to be found on the Pro has to be in the sound department. The original SC88's sound set was vast, at 654 instruments and 24 drum kits, but this has now been almost doubled with the addition of waveforms and sounds drawn from Roland's JD- and JV-series synth expansion board options. The resulting 20Mb of waveforms — two and a half times that found on the SC88 — provides 1117 sounds and 42 drum kits. And there's still 256 memory locations for user voices and two for user drum kits. Accessing such a massive number of sounds is easier than you might think: over MIDI, ▶



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(Paul White - Sound on Sound October 1996)

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Roland SC88

pros & cons

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pros
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cons
- Display now a bit limited for what's going on.
- Manual still not good.
- Still no user instrument naming.

summary

Significant enhancements and a lower price for the 'Pro' version combine to maintain the SC88's position as one of the most desirable GM modules around.

SOUND ON SOUND

FEATURES

- 32-part multitimbrality.
- 64-voice polyphony.
- 1117 preset sounds, 42 drum kits.
- 256 user sounds, 2 user drum kits.
- 128 preset Patches, 16 user Patches.
- Effects: 8 reverbs, 8 choruses, 10 delays, 2-band EQ, 64 factory insert effects, 64 user insert effects.

DRUM KITS

The SC88 Pro's spec notes that it is provided with 42 drum kits. This number is arrived at by adding up the 25 kits available in native Pro mode to the slight variants offered in SC88, SC55 and CM64 emulation modes. The main 25 'native' kits are as follows:

- Standard 1, 2, 3
- Room
- Hip Hop
- Jungle
- Techno
- Power
- Electronic
- TR808
- Dance
- CR78
- TR606
- TR707
- TR909
- Jazz
- Brush
- Orchestra
- Ethnic
- Kick & Snare
- Asia
- Cymbal & Claps
- SFX
- Rhythm FX
- Rhythm FX 2

▶ Bank Select commands, if your MIDI software or controller can generate them, make life fairly easy, and you can also select sounds from the front panel. The pair of buttons labelled 'Instrument' select a Part's main sound, while pressing both together takes you into a variation mode, where the banks of variation sounds can be accessed using the same buttons. It's just as well that the extra banks are easily accessible, since some basic sounds are provided with as many as 31 variations. Of course, the SC88 Pro is fully compatible with all GM and GS (Roland's extended GM protocol) song files, and complete compatibility is provided for files written for the SC88, SC55 and SC55 MkII, and the now rather elderly CM64.

The effects section has also been enhanced; the three system effects (eight types of reverb, eight choruses and 10 delay types, which are available to all parts), plus EQ, are now joined by an 'insertion' effect, which can be applied to any part individually (although it can be switched in for all Parts, if you like), so that you can have a truly distorted guitar or swirly rotary organ without compromising the rest of your arrangement. There are 64 insertion effects (and room for 64 user edits) and several dual-effect and multi-effect options, plus several 3D treatments that use a version of RSS — Roland Sound Space — technology.

In addition to the vast collection of new sounds, Roland have added a bank of what they call Patches: these are quite independent of the main instrument, and offer the user 128 presets (plus space for 16 user Patches) that appear to be complex sounds more akin to those found on an up-market synth. Some Patches have actually been ported from Roland's expansion boards, and some are brand new for the SC88 Pro, but all take advantage of the new insertion effects. Selecting Patches from the front panel is, of course, possible, but can be fiddly (it involves manually loading a Patch and pressing 'All'); external selection uses Bank Select commands, and is much tidier.

One slightly frustrating aspect of the original module was its sole stereo output — the module could, in essence, be split into two fully 16-part multitimbral sound sources, with effects, yet the audio was squeezed through a single stereo output pair. There are *two* pairs of outputs on the Pro (a feature first introduced on the MGS64 module) which is a great improvement.

IN CONTROL

Operationally, the Pro is always in Part mode, like every Sound Canvas instrument before it. You will always be able to access all 32 parts, and select sounds, change effects, transposition and MIDI channel at any time. These tweaks remain with the Part even on power down, and can also be made remotely over MIDI, using System Exclusive or Controller information. In common with the original SC88, the Pro offers a large display, plus a collection of 28 buttons that can be used for selecting and modifying sounds, setting individual Part parameters, and so on.

MIDI control is especially important in the case of the typical General MIDI module, since so many of the parameters that a user would want to alter can only be accessed using MIDI controllers or SysEx in some way. And, of course, this data is used by commercial MIDI File programmers to coax the basic synth engine into generating a more polished, convincing performance. To this end, pretty well everything on the SC88 Pro can be so controlled, although, as previously mentioned, the Pro offers much more in the way of front-panel editability than the average GM module. If you feel a particular Part's sound suffers from a slow attack or needs a bit more resonance, this is all easily done by hand. It's worth recalling that once you've tweaked all the Pro's Parts in this way, you could actually do a System Exclusive dump to an external storage device, with all the changes intact, saving you the trouble of inserting the necessary commands into your sequence, if all you need is a few simple changes.

Actually, front-panel editing is slightly more complicated on the Pro than its predecessor, because there is so much more going on. For example, the strip of eight buttons at the bottom of the machine were used to edit user instruments on the original SC88, also doubling as Delay effect send, instrument select and variation select controls; on the Pro, these buttons are still used to edit user instruments, but now double as edit controls for the insert effects — though, just to complicate matters, in certain modes the older functions can still be accessed.

DOUBLE VISION

One of the best things about the SC88 was that you could use it as a 32-part multitimbral module, via its two MIDI Ins, and flexibly configure it to behave as two virtual modules, in so-called Double Module mode (Modules A and B), with each module having its own reverb and chorus effect. The compromises necessitated by this method of using the SC88 involved losing the delay effect and EQ, and not having a separate stereo output to route the second module through. The Pro solves the second problem, courtesy of its extra stereo output, but you still lose the delay and EQ. However, the additional output pair does allow for a few more options. For example, the extra outputs can be configured as two individual outs, so that you could separate a couple of sounds ▶

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from the mix and treat them externally. Note that when the Pro is split into two modules, or if any Parts are routed to the second set of outputs, any audio appearing at the second outputs goes missing from the headphone mix.

You might be wondering how you access the SC88 Pro's 32 part multitimbrality (and the ability to split the instrument into two virtual modules) in practice. If you're using a hardware sequencer with two MIDI Outs (such as Roland's MC50 MkII), an Atari with an extra output plumbed into the modem port, or a multi-port MIDI interface with your PC or Mac, you simply attach two MIDI Outs to the Pro's two MIDI Ins for instant access to all 32 independent parts — simple. But you may be a PC or Mac user who hasn't yet invested in an interface, and would rather like to use that provided on the module. This also is simple — to a point.

The ability to access 32-part multitimbrality down a single serial cable depends on which software you're using. On my Mac, running Steinberg's *Cubase*, there was no problem; I unplugged my usual interface, substituted the SC88 Pro, tried out a few sequences that needed two MIDI ports, and had 32 Parts coming out in no time. I had a tinker with OMS (Opcode's Open MIDI System), and again, there seemed to be no problem. It mightn't be so easy with other software, and the SC88 Pro's manual is next to no use on this subject, so you'll have to do your homework first.

For PC users, the situation may be more complex, but a driver is apparently available for Windows 95 users that allows them to access both the A and the B module within the SC88 Pro. If your software is dependent upon special drivers, whether you're a Mac or PC user, keep in touch with your supplier to make sure you get what you need.

SOUNDS LIKE...

Sonically, there's not a lot to say: Roland have continued their tradition of quality GM/GS sounds, but their number has increased significantly. It's even harder than usual to pick out favourite or noteworthy sounds, since there are so many variations, with nearly every sound benefiting from at least one or two. For example, GM program 039, Synth Bass 1, has a total of 18 variation basses, including the evocative JP4 Bass, JP8 Bass, TB303 Bass 1 and 2, and more; 040 Synth Bass 2 has 26 variations, and 082 Saw Wave has a whopping 31.

This is the kind of raw material you'd normally expect from a 'real' synth, and the available editable Part parameters (and User Instrument locations) give the user plenty of room for customisation. It is possible, however, to make one or two generalisations. The synth sounds and textures are excellent, coming as they do (in sampled form) from the legendary Roland analogue family, and drum kits are bright and happening. Once again, the provenance couldn't be more convincing — who better to provide TR808 and TR909 samples than Roland themselves? A definite favourite amongst the kits is 053 Asia, which is shown off to brilliant effect on two demos called, simply, 'Chinese' and 'Japanese'. Basses are pretty good too (with a particularly useable Acoustic Bass), as are woodwinds, brass and saxes. String groups are varied and lush, although, as is usual in this part of the market, the solo strings suffer: the demo on the accompanying disk showcasing a string quartet should not be played to a purist! Acoustic and electric pianos are nearly all good, and varied, although I still don't see the point of Honky Tonk Piano.

Worth separate consideration are the new insertion effects and the collection of 64 so-called Patches. The new effects basically provide your compact module with the facilities of a multi-effects processor: everything from individual filter- and distortion-type effects to full multi-effects is provided. In the latter category, three, four or five effects in series are suitable for a variety of guitar, bass and keyboard treatments. These effects are used to good advantage on the collection of 64 Patches — have a listen to the demos provided on a floppy disk; many of the 35 examples feature extreme guitar treatments.

I'd also like to remind you of the potential for creating alternate tunings on the SC88 Pro, with tunings set for each Part; an offset of +/-63 cents can be applied to every step of a scale, allowing you to customise quite drastically. Examples are provided in the manual for just intonation (with C tonic) and an Arabic scale.

CONCLUSION

While the idea of General MIDI may have a relationship to real synths akin to that of the Spice Girls to real music, like the Spice Girls, these products do have a place in the market. Like it or not, there are many musicians, bedroom, desktop, gigging or otherwise, who thrive on playing back commercial MIDI files of pop hits for fun or profit, and there are dozens of small companies who are happy to supply this market. For this type of customer, the SC88 Pro offers sufficient polyphony for even the most complex arrangements, a high-quality sound source, and the new insertion effects, which most GM modules lack.

INSERT EFFECTS LIST

- **FILTER: Stereo Equaliser; Spectrum; Enhancer; Humaniser.**
- **DISTORTION: Overdrive; Distortion.**
- **MODULATION: Phaser; Auto Wah; Rotary; Stereo Flanger; Step Flanger; Tremolo; Auto Pan.**
- **COMPRESSOR: Compressor; Limiter.**
- **CHORUS: Hexa Chorus; Tremolo Chorus; Stereo Chorus; Space D; 3D Chorus.**
- **DELAY/REVERB: Stereo Delay; Modulation Delay; 3-tap Delay; 4-tap Delay; Time Control Delay; Reverb; Gate Reverb; 3D Delay.**
- **PITCH-SHIFT: 2-voice Pitch-Shifter; Feedback Pitch-Shifter.**
- **OTHERS: 3D Auto; 3D Manual; Lo-Fi 1 and 2.**
- **TWO EFFECTS IN SERIES: Overdrive-Chorus; Overdrive-Flanger; Overdrive-Delay; Distortion-Chorus; Distortion-Flanger; Distortion-Delay; Enhancer-Chorus; Enhancer-Flanger; Enhancer-Delay; Chorus-Delay; Flanger-Delay; Chorus-Flanger.**
- **TWO EFFECTS IN PARALLEL: Chorus/Delay; Flanger/Delay; Chorus/Flanger; Overdrive 1/Overdrive 2; Overdrive/Rotary; Overdrive/Phaser; Overdrive/Auto Wah; Phaser/Rotary; Phaser/Auto Wah.**
- **MULTI-EFFECTS: Rotary Multi; Guitar Multi 1, 2 and 3; Clean Guitar Multi 1 & 2; Bass Multi; Rhodes Multi; Keyboard Multi.**

The Pro also has plenty for the creative musician: a huge collection of great sounds, editability, extensive MIDI control, a pretty good filter (for squelchy, bleepy effects), PC/Mac interface and 32-part multitimbrality. For bread and butter sounds and drum kits, there is little to beat the Pro, especially if you're a fan of Roland sounds. If you've experienced the Sound Canvas phenomenon before, you'll be right at home, since operation is very similar, but newcomers may find the manual a little obtuse. Since neither the index nor the table of contents gives the complete story, finding a specific piece of information can involve chasing references from either source and using the pointers that appear within the manual's text.

When I started writing this review, I was going to put somewhere in my conclusion that the SC88 Pro offered great facilities, but at a price. The launch price was £799 — actually the same as the original SC88 back in 1994 — so I would have concluded that more facilities for the same price was a good thing. However, the good news is that as I was finishing the review, Roland slashed £100 off the retail price! This may well be in response to its direct competition, since Korg's NS5R and Yamaha's MU80 both retail for £599, but the reduction is welcome nonetheless.

The existing SC88 owner may be a little cheesed off at the new machine's spec, and lower price, but at least he or she has had up to two and a half years of access to quality sounds. In light of the older module's success, the enhanced power and facilities of the Pro — not to mention the 12.5% price cut — should ensure the flagship Sound Canvas's continuing popularity. SOS

> "While the idea of General MIDI may have a relationship to real synths akin to that of the Spice Girls to real music, like the Spice Girls, these products do have a place in the market."

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CAPTURING A GOOD VOCAL PERFORMANCE

Ask a dozen engineers how to make great vocal recordings and you'll get a dozen different answers — but there are some ground rules, as HUGH ROBJOHNS explains.

The most certain thing you can say about vocals for a song is that they will invariably be heard above all other elements of the track. Consequently, any imperfections in the equipment used, the recording, or the performance will tend to be pretty obvious. To make matters even worse, everyone knows what a voice is supposed to sound like, so inappropriate equalisation, excessive sibilance, or unexpected changes in quality through the song will be immediately recognisable.

The golden rule is that old one about silk purses and sows' ears: no microphone, EQ, or compressor can cure bad vocal technique. The usual problems are poor breath timing, noisy breaths and unintelligible diction; a few sessions with a decent voice or singing coach can make dramatic improvements in a very short space of time, and it is well worth encouraging a budding vocalist to take some professional instruction.

Your first decision is whether to record the vocals 'live', with the rest of the band playing, or to overdub a clean vocal track after the instrumentation has been laid down (although it is usual to record a guide vocal with the basic instrumentation early on in the session). As recording a vocal track as an overdub process is the only way to achieve the kind of sound quality that most listeners will expect, this is the method I'll be concentrating on.

The Neumann TLM 170.

TIMING AND LOCATION

One of the most important aspects of getting a great vocal sound has nothing at all to do with the technology. The best microphone technique in the world cannot turn a lacklustre performance into a good one, and there is no point in recording anything but the very best. A lot of factors influence performance, some of them physical, some psychological, but timing is probably one of the most important.

Apart from the guide line recorded at the start of a session, recording the vocals is usually left to the very end of the recording process, when everything else has been recorded, replaced, overdubbed and polished. At the end of a long day, possibly in a smoky atmosphere, suffering the drying effects of air conditioning, with everyone a little tense or sensitive from 'exchanges of artistic temperament', may not be the best time in the world to coax the ultimate performance from your singer. On the other hand, first thing in the morning may not be much better. This is where the producers's role becomes so important — it's a case of judging when the vocalist's enthusiasm and motivation are at their highest, when their voice is in peak condition, and when there is enough of the song's instrumentation already laid down to enable a vocal line to be added. Similarly, it is important to be able to decide when the best has been achieved, or when to try another take.

The recording location can also have a significant effect on the quality of the end result: no one is going to perform well in a dreary room with bright fluorescent lighting. Some singers like to perform on their own in a dimly lit room, others prefer a brighter setting or want to feel the support of their fellow musicians in the studio with them.

Eye-contact between the producer, engineer and vocalist is very important — it is surprising what encouragement can be passed in the wink of an eye or a well-timed smile. On the other hand, an automatic facial expression reacting to something the singer cannot see in the control room might have disastrous effects, so you'll have to figure out the best way to extract the perfect performance from a particular vocalist. It's definitely worth avoiding a dozen gawping faces staring at the vocalist through the control room window, though, so try to get the band to go away while you are tracking the vocals.

It is currently fashionable to record many of the electronic or electro-acoustic instruments in the control room and some engineers expand this practice to include the vocals. The practicalities of such a technique will depend largely on the size, acoustics and noise levels of the control room, but it can improve the bond between producer or engineer and singer to be all the same side of the glass. I am not a fan of this technique myself because of the severe restrictions it places on monitoring, but it may be worth experimenting all the same — one very well known recording engineer positions the vocalist's microphone in the control room exactly halfway between the main monitors. The cue mix is then replayed over ▶

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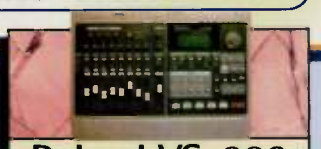

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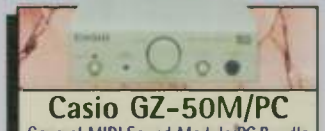

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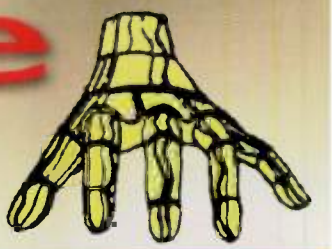

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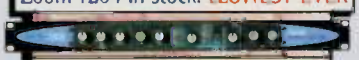

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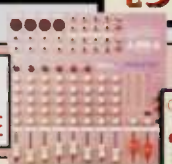

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the monitors, but out of phase so that the monitor sound cancels when it reaches the microphone, leaving just the required vocals. This technique is claimed to provide complete freedom from headphones and improved communication between singer and producer; but when I tried it, the monitor mix spill varied in level as the singer moved about and the out-of-phase sounds made us all feel horribly ill.

CHOOSING MICROPHONES

If you intend to record the vocals in concert with the rest of the band, you will have to adopt a close microphone technique simply to get some degree of separation. This will generally force you to use a microphone with a cardioid or hyper-cardioid polar pattern, a very effective pop-shield, and a bass filter to minimise the boominess caused by the proximity effect. The end results often tend to sound rather nasal, with all the characteristics associated with close mics. Of course, this may be appropriate to the style of the music, but in most cases a more natural and open sound quality is required.

If you are recording the vocals by themselves as an overdub to previously recorded backings, the options become significantly wider: personal taste (and budgetary constraints) play the major part in the decision over which microphone to use. For this purpose, a large-diaphragm capacitor microphone is generally hard to beat for overall sound quality and accuracy, but one essential feature it must have is flat frequency response — peaks in the mid or high regions are likely to cause problems with sibilance; premature bass roll-off will make the vocalist sound thin and weak. Typically, large-diaphragm capacitor microphones such as the Neumann U87, U47 or TLM170 or the AKG C414 are most commonly used for vocal work, but every manufacturer has a perfectly suitable microphone or two in their range somewhere.

Many engineers prefer the sound of microphones that use valve head-amps rather than more modern solid-state designs. Valve microphones not only feel warm to the touch, but they also sound 'warm' and usually have a very flattering quality which suits a number of instruments, and especially voices. Although secondhand vintage valve mics tend to be rather rare, several manufacturers make modern valve microphones which sound extremely good — the Rode Classic, for example.

POSITIONING

Like virtually every other instrument, the human voice sounds better when recorded from a distance rather than close in. Recording the voice in isolation means that you don't have to bother about achieving good separation, so a minimum voice-to-microphone distance might be about 20cm, with a maximum (depending on studio acoustics) of something like 60cm. At these kinds of distances, the recorded voice sounds far more natural and better balanced than anything that can be achieved with close microphone techniques — in particular, breathing and lip noises have a more acceptable perspective. It also means that any small physical movements the singer makes towards or away from the microphone will not cause serious changes in level.

The choice of polar pattern is entirely

MINDING YOUR 'P'S AND 'S'S

Plosive popping on the 'p's, 'b's and 't's of words is caused by high-velocity puffs of air emitted from the mouth when it creates these sounds, which force the microphone diaphragm to hit its end stops. This is a very common problem in vocal recording, but can easily be cured by a combination of vocal technique and microphone positioning — although it is always best to cure the problem rather than treat the symptom, which means not producing the plosive blasts in the first place. Vocal training can help a lot, as can some effort from an untrained singer to slightly reduce their emphasis on such words. Positioning the microphone slightly to the side of (or, even better, above) the line of frontal projection can also help considerably and it's a very good idea to use a windshield so that any blasts that do reach the microphone are dissipated. Open-cell foam windshields are supplied with most microphones and work reasonably well — especially if you leave a small air pocket between the windshield and the microphone grille (I don't understand the physics of this, but it seems that the larger the pocket of still air, the better the pop rejection).

An alternative technique, and one which also helps to keep singers at a sensible distance from the microphone, is a separate mesh-type pop shield mounted on a long gooseneck from the microphone, or perhaps on a separate stand. Several microphone manufacturers make suitable devices (for example the Beyer PS740 or the Sennheiser MZP40 — available from Canford Audio, 0191 415 0205, for about £45 each), but you can make your own quite easily from a circular wire frame supporting a couple of layers of nylon stockings. The frame needs to be between 8-10cm in diameter and placed about 5cm from the microphone grille in such a position that wind blasts cannot reach the diaphragm. You can easily check the performance of a home-made mesh by feeling for plosive blasts with the back of your hand. You may need to experiment with the denier rating of the stockings and the number of layers to achieve the best results, but I'm sure you'll enjoy the challenge...

Sibilance is the result of over-emphasised 's' or 'sh' sounds, and may be caused by the performer's technique, by the poor choice or placing of the microphone, by inappropriate equalisation, or by a lack of headroom in the recording chain. Again, a good vocal technique is the key to an easy life, but there are some things that can be done with technology too.

The choice of microphone is paramount — avoid anything which has even the most gentle of 'presence' peaks. Since high-frequency sounds tend to beam, positioning the microphone slightly above or to the side of the mouth (much the same as when you're coping with plosives, in fact) will help considerably. Some modest equalisation in the 5-10kHz region will usually help to reduce the prominence of sibilance, although it can never be removed completely.

Frequency-selective compression can also be helpful if it's used carefully, but can do more harm then good in the wrong hands. Inserting an equaliser into the sidechain of a compressor, and setting it to provide a mild boost in the 5-10kHz region, will encourage the compressor to introduce a greater degree of dynamic control to sibilant sounds. Although this technique can produce some very good results, it is often fiddly and time-consuming to set up and, given a choice, I would recommend using specialist de-essers which are far easier to 'tune in' quickly.

Finally, never skimp on headroom! A vocalist can have an enormous dynamic range (see below) and sibilance is very good at using up headroom very quickly. Although it is unlikely to be a problem on most modern formats, the pre-emphasis used in older digital recorders (such as the old PCM701 or F1 systems) reduced headroom at high frequencies, making sibilance a real problem. For similar reasons, analogue recorders that are incorrectly under-biased will tend to have excessive problems with sibilance.

dependent on the acoustics of the recording studio — an omni-directional pattern will capture more of the room ambience than a cardioid, of course. If you are recording backing vocals, it may be a good idea to use an omni-directional microphone anyway so that several singers can gather around it at the same time; this often gives better results than trying to control and balance multiple microphones.

The height of the microphone is important. It is almost impossible to sing properly if you are sitting down or slouched over, so mounting the microphone at, or slightly above, head height will tend to encourage the performer to stand up straight, thereby improving their breathing and projection. Mounting the microphone high also makes it impossible for the singer to get too close and so helps avoid problems with plosives.

If the vocalist is used to stage work, they will probably expect to sing with their lips touching the microphone, which is not what's required in a studio situation. Even if you explain that they should stay a foot or so away, they will often creep in towards the mic over successive takes until they are slobbering all over the thing. Mounting the microphone on a high stand out of reach may effect a cure, or you could try putting up two microphones — one for them to eat, and a more distant one to capture the performance at a more appropriate distance.

The lyric sheet can often be the source of undesirable early reflections, which tend to introduce a coloured or phasey quality to the recording of a solo vocalist. Try to position the paper (and its music stand, if used) so that it will reflect the voice away from the microphone rather than onto it, but beware of placing it in such a way that the performer will be moving their head between reading the lyrics and singing to the microphone.

The AKG C414.

DYNAMIC RANGE

The human voice has a surprising range of dynamics which you'll normally need to reduce considerably to avoid its drowning out the backing instrumentation one moment and becoming lost in the mix the next. Once again, a good vocal technique is an enormous advantage here — the singer should back away from the microphone on loud sections and come in closer on quieter ones. With the advent of decent compressors, a good technique is less critical than it used to be and so few modern singers seem to bother, but most of the more senior vocalists still exhibit the technique — and sound all the better for it!

Trying to follow and control a singer's dynamics on the faders is a recipe for disaster in most cases, and the use of a decent compressor is really mandatory. The settings applied to the compressor will have profound effects on the end result and should ideally be chosen during the mixdown process, when decisions can be made about how the voice should balance with the complete backing tracks, rather than at the recording stage. In other words, avoid compressing the vocal to tape if possible — something which is easier to do with digital recording formats than with analogue ones.

The Rode Classic.

The compression ratio will be determined by the amount of 'squash' needed, but is likely to be something between 2:1 and 5:1. Never use a limiter for vocals and avoid going any higher than 5:1 on a compressor, otherwise the sound will begin to take on a most unpleasant 'hard' or aggressive quality. Using a very low threshold will increase the degree of compression, but the unwanted audible side-effects of dynamic control will tend to be less obvious. Unfortunately this approach will also require more make-up gain to restore peak levels, which will introduce more background ambience and tape noise. Ho hum... life is full of compromises. It is not unusual (although arguably undesirable) to require as much as 30-40dB of gain reduction on really loud vocal peaks with some singers, so choose a compressor that can handle this kind of range (many can barely provide 20dB of gain reduction without sounding unpleasant) and always allow plenty of headroom during the recording.

The compressor's attack time is not usually too critical, but the release time certainly will be, and it should be determined by careful listening. Too fast and the background ambience or tape noise may audibly pump; too slow and the vocals may become rather lifeless and lack sufficient dynamic control. Most compressors have an Auto setting which changes the release time constants automatically to suit the nature of the audio signal from moment to moment. This kind of facility usually works very well and is certainly worth trying.

CUE MIXES

The vocalist will obviously need to hear the backing tracks, but this is another necessity that can adversely affect the end results. Normal practice is to feed a cue mix of off-tape tracks, plus the vocalist's own microphone, to a pair of headphones in the studio. However, the balance of individual instruments with the performer's own voice is quite critical, poor balances affecting timing, pitch, and dynamics. It is well worth taking as much care over balancing a cue mix as you would with your own monitor mix, although bear in mind that the requirements for a headphone feed are rather different!

Depending on the singer, you may find it useful to restrict the cue mix to a single pitched instrument — a piano or keyboard, say — as this will help the singer to pitch more accurately; on a strongly rhythmic track, the snare or bass drum may have to be quite dominant to ensure good timing from the singer.

I prefer to send the uncompressed voice to the cue mix as I find that this tends to encourage the vocalist to control their own dynamics and places fewer demands on compression for the subsequent mixdown.

One essential requirement for the cue mix is vocal reverb. It is surprising how many mixers make it awkward to send a reverb return to the headphones, but it is a very important facility. Reverb plays a key role in helping singers to pitch correctly, as well as making them feel good about their voices.

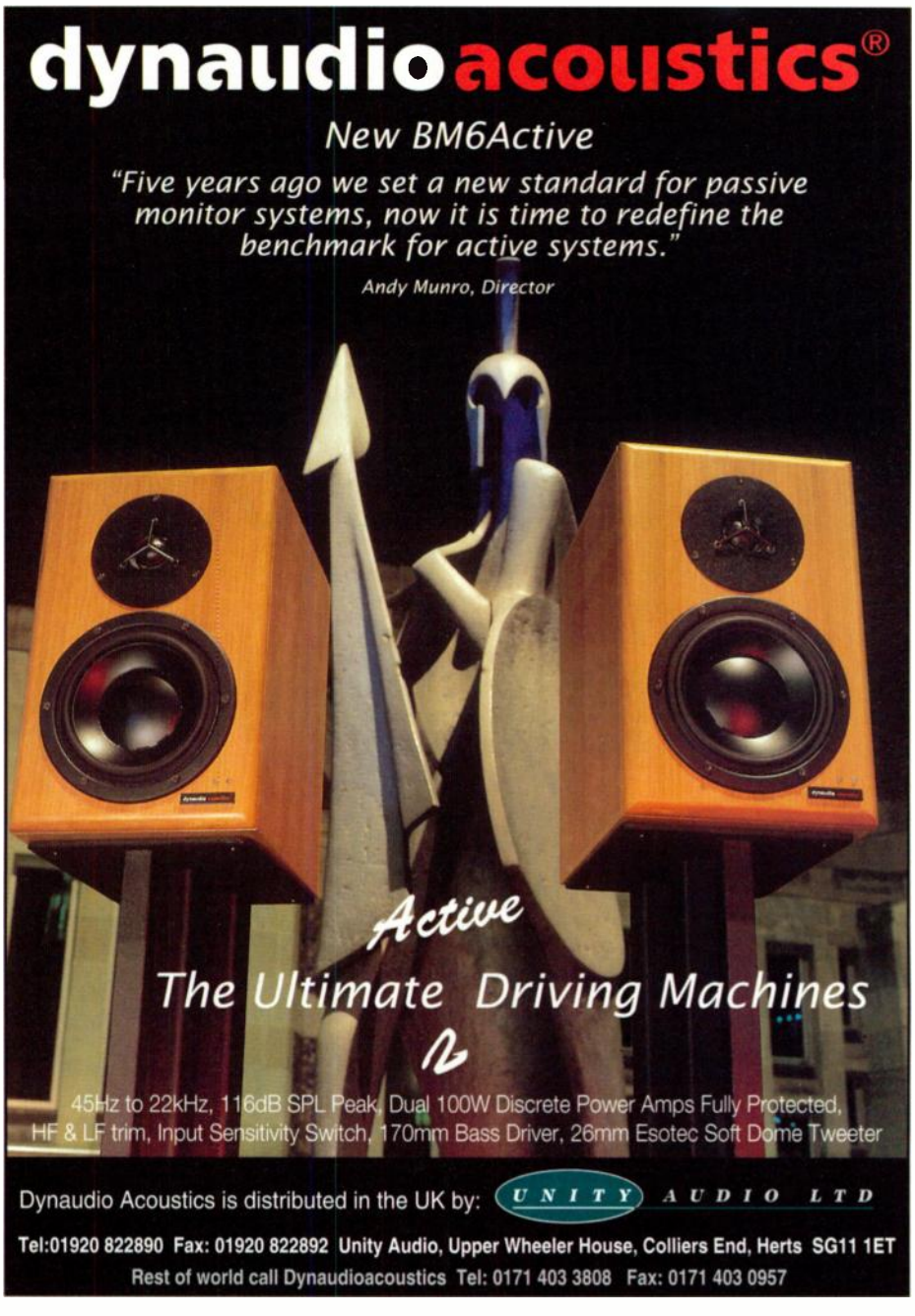
Some performers simply cannot work well with headphones, and in these cases pushing one ear-piece back so that they hear their own voice naturally in the studio acoustic can be a very good idea. The problem to watch out for, however, is cue-mix spill from the unused ear-piece getting onto the vocal track. I used to use a special in-line plug and socket which disabled one side of the headphones, but these days I find it easier to kill one channel of a stereo cue mix (assuming the mixer is suitably equipped). On the subject of spill, make sure that all the other foldback headphones in the studio are turned off during the vocal overdubs too.

ROUNDUP

A good vocal recording relies mainly on three things: good vocal technique; good microphone technique; and good interpersonal skills. The last is probably the most important because the singer will feel far more exposed than other musicians and will consequently need more nurturing and support. Every singer is different and will need to be treated differently — whether we're talking about setting an appropriate mood in the studio, balancing a cue mix or deciding whether or not to try for just one more take — so sensitivity is a valuable commodity.

Listen carefully to the recording and don't be tempted to throw technology at a problem before you have tried more fundamental remedies such as moving the microphone. Use the best-quality mic you have, with the best microphone preamp, and don't use equalisation unless you really have to. Take your time setting up the compressor and always make decisions about EQ and compression within the context of the complete mix — soloing an instrument does not reflect its character and weaknesses in the same way. SOS

Hugh Robjohns is a lecturer at the Centre for Broadcast Skills Training at BBC Wood Norton. The views expressed in this article are the author's own and are not necessarily those of his employer.



Happiness is a Warm Valve

GROOVE TUBES A-SERIES VALVE MICROPHONES

They may look the same as their predecessors, but inside the a-versions of Groove Tubes' mics is a new set of circuitry. PAUL WHITE's feelin' groovy...

Groove Tubes are a company best known to guitar players for their matched sets of valves, but they also produce valve amplifiers, outboard processors and microphones. Their MD1, 2 and 3 mics have enjoyed success for a number of years, but now they've been given new amplifier circuitry to further reduce noise, increase headroom and lower total harmonic distortion. Though the same capsules are used as in the original models, a new suspension system has been added to reduce handling noise — some performers are actually taking these mics out on the road.

Because these are valve mics, you can't run them from regular phantom power sources, so Groove Tubes produce the mains-powered PS2A power supply, which can power any two mics (and some other Groove Tubes products) simultaneously. The mic connects to the power supply via a locking 9-way D connector, and while I have to agree with those people who find these a trifle ugly, they do have the advantage of being inexpensive and easy to obtain, so if you do need to repair or replace a cable the bits aren't hard to come by.

MD1a

Physically identical to the original MD1, the MD1a is a fixed cardioid pattern mic featuring a fairly large diameter capsule with a 10-micron diaphragm; it can handle SPLs up to 137dB without recourse to cissy pads — and there's no LF roll-off switch either. The revised valve preamp circuitry, based on a 12AT7 dual triode, is designed for lower noise and lower distortion, but it also extends the high-frequency response of the microphone. Unlike most cardioid mics, it doesn't seem to have a deliberate LF roll-off built in, so you have to use a pop shield when recording vocals to prevent popping. There are no presence peaks in the response, and though it has its share of bumps and dips, the nominal response is flat from 40Hz-18kHz within 4dB. The equivalent input noise is 20dB SPL and the sensitivity is 50.1mV/Pa. A transformer output stage provides a low 30Ω output impedance, with a maximum output level of 1.7V RMS at 1% distortion.

Cosmetically, the MD1a is seriously chunky, with its heavy plated brass case and 'bullet-hole' ventilation. The tube shines out through a cut-out GT logo, and the singer performs into the ▶

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pros & cons

GROOVE TUBES a-SERIES

pros
- Flattering, warm tonality.
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- Visually imposing.

cons
- As all 'coloured' mics do, they will flatter some voices more than others.
- Fiddly pattern adjustment on MD3a.

summary

A worthwhile revision to a set of established and popular modern valve microphones.

SOUND ON SOUND

side with the cardioid symbol. An optional heavy-duty shock mount is available, but otherwise the mic can be screwed directly to the top of a conventional mic stand by means of a threaded insert in the base. An equally tough metal grille protects the capsule.

Subjectively, the mic sounds very similar to its predecessor, though there may be just a hint more air around the top end. I never experienced problems with noise with the older model, not because these were particularly quiet mics, but because microphones of this type are invariably used at close range. This newer version is a little quieter than its predecessors, but on paper the biggest difference is the reduction in distortion. Fortunately, this doesn't seem to have compromised the mic's warm, punchy sound and, like the original, the MD1a seems to combine the detail of a capacitor mic with the sort of mid-range punch normally associated with a good dynamic model. The low end is also nicely wide and warm, and when the mic is used close up the sound takes on a very rich, intimate character.

MD2a

The MD2a cardioid is, outwardly at any rate, mechanically similar to the MD1a, except that it has a black crackle paint finish and there's a variable sensitivity control peeking out of the end of the case. Unlike a pad, this control affects the capsule sensitivity; talking of which, the gold-sputtered diaphragm used in this capsule is just 3 microns thick — less than a third of the thickness of that fitted to the MD1a. The result is a much extended top-end response: this model claims 40Hz-25kHz ±2dB. The response curve is also a lot smoother than that of the MD1a, with fewer local bumps and dips. The equivalent input noise is 26dB SPL and the sensitivity is 26.4mV/Pa. The transformer output stage spec is the same as for the MD1a.

What we have here, then, is a mic that's a hint noisier than the MD1a, and a little less sensitive, but with a hugely extended upper frequency response. In practical terms, this translates to a mic that's very good at handling transient sounds, making it suitable for percussion, drum overheads, brass, sax and acoustic guitar, as well as vocals. Subjectively, I found it a little less warm than the the MD1a when used on vocals, and the mid-range seemed to project more. Whether this is a good thing depends on the singer — some people will find this mic gives them the extra cut and projection they need, while others may find it slightly nasal-sounding. Used for up-close vocals, this can be a very flattering mic which will really stand out in a mix.

> "...the MD1a seems to combine the detail of a capacitor mic with the sort of mid-range punch normally associated with a good dynamic model."

MD3a

While the previous two mics share the same housing style, the MD3a has a striking punched-metal grille basket finished in polished chromium, the reason being that the pattern of this mic may be adjusted from cardioid, through wide cardioid, to omni by means of a screwdriver. Obviously, a grille open only on two sides would be inappropriate for an omni mic, hence the basket construction. A slotted screw, accessed by means of an aperture in the grille, is used to adjust the mic pattern, and the 'hot' side of the mic is denoted by a Groove Tubes logo. The lower part of the body seems identical to that of the MD2a, and the same variable sensitivity control is fitted.

Looking at the spec, the MD3a comes closer to the MD2a than to the 1a with a 20Hz-20kHz response, flat to within ±2dB. The equivalent input noise is again 26dB SPL and the sensitivity is 25mV/Pa. The same transformer output stage is

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▶ used as on the other two models. Examination of the response plot reveals a better-controlled low end — the others drop off at 50Hz, then kick back up to a +5dB peak at 20Hz or so. There's also a very gentle dip at around 2kHz, but overall the response is acceptably flat.

Tonally, this model falls somewhere in between the other two. It has the characteristic Groove Tubes intimate vocal sound, and the low end seems just a fraction warmer than on the MD2a but with a similar degree of projection and punch. I have to admit that I don't really like the idea of having to poke a screwdriver into the basket to change the polar pattern, but in other respects this is a really nice mic.

SUMMARY

It seems that Groove Tubes have managed to improve upon an already popular design while retaining the character that made these mics popular in the first place. And there's no doubt that these mics have a lot of character — they're designed to flatter, not to simply pass on what they hear.

Though these are predominantly vocal mics, all three can be used to record acoustic instruments or percussion; in this latter application, though, the extended high end of the 2a and 3a might be an advantage. But, curiously enough, for my own voice I preferred the MD1a — it has a lower-mid warmth about it that the the other two mics don't quite equal. Of course, different singers will probably find that different models suit their particular voices, and some singers may not feel comfortable with any of them. That's why the present wide choice of 'character' microphones is such a good thing. The obvious competitor at the price is the Rode Classic tube mic and, for what it's worth, I think the Rode has a more natural sound, but then that's a subjective judgement based on my own voice.

It's unlikely that you're going to buy one of these mics without trying it first, but if you like what you hear, you also have the benefit of knowing that you're buying a modern design using readily available tubes and easily obtainable spares — something rarely true of vintage tube mics. What's more, even taking into account the cost of the power supply, the price is very attractive compared with what you'd be expected to pay for a well-used original tube mic. All three Groove Tubes models represent great value, and though the subjective results of the technical improvements are not that great, the revisions are worthwhile. SOS

> "It seems that Groove Tubes have managed to improve upon an already popular design while retaining the character that made these mics popular in the first place."

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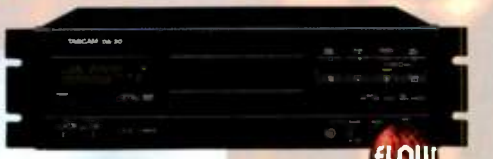

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PROGRAMMING REALISTIC DRUM PARTS

PART 2: In last month's issue, PAUL FARRER offered hints and tips for making your programmed MIDI instruments seem more real. This month it's the turn of drums and percussion.

When asked if he thought Ringo Starr was the best drummer in the world, legend has it that John Lennon, rather cuttingly, replied that he didn't think that Ringo Starr was even the best drummer in the Beatles. And thus started nearly four decades' worth of jibes and derision aimed directly at the one member of the band who essentially holds the whole ship together. We've all got our favourite 'drummer' jokes, yet secretly we are all aware of just how important drumming and percussion are to the modern-day process of music making. A quick look at the current state of play in the sample CD market will reveal just how popular drumming and percussion sample CDs are. Why should this be? After all, most sound modules these days come stuffed with nearly as many drum and percussion sounds as you could ever hope to use, software programs are now so clever that they are capable of making musical decisions all on their own, and drum machines extol their 'human' or 'realistic' rhythmical features. Perhaps one source of our percussion paranoia is that we are all a little bit unsure of our own ability to construct interesting yet 'legitimate' drum patterns. How do we know that what we program into our sequencers could actually be played in real time, and should this even matter? If percussion paranoia is taking over your life, help is at hand. Relax, don your Spandex strides, your headband and your 'Metallica Live in Stockholm' T-shirt, and let's get back to basics.

TO DRUM OR NOT TO DRUM

As we saw last month, when you're programming any instrument part into a sequencer it's vitally important to continually bear in mind not only the kind of instrument you are trying to recreate, but also the playing style relevant to the piece you're working on. So it is with drums and percussion, the main difference being that, generally speaking, the rhythmic feel and tempo are the first things to be established when you're constructing nearly any kind of music. This is why so many programmers and producers start recording 'from the drums up'. It's easy to see why the drum loop has etched itself so deeply into the landscape of popular music production — the loop certainly takes a lot of the decision-making and hard work out of having to start from scratch, and can very often define the whole feel and style of everything that is laid down on top of it.

Leaving drum loops aside for the moment, you can still approach a track with this 'drums first' attitude, but it's worth taking time to think about just what kind of drum and percussion instruments you'll be using. Turning to drum machines and sound modules can often cause 'optional paralysis' — by that, I mean having so many different sounds to choose from that it seems impossible to know which ones to use and, perhaps more importantly, which ones to leave out. The world of MIDI has, in effect, put you in a huge room surrounded by almost every drum and percussive instrument you could possibly need — and then you're expected to pick exactly the ones that will work best for your piece of music.

Listen to your all-time favourite records and pay close attention not only to what the drummer and percussionist are playing, but also to how many different instruments they are actually working with. You may be surprised to find out that there isn't as much instrumental variation as you might have thought. Take Ringo's kit, for instance: bass drum, snare, hi-hats, two cymbals and a couple of toms. The modern-day 'stadium-sized' drum kit, which takes a team of roadies six days to construct and into which the drummer has to be lowered from a crane, may look great on stage, but whether this 'bigger is better' approach actually makes for better records is an arguable point. Therefore, when trying to recreate the drum kit realistically via MIDI, the first thing you need to consider is what sounds to use.

THE KIT

It seems sensible to start with the bass drum, and you can usually find at least three or four knocking around at the bottom end of the keyboard, each with varying degrees of thump or thud. This is the time to really think about what kind of a kit you want to work with. For example, is it a rock kit or a jazz kit? Should the drum samples have any built-in ambience or will you be adding effects later? Of course, the attack, the tuning, the decay, and the general tone of the bass drum (and most of the other drums) will all add to the 'character' of the kit. I've found that bass drums tuned slightly lower are good for giving a track a more atmospheric and laid-back feel (jazz drumming is notorious for big, flappy bass drums), whereas tighter or higher bass drum sounds work nicely for more precise drumming, where the 'tick' on the front end of a sample is accentuated.

The bass drum/snare relationship is one of the ▶

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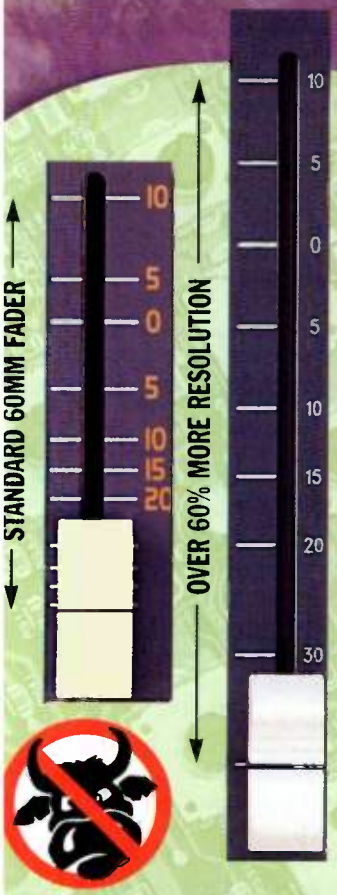

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Realistic MIDI Sequencing

most crucial sonic decisions there is to make. Generally speaking, the snare acts not only as the other half of the 'boom-tick' rhythm combo, but also plays an important role in defining the style of the piece. You don't need me to tell you that there are as many different snare sounds as there are US dollars in Bill Gates' bank account, but it's worth remembering that one real snare drum is itself capable of a thousand different tonal changes in the hands of a decent drummer.

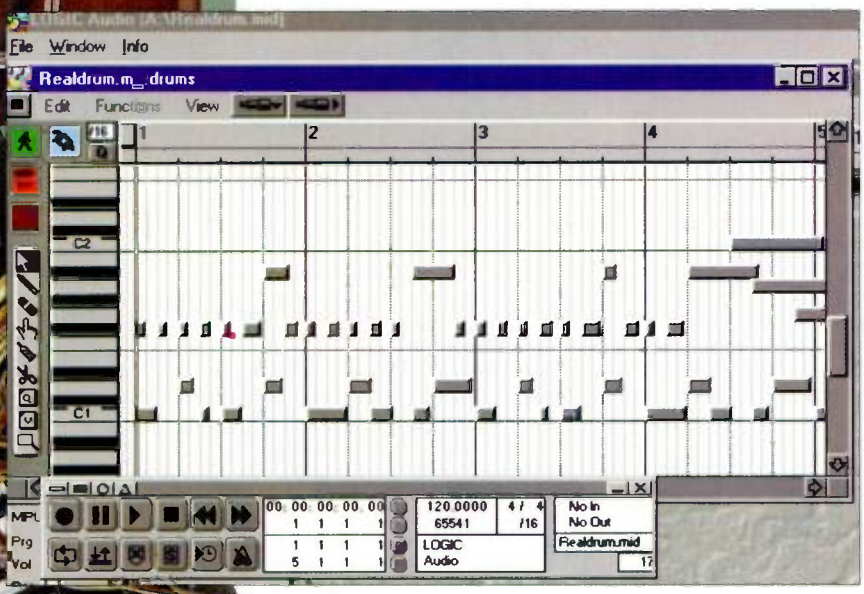

Figure 1: Less is more!

Just as with the bass drum, when choosing a snare sound it's important to know just how flexible the sample is. Is it, for instance, velocity sensitive? Are there more than two or three different samples velocity cross-faded, and if so how does it 'feel' when you play it via a keyboard or drum-pad system? How much ambience is inherent in the sound and could you add more if you needed to? All of these questions are worth a brief look at before you decide which sounds to select.

To take hi-hats as an example, General MIDI would have us believe that your average hi-hat has exactly two states; open and closed (which is rather like saying a Ferrari is either going fast or not moving). The key to unlocking the expression of any drum sound is finding the degrees of variation between these two states, and your choice of drum sample should reflect this. Drum modules like the Alesis D4 have made life a little easier by including a number of different hi-hat samples recorded at varying degrees of 'openness'. Clever programming of a sound such as this (for example, velocity crossfading more than one sample per key) is another sure-fire way to make your hi-hat work seem more realistic. With tom-toms, think sensibly about the actual number of different drums in the kit you're trying to recreate. Also consider whether the tom samples in your sound module are actual recordings of differently pitched tom-toms or simply one tom sample detuned by three semitones as you play further down the keyboard.

PROGRAMMING TIPS

The modern-day drum kit hasn't changed a vast amount over the years. Even with the greatest set of pedals, advanced construction techniques and clever drum positioning, most Earthlings still only have a finite number of limbs with which to play. Or to put it another way, with two legs and two arms at their disposal at any given time, even the world's greatest drummers can only be quadraphonic. Bear this in mind when you're tempted to indulge in fancy playing (find me a real drummer who can play three cymbals at the same time over a tom fill!) and concentrate instead on the essential elements — bass drum, snare and hi-hats.

In a standard 4/4 drum pattern, the bass drum (right foot) can be seen to play on beats 1 and 3, while the snare will play on beats 2 and 4. Over this the hi-hats might work in 16ths or quavers, with the left foot controlling how open or closed the two cymbals of the hi-hat are. Obviously, if the snare work gets any more complex and requires both hands (such as when playing a fill) the right hand playing the hi-hat has to move over to the snare, leaving just the left foot to operate the hi-hat pedal. Likewise, if the drummer uses the right hand to hit a cymbal or a tom, the hi-hat work has to stop. There's a maximum of four different drums being triggered at any one time — and so it should be if you want to program a drum kit realistically via MIDI (see Figure 1).

IT'S ABOUT TIMING

Quantising is called upon to atone for a multitude of timing sins, and its awesome powers would seem all the more crucial in the case of drumming: after all, the drums hold a track together, right? Well, yes and no. Of course solid timing is important to eliminate sloppiness, and if your rhythmic foundations aren't right it'll be almost impossible to add other instruments on top, but the drum track also has the power to drive and guide the song in other creative ways. Real drummers working without the benefit of click tracks generally speed up in choruses and pull back a little during verses. This is a perfectly natural and musical thing to want to do, and even the minutest change in tempo can be just the thing to really lift a certain section of a track.

Computers, as a rule, don't like things to be 'fuzzy', and are continually tempting us to be exact and consistent with timings (probably because it makes the maths a little easier). If you do tend to quantise much of your drumming, why not try increasing the tempo in a chorus or solo section, even if only by a BPM or so? While the change may not even be instantly perceptible, it could make the difference between a good track and one that sparkles with life.

Staying with quantisation for a moment, again think about the feel of the drum track you are working on. Is it acceptable, for instance, to play slightly behind or ahead of the beat to create a

FIVE GOLDEN RULES

1. Remember how many limbs you have! If both hands are playing a complex tom roll, unless you are an octopus the snare and hi-hats should not be playing.

2. Choose your sounds with care. One good drum sample is better than three bad ones.

3. Keep it simple. Ringo did and he owns a Rolls Royce (probably).

4. Try to play with as much dynamic expression and unquantised sensitivity as your sounds will allow.

5. Practise your technique. If it doesn't sound quite right at first, take the time to play it again — it'll be worth it in the long run.

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WRH

Realistic MIDI Sequencing

certain effect? And what about slight rallentandos (slowing down) over a tom fill, moving into a key change for a bit more drama before picking up the original tempo in the new key? (Instant Pink Floyd!)

If you do feel the need to quantise the bass drum as a firm foundation, you might want to try leaving your hi-hat and snare tracks unquantised. Any dynamic differences (or volume expression) you can add will also help a great deal, and will add believability to a MIDI drum track — though it may take you a little longer to do. Chopping a drum pattern up into different sections to work on is another good trick. For instance, you could put together a fairly straightforward drum phase lasting seven bars, most elements of which could be quantised for greater accuracy, but in the eighth bar why not drop in a short, unquantised snare fill? This is a musical feature that the listener can pick up on and, if it's done well, could fool the ear into believing that the whole phrase is played by a real live human — who also just happens to have terrific timing. This trick works particularly well for percussion sounds.

As long as your foundation drum tracks are solid enough, you can be quite flexible with the timings of certain percussion parts, to give them a more human feel. Inserting the odd unexpected triplet or trill is just the sort of thing a live percussionist would do to add their own stamp to a performance, so you shouldn't always be tempted to lay down a percussion groove that you like and simply copy it to all parts of the song.

Just as with choosing drum kit sounds, deciding which percussion sounds to use can be tough. My only rule of thumb is that it's better to have two excellent and flexible percussion sounds that work well together and sound realistic (such as a good pair of conga multisamples) than a handful of mediocre percussive bits and bobs that happily 'busy up' a percussion track without really adding anything to the song.

DRUMMING EFFECTS

There are a number of tricks a drummer can use to spice up a drum track, and it pays you, as a programmer, to be aware of them.

• **FLAMMING GROOVY:** One of the most popular is the 'flam'. When a note is flammed, it simply means that both sticks hit the drum but one arrives fractionally earlier than the other. Flams are particularly noticeable in rock tracks, where you'll often notice monster-sized tom fills lasting a bar or more, but they can also be heard in the percussion section too, with hand-flams on tablas and bongos.

The best way to programme flams is to record your tom track (or percussion part) as usual, then copy the sections you want to flam to a separate sequencer track and impose a negative delay of anything between -6 and -30ms. The resulting 'note doubling' effect is made even more realistic if you also reduce the velocity of the earlier notes slightly, so that the loudest note is on the beat, with a slightly quieter drum preceding it. This flamming effect also works well on snares and odd percussion noises, but be warned: the effect (like many others) should be used sparingly. Too much fancy drum work can have a detrimental effect on the rest of the track.

• **ROLL WITH IT:** One of the hardest effects to recreate believably via MIDI has to be the snare roll. If you actually listen to a real snare as it crescendos over the course of a roll, it doesn't just get louder — the whole dynamic and character of the sound changes too. It's naive to think that you can replicate this entirely using samples, but you can certainly get close to the 'feel' of a snare roll if you follow a few simple guidelines. Firstly, never quantise a roll, no matter how long it is. The best thing to do is mark off the area that you'll be 'rolling' over and slow the track right down. Make it ridiculously slow if you have to (25BPM!) and record the entire roll flat, without any increase in note velocity or speed, from the position you want to start from to the end point (usually on a separate record track, for merging later). Playing the roll back at normal tempo will tell you if the speed feels right, and once you're happy with it, it's time to look at note velocity.

In *Logic*'s Hyper Edit page, just as in the *Cubase* Key Editor, creating a crescendo is a simple enough procedure — just draw a new velocity curve onto the display bargraph. In older programs, such as *Creator* and *Notator*, this feature is in the Process Data page. Most other programs, however, have the ability to force crescendo and diminuendo parameters over certain marked areas. Of course there's going to be an element of trial and error when performing this function and, particularly with older programs, it tends to be a destructive process. As you might need a few attempts to get it right, be prepared to make a copy on another track, just in case. Simply tell the crescendo function to begin at a velocity of 001 at the start of your roll and end somewhere towards 120 and the computer should work out the rest. Also, if you have a way of controlling filters or EQ on your sound module or sampler, all the better. You might like to start with a fairly 'closed' or damped sound at the start of the drum roll, and brighten the top end as the roll progresses.

HIT KIT: WORKING WITH DRUM PADS

Many programmers I know are best friends with their drum pads. The KAT system and Roland's Octapad range are two noteworthy examples, but almost any device that brings the programmer closer to his or her MIDI instrument has to be a good thing. With a drum-pad setup you actually have to use drumsticks, which lends a much higher degree of realism to any percussion part you programme. Many users find pads particularly effective for adding snare fills and other detail work to a previously-programmed bass and snare backbeat.

The KAT TrapKat MIDI pad system.

QUICK, QUICK, SLOW

Real drummers don't tend to hit their drums exactly on the beat, as a quantised MIDI part would, but instead tend to lag or lead a little, depending on the feel they're trying to create. If the drummer wants to make a track drive, it's normal for the snare beat to come a fraction early: you can experiment with this trick by recording the snare on a separate track, then adjusting the track delays. Conversely, to make a song lay back, delay the snare track slightly. As Paul Farrer says, it also helps to maintain a human feel if you can leave the hi-hat part unquantised — or, as a compromise, use the percentage quantise function to only partly tighten it up.

If you have a sampler, it can also be helpful to start your song off by using drum loops from sample CDs, but rather than using them just as they are, either overdub some of your own drum sounds or, better still, replace the whole thing, keeping only the underlying feel. *Paul White*

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They've got the POWER

PAUL WHITE puts Dynaudio's new nearfield monitors to the test and is actively impressed...

DYNAUDIO BM6A ACTIVE NEARFIELD MONITORS

At one time, active monitors were treated with suspicion by the typical user — they seemed over-expensive, and you didn't get to choose what power amps to use — but now we know better. In fact, it can be argued that the active approach is the only way to make speakers behave properly — passive systems are a monstrous compromise, and it's a credit to their designers that the better ones work as well as they do.

CONSTRUCTION & APPEARANCE

Dynaudio's BM6A monitors, are, to my knowledge, the first active nearfield monitors the company has produced — they're certainly the first I've seen — and they are essentially based on a design that can be traced back to the PPM2 broadcast monitor. The Dynaudio BM6A incorporates a pair of specially-designed, discrete 100W MOSFET amplifiers fed from a phase-aligned, 4th-order electronic crossover operating at 2.2kHz. The input stage is a balanced instrumentation amplifier fed from a standard XLR connector. Two level controls provide a 4dB adjustment range for the high- and low-end frequency response (50Hz and 15kHz); these are useful in helping to compensate for proximity to reflective surfaces and, to a lesser extent, to help match the speakers to the acoustic character of

the room. A switch selects between +4 and -10dB sensitivity, and power is fed into the unit via a switched IEC mains socket.

Measuring just 338 x 216 x 285mm, the speakers supplied for review came in a wonderful natural light wood finish with radiused cabinet edges that would complement my Victorian stripped-pine studio furniture a treat (see picture). Sadly, the wood-veneer finish costs extra — for the basic price, the speakers come attired in the more familiar 'studio black'.

Dynaudio is essentially a company dedicated to building driver units, with complete systems being just a small part of their business, so it it comes as no surprise that both the high- and low-frequency drive units are made by them: the 26mm fabric dome tweeter is protected by three metal bars in the form of a star (or Mercedes logo if you're that way inclined), while the bass/mid driver is a 170mm unit with a synthetic cone, roll surround, and the characteristically large Dynaudio dust cap with edge slots. A dual-colour LED set into the front panel shows when the speakers are powered up, and flips from red to green after the short power-up delay time has expired. A second LED comes on to let you know the protection circuitry has started to earn its keep.

At first glance, the cabinet appears to be unported, but closer examination of the rear panel shows a narrow porting slot right at the top of the cabinet. The remainder of the back panel is taken up with a heat sink, so as to furnish the amplifiers with adequate cooling without the need for a fan. The result is a speaker little larger than a typical compact nearfield monitor, yet capable of a 45Hz-22kHz response (-3dB) and with a hefty peak SPL of 116dB per cabinet at 1 metre. The continuous SPL is quoted as 101dB. Both amplifiers are protected against DC faults and thermal overload, and there's a photo-active limiter on the tweeter. I hadn't heard this term before, but I'm told the device is a fast-acting true RMS limiter, which enables transient peaks to pass through the amplifier, but prevents heavy current overheating the tweeter.

LISTENING TEST

Auditioning active speakers is easier than checking passive models, because with any passive system, there's always the nagging doubt that the amplifier you're using might not be best suited to those particular speakers. With active speakers, all you need to do is connect a good CD player to the inputs, and you're in business. I wheeled in my standard test CD collection, but in the interests of retaining some vestige of musical credibility, I'm not going to tell you what all of them are. One of them is Jennifer Warnes singing Leonard Cohen (the *Famous Blue Raincoat* album), which is actually a very nicely recorded album and not only provides a good test of bass extension and vocal clarity, out also shows how good Leonard Cohen's songs can sound when somebody else is singing them! The other I'm prepared to put my hand up to is Madonna singing 'Live to Tell' — the QSound tricks used on this mix provide a nice test of stereo imaging. This particular track is mixed a little on the bright side, but not enough to make it unpleasant.

The verdict, after much swapping of discs and comparisons with my ATC monitors, was that the Dynaudio BM6As are voiced just a hint bright — but only a hint. Overall, the sound stays smooth and very natural, even at fairly high levels, and the benefits of active powering show up in almost dictatorial control of the bass end, which remains both tight and deep. There's also plenty of level.

Dynaudio speakers have always been effective at presenting a detailed mid and high end, and this pair is no exception. The sound has a strong sense of intimacy, but there's little or none of that edgy raggedness around the crossover frequency that lets down so many otherwise competent monitors. Well-recorded voices retain clarity and articulation, but without becoming scratchy or sibilant — a trait often shown up when female vocals are played through imperfect monitors.

Stereo imaging is important for nearfield monitors, because the stereo panning and effects for most mixes are set up using nearfields rather than monster monitors. In common with other Dynaudio speakers I've used, the imaging is convincing and stable, with centre-panned sounds hanging nicely between the speakers. Stereo enhancement techniques push the sound out beyond the extremes of the speakers, and again, good imaging is essential if such effects are to retain their integrity. These speakers convey an impression of both stereo width and depth, and it's also worthy of note that the sweet spot is nice and wide — you don't hear any significant HF rolloff or any serious imaging degradation until you've moved a long way off-axis.

SUMMARY

Over the past couple of years, a number of active monitors have sprung up in the £1200 to £1500 price bracket, many of which are exceedingly good performers. You can make accurate mixes on any of the better models, and any preferences probably come down more to personal taste than to any significant technical supremacy. Even so, when you're spending this kind of money, it's always as well to shortlist two or three pairs, then listen to them side by side.

I've always had the greatest respect for Dynaudio studio monitors, and while I still use ATCs as my reference, there's no denying that Dynaudio manage to deliver a very close-to-neutral sound that is at the same time lively and inspiring to work with. I'd certainly be more than happy to do all my mixing on these little beauties, and it's unlikely that anyone would complain that they weren't loud enough. SOS

info

E Standard black models (not pictured) £1323.05 per pair inc VAT. A price for the limited edition wood veneer models (shown here) has yet to be set, but they will cost slightly more.
A Unity Audio, Upper Wheeler House, Colliers End, nr Ware, Herts SG11 1ET.
T 01920 822890.
F 01920 822892.
E unityaudio@channel.co.uk

pros & cons

DYNAUDIO BM6A £1323

pros
- Wide, stable imaging.
- Well-controlled, smooth and honest-sounding.
- Tight, reasonably well-extended bass end.

cons
- No obvious cons at the price, though some sort of physical driver protection (such as a clip-on baffle cover or metal grille), would be useful for producers wanting to use these as a mobile reference.

summary

These monitors have the ideal attributes for either nearfield monitoring in a pro environment or for main monitoring in a serious project studio. They manage to sound lively and detailed without being fatiguing or harsh.

SOUND ON SOUND

WHY ACTIVE?

Given the possible sources of audio contamination in the average studio, it's amazing that hi-fi enthusiasts still spend days discussing the merits of different types of speaker cable, some of which costs more than the speakers it's connected to! The entire debate is rendered irrelevant in an active monitor system, because the power amplifier is located only inches away from the drive units. What's more, there are no crossover components between the amplifier and speaker to further add to the complex load of a loudspeaker, or to compromise the damping factor of the amplifier. Another benefit is that as the crossover works at line level, before the power amplifiers, the designer can use far more precisely-controlled EQ curves and include phase compensation — and it's even possible, to some extent, to compensate for frequency response anomalies in the driver/enclosure system. Comparing active and passive versions of the same speaker invariably reveals the active version to be capable of louder output before the onset of audible distortion, as well as sounding tighter, and being better controlled.

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★★★★★
SOS REVIEW

SMOOV GROOVES

SMOOV GROOVES is the sequel to the critically acclaimed "Funky Ass Loops" from Sonny T. & Michael B. (♁) and is without doubt the finest collection of laidback smoov grooves & 70's funk. Tempos range from 60-108 BPM. First you get a full mix of each loop, followed by the drum part, bass, etc.

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KEYBOARD REVIEW

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★★★★★
SOS REVIEW

LA RIOT 3

SOS said in review "Conclusion: LA Riot 3 is a hard act to follow - the sheer amount of usable and inspired sounds create an all-American urban soundscape of immense realism. LA Riot 3 is quite simply a classic". KEYBOARD agreed-2CD Set £59.95

★★★★★
SOS REVIEW

FUNKY ASS LOOPS

From the rhythm section of ♁ and the New Power Generation First you get a full mix of each loop, then the drum part, bass part, etc. "A CD unlike any other I've reviewed. Funky Ass Loops is dead easy to use and excellently produced". (SOUND ON SOUND)

KICKIN' JAZZ

Kicking off a series of new products from WC Music Research is this 700 Jazz Drum loops and guitar licks CD/CD-ROM. Played with the style and finesse you'd expect of the master Bernard Purdie. Each set of drum loops has complementary guitar chord progressions and licks played in the same tempo and style.

NEW!

POKE IN THE EAR

In this collection you will find tons of huge Metallic Percussion, crushing Machine loops, dark, ugly and disturbing Ambient Textures, long and evolving Complex Hits, unearthly Vocal Wails, rhythmic Noise Loops and Alien effects. "These guys sound dangerous" KEYBOARD REVIEW. (CD/CD-ROM)

★★★★
SOS REVIEW

PHAT & PHUNKY

Phat & Phunky comes from the programmer of the five star rated CD Dance/Indiustrial 2. Phat & Phunky includes over two hours of complete loops, the samples for each loop, and a disk containing MIDIfiles for every loop!! on 2-CDs. The material is R&B/Hip-Hop/Slo Jamz - perfect for any type of track.

★★★★★
KEYBOARD REVIEW

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NEW!

HYPNOTICA

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NEW!

NEW PRODUCT OF THE MONTH

From the team that brought you Technophobia! "ELECTRONICA" features electro-industrial loops, the components of the loops and MIDI-Files to customize the loops !!

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NEW!

EAST★WEST

SAMPLED SOUNDS ON CD & CD-ROM

★★★★★
KEYBOARD REVIEW

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NEW!

MONSTER GUITARS

Monster Guitars is the first collection to feature ONLY rhythm and lead guitar riffs. This BIG collection (on two Volumes) covers a wide range of styles including Hard, Trash, Rock, Heavy and Funk. Only vintage guitars have been played through classic amps.

NEW!

FREAKIN' BASS

NEW 2-CD SET from ace session bassist WILL LEE, contains five new basses including the infamous Sadowsky 4-string. All basses are sampled chromatically from C1 to D4 at multiple dynamics and playing styles. CD-2 contains a huge collection of bass loops.

ORCHESTRA

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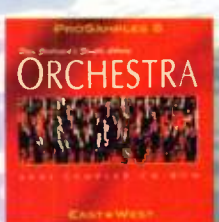

★★★★★
SOS REVIEW

ULTIMATE PIANOS

"The Ultimate Piano Collection is, in my experience, as close to the real thing as technology will currently allow" - SOS Review. The Ultimate Piano collection includes a Fazioli F228, Steinway D, Steinway C and Boesendorfer 225. Triple 5 Star review in KEYBOARD and SOUND ON SOUND.

★★★★★
SOS REVIEW

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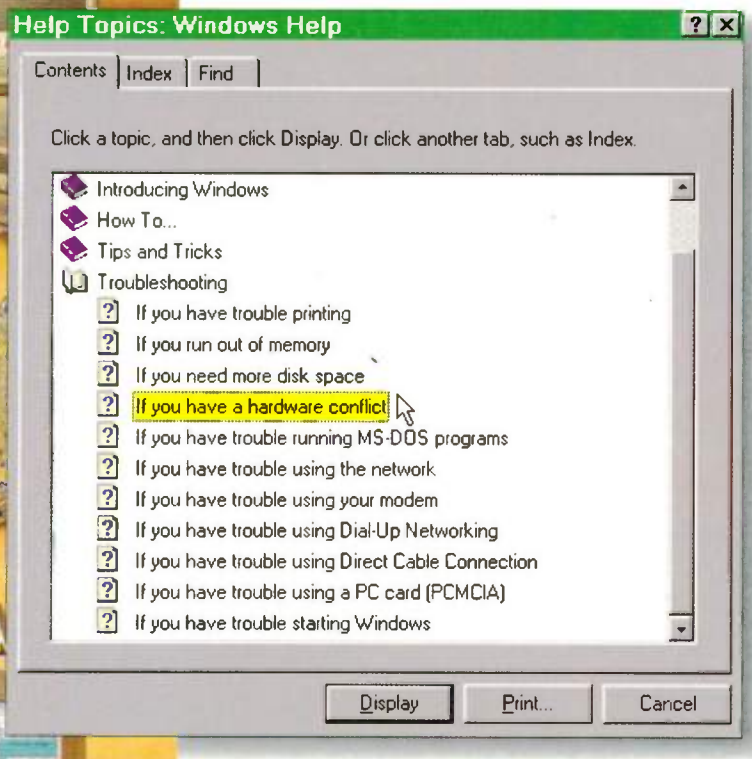
HARDWARE made EASY?

A system that knows when you've plugged in a new piece of kit, and which sets it up automatically, sounds like a big step forward for PC owners. Unfortunately, that big step is into a chasm for many people. MARTIN WALKER lays down some planks to get you safely across.

THE PC MUSICIAN'S GUIDE TO PLUG AND PLAY

Fundamentally, Plug and Play is a radical step by Intel towards removing the sometimes horrendous problems that PC owners may have when they attempt to install hardware expansion cards. Since there are only a certain number of system choices available to be shared between all currently installed cards, the situation often arises that a new card needs to use a resource that is already in use by a previously-installed one. In this case, Plug and Play is designed to interrogate each card for its selection of possible choices for each resource, work out an allocation that will suit all the cards present, set this up automatically, and then let you get on with the more interesting work of writing music. This is the theory. In the real world nothing is perfect, and Plug and Play is, sadly, not infallible. To understand what will work, what falls over, and what needs doing in the time-honoured craftperson's way (by hand), here is the essential *SOS* musician's guide to PnP.



The standard Windows 95 help file contains not only general information, but also a detailed section on troubleshooting.

OVERVIEW

If Microsoft could cause a mysterious fire that destroyed all pre-PnP computers, and all pre-PnP hardware cards, we'd probably all be singing the praises of this new development loudly and in at least four-part harmony. As it is, the problems that occur in practice are mostly caused by the all-encompassing scope of PnP. Contrary to what many people think, it works with older PCs when you're installing new PnP-compatible soundcards, as well as with old cards installed into new PnP computers. This is because it is both a hardware and software specification. PnP cards are free from switches and jumpers, and are configured either by the PnP BIOS in a new machine, or via supplied programs with a pre PnP machine.

There are basically three components to the system, and the first of these is PnP Hardware. This comprises not only the expansion cards, but also parts of the motherboard, since it is now commonplace for items such as hard disk controllers to be an integral part of this. The second part of PnP is the BIOS. This is what most people consider to be the essence of the system, since it can initialise any PnP devices it finds when you power up your computer, during the POST (Power On Self Test). The sequence of events is as follows: firstly, any configurable devices on both the motherboard and any expansion cards are disabled, ▶

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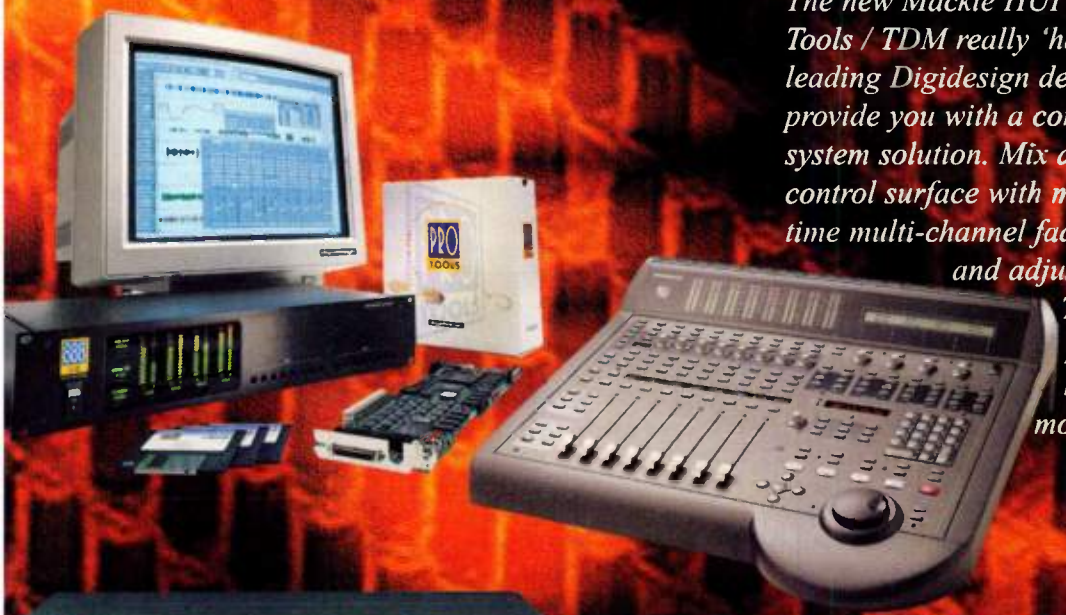

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PLUG AND PLAY

> "If Microsoft could cause a mysterious fire that destroyed all pre-PnP computers, and all pre-PnP hardware cards, we would probably all be singing the praises of this new development loudly and in at least four-part harmony."

▶ and then all PnP devices in both the PCI and ISA slots on the motherboard are identified. From this, an initial map of the IRQ, DMA and I/O resources that will be required is compiled. Then the I/O devices are enabled, followed by the configurable (PnP) devices, by being informed about which resources have been allocated to them. Finally, the bootstrap (loading) program starts up, and control is transferred to Windows 95. The final part of PnP is contained in Windows 95, and this has the responsibility of informing users of any conflicts that cannot be resolved by the BIOS component. You can then re-configure any problem legacy (pre-PnP) cards, either by running on-screen programs provided by their manufacturer, or by turning the system off and then ferreting about inside to alter jumpers (tiny switches) on the expansion card itself. The system is then re-booted, causing the whole process to begin again — this time, presumably, with no conflicts.

BIOS PROBLEMS

The three components I've just mentioned should all work together seamlessly, but there are ways in which things have gone wrong. As Creative Labs mentioned in their interview with Paul White in the December 1996 issue of *SOS*, early versions of the PnP BIOS do not work with Windows 95. The problem occurred because Windows 95 was not finalised until version 1.0a of the BIOS. If you have version 1.0, you'll have problems, since although the BIOS configures the card this information is not correctly reported to Windows 95. All machines bought after Windows 95 came out will work fine, but if you have a version 1.0 BIOS that is causing problems, there are four possible solutions.

- As a temporary measure, it is possible to set up Windows 95 with the 'setup /P i' option, which will turn off Plug and Play. If you later get a BIOS upgrade, run setup again using 'setup /P j' instead. The case and space in both these commands are significant, by the way!
- The second solution (and the best for most modern machines) is to get a Flash BIOS upgrade. This is simply a binary file and small program that loads the file into the Flash ROM (Read Only Memory), thus giving you the latest BIOS code. Latest versions can be found on the manufacturer's web site, but do follow the instructions carefully. If anything happens while the upgrade is in progress, you may end up with a machine that will not boot up at all!
- The third solution is to replace the BIOS chip on the motherboard itself — again, check with your supplier first to make sure that the new chip is compatible with your motherboard.
- The final (and most drastic and expensive) solution is to upgrade your motherboard. Don't forget that in the 18 months or so since Windows 95 came out, there have been significant advances in most areas, and you may gain significant increases in performance by choosing this route.

One other point well worth noting is that you do not need a PnP BIOS to get benefits from PnP devices, nor do you need it to install Windows 95. The PnP component of Windows 95 will happily configure things and point out conflict areas — the main advantage of the BIOS component is that it can disable conflicting hardware at an early stage in the boot-up procedure. If you do have a bad conflict when inserting a new piece of equipment, however, the machine may lock up before Windows 95 gets anywhere near appearing on your screen. ▶

RESERVING YOUR SLOTS

The worst problem with PnP is that it can sometimes act like a spoilt child, and, whatever you try to tell it to the contrary, it always thinks it knows best. The beauty of the BIOS portion of PnP is that it can allocate resources to any new device as soon as it detects it, before the operating system has a chance to boot up, and shuffle any other resources used by previous cards so that no conflicts exist. Unfortunately, unless it has some way of knowing that legacy cards are also in the system, the whole machine may lock up before it ever gets to Windows 95 (whatever Windows 95 setup files are provided by the card manufacturer). The way to combat this problem is to delve into the depths of the BIOS. Most machines come with a small motherboard pamphlet detailing the BIOS features but, for a far more comprehensive overview, enter the name of your BIOS manufacturer into any search engine on the Net to find their web site, and you should then be able to download a far more extensive document. The page you need will be called something like PCI/PnP Setup/ Configuration. Here you should find a full list of IRQs and DMAs are available to PnP. If you have a legacy card set to something specific, simply make sure that you alter the option for this PnP setting to the non-PnP/legacy option. This will then remove the option from the pool available to PnP and enable your system to boot up properly. Some BIOSs have an alternative method that allows you to select a specific range of IRQs to be available to each of the three or four PCI slots.

TRICKS OF THE TRADE

Many people will eventually get to the point where there are simply no more resources available to add a further peripheral to the system. There are several tricks you can use before you have to give up and remove an old card from the system to make way for your new toy. The first option is to look in Device Manager for any options that claim to be using an IRQ but which you know are not doing so. Although printer ports are often claimed to use IRQ5 or IRQ7 (depending on the I/O address used), most printers do not use an interrupt at all and, despite what the system says, this IRQ may still be unused. I had this problem recently, but it proved tricky to convince the system otherwise. The solution proved rather crafty — since legacy devices are not automatically recognised by PnP, I set one of my soundcards, which still uses Windows 3.1 drivers, to IRQ5. Since the system remained blissfully unaware of this, it happily allowed the parallel port to function normally, with no reported errors.

The second option is to share system resources. Although you may have a modem and MIDI interface vying for the same IRQ, it's unlikely that you will ever need to use both these devices simultaneously. Windows 95 may grumble, but a little bit of trial and error can result in your being able to use both devices with the same interrupt setting. Much depends on the individual hardware — some inactive devices 'float' their inputs and outputs and so remain 'invisible' when not being accessed; others hold them firmly high or low, resulting in a crashed system if anything else is accessed by the same interrupt. The design of the drivers themselves can also affect things, so it can often be very much a case of 'suck it and see'. It's worth a try, nevertheless.

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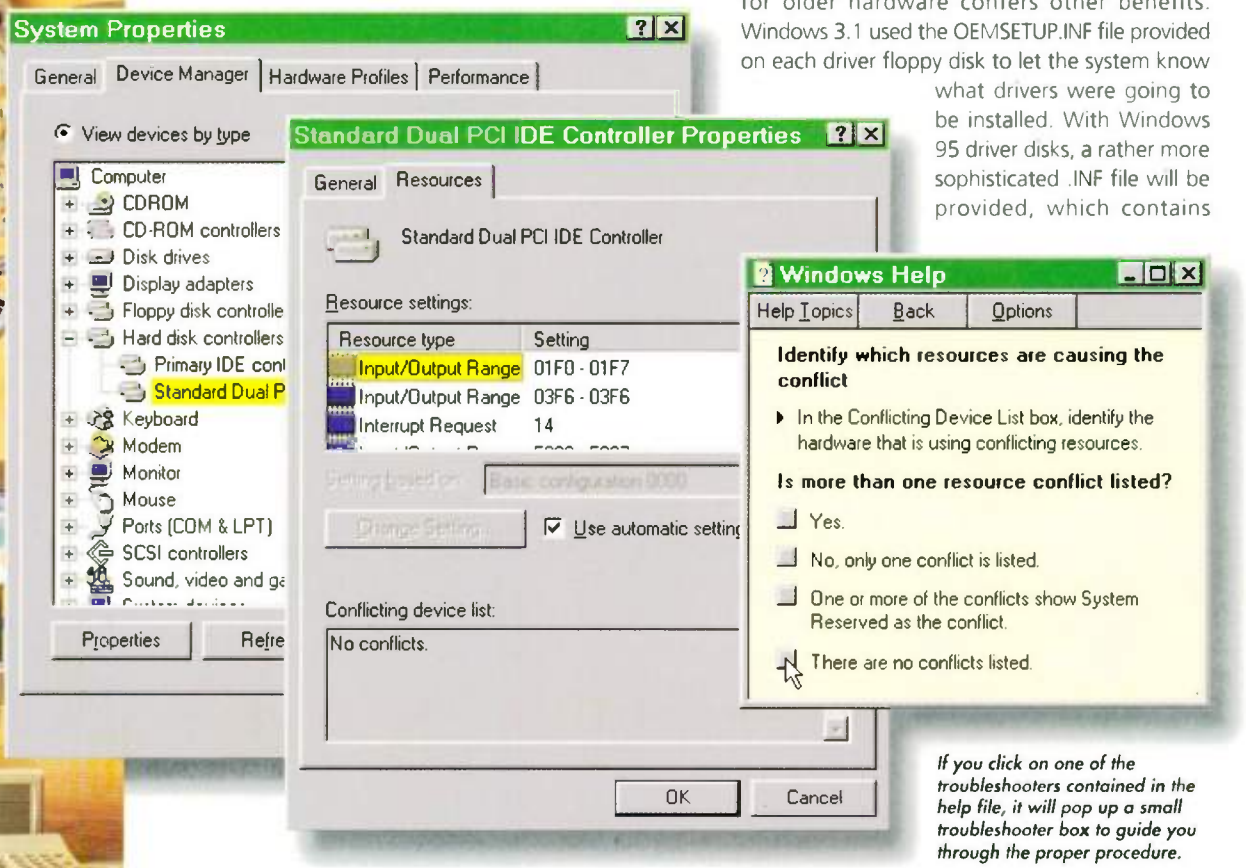
LEGACY DEVICES

Windows 95 is quite intelligent when it comes to installing itself on a machine that is already running Windows 3.1. It starts by looking for existing configuration files or drivers already loaded into memory, to determine what resources are currently being used. Once found, specific I/O addresses are interrogated to see that the hardware is actually present. In this way, Windows 95 builds up a picture of what resources are still available for remaining devices that can be configured automatically. In most cases, if the computer was running with no problems with Windows 3.1, Windows 95 will also set everything up with no conflicts. However, if you've been using a kludge to get two devices sharing the same interrupt (see the 'Tricks of the Trade' box), it may disable one of these drivers, and suggest that you 'resolve the conflict'.

Apart from the speed advantages of running 32-bit drivers, getting Windows 95 driver updates for older hardware confers other benefits. Windows 3.1 used the OEMSETUP.INF file provided on each driver floppy disk to let the system know what drivers were going to be installed. With Windows 95 driver disks, a rather more sophisticated .INF file will be provided, which contains information which is equivalent to that provided automatically by PnP hardware during the BIOS interrogation. Every time you install another set of drivers for a legacy device, the appropriate INF file will be copied into the WINDOWS/INF folder. If you want to see which have been installed since Windows 95, look in Explorer with the files sorted by date (click on the 'Modified' heading). All Windows 95-installed files will have the same date, so any others will show up easily. This information contains all of the possible settings for the hardware, and is copied into the Registry.



If you click on one of the troubleshooters contained in the help file, it will pop up a small troubleshooter box to guide you through the proper procedure.

INSTALLING NEW PERIPHERALS

When installing peripherals, it's best to start with the essential ones. If you've just bought a new computer the system will probably already be set up for the graphics card, and in a modern machine this will almost certainly be of the PnP variety. Before you start madly inserting all your other cards, boot the machine up and pause it (using the Pause key above the cursor group) on the opening BIOS screen provided by most manufacturers, which tells you what processor, memory, disk drives and so on are connected to the system. There should be a section

TERMINOLOGY

- **Beep Codes**: During a POST, the number of beeps and their length (short or long) can tell you which device is faulty, even if your screen remains blank. Information such as this can be found from BIOS manufacturer's web sites.
- **BIOS (Basic Input/Output System)**: This is the part of the operating system that handles communication between the computer and its peripherals. It is normally contained in a ROM chip on the motherboard.
- **Bootstrap**: The program used by the PC to get from its initial power-on to a running condition (origin — pulling a boot on by its own bootstraps).
- **FireWire**: Apple Computer's digital I/O system, which is now being licensed to other companies to produce 1394 PC adapter cards.
- **IEEE (Institute of Electrical and Electronics Engineers)**: An international organisation that, among many other things, sets industry hardware standards.
- **IEEE 1394**: The industry-standard implementation of FireWire, allowing any manufacturer's products to connect to any other conforming to the same spec.
- **Legacy**: The rather patronising Microsoft term for any device that is pre-Plug and Play.
- **POST (Power On Self Test)**: A series of tests run by the BIOS every time the computer is switched on. Basic items such as memory and keyboard are checked, and a beep issued from the PC speaker if anything untoward is discovered (see Beep Codes).
- **USB (Universal Serial Buss)**: A new technology which allows 127 low-speed devices to plug externally into PCs, in a daisy-chain fashion, and take their power from the PC.

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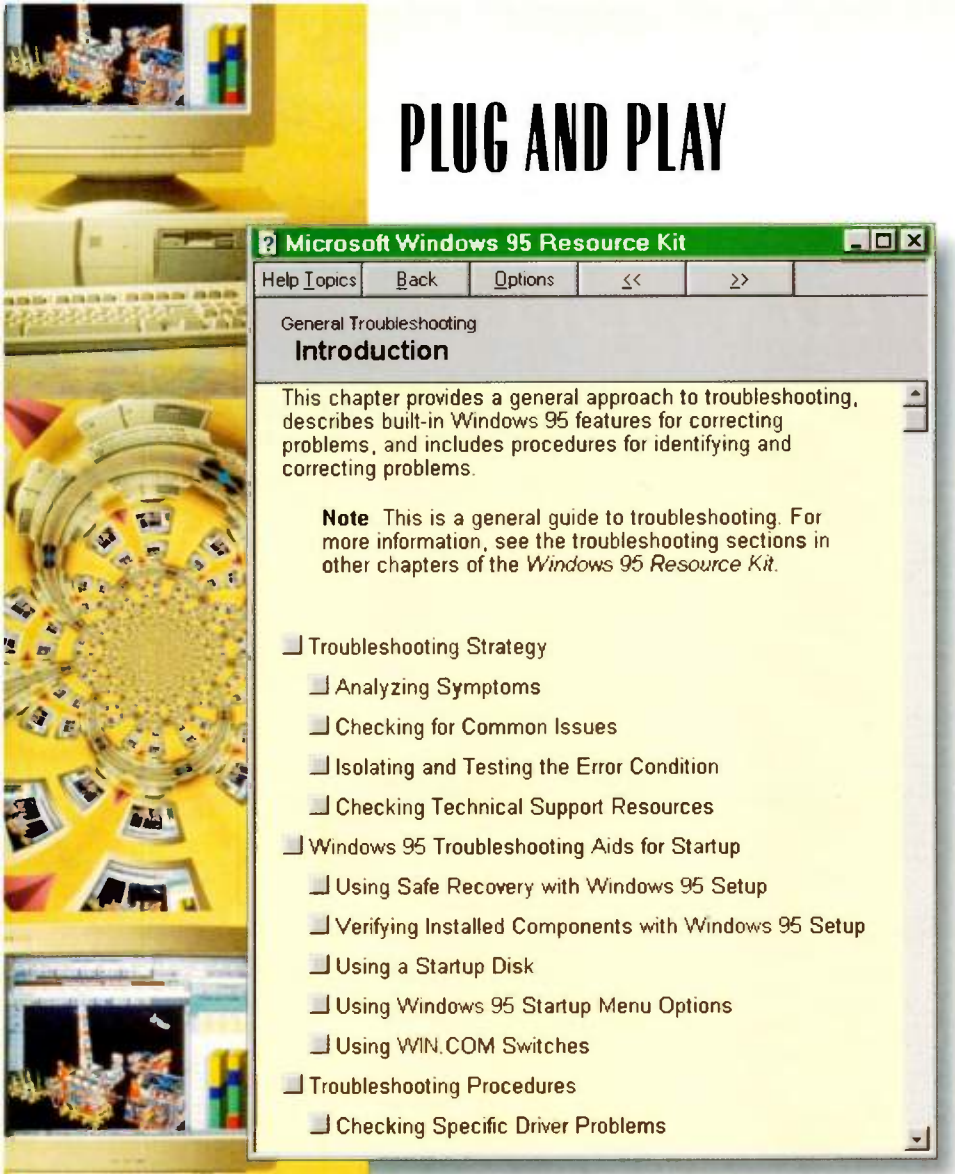

If you have the CD-ROM version of Windows 95, there's an extremely useful help file, almost 3Mb in size, called Win95wrk.hlp, which can be found in the Admin\Reskit\Helpfile folder. Among many other things, it features a large section that covers troubleshooting, but this does get pretty technical.

▶ that shows current resources which have been automatically set up by the BIOS. On my machine, IRQ14 was being used by the hard disk controller (this is the normal setting used by almost every machine) and IRQ11 was being used by my graphics card. If you note down these settings, you at least know what is used by the 'plain vanilla' machine. Then install your cards, in order of importance to the system. For me, the next most important was my SCSI card, without which I would not have access to many other facilities. After making sure (since this was a legacy card) that any jumper settings for IRQs and DMAs did not conflict with any other legacy settings, I installed the card and rebooted. In this situation, assuming all is well, Windows 95 should appear, enabling you to install the appropriate drivers, which will normally be provided either on CD-ROM or floppy disk. When these have finished installing, the system will ask you whether you wish to restart Windows. When you reboot, your card should be operational.

With PnP devices the approach is a lot simpler: plug in your new card, switch on the computer, and the PnP part of the BIOS will detect it and thrash out a new set of resources which will be agreeable to all PnP devices now in the system, while avoiding those you have reserved for legacy devices using the BIOS setup (see the 'Reserving Your Slots' box). Then, at the appropriate point in the proceedings, it will ask for the driver disk, from which point the procedure is identical to that of legacy devices. Once the system has rebooted, it's always worthwhile to use your new device for a few minutes, rather than racing on to the next installation, because if you install everything at once and later find a problem, you won't have a clue what is causing it.

A VISION OF THE FUTURE

Although Plug and Play addresses many of the problems that can occur when you're adding hardware in the form of plug-in circuit cards, a fundamental limitation still looms larger and larger for most people — there simply aren't enough slots (of either ISA or the newer PCI variety) to go round. Even when you have a generous four of each (and this is often not the case), by the time you've added disk controller and graphics cards, support for SCSI, soundcard, MIDI interface, fax modem and so on, you're often left struggling to fit your latest device. Even if there *is* space available, the choice of PCI or ISA may be determined by what slots are still available, rather than which would provide the best performance. Modern compact machines can also have difficulties fitting some full-length cards — often there's only one slot that has no obstacle, such as a CPU heatsink/fan or swathe of cabling, in the way. Even if you surmount all these difficulties, there comes a time when it's not the slots that cause a problem, but a singular lack of resources. Simply building PCs into larger cases and supplying them with a couple of dozen slots wouldn't work, because without more IRQs, DMAs and so on you couldn't initialise all of the cards (and the total power drain might cause problems as well).

The long-term solution is external — and for most people at the moment this means SCSI. Up to seven devices can be daisy-chained on a single SCSI buss, and the only PC resources used are those of the SCSI controller (typically one IRQ). In addition, the latest SCSI devices also feature SCAM (Self-Configuring Auto Magically), which allocates SCSI IDs without those little switches, and is part of the SCSI PnP specification. However, there is another development that looks as if it will be seen more ▶

DON'T PANIC!

The worst that can happen when you plug in a new card is that the system crashes completely, leaving you with a blank screen and no operating system loaded at all. If this happens to you, your up-to-date list of resources used by cards in the system will come in extremely handy.

The most likely cause of this sort of problem is that the new card is currently using an IRQ already used by something else in the system. This normally only happens with legacy devices. When two sets of electronics both try to use the same interrupt, it is hardly surprising that everything can grind to a halt. The solution is to find which IRQ on your new card conflicts and attempt to change to one that is currently unused by the system. If this proves impossible, you may have to start looking for another legacy device whose options allow the conflicting IRQ to be changed. Check that the system still works with these new settings, and then try re-installing your new card now that it has a free IRQ setting at its disposal. These are exactly the sort of problems that PnP was designed to prevent — it should only ever be legacy devices that cause these situations.

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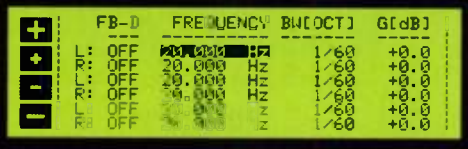

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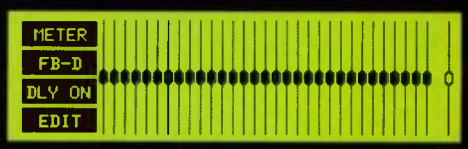

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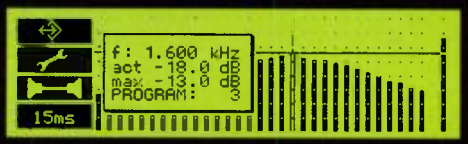

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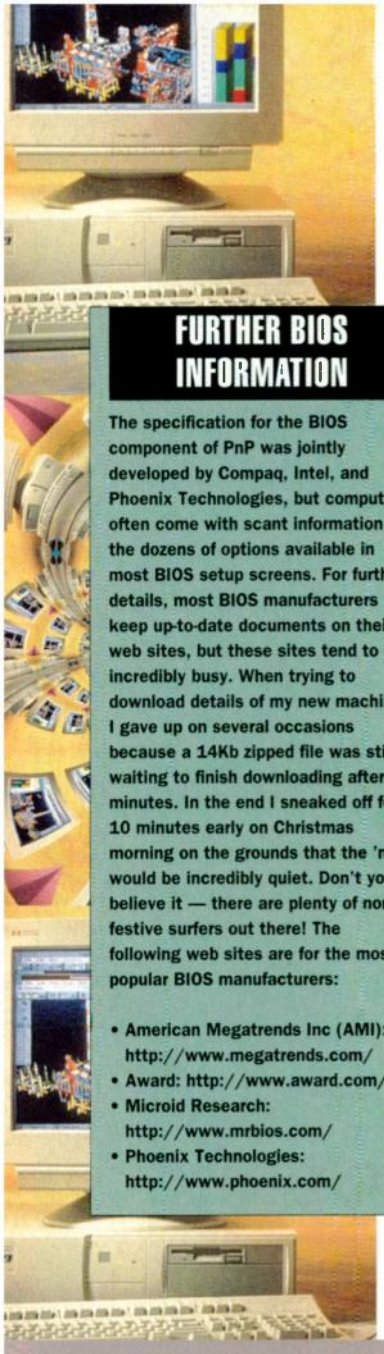

FURTHER BIOS INFORMATION

The specification for the BIOS component of PnP was jointly developed by Compaq, Intel, and Phoenix Technologies, but computers often come with scant information on the dozens of options available in most BIOS setup screens. For further details, most BIOS manufacturers keep up-to-date documents on their web sites, but these sites tend to be incredibly busy. When trying to download details of my new machine, I gave up on several occasions because a 14Kb zipped file was still waiting to finish downloading after 20 minutes. In the end I sneaked off for 10 minutes early on Christmas morning on the grounds that the 'net would be incredibly quiet. Don't you believe it — there are plenty of non-festive surfers out there! The following web sites are for the most popular BIOS manufacturers:

- **American Megatrends Inc (AMI): http://www.megatrends.com/**
- **Award: http://www.award.com/**
- **Microid Research: http://www.mrbios.com/**
- **Phoenix Technologies: http://www.phoenix.com/**

"The worst problem with PnP is that it can sometimes act like a spoilt child, and, whatever you try to tell it to the contrary, it always thinks it knows best."

▶ and more in the future — the Universal Serial Bus (USB). This works in much the same way as SCSI, in that devices are daisy-chained externally to the PC, but has many other advantages. It conforms to Plug and Play (any device newly appearing on the buss can be configured remotely) but with devices configured dynamically (no more fixed IRQ and DMA settings to worry about). It supports up to 127 devices, and can power them from its own 5V supply (no more wall warts!). Unfortunately, its data rate is only 12Mbps (mega bits per second). While this is fine for adding slow devices such as modems, printers, mice, keyboards and joysticks, and will, no doubt, allow far more flexibility on laptop computers, it's not so good for adding high-speed storage.

For a real way forward, IEEE 1394 technology (also known as FireWire) looks far more promising. Again, it's a serial standard, but with much higher speed capability (up to 400Mbps, which translates to 50Mbytes/second). This standard is based on Apple technology, and is designed to handle AV data, using a protocol called 'isochronous', which provides 'guaranteed transfer of time-critical data'. Using a compression system called DV (Digital Video), which has been agreed on by all major companies, and which is designed from the start to cope with both audio and video using a fixed compression rate of 5:1, IEEE 1394 produces a video signal that emerges at a constant rate, eliminating the expensive hardware currently needed to sync audio and video. The only requirement will be the IEEE 1394 I/O connection.

Apple, Compaq and Texas Instruments have all announced plans to release PCs with FireWire technology on board. Consumer audio and video gear such as camcorders and VCRs is also all set to incorporate this standard, and its high-volume sales will allow prices to be set much lower than if the technology was used solely in computer gear. General-purpose FireWire I/O connectors are likely to start appearing shortly in audio and video signal routing systems and, for music applications, a prime candidate is multichannel digital audio mixing. According to those in the know, it will not be long before FireWire sockets also start appearing on high-end synthesizers and samplers (from Autumn 1997, according to the crystal ball); if this happens, we might finally start emerging with a true standard that allows computer, digital audio and video signals to have some measure of compatibility (and, we hope, much lower prices).

Incidentally, you may be wondering why the future busses are both serial — surely a parallel bus with 8, 16 or even 32 lines would be far faster? The problem with extremely high-speed parallel busses is that, due to the inherent propagation delays (the time it takes for a signal to actually get to the other end of the cable), it can be difficult to reassemble multiple data streams in the correct order, beyond a certain speed, as they emerge from loads of different wires. With serial busses, whatever the speed of the data, as long as the data emerges uncorrupted at the other end it will always be in the correct order. Isn't technology wonderful? SOS

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- SONIC FOUNDRY *SOUND FORGE*
- SEK-D *SAMPLITUDE STUDIO*

With the advance of new technology, PC audio editors have finally reached the point where they can give Macintosh systems a run for their money. JANET HARNIMAN-COOK investigates the possibilities...

Studio-quality audio recording on the new faster Pentium PC processors equipped with professional-quality audio cards is now at the level where it can compete with mid-range Macintosh systems. The high-end Power Mac/Digidesign Pro Tools multitrack environment, with multiple TDM plug-in support, still seems a long way off for the PC, but if your aims are more modest, PC applications have much to offer. The three applications under the spotlight in this article — Steinberg *WaveLab 1.5*, Sonic Foundry *Sound Forge 4.0a* and SEK-D *Samplitude Studio* — are not only well-specified stereo recorders and editors but can also be used to supplement the often limited audio-editing facilities of MIDI + Audio sequencers, budget hard-disk audio recorders or ADAT and open-reel audio tape recorders.

These editors are invaluable for editing tracks prior to mixdown; for adding the final edit tweaks to stereo mixes before mastering for CD, tape, multimedia, soundtrack and broadcast; for the audio archiving and salvage of old recordings during vinyl and shellac transfer; and for audio production for games and multimedia developers. With a good soundcard it is possible to do top-quality work on any of these applications; the final choice will be dependent on your individual production needs and budget requirements. Common file formats (WAV, AIFF) make it easy to transfer audio between these applications — and, after all, for the cost of a mid-range budget hardware processor you could buy all three!

CHOOSING A PACKAGE

WaveLab is brought to you by Steinberg, the German MIDI recording magicians who developed *Cubase*, Europe's most widely used sequencer. The release of *WaveLab 1.0* in February 1996 brought fast, user-friendly, stereo audio editing to the PC, and the package included a tasty selection of off-line (that is, non-real-time) processors, as well as batch processing, frequency analysis, and a handy soundfile librarian and database. Steinberg *WaveLab 1.5* (£399) adds proprietary real-time plug-in processing architecture that enables a maximum of six dazzling effects modules to be used simultaneously and edited on the fly. More plug-ins from Steinberg and third-party developers are expected to follow, and the next upgrade, *WaveLab 1.6*, will support Microsoft's *ActiveMovie* audio plug-in (see 'Microsoft *ActiveMovie* Plug-in Support' box). For soundtrack post-production, program creation and CD mastering, the only real shortcoming of *WaveLab* is a lack of EDL — Edit Decision List — functions.

Sonic Foundry *Sound Forge* (£299) is an incredibly versatile, well-featured editor that includes a huge range of audio effect processors, extensive audio-file format-conversion utilities, EDL functions and sampler support via MIDI Sample Dump and SCSI MIDI Device Interface standards. This all adds up to excellent value for money and should appeal to both audio professionals and serious hobbyists. *Sound Forge* is the leading PC audio editor in the USA and the latest version, 4.0a, is the first audio application to support Microsoft's *ActiveMovie* plug-in.

Samplitude Studio (£399), from innovative German software house SEK-D, is more of a mixed bag. Now up to version 2.5, *Samplitude* was first to offer advanced features such as real-time processing of dynamics and multiband EQ, multiple soundcard support and multitrack playback and recording. But despite this it's beginning to look rather dated compared with its two rivals, and is let down by unattractive graphics, quirky selection techniques and non-standard keyboard commands. It is still a competent editor, though — once you get used to the *Samplitude* way of doing things.

The editors are evaluated here according to what features they offer; how easy the application is to learn; how friendly it is to use; the quality of global control, such as navigation and selection; editing power; the quality and scope of DSP functions and effects; the availability of sampler support; and, finally, other special features such as synchronisation and AVI support.

STEINBERG *WAVELAB 1.5*

• FEATURES

WaveLab 1.5 is a true 32-bit Windows 95/Windows NT application and complements stereo recording, editing and multi-effects processing facilities with *Audio Access Database*, an advanced librarian for soundfiles stored on hard drive and CD-ROM. All internal processing is 24-bit and, with an appropriate soundcard, *WaveLab* will play and record 8, 16, 20 and 24-bit soundfiles and is compatible with Windows WAV, Mac AIFF, Sun/NeXT AU, RAW and dual-mono Digidesign Session 8 formats. Advanced dithering options are provided to minimise the re-quantisation distortion introduced during processing and resampling.

WaveLab 1.5 features the Realtime Engine, which allows non-destructive simultaneous real-time processing using up to six plug-in effects modules — depending on the demands of the individual plug-ins and the power of the PC. Soundfiles can also be processed off-line (with time out for processing) and saved to disk using the Realtime Engine, which allows users with PCs too slow to run this kind of processing in real time to take advantage of the plug-in modules.

WaveLab copy protection is one of the fairest and most user-considerate I know of, consisting of occasional requests to insert the CD-ROM; protection for the optional Steinberg plug-ins uses the dreaded dongle, which connects to the PC parallel port.

• EASE OF LEARNING

The *WaveLab* package consists of three floppy disks, a strange monitor-shaped CD-ROM, and the manuals. The main manual is a 230-page soft-covered book with version 1.5 features included in a short addendum booklet. Both are clearly presented with comprehensive indices and well-explained tutorials to help you get started. If you get stuck, there is

Windows help, on-line contextual help and tips. It's a pity that the CD-ROM does not include a multimedia tutorial, but fortunately *WaveLab* is easy to learn and pleasing to use, and additional excellent technical support is available by phone, fax or email from UK distributors Harman Audio.

• USER INTERFACE

WaveLab has the best-looking graphics of our three applications, with a clear, easy-on-the-eye, colourful design throughout all its windows; it features extensive customisation options for screen object colours, text and layout. To suit different user work styles, *WaveLab* also has a wide range of icon, menu and keyboard commands. Multiple wave files can be open at the same time, and saved with zoom and layout details as *WaveLab* project files. The Status bar displays cursor position, zoom factor, selection or soundfile length and sample parameters. The five user-sizable toolbars may be floating, docked, showing or hidden and there are toolbars for Transport, Snapshots (Waveview memory slots), Control Bar (shortcuts for the most frequently used menu functions), Toolbox, and — new in version 1.5 — the Windows Controller (shortcuts to the other Toolbars, the Status bar, Markers view, Master section and Live input function).

• GLOBAL CONTROL

The focus of activity in *WaveLab* is the twin-element Waveview pane: the Overview displays the entire waveform and is used for navigation and to define the area shown in the lower main Waveform graphic window. Click-dragging on the waveform selects the area to be edited, and the whole stereo audio file or either channel may be edited independently. Audio can be viewed down to single-sample accuracy, redraws are usually instantaneous and up to eight waveviews with zoom and range information can be stored as Snapshots. Markers are used as navigation aids or section labels and appear as inverted yellow triangular icons on the Waveview measure ruler; although they may be individually named in the markers list, marker names are only visible on the measure ruler when the mouse pointer is positioned beneath the marker icon. Additional locator functions are available from the numeric pad.

• EDITING

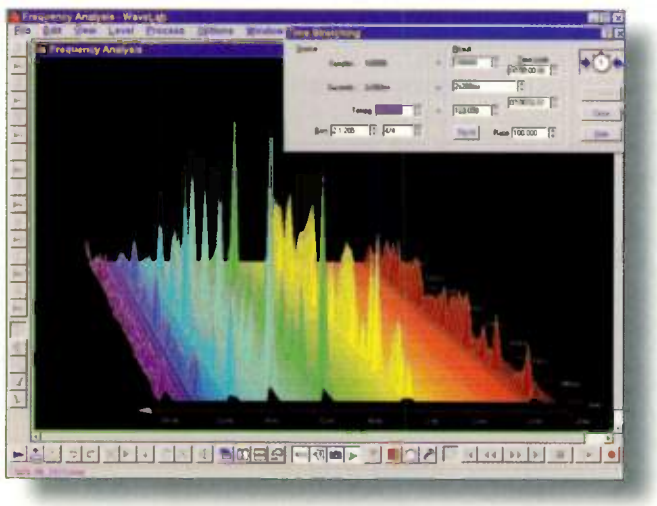
Editing in *WaveLab* is fast, fun and virtual — most edit changes are non-destructive and do not affect the original recording unless you decide to overwrite the file on disk. Selected sections of audio can be repositioned or copied using simple drag-and-drop techniques, and *WaveLab* has a range of excellent-sounding off-line level-processing tools for DC offset correction, normalisation, gain adjustment, fades and cross-fades and sophisticated dynamics processing — compression, expansion, gating and limiting. The only omission is multiband dynamics processing for de-essing.

WaveLab 1.5 does not provide an Edit Decision List (EDL) function containing the track or region names, start and end times and duration information needed to create soundfile play lists for mastering. It cannot yet, therefore, be considered as a viable replacement mastering system for beleaguered Mac Sound Tools II users, especially now that Digidesign have pulled the plug on product support. (For a DIY EDL fix, check out my review of Steinberg's *WaveLab 1.01* in *SOS* August 1996.)

• DSP FUNCTIONS

WaveLab has two sets of utterly fab audiophile-quality DSP audio processors. Those found in the Process menu — Reverse, Timestretch, Pitch correction, Harmoniser, Hi-Fi Chorus and EQ — can only be used one at a time off-line, but the *WaveLab* Realtime Engine plug-ins will run up to six processors in real time. The eight plug-ins that ship with *WaveLab 1.5* resemble the effects modules from *Cubase VST* for the Mac, and are, er... very red: they're the Autopanner, Chorus, Echo, Resampler, Reverb, Leveller, EQ, Grungelizer and Tools1 — M+S microphone processing, channel phase invert and channel flip.

There is also a bonus plug-in: the Grungelizer simulates the narrow bandwidth, AC mains hum and surface noise that characterise vintage discs. The four optional Realtime Engine plug-ins available at the time of writing are Steinberg's *Denoiser, Declicker, Spectraliser* and *Loudness Maximiser* (see Paul White's review of *WaveLab* plug-ins in *SOS* February 1997). In contrast to the often over-optimistic PC minimum requirements figures used by some manufacturers, those in the version 1.5 addendum to the *WaveLab* manual appear to under-estimate CPU performance and the Pentium 100/32Mb PC used for this article ran six onboard plug-ins without dropout. Real-time audio processing of this magnitude and quality is a tremendous achievement and the Steinberg development team deserve congratulations. Eagerly anticipated is version 1.6 which implements Microsoft *ActiveMovie* support and enables ▶



Above: Steinberg WaveLab 1.5 showing Realtime Engine Master Section running Reverb, EQ and optional Loudness Maximiser plug-ins, with wave display in background.

Left: WaveLab Frequency Analysis and Time Stretch off-line processors.

applications such as Waves *Native Power Pack* to run in the *WaveLab* environment. Yummy!

• SAMPLER SUPPORT

WaveLab 1.5 does not support MIDI Sample Dump Standard (SDS) or SCSI MIDI Device Interface (SMDI) and so cannot directly transfer wavefiles to external samplers. Pity...

• OTHER FEATURES

WaveLab 1.5 supports background processing — enabling you to carry on working while off-line processing functions take place — and batch processing, to allow off-line multi-stage processing of soundfiles. The Frequency Analysis function creates a 3D Fast Fourier graph with axes for time, amplitude and frequency, the audio resplendently represented as rainbow-coloured spire-like peaks and valleys. Although very attractive, the Frequency Analysis graph would be more useful with greater zoom and finer ruler calibration. The Audio Access database is very useful and is used to catalogue, locate, audition or transfer to the *WaveLab* editor WAV or AIFF soundfiles stored on hard, removable or floppy disks and CD-ROM. *WaveLab* does not support AVI playback and cannot be synchronised to external devices via SMPTE, MIDI or MTC.

info

£ Steinberg *WaveLab 1.5* £399; the upgrade from version 1.01 costs £49. Optional Steinberg plug-ins, *DeNoiser, DeClicker, Loudness Maximiser*, £299 each. All prices include VAT.

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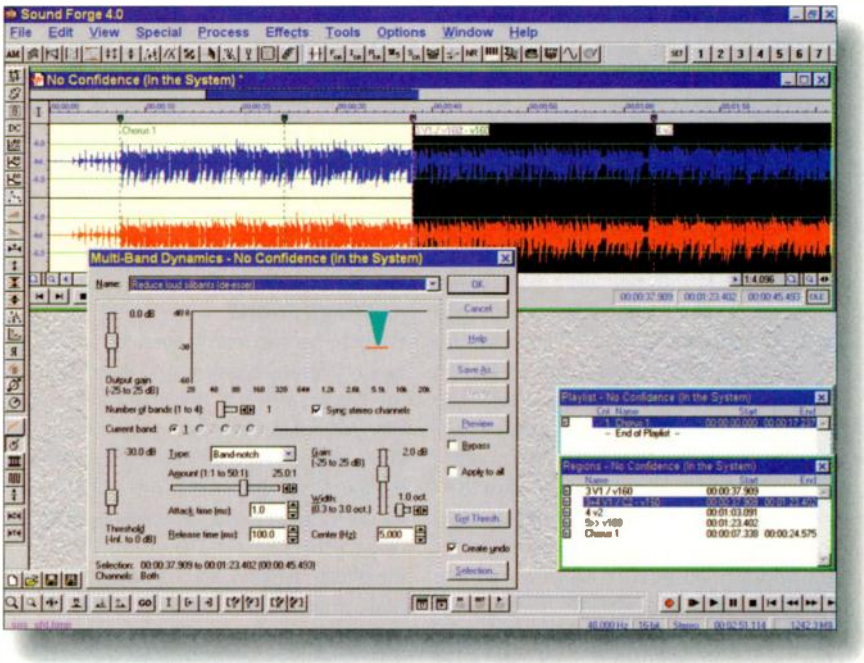
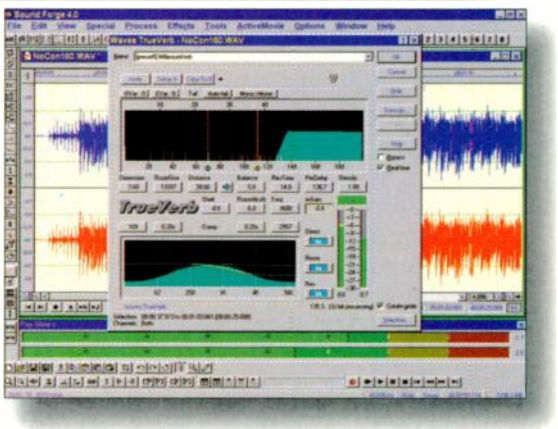
SONIC FOUNDRY *SOUND FORGE 4.0A*

• FEATURES

Sound Forge is a production powerhouse and includes a vast range of edit and record options. The *Forge 4* CD-ROM contains versions for true 32-bit Windows 95/Windows NT4 and 16-bit for Windows 3.1, but the 16-bit version will not perform real-time previews, which rely on 32-bit processing. The default soundfile type is Microsoft WAV (including Digidesign Session 8 files) but you can load and convert between a wide range of other file types, including Macintosh AIFF and SND, Amiga SVX and IFF, and RAW. *Sound Forge 4.0a* will recognise sample rates from 2kHz to 96kHz and supports 8-bit, 16-bit, mono and stereo data formats, and the common Internet audio and video file formats RealAudio 3.0, ActiveX Streaming Format (ASF — used by Microsoft's NetShow On-Demand) and the NeXT/Sun AU format for





Sound Forge 4.0a (above) is the first audio application to support the new Microsoft ActiveMovie audio plug-ins — here (right) it's running the TrueVerb from Waves Native Power Pack.

Java scripts. Unlike most editors, *Sound Forge* allows you to enter and edit the summary information text embedded in Microsoft WAV, and add comments and recording details such as title, engineer and date. There is the option to automatically re-open the sound files as they were when you last quit *Sound Forge* and you can also save and load work spaces to disk. The only copy protection *Sound Forge* uses requires you to enter an activation code during installation, and the enlightened Sonic Foundry philosophy that's printed on page 3 of the manual is worth quoting: "We feel that it is in your best interest that *Sound Forge* does not come with heavy-duty copy protection. We hope you will allow us to continue this policy by abiding by the licence agreement and giving your friend our phone number rather than a copy of the software."

• EASE OF LEARNING

Top marks to Sonic Foundry for an exemplary tuition and reference package — the CD-ROM contains a superb multimedia tutorial with excellent audio quality, and it comprehensively covers the functions and facilities in *Sound Forge 4*, including processing and effects. Complementing the CD-ROM is a chunky, very informative, well-laid-out, 436-page soft-bound printed manual including a useful reference section, an index, a glossary, and sample transfer procedures. Completing the picture is extensive Windows on-line help and tips.

• USER INTERFACE

Sound Forge presents a clearly laid-out, user-friendly environment that makes working fast and enjoyable, with good use of colour and graphics and wide customisation options. Speed menus abound, toolbars proliferate and the huge range of keyboard commands permits a tremendous flexibility that should accommodate the needs of the most demanding user — as the on-line Help says, "You want shortcuts? We got shortcuts!"

• GLOBAL CONTROL

Sound Forge and *WaveLab* have great similarities in soundfile display, selection routines and layout, and *Sound Forge*'s Views toolbar and *WaveLab*'s Snapshots are functionally identical: both recall up to eight different wave views with zoom ratio, selection points and cursor position. *Forge* has a good marker system for fast navigation and section identification — markers can be entered during record or playback by pressing keyboard M; they show up on the ruler as icons with name tags, and can be quickly repositioned if you drag them to a new position with the mouse. Markers appear as

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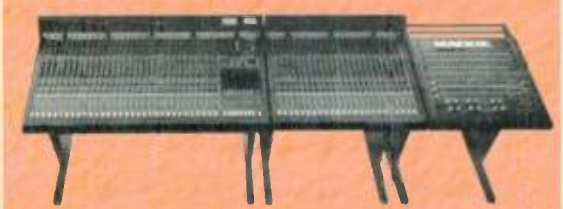

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AUDIO EDITING
on the PC

entries in the Regions list; clicking on a marker entry moves the current position cursor to that point. Regions defining areas of audio within a soundfile can be created by dragging a selected area from the soundfile window to the Regions list; dragging the Region entry into the Playlist builds a playback sequence. Unfortunately, each Play and Regions list is specific to an individual soundfile, and it is not possible to mix and match between several soundfiles and build a composite Playlist.

• EDITING

Editing is quick and efficient. Multiple wave files can be open on the desktop at the same time and selected areas can be dragged and dropped between soundfiles. Edits are usually non-destructive and can be undone if unsatisfactory, but alternatively you can perform edits directly to the original soundfile using Direct Mode. Non-destructive edits can be reversed via the Undo/Redo History window — you can even audition most undo and redo operations. For non-destructive cut and paste you can also use the Playlist or the Cut List. The Cut List may be used to quickly and non-destructively remove pauses and bad starts, for example when you're editing voice-over takes, and it works like a negative image of the Playlist: Regions in the Cut List are excluded from playback. Cuts may also be auditioned using the Preview Cuts command. *Sound Forge* is no slouch but I found *WaveLab* marginally faster for simple cut and paste edits.

• DSP FUNCTIONS

Sound Forge 4.0a provides a phenomenal choice of studio-quality audio processors and effects, including reverb, chorus, DDL and flangers; a 4-band dynamic compressor/limiter for de-essing and de-popping; graphic, paragraphic and parametric EQ; synthesis options; pitch shift and time stretch; and a great wah-wah. (See the 'Processors and Effects' box for a full list.) As all the processors have real-time preview, you can adjust parameters in real time and there are pre-roll and post-roll options.

Sound Forge 3 was the first application to offer third-party audio plug-ins on the PC, including top-flight processors ported across from the Mac, such as *Q-Tools* spatial synthesis and, my own favourite, the Waves *L1 Ultramaximizer* mastering limiter (now available

PC REQUIREMENTS AND REFERENCE SYSTEM

Real-time processing requires a powerful computer, and hard drives must be in pristine condition. The reference PC produced remarkably good results overall but the Pentium 100 CPU stuttered, spluttered, staggered and glitched when attempting the more demanding real-time functions, such as stereo noise reduction using the Steinberg *DeNoiser* plug-in, and reverb using the Waves *Native Power Pack TrueVerb*. To run *WaveLab*, Steinberg recommend a Pentium 133 with 32Mb RAM for entry-level or a Pentium Pro 200 with 64Mb for professional systems; for non-real-time editing and processing functions a Pentium 90 with 16Mb RAM should suffice. The reference PC used for this article consisted of a genuine Intel Pentium 100 CPU; a PCI motherboard with Intel Triton 82430 VX version 3 chip set (dated 04-15-96) and 256K pipeline burst cache; 32Mb RAM; 2.3Gb hard drive; 2Mb PCI video card, 17" SVGA monitor running 1024 x 768 x 64k (Hi-Color); MQX32-m SMPTE/MIDI card. The soundcards were Turtle Beach's Multisound Classic and Multisound Pinnacle with digital option. In Windows 95, all settings including Virtual Memory were standard default Windows 95 with the following line added to the SYSTEM.INI file:

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only in the Waves *Native Power Pack*). Of Sonic Foundry's own optional plug-ins, the Noise Reduction/Vinyl Restoration tool is outstanding value. *Sound Forge 4.0a* CD-ROM includes setup files for Microsoft *ActiveMovie*, enabling the new generation of cross-application *ActiveMovie* plug-ins to be used.

• SAMPLER SUPPORT

Sound Forge Sampler Tool supports SDS and the much faster SMDI. The Sampling section in the *Sound Forge* manual includes clear and comprehensive guidelines on loop generation, individual sampler configurations, and how to audition from the *Sound Forge* MIDI keyboard; the appendix has a section on transfer procedures for Akai's S1000, Digidesign's *SampleCell II*, the Kurzweil K2000 and Peavey's SP samplers. The E-mu ESI32, Kurzweil K2500, and Peavey SX are also supported.

• OTHER FEATURES

Sound Forge will let you open and save AVI files for multimedia use and Regions may be triggered from MIDI or SMPTE using the Virtual MIDI Router, a software driver that allows the transfer of MIDI data between ports. Soundfile triggering is monophonic — meaning that only one Region can be playing at any time and if a second Region is triggered it will override and cut short playback of the first.

info

£ Sonic Foundry *Sound Forge 4.0a* £299; optional *Sound Forge* plug-ins, *Noise reduction, Batch Converter, Spectrum Analyser,* £199 each; Q-Sound Labs *Q-Tools* £199.
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E arbiter@cix.compulink.co.uk
W http://www.demon.co.uk/arbiter
W Sonic Foundry: http:/www.sfoundry.com

SEK-D *SAMPLITUDE STUDIO 2.5*

• FEATURES

Samplitude Studio 2.5 is the top of the Samplitude range and, although a 32-bit application, is not Windows 95 native. It includes a wide variety of editing and processing tools, allows playback of up to 16 tracks, and will — in theory — give eight physical outputs using four stereo soundcards. Multitrack systems are without doubt the future for PC audio recording, and will become commonplace when 4- and 8-channel cards become available. Multiple card support is tricky, as each card ▶

PROCESSORS AND EFFECTS

• STEINBERG *WAVELAB 1.5*

Off-line Reverse Timestretch Pitch Correction Harmoniser, Hi-Fi Chorus and EQ, Normalise, Change gain, Invert Phase, Eliminate DCO, Fade In, Fade Out, Crossfade, Dynamics (Compressor, Limiter, Expander, Gate), Batch Processor

Realtime: Autopanner, Chorus, Echo, Resampler, Reverb, Leveller, EQ, Grungelizer, and Tools1 (M+S microphone processing, channel phase invert and channel flip)

• SONIC FOUNDRY *SOUND FORGE 4.0A*

Process: Auto Trim/Crop, Channel Converter, Crossfade Loop, Convert to 8-Bit , DC Offset, Graphic EQ, Paragraphic EQ, Parametric EQ, Fade Graphic, Fade In, Fade Out, Insert Silence, Invert/Flip, Mute, Normalize, Pan/Expand, Resample, Reverse, Smooth/Enhance, Time Compress/Expand, Volume

Effects: ACM Filter, Amplitude Modulation, Chorus, Delay/Echo (Simple), Delay/Echo (Multi-Tap), Distortion, Dynamics (Graphic), Dynamics (Multi-Band), Envelope, Flange, Gapper/Snipper, Noise Gate, Pitch Bend, Pitch Shift, Reverb, Vibrato

• SEK-D *SAMPLITUDE STUDIO 2.5*

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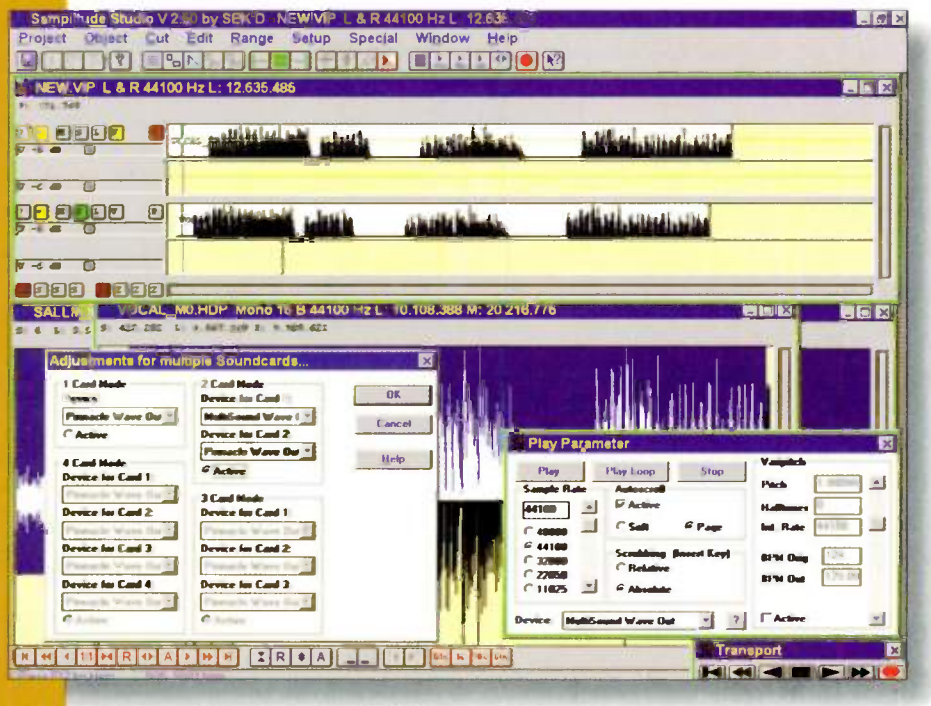

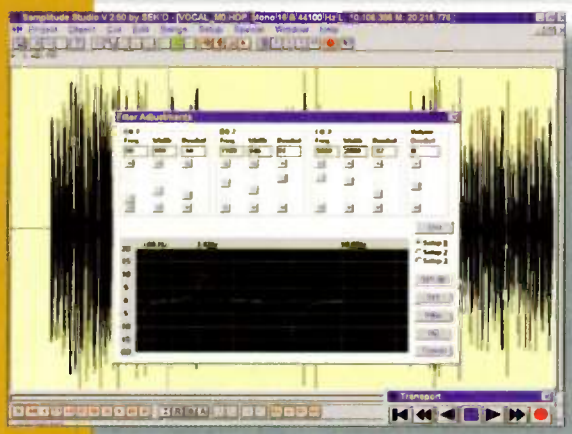

Above: Samplitude Studio 2.5 has up to 16 tracks and multiple soundcard support.

Left: Real-time preview of parametric EQ and dynamics processing are also offered by Samplitude Studio.

▶ demands a slice of precious, limited PC system resources, and a maximum of three matched soundcards would seem to be the limit; this said, the two Turtle Beach Multisound cards on the review system worked well.

Depending on the capabilities of your soundcard, *Samplitude Studio* will record and play back at sample rates of 11, 16, 22, 32, 44 and 48kHz, but all files in a project must share a single rate and it is not possible to use mono and stereo files in the same project. Windows WAV is the only audio file type recognised by *Samplitude Studio*, although audio can be downloaded to samplers via MIDI Sample Dump (SDS). The *Samplitude Studio* installation disk is copy protected and cannot be used to create a backup, and if the installation disk becomes unusable through file corruption or disk damage, the legitimate user will be unable to run the software and may be forced to cancel sessions and lose business, while a replacement disk is sent by post from SEK-D in Germany! This is totally unsatisfactory and grossly unfair, and calls into question the suitability of *Samplitude Studio* for professional use.

• EASE OF LEARNING

Samplitude Studio is a large application and it is hard to avoid the conclusion that some of the more advanced features were achieved at the cost of a better-looking, friendlier user interface; consequently, newcomers should be prepared for slow progress initially until they become familiar with the Samplitude way of doing things. The *Samplitude Studio* package consists of a single floppy disk containing the program installation files and an 141-page spiral-bound printed manual which is comprehensive and contains a basic tutorial and a detailed contents list, but omits an alphabetical index. The manual is hard to read due to the small type size, and this is made worse by poor translation from the original German. To take two examples from page 5, a note concerning soundcard DACs reads: "Important: Samplitude supports only soundcards with 16-bit transformers (CD quality)", and when drawing an analogy between different audio sample rates and different video resolutions the text says "This is comparable to how a computer graphic looks in 256 colours versus one in 16 million colours. Recognisable are both." In a technical reference guide this is unacceptable, and is guaranteed to confuse the novice user. Windows on-line help is slightly better, despite the Help Index's containing a measly 17 entries! As a consolation, perhaps, there are Tool Tips and Contextual Help.

• USER INTERFACE

Loading wavefiles, processing and redrawing the screen are generally very fast, and the menu structure is easy to understand if you're familiar with hard-disk editing techniques, but *Samplitude Studio* unhelpfully implements non-standard Windows keyboard commands and its unattractive graphic design owes more to DOS 5 than to Windows 95! If you spend long periods of time gazing at a monitor, well-designed graphics reduce fatigue and delay the burnout of your creative energies. I found it impossible to make *Samplitude Studio* look good, despite its colour and font customisation options, and the two main views — the VIP Virtual Project (Multitrack) and HDP (Wavefile) windows — are especially stark. The two toolbars contain shortcut icons for Range, Cursor, Zoom, Group, File, Transport and basic edit functions.

• GLOBAL CONTROL

Virtual Projects are the principal way of working in *Samplitude*, allowing non-destructive recording and editing with automated level mixing — including fades and crossfades — across a maximum of 16 mono or eight stereo tracks. Powerful stuff, and a bit like finding a BMW engine in a Trabant! You are limited by being unable to run mono and stereo soundfiles in the same VIP multitrack, and you cannot mix files with different bit rates and sample rates. Multiple projects can be open at the same time and the work space — with its constituent projects, windows and layout — can be saved as a Session file. Selection routines are somewhat ▶

MICROSOFT *ACTIVEMOVIE* PLUG-IN SUPPORT

ActiveMovie **audio plug-ins are derived from the Microsoft *ActiveMovie* (formally known as *Quartz*) specification, which provides a 32-bit open standard for audio and video-related plug-ins for Windows 95 applications. *ActiveMovie* will revolutionise the way we use music applications, as it not only enables real-time preview but can also be used with different host programs. The first of these is the Waves *Native Power Pack* plug-ins bundle — containing the *L1 Ultramaximizer, TrueVerb, C1 Compressor and Gate, Q10 ParaGraphic EQ, S1 Stereo Imager* and *WaveConvert* — and can be run in Sonic Foundry *Sound Forge v4.0a* (32-bit version only) and in the next versions of Cakewalk Music Software's *Cakewalk Pro Audio* (version 6) and Steinberg *WaveLab* (version 1.6).**

E Waves *Native Power Pack* £499.

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AUDIO EDITING on the PC

quirky and navigation is cumbersome despite cursor and range store. *Samplitude*'s Cursor Positions act as markers, appear along the time/measure ruler, and can be named, repositioned by dragging, and inserted on the fly during playback or recording.

• EDITING

Soundfiles, when dragged and dropped onto a track in the VIP window, become *Samplitude* Objects, which may be non-destructively edited with options for cut, paste, trim, discard, position, cross-fade, lock and snap to time or meter. Objects can be arranged in sequence and linked together to form a Group that is treated as a whole when repositioned or processed; the Object box handles can be used to create overall playback level offsets and fades. As *Samplitude Studio* has multiple tracks, you can edit in context between two or more audio parts — a facility that would greatly enhance *Sound Forge* and *WaveLab*. For example, when processing vocal or solo instrumental parts in a stereo editor, you are forced to make your edit decisions 'blind' — that is, you must program your edit changes without being able to hear how the edited material sits with the backing track. But with *Samplitude* you may place the audio parts onto adjacent tracks, perform your edit, and then play back the two parts together, enabling greater accuracy when you're processing and saving considerable time. Most other types of editing are performed destructively to the soundfile data on the hard drive and include loop optimisation, resampling, timestretch, normalise, remove DC offset, convolution, echo, filter, and reverb — all of which are off-line processors and do not include a preview function.

• DSP FUNCTIONS

Samplitude Studio includes superb real-time previews of dynamics and EQ functions.

• SAMPLER SUPPORT

Once edited, audio may be exported to your sampler via mono-only MIDI Sample Dump Standard (SDS); the faster stereo-compatible SCSI SMDI is not supported.

• OTHER FEATURES

Recording can be triggered externally via MIDI from a sequencer; the AVI link is very basic and no match for the Windows Video facilities of *Sound Forge*. SOS

RELATED *SOS* REVIEWS & ARTICLES

Steinberg *WaveLab 1.01* — August 1996
Steinberg *WaveLab* plug-ins — February 1997
Sonic Foundry *Sound Forge 3* — May 1996
SEK-D *Samplitude Studio 2.5* — November 1995

For general advice on configuring and running PC hard disk recording systems, check out the previous articles in the *SOS* 'PC Musician' series (from November 1996).

info

£ SEK-D *Samplitude Studio* £399; optional *Sound Forge* plug-ins, *Noise Reduction, Batch Converter, Spectrum Analyser*, £199 each; Q-Sound Labs *Q-Tools* £199.
A Arbiter Music Technology, Wilberforce Road, London NW9 6AX.
T 0181 970 1910.
F 0181 202 7076.
E arbiter@cix.compulink.co.uk
W http://www.demon.co.uk/arbiter

TABLE OF COMPARATIVE FEATURES

Each application features the following in addition to basic cut-and-paste editing features

APPLICATION	STEINBERG *WAVELAB 1.5*	SAMPLITUDE *STUDIO 2.5*	*SOUND FORGE 3.0A*
Cost	£399	£399	£299
Minimum processor requirement	Intel Pentium 90	486DX 2-66	Intel Pentium 90
Operating system	Windows 95/NT	Windows 3.1/95	Windows 3.1/95/NT
Realtime preview/processing?	Yes — from plug-ins only	Yes (EQ and dynamics)	Yes — 32-bit version only
Stand-alone processing?	Yes	No	No
Real-time preview?	Yes	Yes	Yes
Simultaneous processing?	Up to six effects	No	No
ActiveMovie third-party plug-in support?	Not until v1.6	No	Yes
CD-ROM tutorial?	No	No	Yes
Bit rates	8, 16, 20, 24	8, 16	8, 16
Sample rates (soundcard-dependent)	11, 22, 44, 48kHz	11, 16, 22, 32, 44, 48kHz	2-96kHz
EQ	3-band parametric with Q, Lo and Hi Shelf	5-band graphic, 3-band parametric, Hi, Lo & Band Pass Filters	10-band graphic, Hi, Lo & Band Pass, Notch Filter
Frequency analysis?	Yes	Yes	Optional plug-in
Echo?	Yes	Yes	Yes
Reverb?	Yes	Yes	Yes
Harmoniser?	Yes: 16 voices	No	No
Chorus?	Yes: 100 voices	No	Yes: 3 voices
Auto panner?	Yes	No	Yes
User presets?	Yes	No	Yes
Dynamics processing?	Yes	Yes	Yes
Time stretch?	Yes	Yes	Yes
Pitch shift?	Yes	Yes	Yes
Sample rate/file format conversion?	Yes	????	Yes
DC offset correction?	Yes	Yes	Yes
Batch process?	Yes	No	Optional plug-in
Noise reduction?	Optional plug-in	No	Optional plug-in (includes De-clicker)
De-clicker?	Optional plug-in	No	Optional plug-in (includes Denoiser)
Background processing?	Yes	No	Yes
EDL?	No	Graphic playlist in Multitrack	Regions, Play & Cuts lists
Build loop?	No	Yes	Yes
Discrete output channels using multiple soundcards?	No	Yes (up to four soundcards)	No
Sample dump?	No	Yes	SDS (MIDI) & SMDI (SCSI)
External triggers?	No	SMPTE, MTC	MIDI note & controllers, SMPTE, MTC
AVI video?	No	Yes	Yes
Other features	Audio Access Database, Grungelizer, stand-alone FX processing	Convolution (room acoustics sampling)	See sidebar

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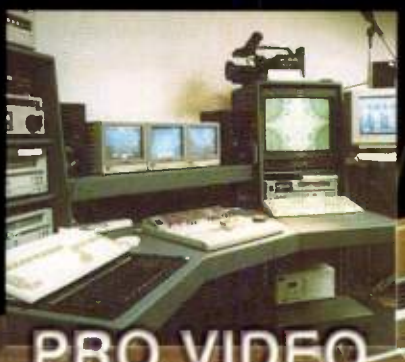

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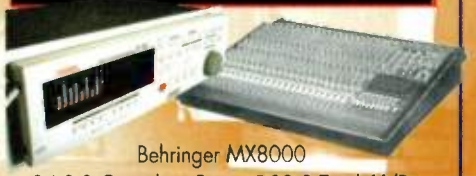

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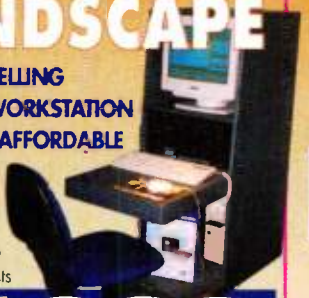

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TURTLE BEACH PINNACLE & FIJI

pros & cons

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pros

- Superb audio quality.
- Classy Kurzweil MA1 synth sounds (Pinnacle only).
- Stunning value for money with digital I/O option.
- Parallel digital and analogue audio output.
- Digital daughterboard does not consume additional PC system resources.
- Daughterboard synth connector.

cons

- Slightly expensive if digital I/O option not used.
- Audio and on-board synth share a single stereo output.
- Uses mini-jack connectors.

summary

The Pinnacle and Fiji cards provide high-quality audio and MIDI processing power that should satisfy users of the new generation of pro music production applications, from MIDI + Audio recording to Red Book CD mastering packages.

SOUND ON SOUND

port connector, and four stereo mini-jack sockets for Mic In/Digital, Line In recording, Auxiliary Playback and Analogue Output. During playback, both digital and analogue signals are output together, allowing you to monitor the output whilst recording to DAT, and also to make analogue and digital copies at the same time — so you shouldn't be alarmed when you see only a single Pinnacle output driver present under the Hardware Playback Setup dialogue in your audio applications.

INSTALLATION: CLIMB EVERY MOUNTAIN

The first step in the installation process is to configure the soundcard. Firstly, if you are using it, add the SampleStore RAM; next, change jumper settings for installation preferences, microphone type and digital I/O, if necessary. Having done this, connect your CD-ROM audio output cable to the card if required, and fit your synth daughterboard to the WaveBlaster header socket. I erred on the side of caution, and, wishing to avoid conflicts with the other audio cards I already have installed, I did not use the Windows 95 install option, choosing instead to configure the PC system resources manually. Windows 95 Plug and Play capability is useful if you are installing the card onto an empty PC, ie. one without MIDI cards, other soundcards, a modem and so on.

Installing soundcards can be tricky and requires great patience, so if you do get into a muddle and feel like starting again, always use the *Killpin* or *Killfiji* uninstall programs — if you attempt to uninstall manually by deleting files in the Windows Explorer or File Manager, you could end up with an even more scrambled PC, and experience all manner of strange goings-on when trying to run applications such as sequencers and audio editors that use soundcards. If you really must use your PC to run games as well as your music recording system, uninstall all other sound and MIDI cards, and physically remove them from the PC, then build from the bottom up. First install the Pinnacle, and check that it's working correctly, then re-install your MIDI interface card, if you use one. Test this too and then, finally, re-install your other soundcards, but Beware — Configuring a PC for Games can Seriously Damage the Health of your Recording System!

KURZWEIL MA1 INSTRUMENTS

When you next go to your local music store, take a listen to these voices, but first crank up the on-board 20-bit Reverb and Chorus effects from the Pinnacle's control panel. Some voices have long envelopes, so hold down that chord, listen and wait:

- VOICE 01: GRAND PIANO

Good rich tone across the whole key range.

- VOICE 46: PIZZICATO STRINGS

Crisp, lively octave pizzicato strings — great for arpeggios.

- VOICE 50: STRING ENSEMBLE #2

— Rich orchestral string pad.

- VOICE 52: SYN STRINGS #2

Great evolving ambient pad sound, with a long envelope featuring filter sweeps.

- VOICE 57: TRUMPETS

Solid and bright with a good rasp — useful for both solo and ensemble use.

- VOICE 87: LEAD FIFTHS

Big, bright resonant filter sweep.

- VOICE 96: SWEEP PAD

Fat analogue-like pad synth with lovely flutey top registers.

- VOICE 108: KOTO

So clean and crisp that you can almost smell Japanese cherry blossom!

- VOICE MIDI CHANNEL 10: DRUM KIT

Great basic GM kit with punchy toms and timbales, plus excellent cymbals with good loops and smooth fades.

The Pinnacle's control panel — used to load user sample banks, set overall output levels, and manually adjust effects for each MIDI channel.

AUDIO

The Pinnacle produces 16-bit quality audio using 20-bit internal DACs, and Turtle Beach claim that the resulting >97dB signal-to-noise ratio is the best found on any soundcard currently on the market — although of course this figure does not take account of other noise introduced into the analogue audio chain by the PC itself. The Pinnacle sounded vibrant and musical, presenting a spacious, well-defined soundstage that exhibited pleasing warmth and presence in the mid-range frequencies, with a translucent, detailed top response underpinned by a robust and punchy bass. Stereo image definition is sharper and cleaner than on the Multisound Classic and Tahiti cards, and recording through the analogue inputs was free from DC Offset — a further improvement on the older Multisounds.

The S/PDIF digital daughterboard automatically configures and appears in the audio port options of your application. When switching between analogue and digital sources on the Pinnacle, it is advisable in most applications to re-configure the card from the Pinnacle hardware and driver setup utility (*Settings.exe*) before altering your application's audio hardware settings. Click on 'Setting Driver' and reset the 'Wave In Default'. If switching to Digital, you may need to click on Refresh first. Hurricane DSP technology enables the Pinnacle to run full-duplex simultaneous recording and playback, which is enhanced by the ability to adjust audio data throughput speeds during playback to accommodate different sample rates.

KURZWEIL MA1 SYNTHSET

The Pinnacle features a 128-voice wavetable synthesis GM set with 4Mb of data-compressed ROM, giving 32-note polyphony over 16 channels via its own internal PC MIDI port. To allow games compatibility, the synth has its own set of PC system resources (IRQ and memory addresses) and defaults to IRQ 9. GM voice sets can be notoriously uneven

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PC REQUIREMENTS AND REFERENCE SYSTEM

The Reference PC used for this article consisted of an Intel Pentium 100 CPU running Windows 95, a PCI motherboard with Intel Triton 82430 VX version 3 chip set and 256k pipeline burst cache; 32Mb of RAM; 2.3Gb of free hard drive space; a 2Mb PCI video card; a 17-inch SVGA monitor; a MQX32m SMPTE/MIDI card. My second soundcard was a Turtle Beach Multisound Classic with on-board Emu Proteus 1XR.

in quality, and vary between the dire and the desirable, so after all the pre-release 'it's a Kurzweil!' buzz, I felt a little underwhelmed when I first listened to the Pinnacle voice set in its default dry state. But when I added copious amounts of the onboard 24-bit Reverb and Chorus effects, the voices came to life — they should prove a valuable and distinctive addition to most MIDI synth collections. What you get is a wonderful collection of sweeping, evolving ambient synth voices, a good piano, great drum kits with long cymbal samples, excellent pizzicato strings, superb tuned percussion and timpani, good trumpets and trombones, and more (see the separate box on the MA1 for more details). The remaining voices are for the most part competent, although some of the strings and the electric guitars are disappointing, and of course there are the usual joke bagpipes — it's amazing how often these GM monstrosities turn up in Scottish BBC TV soundtracks! But overall, the Pinnacle's Kurzweil set is quite classy, and well worth the price difference over the synth-less Fiji. A MIDI implementation chart for the Pinnacle is not included in the package, but can be obtained from the 24-hour Turtle Beach Faxback line, on 001 510 624 6296. You simply call this number on your ordinary phone, and request document #261 to be sent to a fax number of your choice.

The Pinnacle's output mixer.

PINNACLE AND FIJI FEATURES

- MPC-standard Windows soundcard.
- Enhanced full-duplex operation for simultaneous recording and playback using Motorola 56002 DSP chip.
- 16-bit recording with 20-bit DACs using 128x oversampling.
- Signal-to-noise >96dB @0.01% THD (A-weighted).
- Optional digital I/O card.
- Waveblaster header for fitting daughterboard synth such as a Yamaha DB50XG.
- Windows 95 Plug and Play-compatible.

MULTISOUND PINNACLE ONLY:

- 32-voice Kurzweil MA1 MASS synth engine with default GM synth set and 24-bit reverb and chorus effects.
- MAST SampleStore RAM for user MIDI voices, expandable to 48Mb RAM.
- MIDI supports 48 channels over 3 ports (1 each for onboard synth, daughterboard synth and external MIDI).
- Software bundle includes Voyetra *Digital Orchestrator* CD-ROM.

MULTISOUND FIJI ONLY:

- MIDI supports 32 channels over two ports (one for the synth daughterboard and one for external MIDI).

MIDI IMPLEMENTATION:

The Pinnacle is a receive-only device that recognises MIDI messages on 16 channels, and responds to controller messages for bank select, modulation, data entry, volume, pan, expression, sustain, sostenuto, soft pedal, reverb depth, chorus depth, data increment, data decrement, Reg. Param. LSB, Reg. Param. MSB, All Sound Off, Reset All Controllers and All Notes Off. Program Change and SysEx receive commands are also supported.

WAVEBLASTER SYNTH DAUGHTERBOARD HEADER

Both the Fiji and the Pinnacle include a Wavetable header connector for fitting a synth daughterboard, and fortunately, Et Cetera Distribution had sent along a Yamaha DB50XG to try this out with the review Pinnacle. The DB50XG installation was easy; no adjustments were required to the Pinnacle or the PC, and the daughterboard automatically appeared in the port lists on *Logic Audio v2.5*, *Cubase v3.03* and *Cakewalk Pro Audio v5*. The output from both synths is summed to the soundcard's main output with the analogue audio. If this feels crowded, it is possible to modify the DB50XG to provide a discrete output — see Martin Walker's article on making the most of daughterboards in last month's *SOS*.

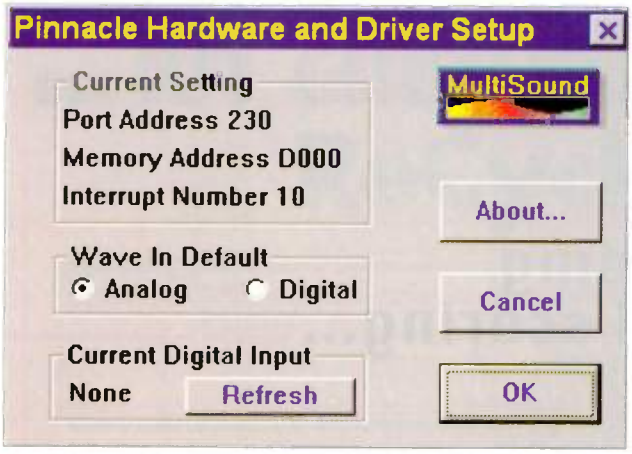
PINNACLE SAMPLESTORE

Your own WAV sounds may be triggered via MIDI from SampleStore RAM. The Pinnacle doesn't ship with RAM installed, but should work with any 60ns (or better access time), single-sided, 72-pin, parity SIMM stick obtainable from your local dealer or from one of the many listed in computer magazines, such as the weekly *Micromart*.

Wave files can be loaded from your PC hard drive or from CD-ROM to the SampleStore RAM via the Pinnacle control panel. Each sample replaces a instrument in the GM synth set, is scaled across a user-defined key range, and can use the on-board digital effects. Once set up, sample bank configurations containing samples, key maps and program information can then be saved. The Pinnacle bundle includes *Wave for Windows SEII* to get your audio editing off to a flying start. Turtle Beach are rumoured to be working on an editor that will create loops and multi-sample sets, but for the moment, you are limited to single-hit samples, which work well enough when used for simple instruments or sound effects. At a pinch, you could even use the SampleStore RAM for replaying chunks of vocals and voice-over.

THE BUNDLES

The Fiji and the Pinnacle packages include: a Mixer applet for controlling the level of the audio sources going through the cards' analogue output (the digital output level is fixed, as it is determined directly by the soundfile data), and a hardware and driver setup utility, which is used to switch input between analogue and digital. The Pinnacle also comes with an additional control panel for configuring SampleStore, manually adjusting Reverb and Chorus levels for each MIDI channel, and setting the overall card output and balance levels. Other applications bundled with both cards are: the previously-mentioned *Waves for Windows SEII* soundfile editor; the *Sierra Audio Rack* (an easy-to-use front end that includes a mixer, wave and MIDI file players, and a controller to play CD Audio discs from the CD-ROM); *Mouse Player*, a useful on-screen MIDI keyboard; and *Microwave*, which, sadly, is not a virtual Waldorf synth, but a



The hardware and driver setup dialogue shows the Pinnacle's base PC configuration, and default record mode status.

simple PC soundfile editor with trim and normalise functions.

The Pinnacle package CD-ROM also contains the full version of Voyetra *Digital Orchestrator Plus v2.11.17* — a surprisingly comprehensive low-budget MIDI + Audio sequencer/editor (currently £129) with MIDI Piano Roll, Event, Notation and SysEx editors, a MIDI mixer, a Track editor, an Audio editor with drag and drop, and a selection of digital audio effects processors including DC Offset correction, normalise, fades, reverse, a compressor/gate, and sample rate conversion. Also to be found on the *Digital Orchestrator Plus* CD-ROM are six Windows video tutorials in AVI format, to help you learn to use the application, and demos, MIDI drum patterns and Sound Gallery song construction wave files.

CONCLUSION

The Multisound Pinnacle is a superb audio card, and with the optional digital I/O card fitted, it is stunning value for money; if you add a Yamaha DB50XG daughterboard as well, to complement the on-board Kurzweil MA1, the Pinnacle becomes the supreme PC music recording card. If you are on a lower budget, the Fiji is similarly hard to beat when fitted with the optional digital board and a Yamaha DB50XG. This said, both the Pinnacle and the Fiji cards would be improved for studio use if they had professional audio connectors, and the Pinnacle could help to conserve precious PC resources if, like the Multisound Classic, it used a single set of IRQ and memory addresses for the whole card *including* the on-board synth.

To sum up, the Multisound Classic and Tahiti were a hard act to beat, but the Pinnacle and Fiji pull it off in style, confirming Turtle Beach's reputation for building some of the world's sweetest PC soundcards. Both cards are highly recommended: watch out for attractively-priced sequencer and Pinnacle/Fiji bundles. SOS

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T Technical Support Line 01706 219999.

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W Turtle Beach Systems can be reached from Compuserve by typing GO TURTLE. There's also a FTP site for direct download of drivers and support files at ftp.tbeach.com/tbeach. Alternatively, their web site is located at http://www.tbeach.com

For Every *Event*uality

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Visualise this. A crisp 13" brass snare right between your eyes. Toms and cymbals precisely placed across the stereo field. The bass guitar deep and clear, sitting just above the kick drum. Layers of newly strung guitars far to the left and right. Keyboards hovering in the air. Voices floating free. Everything detailed. Everything in it's own space.
Introducing a monitoring system so good that you can close your eyes and still visualise every instrument...
...the Event range of monitors.

"I used the 20/20 bas system while remixing "Slow Jams," the second single from the new Quincey Jones album, Q's Jook Joint."

"Event called to see if I would give the 20/20's a listen. The initial listening was very impressive, the sweet high end and the massive tight bottom made me think I was listening to a much larger cabinet. The smooth mids and accurate imaging make the speakers easy to listen to"

Model featured: P8 20/20 bas

"The most enlightening moment came when I took the mix to mastering. I gave the tapes to Bernie Grundman and he put them on and did his initial listen. For the first time ever with one of my mixes, Bernie turned to me and said, "I don't think you need any EQ on this"

Francis Buckley EQ Magazine July 1996

"The Event 20/20's turned out to be damn fine monitors, well up to the task of serious mixing, editing or post-pro work."

"The 20/20's bass end is sufficiently extended to make them useful as the sole pair of monitors in a small studio."

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Paul White SOS July 1996

"Detail in the program material was maintained regardless of volume...high, tinkling synth lines seemed unaffected by ponderous bass drums and remained well-profiled against a thick, swirling, mid-range - exactly as they were intended to be in the mix"

Nigel Lord The MIX January 1997

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Forging Ahead

SOUND FORGE v4.0a
AUDIO EDITING SOFTWARE & DSP PLUG-INS FOR PC

The arrival of audio processing software plug-ins for the PC means that the platform can now compete as a viable digital audio workstation, and the latest update to PC audio editor* Sound Forge *supports the use of several software-based processors. MARTIN WALKER checks them out.

During the last 12 months, the PC has seemingly gone from being a poor relation to joint partner (along with the Mac) in the hard disk recording hierarchy. With the advent of programs like *Cubase Audio* and *Logic Audio* for the PC, many people are now regularly recording up to eight tracks of audio alongside MIDI, with both types of data controlled from a single package. The quality of audio has always been somewhat dependent on the individual PC, since most budget soundcards tend to pick up a small amount of interference from other expansion cards in the PC, as well as from the power supply and hard disk.

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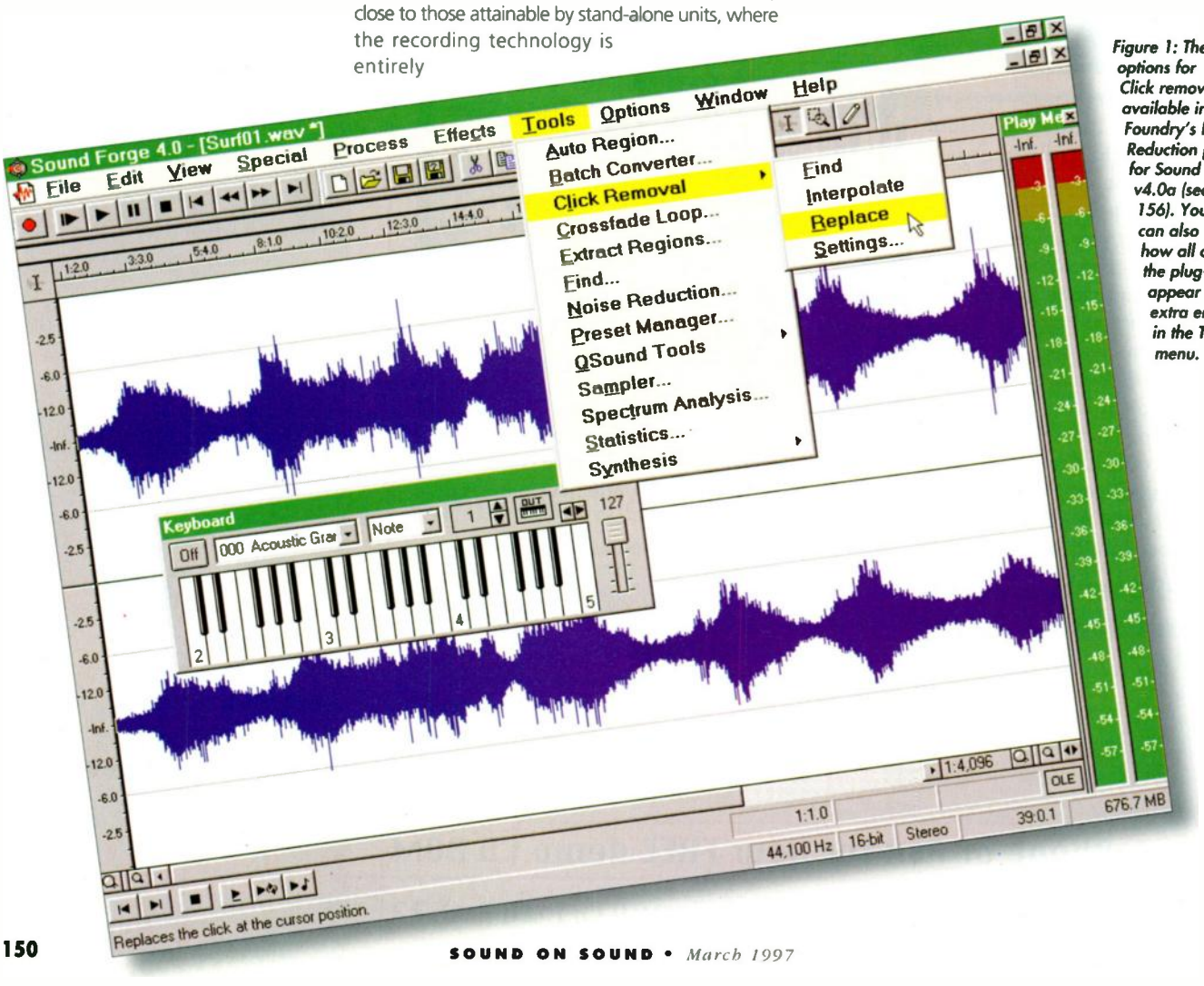

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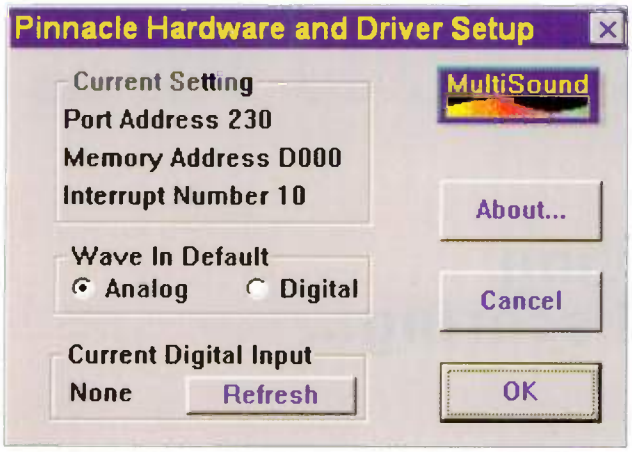

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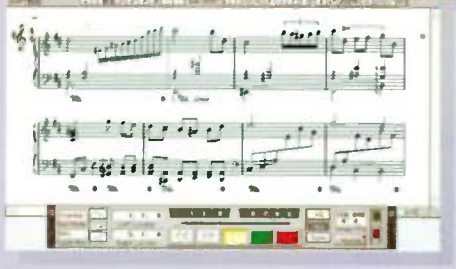

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Mac OS

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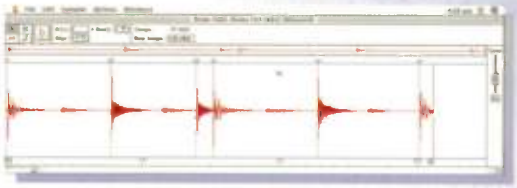
...groove analysis...

ReCycle! 1.6



This program makes the task of matching the tempo of one audio file with that of another EASY. Recycle isolates an audio file's rhythmic components, allocates the samples to different keys on your sampler and saves them as notes in a midi-file. When the midi-file is played, the audio-file will sync perfectly, whatever the tempo. Once you have tried it, you won't be able to live without it. Recycle 1.6 is compatible with Akai, Kurzweil, Emu, Ensoniq, Roland and Digidesign samplers, and is now also compatible with Cubase VST 3.02, enabling it to play back recycled files.

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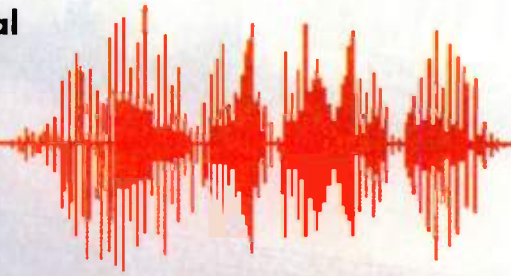

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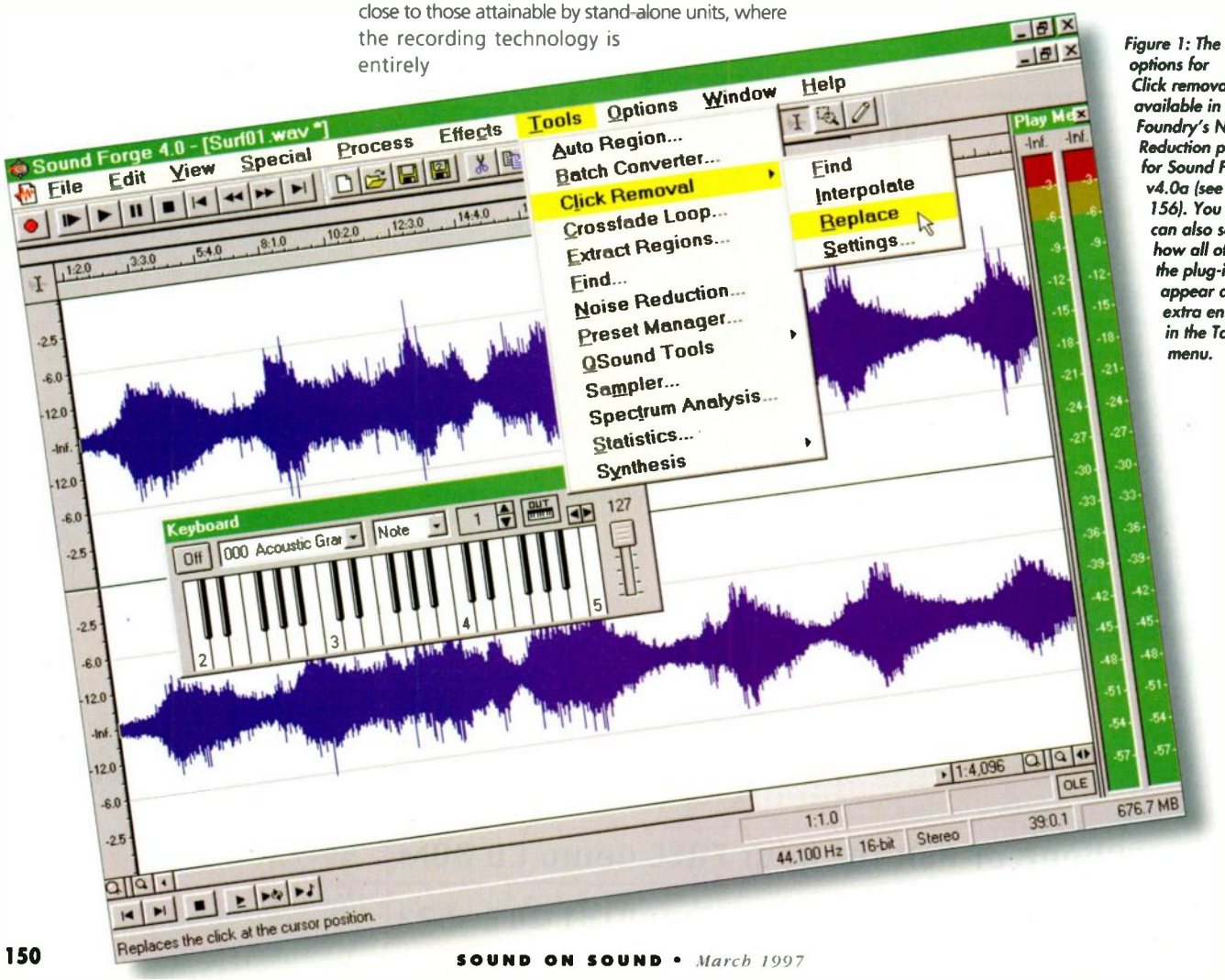

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applications grow ever more comprehensive, so the idea of an expandable core program (which provides basic features) with separate plug-in software modules available (both from the manufacturer of the original program and from third parties) becomes extremely attractive. In the rarified areas of sound processing, it is impossible for a single company to be at the leading edge of all aspects of sound manipulation. In areas such as 3D positioning and psycho-acoustic tweaking, the previous development of Macintosh plug-ins means that the majority of the hard work may be done already for any manufacturer who decides to enter the PC arena.

Although Wave editors have been available for the PC for some years, and many have included special effects such as reverb, filtering, and echo, as well as the more standard items like normalisation and fading in and out, these have in many cases been little more than gimmicks, and whilst giving a great deal of pleasure to people dabbling with their soundcards, the audio quality was generally far worse than the average budget effects unit. Stand-alone budget effects units have come on in leaps and bounds over the last year — you can now buy a rackmount device with an 18- or 20-bit 'engine' providing excellent signal-to-noise ratios and overall sound quality for under £200, and in order to move your processing onto the PC, this same level of performance must be matched or exceeded. Although 16-bit sounds have a theoretical 96dB dynamic range, once you start manipulating audio data, you have to be very careful not to lose information along the way which can accumulate and give rise to audible degradation. For this reason, professional sound editing always uses higher resolution internally (see the 'Bit of a Problem' box), only returning the sounds to 16-bit after processing has been carried out.

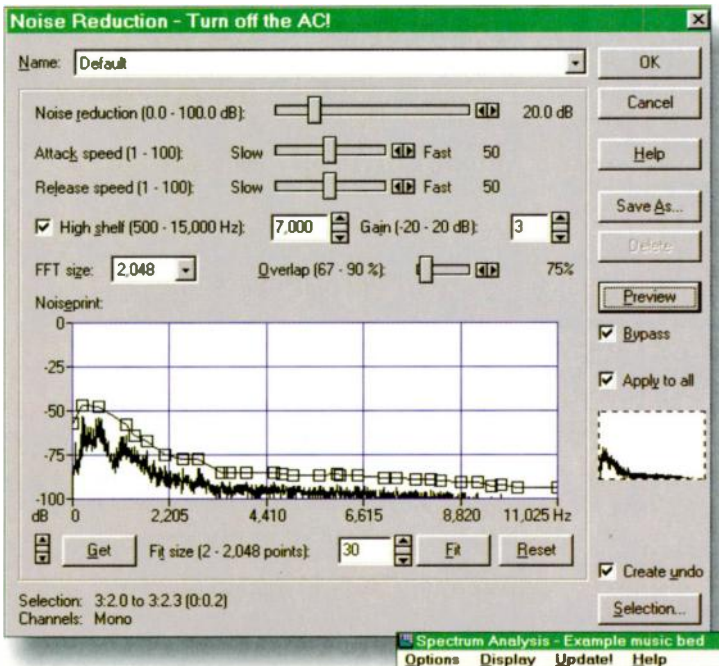

Figure 2: The Noise Reduction plug-in. The lower trace in the NoisePrint window is the spectrum of the noise itself — the upper trace shows how a number of points are used to approximate this response and set it relative to the signal. Any of these points can be dragged upwards by the mouse to give more attenuation at a specific frequency.

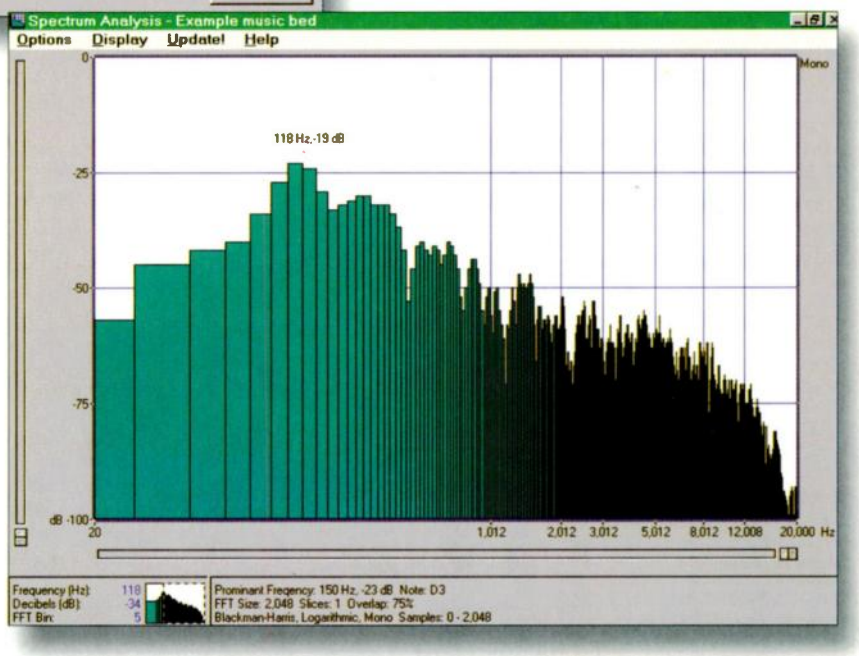

Figure 3: The Spectrum Analyser looking at a short section of audio played by a four-piece guitar band — the prominent frequency mentioned at the bottom (150Hz D3) is that of the bass guitar.

DSP OR NOT DSP

Running 24- or even 32-bit calculations is obviously more processor-intensive (high-end workstations sometimes work with internal resolutions of 56 or even 72 bits), and it is for this reason that DSPs (Digital Signal Processor) chips are often used. These are used to offload the bulk of the arithmetic slogging from the processor to a separate chip. Every time you select a plug-in, the appropriate algorithm code is sent to the DSP, so that for each point on the waveform, a number is sent, and the result returns much faster than the equivalent calculations would have taken when sharing the CPU. By having a reserve of DSP chips at your disposal (the so-called 'DSP farm' beloved of Mac-based Digidesign owners) you can decide how best to use your total DSP power for each project. This sort of power was needed until recently, simply ▶

pros & cons

SOUND FORGE v4.0a £299

pros

- Huge number of extra features.
- Excellent sound quality and many improved algorithms compared with version 3.0.
- Extremely fast operation, even running on non-cutting-edge PCs.

cons

- Sometimes too comprehensive for typical users.

summary

A very good audio editor which has evolved into an exceptional one, with open-ended plug-in design which allows you to get more from your initial investment. With the latest *ActiveMovie* technology allowing other compatible programs to access the plug-ins as well, this has to share the crown for the top PC editor with Steinberg's *WaveLab v1.5*.

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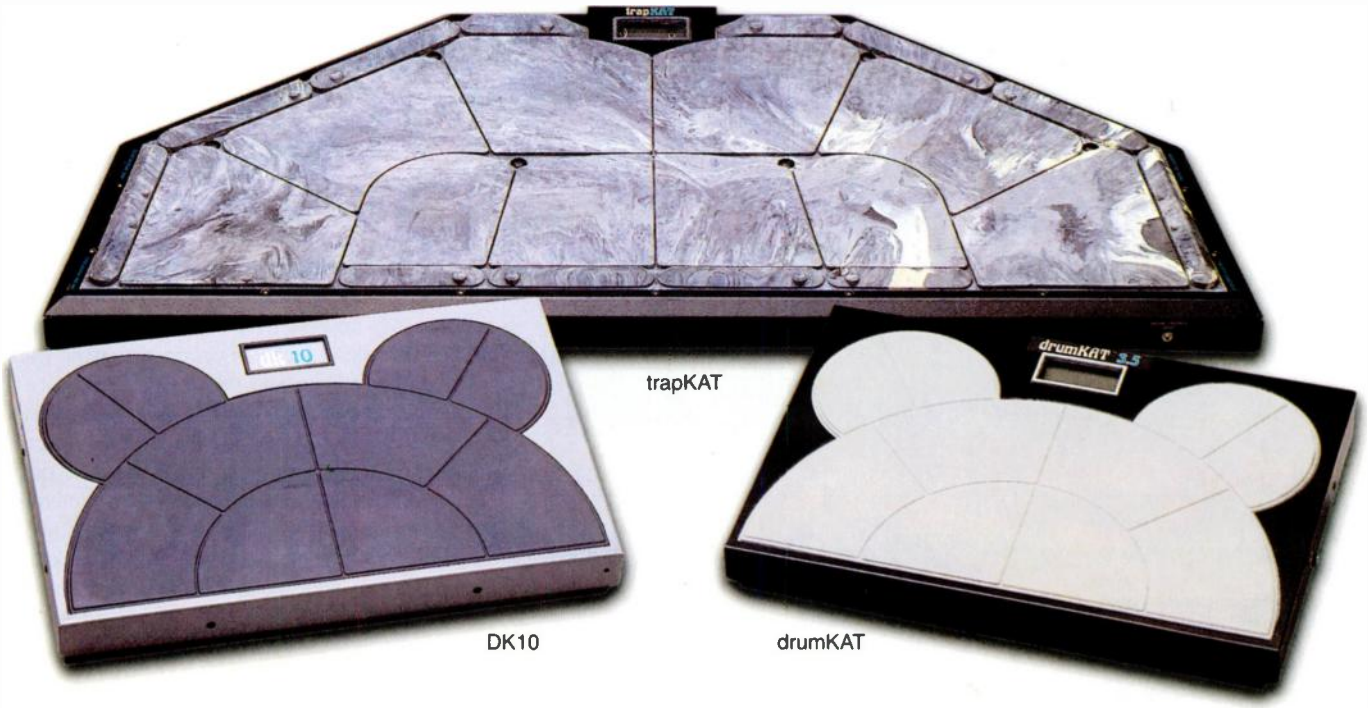

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because computers had insufficient power to carry out audio processing as well as all of the other housekeeping, such as disk read/writes, updating the screen display, and running the other programs that are trying to cope with MIDI data at the same time.

When I first started researching this article in late 1996, the concept of PC plug-ins was exciting enough — being able to add further functions to an existing program is certainly most attractive, and it is nearly always easier to work in an integrated environment than have to move to another application to perform a specific operation not available in the main program. However, without added DSP power, it seemed that none of the more exotic functions found in Mac plug-ins could be implemented on the PC, and despite excellent 'level manipulation' programs such as the *L1 Ultramaximiser* from Waves, it seemed most unlikely that many real-time processing engines would be available until the power of PCs took yet another quantum leap forward.

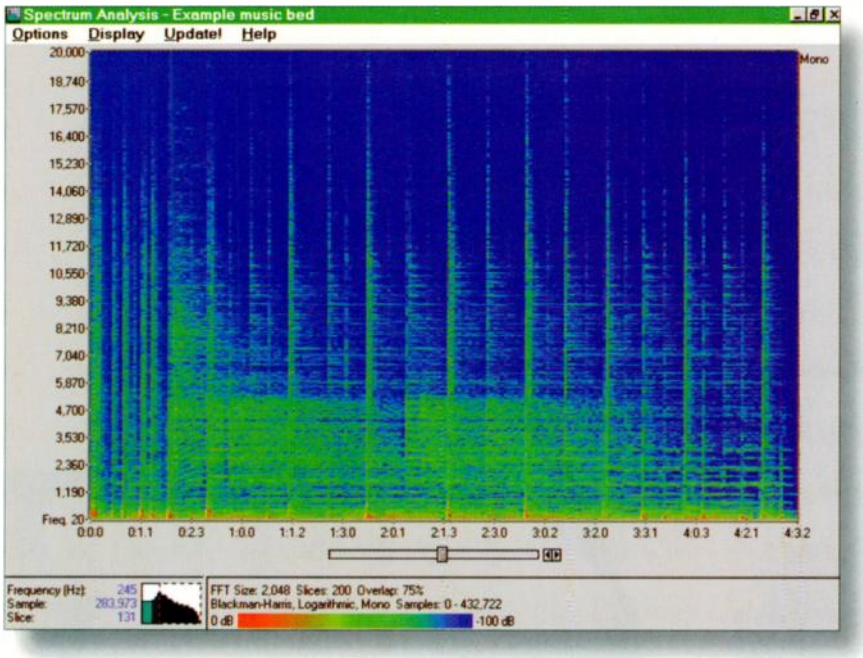

Figure 4: The same music signal seen in Figure 3, displayed here by the Spectrum Analyser in sonogram mode — the initial clump of vertical green lines is a snare drum fill, then you can see the guitar come in, punctuated by snare hits on each off-beat. Once you know how to interpret this sort of display, there is a lot of information to be gleaned from it.

All this has now changed, firstly with the release of Steinberg's *WaveLab v1.5* (using 24-bit calculations but no DSPs), which includes a selection of eight plug-ins, even including EQ and reverb (see Paul White's review in last month's *SOS*). For the first time, a live signal at the input of your PC soundcard can be treated in real-time by professional-quality computer algorithms, and it looks as if, within the space of a few months, the limitations of the integrated 8-track audio workstation (namely lack of real-time treatment for individual tracks when multiple outputs are not available) has finally been addressed.

The next revelation occurred when Sonic Foundry (the designers of PC audio editing software *Sound Forge*) announced an update to *Sound Forge v4.0a*, which is available to existing *Sound Forge* users to download free from the Sonic Foundry web site. This update includes Microsoft's *Active X* technology (itself a form of plug-in), which was originally designed to add features to the Internet browser *Explorer*, and acts as a sort of 'glue' to allow extra bits to be bolted onto your PC system (for example, the subset *ActiveMovie* caters for video and audio streaming). Sonic Foundry's support of this technology has enabled their own plug-ins to achieve real-time previewing (as long as the host PC's processor power is sufficient), but more fundamentally, any plug-in designed to work with *Sound Forge* will also work with any other application that supports *ActiveMovie* technology. This is exciting news indeed, as more developers will be encouraged to support *Sound Forge*, but also, plug-ins will now be useable by sequencers, editors or even Internet browsers in real time! Here, then, are some mini-reviews of the current range of plug-ins available from Sonic Foundry, along with one from QSound.

SONIC FOUNDRY *NOISE REDUCTION* PLUG-IN

This plug-in offers two types of noise reduction. The first (see Figure 2) can perform wonders on material that has any form of fairly constant background noise, such as hiss, rumble (from nearby machinery), electrical or mechanical hum, or indeed any other constant sound that was not intended to be part of the recorded signal. I have heard CDs featuring quiet acoustic recording where the whirr of an ADAT can be clearly heard in the background — this is an ideal candidate for the *Noise Reduction* plug-in. The process is as follows: first, choose a short section of the recording where only the offending noise is present (less than a second will be enough), and press the Get button. This generates a noiseprint — an analysis of what noise frequencies

THE PROTECTION RACKET

In the transition of plug-ins from the Mac arena, one element has survived which is somewhat unwelcome. The QSound plug-in incorporates my first experience of hard disk install protection. This involves a copy-protected floppy disk with (in this case) two installs on board. During each install, concealed data on the floppy is transferred to your hard disk as a hidden file. If this file ever gets moved or corrupted, you lose the install for ever. The floppy will then let you install for a second time, but if this installer corrupts, your program is useless. I know how much Mac owners grumble about this form of software protection, but now, having experienced it first hand, I can only add my voice to the rising clamour, and plead with manufacturers to adopt some other form of copy protection such as that used by Steinberg, whose *Wavelab* simply asks occasionally for the original CD-ROM to be inserted. Hard disk installs are a time bomb waiting to go off for legitimate owners! During the course of this review, I upgraded my PC, and therefore had to uninstall the QSound plug-in from my old machine. The special Uninstall program provided with QTools (*don't* use the standard Windows 95 version!) stubbornly refused to look at my floppy drive with the original disk, and despite all my efforts, refused to be uninstalled. As this happened over a weekend, there was nothing more I could do, and so I lost one of the two legitimate installs. On my new machine, the second install did exactly the same thing, but by then I had visited the QSound web site, which provides instructions on how to uninstall manually using a DOS command line if problems occur. I know manufacturers want to protect their investment (I've been a software developer myself), but I can't help feeling that if this is typical then many professionals will think long and hard before purchasing any program that features this form of software protection.

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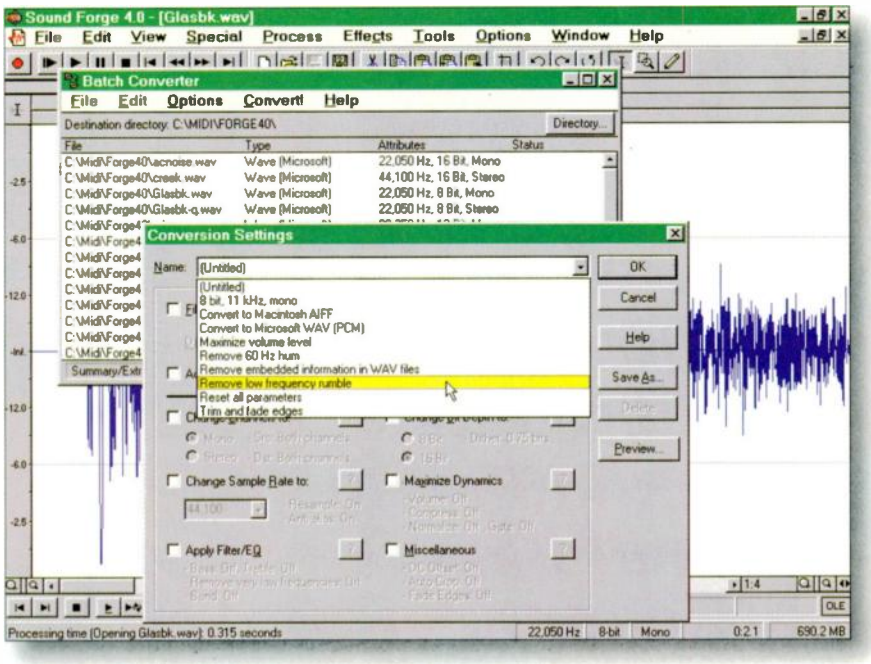

Figure 5: Batch Conversion is automated heaven for the dedicated Multimedia person — the list of presets show a small range of possible operations that can be performed during the conversion batch process.

▶ are contained within your selection. Then, an envelope is created by means of the Fit button, which creates a linked number of points above the noiseprint. This envelope is used by the noise reduction system — any signal below the points is treated as noise. A setting of 6dB above the noise level is recommended as a start point. Finally, by pressing Preview, you can hear the noise reduction in action, and compare it with the untreated version using the Bypass button. If all goes well, the offending noise will be typically 20dB down on the original (a default setting, although any setting from 0 to 100dB of reduction can be selected), and will be significantly easier on the ear. All aspects of the process can be manually tweaked, and I fully expect that in the hands of an experienced operator, dramatic improvements will be possible. This process is very similar to the DeNoise function used in *Dart Pro* (reviewed in *SOS* January '97).

The other function of this plug-in is click removal (see Figure 1), and this is designed for short discontinuities rather than continuous background noise. Options include Find (which searches through any marked area, stopping if anything appears that looks suspiciously like a click), Replace (which removes the offending portion, replacing it with similar data from nearby), and Interpolate (which effectively draws in a line of new data between the values at the start and end points, and which is only effective for very short 'ticks'). Even with the default settings, appreciable improvements can be made using both types of Noise Reduction. This sort of process is invaluable not only for rescuing mistakes, but also for restoring older material from vinyl records which have not withstood the test of time as well as they might. *Sound Forge v4.0a* runs 50% faster than *v4.0*, and Pentium Pros will now work in real-time with 44.1kHz stereo files. At around £200, this plug-in is not a cheap proposition, but is worth its weight in gold in the right circumstances, and is still significantly cheaper and faster than *Dart Pro*.

SONIC FOUNDRY *SPECTRUM ANALYSER* PLUG-IN

This plug-in allows you to translate the normal level vs. time image into the frequency domain, so that you are looking at spectral content. It is extremely comprehensive — so much so that at first it seems a bit impenetrable, even to someone like me who has used both hardware and software spectrum analysers extensively in the past. The signal can be viewed in both the format of a more usual spectrum graph (frequency vs. amplitude, see Figure 3), or as colour and monochrome sonograms (see Figure 4), in which the horizontal axis represents time and the vertical axis represents frequency. The amplitude of each frequency component in this latter case is represented by the colour intensity of each point in the graph. This method of displaying spectral information is useful for identifying distinctive spectral patterns created from sounds such as speech, musical instruments, and bird calls (apparently it is possible for experts to identify birds simply by studying sonogram characteristics). When I first started looking at this plug-in, two main applications sprang to mind: firstly, the obvious one of examining mixes for their frequency content (to highlight problem areas where two instruments clash or for studying other people's work), and secondly, on specialist audio courses, as well as at college and university level, for instructive purposes.

However, during the time I have had this plug-in for review, it has proved more and more useful. It has been used to examine the EQ characteristics of mixers, spot subsonic rubbish that flapped my cones but performed no useful function in a mix, and examine the acoustics of my control room. ▶

UPGRADES & DOWNGRADES

Call me cynical, but I think that upgrades mostly come in two varieties — those which look the same on the surface, but have an improved 'engine' resulting in faster or more reliable operation, and those which have new bells and whistles, which sometimes make the basic program feel more sluggish than the previous version unless you upgrade your computer. First impressions of *Sound Forge v4.0a* were therefore particularly impressive. Not only are there a host of new must-have features, but a lot of things from version 3 have been speeded up significantly, such as screen redraws. These are now so fast that even on humble machines real-time scrolling is possible — ie. when you play a long sample, the display updates the current portion of the waveform continuously in real-time, at any zoom level!

Version 4 of *Sound Forge* has now been out for some months, but has many significant improvements over version 3 (which was reviewed in *SOS* May '96), including greatly accelerated processing, new professional reverb algorithms, redesigned pitch-shift, and graphic fade with dithered or noise-shaped fades. Other useful basic additions are a new vertical zoom (useful for examining low-level areas of a waveform, and an excellent playback meter system with many options, such as holding peak and trough level (highest and lowest waveform values). New features include Sync support for the Record dialogue (which makes it possible to send and receive SMPTE or MIDI timecode while recording), and AVI support now allows audio to be edited in sync with video files — the list goes on and on. Suffice it to say that if you already have version 3, the upgrade to version 4 will give you enough new features to keep you occupied for months to come. For more on *Sound Forge*, see the overview of three PC audio editors starting on page 130 this month.

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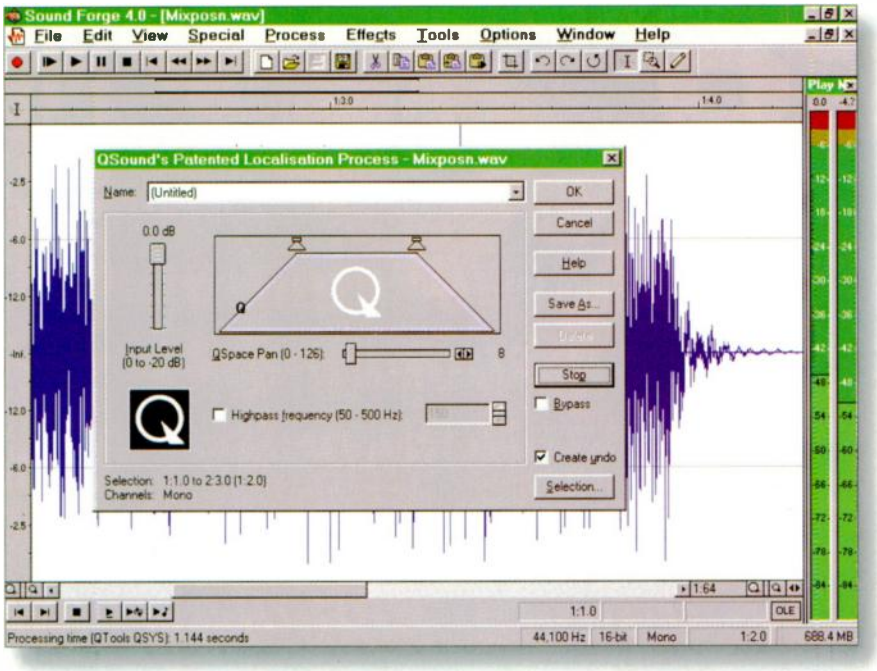

Figure 6: The QSYS stereo width enhancement in action. Notice the smart new Sound Forge v4.0 playback meters on the right-hand side of the screen.

▶ But with the release of the *Sound Forge v4.0a* update, a whole new world opens up — *real-time* monitoring. Now you can carry out spectrum analysis on your mix in as much detail as you want, whilst the track is playing. This turns the plug-in into a far more useful tool, and makes the price of around £100 seem far more reasonable. It is less easy to make pretty displays with *Sound Forge*'s *Spectrum Analyser* than it is on the one provided as part of Steinberg's *WaveLab*, but once you get to grips with it, the *Sound Forge* plug-in is a far more powerful and analytical tool, and is the only one I know of that currently works in real-time.

SONIC FOUNDRY *BATCH CONVERTER* PLUG-IN

This plug-in (see Figure 5) is one of those unexciting options that doesn't strike you as being worth the expense. But I've had people on the phone in the past who have been given a few hours to convert 800 Mac AIFF sample files to their WAV PC equivalents for a cross-platform game conversion, and if this sort of situation ever applies to you, this plug-in may prove invaluable. Although batch converters are nothing new, and indeed you can probably find several in the public domain if you search hard enough, the exciting aspect of this one is that you can subject each sound of your batch to many additional automated processes before it is saved in the new format. Besides the obvious ones, such as mono-to-stereo, bit depth, and sample rate conversion, you can change the volume, add compression, normalisation or noise gating, apply a 3-band EQ with fully parametric mid range and subsonic filter, remove DC offsets, trim out leading or trailing end silences, and fade a selected number of milliseconds at each end to avoid clicks. There is also a useful Extract Regions option, so that you can work with many effects in one large file, give them global treatments, and then run the Batch Converter to automatically separate this file into a series of smaller ones whilst converting other parameters. The downside of this versatility is the price — at around £150, only the well-heeled multimedia person will be able to justify it. If you only need to convert formats, then it may pay to look for something simpler and cheaper. However, if the alternative is hours of drudgery converting hundreds of sounds by hand, this will pay for itself the first time it is used.

QSOUND *QTOOLS* PLUG-IN

This is a *Sound Forge* plug-in from a third-party developer — the ubiquitous QSound Labs. QSound seems to pop up everywhere nowadays, so it's nice to see a version of this technology available to PC *Sound Forge* users. For the background to this 3D spatial treatment, look no further than Paul White's interview with QSound Labs in the November '95 issue of *SOS*. Here, as in many other versions available for different platforms, there are two main treatments on offer. For mono sources, QSYS allows you to 'place' your sound anywhere between or beyond your speakers, as a sort of 'super panning' control (see Figure 6, above left). As long as your speakers are symmetrically placed, it works

A BIT OF A PROBLEM

Many people initially think that if 16-bit audio can approach a theoretical 96dB signal-to-noise ratio, this resolution is quite sufficient for digital audio processing. This is not the case, and the easiest way to explain why is by example. Let's say that at a particular sample point in your waveform, its value is 25, and that you simply want to reduce the level of the waveform to half its original value. This would result in a sample value at this point of 12.5, but unfortunately fractions are not allowed, so we decide to call it 12 (by rounding it down to the nearest integer). After some more digital manipulation, we finally need to normalise our levels, which results in the gain being increased by 6dB (doubling the level). This final value will be 24 (a change of double the original error of 0.5), so we can see that the errors are beginning to accumulate, simply because we had to throw away some information earlier. Of course, in the world of 16-bit audio, there are 65,536 possible values for the waveform at any point, so you might think that missing a half off will make absolutely no audible difference. The problem is that the inaccuracies occur every single time you carry out an edit that changes the waveform in any way — not only changing gain, but EQing, fading in or out, and normalising (this is just a special gain change). It is not just the extremely low-level values that suffer either — at any point on the waveform, the digital result of an edit may not be exactly an integer value. Since these inaccuracies are cumulative (every edit results in more approximations), they give rise to audible deterioration, which gets worse after each process. Typical end results are grainy reverb tails and fade-outs that sound unnatural, but you may also notice EQ that sounds 'edgy', and that you seem to be losing the 'ambience' from your sound, giving a result that is 'veiled', 'flat' or 'lifeless'. To minimise these problems, it is often recommended that the only operations you carry out with 16-bit editors are track re-ordering (no level changes) and click removal (operating over 1-2ms, so that rounding errors are inaudible).

The solution is to take the 16-bit input signal and convert it to a higher resolution such as 18-, 20-, 24- or 32-bit. Then, during the entire time that your signal is being processed, calculations will be made with this higher resolution, and with correspondingly smaller errors. Finally, the waveform is truncated down to 16 bits, and the net result is a cleaner sound. This is one reason why it is not possible to compare digital audio editors solely on how fast they operate — it is the accuracy of the end result that counts, not just the speed of the computation!

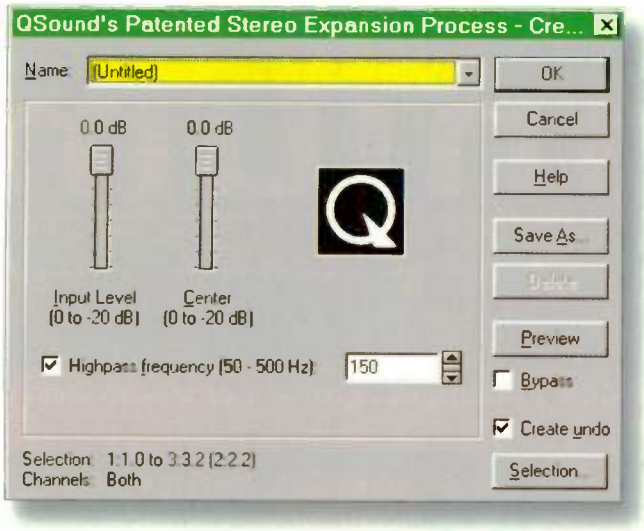

Figure 7: The QXpander — it may look simple, but there's an awful lot going on under the surface.

extremely well (although it must be admitted that some people hear these sort of effects more than others). Once processed, you can download your file to a sampler to create a permanent library of QSound-treated instruments (extremely useful with percussion). The second treatment is QXpander (see Figure 7, above), and this treats a stereo signal with similar fairy dust, resulting in a 'wider-than-wide' stereo image, whilst leaving the central mono information alone. Both work extremely well with the right sort of signals, and have a wide number of applications outside the area of ping-pong gimmickry. For instance, when treating a complete stereo mix (or sub-mix) the effect can be to move the reverb out into the room, leaving more space around individual instruments. At around £200, this plug-in isn't cheap, and with the majority of plug-ins going real-time it is now lagging a bit by comparison, but it still offers one of the cheaper ways to get this revolutionary technology into your music. The main downside for me has to be the copy protection method (see 'The Protection Racket' box). QSound have to protect their investment, but when even the title bar of the QXpander window has to accommodate 'QSound's Patented Stereo Expansion Process', leaving only enough room for the first four letters of the sound filename, perhaps things are going a bit too far.

LOOKING INTO THE CRYSTAL BALL

The plug-ins reviewed here are the start of a new wave — others are just becoming available, such as the bargain-priced *Native Power Pack* from Waves. Together, they provide a tantalising glimpse of where the PC is heading in its new role as a general-purpose digital audio workstation. Although the Mac's DSP farm has yet to appear on the PC, and the DSPs on soundcards are dedicated to specific functions rather than being available for general use, this is sure to change as the lure of more profits begins to attract more Mac developers sideways. Start saving up now, or if you want to buy a plug-in straight away, don't forget those from Glade — they provide fragrance enhancement in your studio for up to 45 days, at only £2.99!

SOS

info

£ *Sound Forge v4.0* £299. Prices for the plug-ins were unconfirmed at the time of going to press. However, the *Noise Reduction* and *QTools* plug-ins were expected to retail for around £200, the *Batch Converter* for around £150, and the *Spectrum Analyser* for around £100. Prices include VAT.

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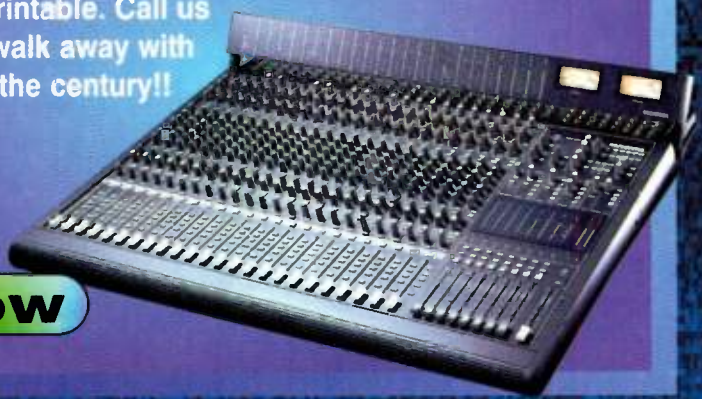

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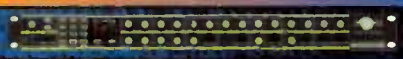

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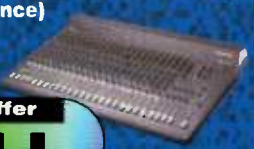

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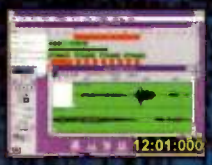

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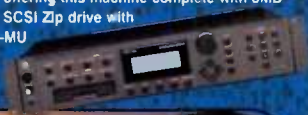

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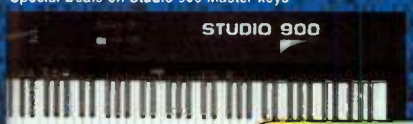

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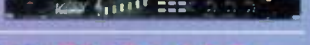

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The Disc

HIDEKI NAKANO &

Motonori Nakamura (right) and Hideki Nakano (left).

When one of the Japanese development team for the new Sony MDMX4 MiniDisc multitracker flew into the UK recently, along with a member of the product planning department, it was an ideal opportunity to find out more about Sony's plans for the home studio-based musician. MARTIN WALKER listened in...

Sony's MDMX4 4-track MiniDisc multitracker (reviewed in last month's *SOS*) is a departure for the electronics company. Although widely known and respected for their expertise at the high end of the professional and broadcast audio market, as well as for their vast range of hi-fi, TV and video products, Sony have only rarely dabbled in other areas of music technology. The DPS series of high-quality effects (the DPSD7 digital delay, R7 reverb, and M7 sonic modulator) appeared way back in 1991, and were quality specialist units that each concentrated on doing one thing extremely well, rather than attempting to better the multi-effects units other manufacturers were producing. After this, things went a bit quiet until the HRMP5 and GP5 heralded the arrival of more affordable units for the home studio and guitarist in 1994. Apart from these, and the DPSV77 effects unit of last year (which combined the best of the DPS series in one rackmounting processor — see review in *SOS* September '96), Sony have not really launched products that are fairly and squarely aimed at the home musician — until now.

When *SOS* learnt that Sony Japan's Hideki Nakano (from the Audio Product Planning Department) and Motonori Nakamura (from the new Pro-sumer Audio section, of which more later) were flying to Britain as part of a whistle-stop tour of Sony's European offices, a meeting was arranged at the London offices of Sony's new UK distributors HHB to discuss the company's forthcoming plans and look at a few aspects of the MDMX4's design in detail. Brian Kane of Sony UK and Mr Nori Nakamura (no relation), the Marketing Manager of Audio Systems at Sony Broadcast & Professional Europe, were also present.

THE SOUND OF MINIDISC

The MDMX4 allows up to 37 minutes of recording with four tracks, and uses Sony's proven MiniDisc technology, in which up to 74 minutes of stereo audio may be compressed onto a removable disc capable of holding 140Mb of data, and smaller than a floppy. Whilst MD Audio (the original MiniDisc intended for consumer use) continues to be sold in Japanese hi-fi systems, the format has yet to take hold in the UK. The more recent MD Data MiniDisc format used in the MDMX4 holds the same amount of data, but is more suited to computer applications.

When MiniDisc was first released several years ago, ATRAC, the data compression system used today by both MiniDisc formats (see the 'Sony Jargonbuster' box), imparted a characteristic metallic sound and fizzy noise to recordings, and many people still believe the format to be dogged by this problem. In fact, continual development and refinement have resulted in four versions of the ATRAC system so far, which currently stands at version 3.5. It is this latest version that is used in the MDMX4, and most professionals I have spoken to have admitted that although they can still hear a marginal difference in sound between first-generation DAT and MiniDisc recordings, they cannot reliably tell which is which. With this in mind, I began by asking Mr. Nakano and Mr. Nakamura how the early MiniDisc sound had been improved. Throughout the interview, Hideki Nakano acted as translator for Motonori Nakamura, so their responses are not credited to them individually.

"The format itself is exactly the same as the early MiniDisc, so there is complete compatibility between early and current versions of ATRAC, but the sound quality is different; the current version is much better than the earliest version. We have developed better algorithms with regard to compression, especially on the encoding side, and also semiconductor devices themselves have improved. For both reasons, MiniDisc is now better than its earlier versions."

As the encoding side has changed significantly, does this mean that recordings made on newer machines will actually sound better, even when

Designers

MOTONORI NAKAMURA OF SONY JAPAN

played back on the early MiniDisc recorders?

"Right. Of course, there are some differences on the decoding side, but there have been more improvements made on the encoding side."

Since it has a 20-bit dynamic range, do you regard the sound quality of the latest ATRAC version as equal to or better than DAT recordings?

"[Laughs] As DAT is 16-bit linear recording and ATRAC uses compression, in theory the sound quality of the DAT recording will be better than the ATRAC. However, we at Sony believe that the difference is minimal, and have every confidence in the sound quality of the MiniDisc. Basically, the quality is only different between DAT and MiniDisc because their data capacities are completely different. But development is still on-going, so we feel that further improvements may still be made in the future."

As the MDMX4 encourages multitrack recording, many people are concerned about generation loss when bouncing and mixing tracks and putting them through the ATRAC compression several times. Do you see the ultimate ATRAC chip being able to withstand multiple bouncing without adding audible artefacts?

"This was of great concern to us at the development stage, since this type of machine is normally used by customers for bouncing or dubbing from track to track. Each time we go through the ATRAC compression system, the sound will deteriorate slightly compared to the original. With the latest version of ATRAC, there is of course a slight generation loss, but it is a great improvement on the original ATRAC compression system."

As I understand it, ATRAC takes the input signal in blocks of 512 samples before compression, but does not grab the same 512 sample chunks when decoding. If the same 512 sample chunk were expanded, such that identical data was reconstituted before any re-mixing, there would be no further decompression loss during bounces. Is this something that would be feasible on ATRAC in the future?

"It is impossible to tell at the moment whether this sort of loss will ever be zero, but certainly sound loss in the future will be minimal, and the system will continue to be developed and improved. To achieve what you are suggesting, we would have to develop some kind of digital mixer with an ATRAC basis. Currently it is impossible to do this — but of course in the future, technology will be improved. Without using some sort of ATRAC-based digital mixing, though, the ATRAC compression system must be used at each stage."

MEDIA

Can you tell us what the main differences are between the new MD Data format and the original MD Audio MiniDisc?

"With regard to the MiniDisc and compression of the audio format, there are two main areas of data — the programme area and the TOC area. On the MD Audio version, the programme area is made on 2 channels, each with 74 minutes of ATRAC audio sound. The disc name, song title and so on are recorded in the TOC area. On the 4-channel MD Data format MiniDisc, we record 4-channel ATRAC-compressed data in the programme area, up to 37 minutes per channel. The big difference is in the TOC — of course we record the disc name and song title as before, but also tempo information to synchronise to sequencers. There is no difference at all in data quality or data transfer rate, and physically the formats are the same."

Does this mean that you can use MD Audio discs in the MDMX4 and lose only that tempo information?

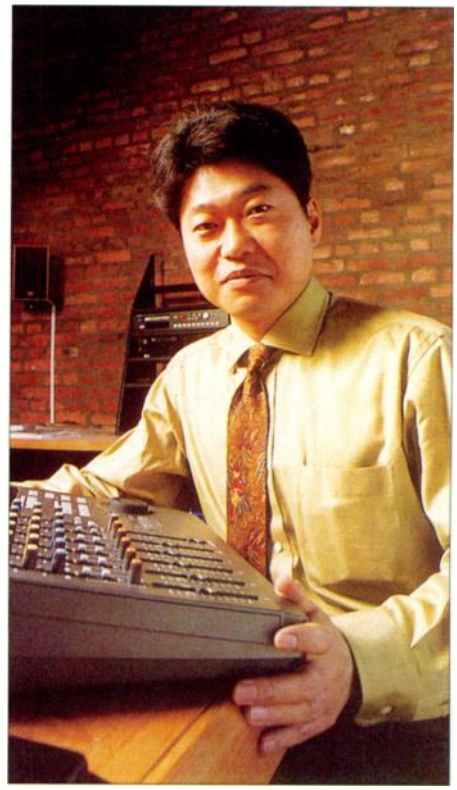
"You can use MD Audio discs with this machine and record up to two channels, but it is impossible to record four."

What are Sony's future plans for the MiniDisc Audio format generally, now that you are moving into a different area? Are you going to continue to develop products that solely use the MD Audio discs?

"As you may know, in Japan, 2-channel MD Audio is already successful and established. Pre-recorded discs are available, but the major use is for customers to buy blank discs to record CDs to listen to on an MiniDisc Walkman or car stereo. On the hardware side, 3 million recorders were sold in total by all MiniDisc manufacturers worldwide in 1996 — but 70% of these sales were in the Japanese domestic market."

With a maximum recording time of 74 minutes for stereo recordings, and 37 minutes for 4-track, can we expect other MiniDisc formats to appear in the future with greater storage capacity?

"We have just announced a 650Mb version of the MD Data disc — the same physical size, but the data capacity is 4.6 times compared to that of current MiniDisc. I don't know the product schedule, but the format will be finalised and available this spring. Using this brand-new MD Data format, recording time will increase drastically, but you will need to ▶



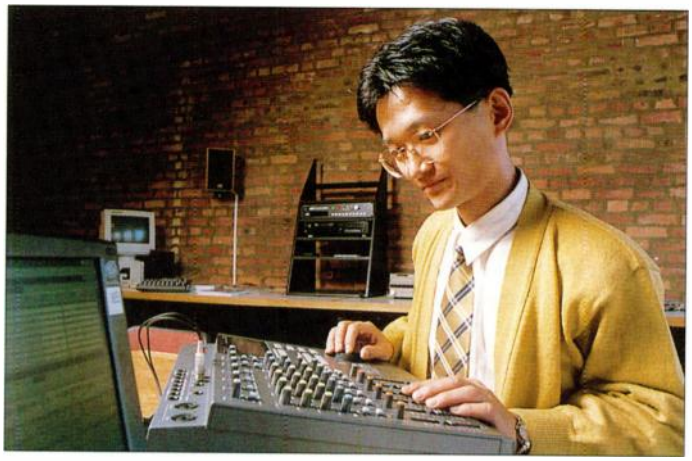
Hideki Nakano.

Hideki Nakano & Motonori Nakamura of Sony Japan

use a new recorder to take advantage of the higher density format. Sony is a licenser of MiniDisc — we developed the MiniDisc format, and we have now expanded it significantly."

The majority of people using compact cassette recorders still use the cheapest tapes available, Now that MiniDisc media costs are approaching those of DAT, how low do you envisage them going, and do you see them eventually falling to current compact cassette levels?

"To have such a cheap media price, cassettes have been used for something like 20 or 30 years; with MiniDisc, we have only just passed five years. I think it's down to economies of scale as well — once you've got an installed user base, that's when you actually start seeing the cost come down. In Japan, the MiniDisc market has expanded drastically, and in the future, that of European countries and the US market will expand rapidly. At that time, of course the MiniDisc hardware market will be huge, and the disc price will fall."



Motonori Nakamura with the Sony MDMX4, which he helped to design.

Do Sony still feel that the compact cassette is nearing the end of its working life?

"In the market, there will always be some kind of cassette tape recorder, but in Japanese stores, packaged stereo systems do not include cassette recorders any more, just a CD player, a MiniDisc player, a tuner, an amplifier and speakers. We still produce stand-alone cassette-based components, but customers like MiniDisc much more than cassette systems. In the future — of course this is just a guess — almost all the cassette-based systems will be changed to MiniDisc. The prices of MiniDisc and cassette are different now, but in the future, when hardware prices have changed, and media prices become the same, at that time MiniDisc will take over. We can compare it with the changeover between LP and CD. Japan's trend was very fast, and after three or four years, the export market also changed from LP to CD. Nowadays, the young generation particularly prefer the quicker access provided by CD and MiniDisc. There are always customers who like to play old records, so cassette will probably not disappear completely, but there is a big trend, and we believe it will probably also follow outside Japan."

"We now have the larger-capacity MiniDisc, and ATRAC 2 compression. With this technology, it is possible to do an 8-track version."

MDMX4 DESIGN

Moving on to the MDMX4 itself, what sort of user do you see buying an MiniDisc 4-track recorder, and why should they choose MiniDisc rather than a hard disk recorder?

"The most important point is that it is removable media, which makes it possible to more easily exchange songs between friends. There are also other manufacturers making multitrack recorders based on the same format, such as Yamaha and Tascam, and these machines are completely compatible, so that any disc recorded on the MDMX4 will play back on any other MiniDisc 4-track. As to the type of customer, amateur musicians are the first priority — the ones currently using cassette-based 4- or 8-track systems. This machine gives them a digital multitrack recorder at a cheap price. Professionals can use the MDMX4 — it's fine — but after several dubbings the sound quality can be noisy."

What are your recommendations for maintaining maximum fidelity when bouncing down? What sort of instruments lose their freshness first of all?

"Normally, customers record drums and bass — the rhythm section — first, and then after that, add keyboards and guitar, and then finally add the vocals. We recommend this type of approach, and we checked and found that six or seven bounces are better than current compact cassette systems, but dubbing 14 or 15 times, for example, will give problems with sound quality. We have no specific recommendations for different instruments — you can use any normal type of recording method."

The MDMX4 allows you to make a digital clone of an existing song before performing any mixdown. Is this a real-time copy, as it appears, and if so, why?

"We need the exact song time to make a song copy, because we write the same data on the disc. To make a clone, the data doesn't go through the ATRAC compression system, but we have to go through the drive itself, so the time is very much dependent on the drive transfer rate. For the MiniDisc, this is 150Kb/second, so we need real time to make clones."

***SOS* reviewers of the MiniDisc multitrackers have been concerned over possible corruption after recording with MiniDisc if the TOC is not manually updated. Why does this not take place automatically?**

"For the MiniDisc format, TOC information is really important, because it controls all data on the disc. It is possible on this machine to have an Undo function, so that TOC information can go back to the previous version. When using functions such as Track Edit, Section Edit, and Song Edit, the audio data itself doesn't change, only the TOC. Every action during recording and editing requires TOC information to be updated on disc, and if the recorder wrote brand-new TOC information on the disc after every operation, the user would have to wait a few seconds after each edit, each new recording and so on. At some point, the machine has to write this ▶

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Sound on Sound, September 1996

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MACFormat, Issue 41 September 1996

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▶ information, but it is up to the user when they record the TOC information, for instance before they take a break. If the customer forgets, and tries to eject the disc, the machine will automatically write the TOC information. This saves having to wait for a TOC update every time an operation is performed."

RELIABILITY

I'd like to move on to the area of reliability — obviously something that people are concerned about when it's their own music. There have been difficulties with mechanical reliability with some consumer DAT machines. How does MiniDisc reliability compare with DAT?

"The MDMX4 uses a device which has also been used on MD Audio decks for a long time. This is mechanically very reliable, because we have long experience of this type of machine."

But there is error correction built into the system, so that it can recover from any data loss. One aspect of this is that with DAT, error correction circuitry is sometimes so good that recordings have seriously deteriorated before audible effects occur. Does this also apply to MiniDisc?

"Of course, the error correction system is not exactly the same as that of a DAT machine, but it is similar in a MiniDisc recorder. There are two major advantages compared to DAT: the first is that it is possible to retry for the signal, as the tape has not gone past, because we use a random access memory and compression system, whereas DAT is a linear recording. Also you don't have any physical contact like that between DAT tape and the heads, so there is no long-term wear involved. The possibility of errors is very small, and fortunately, we have several chances to re-read any that occur."

Many *SOS* readers have concerns over the difference between consumer and professional machines. In the past, some DAT recorders have been bought by recording studios, but they have purchased so-called 'consumer' machines, and then found it difficult to get any technical problems repaired under guarantee. Machines that are only used a few hours per week, but still classed as 'consumer', fall into a grey area, and dealers sometimes say that they cannot then support them, because they have not been used solely in the home. If a professional musician bought an MDMX4, what are the support implications?

"The main target for the MDMX4 is, as I mentioned previously, consumer musicians. Of course, some professional people would use this as a professional machine — the quality is good enough — but the main target is the consumer. We don't propose that the professional musician uses it for his job."

But a lot of professional organisations like HHB have in the past sold consumer products which have been bought by recording studios because they are considerably cheaper than 'professional' models. Products such as 4-track recorders can enter a grey area. Will they be supported if they are being used in recording studios?

Brian Kane, Sony UK: "Maybe I could answer some of the support issues from a UK perspective. The MDMX4 comes from what we term the Pro-sumer section, which is trying to address this grey area — they realise that some professionals will use these products. This is the reason why we've got someone like HHB involved as a distributor. For example, if you look at the rackmounting Sony DTCA6 DAT machine, as opposed to one of the consumer products, we would give that machine a 'pro' type of support, whereas you're quite right in what you say about consumer products. We realise that this new product will cross both fields, and what we will endeavour to do is give it support that you would associate more with the 'pro' side. HHB will be the main people in the UK, and we got them on board because we appreciate their technical expertise, and we have total faith in their ability to support the machines."

FUTURE PLANS

When DAT was first introduced, it was expected that a lot of DAT recorders would be used by consumers. In fact, they are very rarely used in the home, but are used an awful lot by professionals. MiniDisc was originally targeted primarily as a consumer audio format. Does the arrival of the MDMX4 indicate that this is no longer the case? Are you moving into a different area, or simply widening the existing one?

Hideki Nakano: "In these early days, we regard this primarily as a consumer machine, but a 4-channel version. Of course, we would like to expand the line-up of this category as well, both at the low end and high end."

Brian Kane: "There are basically two areas in Japan — a consumer area for home AV, and the new section which has just been set up, called Pro-sumer audio. The MDMX4 is one of its first products. The consumer people continue to do what they are already doing, but a group of people have been taken aside, and they are now dedicated to the MI market — guitar processors, powered speakers, and further developments in this area. It is a subset in some respects, but it is very focused on the musician."

Following this first Sony product in the project studio area, do Sony have plans for other associated products?

Hideki Nakano: "As you know, about five years ago, we introduced a range of signal processors — the DPS series — for the MI market. A little bit expensive, but designed for musicians. We also introduced the HR signal processors, a consumer product. Now we are introducing this new type of MiniDisc multitrack recorder, and we are continuing the signal processing business. Today, I'm afraid that I cannot talk about any exact product ideas, but

QUADRUPLE DENSITY MINIDISC

During this interview, Sony mentioned a new format of MiniDisc which will start to appear in Spring 1997. Although the same physical size as the current MD Data format, it manages to cram in 4.6 times the amount of data. This is done using various methods — a reduction in the laser beam spot size, laser strobe magnetic field modulation technology, and high-density magnetic film technology. Finally, the magic figure of 650Mb can be stored on the new format, the same as on a CD. In addition, the transfer rate has been increased from 150Kb/second (the same as single-speed CDs) to 580Kb/second (4xCD speed). MiniDisc was always intended to be a convenient and robust medium that could make high-quality recordings. Once this new version appears, and sells in sufficient quantity to bring the price down, it could prove perfect for the musician on the move, with the advantages of random access, and none of the problems of DAT, such as susceptibility to magnetic fields, and head and tape wear.

in the future we would like to make many more MI products, following this type of multitrack recorder."

Is there anything that we might see in the next six months?

"One product is an active speaker. As you may know, we have already introduced the SMS1P active speakers, and we will introduce a larger version, the SMS2P, with a 16cm woofer and built-in amplifier, for the studio market. We will be showing this at the coming Frankfurt MusikMesse."

Professional multitrack arguably starts with 8-track machines. Do you have any plans to develop anything along these lines using any of the MiniDisc technology?

"We now have the larger-capacity MiniDisc format, and also the ATRAC 2 compression system. Currently, the ATRAC 1 compression system has 128kbits/second per channel, and ATRAC 2 will be half transfer rate, which means 64kbits/second per channel. With this technology, it is possible to do an 8-track version — not yet, but we would like to do it. We have a large technical resource, but which way is best to go we have not decided yet. We just have the intention to do it in the future."

With the possibility of using ATRAC to record at 20-bit resolution onto 16-bit media with a 5:1 data reduction, will we ever see this same technology finding its way into products without MiniDisc, such as Sony hard disk recording systems?

"We don't have any plans to do this with hard disk rather than the magneto-optical format. Of course, one good application is networking. Transferring data through networks will be a major application in the future, and for that you have to use some sort of compression system, for example *RealAudio*. We think ATRAC will be really good in these sort of applications. This is just an idea, and not studied as yet, but regarding ATRAC and hard disk and ATRAC magneto-optical, we don't have any plans right now."

Finally, would you like to tell us what direction Sony is going to take in the future?

Nori Nakamura, Sony Broadcast & Professional Europe: "As a whole, Sony have established their video and audio field of professional production in the last decade or so. Also, in the consumer field, we are successful in the areas of hi-fi, TVs and videos. What Sony is now trying to do is to widen one part of our market — in musical instruments. We are very new to this field, but with the technology from the high-end and also the consumer field, we feel that we can produce a lot of exciting products in the MI market of the future. It will present a lot of new challenges, but in order for Sony as a whole to expand, we would like to participate. We hope the MI business will be very challenging for us for many years."

SONY JARGONBUSTER

- **ATRAC (Adaptive Transform Acoustic Coding)**

The compression method used to achieve a 5:1 reduction in audio signals so that they can fit on a MiniDisc.

- **MD AUDIO**

The original format MiniDisc used in hi-fi systems.

- **MD DATA**

An updated format currently used for 4-track and computer storage.

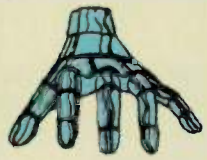
- **MO (Magneto-Optical)**

Recording takes place using a laser to heat up a spot on firstly a disc, and then a magnetic head which writes data. Once the spot has cooled down, the magnetic data is 'cast' on the disc.

- **TOC (Table Of Contents)**

The area on an MiniDisc used to store song and disc names and tempo maps. This can be edited without altering sound data, to play back sound chunks in any order.

the digital VILLAGE



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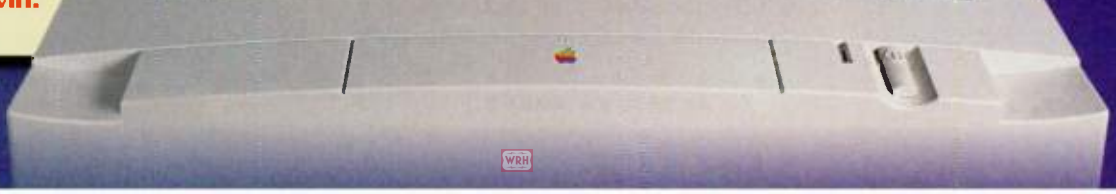
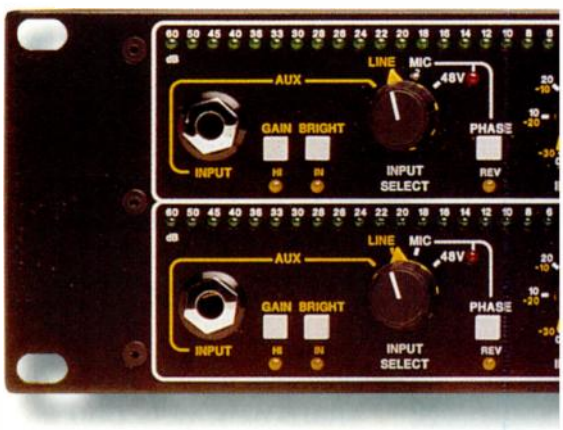


Class of '62

DRAWMER 1962 DIGITAL VACUUM TUBE PREAMP

Drawmer's 1960 series leaps into the digital age with the launch of the 1962, which combines a specially designed low-noise preamp, variable tube coloration and audio-sweetening tools with an optional 24-bit output stage. PAUL WHITE celebrates the year of the tube.



The Drawmer 1960 series of processors started with the still-popular 1960 dual-channel compressor, featuring hybrid tube/solid-state circuitry, on-board mic preamps, and even an instrument input with EQ. This was later followed by the 1961 2-channel equaliser, another well-accepted hybrid design. Now Drawmer have launched the 1962, which, like its predecessors, is resplendent in black with the familiar Drawmer front-panel styling.

The 1962 is another hybrid valve design, but with a difference — it has the option of a very high-resolution 24-bit digital output stage based on Drawmer's proprietary circuitry. Essentially, the new unit is a dual-channel mic/line preamplifier which features extremely low-noise operation. The 1962 spent many months in the design stages, and part of the delay in bringing it to market was, apparently, due to Drawmer's desire to bring the preamp noise down to the lowest possible level, to do full justice to the high-accuracy digital output stage they'd developed.

In addition to functioning as a dual-channel preamp, the 1962 includes variable high- and low-pass shelving filters, similar in concept to those used on Drawmer's own DS201's side-chain, plus a 3-band, fixed-frequency cut/boost EQ specifically designed for gentle sweetening rather than full-scale tonal reshaping. Further tonal tailoring is provided by an enhancer stage, which has separate controls for low- and high-frequency enhancement based on a form of dynamic filtering.

The whole point of building valve equipment is to replicate the classic warmth of vintage valve circuitry, which is due mainly to subtle but musically-pleasing distortions. A variable Tube Drive control on the 1962 enables the user to decide exactly how much tube coloration is appropriate for a given sound source. There are two dual-stage valves in the audio signal path, and each of the filter, EQ, enhancement and tube drive stages is independently bypassable, so that minimum-signal-path recording is possible when required.

Under most circumstances, I'd imagine the two channel outputs would be kept separate, and would either be connected directly to a recording system or patched into a conventional mixer. However, where a situation requires the two channels to be mixed — live recording to a stereo machine, for example — provision is made for mixing them, with control over pan, individual channel level and overall level. Each channel also features a switchable peak limiter, with the limiter circuit located at the end of the signal chain so that any gain changes caused by EQ will be compensated for.

THE TOUR

The 1962's two audio channels may be operated independently or linked for stereo operation, in which case the control circuitry for both channels' limiting and enhancement circuits responds to the average of the two channel settings. The remaining controls are not linked, so must be matched by hand.

Both mic preamp stages are identical, and are equipped with fairly conventional facilities, including phantom powering and phase inversion — no pad switch is necessary, due to the very high headroom available. A four-position rotary switch selects the audio input source: Mic; Mic with 48V phantom power; Line; or Aux. A huge 24-section LED level meter sits above each input stage, and a separate peak LED warns of clipping.

The microphone input stages themselves are extremely low-noise solid-state designs, followed by a valve gain stage running at high voltage. The aim here is to enable good-quality solid-state mics (or line sources) to take on the character of valve mics. Both the mic and line inputs are on rear-panel XLR

pros & cons

DRAWMER 1962

pros

- High-performance audio path.
- Digital output option.
- Variable tube coloration.
- High-resolution mode enables stereo recordings of 18, 20 and 24 bits to be made using three tracks of a digital multitrack machine.

cons

- No S/PDIF input means that the opportunity to apply noise-shaped dither in real time to digital recordings of more than 16 bits (during a mastering session, for example) is lost.

summary

A powerful and versatile addition to the 1960 range, with the option of a very sophisticated digital interface.

SOUND ON SOUND

connectors, but there's also a front panel Aux input on a conventional jack for use with instruments. This is compatible with a range of signal sources, from electric guitars and basses to synthesizer modules; if the valve stage is overdriven, significant amounts of harmonic distortion may be created — if desired! The input stage features a Mic/Line Gain knob which provides a maximum of 60dB of gain, while the Aux input has both Gain and Bright switches. The Gain switch provides a 20dB boost to the Aux input; the Bright switch introduces a 2kHz boost of around 10dB, to approximate the voicing of a typical guitar amplifier.

Enabling the 1962's built-in limiter prevents the signal level from exceeding the 0dB level shown on the gain meter; a red LED illuminates to show when gain reduction is taking place. Insert points on the rear panel allow additional processing, such as compression, to be added to the signal path.

LEDs above the two Enhance controls give some idea of how much processing is going on, and a Bypass button allows Low and High enhancement to be switched in or out.

Each channel includes a tube gain stage designed specifically to introduce a controlled amount of tube coloration. The harder the tube is driven, the greater the degree of harmonic enhancement added, and ostensibly, the more warmth and detail the sound takes on. Again, this stage may be bypassed when not required.

OUTPUT STAGE

Each channel's output level (outputs are available on rear-panel XLRs) is controlled by the Channel Output Level control. An 8-section LED meter above the control monitors the signal level. As supplied from the factory, the signals subsequently fed to the Mix output stage are independent of the channel Level controls, but if you prefer to take the Mix input post-fader, you can reconfigure PCB jumpers inside the unit to achieve this.

DIGITAL MODULE

The D62/T digital output module is optional, but may be ordered with the 1962 or fitted at a later date by the user. No calibration is necessary. This option provides 16-, 18-, 20- or 24-bit word-length outputs in both AES/EBU and S/PDIF formats, as well as Tascam's proprietary TDIF format. As yet, no ADAT option is available, though I understand that one is planned. There are also several different types of user-selectable digital output options, including dither, dither off, and high-resolution recording options, accessed via a 16-way, front-panel rotary switch. Word Sync in and out connectors are fitted to facilitate integration into larger digital systems, and the user may select between 48kHz, 44.1kHz and external sample rates.

EQ AND FILTERS

The two filters, one high-pass and one low-pass, have fixed 12dB/octave slopes and variable frequencies. The high-pass filter has a range of 15Hz-200Hz, while the low-pass filter covers the range between 2.5kHz and 56kHz. A single button, with status LED, switches both the low- and high-pass filters in or out of circuit.

The fine-tune EQ comprises three fixed-frequency cut/boost controls designated Low, Mid and High. Low provides up to 10dB of cut or boost, with a gentle 6dB/octave slope, while Mid is a 6dB/octave band-pass control designed to emphasise presence. High is also a 6dB/octave shelving filter, providing up to 10dB of cut or boost. Though this appears to be a very simple equaliser, it has a very sweet sound and isn't designed to provide the same functionality as, say, a parametric EQ. As the name implies, it's there for fine-tuning the sound. A single button bypasses this whole EQ section, as well as the rear-panel insert point.

Enhancement of one kind or another has become part of the recording landscape of the past decade, and the circuit used here is designed to emphasise transients using Drawmer's own Dynamic Spectral Enhancement system, or DSE.

The Stereo Mix section allows the two channels to be mixed and the overall mix level to be adjusted. Separate pan controls are provided for the two channels, but there's no way to balance the two levels from here. Instead, you either have to reconfigure the Channel Output Level controls or tweak the Input Gains. Up to three external stereo line-level signals may be mixed in with the channel signals via the rear-panel Stereo Mix jacks. Eight-section stereo LED level meters monitor the output levels.

Output Level is a continually-variable stereo control that sets the level of the Mix outputs. The gain range is from -15dB up to +20dB, though adjustment of this control does not affect the signal level fed to the digital section. The signal levels of the two channels are visible on the two vertical 8-segment meters in the Stereo Mix section.

DIGITAL SECTION

The digital section at the extreme right-hand side of the front panel only becomes active when the optional D62/T module is fitted. If no module is fitted, the LEDs don't light and the controls have no effect. Available as a rear-panel slot-in module,

▶ the D62/T employs a high-resolution analogue-to-digital converter proprietary to Drawmer, and also offers a number of different output formats, which include various dither types as well as a useful high-resolution mode for recording two channels of 24-bit audio to three tracks of a 16-bit recorder. When the 1962 is in high-resolution mode, two tracks record the most significant 16 bits as normal, and seven of the eight least significant bits from each channel are combined to form a third 16-bit signal recorded to the third track. Because this is a proprietary system, the 1962 also includes replay modes so that recordings made in this format can be decoded. Of course, a perfect 24-bit system would have a dynamic range of 144dB, something that can't be achieved using existing technology. Drawmer's system manages an impressive dynamic range (analogue in to digital out), of around 123dB — as good as the industry's best-performing converter systems, and better than a theoretically perfect 20-bit converter. In the digital domain, the dynamic range is 136dB — just 8dB short of theoretical perfection.

"The 1962 has been a long time making the transition from R&D to pro audio store, but I think the wait has been worth it."

Front-panel controls access all the main functions of the D62/T and the switches on the D62/T's rear panel (Input Select and Output Select) should normally only need setting during installation or when changing I/O formats. Sample rate is selected by a single front-panel button that continually steps through the 48kHz, 44.1kHz and External Clock options. Internal clock is also available at the rear panel Word Sync Out BNC socket. Ext Clk enables the 1962 to lock to an external clock source via the BNC or the TDIF1 socket.

The front-panel Word Length button selects between 24-, 20-, 18- and 16-bit output resolution, and the Source button enables the digital output to be sourced from either the channel outputs or the stereo mixed output. Finally, there's a 16-position rotary switch offering alternative types of dither and noise-shaping to suit different types of programme material, as well as the high-resolution record and playback options. Positions 1 to 10 provide a number of dithering options (see 'All of a Dither' box), while position 12 turns dither off.

Dither is an established system that involves adding a low level of mathematically-generated noise to a digital signal that is being reduced in bit length — from 20-bit to 16-bit, say — in order to reduce the effect of quantisation distortion at very low signal levels. Properly implemented, dither allows decaying signals to fade more smoothly into the noise floor; without dither, very low-level signals are represented by so few bits that they are severely distorted.

A more recent development, again used by many different manufacturers, is noise-shaping. This involves spectrally redistributing the added dither noise so that most noise occurs in the parts of the audio spectrum where the human ear is least sensitive. Because of the differing spectral content of different styles of music, different dither noise-shaping profiles have been developed, so that the user can pick the most appropriate one for the material being processed.

The ability to record and restore 24-bit stereo data (actually, it's 23-bit, as the remaining bit is used for another purpose) to three tracks of a 16-bit multitrack recorder is a very valuable one. Replay from the multitrack machine is handled by switch positions A, B, C and D. When this feature is used with a Tascam DA88 or DA38, conventional 16-bit recordings are routed to all track pairs simultaneously; high-resolution audio recording (in either 24-, 20- or 18-bit format) is sent to track groups 1,2&3 and 5,6&7 of the tape machine. In high-resolution mode (selected by choosing a bit-resolution of 18, 20 or 24), a conventional 16-bit signal is sent to tracks 1/5 and 3/7, with a composite track comprising the least significant bits routed to tracks 2/6.

To replay a high-resolution recording, it is necessary to select the appropriate 'decode' switch position to pick up either tracks 1,2&3 or 5,6&7, then play the digital signals back through the 1962 via the TDIF interface. In replay mode, if a ▶

D62/T DIGITAL CONNECTIONS

Three digital data output formats are supported by the 1962's D62/T digital interface: AES/EBU via an XLR connector, S/PDIF via an RCA phono jack, and TEAC's TDIF, which presents the digital data as four stereo pairs.

When clocking the D62/T from an external source, there are two options — the TEAC TDIF1 Digital Interface protocol (which uses a 25-pin D-sub connector system), and 75Ω BNC.

When using TDIF1, the Input Select button should be set to Out. When sync'ing via the 75Ω BNC connector, the Input Select button should be In. An LED status indicator on the module illuminates steadily if a reliable and compatible clock source is being read. If the clock source is incorrect or incompatible, the LED will flicker, and if no clock is present, the LED will blink steadily.

In External Clock mode, a reconstituted word clock is passed on to the Word Sync Output BNC socket.

TECHNICAL SPECIFICATIONS

Measurements taken at +4dBu operating level

Input Impedances	Line 20kΩ, Mic 150-600Ω, Aux 470kΩ
Mic Input Noise	-128.5dB (@ +60dB Gain)
Maximum Input Level	+28dBu
Output Impedance	50Ω
Maximum Output Level	+20dBu (balanced)
Dynamic Range	123dB
Bandwidth	10Hz-35kHz (-1dB)
Distortion (THD & Noise)	Unity Gain at 1kHz: Line 0.025%; Mic less than 0.01%. All Processing In: Line 0.03%, Mic 0.01%.
Power Requirements	100-120V or 195-250V at 50-60Hz, 38W
Case Size	482mm (W) X 88mm (H) X 250mm (D)

triple DAT

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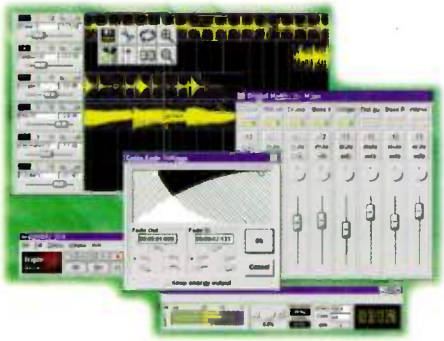

The Multitracker

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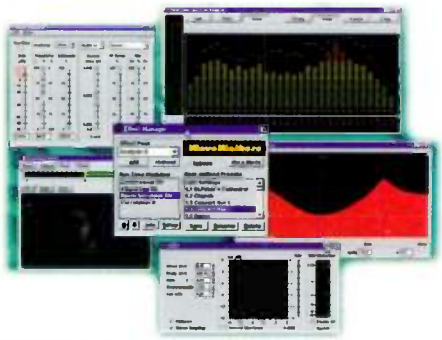

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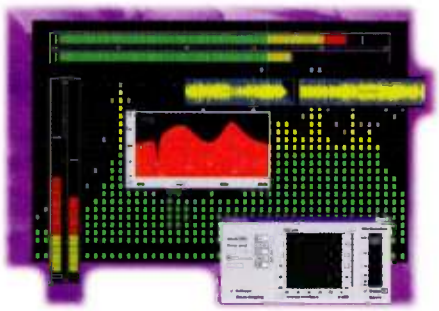

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▶ high-resolution recording is detected, positions A or B select tracks 1,2&3, while C and D select 5,6&7. The actual bit resolution is detected automatically. Because it is not possible to select a dither option at the same time as selecting a TDIF mode, the dither setting relating to switch setting 1 is always used.

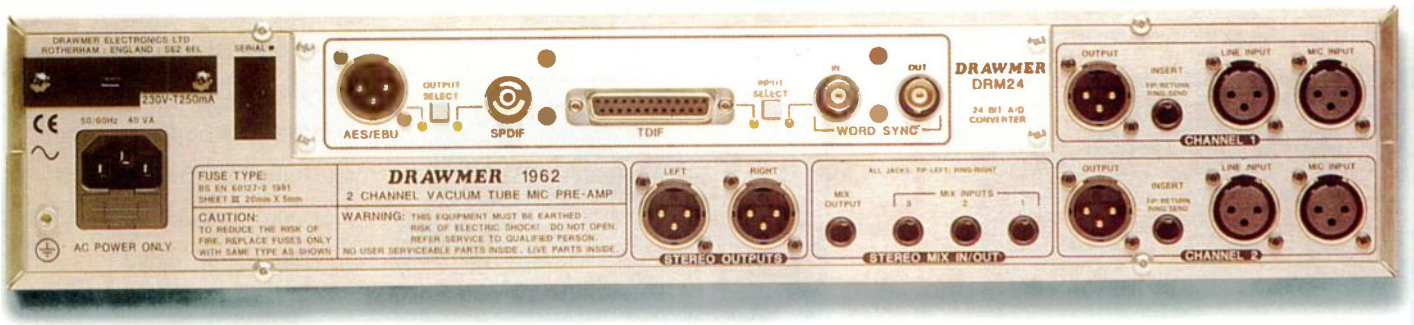
IN USE

Using the 1962 is perfectly straightforward, and for minimum-signal-path recording, it is necessary only to bypass the filter, EQ, enhance and tube drive sections. However, I found the filter section extremely useful, especially for shaving away unwanted bottom end in both vocal and instrumental material. The high filter provides a simple means of removing irrelevant top end from guitar parts and similar restricted-bandwidth parts.

Though the EQ section is only included for fine-tuning and is ostensibly just a 3-band, 'fixed everything' design, it actually sounds very nice indeed. Most signals being recorded through a preamp of this quality shouldn't really need much in the way of EQ anyway, so the scope provided by the EQ section is probably a lot more than would ever be needed in practice.

I was a little doubtful at first about whether it was a wise move to include an enhancer in a high-quality mic preamp, but this particular design can be considered almost as an extension of the EQ — except that it can do things the EQ can't. The High enhance control, in particular, adds a very nice sense of openness and transparency to the top end, almost in the same way as an 'air' EQ, but because of its dynamic nature, it tends to accentuate detail without bringing up noise. At the low end, the enhancement adds warmth and thickness to a sound, and though this is, again, quite subtle, it's effective enough to make me wonder whether there was any need for the tube drive stage at all!

Switching in the tube drive at high drive settings produces a very controlled, but nevertheless quite audible, degree of enhancement. Apparently, at the maximum setting up to 50% distortion is available, but, because this is mainly second harmonic, what the tube does add is sweetly authentic — not faked, hyped-up or overdone. Having said that, it's unlikely you'll need to set it flat out very often.



SUMMARY

I've used Drawmer's 1960 compressor and 1961 equaliser for some time now, and they still manage to impress me with their ability to sound musical in just about any situation. The 1962 slots into the series nicely, combining a seriously clean mic amp and line DI front end with some genuinely useful audio-sweetening tools. Having a digital output option is something of a first for Drawmer, but they've obviously put a lot of thought into it, including their own system for producing a 24-bit output resolution. Listening

ALL OF A DITHER

Various dither options are provided so that the user can judge which one works best with specific programme material. The most powerful system places all the noise at the high end of the audio spectrum where the ear is least sensitive, but this can sometimes cause problems if HF EQ is applied to the audio at a later stage. In extreme circumstances, tweeter damage is a possibility. The remaining options tend to spread the noise over a wider part of the spectrum, necessitating less boost but reducing the effectiveness of the dither slightly. Relatively little information is supplied other than the dither frequency and boost amount.

- Position 1: Shifts the noise to the very top of the audio spectrum, applying a boost of 30dB.
- Position 2: Shifts the noise to the very top of the audio spectrum, applying a boost of 20dB.
- Position 3: Shifts the noise above 17kHz with a boost of 30dB.
- Position 4: Shifts the noise above 17kHz with a boost of 20dB.
- Position 5: Dual-slope noise characteristic which places the noise above 16kHz with a boost of 10dB.
- Position 6: Shifts the noise above 14kHz with a boost of 20dB.
- Position 7: Shifts the noise above 14kHz with a boost of 15dB.
- Position 8: Shifts the noise above 12kHz with a boost of 15dB.
- Position 9: Shifts the noise above 10kHz with a boost of 10dB. Smooth, dual-slope filter.
- Position 10: Shifts the noise above 10kHz with a boost of 10dB.
- Position 11: White noise dither (4-bits).
- Position 12: Dither Off

- Position A: Tape Playback Tracks (1,2&3 in hi-res mode; 1,2 in 16-bit mode).
- Position B: Tape Playback Tracks (1,2&3 in hi-res mode; 3,4 in 16-bit mode).
- Position C: Tape Playback Tracks (5,6&7 in hi-res mode; 5,6 in 16-bit mode).
- Position D: Tape Playback Tracks (5,6&7 in hi-res mode; 7,8 in 16-bit mode.

When recording to TDIF at 16-bit resolution, any dither setting may be selected. To replay high-resolution recordings, Positions A or B select tracks 1,2&3, while positions C or D select tracks 5,6&7. External sync must be selected before recording to TDIF. In TDIF high-resolution replay mode, type 1 dither is automatically engaged when the word length is being reduced to less than that of the recording.

In 16-bit mode, TDIF data is always sent to all track pairs simultaneously, as well as to the S/PDIF and AES/EBU outputs (switch positions 1-12). Switch positions A through D select TDIF track pairs 1,2 3,4 5,6 7,8 for replay.

to signals recorded at a deliberately low level, the effect of using dither is quite dramatic. Instead of fading into noise and grunge, the dynamic range is significantly extended, and if you select the non-noise shaped dither option, it's immediately obvious that the signal is much noisier than when shaping is used. Telling the difference between the various dither options is not so easy and requires a good choice of D/A output converter and suitable, low-level test material.

Having a TDIF interface is good news for the many professional post-pro houses using Tascam machines, but less so for the thousands of ADAT owners around the world, so I can only hope that an ADAT interface option surfaces sooner rather than later. The system of using extra tape tracks to record additional bits, to provide a means of recording up to 24-bit audio on 16-bit machines, isn't new, but you normally have to buy a separate box to do the job. Here the system is built in, so Tascam DA88/38 owners have a bonus already.

Even without the digital I/O option, the 1962 is an extremely flexible mic amp/DI preamp that can be used in squeaky clean solid-state mode or with the benefit of fully variable tube coloration. The EQ section, while not as flexible as a fully parametric design, is perfectly suited to gentle sweetening, and the enhancer is smooth enough to be treated as an extension to the EQ rather than as an obvious effect. With the digital module installed, the 1962 is ideally suited to stereo high-resolution recording, either to a DA88 or to one of the new high-resolution DAT machines. The 1962 has been a long time making the transition from R&D to pro audio store, but I think the wait has been worth it. SOS

AUDIO CONNECTIONS

Both the mic and line channel inputs and outputs are balanced on conventionally-wired XLRs with an operating level of +4dBu.

The insert point is a TRS stereo jack wired ring-signal send, tip-signal return and sleeve-ground. Bypassing the Fine EQ section also bypasses any processor connected to the insert point, which may be wired to a normalised patchbay for convenience.

The Stereo Mix Output XLRs are electronically balanced and conventionally wired.

The Stereo Mix In/Out sockets allow other stereo, line-level sources to be mixed with the output of the 1962 prior to digital conversion and are on (stereo) TRS jacks. These are wired ring-right channel, tip-left channel and sleeve-ground. These connections are unbalanced at +4dBu operating level. Systems comprising two or more 1962s, where the outputs are to be mixed, require only one of the 1962s to be fitted with a D62/T digital converter.

info

£ Drawmer 1962 including D62/T option £2643.75; Drawmer 1962 alone £1380.63; D62/T option alone £1263.13. Prices include VAT.
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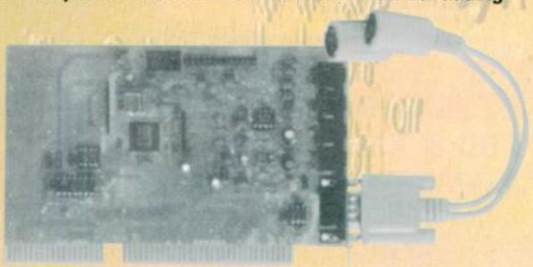

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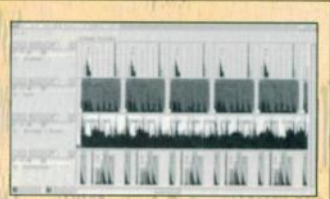

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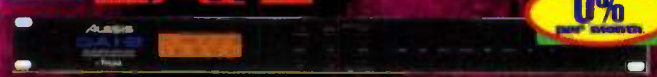
ALESIS adat AI-2



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Audiowerk8 is a PCI recording card with 2 analog inputs, 8 individual outputs, and stereo digital I/O (S/P-DIF). Audiowerk8 is fully compatible with any MacOS or Windows 95 PCI computer. Thanks to its advanced circuit design, the card is only 7" in size, and even fits in the PCI slots located behind the CPU fan. The high quality A/D D/A converters feature state of the art bitstream technology (18 bit equivalent) to ensure professional sounding results. With Audiowerk8, Emagic makes the advantages of random access digital audio recording compatible with the budgets of home studio owners and their existing equipment. Bundled with the card is a new type of control software, the virtual multitrack recorder VMR.

VMR

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VESTAX HDRV8 8-TRACK HARD DISK RECORDER

If you're looking for 8-track hard disk recording in a hardware unit that behaves just like a tape recorder, but with all the benefits of digital recording, you owe it to yourself to check out the Vestax HDRV8. PAUL WIFFEN reminds that you should never judge a book by its title.

Several years back, when I first encountered a Vestax hard disk recorder at the Frankfurt Musikmesse, I was as sceptical as the next man about the possibility of anything bearing the Vestax name being a viable example of state-of-the-art digital technology. But the HDR6 was a very pleasant surprise, both technologically and price-wise. It taught me a lesson I should already have learnt. After all, I can remember a group of cynical journalists (including yours truly) sneering quietly in the corner back in 1984 while attending the launch of the first musical instruments from a second-division Japanese hi-fi manufacturer at Syco Systems. "They'll never achieve anything in this field", we opined confidently over our champagne and canapés. We were talking about Akai (apparently, there was a saying in Israel pre-Christ: "Can anything good come out of Nazareth?"). By assembling a team of Westerners (British, to boot) to design their samplers, Akai not only broke into the hi-tech market, but are now the industry standard by which other samplers are judged.

When I followed the trail of the HDR6, it led me to Jean-Paul, its Canadian designer, who explained that he had taken his original design to the American Vestax office, who had adopted the project for manufacture in Japan under the Vestax name. So any associations with previous analogue multitrack recorders are purely coincidental: the HDR series is designed in North America. I chased down a unit for review and when I sat down to look at it, I was very impressed indeed. It was the first rackmount hard disk recorder I had seen which behaved like a tape recorder without sacrificing all the benefits of random access recording that you always seem to get from computer-based systems but all too rarely, even today, from stand-alone units.

DEDICATED FOLLOWERS OF FASHION

Unfortunately, most people did not share my willingness to suspend their disbelief. A few hardy souls read my HDR6 review, found their way to one of the few stores who were prepared to stock a Vestax hard disk recorder, checked it out and found that it out-performed more established makes. But the vast majority went ahead and bought the name-brand product anyway, despite the fact that it cost more, had two tracks less and performed all edits destructively (and time-consumingly) and that the MIDI board for MTC and/or a tempo track was an option, not standard. As a result, the majority of HDR6s entering this country languished in Vestax's warehouse until recently, when they were sold off at a loss to clear. Some people got a very good deal indeed.

An attempt to update the basic HDR6's hardware early last year to a pseudo 8-track (called, imaginatively, the HDR8) failed to excite anyone's interest. I would like to think that this was because it didn't have eight inputs and eight outputs and couldn't record eight tracks at once, but I suspect it was more to do with the fact that, once again, it had Vestax on the front panel. It reminds me of a former colleague, always complaining he was broke, who wouldn't buy any jeans or T-shirts which didn't have large labels saying 'Calvin Klein' and 'Armani' on them. I tried to explain to him that normally companies *pay* to advertise and he shouldn't fork out several times the normal price to do it for them, but to no avail. He also preferred Apple computers back in the days when they didn't do the job better than anything else, they just cost more (unlike now, when *Cubase VST* on a Power Mac outperforms anything else at the same price by a factor of at least two). By now he's probably gone on to a Silicon Graphics machine because Macs are far too affordable!

Sometimes I really think I know how John the Baptist must have felt, a lone voice crying in the wilderness (the second biblical reference in this review; comes of having a minister for a father), but then that's probably just my ego justifying the fact that few people pay any attention to what I say. And here I go again, urging people who know the only choice for them is Akai, Fostex or Roland to at least look at the new Vestax machine, if they can find a dealer prepared to stock it (anyone who thinks the buyers for most hi-tech stores are any less conservative than the

consumers of such technology is wrong — they're even more brand-name conscious!). But enough preaching. What makes the HDRV8 a serious competitor in the 8-track stakes?

NOT JUST 8-TRACK PLAYBACK

Perhaps the most important thing is the ability to record eight tracks at once. The HDRV8 is not just a modified HDR8 (which was a virtual 8-track in that the disk could play back eight tracks at once but they had to be mixed internally with effects send/returns, as it was really just a modified HDR6). The HDRV8 is actually an all-new hardware design. The first evidence of this is in the case design, which moves away from the gunmetal grey of the earlier units to a cream front panel with bluey metallic rack ears and walnut transport controls (see the photo if you're confused). The reaction of my colleagues to the HDRV8's cosmetic upgrade was actually quite encouraging, in that it seemed to stimulate them to want to check the machine out. The more astute of them were even more excited when they looked at the back panel, to discover eight separate inputs, eight separate outputs, three stereo Aux Returns, S/PDIF in and out, and MIDI In, Out and Thru, in addition to the Master Stereo output.

This is the really important part of the HDRV8's all-new hardware, as so many of the buyers of stand-alone hard disk recorders are looking first and foremost for a tape recorder substitute. Unlike those adding digital audio capability to their computer sequencing setups, they do not consider the ability to cut and paste audio around, bounce tracks together without quality loss, perform audio manipulations digitally in real time, or any of the other 1001 advantages of hard disk recording compensate for losing the ability to record eight tracks at once and the access to instantaneous hardware transport control. Those people who fall into this category will be happy to know that the HDRV8 fulfils all these criteria. The eight balanced TRS quarter-inch jack inputs can be connected to a conventional 8-buss desk at line level for full 8-channel simultaneous recording. You could actually record a drummer or live band on the HDRV8 for later mixdown. Similarly, if you want to mix the HDRV8 through a conventional mixing desk, you're in luck: the eight direct outputs are also on balanced TRS quarter-inch jacks. So those of you with analogue mixers won't have to change your recording practices one iota. Indeed, the only difference you'll notice is an amazing improvement in quality from an analogue tape machine (thanks to the HDRV8's 18-bit A/D and 20-bit D/A converters), the total disappearance of tape hiss and the fact that you don't have to hang around waiting for a tape mechanism to shuttle backwards and forwards (which always used to be the way New England Digital sold the Synclavier to analogue engineers and producers!).

The sound of the HDRV8 is amongst the best of the digital multitracks or computer-controlled hardware systems I have heard. With an excellent low-end response (often lacking in digital) and the crispest vocal sound I have heard in many a long year, I wouldn't hesitate to recommend it in the most demanding applications. You need have no ▶

pros & cons

VESTAX HDRV8 £2299

pros

- Excellent sound quality.
- Eight channels of automatable mixing/EQ.
- Uses fixed or removable drives for recording and backup; optional SCSI interface for external drives.
- Non-destructive Playlist for fast, intuitive and safe audio editing.
- Built-in mic preamp.
- Excellent digital compatibility.

cons

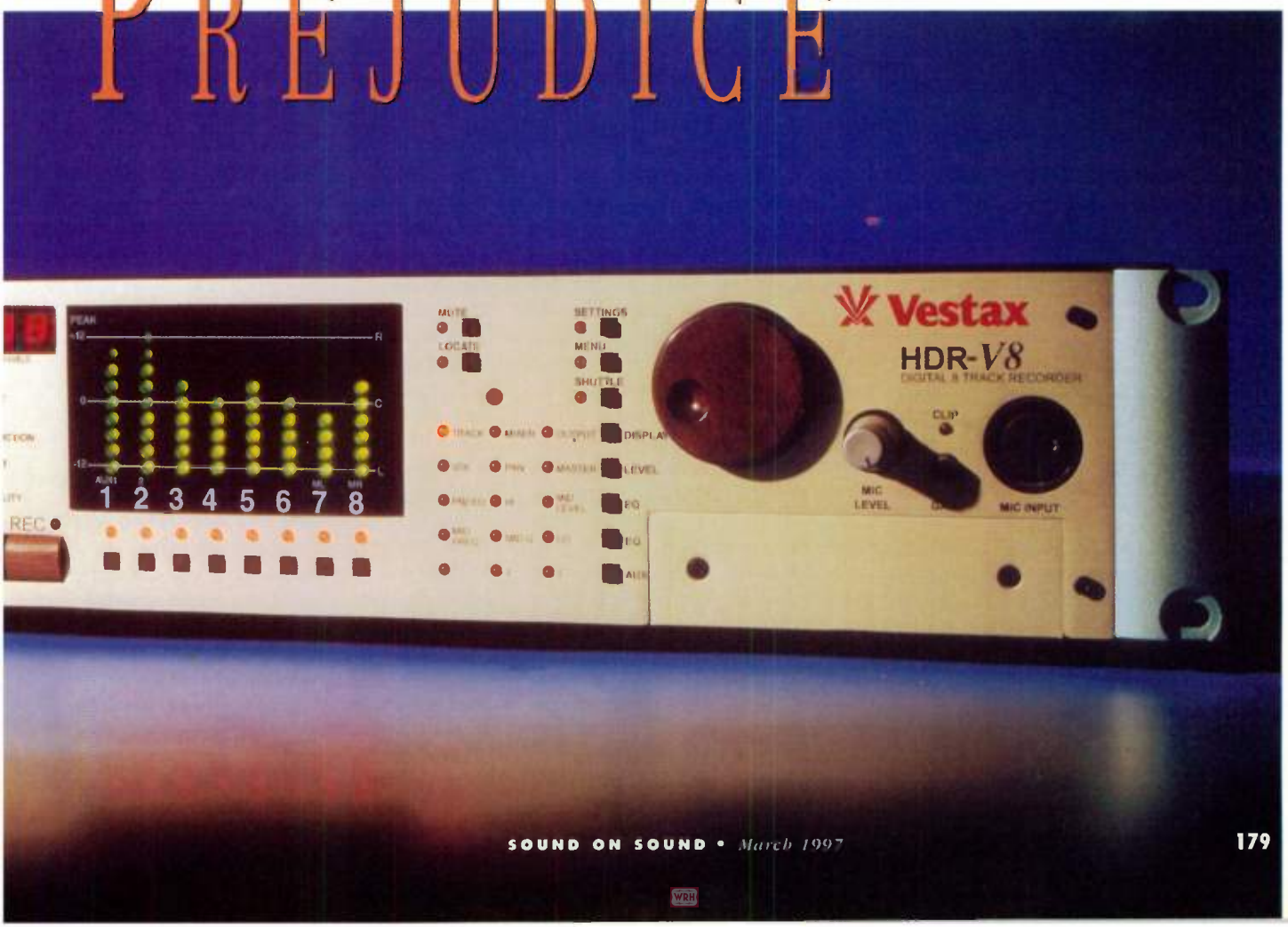
- Song length cannot be easily changed once recording has started.
- No phantom power on mic preamp.

summary

The HDRV8 builds on the excellent facilities of its predecessors. The mic preamp, MIDI and S/PDIF as standard mean that it is ready to use on its own or with just a MIDI sequencer. In an analogue studio you have the necessary balanced ins and outs for mixing externally and if you want to stay all-digital, the options mean that it can handle its own effects processing internally or interface digitally with the most exclusive company. A real gem which won't turn you into a pauper.

SOUND ON SOUND

PREJUDICE



"The sound of the HDRV8 is amongst the best of the digital multitracks I have heard. You need have no fear of using the built-in converters to record classical music or dynamic percussion."

fear of using the built-in converters to record classical music or extremely dynamic percussion. Clearly Jean-Paul has his act together on A/D conversion.

Those of you who have already made it into the digital domain (or who are thinking that the time may be ripe for the move) will be pleased to know that the internal MIDI-automatable digital mixing of the HDR6 and HDR8 has been retained, and the last three direct outs can be switched to act as aux sends to the three stereo aux returns if the HDRV8 is to be used as its own mixer. The final stereo mix can then be sent direct to DAT via the S/PDIF ouput for a true all-digital production (no analogue mixer hiding between a digital multitrack and the S/PDIF output on the back — unlike in some hard disk or MiniDisc recorders I could mention).

NO MIXER, SIR? THEN HAVE A MIC PREAMP!

Those whose budget only extends to the HDRV8 will be pleased to see a useful addition to the original Vestax hardware. On the right of the front panel is a mic preamp, complete with XLR input and level control. This means that the HDRV8 can be used without any external mixing capabilities whatsoever, to record and mix an entire project.

There's a hard-wired rotary knob for setting the Mic Level, a Clip LED, and a Gain switch which changes the input gain from -10dB to +4dB. This means that the HDRV8 can take the input from any dynamic microphone or condenser with battery (no phantom power, unfortunately) and record it direct to the hard drive without the need for a mixer or preamp. Of course, a more professional setup would probably use a compressor combined with a mic preamp (something like the Joe Meek Voice Channel, or similar), but the fact of the matter is that with the HDRV8 you can at least get started on recording vocals without the additional cost of a mic preamp. Maybe the optional effects board will offer digital compression, although the one analogue device I recommend to anyone recording vocals and other acoustic sources is a damn good valve compressor. This allows you to simultaneously warm up the sound and make sure the A/D converter is being continously driven good and hard (you can't get the bits you lose on low-level signals back once you are in digital, however good your normalising algorithm!).

ADDING DRIVES

Although the internal 1Gb IDE hard drive supplied as standard for the HDRV8's £2300 asking price allows 25 minutes of uncompressed 8-track recording (over 200 track-minutes), the first thing you discover about random access recording is that no hard drive is big enough. Fortunately, the HDRV8 (like its predecessors) has all the internal connections for another IDE hard drive. This makes it pretty cheap to add a second hard drive, which can record contiguously from the first to more than double the recording capacity, larger IDE drives being available (alternatively, this second drive can be used as a backup device, something particularly relevant for the devices discussed below).

However, in 10 years of hard disk recording I have discovered that there is really only one answer to the problem of the largest hard drives never being big enough: removables. Apart from anything else, keeping track of songs and moving them between different machines as easily as with tape recorders is only possible with removable devices. Fortunately, below the mic preamp, the HDRV8 has another innovation from the HDR6 and HDR8 — a screw-on plate which covers a slot designed for removable drives. This will apparently accommodate Syquest drives (including the new 1.5Gb Syjet) but experiments with the Jaz drives have proved unreliable due to unannounced firmware changes which Iomega keep making (something some Roland VS880 purchasers have discovered to their cost). As a result, these are not recommended for use with the HDRV8. It may also be possible to use the new Nomaï 540Mb removable (which is 270 Syquest compatible). Again, all these removable drives can be used either to record eight tracks directly, or to to back up the internal IDE hard drive.

SONGS

Once you have all this recording time on-line (either on fixed or removable hard drives), you can divide the available space on the internal 1Gb and any second drive that is set for recording (rather than backup) into Songs — unlike some other stand-alone hard disk recorders, where you have to do the housekeeping for different projects. You set the time length for each song and assign it a number for quick recall. Obviously, the total number of songs is determined by the size of your hard drive, but each individual song can be as long (up to the maximum available) or as short as you want. So someone working on lots of little projects can keep them all spearate and quickly move from one to another.

One word of warning: song length cannot be changed once recording has started, so you should always allow more time for your song than you think you might need. The only way to make a song longer once you've started recording is to back it up and re-load it into a new, longer song slot. If you do this to a second drive it's reasonably quick, but if DAT is your only backup, this is going to take a long time.

Songs can be created, recalled and deleted in Song Mode. However, deleting a Song does not erase the audio data, merely the playback references, so you can get it back by creating a new song with the same number and length. To delete audio data you must actually record new audio over it (sounds nice and safe to me).

Once you've created a song, you can stripe MIDI Time Code or MIDI Clock from a sequencer Tempo Map onto a special track, so you don't lose an audio track like you would on an analogue tape machine. This means that the HDRV8 can be used with any sequencer on the market (they can all sync to one or the other). If you stripe MTC, the display shows hours, minutes, seconds and frames, whereas MIDI Clock shows a beat counter to

MERGING (AKA BOUNCING DOWN)

Even a full complement of eight tracks gets used up eventually, and you may want to bounce down to mono or stereo and record another seven or six tracks respectively. All you need to know to do this on the HDRV8 is that the Merge button is the one you press. This lets you select one or two tracks as the destination for the bounce. Then all you do is mute the tracks you don't want to appear in the bounced result and go into record as normal. Any mix/EQ settings on the tracks playing back will be reflected in the result (including any MIDI-automated changes), as the recording is taken from the Master Out(s) just before the D/A converter (so that the bounce is of the degradation-free all-digital variety).

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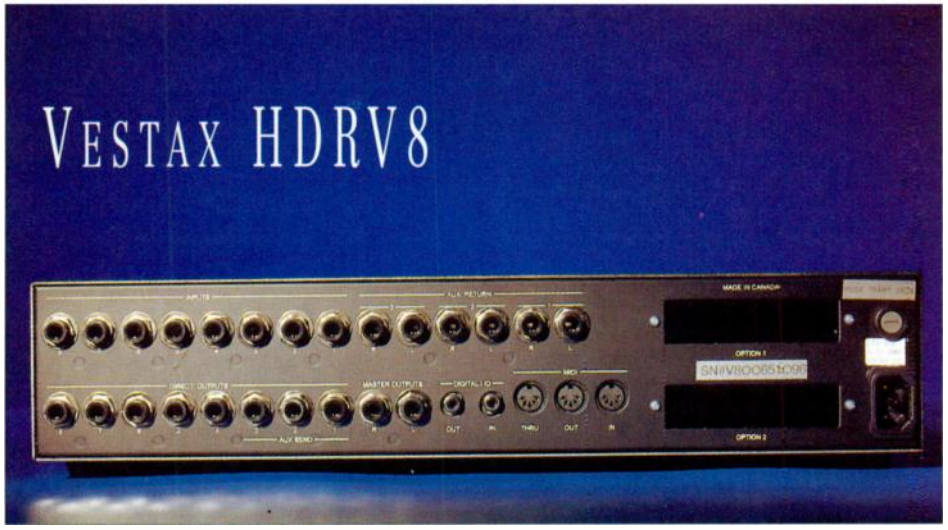

The HDRV8's back panel, complete with expansion slots.

confirm the striping. Any tempo changes set up on the sequencer will be recorded and then, when the HDR is put into playback, the MIDI Clock will be sent out; provided the sequencer is set to sync to MIDI, it will follow the recorded tempo changes.

FAMILIAR OPERATION

Those of you who took the trouble to look at the HDR6 will have discovered how easy it is to use and the HDRV8, whilst adding to the hardware spec of its predecessor, retains exactly the same method of operation. For those of you who have not seen an HDR6 and don't have my review to hand (see the February 1995 issue of *SOS*), I'll quickly recap on how easy the design is to use and understand.

Anyone who's ever used a tape recorder will instantly be able to use the transport controls. Rewind, Fast Forward, Stop, Play — all work in standard fashion, and Record in conjunction with Play will start recording on any track whose red Record Ready LED is lit below the main display. The smaller Counter display keeps you abreast of your exact location in the current song in absolute time. In Shuttle mode, the jog wheel lets you finely adjust the current position with audio scrubbing, so that you can set the A and B points which are used for all punch in/out, looping, copying and moving operations.

All these operations are very simple, and if you use them to their fullest capacity you can carry out any edit that you could achieve on a computer-based system, although you might need to keep a handwritten log of your song structure in bars, beats and ticks (or mins, secs and frames if you have not recorded to a MIDI Tempo Map striped from a sequencer). I sometimes think that the whole process of editing MIDI data and digital audio has become so visual that we forget we're working with sound. It's all too easy to make an edit that looks right, when sometimes we should stop and listen to check that it *sounds* right. With the HDRV8, there's no danger of falling into this trap. Using A-B Repeat Play, for example, you can check that a drum loop has been accurately marked before you copy it as many times as you need. As the loop replays, you get a very accurate idea of how it will sound when you move or copy it, especially if you use the Copy Repeat function.

As far as editing goes, the HDRV8 is better than most of its stand-alone rivals, simply because all such edits are non-destructive. This means that when you perform an edit, no data is moved on the hard disk. Instead, flags are memorised at the specified edit positions, and from then on the audio data is played in the new order you've given. This is the beauty of random access recording, but many stand-alone hard disk recorders actually move the data around on the hard drive. This means that the edit takes a long time, and even if there is an undo function, that it will take as long to undo as the edit, because all the data has to be moved back again. Another problem with this approach is that if the power is cut for any reason during the edit, your audio data will be scrambled.

THE ADVANTAGES OF PLAYLISTING

The HDRV8 keeps the flags for all the edits you do in a 'playlist', a set of instructions for the order of playback of the audio material. This means that you can always revert to the original, unedited audio recordings as they were first made. It also means that an Edit or Undo operation is instantaneous.

However, there may come a time when you are completely happy with the edited version of a song. It is then possible to Reduce Playlist, which makes all the edits permanent by actually moving data on the hard drive (so you'd better be sure you never want to change anything). Alternatively, you may change your mind about the entire edit and want to revert to original audio recordings. There is a Delete Playlist function as well. Needless to say, both functions have a 'Sure?' message which needs confirming before you keep or throw away your edits forever!

REAL-TIME MIXING/EQ

Just like its predecessors, the HDRV8 lets you make all mix and EQ changes in real time. You simply select the parameter — Vol, Pan, Pre-EQ level (to

DIGITAL DOMAIN HARDWARE EXPANSION

If your mixing needs outstrip the capabilities of the HDRV8, you'll still be able to use it with digital mixers, entirely in the digital domain, as Vestax have announced an ADAT optical interface, due in April, as one of the options for the two expansion slots on the back of the unit. For those who have missed me banging on about this excellent interface for the last year, let me mention once again that you do not need to have an ADAT to use this interface, just eight digital audio channels which you want to send down one electrically-isolated cable (say goodbye to earth loops). This means that you could connect the HDRV8 bi-directionally to one of the two ADAT I/Os standard on the Korg 168RC 8-buss digital mixer in order to simultaneously record all eight channels from digital. The same can be achieved using the optional ADAT I/O boards for the established Yamaha 02R, the imminent Yamaha 03D or the Mackie Digital 8-buss premiered at NAMM (although you'll have to wait till the autumn for this last alternative).

Another option for digital expansion is the Tascam TDIF interface on a D-connector. Though it is less likely that anyone will use this to interface to the increasing number of digital mixers available, it is the only option if you want to connect digitally to the Tascam DA88 and DA38 multitrack recorders, to edit recordings made in this tape format. This should also be available around April.

Of more interest to those who don't have external mixing and effects devices to which they want to connect the HDRV8 is the FX1 digital effects board option mentioned in the manual's preamble. Although details of exactly what effects it will offer are sketchy at the moment, at around £300 this will be another way to expand the HDRV8's mixdown capabilities while remaining in the digital domain. Other options include SCSI for external drives and SMPTE for sync to analogue audio or video tape.

We've also just heard of a hardware control surface, the MX1, from Vestax, which is MMC-compatible and ideally suited to controlling the functions of the whole HDR range. Watch our news pages for more information as soon as we have it.

compensate for EQ boost/cut), Hi Cut/Boost, Mid Cut/Boost, Freq & Q, Low Cut/Boost, Aux 1, 2 and 3 Send for each track, plus Aux and Master levels — and adjust it using the jog wheel. When you're doing this, the track-level LEDs show you that parameter setting for all eight tracks, and the selected track's parameter value is shown in the Counter window.

At any point you can go to the Save function in the main menu and save a mixer snapshot under one of the 128 MIDI Program Change numbers. These can then be instantly recalled at any time, via MIDI or from the Pro function in the Main Menu. For those who like their automation dynamic, the HDRV8 sends and receives MIDI Continuous Controllers for each parameter movement in the mixer. This means that you can record all mixer parameter changes into a MIDI sequencer and replay them, or use external devices to control the mixer (Jean-Paul uses both a *Cubase* Mixer Map and a hardware MIDI fader panel to demonstrate this at trade shows). With the FX1 internal effects board fitted, the HDRV8 should be able to have all the DSP effects under MIDI control as well, for total recall at a budget price.

CONCLUSION

I've taken to using *Cubase Audio* for all my digital audio recording/editing projects, but that really ties you to working in a fixed location. The HDRV8 makes me remember what I always used to say: that hardware solutions are best. With an HDRV8 I could get out more and record some live music, or at least some real musicians, even if I then brought the project home and transferred it onto the computer in one pass, via the optional ADAT optical I/O for editing. The HDRV8 is certainly the best way I have seen of doing that sort of thing. If you want your hard disk recording in a compact stand-alone format, the HDRV8 is my recommendation, not just from the price point of view, but for speed of operation, sound quality and flexibility. And if you don't own a computer or one that is capable of supporting digital audio editing, the V8 won't let you miss one! Just sync your sequencer via MIDI and you're away. SOS

info

£ HDRV8 £2299; SE1 SMPTE interface board £465; SS1 SCSI interface board £440; FX1 effects board £250. ADAT and TDIF interfaces, £TBA. Prices include VAT and are subject to confirmation.
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Butch Vig

TALKING GARBAGE

Butch Vig came to fame for his work on the seminal Nirvana album Nevermind, going on to make a name for himself in post-punk indie production. Now he's hit the big time as both artist and producer, as part of internationally-successful band Garbage. RICHARD BUSKIN caught up with him to talk about roots, reincarnation, and rubbish...

"Cathartic," is how Butch Vig chooses to describe the experience of hearing Nirvana perform either in concert or on tape. Add "intense passion," and he's talking about the writing and singing of Kurt Cobain.

"Very few artists have that kind of sensibility in their nature," says Vig, "and that's part of what made Kurt so amazing and also so much of an enigma at the same time. He didn't know what the hell he was trying to say but he was definitely trying to get it out."

It was while producing records for independent label Sub Pop that producer/engineer/writer/musician Butch Vig first came into contact with Nirvana. The band just happened to be one of the acts on Sub Pop's roster and, having recently come off the road, was scheduled to record what was ostensibly going to be its next album for the company. Yet these were the days before drummer Dave Grohl had joined the band, and apparently all was not running that smoothly for the other members.

"I don't think they were necessarily happy with the line-up, or at least Kurt wasn't," recalls Vig. "Still, we recorded six or seven songs at Smart [the Wisconsin studio that Vig co-owns with Steve Marker and Duke Erikson] and they were going to come back and do some more, but this was right around the time when all of the major labels took an interest in them and they subsequently jumped from Sub Pop to Geffen. So really the stuff that I had recorded with them primarily became demos, and they got bootlegged real fast!"

Nevertheless, in spite of Geffen's desire to bring in a big-name producer, Nirvana held out to have Butch Vig at the helm when it was time to lay down new tracks in the studio. "I was lucky" is Vig's modest assessment. The result would be *Nevermind*.

NO FRILLS

"The only track that made it from the original sessions at Smart was 'Polly', which was a fairly stripped-down acoustic song," recalls Vig. "Then, after Dave Grohl joined the band, the new stuff was recorded at Sound City in Los Angeles. That's pretty much a no-frills studio. It has a big, live tracking room, there's an old Neve board, a 24-track analogue Studer tape machine, a good collection of tube mics, some nice LA2A compressors, but not a lot of outboard gear."

Recording was approached very much from the live perspective, with the drummer set up in the middle of the room and the bass and guitars isolated for separation. Nonetheless, Vig was determined to push the band in order to achieve the right results, and to this end he had Krist Novoselic redo some of his bass parts and Kurt Cobain performing quite a number of guitar overdubs. "He doubled a lot of the rhythm guitars," Vig recalls, "and he overdubbed clean and distorted tracks in almost all of the little solo sections."

Band and producer shared the engineering credit for the album, yet Vig confirms that this was hardly the truth of the matter. So, does this mean that Kurt, Krist and Dave were the only ones with their fingers on the faders? "Er, no... At the time almost every project that I was involved with had me co-producing and engineering," says Vig. "I had kind of grown up in the punk scene, when a lot of the bands wanted to have a say in everything, so I didn't particularly care if I had solo credit for that stuff. In fact, if you look at a lot of the records that I've done since then, many of them say that they are co-productions, whatever that means. The bands' input may be marginal, but I still like to collaborate."

EXTRA DRY

Utilising a Neumann U67 and an LA2A, most of Cobain's vocals were recorded in the small Studio B at Sound City and ran straight to tape. The results alternate between a smooth, compressed, phasey sound and one of extreme dryness when the voice sits alone, yet minimal effects were employed. "Kurt really had an amazing voice," confirms the producer. "He could scream and it would have this great rasp and tone to it, and yet he could also bring it down really quiet and sound so world-weary and exhausted and intimate. It's hard to put your finger on it, but not many artists have that kind of voice or persona. Kurt had this brilliant pop sensibility in terms of melodic structure and phrasing, and yet he loved the attitude of punk, and those are the two things that collided and made Nirvana so special.

Photo: Lissa Wales

"In the studio I used a fair amount of compression on the vocals so that I could control his dynamics, and I also got Kurt to do some double-tracking. I'm a big fan of doubling, particularly on choruses, so he did that quite a bit on the record and that's part of what the sound is. Andy Wallace, the mix engineer, had a little bit of tight slap echo — almost a double echo — on a couple of the songs, and he also used a little bit of reverb and so on, but for the most part the vocals were left fairly dry. That really was the approach that the band and myself wanted to take. We didn't want to have it too washed out with reverb or echo, and it was the same with the drums and the guitars; we wanted everything to be fairly dry and in your face.

"I actually started getting more and more into recording everything very dry, and getting away from ambient mics, when I worked on *Gish* with Smashing Pumpkins. Everything would be really in your face, and then if you wanted to add reverb or echo later you could. You could put it farther back in the mix, but if we wanted something to be way up front in the mix you could also do that. That's how I've worked on pretty much all of the records since then. I don't really like to record with a lot of ambience, particularly on vocals or guitars. I will put ambient mics on the drums, but I also like to have tight mics.

"In the case of Dave Grohl's kit I used an AKG D12 and a FET 47 on the kick, and then we built a drum tunnel consisting of old drum shells attached to the bass drum and extended out about six feet. That way you can move a mic back three to four feet, and the FET 47 was a little farther away from where the front head would have been. By having the drum tunnel, you isolate the room, so that you don't get all of the cymbal bleed, or whatever."

Otherwise the drum miking was fairly standard: a Shure SM57 on the snare, along with an AKG 451, Sennheiser 421s on the toms, AKG 414s and Neumann KM84s on the cymbals, and Neumann U87s for distant room mics.

DISTORTED REALITY

The guitars, on the other hand, were a different story, often characterised by assorted types of distortion and, in some cases, a sound so overdriven that the end result bears little resemblance to the instrument that originated it.

"Aside from a Marshall on just a few things, the amps that we primarily used were a Mesa Boogie, a Fender Bassman — which is one of my favourites — and a Vox AC30 for the cleaner overdriven sounds," Vig recalls. "However, there's not a lot of processing going on. Kurt had a Rat distortion pedal that he used on a couple of songs, and on a track like ▶

Butch Vig

'Breed' we just DI'd the Rat, we didn't go to an amp. We split the signal and we ran it to an amp, and we also took the DI and ran it right into the board so that it had much more of a fuzzy white-noise kind of sound to it. Then we blended the two together to get something that sounded cool."

The extremely warm, fuzzy sounds f Novoselic's bass guitar also resulted from a combination of DI and miking. "I like to put a couple of mics on the bass, even though I usually only end up using one," says Vig. "On *Nevermind* we placed a FET 47 and a Sennheiser RE20, and we then just used the 47, which has more of a thumpy, mid-range sound to it. Krist used an Ampeg SVT amp, which I'm a big fan of, while in terms of the DI I don't like to use normal DIs. I use a customised Tech 21 Sansamp, and I have a live split, so you can use it as a DI but it produces more of an amp sound. You can dirty it up, you can add some tone to it, and it's just much more usable as a DI signal as opposed to a straight DI, which to me sounds really thin.

"The sampler is probably the thing that has changed music more than anything else during the past five years."

"As for that kind of washy sound on 'Come As You Are', that was an effect that Kurt had, called the Small Clone, which is basically just a flangy chorus box but with a very distinctive sound. It's really kind of wide and watery. Not subtle, put it that way. Then we double-tracked his guitars on that so it had even more of a wide sound to it."

GARBAGE IN THE CAN

In 1994, having become "kind of burned out on doing really long records," Butch Vig began collaborating with his old partners Duke Erikson and Steve Marker on remixes for acts such as U2, Depeche Mode, Nine Inch Nails and House of Pain. Featuring different instrumentation, these remixes would also highlight new guitar hooks and bass grooves, and the effect of writing and playing together again served to inspire the three men to form a band.

"We wanted to take that remix sensibility and somehow translate it into all of the possibilities of a band setup," explains Vig. "We also thought it would be cool to work with a woman singer, and Steve saw Shirley [Manson] on MTV with her band Angel Fish. I think they played her video once, and Steve happened to tape it that night and showed it to us. I just fell in love with her voice, because instead of screaming or singing really aggressively, she took the opposite direction: really low and understated. To me it was much more intense than a lot of other singers who scream all of the way through songs.

"So we called her up and asked her to come and sing on a couple of songs, not really knowing what was going to happen. We thought that maybe we'd work with different singers or that this just wouldn't work out, and it was a little awkward at first, but we soon realised that there was this chemistry going on, and she ended up joining the band."

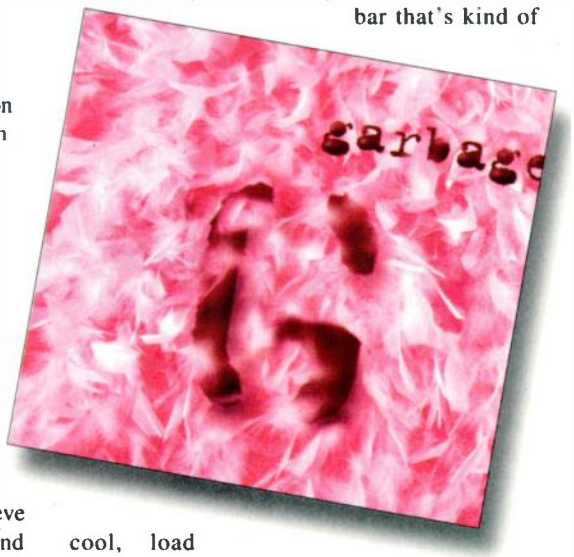
The name of that band, by the way, was Garbage. Signing to a deal with Almo Sounds, which is distributed through Geffen in the States, and Mushroom Records, which is distributed by BMG everywhere else, the newly-assembled quartet next set about making a record with the naive intention that there would never be any plans to tour... wrong!

"Not going on the road would really free us up to record tons of stuff," offers Vig when trying to explain this notion. "We ended up having 48 tracks of samples and loops, and all sorts of strange processed sound effects and weird guitar overdubs, and then through the mix process we'd add and subtract until we'd get to a point where the song still came across. However, we then also realised that if we were going to have a successful record we'd have to go out on tour and promote it..."

Fourteen months, 20 countries and 200 shows later, this appears to have been the right decision — though, just a few days after said road show has come to an end, Butch Vig is describing it to me as "a long, long haul".

Recorded at Smart Studios, Garbage's eponymous debut album was conceived in the late summer of 1994, completed in May of 1995 and released the following August. Fairly free artistic expression was the general order of the day.

"Basically the way we work is that someone will bring in a loop or a sample, and then we might jam for a couple of hours, find one bar that's kind of cool, load that into our samplers, jam on top of that, Shirley will ad-lib, and then we'll take that home, come back, jam on it some more, record some more things, add and subtract... Often, by the time a song was finished, all of the original ideas were gone, and the song had somehow mutated into something completely different."



The band's well-used samplers comprise two Akai S1000s and a pair of Kurzweil K2500s, while a recently-purchased Digidesign Pro Tools system may well make its presence felt on future projects.

"Our old samplers do have a certain sound to them," points out Vig. "I think it was good that we did some things in the Kurzweil and some things

GET SMART: SMART STUDIOS

Located in Madison, Wisconsin, this commercial facility houses a tracking room and a smaller mix room. In the former, there's a 32-input Trident ADC Series console with Uptown flying fader automation, Studer A27 and Sony 3348 multitrack machines, B&W 801 and 808 monitors, and KRK 6000 and Yamaha NS10 monitors. "I also have a small pair of B&W 805s that I lug back and forth between my house and the studio," says Butch Vig. "I like the way they sound. They're very smooth at the top end."

The mix room has a 56-input customised Harrison console with Uptown flying faders, assembled from two old desks that date back to the mid-'70s. "We took the VCs out and we cleaned up the signal path, because I really like the way the preamps and the EQs sound on them. They're much more like an old English-sounding console." Other equipment includes a Studer A27, and the same large B&W monitor configuration as in the tracking room, together with a pair of Haybrook nearfield speakers.

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Butch Vig

in the Akai, and we'll probably feel the same way about the Pro Tools, but even though there was a lot of digital processing with the samplers, everything gets flown back onto tape. We really like the sound of analogue tape — it kind of glues everything together and is very forgiving in its sonic qualities."

More than many producers and engineers, Vig uses studio gear almost as if it is an add-on to the instruments. "We try to take that approach," he says. "I got bored spending so many years recording really fast, straightforward punk records, so that's why we didn't want to approach the Garbage record from the angle of a band playing live. Instead it was like, 'We can record 47 guitars on this song, mix it down to a stereo sample, then run it backwards, record another 20 guitars and process them so that they sound like a percussion instrument'. You see, the guitar is still pretty much the rock 'n' roll instrument that I love. Duke and Steve are primarily guitarists, and so, even though we used samplers and keyboards, there are a lot of things on the Garbage record that originally came from a guitar.

"We just wanted to see what we could do, utilising the studio and the gear there, to create something that sounded fresh. It's impossible, I think, to do something new in music, but the exciting thing is that you can take elements from different genres and try to combine, process and mutate them so that they sound new and fresh. That's kind of what we wanted to do on the Garbage record."

WALL OF SOUND

"Take 'Stupid Girl', for example. The whole song was written around that bass groove. We wanted to have a song with a very thumpy and repetitive bass line, with the bass line acting almost like a hook. Well, we actually recorded most of that song in Steve's basement on an ADAT using an Akai, a couple of small amps and a small drum kit. We had a bunch of stuff going on and Steve took a loop from The Clash, the bass went down, Shirley started ad-libbing vocals and came up with a mostly finished lyric, and then we started incorporating all of these noisy little mistakes. Like at one point Steve was trying to dub something from one track to another track on the ADAT, something happened digitally and he got this scratchy feedback. He thought, 'Oh, this sounds cool,' so he sampled it and managed to tune it into the song, and that almost became a hook. In fact, we're very into things that aren't necessarily musical but can still become hooks.

"The same applied to the start of 'Super Vixen' which has all of these stutters and stops, and which was totally an accident. We were working on some guitar part at the start of the song and we put the tape machine into a loop — you know, pick up and rewind and play again — and after a while the tape was parking and again we thought, 'That's kinda cool!' So then we decided to do that every time, but because a lot of things played through those pauses we had to do some extensive muting with the automation in the mix in order to get them super-tight. So basically it goes to dead air, and in a way it's just silence, but that also becomes a hook. A lot of people commented that they thought their CD players were broken when they first put it on, which is cool!"

> "A lot of times we don't know what we're doing. It's like trial and error — and a lot of error."

All this improvisational trial-and-error multi-layering could be said to amount to a latter-day 'wall of sound'. Vig agrees: "Kind of! I mean, a lot of the bands that we listen to and who we love are doing very similar things: Tricky, Massive Attack, Björk... I think the Beck record is brilliant.

"The sampler is probably the thing that has changed music more than anything else during the past five years. Originally hip-hop and rap were the only forms of music to be really influenced by that technology, but now everyone's using it and it's really cool to see these different styles of music all intertwined. That's one thing that new technology can do for you."

BEFORE VIG WAS BIG: HISTORY

Butch Vig first hooked up with fellow Garbage men Duke Erikson and Steve Marker in the early 1980s, while obtaining a degree in Film at the University of Wisconsin. Work there on electronic music soundtracks stirred Vig's interest in the manipulation of sound, and this found a further creative outlet when Spooner, the band that he and Erikson played in, released a series of three albums on independent labels. "We basically had to produce ourselves and that was kind of a trial by fire," Vig recalls.

In 1983 Erikson, Marker and Vig rented some warehouse space and launched Smart Studios. The then-hot punk scene in Madison, Wisconsin helped them to attract a lot of local bands and gain a reputation for making high-quality yet cost-effective records. Local success led to more regional work, while Vig's own solo productions for a number of independent labels eventually brought him into contact with Sub Pop, and artists such as Smashing Pumpkins, Tad, The Fluid and Nirvana. His first major project was the Pumpkins' *Gish* album in 1991.

ON THE ROAD WITH GARBAGE

"It was kind of daunting," reports Butch Vig. "We really had no idea how to use the technology and duplicate some of these songs live. Initially we thought we'd get some samplers, get a DJ, get a bunch of extra musicians and somehow keep it simple, and so we found a bass player from Los Angeles called Daniel Shulman, who joined the band for touring and is also going to play on the next record. He has a hip-hop background — he's worked with Run DMC and other bands in Los Angeles. He helped right away, because I think he really glued everything together.

"I mean, we didn't do all that much live playing on the record, and I'm not necessarily a great musician either, so I was thinking, 'Holy shit! How am I going to go out and play some of these songs?' Anyway, what we ended up doing was getting a Ddrum, a pretty massive sampler, through trial and error I figured out what grooves I was going to play, and then I sampled some of the sounds from the album that I could trigger live, as well as sampled sound effects and loops that I could play along with. At first I tried to just use monitors, cranking them up, but in the end I basically had more of a studio setup, with a headphone mix enabling me to hear very distinctly what I was triggering and what I was playing along with.

"Duke and Steve took all their guitar pedals, as well as their Kurzweil samplers, and they loaded in all of these samples that they had concocted in the studio, while they were also able to trigger some new things and keyboard sounds. Steve did multiple things — he played guitars as well as having a key pad underneath at the same time.

"As for Shirley, she just sang. We decided we didn't want to sample vocals or stuff extensively from the record. We just wanted to go out and have all five of us play as a band. So with Shirley, for instance, at the end of 'Fix Me Now' there are three or four parts all overlapping, but she just decided to sing whatever she thought was the main part. In fact, at some point in the song she sang all of those different parts separately. We just decided that we wanted one mic on stage, and Shirley kind of ran the show."

Garbage, with Butch Vig front left.

Sample (for want of a better word) the creative process behind a track like Garbage's 'As Heaven Is Wide': Butch Vig's big, pounding, rock drum sound was augmented by Duke Erikson's fuzz bass and Steve Marker's blaring guitars. Then lyrics were written and Shirley Manson took a vocal stab at them, before making some amendments to the words and singing properly over the track. At that point, uncertain as to what the next step should be (but certain that there needed to be a next step) the band put the song to one side for a couple of weeks. Butch Vig takes up the story:

"One day we came into the studio and Steve got these icy, chattery techno loops going, using samples in the Akai and the Kurzweil, and slowly but surely we just got rid of all of the live drums and guitars, and the track took on this kind of cold, menacing club vibe. Sort of a punk techno thing, I guess. The only thing that remained from the original tracking was the fuzz bass, and then we went back and triple-tracked it — we double-tracked the low bass and then did a high octave that we put down in the centre. They're all slightly out of sync, and that gives it this strange, flangey effect.

"We kept putting more stuff on, and the only time the guitar appears is at the end when you hear Steve slide into the song that we faded in. Yet one of the most surprising and interesting things about the process was that, even though Shirley had sung over the original rock track, her vocals now sounded way cooler against all of the new instrumentation. She didn't change the vocals at all, but suddenly they took on a whole different persona when we changed the music underneath.

"A lot of times we don't know what we're doing. It's like trial and error — and a lot of error. I mean, we never really sit down and say, 'Here's a plan, let's do this.' We really do experiment a lot and it's... difficult, because we're a disfunctional democracy! All of us have opinions and everyone has an ultimate power of veto. If someone hates something then we'll discuss why. The good thing is that there's a certain sensibility that the four of us share, and so when something really connects with one person it's usually going to connect with all four of us. Not always, though! There were some great arguments in the studio, let me tell you! Still, with any band I think that kind of creative tension is healthy. You have to be able to put it away and not take criticism personally. That can be hard to do, but it's healthy when you can deal with it."

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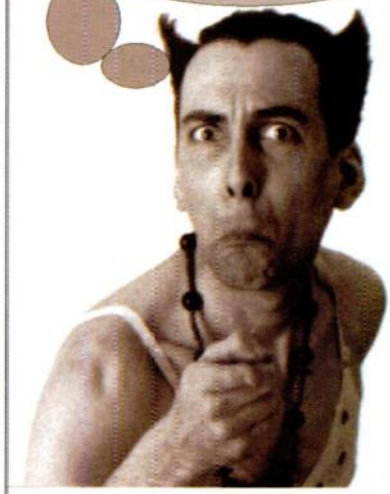

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Super Model?

ROLAND JP8000 ANALOGUE MODELLING SYNTHESIZER

When Roland announce a new synth, endowed with a new breed of synthesis, it's time to sit up and take notice. The 'Analogue Modelling' JP8000 appears to offer the power and flexibility of digital control applied to analogue-type sounds. Can it be too good to be true? PAUL WARD tries to stop tweaking long enough to tell us...

Roland's vintage synths have a fanatical following among the retro-junkies of the late 1990s. Models from the Jupiter series, such as the JP6 and JP8, are justifiably some of the most respected synths around. Now Roland have seen fit to dust off the old 'JP' prefix and adorn their latest offering with this pair of letters that has become part of synth history — a hefty responsibility for a digital synth to carry.

MEET THE NEW KID

Yep, that's right. This synth, despite its looks, is most definitely of the digital persuasion. But the JP8000 lives to produce analogue-type sounds. Several other manufacturers have already attempted to reproduce the synths of old, offering up their waveforms in an S+S (Sample + Synthesis) package with varying degrees of success. More recently, some companies have turned to physical modelling for their retro-sounds. Roland are keeping their cards close to their chests when it comes to what is actually under the JP8000's bonnet, but have at least given it a name — 'Analogue Modelling'. What this name implies is currently open to conjecture.

But the aspect of this synth that is arguably of more immediate interest is the user interface. This is an instrument bristling with knobs, buttons and sliders. Personally, I find it quite appealing to look at, although the 'built-like-a-tank' feeling of the older, metal-clad JP series is somewhat lacking here. The velocity-sensitive keyboard has a four-octave span, which seems to leave it an octave short in my opinion — especially given the JP8000's 8-note polyphony. Stranger still, and perhaps more worrying to many, is the lack of keyboard aftertouch. For a synth with the amount of control possibilities that the JP8000 offers, I would have placed a hefty bet that aftertouch would have been included.

To the left of the keyboard are the ubiquitous Roland bender/modulation lever and the most welcome sight of a ribbon controller. Around the back you'll find the AC mains socket with attendant power switch, a headphone socket, and a pair of master left/right outputs on standard quarter-inch jack sockets. Extra control sources can be attached by way of inputs for both a switch pedal and a continuous control pedal. MIDI In and Out sockets are provided, although there is no Thru socket, which seems rather mean on a synth of this price.

WHAT A PERFORMANCE

Before delving into the workings of the JP8000's controls, I really need to explain the concept of Patches and Performances, since this is directly relevant to how the settings of the controls are stored. The most basic currency of the JP8000 is a 'Patch'. There are 256 Patch memories, divided into 128 user Patches, which can be overwritten, and 128 preset Patches, which can't. A 'Performance' is basically a pair of Patches (making the JP8000 an essentially bi-timbral sound source) with certain performance parameters that govern how the Patch will respond to the keyboard, arpeggiator and other performance features. In the past I have berated manufacturers for the system of patch 'pools', whereby altering a patch for the benefit of one Performance irreparably damages any other Performance using the same patch. Well, I want to hug the Roland design team, because here they've got it right! Patches within a Performance become part of that Performance memory and can be edited to distraction without altering the source Patch in any way — unless, of course, that's what you want to do! I can't express how much joy this brings to one such as myself who has experienced first-hand the horrors of the JX10 and the Korg Wavestation.

Within a Performance, Roland have retained the Upper/Lower 'Part' system in a similar way to that of many of their earlier synths. Each Part consists of a Patch, together with its performance parameters, such as MIDI channel, transposition, and various synchronisation options for LFO, delay

and chorus. Also within the Performance are a number of parameters common to both Parts, such as relative detuning, voice number assignment and output assignment. Parts may be split (with definable split point), layered, or played singly across the whole keyboard.

SET THE CONTROLS...

First, a look at the controls that affect a Patch. Immediate tactile control is one of the main virtues of old analogue synths. Reach out with those grubby fingers and opposable thumbs, tweak the myriad knobs and buttons and experience the delight of real-time control. The 1980s witnessed the disappearance of the control-laden panel in return for the power and diversity of digital control. Well, times have moved on, and players are again demanding the return of real-time physical controls to breathe life into their music. The JP8000 rises to the challenge in no uncertain way, with a control panel that for all the world looks as if it belongs to a synth many years its senior.

Anyone familiar with analogue synths will find little to trouble them here. Two audio oscillators are provided, each with a selection of waveforms. Oscillator 2 is the simpler of the pair, with selectable square/pulse, sawtooth and triangle waveforms. Synchronisation to Oscillator 1 is offered, so you can get those searing sync-lead sounds or ripper basses. The initial pulse width of the square/pulse waveform can be set manually and also modulated by LFO 1 for rich, chorus-like effects — a favourite trick of old single-oscillator analogue synths. Through a combination of the coarse and fine tuning controls, Oscillator 2 will cover a span of ±4 octaves, although fine beat-tuning is restricted to within 2 octaves.

Oscillator 1 forgoes the tuning controls, but adds a wider range of waveforms, and a pair of control sliders with which to make fundamental changes to the waveforms at source. The pulse/square wave, for instance, utilises the control sliders to provide pulse width and pulse width modulation, in much the same way as Oscillator 2. The similarity ends there, however. The sawtooth and triangle waves can have their shapes changed by control slider 1; slider 2 sends a variable amount of shape-change modulation from LFO 1. 'Shaping' basically means altering the strength of the wave's fundamental — something that varies among the waveforms of real analogue synths. With the JP8000 I was able to get fairly close to the sound of my old Roland synth waveforms, as well as producing passable imitations of Prophets and Moogs. The noise waveform comes with its own cut-off and resonance settings, courtesy of the control sliders. The 'triangle mod' wave offers what essentially amounts to a 'wrap' feature, where the energy of the waveform wraps back on itself to produce a larger number of overtones. Theory aside, the resulting sounds are similar to passing a square wave through a phaser. Control slider 1 sets an initial point and slider 2 specifies an amount of modulation from LFO 1. The 'feedback' wave features control of the level and frequency of the harmonics, to produce anything between a sawtooth being gently flanged to the kind of feedback more usually associated with a guitar being held close to its amplifier. I could enthuse for quite some time about this one!

'Super Saw' ostensibly amounts to the effect of seven sawtooth waveforms being played in unison. The control ▶

pros & cons

ROLAND JP8000 SYNTHESIZER £1499

pros

- Very realistic 'analogue' sounds.
- Friendly operating system.
- 8-voice polyphony.
- Extremely powerful real-time modulation possibilities.
- The immediacy of real knobs, sliders and buttons.

cons

- Keyboard not capable of producing aftertouch.
- No MIDI Thru.
- Very basic effects section, with no reverb.

summary

This is a synth that will get you very close to the analogue sounds you've been after, but goes much further, to provide a level of real-time control that positively inspires creativity and experimentation. Sure, the JP8000 has its faults, but so do all the best synths. The bottom line is that it sounds good and performs impeccably. If you've been looking at a Nord Lead or a Korg Prophecy — or wondering when the new Minimoog is going to make an appearance — then you owe it to yourself to check out this machine too before making a choice.

SOUND ON SOUND

sliders allow you to vary the level of the six extra oscillators against the original and also to detune them for subtle — or not so subtle — thickening effects. Of all the waveforms on offer I was most disappointed with this one. Perhaps I had expected too much of it, but I couldn't quite get my brain to accept that I was listening to seven oscillators. Put three real analogue waveforms together and the result can be powerfully rich. The JP8000's Super Saw sounds like the kind of thing you'd achieve with a good chorus processor — not bad, but just not as dramatic as you might expect.

In the Oscillator Common section the balance between the two oscillators is set, and both can be passed through a ring modulator to get those time-honoured clangorous and pseudo-distorted effects that were such a staple of the '70s sci-fi genre. LFO 1 modulation of oscillator pitch is available here, along with a simple attack/decay pitch envelope. LFO 1 and envelope pitch modulation can be sent to both oscillators, or oscillator 2 only, and are fully variable between both positive and negative modulation amounts. Additionally, if oscillator cross-modulation is selected, LFO 1 and the pitch envelope will vary the amount of cross-modulation.

HOW LFO CAN YOU GO?

The JP8000 actually has two LFOs, although LFO 2 is dedicated to the modulation lever. LFO 1 offers a choice of triangle, sawtooth, square, and sample/hold (or 'random' as some users know it). Rate and fade-in time are adjustable and it is also possible to sync the LFO, along with the chorus and delay time, to external MIDI clock messages. LFO 2 is a simpler affair, allowing adjustment of rate, positive or negative depth and assignment to one of pitch, filter cut-off, or amp. As the bender lever is pushed forward, the LFO imparts more of its modulation to the specified destination. Pressing the lever to left or right produces pitch bend. While we're on the subject, I ought to say that I have never really got on with Roland's bender levers, since the amount of travel is just too small to allow for much finesse. Indeed, I have never found anyone else with much good to say about them either, but Roland are sticking with the mechanism, so someone out there must like them! On the model I had for review I also found that the lever had trouble resetting to zero when it was released from a pitch bend — this is one aspect of analogue synths that I was hoping hadn't made it into the digital age!

The JP8000 is generous with its filter options. Three basic filter types are available — low-pass, band-pass and high-pass. With a response switchable between 12dB and 24dB per octave, you should find it possible to emulate most of the classic filter effects your ears could desire. A notch filter option would have been nice, but very few synths, short of the mighty modulars, ever sported these, so it would be churlish of me to call it an omission. Alongside the basic cut-off and resonance sliders are the filter envelope controls. A straightforward ADSR (Attack Decay Sustain Release) system is employed, which I still prefer to the often

ARPEGGIATION FOR THE NATION!

It's no secret that I have a passion for arpeggiators. Designed properly, they are a simple and inspiring way to add a little stardust to a production. There isn't the level of sophistication here of devices such as Quasimidi's Motivators, but what the JP8000 lacks in sophistication it makes up for in immediacy. In its simplest form, all that is required is to hit the arpeggiator on/off switch and hold down some notes. Tempo is adjustable over a 20-250bpm range, notes can be repeated over a range of up to four octaves and sorting options allow for up, down, up and down, and random note order. Hidden behind the numeric key panel are further options for defining which of the two synth parts will arpeggiate, and for changing the beat pattern of the arpeggiator from simple values such as quarter notes or triplets to named patterns such as 'echo' or 'walking bass'. These beat patterns will also accent the arpeggios in various ways. The arpeggiation options are stored along with a Performance. Unlike certain other synths I could mention, the JP8000 transmits the arpeggiated notes from its MIDI Out.

A further mode of the arpeggiator takes us into the RPS (Real-time Phrase Sequencer) capabilities of the JP8000. RPS is a function that lets you assign various musical patterns, up to four measures in length, to each key on the keyboard, and play them back with one finger. When recording these patterns it's possible to quantise your playing, and add as many overdubs as necessary (as long as you don't go over the 8-note polyphony limit, of course). Unwanted notes can be erased and whole patterns may be copied to other keys or erased entirely. RPS patterns can even be recorded from an external MIDI device. I'm sure that RPS will have its champions, but I can't help feeling that it's a little out of place on a synth of this nature.

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unnecessary complexity of many of today's multi-stage envelopes. A trio of knobs adjust positive or negative filter cut-off modulation from keyboard tracking, LFO 1 and the filter envelope.

Another set of ADSR sliders adorn the amp stage and a level control defines the patch's programmable volume. A selector switch decides whether LFO 1 will modulate volume or pan position (by positive or negative amounts), or whether the modulation control will act as a simple manual pan pot.

Oscillator 1 and 2.

Usefully, near the end of the Patch's audio chain there's a pair of bass/treble tone controls. These really do a useful job, serving to emphasise deep sub-basses or add a searing edge to a lead sound. Full marks to Roland on this one.

Following right along are the effects parameters. Chorus is added by a simple level knob. In reality, 12 different modulation-type effects can be applied, and these are selected in the numeric key panel's menu system. Of particular note is the Deep Flanger, which is as good as any I've heard. No editing of any of these effects is possible, other than setting the modulation speed to sync with LFO 1 or an external MIDI clock. Delay may also be added, with basic control over time (up to a maximum of 1.25 seconds in mono), feedback and level. Again, a selection of delay types is available under the key panel section, allowing various right/left ping-pong delays, short flutter echoes or a simple mono delay.

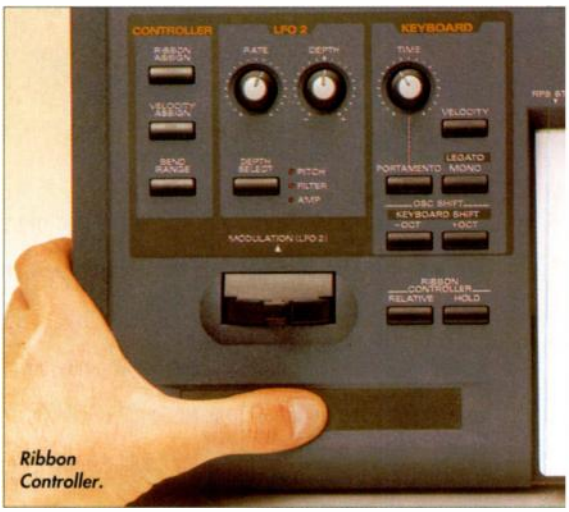
To the left of the keyboard are controls to set mono/mono legato and portamento on/off and rate. Portamento may be triggered by legato playing, but is fixed to time-based settings, making it problematic to get an exact emulation of the portamento/glide found on many monosynths (such as the Minimoog). Assuming that that this is a function of the JP's software, I'd encourage Roland to add a fixed time/fixed rate option in a future software revision.

PERFORMANCE CONTROLS

So far we have seen what might pass for a reasonably endowed analogue synth, though a fair amount of digital trickery is being employed to create the illusion. But the JP8000's real magic begins to show where analogue emulation ends and the wonders of digital performance control begin. All of the JP8000's synth controls are capable of being transmitted as MIDI data and received on playback. In other words, you can twiddle those knobs to your heart's content and hear all of your twiddles played back. This alone kept me enthralled for so long that the review deadline was in danger on more than a couple of occasions! But the JP8000 has more in store...

For a start there's the friendly little arpeggiator, which also features Roland's own RPS (Real-time Phrase Sequencer) technology (see the 'Arpeggiation for the Nation!' box for more details). Then there's the Motion Control feature. Put simply, this allows you to record the movements of any number of controls on the front panel for up to eight measures and play them back, either as a free-running loop, or as a pattern that repeats each time a key is pressed. All of the JP8000's control slider and knob movements may be recorded, with the not unreasonable exception of the tempo and volume knobs. Four Motion recordings are stored in memory, although only two can be accessed from the main control panel at any one time. This really is a superb feature, capable of producing evolving patterns of ever-changing subtleties, or complete pandemonium! In keeping with the JP8000's overall philosophy, the data generated by the Motion Controls are transmitted from the MIDI Out for recording to an external sequencer.

And so to that lovely little ribbon controller. Far from being the simple pitch/filter bender to which most ribbons find themselves assigned, this device holds the key to a world of sound control that boggles the mind. The ribbon is capable of being assigned to virtually every knob and slider on the JP8000's front panel — simultaneously! While some parameters increase as the ribbon is pressed left to right, others can be made to decrease — each with its own programmable control range. My gob was well and truly smacked. The potential for this amount of real-time control is breathtaking. Cue another hour or two of trying to tear myself away from the JP8000 and back to the word processor... The response of the ribbon may be set to act relative



Ribbon Controller.

to the point at which your finger first touches it, or to instantly change control values depending on where pressure is applied — great for those hammer-ons! When released, the ribbon's control values will reset to neutral, or can be set to hold.

In much the same way as the ribbon controller, velocity can be applied to the same multitude of

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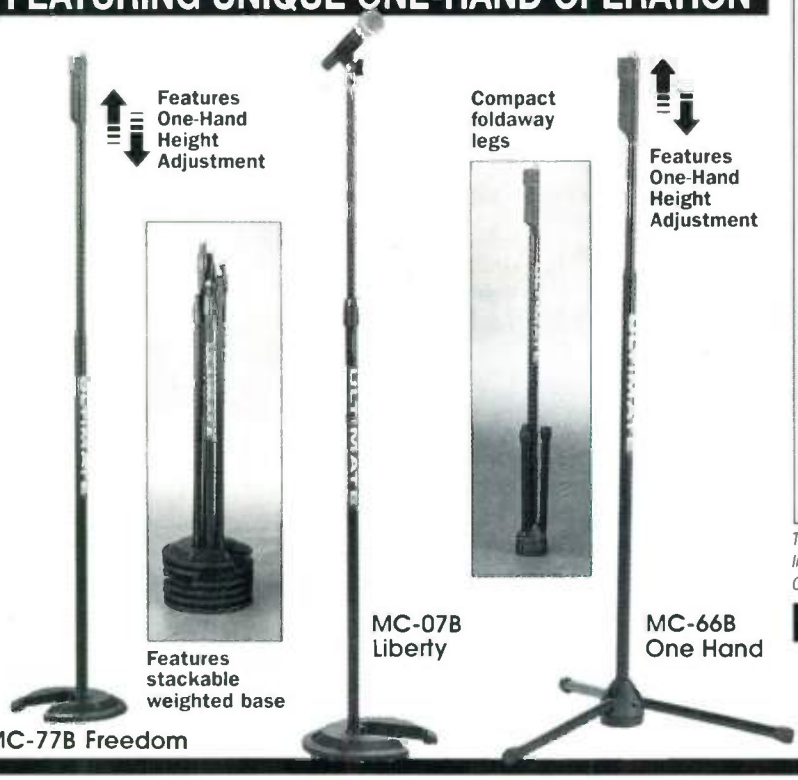

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programmable control destinations. With a combination of ribbon and velocity, the JP8000 has the capability to produce a very animated sound palette, from gentle filter sweeps to avant-garde cacophonies. Th s seems to make it all the more sad that Roland have not seen fit to provide a keyboard with aftertouch response. Using the ribbon is all well and good, but how about those of us who still want to play with two hands? To their credit, Roland do allow a continuous control pedal, as an alternative to jobs such as expression

Filter, Amp and Effects sections.

or panning, to take on the duties of the ribbon controller. Additionally, if you connect a master keyboard that is able to transmit aftertouch, these messages can also emulate the ribbon controller.

Another Performance feature worthy of attention is the Individual Trigger function. When you make use of Individual Trigger, the Upper Part is de-coupled from triggering its filter or amp envelope. This triggering function is then taken over by the Lower Part, either from a specific note or from any notes. Although this sounds a little esoteric, it merely means that you can hold down a chord with your right hand which will not generate any sound, and then trigger it by pressing keys with your left, at which point the chord will be heard. The trigger notes can also be received from a specific channel arriving at the MIDI In socket, allowing for some dazzling stuttered chords in perfect sync with an external sequence.

The JP8000 has a very flexible MIDI specification. Each of the Parts in a Performance can receive on its own MIDI channel and will respond to individual patch change messages. A separate MIDI channel may be defined as receptive to Performance changes. All of the JP8000's internal settings are available for transmission as MIDI System Exclusive data. By far the most useful dump type is that which transmits the temporary storage area, allowing a sequencer to record and restore the Performance and Patches used in a song, even if the original Performance memory has been overwritten. Any external controller can be made to adjust any number of the JP8000's knobs and sliders.

"...the JP8000's real magic begins to show where analogue emulation ends and the wonders of digital performance control begin."

ALL GOOD THINGS...

If I was to be picky, I might suggest that the JP8000 can often sound a tad on the thin side. A little detuning, chorus or layering helps, and a quick turn of the tone controls can work wonders. But you have to apply a little work to reach a meaty sound, which is in direct contrast to those real analogue dinosaurs, where more often than not the object of the exercise is to thin the sound out! I had the advantage of playing the JP8000 alongside my old Rolands, Prophets and Moogs, and I was pleasantly surprised to find how close I could get to all of them, given a couple of minutes' fiddling. Roland include some very evocative sounds in their presets. Performance 27, 'Legato TB303', will be of interest to anyone still under the spell of the little bleepmaster, and Performance 54 will delight the ears of anyone who once sold a Juno 6 and regrets it. Try to play 'The Star-Spangled Banner' on Performance 14 while making heavy use of the ribbon and bender lever to bring out the Hendrix in you. Roland run the whole gamut with the onboard presets, from dance-oriented squelchy basses to sweeping new-age strings. Most of the presets are perfectly usable straight out of the box, but the ease with which changes can be made positively encourages you to hone and customise.

CONCLUSION

There is so much to like about the JP8000 that its shortcomings are easy to forgive. The lack of keyboard aftertouch stays as my main gripe and some of the meatier polysynth sounds had me MIDI-ing up to a longer keyboard to hit those octave span left-hand bass parts. But I just couldn't help liking this machine. The instant gratification of reaching out for those controls and knowing that your every move will be played back from your sequencer is so inspiring that you just can't put the thing down! All of the analogue sounds that you know and love are probably in there somewhere. The overall sound is probably slightly more 'refined' than that of a real analogue synth, but I'd defy all but the most golden-eared to tell the difference in a blindfold test. The JP8000 does have a certain sound quality that is all its own — not as plummy as Korg's Prophecy, perhaps, but richer than any of the sample-based synths I've come across.

For anyone who is currently contemplating one of the newer analogue or analogue sound-alike synths, or scouring the classifieds for a vintage original, the JP8000 is certainly worth checking out. The sounds are there, the amount of control is awesome, and the price is very reasonable, in my opinion. I have a feeling that Roland may have a future classic on their hands. SOS

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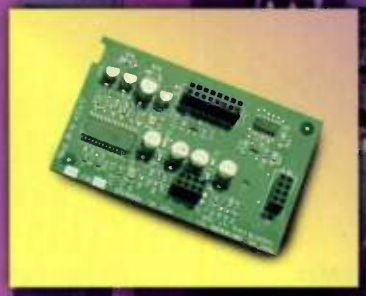

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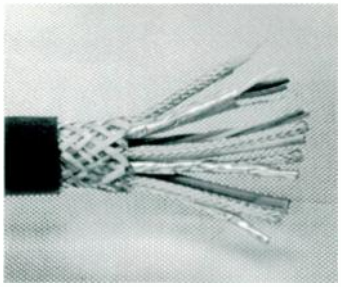

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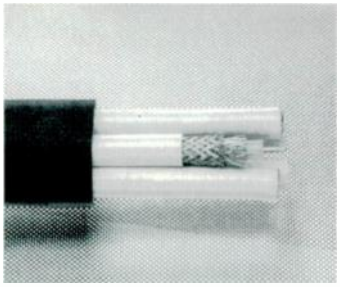

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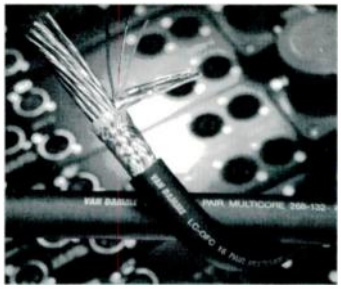

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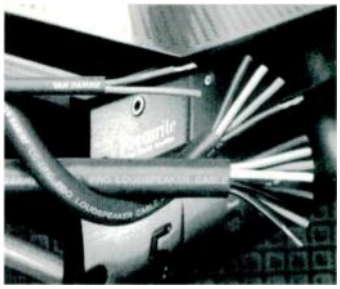

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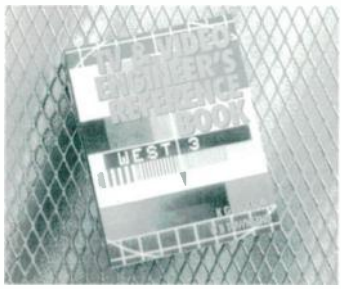

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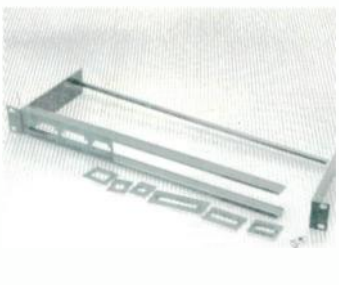

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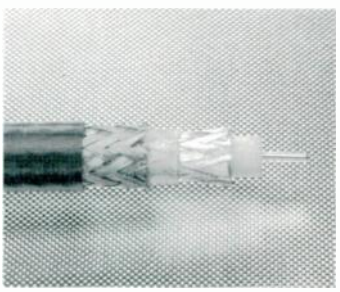
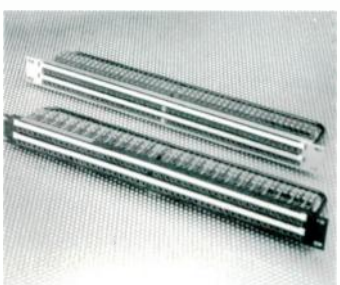


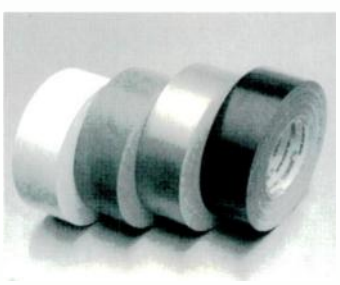
Van Damme triaxial cable

Rean 'A' gauge patch bay



Rean Bantam patch bay

Triaxial connectors



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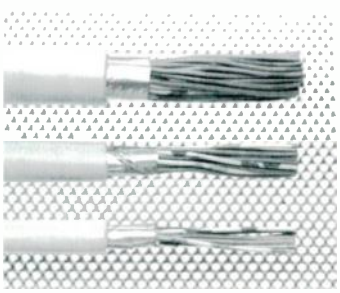

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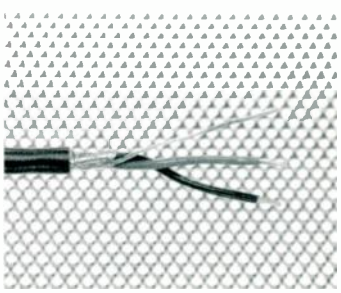

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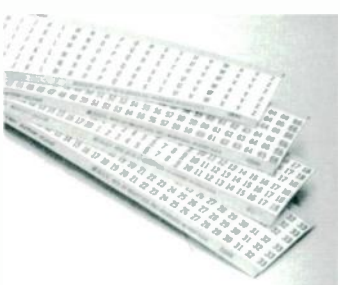

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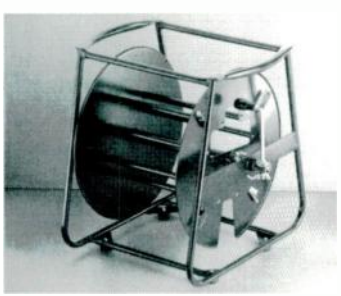

Hanser drums

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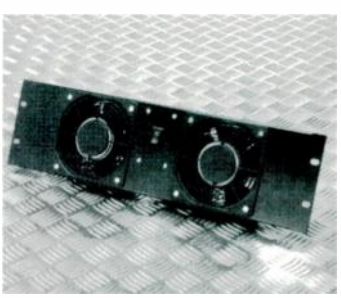

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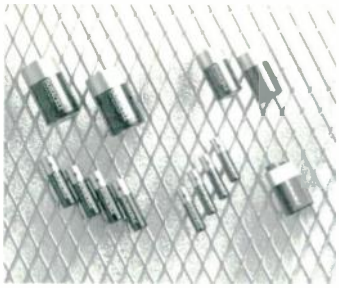
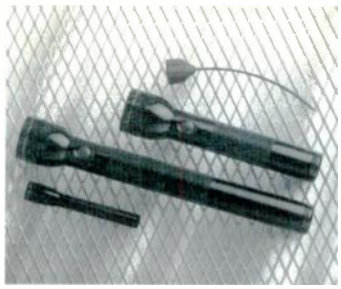
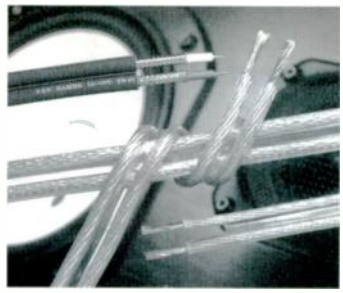


Batteries

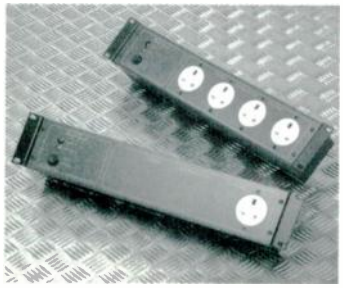


Mag-lites

Magnetic tapes



Van Damme hi-fi cables



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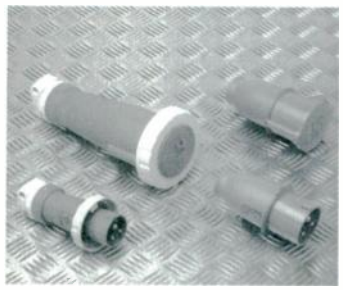

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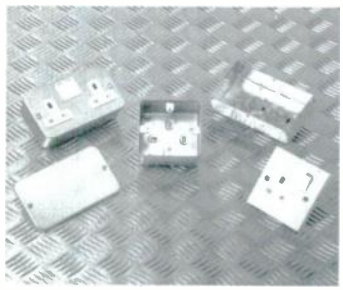
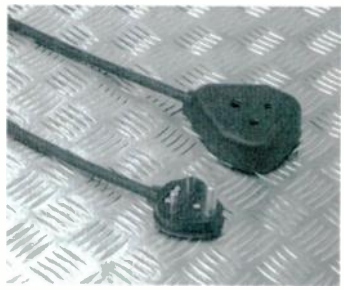


Backboxes and plates



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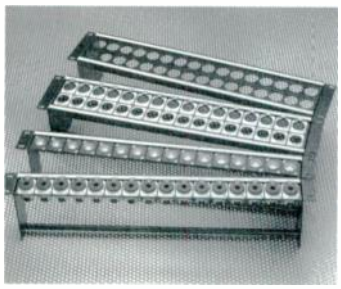

XLR patch panels

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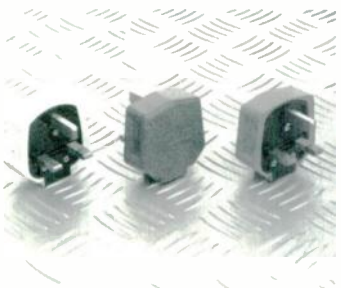

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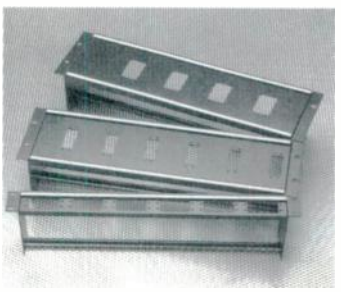

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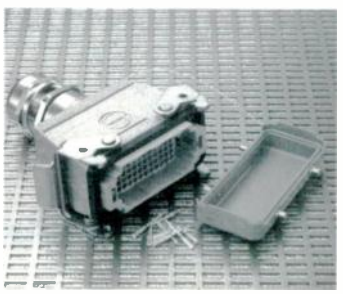

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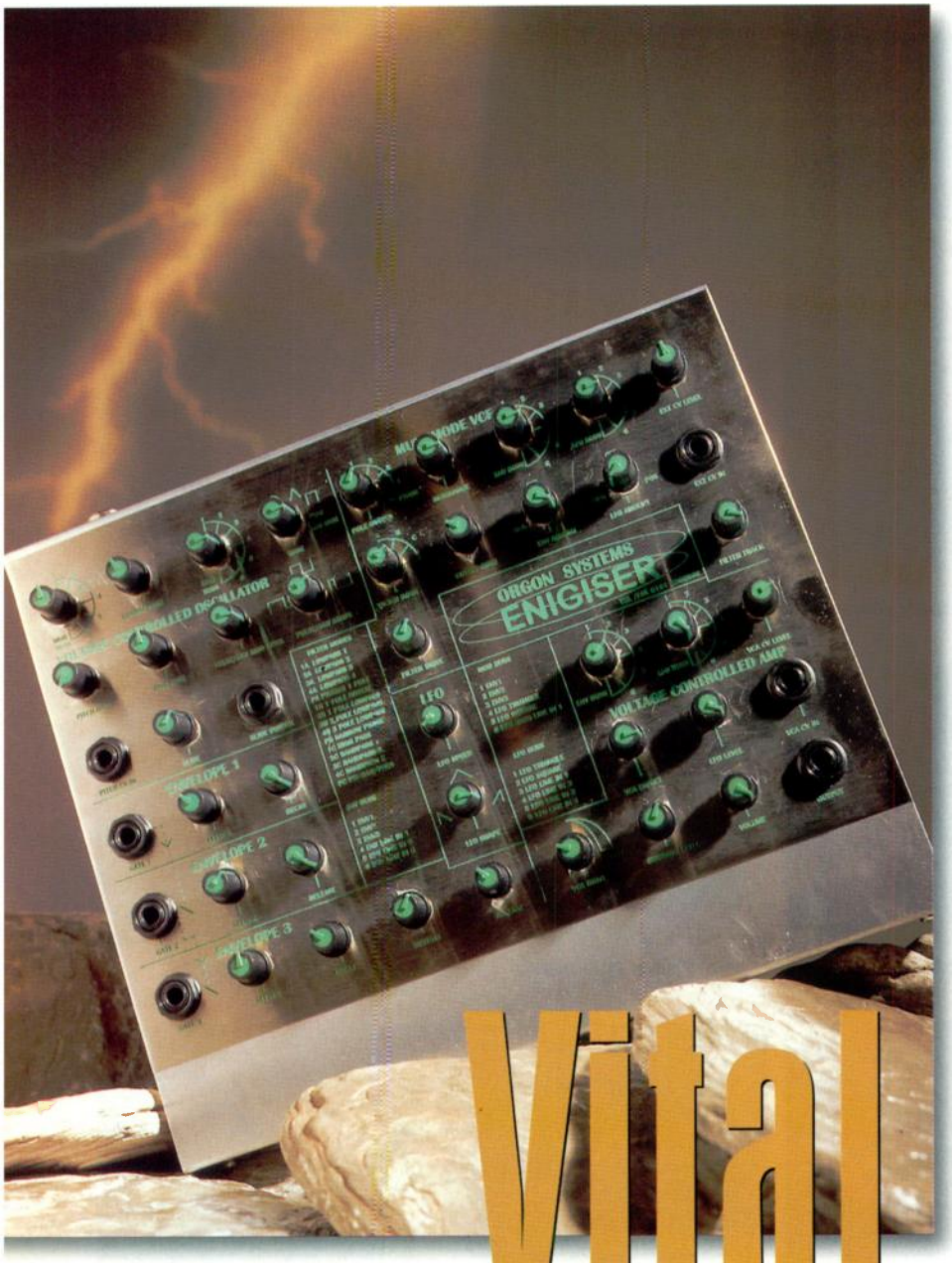

Vital Orgon?

ORGON SYSTEMS ENIGISER ANALOGUE SYNTHESIZER

This British-made single-oscillator monosynth is unashamedly retro in both its knob-laden styling and its lack of MIDI. PAUL NAGLE gets orgon-ised...

As the millennium approaches, bringing with it a new era of technological advances (and several new buildings in the London area) it's interesting to reflect on how the synthesizer has progressed in the 30 years of its existence. Originally a hands-on instrument covered in dozens of knobs, sliders and wires, it could be played only by synthesists, who coaxed it into life with their arcane knowledge. These days, a synthesizer is often seen as the impersonator of a multitude of existing instruments which appear at the touch of a button to be played on a piano keyboard. To tailor these sounds, it is necessary to dial up the appropriate page on a display screen and change the numeric values — blurring the distinction between computer and musical instrument — but modern synths arrive brimming with memorised sounds, so programming is often neglected anyway.

Recently, thank goodness, it has started to dawn on manufacturers that tweakability and immediacy are important after all, and the concept of musical performance is now being applied to many instruments. In these ever-changing times, it is reassuring to know that more traditional synthesis techniques haven't been abandoned; indeed, the latest entry in the knobby camp comes from British company Orgon Systems, who believe that plenty of honing is needed before we perfect old-style synthesis.

OUTSIDE

The Orgon Enigiser is a remarkable-looking instrument with its square, silver case, green knobs and green text (which looks kinda flash but from some angles is quite hard to read). It measures 11¾ x 10 x 2 inches and has a total of eight quarter-inch jack sockets on the front panel. The only other connector is the rather unusual screw-in affair for the external power supply, located at the rear or top (or whatever) of the synth. I don't know about you, but if I must have an external power supply I'd much rather have one that can easily be replaced when someone stands on it at a gig.

The most surprising thing about the Enigiser is not something it has, but something it doesn't have: it's 1997, this is a brand-new synth, and there's no MIDI in sight. The manual provides no explanation of why MIDI was omitted in favour of CV/Gate connectors; the advertising blurb uses the rather enigmatic phrase "Connects via industry-standard CV/Gate interface". That's rather like trying to sell a new car which won't use unleaded petrol.

An insight into the philosophy behind Orgon Systems can be gleaned from the glossary entry in the manual, which refers to the Enigiser as "A box

of analogue electronics with loads of knobs on it which can produce interesting, original and sometimes musical audio textures. Not a Mickey Mouse pre-patched MIDI-cloned black box wedged full of cheesy preset predictable crap for the mass market. See Computer." This has an air of good old British eccentricity which certainly made me smile. The manual also refers to future plans for sequencers, a MIDI interface, larger and more experimental synthesizers, and a modular expansion box for the Enigiser: clearly, the Orgon team have plenty of ideas waiting to hatch.

IN DETAIL

The Enigiser is a single-oscillator monosynth module whose sound can be beefed up somewhat by a sub-bass feature (more on this later) and treated via a very comprehensive Voltage Controlled Filter section, three envelope generators and an LFO. The oscillator has a selector switch for sine wave, triangle wave, square wave, variable square and variable sawtooth — the last a nice touch, and a source of of some of the richest sounds available from the Enigiser, especially when the sawtooth width is modulated by the LFO. The selector switch is a little tight and I'm that sure the knobs on this review model are smaller than on others I've seen. They vary in response from smooth to rather stiff but do free up with use. Main pitch can be set over an 8-octave range, with fine-tuning the expected plus or minus a semitone. Slide (portamento) can be added and even switched on or off via the jack input.

CATCH THAT BUSS

All modulation in the Enigiser is controlled by internal buss routings, selected via rotary pots. Once they're selected, an Amount knob determines the depth of the modulation or envelope effects. The available buss routings are printed neatly on the front panel and allow most combinations of the three envelopes and two LFO waveforms to control the Oscillator, Filter and Amplifier sections. There's also a total of eight unused routings for additional envelope and LFO functions, which currently act as 'off' switches.

The LFO produces both square and triangle/sawtooth waveforms — don't be fooled by the panel graphics, which depict only the latter. These are available to the VCO, VCF and VCA, depending on the buss settings. Each LFO wave is continuously variable, as on the Korg MS series, so if you wish you can modulate the pitch with a triangle wave while a square wave is directed at the cutoff frequency. There is no Random or Sample & Hold option but, on the positive side, the frequency range of the LFO is impressively wide; at its fastest, it sounds almost like a ring-modulator if applied to pitch. A single LFO means that you can't create a slow, swirly pulse-width modulation alongside a fast vibrato; fortunately, one of the three envelopes can be roped into helping and, if you have a means of triggering this envelope externally, an independent modulation can be created.

The Enigiser has one traditional ADSR envelope and two half-envelopes, AD and AR. The gate signal is cascaded to all three, but individual inputs are provided so that each one may be triggered separately or in any combination you need. This is a great approach and would be especially cool in a modular setup if these envelope voltages were available as outputs. As it is, you can sweep the pulse width with one envelope, the cutoff frequency with another and the output stage with a third.

ACE OF BASS?

The sub-bass isn't (as I'd expected) a traditional sub-oscillator in the square-wave-one-octave-below sense, as seen on the likes of the Roland SH101; it's actually a sine wave that bypasses the filter and adds a fundamental tone at the VCA stage. This can be used to add some depth after you've filtered out most of the harmonics using one of the high-pass or band-pass filters, especially as its level can be driven quite high. Better still, the main input to the VCA section can be overdriven, resulting in a

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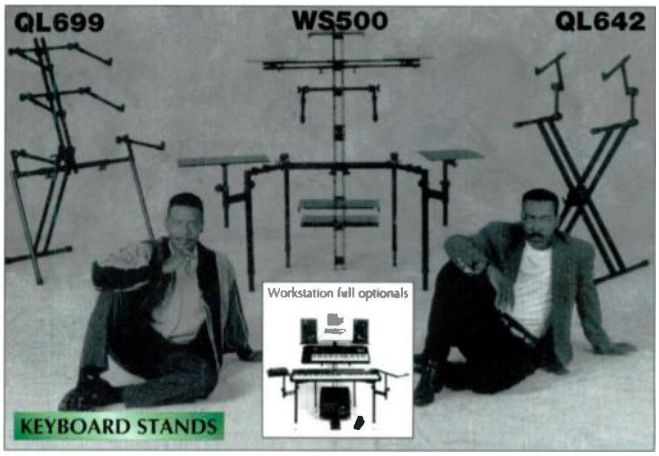

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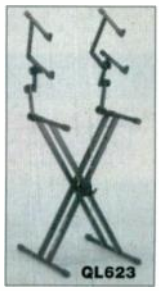

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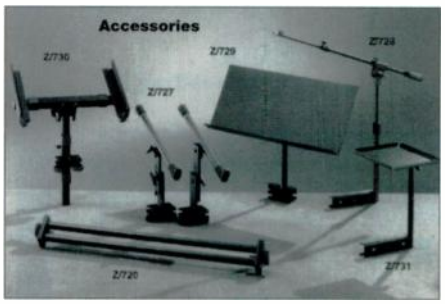

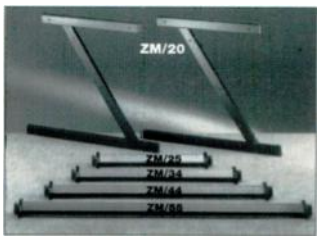

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Orgon Systems Enigiser

pros & cons

ORGON SYSTEMS ENIGISER £469

pros
- Lots of filter types.
- The three envelopes can be triggered independently.
- Both VCF and VCA can be overdriven.

cons
- Single-oscillator design.
- No noise source.
- No MIDI.
- External PSU.

summary

Not a synth for the faint-hearted, the Enigiser dares to tread where few others have gone for many years. The lack of MIDI will put off some potential buyers, although the more experimentally minded may appreciate the impressive number of choices in the filter department.

SOUND ON SOUND

▶ subtle distortion that's quite pleasing. The addition of a simple divider circuit to add a square wave at an octave or two below the fundamental would have been better still, I think, giving the sound more oomph; nevertheless the sub-bass is a welcome addition. Another jack input provides external control for the VCA so that accents can be created, provided that your MIDI/CV convertor is capable of generating an extra voltage output.

IN USE

I connected the Enigiser to the CV/Gate outputs of my beloved Pulse Plus, set an arpeggio running on the Pulse and started trying things out. It took me a few moments to work out that I needed to turn up the Filter Drive before I could hear the VCO, and then I found the Enigiser to be capable of sounds ranging from bright and punchy to wild and raucous. Much of the synth's character is derived from its filter, which has an aggressive resonance and can be switched from a puny 6dB in 1-pole increments right up to the classic 24dB so often used for a powerful bass. I found it difficult to create classic analogue lead voices, but I suspect that many potential Enigiser owners will be those people who always wanted a synth to make strange noises such as those obtainable from the Korg MS50 or VCS3 (to which the Enigiser bears a passing resemblance), but could never quite find or afford either of these vintage instruments.

In order to liven up the sound, I spent much of my time performing tricks such as adding pulse-width modulation, vibrato and sub-bass. Keeping the filter on the edge of resonance and tracking it with the keyboard creates some of the most complex textures, and I like the fact that both the VCF and VCA sections can be overdriven to dirty things up even more — as an introduction to analogue synthesis, the Enigiser would be an invaluable learning tool. However, a second oscillator should have been included to boost its sonic arsenal (and lure potential buyers away from the secondhand market and its Korg MS20s, Sequential Pro Ones, Moog Prodigys and so on). The Enigiser's main strengths, I feel, are synth basses, sequency blips and filter twangs (the squeaks, weebles and burbles are all first-class). It's the omission of a noise source that prevents this synth from taking the honours in the sound-effects stakes. No whooshing sea and surf noises, alas.

CONCLUSION

This is a hard synth to sum up: on the one hand it has lots of knobs, more types of filter than you can shake a very shaky stick at, and several

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MULTIMODE VCF

A single-oscillator monosynth at this price needs something special to give it added zest. In the case of the Enigiser, that something is the Voltage Controlled Filter with a total of 15 different settings.

The filter type is selected by a combination of two knobs, Filter Input and Pole Output. The complete list of types available is: Low-pass 1, Low-pass 2, Low-pass 3, Low-pass 4, Phaser, 1-Pole, 1-Pole Notch, 1-Pole Low-pass, 2-Pole Low-pass, 3-Pole Lowpass, Narrow-Phase High Pass, Bandpass 1, Bandpass 2, Bandpass 3, Phase and & Bandpass.

To get a flavour of what all these actually sound like, let's look at each type in turn:

• LOW-PASS — the traditional filter type that everyone's familiar with. With cutoff frequency at maximum, the filter is open and all harmonics pass through. As the cutoff frequency is lowered, the filter is closed, removing higher harmonic components in the sound and eventually leaving only the fundamental tone. Adding resonance emphasises harmonics at the cutoff frequency.

• HIGH-PASS — As this filter is closed, low frequencies are removed; increased resonance boosts harmonics at the cutoff frequency. Produces a thin sound suitable for adding sparkle to hi-hats and other sounds that rely on upper frequencies.

• BAND-PASS — passes those frequencies at the cutoff. Increasing resonance narrows the band-pass response and boosts harmonics at the cutoff frequency. Produces a rather nasal sound

• NOTCH — the opposite of a band-pass filter, the notch removes harmonics at the cutoff frequency, leaving a gap whose width is determined by the resonance setting.

• PHASE — the phase filter shifts harmonics around and above the cutoff frequency, creating a gentle sweeping effect.

If you think in terms of more poles equalling a steeper roll-off of harmonics, you'll understand well enough. As an example, the Enigiser can switch between single-pole operation right up to 4-pole (24dB). A single-pole filter has a more subtle effect than a 4-pole and it's nice to be able to choose between so many different combinations. The Enigiser filter can produce a powerful self-oscillation when resonance nears maximum; routing the main pitch CV to the control input enables the filter to be played as a tuned sound source.

unusual programming options; on the other hand, it doesn't cover all the bases usually required of a monosynth because of its single-oscillator design. The lack of MIDI may be a bonus for a few people who are still using analogue sequencers and synths, but for the vast majority of us the Enigiser will require a MIDI/CV convertor before it becomes useful — which starts to make it an expensive proposition.

Ultimately, I think the Enigiser will be judged on its filter types and the sounds that can be coaxed from them. And I remain unconvinced. I also wish that there was an option to process sound sources other than the synth's own oscillator: an external filter input would increase the Enigiser's usefulness exponentially. However, if you are of an adventurous nature and have a desire to seek out new life and new civilisations, then give the command: Enigise! SOS

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Internationally renowned as a producer, recording engineer, and designer of audio equipment, George Massenburg is nonetheless still in love with the art of music production. DAVE LOCKWOOD met up with him in Los Angeles.

George Massenburg

THE EQUALIZER

In a stellar career spanning more than 30 years, George Massenburg has been responsible for engineering some of the most acclaimed recordings of the modern era, pausing along the way to invent that mainstay of the modern recording process, the parametric equalizer. He is, of course, also associated with a number of other products — in particular, the high-performance mic amps and mixing automation system now marketed by GML, the company he founded in 1982.

Born in Baltimore, Maryland, in 1947, and raised there and in Macon, Georgia, Massenburg acquired an early interest in music, electronics and sound recording — aged just 15, he was already working part-time both in the recording studio and in an electronics laboratory. After working at ITI in Huntsville, Maryland, he presented his seminal AES paper on the Parametric Equalizer; later he became chief engineer of Europa Sonar Studios in Paris. He was subsequently to design and manage several recording studios — the studios at ITI, and later the

Complex in Los Angeles — as well as contributing acoustic and architectural designs to many others, such as George Lucas' Skywalker Ranch and the Site in Marin County. He is now Adjunct Professor of Recording Arts and Sciences at McGill University in Montreal, Canada, and lectures at UCLA and USC in Los Angeles.

Today, Massenburg continues to refine many of his original ideas: parametric equalisation, mixing automation systems, and more recently introduced devices — such as the GML Dynamic Gain Controller — which have been in development, on and off, for 20 years. As well as these products, the company currently manufacturers the GML High Resolution Topology line-level mixing console, and the reference-standard GML 8200 Parametric Equalizer. GML Inc also act as consultants and independent designers for several major audio electronics manufacturers.

STARTING OUT

How did you first get involved in sound recording, and what kind of gear was available to you then?

"I played trombone from about age eight, and then later on in my high-school marching band; even later I played bass in a bluegrass group and also an R&B band. I started out in recording by hanging around this very small studio in Baltimore, Maryland called Recordings Incorporated, whose studio business was mainly radio and television commercials, but also some bands.

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George Massenburg

Eventually I worked there. We had 2-track Ampex 300s and 351s, Ampex MX35s and custom-built mixers, an EMT140 plate and a few great microphones. There was a demand for 4-track recording, but to do that we had to build the machine ourselves, which I did. Also, I was obliged to build a console. Now, this is not because I was good at building consoles or anything else, but because it was the only way that I would be doing any 4-track recording.

"I started making money doing this around 1964 and the next year went to Johns Hopkins University as an Electrical Engineering major. I was a terrible student, and I left school in 1967, greatly disappointed, but by that time had the basic idea for the Parametric Equalizer. It used a variation of a gyrator that I was told would be impossible to realise, although I was already using one to do the low-frequency shelf in the first equalizer. By 1968, when I was 21 years old, I had designed the basic Parametric Equalizer and built a small console that included the first parametric equalisation.

"My first big company, ITI, was manufacturing the first commercial Parametric Equalizer by 1971; but we also had recording and photographic studios, printing and record-pressing facilities — I learned how to do just about everything except metal processing. The studios are no longer around, but the ITI Parametric Equalizer survives even today. It wasn't necessarily difficult to design, but it was very difficult to sell. At the first AES show everyone (with the notable exception of Gerhard Lehner, then of Barclay Records) asked me, 'Where are the steps?' It took a long time to explain, and most of the work was spent demonstrating how the Parametric Equalizer was an improvement to control sounds, such as snare drums and, especially, acoustic guitars. And still today a lot of engineers do not know how to best use a parametric equalizer. To use it properly takes more time and careful listening. This is true of most devices I design and, as a result, record companies don't like me very much."

> "I would advise young engineers that the first thing that you have to forget about in making serious records is the sales."

INSIDE STORY

What do you listen for in a recording — what's important to you?

"What's important for me is the inner story in the music; this is hard to verbalise, but I think it's something that the ear knows. What I love about music is transparency and the ability to hear the musician. This in itself has little to do with making hit records. I would advise young engineers that the first thing you have to forget about in making serious records is the sales. My vocation is making artful records and hoping that they'll sell, while some producers strive to sell records and hope that people will think that they're art.

"One could demonstrate that the most important parts of music never change. My favourite comparison is between an old King Curtis [American R&B pioneer] record with Chuck Rainey on bass. It's an old instrumental, 'Soulin'', one that inspired me greatly. Listen to it alongside a recent Alanis Morissette track, with Flea from the Red Hot Chili Peppers on bass. You can't help but hear that the musical values are basically the same as 30 years ago. The Alanis Morissette track has sold more than 18 million copies, so it's a very successful record, but to me, this is not as good a recording as the King Curtis record done 30 years ago. Modern recording means processing, and in the Alanis Morissette record there are some very 'special' methods — to my ears it sounds like the lead vocal was processed in part through a guitar amplifier! Guitar amplifier and a microphone — 18 million records! So who knows?

"Last year, Peter Asher and I made a record for an Australian artist which was subsequently redone by a prominent remix engineer. Record companies have for some time now, in their insecurity and confusion, remixed a project before release, but in this case it was the artist who was insecure. This always hurts me as an engineer — on one hand I hope that the remix will be better, and that it will bring out the best in our work. But it has never turned out like that.

"The remix that comes to mind starts from scratch, eliminates the fine-level tuning, and heavily compresses and then equalizes each and every track. Snare drum, compressor, equalizer; overhead, compressor, equalizer, all the way down the console, which was a modest SSL. Once it's mixed, the SSL buss limiter is utilised. The snare drum and the lead vocal are prominent in the remix, but to my ears there is no depth, no detail and no dynamics in the vocal. I guess as choices go it's like any other, and it is one that any engineer might be asked to make. But I loathe the motivation behind the process and, often, the result."

Using a lot of compression might be a valid way to help the track sound better on small systems, though, mightn't it?

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George Massenburg

"Only in the sense that in utilising a lot of levelling, a mixer has to listen and think about balancing elements far less. Large or small systems, it's not the issue — the issue is balance. And balance is not static. Anyway, the small speaker mono listening model, a great issue from the '60s through the '80s, is a bit less of a consideration today. Now we still mix for a majority of our listeners — I mean, most of the time we really want to reach folks, don't we? — and many of the systems that they're using, including television, are improving slowly — the hired-gun remix may sound incrementally better on television. Well, forgetting what makes one mix 'better' than the another, 'louder' is always attractive to the guys with money on the line. Going back to my remix example, I'd have to admit that I did learn from what happened; however, I quickly learned how to improve upon it.

"Many years ago I made a record, *Warm Your Heart*, for Aaron Neville. In many ways I am happier with this record than any other I have done in the past 20 years — this is my favourite sound in the world. It was crafted by brilliant musicians: Russ Kunkel, Carlos Vega, Bob Glaub, Brian Stoltz, Ry Cooder on guitar, Don Grolnick on piano — not to mention the sheer brilliance of Aaron himself. It has detail and depth, dynamics and character, but the record company were worried that it wouldn't sell. I imagine that they would have liked to remix the entire album. They did, in fact, force a remix on one single and it was a huge hit. To this day I feel it was a terrible job — dumb, arbitrary parts added with lots of mistakes. But it bought into that stupid New York dance scene, and, of course, they played the heck out of it: maybe for political reasons, I don't know. Unfortunately, it made us — Aaron, Linda, and I — a lot of money, something with which I shouldn't argue, I suppose."

COMPANY POLICY

How do you deal with the situation if you know the record company wants it to sound different to the way you are hearing it before you've even mixed it?

"Well, first I work for the artist, not the record company. As such, I am not always popular with record companies. But because one has to keep one's mind open, I have a huge bag of tricks — sounds for instruments, for tracks and mixes. And I think I've learned both how and when to bring them out. Were an artist to ask me to chase down a sound in their head, I believe I should have ideas ready to play to them. Unfortunately, many requests from A&R departments have nothing in the world to do with music. My advice, when an idiot asks you to do something that really is not in your heart or skill, is to bow gracefully out.

"Not that I always get mixes right, either. If I were to remix [the Aaron Neville record], I probably would use less long reverb — that's one big difference with modern records. I'd take dry drums and keep them tighter. And, instead of reverb, I might use a 'cool' and subtle loop on the snare or percussion. The point is that I could make myself very happy with that mix, too. If I get the feel right I can go almost anywhere with it.

"If I choose a stereo buss compressor I would use a GML EQ and Dynamics Controller, then maybe a [TC Electronic] M5000 in 3-band. The capability of this setup ranges from 'clean and transparent' to what you might call 'that really shitty sound', the latter being what record company A&R people are accustomed to hearing."

"Were an artist to ask me to chase down a sound in their head, I believe I should have ideas ready to play to them."

So you feel there is never just one 'best' mix for a track?

"Sure, for me there is one mix that I like. But I could mix that particular track in four different styles: the original record; a pure hip-hop where I replace the drums with a drum loop; another style where I use the original drums with the hip-hop loop added and maybe a different bass; or a straight-up rock and roll approach centred around the amped guitars. And I feel confident with all four of these styles of mixing. But, hopefully, there would be one that the artist would like the best, although record companies are often predisposed these days to releasing more than one mix."

LOOKING FOR BLISS

Do you think that the widespread use of the typical Mackie/ADAT artist's studio has significantly changed the way that records sound today?

"Absolutely, no doubt about it. But let's call it the 'project studio'. It has brought power and facility to an ever-expanding group of people, many of whom are new to the endeavour. On the other hand, I very seldom hear evidence that the craft of songwriting itself has been enhanced, although getting a demo to sound more 'finished' is certainly easier and much less expensive now."

How do you feel about artists trying to play the producer's role themselves?

"Speaking as a producer, I think that the artist needs a producer, at least as a foil: someone to temper the artist's indulgences. With few exceptions, artists are better off when they can

GONGS AND GLORY

George Massenburg's recent engineering credits include an album for Journey, and he has produced records for James Taylor, Randy Newman, Lyle Lovett, Aaron Neville, Michael Ruff and Linda Ronstadt. He has been nominated many times for the non-classical engineering Grammy and for Record Of The Year in several years, and he won the Grammy for Best Engineered Non-Classical Record in 1990 for Linda Ronstadt's *Cry Like A Rainstorm, Howl Like the Wind*; *The Trio* won the Academy of Country Music Record Of The Year for 1988. In 1989 *Mix* magazine gave him both Producer and Engineer Of The Year Awards for Little Feat, and he picked up the Engineer Of The Year Award in 1991 (for Linda Ronstadt) and 1992 (for Lyle Lovett).

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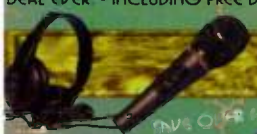

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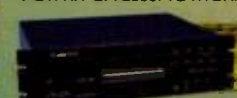

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WRH

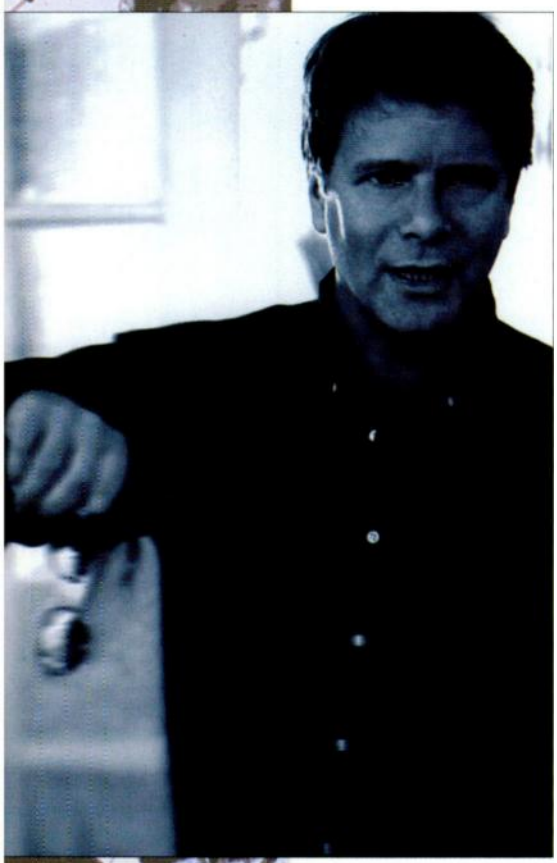
'follow their bliss', and allow an enlightened producer to aid them."

Is there a list of 'must have' items that you always want to have available to you when you are engineering?

"I guess so. I'd hesitate to list brands — I wouldn't want others to buy specific gear expecting a particular result. To a serious session I'll always bring: a lot of microphones (some custom), special mic wire for the vocal mics, direct boxes, good headphones, two kinds of good mic preamps, equalizers, dynamics units, converters, processors and reverbs, a DAW [Digital Audio Workstation], two kinds of monitors, my laptop, and my dog, Robbie. Sometimes I bring my son, Sam."

Do you think that digital equipment will ever be capable of truly replicating the subtle 'desirable imperfections' of many of the analogue old favourites?

"The picture that I have in my head is of a relationship between increasing resolution and sampling rate and reducing jitter on one axis, and reducing digitally-generated artifacts on the other, that's asymptotic. No, we can't expect to arrive at what we had with analogue chains, but we can get damn close."



ABOUT FACE

When I first started engineering records I knew I could go into almost any studio and be comfortable working the desk and multitrack, whatever it was. The situation facing the young engineer these days seems rather different, with the plethora of different interfaces and protocols. Is there a case for greater harmonisation of workstation/editor interfaces?

"I think you're asking two different questions. The first question, I think, is how complex an interface should be; the second is how 'standard'.

"As regards complexity, the short answer is Einstein's: 'Everything should be as simple as possible, but no simpler'. I can't tell you how many times a debutante engineer has complained about the complexity of my automation interface; at the same time, sophisticated users are asking for more capability.

"Regarding standardisation, most of our equipment is rather new and hasn't had time to evolve, and different equipment designers see a given task slightly differently, and hence create different interfaces. But different interfaces and feature sets will undoubtedly merge in time. Let me use a musical instrument analogy. The piano, by now, has been around for a comparatively long time, during which its 'feature set' changed until we got what we have today. But today, what is and isn't a piano — let's ignore sampled pianos for the moment — is very clear in our minds, and you can sit at two different instruments and perceive few, albeit subtle and artistically important, differences.

"The answer is to give the technology time to evolve, and for designers to be sensitive to the needs of the end user."

Wouldn't we all benefit also from an interchange format standard for mix automation data?

"You bet we would. It's definitely on the cards for the future. Exchanging allows a mixer's recorded gestures to be retained across a project, as it moves from studio to studio. The concept ultimately confirms the artistry inherent in a mixer's work.

"Can you imagine if computers had evolved antagonistically? Microsoft continually building in schemes such that their files couldn't be transferred to IBM mainframes? Or Macintoshes? Or to the Internet? Not to say that Microsoft have made it any easier, mind you.

"Crafting and implementing an automation file exchange format across our industry is a example of the classic 'zero-sum' game. If all manufacturers do it, then it works out okay. If one console or automation manufacturer doesn't subscribe to it, then he 'wins' in the sense that a studio owner with that system keeps his clients locked in. There are ways around that, but it's far easier if everyone agrees to share data, as is done in virtually every other discipline involving this type of data."

HERTZ DESIRE

Most people in pro audio now seem to agree that the 16-bit/44.1kHz standard was aimed way too low for original recording and mastering — but what should we be aiming at? Will we be saying in 10 years' time that even 24-bit/96kHz wasn't good enough?

"In this business, you must realise that 10 years is a long time and we may be in for some technological leaps. I don't want to be cast as a recording prophet but, with the introduction of the DVD [Digital Video/Versatile Disk] in mind, my feeling is that 96kHz/24-bit, 'losslessly'-coded 5:1 channels are a good next stage. But we must keep in mind very real questions regarding what is audible and what is an extravagant, perhaps wasteful use of bandwidth. It's important that format agreements be reached, but somewhat flexible standards for the medium would do much to facilitate both creativity and archiving. I'd like to imagine a flexible format set, with room for the producer who might want two hours of sound in five channels for one project and stereo with extraordinary 200kHz for another. We have to work from a starting point and then expand the format as existing technology matures, costs come down, and wondrous technology becomes available in the future. For us, it's rosy if the format is kept flexible, and by that I mean that we as producers retain the ability to use the medium in different ways."

Do consumers really want greater dynamic range? In most domestic replay situations they're unable to use the dynamic range they've already got without either annoying their

sound on stage

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WRH

"My vocation is making artful records and hoping that they'll sell, while some producers strive to sell records and hope that people will think that they're art."

neighbours or losing the quiet bits in the ambient noise level...

"In my experience, what consumers 'want' is unclear. Hollywood is full of ex-geniuses who once seemed to know what consumers 'wanted'. I sure don't see anyone returning a new release and saying, 'You know, the dynamic range on this is difficult to control, either I can't hear it or it seems to annoy my neighbours'. Seriously, very few consumers deconstruct what we do — it's the producer who makes the call. I've been most successful when I work hard to make records that have rather modest goals, and that sounds really good to me in a number of studied ways. Consumers? Paraphrasing someone, if you give them quality, they will come."

Do you get involved with the mastering of your recordings?

"Oh yes, I am very much concerned with the mastering, and the processing at the plants as well — to make as certain as I can that a single-speed transfer is made, for instance.

"I work for producers and artists and the most important thing is to make the producer and artist happy. I am not generally concerned with the record company, and this gets me in a lot of trouble, because the modern record company wants to control the music, so they will often try to re-master and remix. Once again, when a record company does this for the wrong (which is to say, non-musical) reasons, it pushes me to the edge. For instance, if they give a remix to a certain popular mix engineer for political ends, I'm nearly homicidal. And my experience has been that if the record company gives my master tape to certain mastering engineers, sometimes it sounds as if they have processed it by looking at the meters. My mastering engineer of choice is Doug Sax, who I have known for 25 years. We have dinner every Thursday night. Sometimes we disagree, and sometimes he is paid a lot of money to recommend making no changes to what I bring in — he pays for dinner then. But, over the long term, I have been most proud of the records that he mastered."

"I really begin to hear my own records after five or 10 years have passed. I did a record for Earth Wind & Fire, 22 years ago, and I heard it used for a new Microsoft television commercial. Sounded great; it sounded like a new record, they've never done anything even remotely like it since. After all those years I had forgotten about how badly the so-called producer of the record treated me at the time. Temporarily."

HEARING PROBLEMS

Are you content to live with 'imperfections' in a take provided the performance is there?

"I guess so — what the hell is an imperfection, anyway? It is very difficult to say what is perfect in recording. We're looking for something that 'touches' someone's spirit, aren't we? That's not a very objective goal. Now, I've learned to overlook mic pops, even like them, even though most would call them 'imperfections'; also I like those little sounds from a person's mouth, the ticks and smacks. If I distract the vocalist when I stop the tape because of a pop, that could ruin that performance. I'm not likely to take that chance. The most important element for me is the performance, all of it. Going even farther: a pop in a vocal is a feature. It says to me that the vocalist is singing very close to my ear. She is so close that I can feel the warmth of her breath. To a record company, it is a problem. To me it is very sexy."

This is such a subjective area — we don't all hear these things in the same way.

"Almost everybody has a lot of trouble being accurate (or honest) about what they hear, and it is important to find somebody who can really tell you what they feel, from their heart — forgetting about what's hip to say. It has taken a lifetime for me to learn how to talk about what I hear. Also, another person will hear the same material from a different perspective, and from a different experience than yours. I think of the perception of sound as one perceives light on a given subject. You might imagine finding instrument sounds as looking at different ways to illuminate a subject. On a guitar, one may be asked to 'put mid-range on it so I can hear it better'. Often, that's not so musical. I might selectively take some mid-range artifact out of it — I would listen for something that was distracting. I would probably do the opposite of someone who wants to hear more guitar by boosting the mid-range, but it would make a better mix to my ears.

"You just have to listen very, very hard. Sometimes I have no idea what I am going to do, but then I find it. I always have an idea. I always have a lot of ideas, so if a producer doesn't like one idea, well, I have 10 more. I get my ideas from life. Some years ago, Allen Sides, myself and our friends went on a river trip down the Grand Canyon. Four days with no electricity and no music, no television and no telephones. We talked about music while we bounced down the Colorado river, listening to the sound of the canyons and the caves. We talked for days about Phil Ramone's old Verve recordings! The other people on this trip thought we were crazy, because we kept clapping our hands and listening to the returns — beautiful, long, rich, diffuse reverbs. After the trip, I came back, and for the longest time, I used 7-second reverberation on everything.

"I would suggest that the best work you do is for little or no money. It simplifies the dynamic between you and the artist, producer, label; you might have a chance of concentrating on what you are hearing. Earlier, I mentioned walking out of the session if somebody asks you to do something that doesn't make any sense; this is much easier if you're not counting on the session to pay for the rent and the kids' food. And if you're working for free to start with, that issue is already addressed. I guess you could say that the most important thing for me has become the pursuit of integrity. To make music with honesty and passion."

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LIQUID GUITAR

(AUDIO CD)

A record-company executive once told me that one out of every three records sold on the planet was a country and western record. A sobering thought, maybe, but country music has still never really had a huge marketplace for sample CDs, and the small number of CD releases that (in Europe at least) cater for this musical genre reflects this. There must still be, however, quite a demand for guitar licks, riffs and chord samples that could fit into both country and country/rock categories — as this 70-track audio CD from Voice Crystal proves.

The CD lasts for just over 68 minutes and is a comprehensive study of the playing styles and tones that make up a large section of the contemporary American music scene. It's split roughly into four main stylistic categories: National Guitar, Electric Slide, Pedal Steel and Acoustic. Although the country music influence is felt throughout, to limit this CD's use to just Garth Brooks soundalikes would be wrong. There are a good number of blues riffs, as well as a handful of 'wah-wah', Hawaiian guitar and sitar samples too. The pedal steel is also used to great atmospheric effect, and kd lang fans will take delight in the laid-back and subtle overtones that most of these samples have. In the sleeve notes the BPMs are listed where appropriate, and the key of each riff or slide is also mentioned to make the sampling process easier.

In nearly all of the categories each track gives you a number of variations on the main theme. For instance, the electric slide has a series of useful chord swells which are not only presented in the keys of B, C ,D, E, F, G and A, but also give you long and short versions of each. It's a similar story for many of the other tracks, some of best being the sliding National guitar samples, but in using this CD I found myself aching for a few more of the excellent riffs as opposed to just chords and arpeggio effects, of which this release has many.

The quality of the session musicians who put the disc together shines through in all of the performances, and will undoubtedly inspire and encourage all sorts of users to fuse these samples into more modern styles of music, but to say that this is a one-stop resource for modern American guitaring would be perhaps overstating it a little. Although the CD covers quite a lot of ground stylistically, I did find a few niggles: the CD signal breaks up occasionally and causes quite noticeable distortion in strange places. Potential users may also be interested to know that Voice Crystal ask that if you use these samples, you should send two copies of your finished work to either Cydonia Productions in the States or to Sounds OK in the UK. If you are happy doing this and you are on the lookout for some interesting Country/Rock influenced guitar samples with the emphasis on effect as opposed to out-and-out performance, *Liquid Guitar* could be well worth a look. *Paul Farrer*

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CREATIVE ESSENTIALS

(MIXED MODE CDS)

Creative Essentials is an ever-expanding series of low-cost sample CDs, which tend to be released in batches of 10. In addition to their audio content, the discs contain AIFF and WAV file versions of the samples, enabling them to be loaded into certain sample replay or sample editing programs, including Akai's *MESA*. WAV files can also be loaded into certain soundcards for replay. Because of the three different formats supplied on each disc, the amount of content isn't as great as you might get on an all-audio CD or CD-ROM, but you still get a lot of sounds for very little money. What's more, because of the large number of discs in the series, the material is broken down into very specific areas, ensuring minimum wastage.

The AIFF and WAV data are located on track 1 of the CD, which can't be played on a regular CD player. The remaining tracks are conventional audio tracks, concluding with a 1kHz test tone.

WOODWIND AND BRASS ●●●●◗

This disc comprises multisamples (usually six or eight samples per sound) of flute, clarinet, bassoon, woodwind section, cornet, flugel and piccolo trumpet; plus French horn, trombone, and trumpet, each solo and as a section. Also included are multisamples of trills and runs. Both long and short notes are included where appropriate, so there's no need to loop the sounds unless you need longer notes. However, the sustain part of the long notes is pretty even, so looping shouldn't be a problem. The recording quality is good and the instrument sounds are nicely played and tonally neutral, with no obvious reverb or ambience added.

ORCHESTRAL FLAVOURS ●●●●◗

Orchestral Flavours kicks off with an impressive selection of multisampled hits in major, minor and diminished keys, as well as in unison, before treating us to a selection of lovely hits with glissando. If sample replay synths have given hits a bad name, this collection should do a lot to restore your faith. Various string hits follow, as do sustained strings, string arpeggios, sustained chords, tone clusters and a large selection of orchestral percussion. The latter included timpani, snares, rolls, cymbals, gongs, triangles and castanets.

The sounds available here are better than on some premium-priced sample CDs I've heard and are beautifully recorded.

STRING TEXTURES ●●●●

This time the collection starts off with multisampled solo cello, viola and violin, including tremolo, pizzicato and short-note options. Basses

come next, followed by small ensembles of the various string instruments. The recordings have a nicely intimate, woody sound with plenty of character, and the different playing styles represented provide plenty of variety for creative arrangement. Again, these samples compare well with premium-priced sample sets.

VOICES OF AFRICA ●●●●

Changing pace somewhat, *Voices of Africa* provides a wide array of sung or shouted words and phrases with tempos listed where appropriate. Most of the examples have a nice tribal feel, though some are more gospel-like. A multisampled set of sustained notes is provided along with a selection of female yodels and male rhythmic chanting, clapping and long sung phrases. Both the performances and recording quality are good, and anyone into world music should find plenty of inspiration here.

ETHNIC FLAVOURS ●●●●

Ethnic Flavours is not, as I had hoped, a 'scratch and sniff' curry menu, but a cocktail of hits, grooves and wind instruments from around the world. Starting out with tabla rhythms and Indian flute riffs and note samples, the library progresses to African rhythms and sounds, including talking drums and bells. There are also sections of rhythm guitar, multisampled choir notes and operatic-sounding female vocal phrases.

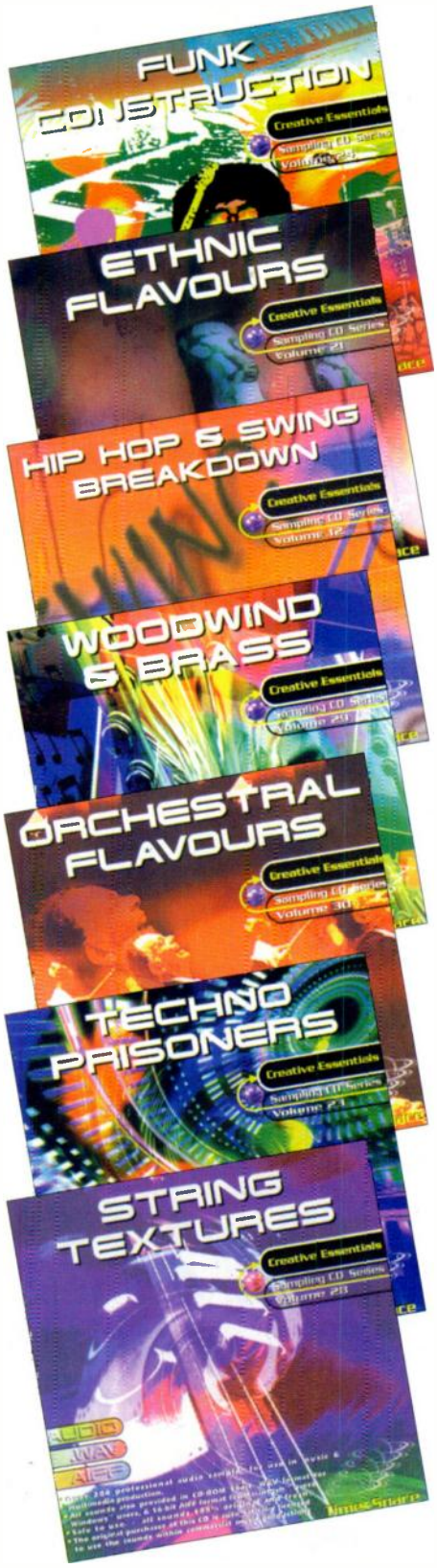
The disc concludes with various sounds from China, including flutes, Japanese percussion and a few South American instruments, among which are some nicely recorded pan-pipe multisamples.

WORLD CLASS BREAKS ●●●◗

As the name implies, here is a selection of rhythms ready for looping in a variety of contemporary dance styles, divided into hip-hop, swing, R&B and soul, acid jazz, indie dance, '70s funk, house, garage, trip-hop and jungle. Tempos range from 70 to 160bpm and four selections of five loops each are provided per style. The rhythms are pretty conventional, but that makes it easier to add stuff over the top if you want to. The sounds range from acoustic drums to drum machine, and the samples are fairly dry so you can add your own effects. The collection is more workmanlike than inspirational, but still very useful.

FUNK CONSTRUCTION ●●●

Funk Construction approaches life in a similar way to *World Class Breaks*, except that this one includes both loops and individual drum hits, enabling you to build kits to match the sound of the loops. After the drum kits come percussion grooves, various multisampled electric pianos, organs, clav and a few '70s



synth sawtooth, square and lead sounds. To finish, there are funky rhythm guitars, bass sounds, fretless bass, slap bass and a brass section. As on the previous disc, the drum loops sound a touch pedestrian, but a little EQ and effects would liven them up nicely.

Tempos for the loops are given on the sleeve where appropriate and the multisamples tend to be just one sample per octave. Some of the rhythm guitar licks are very nice and I particularly liked some of the conga rhythms, but the multisampled instruments were frankly rather dull. Worth a 3, though.

TECHNO PRISONERS ●●●◗

After you've got over the dreadful pun, *Techno Prisoners* comes up with a wide variety of sampled synth sounds, hits and drum loops, most of which are exactly right for the genre. The usual blips and nastily filtered synth stabs are present, along with a few riffs, multisampled synth sounds and pads. There are lots of loops on this disc combining rhythmic percussion with very electronic, analogue-type synth sounds, and these are divided into various styles over the tempo range 90-160bpm. If you want to be your own Chemical Brother, this might be a good disc to start out with!

HIP HOP & SWING BREAKDOWN ●●●●

First out of the bag comes a selection of nicely grungy drum loops with plenty of swing, all the way from 70-110bpm. Ethnic percussion also figures in this section, as do brush kits and highly processed drum sounds. To accompany the rhythm loops is a selection of synth bass loops and bass multisamples. Again these are analogue and fairly bland, but they fit the bill. To follow, there are 15 female vocal phrases in the 'Oh yeah, baby' style, some nicely gritty guitar chords and a number of bass slides.

Multisamples of Rhodes piano, organ, vibes and mono synth stack up alongside sax squeals, drum hit samples and electric piano to complete the picture. There are no huge surprises here, but if you need a musically useful set of samples to get you started, this is a bargain collection.

HOUSE & GARAGE CONSTRUCTION ●●●●◗

Not a DIY book for would-be home builders, but a whole collection of loops, instruments and noises for putting together house- and garage-style songs. The rhythms have a nice feel to them and there are 10 different loops provided at each tempo. Tracks 11 and upwards provide a handful of synth and bass loops complete with echo effects, plus some nice arpeggios, then it's on to multisampled synth sounds and Indian vocal snatches with reverb. Suitably cheesy house organ multisamples are provided, along with some rather good string, bass and ambient pad samples. Again, no new ground is being broken, but if you need a handy kit of bits at a bargain price, this one has to be worth it.

Paul White

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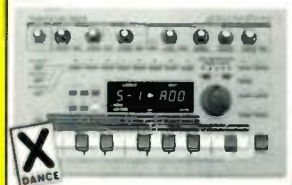

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Many of today's digital effects processors offer you considerable control over the creation of artificial ambiences for your music, and if you know how reverberation works in real spaces, you'll be better equipped for designing fake ones. HUGH ROBJOHNS boldly goes...

Reverberation is something that few people are consciously aware of, yet it is one of the most fundamental aspects of a room's sound character. If you were to blindfold someone, take them to an unfamiliar building and lead them through a succession of rooms, clapping or shouting in each one, they would almost certainly be able to give a pretty accurate description of the size of each room. If they were being particularly perceptive, they might even be able to suggest where they were standing in each room and probably even give some idea of what there was in terms of wall coverings, curtains, soft furnishings and so on! In other words, it is reverberation that gives your brain most of the information it needs to create an aural picture of your immediate environment.

Every room has its own sound or 'acoustic', and part of the job of a recording engineer is to assess whether a room's characteristic sound is worth using in a recording. If the dimensions, layout and fabric of the room enhance the recorded sound quality, all well and good, but if not, the microphone technique used should minimise any room sound so that an artificial acoustic can be added later from a reverb processor.

In this age of digital technology, artificial reverberation is not only more affordable than ever before, but can also be stunningly realistic and very controllable. With a good understanding of the physics of natural reverberation, and the fundamental operational principles of reverb processors, it is possible to quickly create the illusion of any acoustic environment you can imagine.

Remember, though, that if you choose to use artificial reverb, it is essential that the recording has the absolute minimum of the recording venue's room sound. If the original environment can be heard, adding extra 'fake' reverbs will just result in a cluttered sound and the mix will often become confused and indistinct.

TIMING

To understand what a reverberant sound actually is and what information our hearing system is able to extract from it, you need to think about how sound waves travel and what happens when they encounter various surfaces.

The first thing to consider is how fast sound travels in air. My old school physics books said 760mph and the new ones probably say 340 metres per second, but I find it hard to relate these numbers to anything meaningful (other than the average speed of traffic around the Evesham bypass in the morning....).

A much more useful figure to tuck away in the dark and dusty recesses of your mind is that sound travels roughly a foot each millisecond. Assuming that you're not too young to relate to feet as a valid dimensional measurement, this rule of thumb will allow you to calculate and set one of the most critical parameters of any reverb processor. One quick side note: the speed of sound varies with the condition of the air. Temperature, humidity and pressure (ie. altitude) all have significant effects on the speed of sound, and in certain applications the 1ft/ms guide is not sufficiently accurate. However, as far as dialling up room sounds on a reverb unit is concerned, it's close enough. Imagine that you're standing in the middle of a very large, brick-walled barn with a deep covering of straw on the ground. You have a spontaneous urge to clap your hands: what happens? Well, the very first thing you'll hear is the direct sound of your hand clap, and it's this direct sound that the brain uses to pinpoint the direction of the sound source.

Assuming that the hand-clap radiates sound waves in all directions simultaneously, the next thing you'll hear will be reflected sound from the various

room boundaries or nearby objects. As the floor of this imaginary barn is covered with a deep layer of straw, there will be no significant reflection from the ground (although in practice this is often a dominant source), so the first 'room sounds' will be reflections from the side walls and ceiling. If the barn measures 40ft by 60ft and is 20ft high, and assuming we're standing in the middle of it, the very first reflection will come from the roof, after about 30 milliseconds.

This time delay can be estimated by working out the distance the sound wave has to travel — if you're a man standing up in the barn, your hands and ears are likely to be about four and six feet respectively above the floor, so (20-4) + (20-6) = 30. Sound travels roughly 1 foot a millisecond, so it will take 30ms for the sound of the clap to reach the ceiling and return to your ears. Similar calculations reveal that the side-wall reflections occur 40 and 60ms after the initial direct sound.

The time taken for these first reflections to be heard goes a long way towards defining the perceived acoustic size of the room. Short delays imply small rooms, and long delays large rooms. To mimic this natural characteristic, artificial reverberation units normally allow the user to set the time delay between the direct sound and the very first reflection with a parameter called Pre-Delay. This is generally adjustable in millisecond increments (or finer) over an astonishingly wide range (see Figure 1).

So the first reflection comes from the closest surface, and is followed by others from the adjacent room boundaries, the whole ensemble being known as Early Reflections. The timing, relative amplitudes and timbre of these individual reflections are determined by three things: the placing, angles and nature of reflective surfaces; the location of the sound source; and the position of the listener. Moving any of these will change the relative timing of the early reflections quite significantly, but our hearing system is remarkably good at extracting even the most subtle information. Consequently, these initial reflections and their relative timing are very important in defining an imaginary acoustic space.

> "...artificial reverberation is not only more affordable than ever before, but can also be stunningly realistic and very controllable."

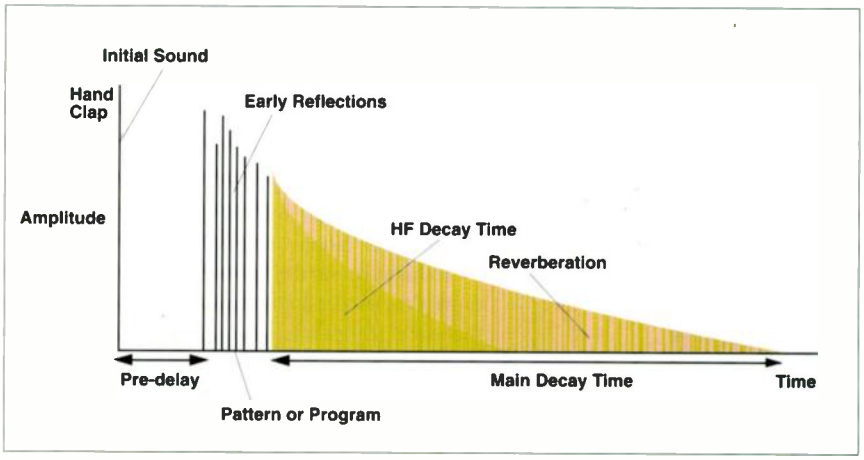


Figure 1: The relationship between an initial sound, pre-delay and early reflections.

The better reverb units allow the user to alter not only the value of the pre-delay, but also the number, grouping, timing, amplitudes and tonal qualities of the first reflections. In some cases, these parameters are preset by the manufacturer and are simply selected from a list of programmed options, such as Hall, Chamber, or Plate, although occasionally they are derived from measurements taken in genuine acoustic environments. The most sophisticated machines allow the user to specify the cubic volume of the imaginary room, or even its precise dimensions, together with the source and the listening positions!

TAILS

So first we hear the direct sound; then, a short time later, a number of discrete reflections return from the various surfaces in the room. However, these reflections don't just stop when they reach the listener — they continue until they reach other surfaces, where they instigate more reflections. These reflections start even more reflections and the sound density becomes too great to allow us to distinguish the reflections as separate events.

At each reflective surface, some of the sound energy is absorbed, and more is lost as the sound travels through the air — which is why reverberation gradually dies away. This reverberation 'tail' may last for anything from, say, 0.3 seconds (for a dead-sounding room), through to several seconds in a church or big concert hall.

The length of the reverberation tail is usually specified in terms of its 'RT_{60}'. This is defined as the time taken for the reverberation to fall by 60dB in level below the original direct sound. Every reverb unit allows this time to be adjusted, normally through a parameter called Decay Time.

It's important to note that the reverberation tail lasts for different durations at different frequencies. High-frequency sound waves have a lot of trouble persuading air molecules to vibrate quickly enough to pass the sound energy onwards. Consequently, ▶

Hugh Robjohns is a lecturer at the Centre for Broadcast Skills Training at BBC Wood Norton. The views expressed in this article are the author's own and are not necessarily those of his employer.

high-frequency sounds tend to die away, as they travel, much faster than mid-frequency sounds. On top of that, high-frequency sounds are absorbed by soft furnishings (which includes people and even wallpaper!). On the other hand, high frequencies reflect strongly from a wide range of surfaces, such as windows, sound desks, equipment racks, and so on. At the other frequency extreme, low frequencies are only reflected by large and very solid objects, so there may be little LF in the reverberation at all in some circumstances, but a definite bass 'bloom' in cave-like rooms!

To help provide this level of realism, most reverb units allow you to adjust the reverberation time for high (and sometimes low) frequencies relative to middle frequencies, and introduce some kind of overall equalisation to the reverberation tail.

KNOBS

Let's recap on the parameters that today's digital reverb processors are likely to offer for the simulation of real acoustic spaces. Firstly, although I haven't previously mentioned it, there is usually a means of balancing the direct sound against the reverb. The direct sound is often referred to as 'dry' and the reverberation as 'wet', so a wet/dry control will probably be in there somewhere. Some of you will know how unpleasant it sounds when an analogue-to-digital (A/D) converter is overloaded, so a critical control on digital reverbs is the input level control, and its associated headroom meter.

The first control which defines the reverb character is pre-delay, which effectively defines the distance of the first reflective surface. This will be followed by one or more parameters for controlling the number, timing, amplitude, and timbre of the other early reflections. Some machines provide controls called 'Pattern', 'Level' and 'Room Size'; others might simply offer preset venue simulations ('Hall', 'Chamber', 'Jazz Club', and so on).

After the early reflections, the reverberation tail is set by a control for overall decay time. This is normally accompanied by a parameter that adjusts the relative decay time at high (and perhaps) low frequencies. There's usually also some means of setting overall tonal characteristics, although this may be little more than a simple bass and treble equaliser.

Finally, having skilfully set all of these parameters to create a wonderfully believable artificial acoustic(!), you can usually store your fake room in one of a number of user memories.

CREATING SPACES

You cannot create an artificial acoustic space if you don't know what a real one sounds like to start with, and the only way you can find out is to actively listen to sounds in as wide a range of environments and circumstances as possible. Everyone has a very detailed subconscious knowledge of how different rooms sound, and although few are able to analyse the reverberation structure, most spot incongruities in artificial reverberation very easily.

It's very revealing and informative to consciously listen to the sound of different rooms as you move around in a building — even in places with which you thought you were familiar. Try to analyse in your own mind what sort of pre-delay, decay time, early reflections and high-/low-frequency decays naturally occur to create the 'sound' of that room. Don't just listen to indoor reverberations, either — try to assess the reverberant features of the local high street, the great outdoors, a wood or forest, or wherever you happen to be. You will find reverberation in places you didn't expect it, and may be surprised to discover that places you assumed to be reverberant actually are not!

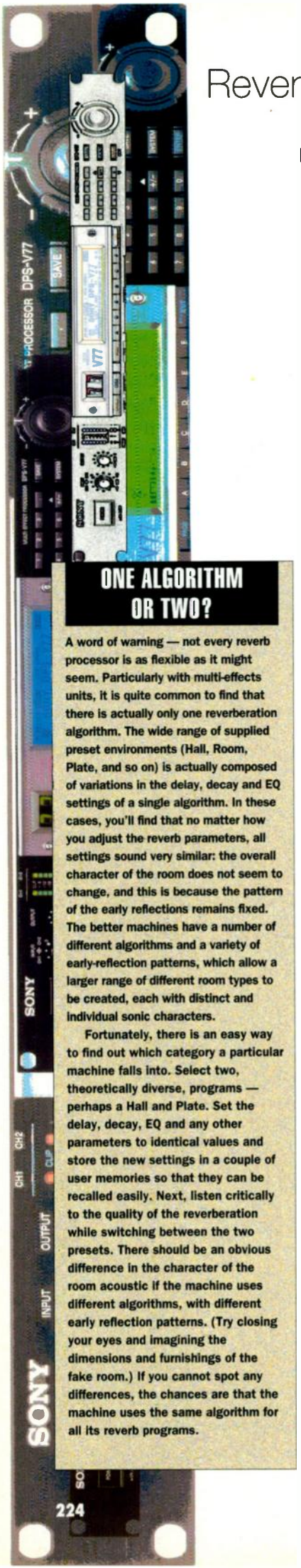
MONO AND STEREO

The very nature of genuine reverberation is that it tends to come at you from all over the place, but particularly from the sides of the room. This has significant effects on the compatibility between stereo and mono versions of your mix, since the mono listener is effectively denied any information from the sides of the stereo image.

To see how this happens, consider a simple M&S (Middle & Side) stereo microphone technique being used to record something in a reverberant room: the stereo listener hears the full acoustic in all its glory, but the mono listener hears only the forward-facing 'M' microphone, not the sideways-facing 'S' microphone — and guess which one picks up the bulk of the room sound? This absence of reverberation in mono afflicts artificial reverb processors as well as natural acoustics. In practice, the amount of reverberation heard in mono may be substantially less than that in the stereo balance, and if mono listeners are likely to be an important part of your music audience, always check for mono compatibility. In general, you almost always have to compromise the balance in some way because either the mono will be too dry, or the stereo will be too wet!

> "You cannot create an artificial acoustic space if you don't know what a real one sounds like to start with..."

Tricks worth trying include reducing the stereo width of the reverb (turn the pan-pots in a bit towards the centre instead of having the reverb returns running out to full left and right), or mix in a small amount of reverb from another reverb processor, panned centrally. The extra reverb should be set up with the same parameter values as the stereo reverb, although a slightly shorter pre-delay and longer HF decay time often work well. The balance between the dry sound, the



ONE ALGORITHM OR TWO?

A word of warning — not every reverb processor is as flexible as it might seem. Particularly with multi-effects units, it is quite common to find that there is actually only one reverberation algorithm. The wide range of supplied preset environments (Hall, Room, Plate, and so on) is actually composed of variations in the delay, decay and EQ settings of a single algorithm. In these cases, you'll find that no matter how you adjust the reverb parameters, all settings sound very similar: the overall character of the room does not seem to change, and this is because the pattern of the early reflections remains fixed. The better machines have a number of different algorithms and a variety of early-reflection patterns, which allow a larger range of different room types to be created, each with distinct and individual sonic characters.

Fortunately, there is an easy way to find out which category a particular machine falls into. Select two, theoretically diverse, programs — perhaps a Hall and Plate. Set the delay, decay, EQ and any other parameters to identical values and store the new settings in a couple of user memories so that they can be recalled easily. Next, listen critically to the quality of the reverberation while switching between the two presets. There should be an obvious difference in the character of the room acoustic if the machine uses different algorithms, with different early reflection patterns. (Try closing your eyes and imagining the dimensions and furnishings of the fake room.) If you cannot spot any differences, the chances are that the machine uses the same algorithm for all its reverb programs.

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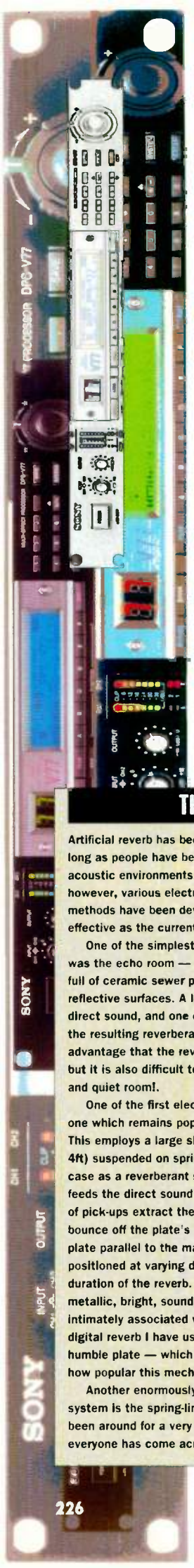


Reverb from First Principles

mono reverb, and the stereo reverb needs to be adjusted carefully, while you continuously switch between mono and stereo listening to find the most uniform results in the two modes.

In matrix surround systems (such as Dolby Surround), real or artificial stereo reverb tends to spread across the rear channel quite naturally as a result of the way in which the rear-channel information is encoded and decoded. Altering its stereo width controls the front-back balance, narrowing the reverb pulls it to the front, and increasing the width pushes more to the sides and rear.

Many stereo digital reverb units have a single input and a stereo output, and this often causes people to wonder how the reverberation can be 'true stereo' with only a mono input. The answer is simple if you consider the real situation of a sound source within a reverberant space.

If someone claps, there's only one sound source, yet the reverberation will come from all directions and could be captured by a simple stereo microphone array — a mono input to the room and a stereo output from it. Of course, in a more complex situation with, say, a string quartet in the room, there are multiple sound sources and each will have slightly different pre-delays and early reflection patterns, but this is usually a very subtle distinction, and in practice the mono-in, stereo-out system of most digital reverb units works perfectly adequately.

Something few people ever check is the line-up of a stereo reverb unit. However, it is a stereo source and should be treated in just the same way as any other stereo signal, which means making sure that the left and right reverb outputs have the same gain and equalisation through your mixer. I find that a quick, easy and reliable method of doing this is to simply dial up a 3- or 4-second decay time and send a brief burst of signal into the machine. Listen carefully to the dying reverb tail: it should decay centrally, possibly even becoming narrower in width as it goes (although this depends on the particular algorithm). If the reverb tail appears to collapse towards one side or the other, your return channels have different gains and should be adjusted.

CHOOSING AND USING REVERB

In general, two reverb units will meet the needs of pretty much every recording situation. One machine would normally be set for a short, bright sound (perhaps a plate setting) for percussive sounds, whilst the other would be set to a longer, warmer patch, providing a 'lush' quality for vocals and solo instruments. You could also try passing some instruments through both reverbs (percussive one first) for a third alternative.

Some engineers like to use several reverbs to create a layering effect, but I generally find that this approach causes

THE MUSEUM OF ARTIFICIAL REVERBERATION

Artificial reverb has been around for more or less as long as people have been performing in non-ideal acoustic environments. In more recent times, however, various electronic and electro-mechanical methods have been developed, although none was as effective as the current generation of digital designs.

One of the simplest and most obvious systems was the echo room — literally a room, often tiled and full of ceramic sewer pipes to provide a wealth of reflective surfaces. A loudspeaker generated the direct sound, and one or more microphones collected the resulting reverberation. The echo room has the advantage that the reverb is naturally very complex, but it is also difficult to adjust, and requires a large and quiet room!.

One of the first electro-mechanical systems (and one which remains popular to this day) is the plate. This employs a large sheet of metal (typically 6ft by 4ft) suspended on springs within a sound-deadening case as a reverberant space. A vibrating transducer feeds the direct sound into the metal plate and a pair of pick-ups extract the reverberation as the vibrations bounce off the plate's edges. A motorised damping plate parallel to the main one can be remotely positioned at varying distances to control the duration of the reverb. The plate has a characteristic metallic, bright, sound quality which has become intimately associated with pop music. Virtually every digital reverb I have used includes a simulation of the humble plate — which is a very good indicator of just how popular this mechanical system remains!

Another enormously popular electro-mechanical system is the spring-line reverb. This technique has been around for a very long time, and I'm sure everyone has come across guitar amps with spring reverbs installed. The operating principle is similar to the plate, in that a transducer sets up vibrations in a spring, which rattle back and forth, to be extracted by a pick-up at the other end. The character of a particular spring reverb unit is fixed (other than the wet/dry balance), but can be optimised for the sound source at the design stage by careful choice of the number, length, diameter and compliance of the spring(s).

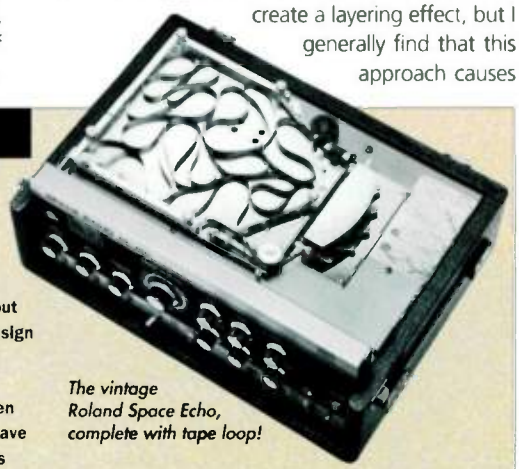
All manner of record-replay systems have been developed to provide a reverb effect, but none have survived the digital revolution. The earliest ideas simply used a three-head tape machine, where the direct signal was recorded onto tape and the replay signal provided the reverberation. The tape speed and head spacing determined the pre-delay and if some of the replay signal was mixed with the direct signal, a pseudo-reverb could be created. The results are hardly realistic, but the system was popular at a time when the alternatives were too expensive or impractical.

The record-replay theme was further developed into machines like the WEM Copycat and the Roland Space Echo, which used tape loops and multiple replay heads, with the ability to adjust the contribution and feedback of each head — but then solid-state technology arrived...

Bucket Brigade systems became popular for a brief time (fortunately) just before the first true digital reverb machines hit the market. Bucket Brigade delays were a halfway house between analogue and digital systems, but were no more realistic or flexible than the earlier tape-loop products — and were often a lot noisier!

The advent of digital technology really revolutionised artificial reverb, basically because the time-domain signal processing of digital audio lends itself very well to the kind of sound manipulation needed to create realistic reverb. Creating a pre-delay is simply a case of storing sound in a memory until the required time has passed. The early reflections are created by replaying the direct sound repeatedly at suitable moments, with level and equalisation changes as necessary. The main body of the decay is created by cycling the direct sound through a complex set of short feed-back and feed-forward delays, configured to introduce the desired equalisation characteristics.

Digital reverbs are available to suit all pockets from a large number of manufacturers, including Yamaha, Sony, Digitech, Klark Teknik, ART, Ensoniq and Alesis, to name but a few. However, if you ask any professional sound engineer to name their favourite reverb machine, chances are you'll hear one name above all others. Lexicon are probably the most popular manufacturer of digital reverbs, and their product line extends from push-button preset units to the most complex state-of-the art systems.



The vintage Roland Space Echo, complete with tape loop!

a loss of definition and adds confusion to the overall sound. Going back to the idea that the artificial reverb is merely replacing the poor acoustics of a less-than-ideal recording venue, it could be argued that there should only be one reverberation sound for everything, as would be the case if the musicians all played live in the same reverberant room!

The next issue to address is how much reverb to use. The classic mistakes of the novice are using too much reverb return on everything and allowing reverb tails to be too long. Reverb generally needs to be subtle, and ideally only the loudest musical

"You will find reverberation in places you didn't expect it."

peaks should cause obvious tails. Even the biggest halls rarely have a reverb time in excess of four seconds, and often a two-second decay time is easily long enough.

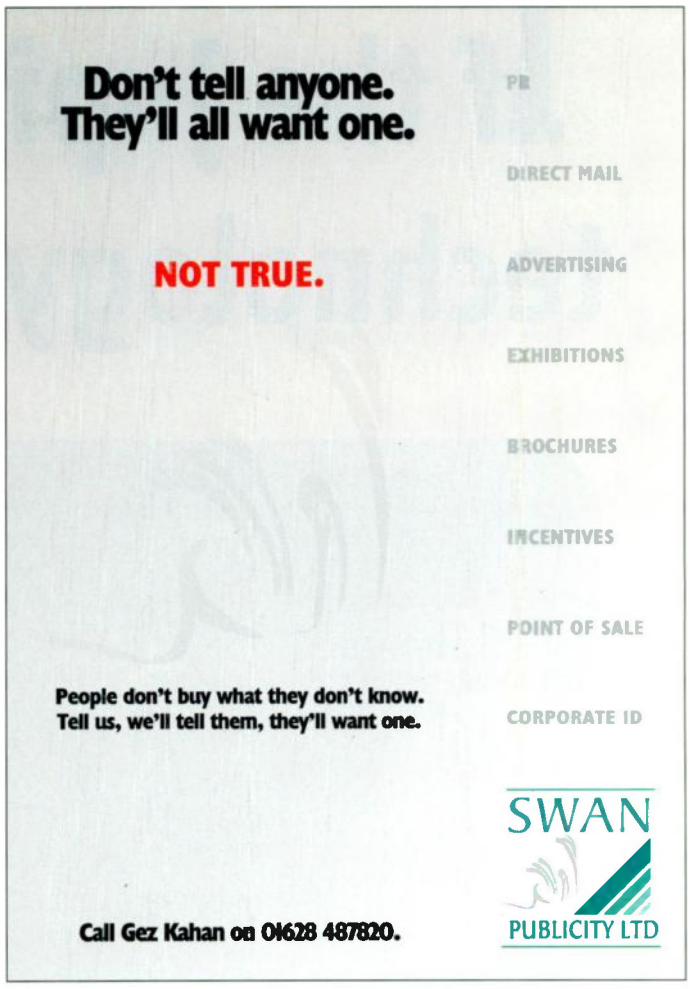
The choice of reverb parameters is dependent on both personal taste and the nature of the programme material, so it's impossible to give specific recommendations, but try to create life-like environments wherever possible. Most reverb units offer a number of special effects, such as gated or reverse reverbs, and these are best used sparingly, so that they keep their impact. While we're on the subject of special effects, it's worth trying out the pseudo-reverberation programs too. Algorithms such as 'Ambience' or 'Alive' can often add extra definition and life to dull vocals, or spice up closely-mic'd solo instruments without your having to resort to using those horrible exciters (just a personal opinion, of course...).

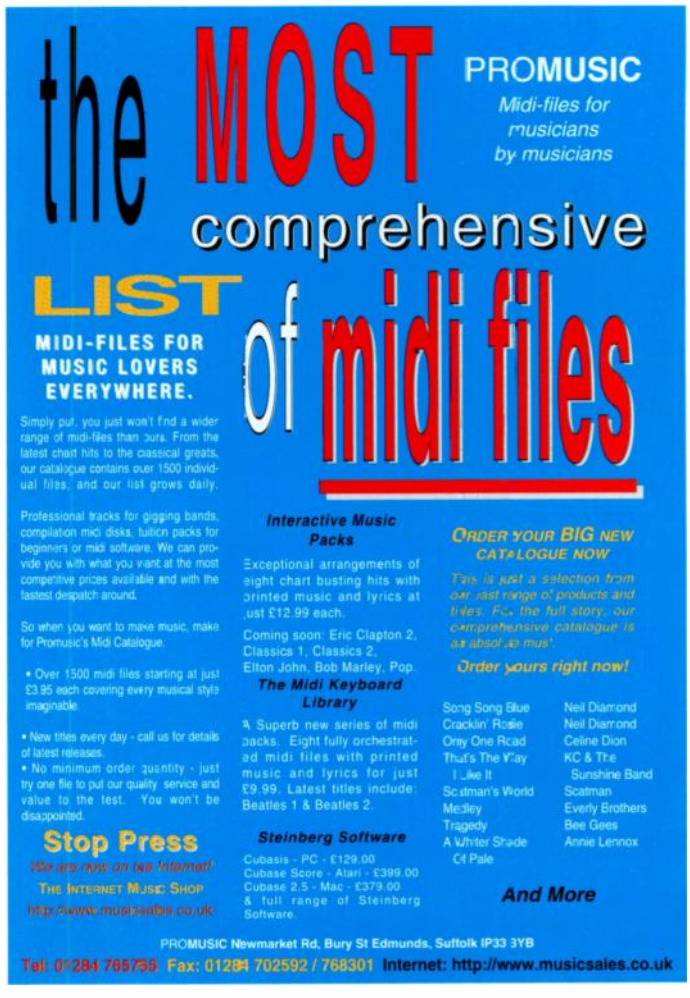
Normally, reverb sends are taken post-fader, so that direct signal level adjustments are reflected in their reverb returns. However, it can often be useful to send pre-fader, and not allow any direct signal into the final mix at all. This is particularly effective with sustained keyboard string sounds and the like, where it helps to make less-than-ideal synth sounds blend a lot more smoothly.

Another useful trick is to set up a reverb specifically for the keyboard sounds, and route the reverb returns through a chorus unit. This provides a completely different kind of sound to chorusing the keyboards directly and adds an interesting 'swirling' quality which can be very effective if used discreetly.

Although reverb processors are most important during mixdown, they're also vital during recording, especially when recording vocals. Many singers have enormous trouble pitching properly without reverberation and it's essential to have the ability to route reverb returns to the headphone monitor mix. The reverb setting for the cue monitor is not particularly critical to the performance (provided it is broadly appropriate) and need not be recorded, although some engineers do like to record voice and reverb together (occasionally as a complete mix but more usually on adjacent channels on the multitrack machine). This is particularly useful if the reverb plays a part in the performance (through timing or percussive vocal effects, for example).

As artificial reverb becomes more and more elaborate, there's a trap which many engineers find themselves falling into. It's possible to become so engrossed in adjusting each parameter minutely, trying every possible combination along the way, that you lose sight of the original idea. The best way of getting the sound you want, quickly, is to understand the nature of real reverberation and apply that knowledge to creating the acoustic space you've imagined. It's far better to think for a minute or two, and then dial the right numbers in, than to sequentially try every preset on the machine, hoping to stumble across something that sounds OK.





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DISC-O-TECH

USING *TOAST* & *MASTERLIST CD* TO MAKE CDS IN THE STUDIO

Now that CD writers and well-specified CD-burning software are becoming more affordable, you might like to think about the advantages DIY CDs could bring to your studio. MIKE COLLINS explains the benefits and takes you through the burning process using two popular software packages.

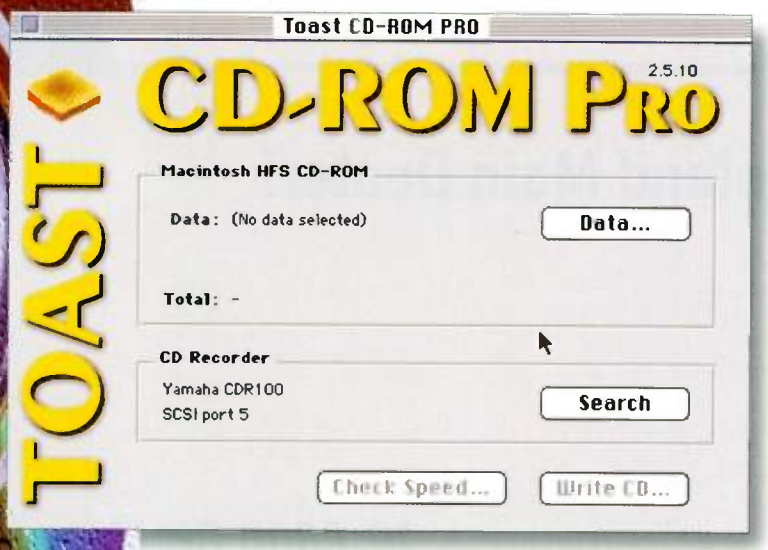
Like many studio owners, you may have started to notice some great deals on CD writers and software at around half the price they were this time last year; you might be wondering whether you could now take the plunge into making your own CDs. You probably already have a suitable computer, and maybe you also have a digital audio card for it. Already, your hard disks are full of data, and opticals for backups are not particularly cheap — so a CD-writer could do a lot for you. A whopping 650Mb of computer data can be backed up on a CD-ROM disc for around a fiver, and you can also make an audio CD with the same machine — if you have the right software.

THE HARDWARE

There are lots of CD-R drives available to choose from, and I have had successful results using the Sony 920, the Plasmon 4240, and the Yamaha CDR100. These drives offer different speeds of writing, with the Sony and Plasmon offering up to 2x speeds and the Yamaha offering 4x speed. A 1x machine takes as long to write the disc as the audio lasts, while 2x halves the time taken and 4x quarters it. Of course, this also depends to some extent on the CPU speed of the computer you are using and the capabilities of any other software or hardware involved. You need to use a fast hard drive, ideally an AV model which will stream the data onto the CD-R disc with no interruptions, and you'll need an audio card if you go for Digidesign's *MasterList CD* software.

You also need to give some thought to blank discs (as these are not all made equal), particularly if you want to burn discs at 4x speed. I stick to well-known brands such as Maxell, HHB and TDK, and I have had problems with some other makes refusing to burn successfully.

I use a PowerMac 9500/132 computer with Digidesign Pro Tools III installed, although until recently I was using a Quadra 950 with a 4-channel Pro Tools system, which also worked extremely well. As far as software is concerned, I started out with Astarte's *Toast CD-ROM Pro* so that I could back up my Macintosh files more cost-effectively and ended up shelling out plenty of extra dosh for Digidesign's *MasterList CD* so that I could produce professional-quality audio discs.



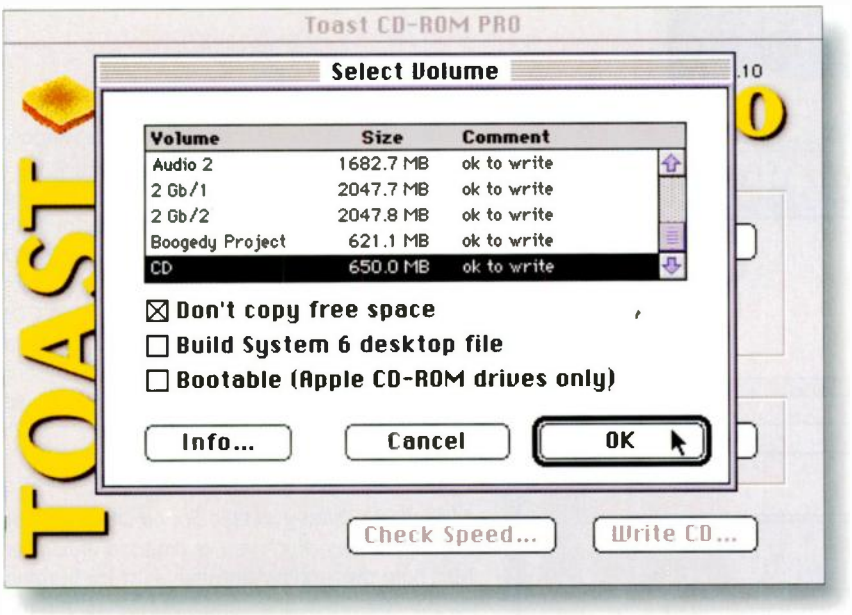
Toast's main window.

USING *TOAST* TO BURN A CD-ROM DISC

There are two ways to do this. If you have a hard disk of up to 650Mb in size, you can simply select this from within *Toast* and 'burn' it to disc. If you're using a larger hard drive, you can create a temporary partition, of up to 650Mb in size, and then copy the data you want to record to CD-ROM into this. Just select the relevant item from the Options menu, and you'll be able to name the partition and select which drive to use. A temporary hard disk icon, which behaves just like a normal hard disk, will appear on your desktop. Copying the files you want to back up onto this temporary partition will ensure that they are all contiguous (with no gaps between the data) and available from the same drive. They will then be more likely to burn successfully onto the CD-ROM.

To back up your Macintosh data or audio files, you just double-click on *Toast CD-ROM Pro*, and up comes a window where you can search the SCSI ports to locate your CD-R and select the data to write to the disc. If you are making a Mac HFS CD-ROM, the software conveniently defaults to this mode, although you could select other modes for different types of disc from the CD-ROM menu at this point.

In the main window of the software (see left), you use the Data button to select the hard disk volume you want to burn to disc. If you have partitioned your hard disk drive using disk-formatting software such as *FWB Toolkit*, you can split the disk into two or more partitions which will each 'mount'



Toast's Select Volume dialogue box.

on your Macintosh desktop as though they were quite separate disk drives — and they are, as far as your files are concerned. The Select Volume dialogue box which comes up lets you choose from the different drives currently hooked up to your computer. Here you can select from various options, including 'Don't Copy Free Space', 'Build System 6 Desktop File', and 'Bootable'. This last option is the one to go for if you're making a CD-ROM disc with Macintosh files, including a Macintosh System Folder from which you might want to boot up your computer. For instance, you might want to put the entire contents of your internal hard drive onto a CD, so that if the internal drive ever goes down you can re-boot from the CD-R backup, re-format your internal drive, and then copy the data back to your internal drive. This trick doesn't work with all CD-ROM drives, though — mostly only with the newer Apple CD-ROM drives which are built into many of the current models. And don't forget that you should be backing up your work files as you go — to optical disc, DAT, or whatever.

At this stage, be sure to carefully arrange the folders on the hard drive that you are writing to disc, to make sure that the windows open in sensible positions onscreen and that the files are arranged neatly — because you can't change your layout after you've written the disc!

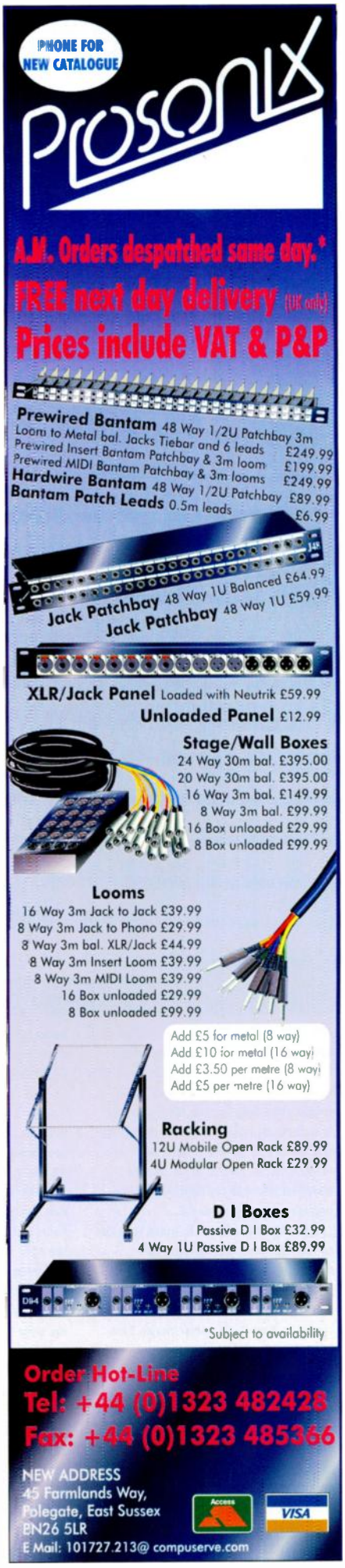
When you're using a particular combination of computer and hard drive for the first time, it's wise to test the system to see which writing speeds will work successfully — so hit the Check Speed button. After using the Start button, wait until the low and high figures settle. The required data transfer rate is displayed below, so that you can check that your system is fast enough. I used a temporary partition of 650Mb on a Micropolis 4Gb A/V drive with my PowerMac 9500, and there was more than enough speed available to write to the disc at 4x speed.

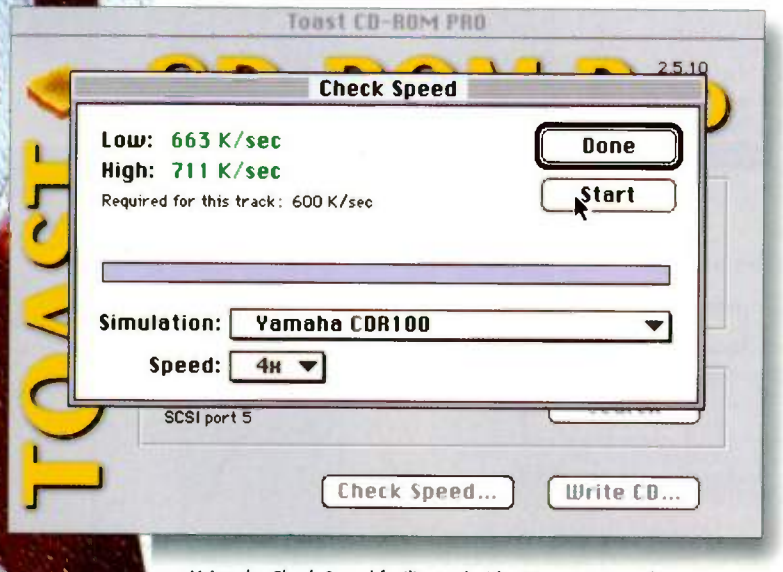
Once you've chosen the speed, hitting the Write CD button will cause a prompt to insert a CD-R blank to appear. Finally, you'll be presented with the Write CD dialogue window. Many CD recorders, such as the Yamaha CDR100, will let you create multi-

BITS & PIECES: HARD DRIVE FRAGMENTATION

You must make sure that your hard drives are not fragmented before you try to burn a disc. Fragmentation of computer files can start to occur as soon as you start editing files, or when copying to a partly-filled hard disk from which files have been previously deleted. When a file is fragmented, part of its data has been written to a different part of the hard disk, and is physically separated from the main body of data. When you read the file back, the disk's read head will have to jump across to this 'orphaned' data, and then perhaps jump back again. With a badly-fragmented file, the read head could be jumping around all over the place! This skipping about takes longer than simply following a set of continuous data along the disk, and can lead to breaks in the stream of data being transferred onto the compact disc — which means death for the disc you're writing to.

One way of ensuring that there's no fragmentation is to copy all the files onto a newly-formatted hard drive or a newly-created hard disk partition of the correct size. But then there's always that last-minute edit you wanted to do on one of your audio files, or that last-minute change of mind about which files to include in your backup. And that's where the fragmentation starts. If there's even the smallest chance of fragmentation having occurred, you should check out the state of your disk drive using Norton Utilities *Speed Disk* software, which will report on the amount of fragmentation and let you de-fragment your disk by rewriting the files to the disk consecutively.





Using the Check Speed facility to decide CD-writing speed.

INFORMATION

Toast CD-ROM Pro is usually supplied as part of a CD writer package, but some retailers, including TSC, may be able to obtain it to individual order.

A TSC, 9 Hatton Street, London NW8 8PR.
T 0171 258 3454.
F 0171 262 8215.

Digidesign *MasterList CD*:

A Digidesign UK, Avid Technology Ltd, Westside Complex, Pinewood Studios, Iver Heath, Pinewood, Bucks SL0 0NH.
T 01753 653322.
F 01753 654999.

session discs, so you could write, say, 100Mb of data the first time, then add another 200Mb on a second session, and fill up the remaining 350Mb later. *Toast* therefore gives you options to write either a single session (which you would choose if you had a smaller amount of data than space on the CD and you wanted to write subsequent sessions), or to write the data to the whole disk (which I chose, as I had almost 650Mb to write). At 4x speed the disc took about 17 minutes to write, and at the end of this time you can choose to verify the data if you like. Verification actually takes about the same length of time as writing the disc, so you can eject the finished disc at this point if you prefer. If you then put the disc back into your CD-ROM drive, you'll see that the directory now has a small lock icon at the top left of the window to indicate that you cannot write to this disc.

That's just about all there is to it! You can make CD-ROM discs that can hold data for both Mac and PC, and you can also make an audio CD using this software — but these are basic discs which you cannot use for pressing a run of CDs from, as there is no way to enter the specialised PQ subcodes needed for commercial discs. So if you're serious about making audio CDs you should check out Digidesign's *MasterList CD*.

MASTERLIST CD AND AUDIO DISCS

MasterList CD lets you take *Sound Designer II* or AIFF audio files which you've digitised onto your Mac hard disk and put these in a list for burning to CD. You can audition the files from within the list, rearrange playing order, and adjust the levels of the individual tracks. You can even insert crossfades between adjacent tracks, although you may run into limitations here, depending on how much free RAM you have available. You can also enter all the PQ subcodes used for commercial CD production into a separate window which lists all the start times and track lengths, and has fields to enter the subcode data.

You can use this software with any of the Digidesign cards, from the humble Audiomedia to the mighty Pro Tools. Actually, the Audiomedia card is not all that humble when it comes to burning CD-ROMs, and even the older Sound Tools and Pro Tools 4-channel cards work extremely well. Depending on your combination of CPU, hard drive, CD-R drive and Digidesign card, you may have to write an 'image' file to disk first — which ensures that all the data is in one long, unfragmented file ready to stream onto the disc.

WHAT DO YOU NEED?

• COMPUTER & DRIVE

Ideally, you should go for one of the faster models of computer and pair this up with one of the faster A/V disk drives. The data has to be shifted by the computer from the hard disk onto the CD pretty fast and with no interruptions, so the drive should suspend thermal recalibration while delivering data to the CD.

Having said this, it is quite feasible to run older, slower models of computer and hard drive and still successfully burn discs, especially if you're happy to use normal speed and take the time to prepare image files.

• SOFTWARE

The best choice of software for creating CD-ROMs is, without question, Astarte's *Toast CD-ROM Pro*. I've checked out several competing packages on the Mac and nothing comes close to *Toast* for ease of use and ease of learning. You *can* create audio discs using this software, but for serious work of this kind you need a dedicated package such as Digidesign's *MasterList CD*.

• AUDIO HARDWARE

How do you record the digital audio to your hard disk in the first place? All the latest Macs feature built-in 44.1kHz/16-bit audio circuitry, and you can connect your DAT or other audio source to the analogue audio inputs on the Mac and record audio to disk using a wide range of software, such as *SoundEdit 16* or *Cubase VST*. Another option recently available from Korg is the new Soundlink DRS 1212 I/O PCI card, which has two analogue inputs and outputs, an S/PDIF I/O, and an ADAT 8-channel optical I/O. The useful thing to note here is that the ADAT optical link can be used with an increasing number of third-party products, to let you interface the card with other digital audio recorders or mixers. The DRS 1212 comes supplied with OCS's *Deck II* software and costs about the same as a Digidesign Audiomedia III, or maybe a little less.

Alternatively, you can buy a Digidesign audio card such as the above-mentioned Audiomedia III. This features S/P DIF I/O and eight analogue inputs and outputs on a PCI card. If you've just won the lottery, you could go for one of the professional Digidesign systems, such as the Pro Tools III TDM 16-channel (expandable) system, to which you can connect Digidesign's professional rackmountable interfaces with AES/EBU and S/PDIF I/O, eight analogue inputs and outputs, sync signal inputs, and so forth.

One point to note with the Digidesign cards is that the different combinations of cards and Mac CPUs don't all support real-time writing of CDs at 2x and 4x — some combinations will only allow you to write a pre-prepared 'image' file at the faster speeds. You need to consult the documentation which comes with *MasterList CD* to check which combinations allow which writing speeds, or call Digidesign technical support to ask before you buy. It is also worth pointing out that several authorities say that writing audio discs at 2x speed produces the best results, with the fewest block error rates.

So should you pay out for an audio card if you have a Mac which will record audio at 44.1 kHz/16-bit quality? First of all, a card will let you transfer digitally from DAT or CD sources, while the standard Mac will not. This is important if you want to avoid a couple of D/A and A/D conversions, and the Mac's A/D converters are certainly no match for those in the dedicated audio cards. Also, if you intend to do any multitrack recording, the dedicated cards always make a much better job of this than the standard Macintosh hardware. I have encountered a fair few glitches and distortions when playing back audio using the Mac's internal circuitry, while I have very rarely encountered anything amiss when replaying using any of the audio cards. So the short answer is yes — if you can run to it!

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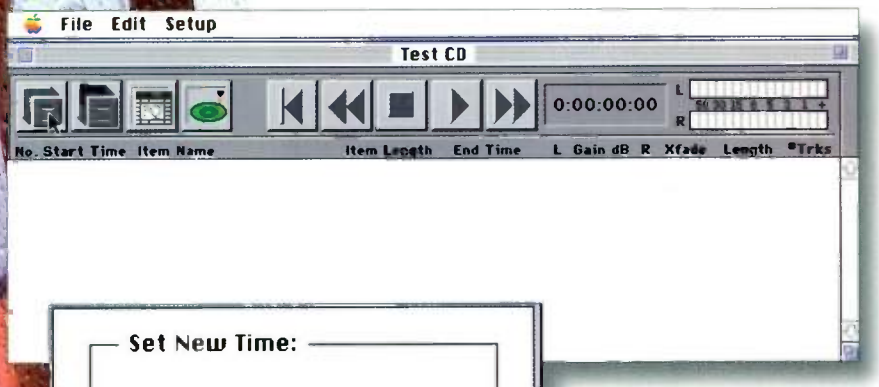


Above: An empty list in MasterList CD.

Left: Setting track spacing.

CD RECORDERS: MAKING THE WRITE CHOICE

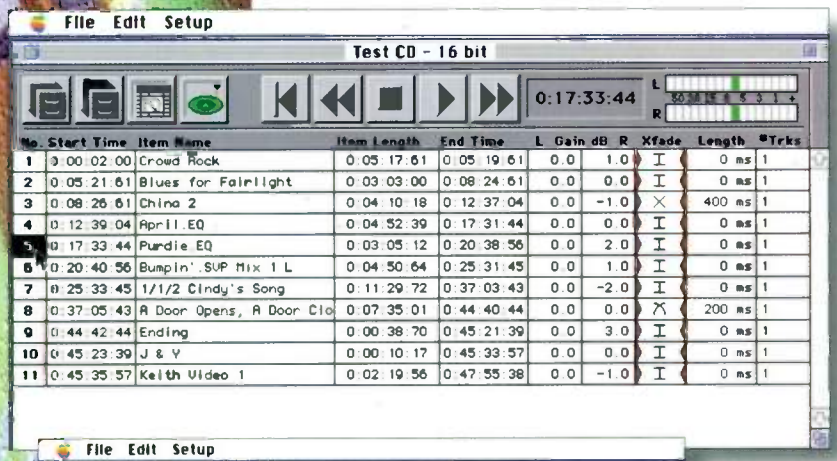
There are plenty of CD recorders to choose from, including models from Sony, Plasmon, Yamaha and others. I'm using a Yamaha CDE100, which features single-speed (1x), dual-speed (2x) and quad-speed (4x) recording.

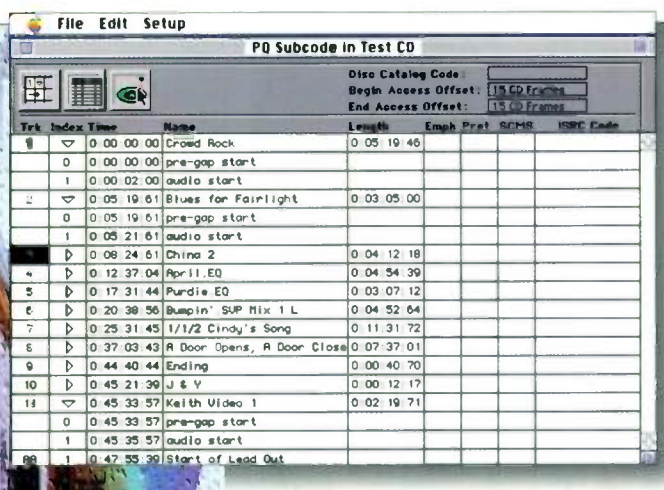
This drive conforms to all the standards, including White Book, Red Book, Yellow Book, Blue Book, Green Book, and Orange Book — the last of which allows incremental writing of multi-sessions, as well as featuring disk-at-once and track-at-once capabilities (so you can create CD-DA, CD-ROM, CD-ROM-XA, or CD-I discs with appropriate software). The CDE100, unlike some drives, also supports Simulation Mode, Catalogue Numbers, ISRC codes, Audio Index points and Copy Prohibit, and allows a minimum track-spacing of 0 seconds.

▶ You don't necessarily have to use a Digidesign system to digitise the audio, now that PowerMacs feature a built-in 44.1kHz/16-bit audio digitiser, but if you have your audio on DAT you'll probably value the digital inputs on the Digidesign cards. You do need to 'top and tail' your digitised files and perform any final edits, compression or EQ using *Sound Designer II* or Pro Tools software before you're ready to start with *MasterList CD*. As when creating a CD-ROM disc, you need to put your audio files on a clean hard disk partition, or be prepared to defragment the drive containing the source files before writing the audio disc. If you copy files to a clean hard disk partition, you'll need sufficient hard disk space to create this. I often find myself using *Toast CD-ROM Pro* to create a temporary hard disk partition to use with MasterList CD, as using a temporary partition makes such a lot of sense in practice.

Once you have all your files ready on a suitable disk partition, launch *Masterlist CD*. An empty list appears. You'll usually set the item spacing first, so that there is a gap of, say, two seconds between each track. Clicking on the icon at the left of the screen allows you to import your audio files and place these in the list. You can set crossfades between tracks, adjust the gain settings for left and right channels independently, and rearrange the order of the tracks by dragging the track numbers at the left of the list.

To enter subcodes, hit the PQ icon near the top left of the screen, to bring up the subcode editor. Here you can enter a catalogue or bar-code number for the disc, turn the digital copy protection or Serial Copy Management System flags on or off, turn the emphasis flag on or off, or enter an ISRC code for each track. If you set the SCMS flag to 'on', this will enable the user to make just one digital copy and no more. Emphasis is used on some recordings, mostly those made on earlier designs of DAT recorder: if your audio has been 'emphasised', this means that its frequency balance has been altered by the DAT recorder to 'fit' onto the tape better, and the original frequency balance needs to be restored before playback. Most DAT players have de-emphasis circuits built in for playback purposes, but the emphasis flag in the digital data has to be set so that the player knows it should use the de-emphasis circuitry. The International Standard Recording Code is an identifier code which can be used to track all the holders of rights in the music contained on the disc, such as the performers or the writers of the music. These codes are normally issued by a record company, who will keep records to relate the codes to the personnel involved in the recordings. Of course, you can just enter whatever info you have here — and if you're making a CD test disc, you don't actually need to enter any subcodes to make your CD. ▶





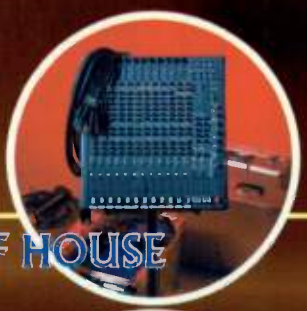
Above: Importing audio files into the list.

Left: The subcode editor.

THE NEXT CHAPTER IN THE HISTORY OF SOUND HAS JUST BEEN WRITTEN

TRILOGY

MIXING CONSOLES



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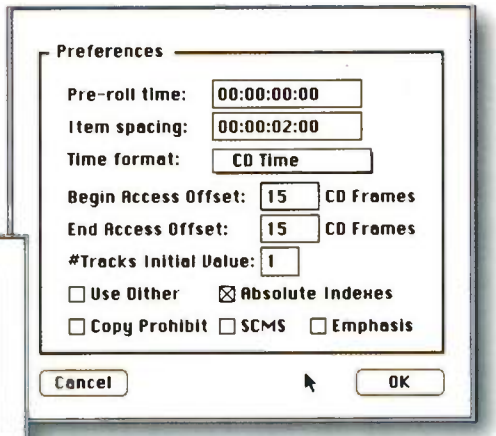
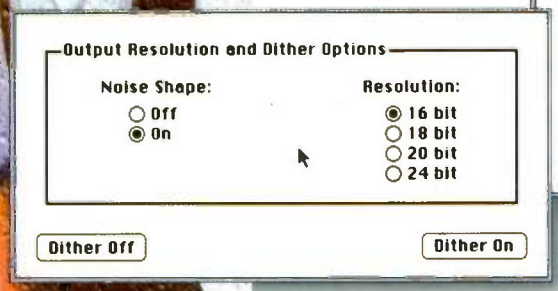


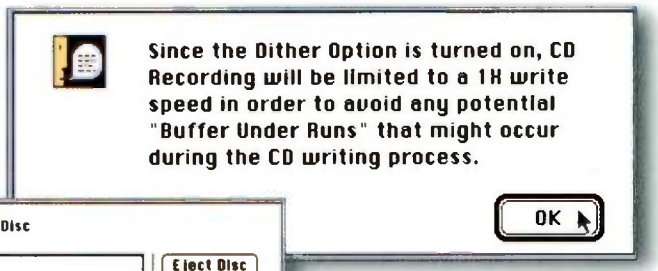
The Preferences dialogue.



Choosing Output Resolution.

If you opt to make an image file, you close your *Masterlist* once this is done, and then open the image file to burn it directly to disc, using the 'Load Image' file command in the File menu. The advantage of using an image file is that you can burn it to disc faster than if you have to process your files with gain changes, crossfades, or 'dither' while burning your CD, and with more reliable results. The disadvantages are that it can take an hour to write the file, you need sufficient disk space to write to, and then you still have to burn the CD-R.

If you want to go ahead and burn a disc without making the image file first, you'll often find that you're restricted to burning at slower speeds. For instance, I encountered this message on my system when I chose the 'Write Compact Disc...' command from the File menu:



The Write CD dialogue features a Speed Test function.

The Write Disc dialogue features a Speed Test function to test the Hard Disk and CPU speed. This gave the number 1.6 somewhere near the centre of the box, to indicate that my system was not fast enough to write at 2x, let alone 4x speed!

When you first set up your system to make a CD, it can be worth your while to use the Test Mode if you're in any doubt about the ability of your system to write a disc successfully. In this case, you check the Test Mode box before hitting 'Write Disc' and *MasterList* will simulate the process without actually writing the disc. Of course, this will take an hour or so at 1x speed, which is a bit of a pain — although once you've checked that discs will burn OK, you shouldn't need to do this again until you next change your computer/hard drive configuration.

When you're happy that the the system is configured correctly and is running fast enough to burn discs at your preferred speed, you simply hit 'Write Disc', pop in a blank, and sit back. Some time later, a cute little bell sound alerts you to the fact that your disc is complete.

I've made dozens of audio discs using *MasterList*, and have rarely encountered any problems (other than those of my own making, when I forgot to defragment a hard drive containing fragmented files, or tried to burn at 2x speed without checking the fastest speed my system would allow).

DISCWORLD: THE JARGON

The most important standards in this area are Orange Book and Red Book. The Sony/Philips standard for recordable CD-R discs is known as Orange Book; the standard for CD-DA (Digital Audio) discs is known as Red Book — so Red Book CDs are what we all know as the standard audio CDs we can buy in record shops.

Disk-at-once recording means that the whole disc is written in one pass. Most newer CD-R drives, including the CDE100, support this mode, and you can supply these discs to a mastering facility for volume pressing.

Track-at-once mode, as its name suggests, only allows you to write one track at a time, and the write laser stops writing between each track. If you produce a CD-DA disc in track-at-once mode, various link and run-in/run-out blocks appear on the disc, which may appear to be errors, so these discs are often rejected by CD-mastering facilities. Some CD recorders can only write using track-at-once mode, and these drives can be recognized by their fixed track spacing of two seconds.

The Macintosh HFS format is used to create CD-ROM discs that will 'mount' on the desktop of any Macintosh computer, so that you can then use these as read-only storage discs — typically for archiving general computer data.

The ISO 9660 format is used for CD-ROMs that are intended for MS-DOS, Windows, and other ISO file systems. These can also be read by Macintosh computers, but will have ISO 9660 or MS-DOS-format file names.

The Mac/ISO hybrid format allows you to create CD-ROMs that can be read by both Macintosh and ISO file systems, with data common to both file systems being shared on the CD-ROM.

▶ Before you proceed to burn your disc, there are a couple of other simple things you should attend to. For instance, you need to decide whether to use 'dither' or not. You would use dither to reduce the sample size of a sound file from 24-bit to 16-bit, or for noise-shaping of re-quantisation noise in a 16-bit file. TDM plug-ins are available from Apogee (*MasterTools*) and from Waves (the *L1*) which offer more advanced dithering algorithms, so if you've already dithered your stereo masters using one of these, you should leave *MasterList CD*'s simple dithering off. If you *want* dither, you have to specifically turn this option on in the Preferences dialogue. You also need to choose the Output Resolution, selecting 16-bit for a standard Compact Disc, and in the Setup menu you can choose Project Info for entering copyright details and other information for inclusion within the disc.

IMAGE PROBLEM

At this point you're ready to burn your disc, so you need to decide whether to do this in real time or instead make an image file so that you can burn the disc at 2x or 4x. The image file takes quite a while to process, as it contains all the original files, along with any gain changes, crossfades and so forth that you've entered into your list. However, discs burnt at 2x or 4x are reputed to have lower error rates, so you should always use the higher speeds if you want to send your CD-R off for duplication.

When you choose 'Save Image File' from the File menu, you'll see two check boxes, for Contiguous Allocation and Write LSByte First. Don't worry about these — *MasterList CD* chooses the correct options for your system automatically. Just hit 'Save', sit back, and wait.

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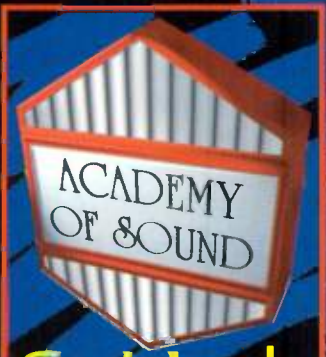

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The French Con

JEAN-PHILIPPE RYKIEL • FRANÇOIS BREANT

Musicians, arrangers and producers Jean-Phillipe Rykiel and François Breant are well known in their native France as pioneers of Western and African crossover music, and for their willingness to use technology to produce new and challenging forms of music. PAUL TINGEN paid them each a visit at their Parisian studios to discuss their working methods.

The world music movement which emerged during the mid-'80s was the only new pop music of our times not to come out of either Britain or the United States. And although the first successful world music records contained African music, they did in fact come from Paris, which was, and still is, an exciting melting-pot filled to the brim with an incredible diversity of non-Western and Western musicians.

Three of these musicians stood at the cradle of what's still one of the most successful, innovative and influential African crossover records of all time. They were the Malian singer Salif Keita and French keyboard players, arrangers and producers Jean-Philippe Rykiel and François Breant, and the record they produced was Keita's *Soro*, which was released in 1987. For the tenth anniversary of one of the legendary records of our time, I went to Paris to talk to the two Frenchmen who were responsible for its stunning hi-tech arrangements and production.

RYKIEL

My first face-to-face meeting with Jean-Philippe Rykiel got off to a rather unusual start. Seconds after shaking my hand as I entered his basement apartment in central Paris, Rykiel escorted me to his studio and asked me to read out the information contained on a number of pages on the screen of an Akai MPC3000. Sometimes he pressed a few buttons, and asked what changes this made on the screen. Meanwhile all my comments were recorded with a dictaphone which Rykiel held in his other hand. The reason for this slightly bizarre introduction was very simple: Jean-Philippe Rykiel is blind, and at times he needs help to find his way through the tangled, impenetrable web of today's page- and menu-driven technology.

Jean-Phillipe Rykiel.

At a time when many sighted people are complaining about the complications of modern-day interfaces, the difficulties that blind people face are almost unimaginable. Jean-Philippe Rykiel nevertheless manages to operate his digital 16-track home studio and his collection of keyboards mostly by himself — an indication of his genius. Another indication is that he has, during the last two decades, gained a reputation as one of the world's foremost keyboard players, and a man who also has impressive talents as a writer, arranger and producer.

Anybody who has more than a passing interest in world music will have come across Rykiel's name on several recordings, especially African ones: the many African artists Rykiel has worked with include the famous names Youssou N'Dour, Salif Keita and Papa Wemba. Yet Rykiel's work covers a much broader spectrum than just African music: he has also worked with reputable artists such as Vangelis, Jon Hassell and Leonard Cohen, and ex-Gong members Steve Hillage, Tim Blake and Didier Malherbe. On top of this, he has released two solo albums, *Jean-Philippe Rykiel* (1981) and *Nunc Musics* (1991), and at the moment, the 1995 duo album that the 36-year-old Frenchman made with Tibetan monk and singer Lama Gyourmé, *The Lama's Chant*, is a slow-burning new age and world music hit in several European countries.

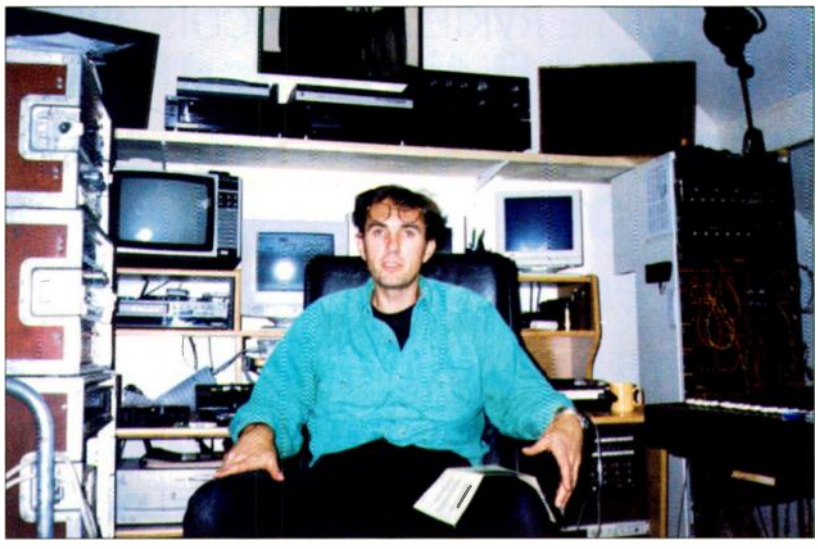
REVENGE

A long time ago, Rykiel ran into trouble at the specialist boarding school for blind children he attended — he was punished for playing the blues. He renounced music lessons in response, and tasted sweet revenge when he made his recording debut at the age of 16, playing keyboards on a record by the well-known French artists Brigitte Fontaine and Areski. Rykiel started to work with African

musicians on a regular basis during the early '80s, playing with and producing, among others, the band Xalam. In 1987, he helped set a new standard for the fusion of African music and Western music technology with Salif Keita's international breakthrough album *Soro*.

Since then Rykiel has produced two and arranged three tracks on Keita's *Folon* (1995), played on Papa Wemba's *Emotion* (1995) and worked as a producer, arranger and writer on two Youssou N'Dour albums: *Eyes Open* (1992) and *The Guide* (1994) — although he wasn't involved in the making of the well-known worldwide hit duet with Neneh Cherry from that album, '7 Seconds'. Rykiel's collaborator on *Soro*, François Breant, still remembers Rykiel's talents with awe a decade afterwards:

"He has really fantastic ears and an astonishing memory," Breant marvels. "He would say to the engineer: 'Hey, you put the compressor at plus 4dB with a ratio of 2:1, and I don't like that'. He got that information purely from listening. And I've seen him program a Yamaha DX7, without any visual feedback, of course, just using his ears — and that's amazing. He's a great artist."



François Breant.

nection

MODESTY

Having recorded all the information he needs from me from the MPC3000's screen, Rykiel guides me to a comfortable sofa planted right next to his equipment. For a great artist, and one of the most admired and respected people in the French music scene, he is also, as it soon turns out, extremely modest. Asked how he sees himself, and what he considers his main strengths, he answers:

"I hope I'm a musician. Probably not the best musician in the world, but someone with a musical sensitivity that some people happen to like. I've never asked myself what my main strength is. Life is not a contest. Saying what you're good at is a bit artificial. Every musician is able to produce, arrange, and write music, and it depends on the circumstances what you end up doing."

This is the main theme that emerges from most of Rykiel's words: he loves music, and has little time for all the paraphernalia that can come with being a successful musician, having no real interest in the trappings of success, or the big ego that can result. Nor is he interested in endless questions about his gear, protesting at one point: "I don't think you should focus too much on the equipment that I'm using, because it's not very important. I think that music is more important than equipment. ▶

LEADING LIGHT — RYKIEL ON MODERN STUDIO TECHNOLOGY

You might well wonder how on earth the visually-impaired Jean-Philippe Rykiel can possibly operate in his FMR studio. His remarks are fascinating, and reveal much about the problems facing blind musicians wishing to use today's technology. He explains that he has a number of physical aids to help him at FMR: simple braille signs that he sticks on his equipment; a very sensitive and directional light sensor which makes a noise when pointed at a light source, so he can establish whether he has activated a track, for example; and a special voice computer...

"It has voice synthesis, and I use it as a phone book, notebook, diary, calculator and word processor. I have people read me the most useful parts of equipment manuals, and the most relevant sections of the menus, then I load all that into memory. If, for example, I then want to know where I can find a certain function on the MPC3000, I call up a file called MPC3000, type in the relevant function, and it tells me that I can find it on the third line on the fifth column of page three, say. But I'm so familiar with most of my equipment that I don't have to refer to the computer."

As you'd expect, Rykiel's choice of gear is guided as much by its degree of user-friendliness to a blind person as by its sonic qualities: "The Roland JD800 is part of my setup because it's so much easier to program for me with all the front-panel buttons. But it's still not ideal, because I can't see whether the tone buttons on the front are lit or not, which is a bit of a drag."

Rykiel's main gripe is clearly with equipment that relies heavily on a visually-oriented interface. Computers come top of the list: "I can't use any computers, because the interface is too visual. There's nothing a blind person can do with computers, except maybe accounts or word processing. I have complained a lot about computers, but I'm not the only one — Vangelis also complains about them.

"It has no effect, though, because professional musicians are not the most important clients of manufacturers; their biggest clients are people who simply want to have some fun, and who are very happy with equipment that looks like computers and get happier the larger the screen is. In adverts, huge screens are said to equal user-friendliness, but that's ridiculous — not only for blind people but for all musicians, because screens make it more difficult to improvise with sounds: when you're on stage, for example. But now that more and more equipment is getting computerised, and the interfaces are getting more and more visual, with screens and pages and menus, it's going to be harder and harder for blind people to use modern equipment. This is extremely frustrating, because there have been many exciting developments. The Korg Wavestation, for example, can do wonderful things, but I can't use it: the editing is far too complex, it's full of menus and sub-menus and menus inside of menus — there's no way I can keep track of where I am! And we're too small a market for manufacturers to bother with. It's a real shame, because I think that blind people bring a different sensitivity to music, and if we cannot use modern equipment any more, we will be forced to either stop making music, or only make music with older equipment."

the keyboard player in the band of Bernard Lavilliers, one of France's leading radical musicians of the day, and eventually became the band's musical director, arranger and producer.

"I learnt to think vertically as well as horizontally," he explains. "As an instrumentalist you tend to only worry about your own part, but as an arranger and producer I had to think of music as being made up of layers. The arrival of sequencing during the '80s made me very happy, because it suddenly meant that you could work on your own and keep all your layers flexible; there was constant interaction between your parts. With multitracking, your options get narrower and narrower as you put each part down, but with sequencing, and now with direct-to-disk recording, you can keep different parts much more fluid and interactive. The only disadvantage of the arrival of MIDI was that playing synths in the studio became less exciting. In the past you knew that you could never quite reproduce the sound you had; you had to get it right, so you played as if your life depended on it. But since MIDI came along, you can keep on doing things until they are perfect, and studio work can become quite boring."

OLD AND NEW

After leaving Lavilliers' band in 1983, Breant went on to become a full-time producer. In 1986 he was introduced to Salif Keita and African music.

"It was a shock to me," he remembers. "It was a real discovery, and it had a great effect on my life. Working in the French music industry in those days was sometimes very frustrating, because of the low quality of rock records that we put out. The reason for this was that we had some sort of complex — we rejected our own roots, and did only rather derivative English- or American-influenced music: Johnny Hallyday and Telephone were examples of this. But the Africans I met had their own musical roots, and they were proud of them. At the same time, they had a sensitivity and openness to contemporary music — they were playing their own music on electric guitars and drums, and they even managed to be popular doing this. Their music was also very sophisticated. It was the same with Cuban and Brazilian music: I was jealous of these music cultures that were capable of being independent of the Anglo-Saxon influence."

And so, together with Jean-Philippe Rykiel and Salif Keita, Breant set to creating one of the most influential African records of all time, and an amazingly mature hybrid of African roots and Western influences: Salif Keita's *Soro*, released in 1987. *Soro* hit the international music market like a bombshell, and was a major factor in the creation of the music genre that's now called world music.

After this Breant worked for a long time with Keita on *Soro*'s 1989 follow-up, *Ko-Yan*, an album that was clearly a labour of love on his part ("I put a lot of myself into that record, and spent more time and energy on it than any producer could afford"). It was therefore extremely frustrating for him to be confronted with the decision of Island Records to have the finished album remixed by Paul 'Groucho' Smykle. According to Breant, the sound of the album became more slick and commercial, and its subtleties were lost (an observation substantiated by the original mixes he played me). *Ko-Yan* was nevertheless an excellent album, though not in the same league as *Soro*.

After *Ko-Yan*, Breant was involved in a few other African albums, but he has spent most of the '90s producing French top acts such as Kent and Enzo Enzo, and writing and arranging film scores and music commercials. Most of his arranging and writing work takes place in his home studio, and the equipment here is a curious mix of the old and the new. Among the older pieces of gear are analogue keyboards and synths such as the Crumar Organiser B and T1 drawbar organs, ARP Odyssey and Oberheim Xpander synths, Revox B77 and TEAC DX8 tape recorders, an Atari 1040ST, and a Soundcraft Series 2000 desk. Newer equipment includes three Akai S1000 samplers, a Yamaha TX802, a Roland JV1080, JX10 and Korg 01/W synths, and an Apple Macintosh 7100 with two connected screens and *Logic Audio* software, plus Digidesign Audiomedia cards which give him four tracks of hard disk recording. His outboard gear includes a Yamaha REV 7 and SPX90, a Korg SDD3000 delay, an Alesis 3630 compressor and an old Mu-tron stereo flanger.

FRENCH ROOTS

Curiously, Breant uses ordinary hi-fi equipment for amplification and monitoring in his studio, just as Rykiel does. But unlike Rykiel, he doesn't find hi-fi equipment superior to studio monitoring equipment; his choice is a consequence of his pragmatic music-first-technology-last attitude.

"It works for me to have hi-fi equipment for monitoring. A studio amplifier would give me fewer facilities, and if I bought one I'd need to replace my desk. I intend to get the new digital Yamaha desk, or a Mackie, but this setup works fine, and maybe I'm too lazy to change things. It doesn't seem that important. Again, it's simply a matter of working with limitations. The same goes for this whole discussion of whether recording on analogue is better than on digital — I don't give a damn. If I work in a studio with digital equipment, I work on digital, and if there's analogue equipment, I use that. What matters is the music, not the tape recorder, or the desk. Digital and analogue may not sound exactly the same, but who cares? John Coltrane didn't sound the same in different halls, did he?"

François Breant: "What matters is the music, not the tape recorder, or the desk. Digital and analogue may not sound the same, but who cares? John Coltrane didn't sound the same in different halls, did he?"

Part of Jean-Philippe Rykiel's keyboard collection, in his Paris basement studio.

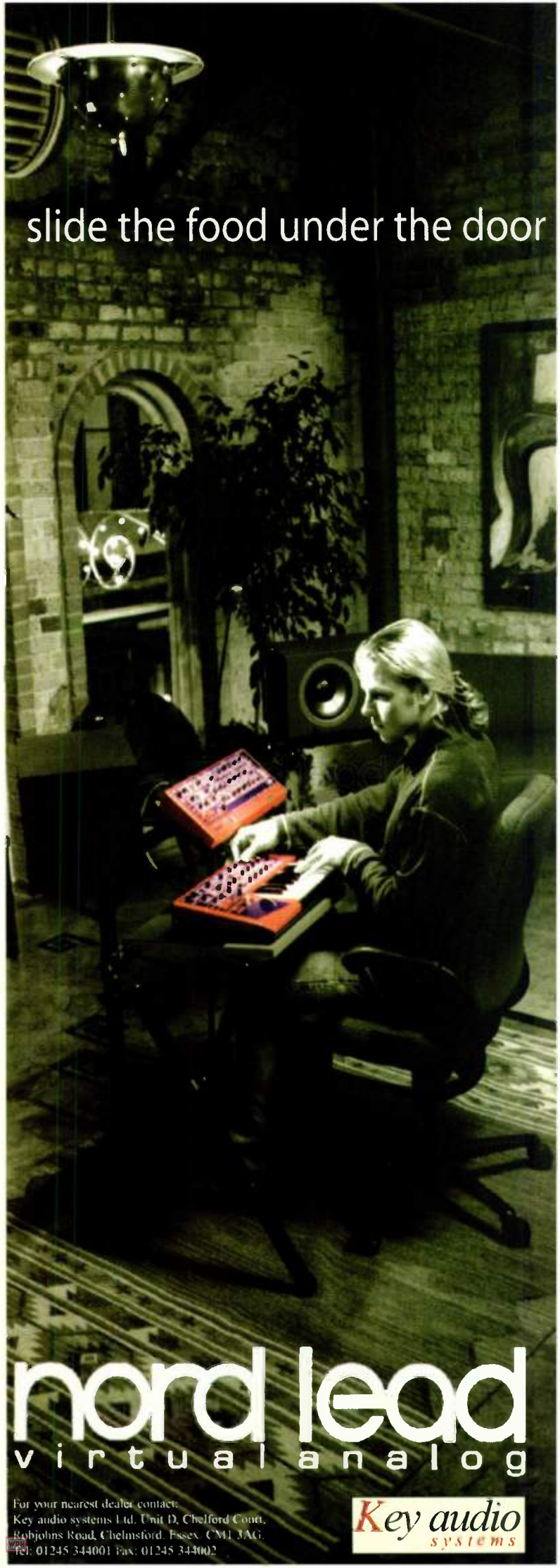
What Breant does seem to care about, however, is the user-friendliness and practicality of equipment. He's enthusiastic about the facility to run audio and MIDI data next to each other on his Mac, and intends to buy a Digidesign Pro Tools or Session 8 system, to have up to 16 tracks of hard disk recording. Since most of the work in his studio consists of arranging and demo-ing, he's not too bothered about the quality of synth sounds or the truthfulness of instrumental samples, and prefers to do all his instrument 'simulations' on the Roland JV1080 — "It's really easy and fast".

It is surprising, therefore, to learn that Breant still scores his arrangements by hand, rather than using the computer to print them out. "The advantage of using the computer is, of course, that you can edit and print parts easily. But I don't think it's faster. When I print things with the computer I still have to make many changes by hand afterwards," he explains, showing me a piece of very elegant calligraphic scoring. "To get the score perfect, you have to quantise everything in the computer, and even then it will make awkward mistakes in rhythm notation. Finally, indications for expressions and dynamics are much easier written by hand. And I must say that I get pleasure out of doing calligraphy."

Breant confesses that he's losing interest in synths and samplers, because he feels that all that's being done at the moment is "regurgitating what has already been done". His renewed interest in live performance has led him to plan building glass doors halfway across his large attic room, so that he can record musicians in his studio. Reflecting his interest in live music and in going back to one's roots, and in part an echo of his work with Salif Keita, is the passionate interest he takes in the current emergence of an authentic French music style that's both contemporary and rooted in its past.

"The British had the intelligence not to reject their roots, and the French have only recently been discovering the wisdom of that. Our roots are in Gaelic, vaudeville and European music, and the *chanson* tradition of people like Edith Piaf. The only problem is that artists like Les Negresses Vertes, Kent and Enzo Enzo are not developing these roots. What I'd like to do is a similar project to *Soro*: create a blend of old and new, hi-tech and low-tech, and so on. I don't see why there can't be screaming electric guitars and heavy drums on an Edith Piaf-influenced song."

Now, if it's going to be as good as *Soro*, that would be something to look forward to. Maybe Breant and Rykiel could patch up their personal differences (for their mutual professional admiration was evident), and surprise us all — then the next musical movement of the mid '90s could once again come out of Paris.



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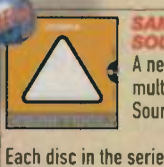

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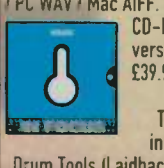

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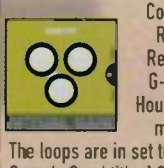

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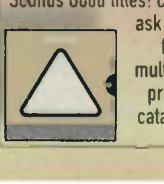

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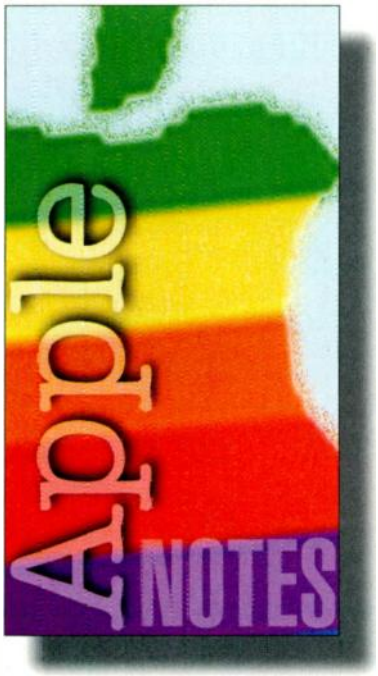


Martin Russ puts the latest doom and gloom Apple news from the media into context.

APPLE NEWS IN BRIEF

• MAKING TRACKS

Mark of the Unicorn's UK Distributor has moved: MusicTrack are now at 19a High Street, Shefford, Bedfordshire SG17 5DD. Telephone: 01462 812010. Fax: 01462 814010. E-mail: 100415.2665 @compuserve.com Web site: http://www.motu.com

For a free *FreeStyle* or Composer's *MOSAIC* demo disk, send them a high-density disk and a stamped addressed envelope.

The current versions of MOTU software are: *Performer* 5.5; *Digital Performer* 1.71; *Freestyle* (Mac) 1.04, (Windows/PC) 1.05, *Unisyn* (Mac) 1.14, (Windows/PC) 1.2; Composer's *MOSAIC* 1.43; FreeMIDI 1.28

• POWER CRAZY

With 225MHz 604e-based Power Computing Mac clones already available, and a 250MHz version shown at the San Francisco MacWorld show, the news of a prototype 300MHz machine with a 60MHz internal buss from Power Computing comes as no surprise. Processing-wise, a machine like that would be about 10 times faster than my current humble Centris 610!

And as if 250MHz PowerPC-equipped Macs weren't fast enough, we should soon see 533MHz chips from Exponential!

It begins to look as if January is a bad month for Apple. In 1995 there were secret negotiations for a proposed takeover by IBM at $40 per share. In 1996 there were persistent rumours of a takeover by Sun Microsystems, with $25 a share offered. Now, after a year with Gil Amelio at the helm, Apple's share price has fallen again, their market share is allegedly shrinking in the face of the Windows/Intel marketing machine, and there has been considerable confusion about which operating system Apple will be using in the future. With reports in newspapers like the *Sunday Times* virtually writing Apple off, it looks bad again for what was once the fastest-growing company ever in American history.

UNEXPECTED

Last month it all looked clear. BeOS was set to be the MacOS of the future, although the transition from System 7 looked to be less than straightforward. But then Apple bought NeXT Software for $400 million, and this brought with it ex-Apple founder Steve Jobs — now probably equally famous for heading up Pixar, of *Toy Story* fame. Suddenly, Apple had a very different future operating system strategy: Apple bringing the QuickTime multimedia technology and the Mac's look and feel, while NeXT's highly regarded object-oriented Operating System and WebObjects Internet development system offered integration of the Mac desktop with the Internet.

So Copland is gone forever (that's several years of hard work and allegedly $500 million down the drain!), and the new revised/being specified System 8/Rhapsody will probably look very different indeed when it finally appears. If, like me, you haven't quite got around to going PowerPC yet, then this may well be very good news, because System 7.x.y is likely to last rather longer than Apple probably intended, and so 68K Macs have suddenly got an unexpected extra lease of life. System 6 may only have got to 6.0.71, but System 7 is going to run and run.

THE FUTURE

Which brings us back to the question that occupied minds almost exactly a year ago: what happens to Apple next? (Not a deliberate pun, but I'm sure that the T-shirts are about to appear with some variant of this on them!) Despite what some sections of the media might suggest (some coverage has been more like obituary than comment), Apple aren't going to keel over and plunge to the bottom of the ocean tomorrow. Several things are going quite well, thank you. For example, about 62 per cent of Internet servers are MacOS-machines, mainly because of their outstanding price/performance/reliability quotient. And don't forget the unexpectedly large sales of clones reported by Motorola: 40,000 StarMax machines in the first month of sales. Then there are the 26 million Mac users worldwide (approximately) — many of whom are totally committed to the MacOS platform in a way that Microsoft and Intel can only dream about with Windows/PC users. And then there's Apple's manufacturing position: depending on whose figures and rankings you believe, they are still the third or fourth largest computer manufacturer in the world — although the clones may change this.

As an interesting analogy, consider this. One of the largest-selling keyboards of all time was the Korg M1. Korg have followed this up with a series of very successful instruments which consolidate the ideas behind the M1. And yet the other manufacturers survive, because not everyone likes a keyboard rig consisting of just Korg equipment — in fact, it's the mixing together of contrasting types of sounds that many people like. So why are computers any different? Why does there have to be a hugely dominant type that squashes all the opposition? If keyboards aren't a natural monopoly, then why should the world go PC-only? Personally, I've not got any Korg keyboards, and I'm quite happy to make music using a MacOS computer.

HOW IT WORKS: MMX

A brand new processor from Intel might be thought to be bad news for MacOS users, but not necessarily. Just after Christmas, Intel launched their new MMX (a weird acronym for Multimedia Extensions!) chips, which add 57 extra instructions to the Pentium processor (introduced a couple of years ago) intended to enhance performance in multimedia applications. Applications need to be rewritten to take advantage of the new instructions, and so by now PC users will be seeing 'MMX-ready' and 'MMX-upgrade' on multimedia applications.

MMX provides parallel processing of multiple bytes of data that require 'multiply and accumulate' operations, and so speeds up the processing of repetitive tasks. These are the sort of mathematical processes that a DSP might traditionally be used to carry out, and so the MMX chips will improve the performance of audio and video applications. Intel claim that the gain is between 10 and 20 per cent for non-MMX-optimised applications, and should be 50 per cent or more for optimised ones.

From a MacOS perspective, this might sound

like yet another place where the MacOS is falling behind in multimedia. In fact, the electronic industry newspaper *Electronics Times* made it front-page news with the headline "MMX deals first blow to Apple..."

But PowerPC chip manufacturers (and Mac-clone makers) Motorola have said that the MMX merely brings the Pentium up to PowerPC performance, and this is reinforced by figures published recently in *MacWorld* magazine, where an MMX-optimised *Photoshop 4.0* on a 200MHz MMX P55C-powered PC was only marginally faster than an ordinary *Photoshop 4.0* on a PowerMac 9500/200. Similar tests carried out by *Byte* magazine again put a 200MHz 604e-powered PowerMac ahead overall. For 3D work, the 9500/200 PowerMac was again measured as being faster than the MMX platform by *MacWorld*. It has also been reported that there are on-chip delays in context switching from Pentium floating point to MMX operations, which might reduce the effect of any performance increases.

With news of the 250MHz PowerPC chips and the forthcoming Philips TriMedia multimedia co-processor chip, it looks as though Intel are still behind the MacOS platform.

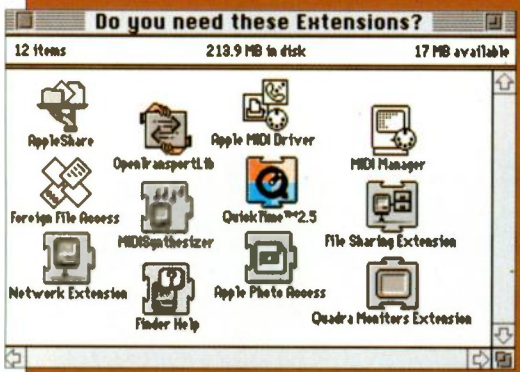
COPLAND CLONES

If you've not been following the ongoing 'slim your Mac' series in Apple Notes, you may well have one of the many 'Copland' lookalikes. These are sets of icons, fonts and other bits of screen furniture (left) that convert the familiar Mac Desktop and Finder into something resembling the appearance of the long-awaited Copland/System 8. With Copland now defunct, the likelihood is that these will become negative status-symbols — rather like satellite dishes, gold medallions around the neck, and platform shoes. My bet is that after the laboured non-arrival of Copland, Apple's user-interface designers will take a long hard look at what was planned, and will make sure that Rhapsody looks different again. Personally, I think that they might well take a cue from the 3D look that many MIDI/digital audio applications now have, particularly Mark of the Unicorn's *Performer* or Steinberg's *VST*.

So this month's tip is to abandon any attempt to look like Copland, and to wait for the 'Rhapsody' emulations that will surely follow!

SOS

EX-EXTENSIONS



• **FOREIGN FILE ACCESS. Useful only if you intend putting non-Mac CD-ROMs into your MacOS computer. The associated extensions ISO 9660 File Access and High Sierra File Access provide additional non-Mac CD-ROM compatibility.**

• **NETWORK EXTENSION. Unless your MacOS computer is connected to a network (AppleTalk, EtherTalk and so on), then you don't need this. MIDI networks don't count in this context, by the way!**

• **OPEN TRANSPORT. The modern replacement for MacTCP and all the rest of the mnemonic-rich Internet software is called Open Transport. It's recommended for PowerPC-based MacOS computers, but the advantages for 68K users are less clear-cut. Installing an Operating System upgrade may well result in the installation of lots of Open Transport files, plus the 'Network Software Selector' application, which lets you choose the old (MacTCP and so on) or new (Open Transport) networking software. If you're happy with MacTCP *et al*, then all of the Open Transport stuff can be consigned to the 'Non-System Folder'.**

• **QUICKTIME. If you use lots of multimedia CD-ROMs, or use QuickTime's Music Architecture for playing back MIDI movies, then you need the QuickTime extension. But if you have a 68K-based (non Power-PC) MacOS computer, you do *not* need the QuickTime Power Plug extension.**

• **MIDI SYNTHESIZER. If you've played with the QuickTime Musical Architecture, you may well find several of these 'synthesizer components' in your Extensions folder. They include: Oberheim Matrix 1000, Yamaha FB01 and TG100, Roland CM500 and MT32, plus the generic 'MIDI synthesizer'. Unless you're actually using QuickTime to talk to your MIDI equipment, these may well be superfluous.**

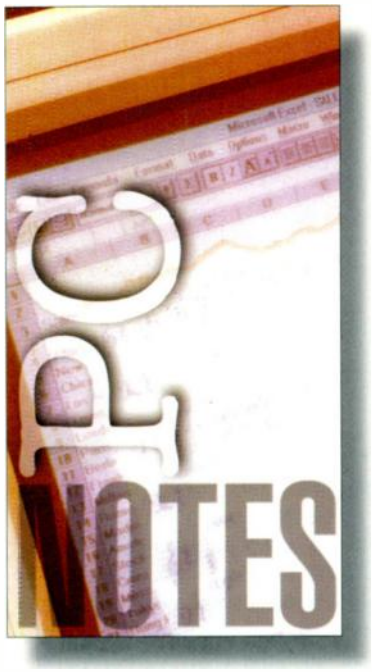
• **APPLE PHOTO ACCESS. Support for Kodak's PhotoCD format. Do you look at photos on your MacOS computer?**

• **FINDER HELP. You could try reading the manual instead! Save 68K.**

• **MIDI MANAGER & APPLE MIDI DRIVER. You should only need these old and obsolete Apple precursors if you use software that insists on them. OMS and FreeMIDI are both much better.**

But there are hidden traps to removing too many Extensions. For example, some of the more advanced (and useful) features of Apple's Find File application (as found in the Finder's 'File' pull-down menu) will only work if you have the Finder Scripting Extension installed...

The closely related AppleScript scripting system may also be another Extension that is not worth removing. Some applications use AppleScript to carry out some tasks, but so far I've not come across a music or MIDI related program that needs it — though I would love to hear from anyone who finds one!

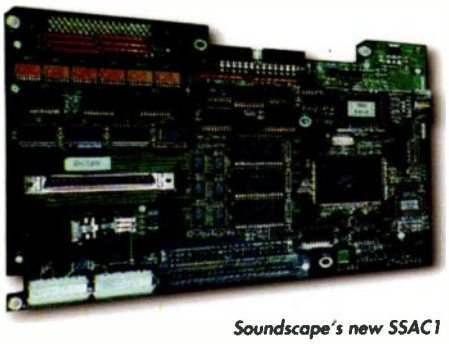


Soundscape Version 2.0

BRIAN HEYWOOD brings you the latest hard disk recording news from Soundscape, and gives his PC a thorough medical with CheckIt...

It's exactly four years since I first mentioned the Soundscape SSHDR1 hard disk recording system in this column, back in the March '93 issue of *SOS*. Since then, the system has gone from strength to strength, acquiring a wide user base and being employed on a number of high-profile jobs, including the audio post-production for the National Lottery TV ads. In fact, it would be fair to say that the Soundscape system has become one of the major non-linear audio editors for the PC. Emagic and Cakewalk certainly think so, as they now directly support the hardware in their MIDI + Audio applications.

Far from resting on their laurels, Soundscape have now launched an accelerator card, the SSAC1, and a new audio interface, the SS8IO1, which add substantial new features to the SSHDR1 system. The SSAC1 essentially upgrades the DSP (Digital Signal Processor) in the current SSHDR1 so it can handle the improved features in the latest version (v2.0) of the front-end PC software. The new card also offers an extra eight channels (ie. inputs and outputs) in the form of a TDIF (Tascam Digital Interface) port, which means that the upgraded SSHDR1 module will be able to handle 12 outputs and 10 inputs.



Soundscape's new SSAC1 upgrade for their SSHDR1 hard disk recorder gives eight extra tracks, plus many new facilities.

The whole concept of the SSAC1 fits in well with both the PC philosophy and the original Soundscape concept: that of expanding and enhancing the existing unit instead of replacing it. Current users of the SSHDR1 will be relieved to know that the new card can be easily retrofitted to all existing units; however, they will need to upgrade to version 2.0 of the front-end software to take advantage of the extra inputs and outputs, and this requires Windows 95. The choice of the TDIF interface is interesting, since it allows direct connection to a Tascam DA88 or Yamaha 02R/03D console with no extra hardware. The SSAC1 card costs £600 including VAT, and needs to be fitted by Soundscape, so you have to ship your SSHDR1 back to them. There is also a £50 fitting charge.

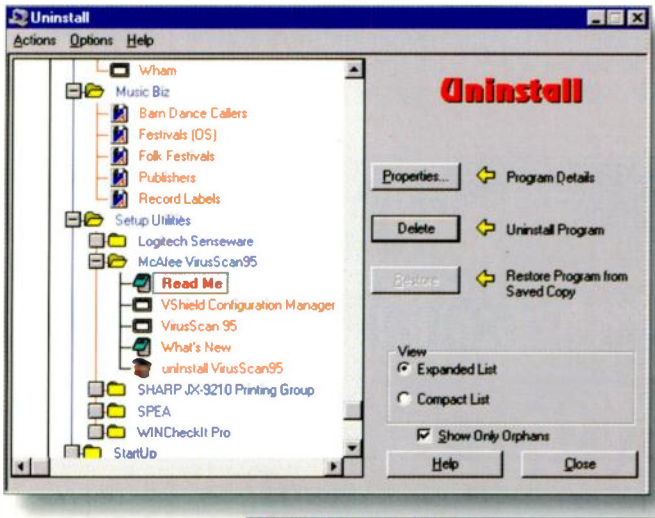
Users that don't have DA88s, or (like me) use ADAT, aren't left out in the cold, as they can use the new audio interface. The SS8IO1 (price £1495 inc VAT) gives you access to the eight extra I/O channels in both digital *and* analogue formats. The 19-inch 2U rack unit connects to the SSAC1 card via the TDIF connector, and uses 20-bit crystal semiconductor converters to provide A/D and D/A conversion. The unit also has an optical interface for direct digital connection to ADATs, and LED level metering provided as standard. If you don't want the extra inputs and outputs, but want your augmented SSHDR1 to connect to your ADAT in the digital domain, a cut-down version (the SS8IOD) will be available, although the price for this has yet to be set.

In all, the upgrade looks pretty comprehensive, and will give Soundscape a keen price/performance ratio. But it doesn't end there; Soundscape are also releasing a cheaper version of the SSHDR1 hardware/software package to make it easier for PC musicians to get into the world of hard disk. The new system will be known as the SSHDR1 FS (fixed software — price £1999 inc VAT). Anyone who buys this will be supplied with the version 1.18 front-end software, an AVI file player, and remote control software for RS422/MMC control of DA88, ADAT and VCRs. An further upgrade is available to buyers of the FS system to give them the latest version 2.0 front-end software and the SSAC1 card (this costs £1250). Finally, if you want to go the whole hog, the full version of the SSHDR1 (now known as Soundscape Plus, and retailing for £3200 inc VAT) comes with the SSAC1 card and version 2.0 software pre-installed.

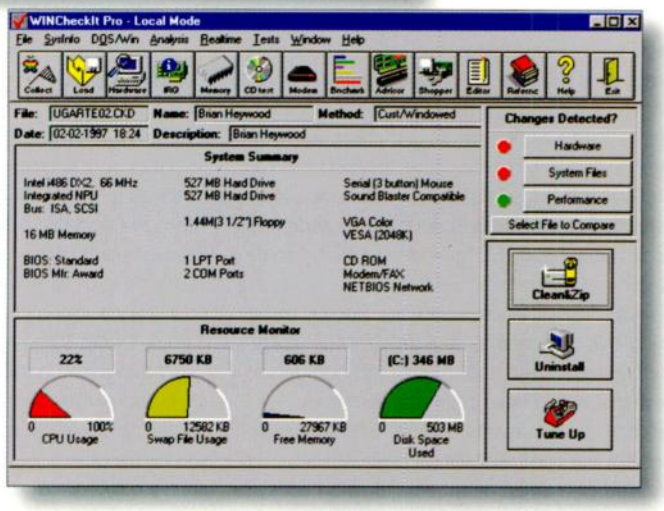
GIVE YOUR PC A CHECKUP

Don't be fooled by TV adverts and computer sales people; any system as complicated as a personal computer is likely to need some corrective tweaking every now and then. This is especially true for all of us who use PCs for music, since we often operate on the leading edge of PC technology. This is not because the technology we use is particularly advanced, but is rather down to the fact that we use odd combinations of hardware which are unlikely to be found on your average office or home-based PC. Mixing multiple soundcards from different manufacturers with network cards, video capture cards, MIDI interfaces and the like can create strange brews that can drive us to distraction — and completely

WINCheckIt's Tune Up utility lets you tidy up your hard disk.



WINCheckIt's Uninstall utility lets you get rid of those unwanted applications safely (if used carefully).



WINCheckIt's control panel helps you find the ghost in the machine.

baffle computer support types. In this situation, it is useful to have a toolkit that allows you to see what's happening deep down in Windows — 'under the bonnet', as it were. I've been using a software package called *CheckIt* over the last few weeks which aims to provide this kind of facility to Windows users. The package actually comes in two flavours: the basic pack is called *WINCheckIt* and seems to contain all the main software components, while the 'Pro' version is called *CheckIt Diagnostic Kit*, and includes additional stand-alone software and some hardware bits and pieces.

The Windows side of the package includes a control panel that lets you monitor the current state of your operating system and collect information about your PC. Using this control interface, you can run basic system tests, and compare the results with benchmarks to see how well your PC performs compared to a number of standard PC configurations (for example DX4/100s and Pentium 133, 90, and 60s). There are also three useful Windows utilities that help you maintain your system; *Clean&ZIP* allows you to remove dead and duplicate files, or compress files that you don't use very often, *Uninstall* helps you find and remove unwanted applications, and *TuneUp* defragments your Windows RAM. I found the *Clean&ZIP* applet particularly useful, as it allowed me to reclaim about 77Mb of hard disk space taken up by 'dead' temporary files and old backup files.

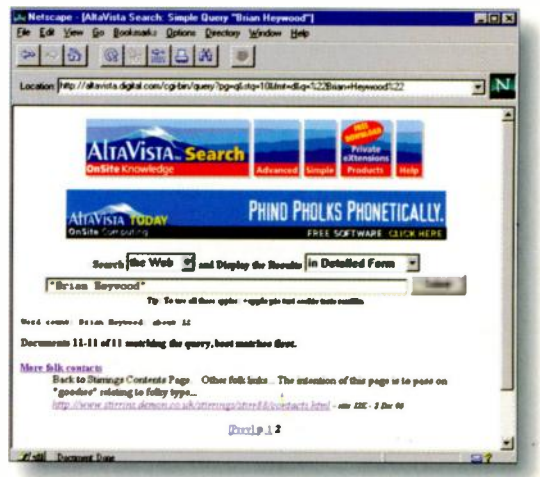
The additional hardware supplied with the *Diagnostic Kit* include 'loop back' plugs that let the software test your serial and parallel ports, and a set of disks that allow you to check out a PC that won't boot from its hard disk. This last facility is very useful for chasing elusive problems like those caused by dodgy RAM. Both versions of *CheckIt* come with a CD-ROM containing the McGraw-Hill Technical Library, and four fairly basic PC reference books (in Adobe Acrobat format) that cover DOS, Windows 3.1, Windows 95, and upgrading and repairing your PC. The basic package costs just under £30, while the more comprehensive *Diagnostic Kit* one clocks in at £58. Both versions are available from Software Warehouse (01675 466467).

CYBERSPACE CORNER

If your curiosity has been engaged by the current hype about the Internet, and you have logged on to the World Wide Web (WWW), you probably know how difficult it is to find anything useful. This is because the Internet is a 'flat' network on which any node — for instance your PC — can connect to any other node that is equipped with a suitable web server. This can be frustrating, since the information you want may be available, but you probably don't know where to look for it. It's like having a huge encyclopaedia with the entries in a random order and with no index.

One way to get around this problem is to use a 'search engine' like the one available at Digital Equipment Corporation's (DEC) *AltaVista* WWW site. This allows you to do free text searches of the WWW or the Usenet newsgroups. The system works by 'crawling' the web (ie. accessing each page on the web and reading the text content) and storing key words from each page. This means that it can search its own internal database rather than the web itself, and thus return an answer very quickly. If you want to check out *AltaVista*, point your web browser at

http://altavista.digital.com/



DEC's AltaVista helps you wring useful information out of the World Wide Web.

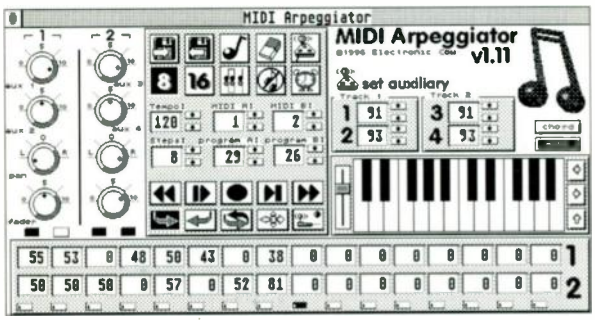
DEREK JOHNSON keeps the Atari flag boldly flying with news of a new Atari-based software-only synth, and also checks out a new shareware sample conversion utility...

As promised in last month's Atari Notes, it's time to have a look at Richard Evans' shareware sample conversion and management utility, *SampleC v1.04*, which has been floating about as a beta version for a while. Basically, *SampleC* offers a tidy and well-designed environment for converting between different sample formats, and sending (or receiving) them over MIDI to SDS-compatible (Sample Dump Standard) samplers. In addition, hardcore samplists with hundreds of samples on their hard drive will be able to use *SampleC* to easily catalogue and keep track of their library. The list generated by the software will show file format, sample rate, size, resolution, sustain loop values and user-definable descriptions. The software can then use the sample list to generate an *ST Guide*-format hypertext document; you'll need a copy of Holger Weets' *ST Guide* in any case, to read the software's on-line manual, which is in this format. File formats recognised by *SampleC* include AVR, AIFF, RIFF, WAV and CDP soundfiles from Composer's Desktop Project systems; 8- or 16-bit and mono or stereo samples can be handled, at a variety of sampl ng rates. This is an excellent tool for *Replay 16* users, or for the ST user who is nabbing Mac or PC samples from the Internet.

Theoretically, any flavour of Atari from ST to TT to Falcon should be suitable for running *SampleC*, but bear in mind that it was written with system enhancements such as *NVDI*, *MagiC* and *Freedom* in mind; if you also have these packages, you'll be 100% compatible. I've experienced no problems so far, except for a few with *ST Guide*, not *SampleC* itself. Availability is still a bit vague; we'll pass on details when we have them.

HAVE A COW, MAN

MIDI Arpeggiator and *Sound Chip Synth* are two nifty and cheap little programs from the eccentrically-named Electronic Cow. *MIDI Arpeggiator*, in spite of its name, is more of a two-channel 16-step sequencer, with a few extra bits to keep things interesting. The screen pretty well shows you everything you need to know: sequences can be up to 16 steps long, you can set a MIDI channel and program change for each channel, level and pan controls are available for each channel, and tempo is variable between 30 and 300bpm. In addition, each channel has two 'auxiliaries' which can be customised to transmit any MIDI data. Notes are displayed as MIDI note numbers, with 60 being middle C; the use of note names (or the ability to toggle between note names and numbers, perhaps) would have been slightly more intuitive. Notes are input from a MIDI keyboard, or from the on-screen virtual keyboard. A confusingly-named duophonic function adds a third part, based on the material already playing, which can be effective. Most interestingly, *MIDI Arpeggiator* can be sync'ed externally. Data can be saved in native or MIDI File format, and performances can be streamed to disk as a MIDI file of up to 60k. *MIDI Arpeggiator* is huge fun, and can be a useful creative tool. Be warned, though, that unexpanded STs may show the occasional operational oddity — moving the mouse while the software is playing can cause the tempo to slow down. If you're running a Falcon or an accelerated ST (with *NVDI* or something similar), this problem doesn't arise.



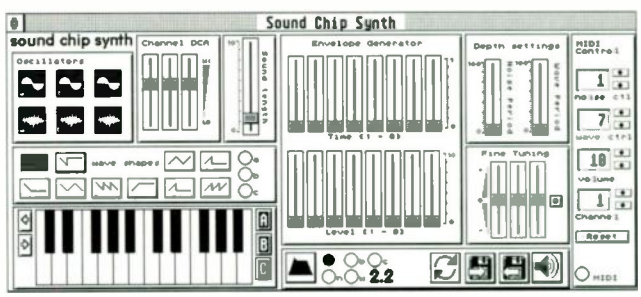
Electronic Cow's MIDI Arpeggiator.

SOUND CHIP SET

Sound Chip Synth v2.2 is a sound generation program designed to take advantage of the ST's on-board FM sound chip. Although this may seem like a strange thing to do — the ST's sound chip is not the most hi-tech of devices — the software is capable of squeezing some quite useable results out of the device. Once again, the screen pretty well shows it all: each of three channels has access to a variety of wave shapes and a noise source, as well as level and fine-tuning controls, and a sound length fader (0-8 seconds). There are two depth faders for wave and noise period; these affect the length of time it takes for a waveform to complete its cycle, and alter the coarseness or pitch of the noise generator; as with all *Sound Chip Synth* controls, experimentation is the rule. Most interestingly, there's an 8-stage envelope generator, with separate time and level controls for each stage. There are actually five EGs on board: three for the sound channels, and one each for controlling the wave and noise depth. Keyboard shortcuts, incidentally, are available for all major functions.

Auditioning a sound, via the on-screen keyboard (or an attached external one) can be strange, since the software reacts slowly; this may simply be a problem with an un-souped up ST. Once you've created a sound you like, it can be saved in 8- or 16-bit AVR format, as used by various Microdeal ST sampling hardware/software packages. Load the file into your editor (or *SampleC* — see above!), and your unique sound can be beamed, via MIDI Sample Dump Standard, to an external sampler.

Within the limitations of the ST's sound chip, *Sound Chip Synth* is capable of some pretty useful results, although the best sounds will be the ones you've worked hardest at; not surprisingly, sounds with a digital edge are easiest to produce. When you do get a good result, it's a very satisfying feeling.



Sound Chip Synth — synth sounds from your Atari, with no extra hardware required!

Both packages cost £10 each (plus £1.50 p&p), both are being supported enthusiastically by their author, and both have manuals that utilise the included *ST Guide*. Contact Electronic Cow for more details at 350 Broadwater Crescent, Stevenage, Herts SG2 8EZ (or alternatively, email abi91@dial.pipex.com. Web access is available at http://dspace.dial.pipex.com/town/terrace/abi91/cownet.html). SOS

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STEREO LAB

STEREO MICROPHONE TECHNIQUES EXPLAINED

PART 2: HUGH ROBJOHNS continues his history of stereo recording techniques with a look at the development of spaced microphone arrays.

Last month we investigated the various coincident techniques for stereo recording developed by Alan Blumlein in the early 1930s; this time we'll be covering some alternative techniques using spaced microphone arrays.

WALL OF SOUND

Some of the earliest stereophonic experiments were made in America under the direction of Dr Harvey Fletcher at Bell Laboratories, as mentioned in the first part of this feature. One of the techniques investigated was the 'Wall of Sound', which used an enormous array of microphones hung in a line across the front of an orchestra. Up to 80 microphones were used, and each fed a corresponding loudspeaker, placed in an identical position, in a separate listening room.

The operating principle was that the array of microphones 'sampled' the wave-fronts of sound emanating from the orchestra, and these exact wave-fronts were recreated by the loudspeakers in the listening room. The results were extremely good, with remarkably precise imaging and very realistic perspectives. However, the technology of the '30s was such that recording or transmitting 80 discrete signals was simply not practical.

Consequently, the initial microphone array was systematically simplified to find the minimum number of microphones that produced acceptable results. The general consensus was that three microphones and three loudspeakers represented the best compromise between high-quality imaging and practicality.

Today, the three-spaced-microphone technique is still in widespread use (one form being the Decca Tree) and the three-loudspeaker arrangement is the standard method of frontal sound reproduction in every cinema!

MONO COMPATIBILITY

So, what is the disadvantage of spaced microphone techniques compared with the coincident systems? Well, the main problem has to be mono compatibility. Any array that has multiple microphones spaced apart from each other will capture the sound from a given source at different times. If the outputs from all of the microphones are mixed together (to produce a single mono signal), the sound will become coloured because of a process known as 'comb filtering' — the beginnings of phasing or flanging. In a severe case, the comb filtering may alter the sound to such an extent that an orchestra will sound as if it's at the other end of a long cardboard tube. The greater the number of combined microphones, the worse the effect is likely to be.

However, if you can guarantee that recordings produced with a spaced microphone array will not be combined to make a mono signal, the comb-filtering problem becomes totally irrelevant — the argument adopted by many of the organisations that record classical music.

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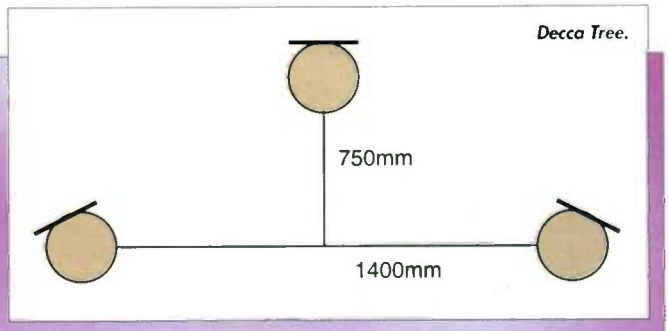
DECCA TREES

The most commonly used spaced-pair technique is probably the Decca Tree. This was developed many years ago (some time in the early '50s, in fact) to allow the use of omnidirectional microphones to record in stereo.

The basic arrangement is to mount three microphones in a triangular pattern, the central microphone being forward of the others. Dimensions are not particularly critical but, typically, the two rear microphones are about 140cm apart, with the central microphone about 75cm forward of them. The exact dimensions may be varied to suit the size of the sound stage being recorded, and, depending on the polar accuracy of the omnidirectional microphones used, it may help to angle the outer microphones towards the edges of the sound stage so that the microphones' best high-frequency response favours these parts.

The left microphone is recorded on the left channel of the stereo recording, and the right mic on the right channel, as you would expect; the central microphone is distributed equally between the two channels. Although combining the central microphone with the two edges is potentially risky in terms of comb-filtering effects, the hazards are far outweighed by the advantage of a very stable central portion of the sound stage, avoiding any possibility of a 'hole in the middle'.



Decca Tree.

This extra stability is not only due to the mere presence of an additional microphone covering the centre of the sound stage, but also because the central microphone is forward of the others. The slightly closer proximity to the sound stage means that it will capture sounds before they arrive at either of the other microphones. On replay, this will cause the sound stage to build from the centre, expanding to the edges as the out-rigger microphones capture the sound fractionally later. It is a very subtle effect — one that works at a subliminal level — but is crucial to the effectiveness of the Decca Tree format.

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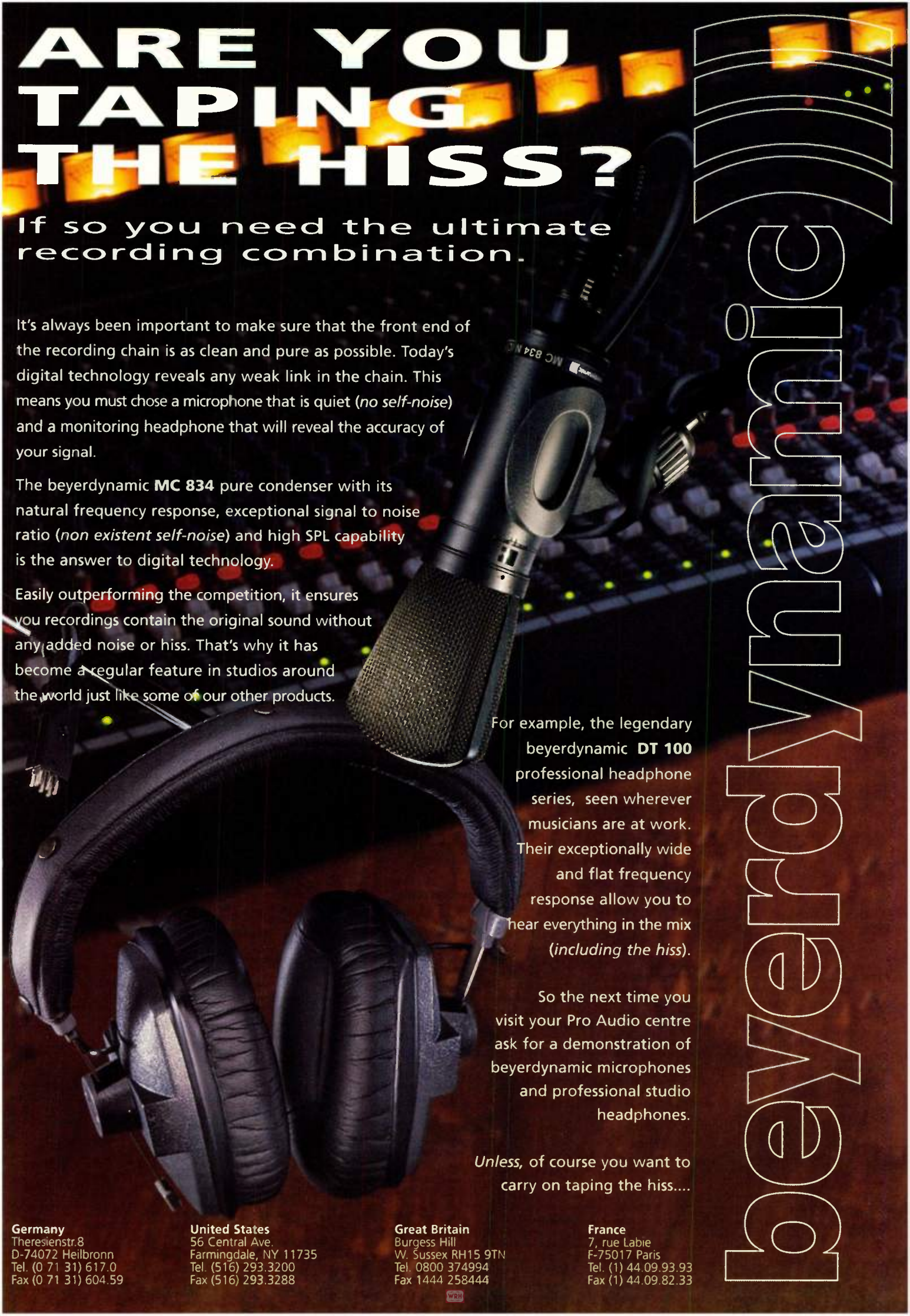

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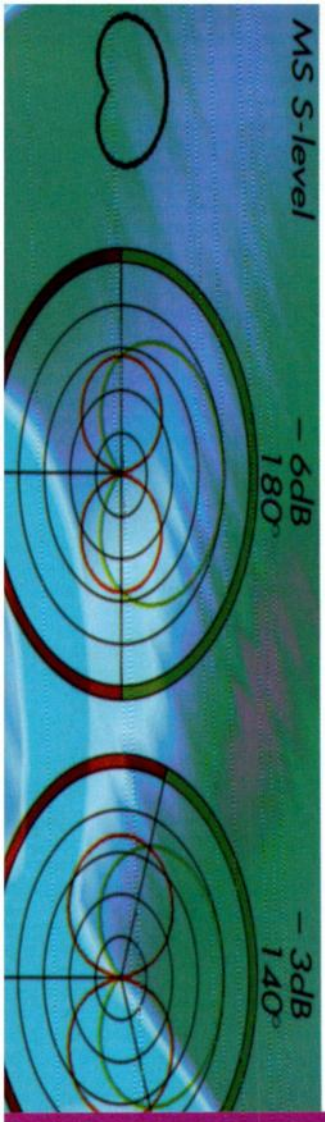


STEREO MIC TECHNIQUES

▶ is on CD or cassette these days, mono replay is no longer an important consideration — when was the last time you saw a mono CD or cassette player? Whether you're listening on a serious hi-fi, in the car, on a mini-system, or through a 'Brixton briefcase', it will almost always be in stereo. Even broadcast music is in stereo on Classic FM or Radio 3 for the vast majority of listeners.

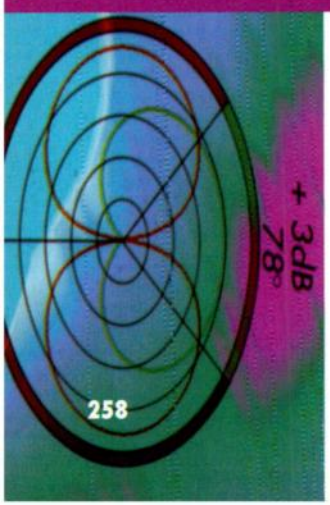
LOVELY OMNIS

So classical music, in particular, is often recorded with spaced microphone arrays because mono compatibility is not an issue — but why would anyone want to use spaced arrays? What is wrong with coincident systems which offer mono compatibility as standard?

As we saw last month, all coincident systems have to use directional microphones in order to create the necessary level differences between the two channels of the stereo system. Directional microphones rely on the pressure-gradient principle, which has an inherent problem with low frequencies. The mechanical design of the microphone diaphragm assembly has to compensate for the inadequacies of the pressure gradient by making the diaphragm resonate at very low frequencies. Although this can achieve an acceptable frequency response, it generally compromises the sound quality, restricting the smoothness and extension of the very lowest frequencies.

On the other hand, omnidirectional microphones do not suffer from any of these compromises. They have very smooth and extended low-frequency regions, with very even off-axis responses, both of which are very desirable characteristics. The only problem, of course, is that omnidirectional microphones do not work terribly well as coincident pairs because they do not produce level differences proportional to the angle of incident sound. Omnidirectional microphones can only be used to record in stereo if you space them apart and deliberately record timing differences.

"The principle of binaural recording is to replicate the way our ears capture sounds, and replay those sounds directly into the corresponding ears."



SPACED STEREO

I mentioned last month that reproducing the kind of timing differences captured by a spaced microphone array over a pair of loudspeakers would confuse our hearing system and therefore not produce good stereo images. This was only a half-truth, I'm afraid! It is true that replaying a stereo recording with timing differences between the two channels leads to a confusing set of time-of-arrival differences for our ears, but the sound is normally still perceived as having width and a certain amount of imaging information, and it usually sounds a lot more spacious than a coincident recording.

COMBINATION TECHNIQUES

In most cases, one primary technique rarely produces the results we want in our recordings. Last month we saw how combining a coincident pair with spot microphones was an effective technique. A similar combination of spaced mics and spot mics also works well, but many engineers prefer to add a spaced array to the full coincident/spot combination. This adds more spaciousness and ambience to the recording and is simply achieved by placing a pair of omnidirectional out-riggers towards the left and right edges of the sound stage. The effect of the omnis is to provide a much richer and more substantial sound, while the coincident pair provides most of the imaging accuracy and the spot mics highlight the inner detail and lift the weaker instruments.

The idea can be used on a drum kit, where spot mics are placed close to each drum head to capture the slap and attack of the sticks on the skins, and a pair of omnidirectional microphones is placed some distance away to give a broad and spacious stereo image. If the microphones are placed low down, towards the floor, they will tend to favour the drums rather than the cymbals, and if they are higher up the reverse is true.

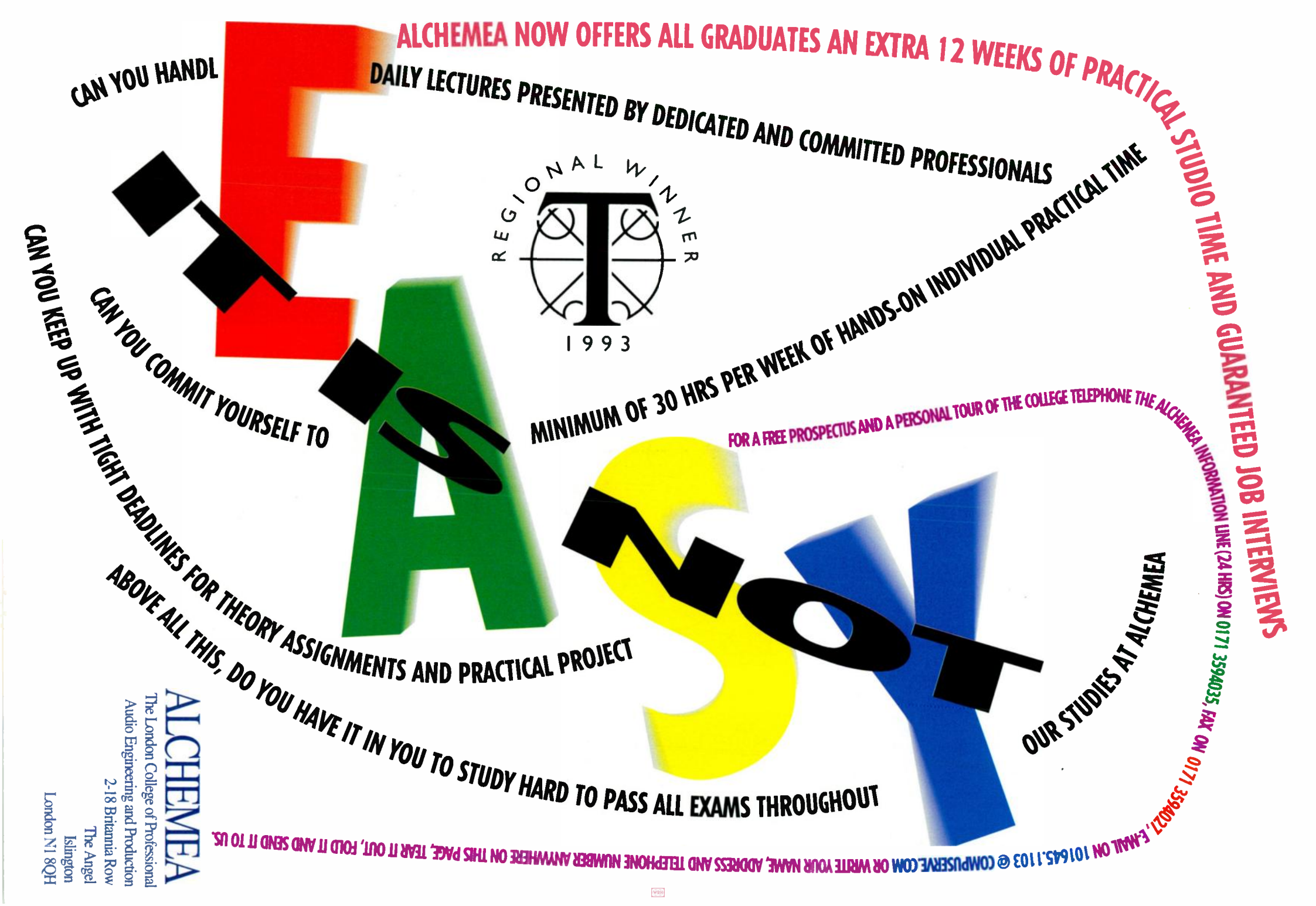
The problem (as far as Alan Blumlein was concerned, anyway) is that, apart from the mono compatibility issues, the imaging is not very precise and often seems to huddle around the loudspeakers rather than spreading uniformly between them. In really bad cases, the recording may even appear to have a hole in the middle!

If I were to compare the two main types of stereo recording as if they were paintings (a ludicrous thing to do, but I'm going to anyway!), then good coincident recordings are like etchings or line drawings — very precise imaging, lots of detail, leaving nothing to the imagination. On the other hand, spaced microphone recordings are more like water colours — the detail is blurred, and the essence is more about impression than reality.

Many people specifically prefer the stereo presentation of spaced-pair recordings, finding them easier to listen to than coincident recordings. There's nothing wrong in that — as far as the recording engineer is concerned, this is just another technique with a collection of advantages and disadvantages over the alternative formats. It's up to you which technique you use, and as long as you are aware of the characteristics of each system, you are in a position to choose wisely and should be able to achieve the sound quality you seek very quickly.

PRACTICAL SPACED TECHNIQUES

The simplest spaced-microphone technique is to place an identical pair of omnidirectional mics a distance apart in front of the sound source; most engineers would generally choose a spacing of between a half and a third of the width of the actual sound stage. For example, if you set out to record an orchestra, typical positions might be a quarter of the way left and right, either side of the centre line. The distance between orchestra and ▶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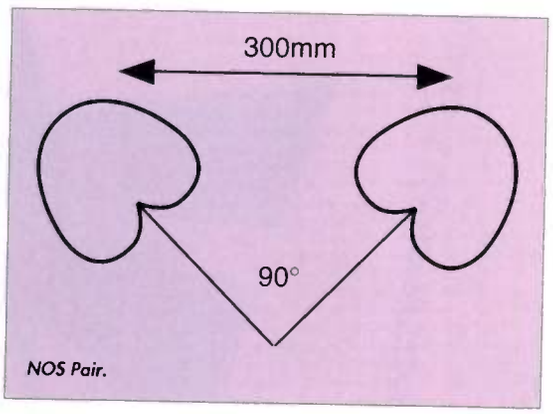
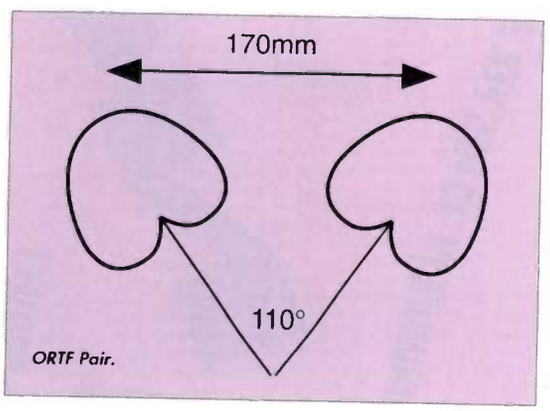
STEREO MIC TECHNIQUES

▶ microphones will depend on the acoustics of the environment and the kind of perspective you want to achieve. For the recording, each microphone feeds its corresponding track on the stereo machine.

The potential problem with this arrangement is a hole in the middle of the stereo representation. The simplest way to avoid this disastrous situation is to bring the mics closer together, but this will affect the spaciousness of the recording, the whole thing tending to become rather narrow and lifeless. The optimal position is often a little harder to find than might be imagined at first.



NOS Pair.



ORTF Pair.

Although most people use the spaced technique purely so that they can take advantage of the qualities inherent in omnidirectional microphones, there is no reason why you should not use directional microphones in a spaced array — a very well-known classical music recording engineer, Tony Faulkner, often uses figure-of-eight microphones, for example. The advantage of using directional mics is that it is possible to reject some unwanted signals (typically reverberation) while retaining most of the other advantages of spaced-mic recordings.

Other spaced techniques that use directional microphones include the ORTF format and the NOS system (both named after the European broadcasting companies that developed them). These are often called 'near coincident' techniques because they combine the level difference recording characteristics of directional coincident microphones, with spaced arrays.

In the case of the ORTF technique, the basic configuration uses a pair of cardioid microphones with a mutual angle of 110°, spaced about 17cm apart. The NOS variant has a 90° mutual angle and a spacing of about 30cm, and — just for the record — the Faulkner array uses a pair of figure-of-eights, both facing directly forward, but spaced by about 20cm.

I often use the ORTF or NOS techniques, generally with good results, and I recommend that you experiment around these basic arrangements to find out what works best for you.

BINAURAL RECORDING

Binaural recording is one of those techniques that seem to have a cyclical life. It becomes very popular for a while, then seems to disappear without trace, only to be re-invented a few years later...

Binaural recording is a basic two-microphone spaced-pair technique, but it is rather specialised in that it only works effectively when listened to through headphones. The principle is to replicate the way our ears capture sounds, and replay those sounds directly into the corresponding ears.

Our ears have a hemispherical polar pattern, largely dictated by the lump of meat cunningly positioned between them. As we saw last month, the head creates sound shadows and timing differences for the two ears, so a binaural recording format has to replicate those actions.

The easiest technique is simply to clip a couple of small omnidirectional microphones (tie-clip mics are perfect) to the ears of a willing victim (the arms of a pair of glasses would be less painful!). If recording an orchestra or band, the human mic stand would have to be persuaded not to move their head, but stunning results can be obtained if the microphones are recorded on a cassette or DAT Walkman as you go about your daily chores. Crossing a busy road can cause very entertaining reactions in the listener — and see what happens if the recording includes your morning ablutions: listening to the binaural sound of someone brushing their teeth is an experience in itself!

> "Binaural recording effectively transports our ears directly to the recording venue."

A rather more practical method is to use a Jecklin Disc (also known as a 'Henry' in some circles), which mimics the fundamental acoustic aspects of the average head. The disc can be made from perspex or plywood, typically about 25-30cm ▶

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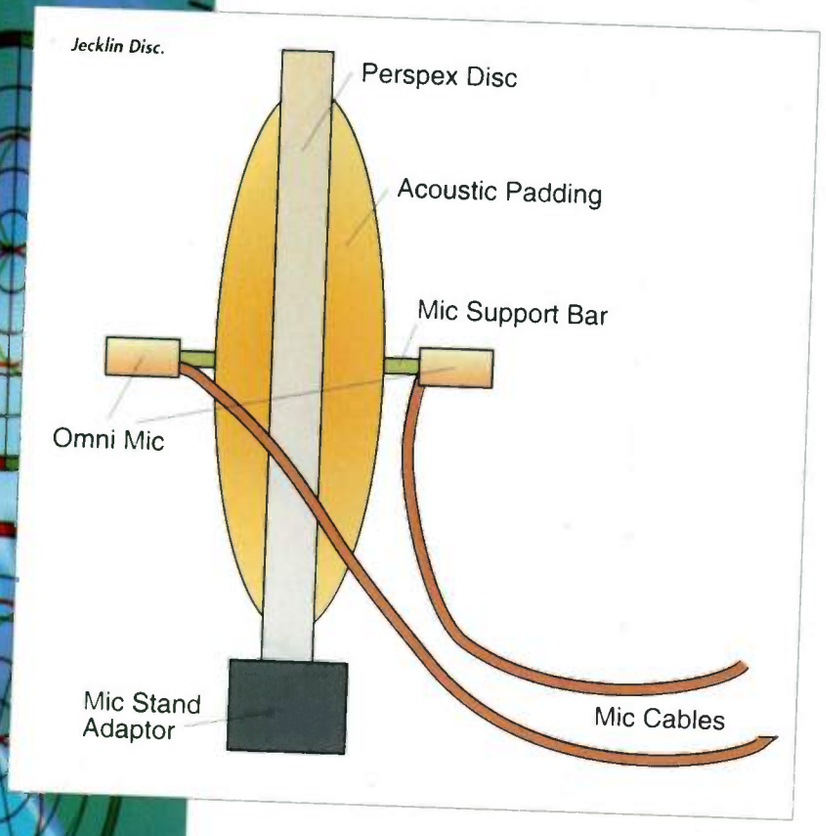
STEREO MIC TECHNIQUES



Jecklin Disc.

▶ in diameter, with a mounting point for the microphone stand on one edge, and fixings for a pair of microphones arranged through its centre.

The surface of the disc should be covered in some kind of absorbent padding to avoid reflections from the disc surface back into the microphones, and the mic capsules should be mounted about 15-18cm apart on opposite sides of the disc.

The operating concept is that the microphone-spacing matches that of our ears, and the disc provides the sound-shadowing effects of the head; thus the whole technique should be able to capture signals in the microphones which will closely match those of our own ears. When replayed over headphones, the signals from the disc mics are fed directly into our ear canals, bypassing the effects of our own head- and ear-spacing — effectively transporting our ears directly to the recording venue.

In practice, the results vary from being incredibly three-dimensional and realistic, to forming a stable and solid image behind, but not in front of, the listener's head. The differences are probably due to the difficulty of accurately matching the dimensions of the recording system to the listener's own physique. If you really want to go overboard, the state-of-the-art binaural technique uses a fully bio-accurate dummy head (a common alternative name for the binaural system is 'dummy-head recording'). Several manufacturers produce anatomically accurate heads, often with the complete torso. Even greater accuracy can be achieved by using carefully shaped pinnae around the microphone capsules and even replicating the various mouth, nose and sinus cavities within the human head!

Interestingly, binaural recordings replayed over loudspeakers manage to convey a sense of stereo width and movement without having any accurate imaging qualities. This facet of the technique is often used to advantage in the production of sound effects for radio and television. In general, sound effects — especially atmospheric effects — should convey the environment, but must not distract from the foreground dialogue or action.

Imagine a scene from a radio drama where two actors appear to be conversing on a busy town street. If coincidentally recorded effects were used, the sounds of footsteps and buses travelling across the sound stage could be intensely distracting. However, a binaural recording of the same atmosphere, while being very realistic over headphones, is far less distracting over loudspeakers. Scale, width, perspectives and movement are all conveyed to the listener, but in a laid-back manner that is often far more effective.

SUMMING UP

Spaced techniques allow the engineer to take advantage of the inherent quality of omnidirectional microphones in stereo recordings, particularly their extended and even low-frequency response, and their smooth off-axis pick up. The only problem to be aware of is the potential for comb-filtering effects when spaced microphones are combined, and the more the mics, the worse the effect is likely to be, although it is very hard to predict the audible results.

There are no rules about spacing microphones — it really is a case of trying an arrangement and listening carefully to the results, then moving things about until you find what you are after. Thinking about the physics of the whole thing helps but, in practice, placing spaced microphones is really a black art, and the best results are almost always obtained by trial and error.

Binaural techniques are a lot of fun, and can be stunningly realistic, but most people prefer to listen over loudspeakers rather than headphones, so the technique is of limited practicality.

Most of my own best recordings have used spaced systems to overcome the weaknesses of coincident techniques (generally, excessive precision and a lack of spaciousness), and my personal favourite arrangement is the near-coincident ORTF setup. This rarely fails to provide the kind of sound I like, and is usually a good starting point from which to build the final sound.

I have used variations on this theme to form the basis of recordings of everything from solo acoustic guitars, complete drum kits, Leslie speakers on Hammonds, and live jazz bands in clubs, up to full concert orchestras.

However, your likes and dislikes, in terms of stereo sound stages and imaging details, are bound to be different from mine, so don't take my word for it, go out and experiment — it really is the only way! SOS

"Placing spaced microphones is really a black art."

Hugh Robjohns is a lecturer at the Centre for Broadcast Skills Training at BBC Wood Norton. The views expressed in this article are the author's own and are not necessarily those of his employer.

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Chorus of Approval

DIGITECH VOCALIST WORKSTATION VOCAL HARMONY PROCESSOR

The newest member of Digitech's Vocalist family of intelligent pitch-shifters boasts some slimmed-down features from previous models and a 'hands-on' user interface. PAUL FARRER warms up with some scales, adjusts his bow tie and takes this powerful module right through to the standing ovation and bouquets.

When Digitech released the first in their Vocalist series of 'intelligent harmonisers', the VHM5 (see *SOS* October 1991), it caused something of a minor revolution. The ability to pitch-shift live or recorded vocals and thereby create accurate harmonies (or correct dodgy singing) seemed almost too good to be true, and with MIDI control thrown in, the Vocalist's success in the hi-tech market was assured. After several more well-received incarnations, including the fully-featured rackmount Studio Vocalist and the cheaper, easy-to-use MIDI Vocalist (see *SOS* August '95 and July '96 respectively), Digitech have now redesigned this multi-talented module once again, coming up with the Vocalist Workstation reviewed here. With a price tag of around the £750 mark, the unit is cheaper than the Studio Vocalist, but more expensive than the MIDI Vocalist, and is therefore unlikely to be classed as an entry-level piece of gear. However, the inclusion of the built-in reverbs and onboard faders could win it quite a few friends.

JUDGING BY APPEARANCES

Physically, the Vocalist Workstation is very reminiscent of the original Digitech VHM5 design. Five sensibly-proportioned faders nestle on the drum machine-sized top panel, and these control input, output and reverb levels, as well as the original signal (or 'Lead', as it is referred to) and harmony levels. There is a finger-friendly data wheel on the top right, and a simple one-octave 'keyboard' for inputting chord changes and other pitch information. Up near the 4x20-character liquid crystal display, there are eight soft keys (arranged in two rows of four), four input monitor LEDs that range from -30 to 0dB, a MIDI Active LED, an overload warning LED, and two others that indicate when the pitch detection circuitry has recognised the incoming note. The LCD is clear enough and backlit, but you can't help feeling that both this and the LEDs are just a little too small — in a dark and crowded live venue, you could acquire a pronounced squint trying to see what is going on. What's more, there would have been enough physical space on the front panel to accommodate a slightly larger display.

The multiple XLR and line output options of the Studio Vocalist have been ditched in favour of a simpler set of stereo line outs. There is a footswitch and headphone socket, as well as the usual MIDI In, Out and Thru sockets. Audio signals can be sent to the unit via the mono line in, or you can plug a mic straight into the single, balanced XLR input. Be warned, though — unlike the Studio Vocalist, the Vocalist Workstation does *not* provide phantom power, and is powered at the unusual voltage of 9.75V DC from a short-cabled 'wall wart' that will almost certainly be impossible to replace if it goes wrong! In favour of portability, the unit weighs only 0.7kg. This smaller, more lightweight construction does have its advantages, and has obviously contributed to keeping the price down, but you do get the feeling that the whole unit might be just a bit *too* compact at just 267x167mm, especially when you consider that under normal operating conditions you are likely to have at least five cables going into the back panel. Certainly while I was carrying out this review, things got a little crowded, cable-wise.

HOW IT WORKS

At the heart of the Vocalist Workstation (as with all recent Vocalist products) is a harmony processing chip from IVL Technologies in Canada (see IVL interview in *SOS* August '96), and Digitech certainly use this technology to its fullest potential. The Workstation has 18-bit A/D converters, and has a frequency response of 15Hz-20kHz, resulting in impressive sound quality.

Just as with any other processor, setting up the input and output levels is crucial to the performance of the module. Luckily, with the Workstation's onboard faders, this is a simple enough procedure, and once I'd set up these levels, I found the unit to be extremely quiet and well behaved.

The Workstation contains 50 factory presets and a further 50 blank locations into which you can store your tweaked and edited patches. Selecting a preset is child's play: simply turn the data wheel

pros & cons

DIGITECH VOCALIST WORKSTATION £750

pros
- Excellent sound quality and features.
- User-friendly operation.
- Good vocal tracking, pitch correction and harmonic realism.
- Comprehensive MIDI spec.

cons
- No phantom power.
- LCD and back panel a bit crowded.
- The built-in 'keyboard' produces a loud click.

summary

The Vocalist Workstation is a fantastically useful studio/live tool with some excellent presets and a well-designed operating system. Its relatively high price, however, may put it just out of the reach of many home studio owners.

SOUND ON SOUND

one click, and a new preset is loaded almost instantly. The presets are split into seven main stylistic categories: Demonstration (a mixed bag to show you what the Workstation can do), Vocal Thickening, Vocoder, Scalic Harmony, Chordal Harmony, Reverb Only and Special Effects. Of course, the presets that actually construct harmonies from the input signal have to be told which chord you want to build and what 'style' that chord is (is it, for instance, major or minor, and is it a 7th or diminished?). This can be achieved a number of ways. Firstly, when you load up a harmony-constructing preset, the screen displays a list of up to eight different harmonic variations that can be selected using the eight soft keys beneath the Workstation's LCD. The variations differ between presets, and if a particular harmonic style you want isn't listed as the preset boots up, it's a simple enough procedure to assign new harmony types to a particular soft key function (see the 'Sweet Harmony' box for a list of available harmonic types).

A loaded preset defaults to a major chord style, and using the built-in keyboard, you simply hit a note of the scale to select the actual chord itself. So, for example, if you hit a D on the keyboard, harmonies will be constructed that are appropriate to the key of D major. Another way to input the root note information is from a sequencer, or live from a MIDI keyboard. The MIDI spec allows you to send a track of MIDI information (such as a sequenced synth pad) to the Workstation, which can read the chord type and assign appropriate harmonies from that. The third way of changing chords (particularly useful for live applications) is via a footswitch. This is achieved by chaining together a pre-programmed set of chord structures and program changes (in the form of a so-called 'Song') and then stepping through these by either triggering from the Workstation's front panel or using a Digitech footswitch (the manual doesn't mention whether you can use other manufacturers' footswitches or not). You can have up to 50 Songs in memory at any one time, and each one can be composed of up to 16 named sections (such as verse, chorus, and so on). Each section can, in turn, have a maximum of 32 steps (chord or program changes).

IN USE & EDITING

The Workstation's presets are designed to give you a good selection of instantly usable vocal effects, with more emphasis on getting going straight away than on distracting you with endless editing options. In this respect, the module succeeds tremendously well. Compared to Digitech's Studio Vocalist, I found the Vocalist Workstation more readily accessible, and, despite the heat and time constraints of a vocal session I was involved with during the review, the unit performed admirably. My only concern was that the buttons making up the small 'keyboard' on the front panel emit an alarmingly loud click when depressed. The upshot is that any singer who intends to sing at the same time as playing the Workstation's keyboard would have to be very careful with microphone types and positions in order to avoid unwanted percussion accompaniment!

If you do feel the need to delve deeper into the edit pages, there is a refreshing simplicity to their general layout, too. For instance, when you ▶

MIDI

The Vocalist Workstation is clearly designed with MIDI in mind, so it is perhaps not surprising that its specification in this area is very good: MIDI pitch bend, modulation and aftertouch can all be employed to embellish the 'performance' of the presets. The chord sequences (or Songs) mentioned elsewhere in this review may be easily saved and reloaded via MIDI to an editor/librarian or another Vocalist, as can the preset banks and other SysEx data such as utility (or setup) parameters.

SWEET HARMONY — BASIC OPERATIONS

For those of you who aren't familiar with the Digitech family of Vocalists, here is a quick run-down of its simplest form of operation. A vocal (from either a live mic or a recording) is fed into the unit's processor. If we assume we are working with a three-part harmony preset, the Workstation will then split the signal, via pitch-shifting, into two other notes. If you are working in the key of G major, for instance, and sing a G, the Vocalist Workstation will pitch-shift the original signal down to a D, and shift a copy of the original signal up to a B. Obviously, as the chords of the song change, the new chords must be entered into the Vocalist, either from the small built-in keyboard, via MIDI, or by using the 'Song' chaining function. The style of the chord is also important: in the chordal harmony presets, you can choose from Major, Major 7th, Minor, Minor 7th, Dominant 7th, Minor 7th flat 5th, Diminished 7th, Augmented 7th, Suspended and Suspended 7th chord types. In the scalic harmony presets, the edit pages also allow you to choose the particular type of scale that will work best with the type of song you are working on, for example, Major, Minor, Whole tone, Diminished, Blues, Dorian, Harmonic Minor and Melodic Minor.

jump to the mix page, four bargraphs appear on screen indicating the output levels of each note (or voice) of a harmonic block. These correspond to (and are in line with) the eight soft keys under the LCD, and you select and alter each individual level using a combination of these and the data wheel. The whole system is very intuitive and after only a short time, the fine-tuning and creation of new and unusual harmonic effects becomes second nature.

All the presets come with some other very appetising initial edit parameters, although the fundamental functions vary quite a lot between presets, and so the available edit parameters alter depending on the preset selected. Those on offer include pan, level, and vibrato settings for each individual harmonic, gender (to give your harmonies a male or female sound), reverb type (studio, chamber, club, hall, and arena) and various humanisation features. One of the most interesting of these features is a form of randomiser, which arbitrarily detunes certain notes within a harmony block to make it seem more 'real'. There is also a neat 'scoop' or portamento parameter, which works particularly well on the more effected vocal sounds, such as those produced by the Vocoder.

As you get deeper into the more obscure areas of editing, the manual sometimes struggles to explain itself as clearly as it might (see the 'Chordal or Scalic?' box on the difference between the two types of harmony), and you often get the feeling of being surrounded by complex muso-babble, which is a shame, because the actual everyday operation of the Vocalist Workstation is really not that difficult at all. The inclusion of the faders on the front of the unit gives all of the presets an immediate feel, and I can see most users getting a huge amount out of the unit without ever having to venture further than the basic (but very powerful) initial edit levels. You don't have to hunt through endless pages to find the mix ratio between original signal and effected harmonies, nor do you have to look hard to find the overall reverb control — instead, it's all there for you on three faders. Bliss.

As I've mentioned, Digitech have obviously ploughed a lot of research into selecting presets that provide instant gratification, and the Voice Thickening presets are one good example of this. This is an often sought-after studio effect that can enhance a lead vocal by giving it a double-tracked feel. The selection within the factory preset bank nearly all sound as natural as can be expected and offer both male and female unison or mixed styles. The Pitch Correction preset (found amongst the Vocoder presets) is another useful feature that could be used to repair a recorded section of a vocal that's out of tune. When this preset is selected, the input vocal remains 'dry' or un-effected until a note is pressed on the keyboard or sent via MIDI, at which point the exact pitch of the sent note is forced onto the incoming signal. You can also adjust these pitch settings via the pitch wheel on a MIDI keyboard.

When you consider some of the Workstation's less obvious features, such as its ability to set thresholds to ignore certain frequencies of sibilance, or the extreme low-frequency filter which helps to enhance the tracking process, or the anti-feedback control specifically for live work, you begin to wonder if the poor folks who developed the Vocalist Workstation ever got any nights off at all!

CONCLUSIONS

In only six years, the Vocalist concept has come on tremendously, and in a short review such as this, it would be tough to list all the clever things that the Workstation can do, but one word that could describe it overall is 'intelligent'. This is meant not just in the sense of intelligent harmonising, which the Workstation handles extremely well, but also to describe the intelligence that has gone into taking an established product, improving the sound quality, performance, and range of features, then trimming down a few non-essential operations to bring the product into a lower price range. The Vocoder presets are simply outstanding, and although the pitch correction can sound a bit artificial, the presets provided here are a welcome inclusion, as is the small (but fairly usable) selection of reverbs. The debate as to whether or not a listening audience will be able to tell that your processed harmonies aren't real very much depends on how the Workstation is used. It's not at all difficult to make it sound lousy, but it doesn't take a genius to make it shine either. It also really makes you think about the wealth of different vocal sounds and styles there are, and using it can teach you a good deal about harmony and harmonic structure.

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CHORDAL OR SCALIC HARMONY?

One area where the manual gets a little tongue-tied is when trying to explain the difference between these two harmonic types. Essentially, a Vocalist Workstation preset working in a Chordal mode creates a constant harmony block which stays on whichever chord you have selected, but which automatically moves within that chord to sound correct over your lead voice. A Scalic harmony preset, however, creates less static and more moveable harmonies, which will stay closer to the original melody as it jumps around. Scalic harmony presets have a generally more fluid feel to them, and tend to work better for pop vocal harmonies, whereas Chordal presets are often better for more jazzy or thicker-sounding chords.

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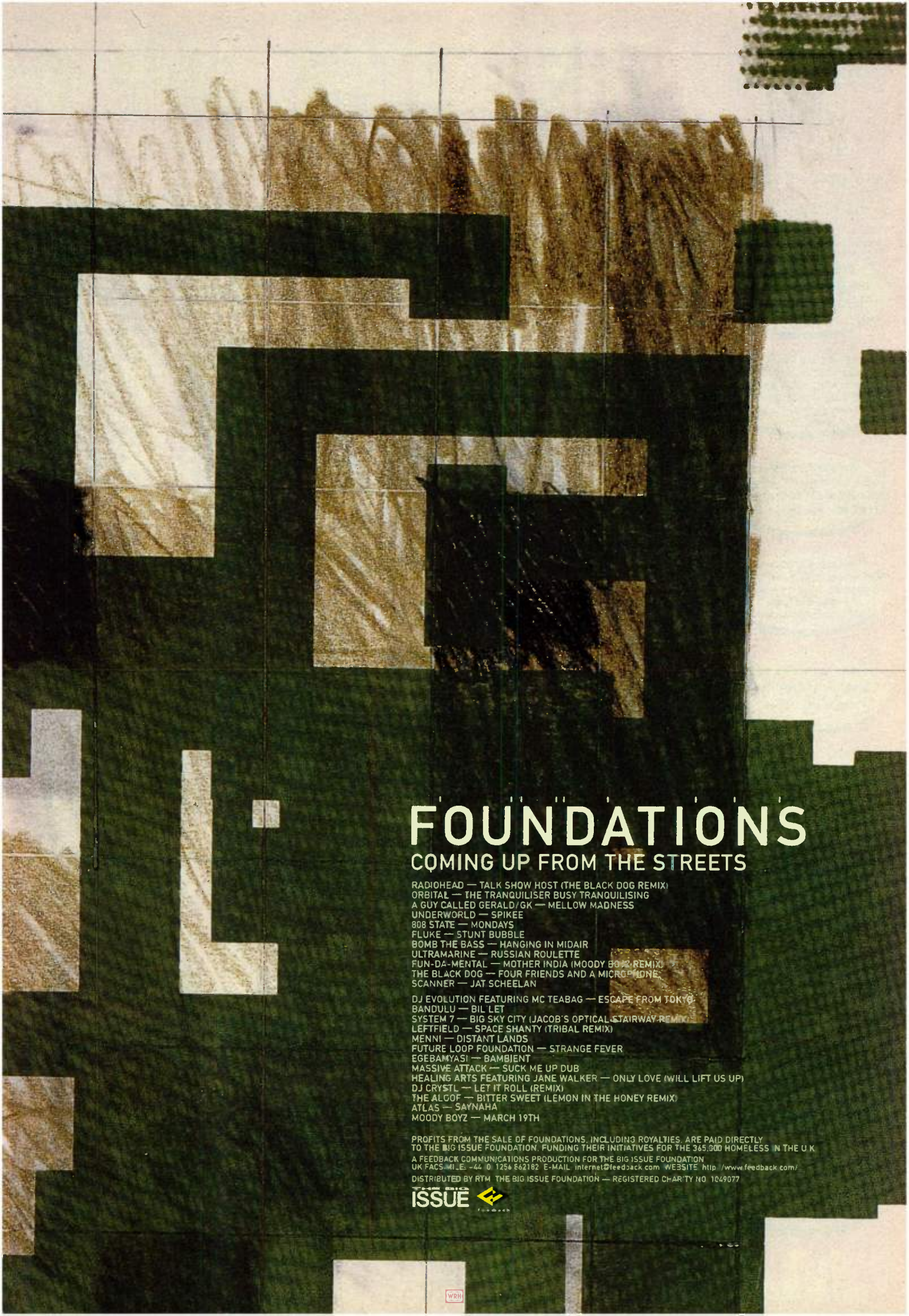

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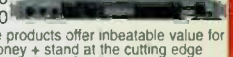

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CTS PROFESSIONAL SALES

Carlsbro Retail's installation arm, CTS, has recently set up a brand-new sales facility near Nottingham. PAUL WHITE takes a look around.

Founded by Stuart and Sheila Mercer, Carlsbro started out as a small company building amplifiers and speakers for gigging musicians, but before long it was evident that some form of commercial outlet was needed for their products, so Carlsbro Retail was set up under the guidance of then drummer Keith Woodcock — who quickly realised that the shops needed to sell not only Carlsbro gear, but also the other equipment and instruments needed by gigging musicians. Carlsbro Retail eventually grew into a chain of some 12 music shops, and, around 15 years ago, CTS was set up to handle the growing installation side of the business. Over the years the name has changed several times but the initials CTS have remained: the current title is Creative Technical Services.

CTS

CTS was created to cover the growing installation side of the Carlsbro Retail group of musical instrument stores, and began life putting PA systems into music venues throughout the UK. Today the company is very well respected within the industry, is British Standard approved, and can fully design, install and service sophisticated computer-controlled lighting rigs, high-power Tarm laser systems and leading-edge video suites, a large number of which are bought by large leisure operators so that they can produce their own exclusive in-house video material.

Though installing sound systems may not sound too technical, the number of safety features and architectural considerations that have to be taken into account is daunting, and some nightclub systems are incredibly complex. Managing Director Ivor Green tells me that the CTS public liability insurance bill alone is frightening!

Now CTS and sister company Carlsbro Retail/Academy of Sound, guided for nearly 30 years by industry stalwart Keith Woodcock, who's now Chief Executive, are in the business of re-inventing themselves. Although Carlsbro have traditionally been regarded as specialists in traditional 'guitar, bass and drums' rock 'n' roll gear, Academy of Sound have a pool of experience in the hi-tech world and, along with CTS, can effectively service customers requiring a digital studio, an audio/visual edit suite or even a private video production company.

The outcome is that the Carlsbro Retail outlets are evolving into the newly refurbished Academy of Sound stores, each one having designated specialist areas within the store for key products. Specific hi-tech staff members are being trained by CTS to provide the level of customer support required to operate modern computer-based systems and digital hardware, the aim being to have a technically qualified member of staff on hand at all times to help resolve (or avoid) problems.

CTS PRO SALES

I was shown around the brand new CTS Pro Sales facility by MD Ivor Green, who has been with the company for more years than he cares to remember.

"While Keith promoted the stores, I developed the installation business; our expertise at CTS is in high-power sound, lighting and lasers. We bought the installation business out of the Carlsbro group in about 1990, and that followed through with the evolution of the retail business. That left two businesses with two separate administrations, so it made sense to put the two together so we could face the future with a single administration. We developed the marketing strategy to include 'Play it Again Sam', a store dedicated to selling secondhand gear, much of it taken in part exchange in the course of our installation work.

"CTS has always had to spend a lot of money on R&D — we are a turnkey operation so we have to incorporate sound, light, laser and video ▶

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CTS PROFESSIONAL SALES

systems. We'd already got our own TV edit suite and our own lighting computer, and we'd obviously done the development for our own installed loudspeaker products, currently gracing venues of the likes of Camden Palace, so it was a logical development for CTS to handle the top-end products in the audio and visual markets.

"Our aim was to develop the professional market, but many professionals are actually home-based businesses, with maybe £60-80,000-worth of equipment, doing sound for picture work, soundtracks for computer games and so on. To that end, we needed a facility where clients could try out systems in a suitable environment with qualified technical support staff."

"It was a logical development for CTS to handle the top-end products in the audio and visual markets."

CTS Professional Sales opened just three months ago on an industrial estate in Mansfield, but although the outside of the building has the anonymous look of industrial units everywhere, the CTS demonstration room has to be seen to be believed. Dominating the room is a state-of-the-art high-intensity projection TV system (I'm told that a lot of this kind of product goes into exclusive nightclubs so that they can run their in-house-generated video material, and apparently some club owners are planning to video-link different clubs in the same way as bingo hall operators sometimes do at present). When not being used for demonstration, this screen can be linked to the computers or video systems in the demonstration area to give everyone a clear view of the screen during training or product evaluation sessions. The company also have video graphics design capabilities, and programs such as *Lightwave 5* and *3D Studio Max* are on demonstration.

The room is divided into separate workstations; CTS build their own range of studio furniture and this is used as the basis of the individual work areas. There's a complete audio workstation based around Yamaha's 02R, a couple of Tascam DA88s, pro-audio sound modules, a comprehensive outboard, and Dynaudio monitors of all sizes. For computer-based audio, there's a Digidesign TDM Pro Tools system with all the trimmings, a Soundscape system, and numerous other familiar packages. On top of that, there are displays of seriously desirable microphones, and an impressive amount of broadcast-standard video equipment. Ivor feels very strongly that video is an integral part of the company's future.

"A few years from now, there's going to be virtually no audio-only product, so anyone who doesn't learn to integrate with video is going to find themselves out of a job. Digital Video Disk is just around the corner — it can hold 4.7Gb of data with 6-channel surround and multi-language dialogue, and digital TV is imminent, with over a hundred new channels opening up. This will provide opportunities for independent programme-makers."

One of my concerns is the increasing popularity of the PC platform as the basis for audio workstations, not because it can't do the job but because there are so many pitfalls in putting a system together. I communicated my concerns to Ivor, who already appreciated the magnitude of the problem and is in the process of developing strategies to cope with it. I related the the subject of a recent phone call from an *SOS* reader who had bought *Logic Audio* plus a Digidesign Audiomedia III card and couldn't get them to talk to each other. Both companies did all they could, and verified that the respective products weren't faulty, but still the reader was left with a non-functioning system. I didn't know the answer either, because I have exactly those components running fine on my Pentium 90, but a couple of the CTS tech support guys chipped in and informed me that a lot of it is to do with the type of motherboard used in the PC, and the chip set it uses. Apparently chip sets are often optimised for video performance at the expense of audio performance, and some are completely incompatible with the audio components mentioned.

"The problem is that customers go to a computer discount warehouse, buy a Pentium PC of such-and-such a speed (either ready-built or as a set of parts), and expect it to work. Because PC components are made by so many different companies, different models behave differently. Just because the system you want runs on your friend's Pentium 166 or whatever doesn't mean it'll run on any Pentium 166! Furthermore, there are lots of software settings that need to be set up in order to optimise a machine for audio."

This is not great news for those who want the computer as a tool rather than as a constant source of mental stimulation! However, CTS Pro Sales have a solution. They provide and configure their own PC computers, the add-on cards and the necessary audio or video software as a system, and

they guarantee that that system will work. What's more, the computer comes with a built-in modem, so a certain amount of diagnostic work can be carried out remotely: you simply hook the computer up to a phone and call CTS technical support. Additionally, if the customer is prepared to pay a further £100 for a copy of *PC Anywhere*, the CTS engineers can take over control of the PC via their own computers, optimise software settings, check functionality, and even diagnose hardware problems. When you come to upgrade, CTS will rebuild the PC for you to guarantee continuing compatibility.

While buying a PC this way may be slightly more expensive than going to a computer discount store, the price differential isn't as great as you might expect, and I, for one, think the peace of mind is well worth it.

So what else can we expect from CTS? According to Ivor, their policy is to provide the clients with all the information and hands-on testing they need to make sure that they're buying the right system for their needs; and, as the AOS stores do, they guarantee that if a customer discovers that they've made an inappropriate choice, they can exchange it within the first 14 days. There's also going to be a sizeable PA and lighting test area, though this was still at the planning stage when I visited. Here, clients will be able to drive PA systems at realistic levels, compare systems, and audition lighting equipment. It sounds as though Ivor and his staff have their work cut out for the foreseeable future, but I've a feeling that they're enjoying every minute of it!

"Anyone who doesn't learn to integrate with video is going to find themselves out of a job."

info

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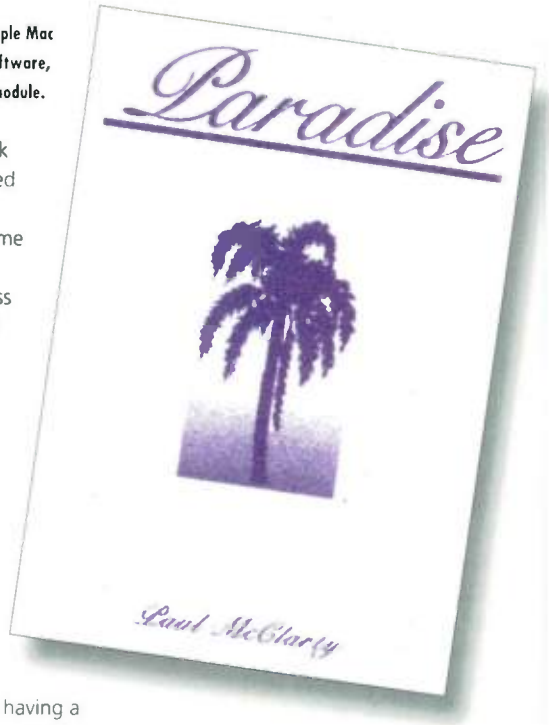
PARADISE

Recording Venue: Home and The Garlo.
Recording Equipment: Tascam 8-track, Apple Mac running Steinberg *Cubase* sequencing software, Roland D70 synth, Korg 05R/W synth module.



This demo showcases some slick pop soul from Paradise, recorded by guitarist Phil Hearn. The rhythms groove, courtesy of some decent programming using *Cubase* to trigger drum and bass sounds from a Roland D70 and Korg 05R/W. It's obvious that Phil has worked with decent pop/rock drummers in the past and has a good idea of how they put a groove together.

Occasionally the levels seem a bit out of hand, and it's difficult to say at what stage this has happened. It's most noticeable on the vocals, which distort from time to time, and some of the bright keyboard sounds are having a hard time too. I'd say that the cassette is overloaded. Some tape designed for mass production does overload if you pump what you think are good levels onto it, so it's worth checking the tapes you send out. Personally, I use a three-head machine, which is indispensable when clients bring in low-quality tapes to copy a master they've just spent three days recording!

The mixes are very good, with a liberal sprinkling of reverb that dates the production but works well with the soul style of singing. For my taste, the guitars are perhaps too subtly placed in the mix, allowing keyboard washes to dominate, and the use of bell sounds moves the production firmly across the Atlantic. Yet all this makes good commercial sense, giving the songs a radio-friendly feel. ❑

Readers submitting demo tapes should note that SOS regards the inclusion of photos or artwork with demos as permission for the magazine to reproduce this material free of charge, as illustration, with any review of the accompanying tape.

TORQUE

Recording Venue: Home.
Recording Equipment: Tascam M2600 24-channel mixer, Yamaha NS10 monitors, Sony DTC60ES DAT, Alesis Quadraverb GT guitar effects and Midiverb III effects, Zoom 1202 effects, Behringer compressor, Atari ST running Steinberg's *Cubase*.

Taking samples from the movie *Full Metal Jacket*, the first track on this tape is aimed at listeners of quirky, distorted techno, and the generally crunchy nature of the sound fits in perfectly with this direction. It's the distorted hi-hats that really do the trick, placed to the front of the mix, while the more ambient bangs and crashes are heavily reverbed, and thus distanced for the listener. Meanwhile, the dull thud of the bass drum underpins the first track on the demo, which has an interesting and constantly varying mechanical-sounding loop swinging around the stereo image.

Track two starts with promise: a low tone creates a foundation for a twanging synth loop, soon joined by basic 4/4 kick and a more jungle-esque snare and hat loop. The sound is widely spread, using pre-delay reverb effects on the mechanical crashes and bangs that punctuate the mid frequencies of the track, and the bass drum is made grainy using a short early-reflection reverb, again pre-delayed in tempo with the rhythm.

Steve Hough of Torque has had some compression difficulties on the mix. The problem is that the louder instruments tend to reduce the level of the other instruments. This does happen with compressors if you push them hard enough, because once the compressor threshold has been exceeded (in this case by the bass) the level of everything is brought down. If it's the bass end that needs most attention on the mix you could try running a stereo graphic or other EQ on the side-chain of the compressor, making it more sensitive to bass frequencies without affecting the rest by cutting the frequencies above 150Hz. ❑

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FITZWILLIAM SWING BAND

Recording Venue: Crypt of Fitzwilliam College Chapel, Cambridge.

Recording Equipment: 2 Alesis ADAT digital 8-tracks, Studiomaster P7 16:8:2 mixer, Alesis 3630 compressor, Lexicon Reflex reverb, Yamaha NS10 and TEAC SW1 monitors, Oktava MK219, AKG SE300B with CK91 cardioid capsule, AKG C1000, Shure SM57 and 58 microphones, mastering on PC running *SAW Plus*, TC Electronic M5000.

The venue for this recording was the room that the band rehearse in, described as having mostly curved, concrete walls which distribute the sound evenly. Not surprisingly, microphone spill turned out to be a bit of a problem, and the ride cymbal level was difficult to control.

On the evidence of this recording, the microphone spill seems to have been dealt with as effectively as possible. However, for recordings like this, where you want to capture the energy of a band performance, the spill often helps to homogenise the sound, as all the instruments are influenced by the EQ and reverberation characteristics of the room.

Ride cymbals can often be a problem, and in a band like this the ride cymbal is often the band metronome and needs to cut through live. Yet when recording using overheads the close-miked drum sound is dominated by the same cymbal that sounds balanced to the audience. Careful microphone placement can cut this problem down a bit, especially if you use directional microphones (as in this recording, where two AKG C1000s did the job), but often a quieter, more studio-orientated cymbal has to be found. The trick is to spot the problem when setting up, rather than later — not always easy to do when you've got limited time and a lot of musicians hanging around getting bored!

Even though the drums were screened off from the other musicians, engineer Andy Cross was disappointed that the ride cymbal bled onto other microphones. Yet in a room with concrete walls the high frequencies are bound to be emphasised, and to my ears the problem didn't seem as bad as Andy thought. I notice that the finished master lacks presence and suspect that some treble was lost in an attempt to cut the ride cymbal level. A parametric EQ with a tight bandwidth could have been used to try and cut the ride cymbal level too. Even so, I played it back with a +6dB boost at 12kHz and it improved the overall sound.

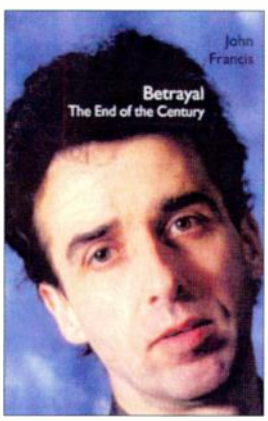
I've concentrated on the problems that Andy brought up in his letter, but in truth this is a fine recording of a fine swing band. Once a little presence has been added, a truly professional-sounding recording emerges. ❑

QUICKIES

MARK GLEESON AND STEVEN HAWKES: This is Mark and Steve's first attempt at writing a dance track and I have to say that it's not bad at all. There's nothing dangerous here — it's a pop song given the dance treatment, four on the floor, with a good vocal hook from a female vocalist who tracks up well. So far, so good — but I can suggest some changes. For instance, how about replacing the synth sax phrase with a simpler sound, like the sort of monophonic analogue synth used on garage tracks? It's also a very full track, instrumentally, and it would be interesting to have heard a club mix, taking the track back to bass, drums and vocals with little else in places, then experimenting with synth loops and phase effects. The letter also apologises for the lack of TR909/808 and M1 piano sounds but to my mind the song works without these sounds. Remember that in dance, as in many things, rules are there to be broken!

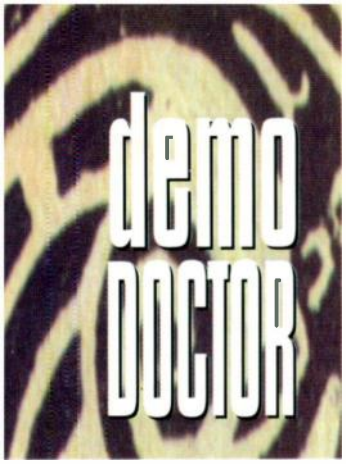
DREAM KITCHEN took my advice and invested some of the money they would have spent on marketing in the studio instead — then they sent me their new tape to prove it! It's a significant improvement and proves the point that you've got to have something to sell before you go to market. The songs are punchy and well delivered by vocalist/guitarist John Reid and the band sound tight. Sonically, the mixes are punchy in the bottom end but sound better with presence added to the overall mix, so if the band do another run of cassettes it wouldn't hurt to put the master through an enhancer. Best track is the longish but well-developed 'Silent Revolution' — plenty of dynamics and emotive singing!

Not only does **JOHN FRANCIS** write and record songs, but he's also written and published a book of lyrics and poems. The songs on this tape with titles such as 'Problem', 'Chronic Anxiety' and 'Heavy Load' are pretty par for the course: this tape is not to be filed in the easy listening section! The title track of the tape is based around two chords and a minimal guitar which could do with some more treble. Yet its dark nature is the perfect foil for John's melancholy vocals. However, these vocals could have been mixed higher, with some compression to help the occasional inconsistency in level, as the lyrics are so important. The extra instrumentation provided by guitarist Frederic Pugsley varies a production sound which is as bleak as the lyrical content. Some harmony vocals would have been nice on the bluesey numbers and occasional blues harp or sax would have opened up the sound.



Merging Celtic and mediaeval styles with tribal rhythms and pulse dance trance, the **SPACE GOATS** produce the sort of music that sounds at its best when you're sitting around the campfire or lying in the sun at a summer festival. The acoustic instruments — didgeridoo, bouzouki, hammered dulcimer and mixed percussion — have been well recorded, but some of the lead voices are a bit harsh: most of them could do with a slight cut at 1kHz to soften them up. Yet the massed vocals of the opening song, 'Pixies' Jinx' (an anti-road-building anthem) work well and don't need any EQ at all. The second song, 'Touch the Land', shows that the Space Goats can produce and write good protest songs that sound like earthy and organic versions of what the Levellers are only able to achieve with electric instruments and more bombast. A good mix on this track — and consistent mixes throughout the rest of

Continued on page 276 ▶



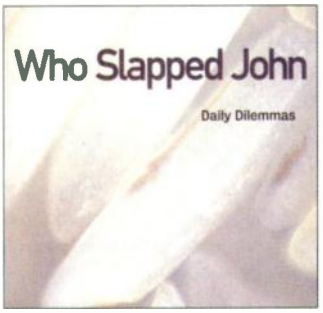
QUICKIES Contd...

the album — also proves that acoustic instruments can be ballsy and that dynamics can be lifted by good playing and interesting arrangements. Anyone who can record a hammered dulcimer as well as this deserves praise!

HYPERBOREA's publicity describes them as producing "tribal dance music from the threshold of Celtic magic." This offering has been well recorded at

studios in Cornwall, Dublin and London, with a full sound on the instruments but a thin one on the voice of Una O Boyle, which tends to make it sound weak against the other instruments. The vocals are in Gaelic but sung in a pop style that suits the music better than the traditional folk style I'm used to. The album has been exceptionally well produced and includes a free single containing 35 minutes of dancefloor mixes. Much of the material I listened to merged instruments like fiddle well with trance dance and ambient, by using echo to blend the acoustic with the synthetic sounds. A perfect example of this is found on the third track, 'Sylph', where a slow build features the fiddle taking the high-mids in the mix and fat analogue synth ducking and weaving underneath.

WHO SLAPPED JOHN: Allen Evans and Paul Gilbert's self-

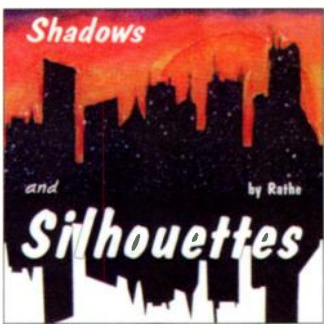


financed and self-produced CD was recorded at home and as yet has no distributor. The opening track is reminiscent of Julian Cope, probably because of the high, anthemic pitch of the sung chorus line and the weight of the organ in the mix. To create more impact I would have gone for a more ballsy guitar sound on the melody line underpinning the chorus. I don't mean more distortion — just a slightly fatter sound, higher in the mix. Other suggestions (too late now, anyway, as the CD has been manufactured) would be to fatten the acoustic guitar sound when it is exposed and use the more 'toppy' sound when it is joined by organ and electric guitar for the opening number (the acoustic sounds better on the verse of track six on the CD, 'What About Me?', if you need a comparison). A lot of work has gone into the making of this CD, which contains some interesting production ideas such as the tracked vocal start to 'Liquid Sky', from which the drums fade in. My favourite song was 'Sister', featuring a wonderful emotive vocal from Caroline Salkeld and some sensitive minimal piano playing from Allen Evans. The CD is available from Suction Records, PO Box 11161, London W2 5GF.

MARTIN ARCHER's move from sax player and performer of free-form jazz to synthesist and programmer has taken place over the past few years. This doesn't mean that he's hung up his sax.

Instead, he's brought with him the methodologies of some of his earlier work, using static compositions and utilising the improvisational techniques of the many musicians featured on this CD. So for some tracks the musicians respond to a synthesized sound or pattern, yet the recording is electro-acoustic, with the emphasis on the acoustic. It's been well engineered by Max Wall, who is also featured on bass guitar. Where sounds are acoustic, unless heavily treated they have been recorded organically, without the artificial high-frequency content so often added on other recordings.

At 18 years old, **RATHE** is fortunate enough to have found someone to finance a CD of his instrumental music. The compositions show promise in the playing but lack originality, and there are some problems with the mixing. For example, the string synthesizer sound on the second



track, 'Cat's Eyes', is harsh and sits uncomfortably against the backing. Some cut at 3kHz cures this but could equally well have been achieved using the synth's cutoff and resonance controls. Another problem with the mixing is that there seems to be too much reverb on nearly everything. A perfect example is the long gunshot snare of 'Midnight City Skyline', which is OK for one or two accented hits, to add dynamics to the song, but becomes redundant on the backbeat. In contrast, the more subtle 'Peace for Nana' shows that Rathe is capable of better mixes and can come up with some interesting sounds too.

I reviewed **DAVE WHYTE**'s last CD after he'd waited rather a long time. Hopefully the new CD hasn't spent as long in the jiffy bag! Once again, the album has been recorded at home, but this time he's got a pro studio engineer friend to mix it. The result is very impressive, with a modern, lightweight, yet punchy sound courtesy of stereo compression and some sort of enhancer. This should get Dave's country rock onto the radio in Luxembourg, where he's based, but he should also seriously think about sending the album out to companies who specialise in country music. I criticised the vocal performances last time around for sounding as though they were just going through the motions, but on this album this seems to have been rectified. I do have a couple of points to make, though: firstly, sometimes the backing vocals are a touch quiet (as on 'Why Baby Why?') and occasionally I feel I'm waiting for a change in the guitar sound, which is heavily processed with compression and a light dusting of modulation on a lot of tracks. The best song is 'Spend a Little Time' which, in common with the other songs, has well-programmed drum parts and a great Hammond sound.

CHROME's offering showcases some nice songs, but I think they've had a little bit of trouble with the recording. The vocals, for example, are rightly mixed up-front with little in the way of effect — they have that intimate, almost conversational tone. The problem is that they are very woolly, with nowhere near enough presence. As a consequence, the opening track on the tape really needs to be remixed. I love the vocalist, though, who has the gravelly sort of voice that you know is the result of cigarettes and spirits! The rest of the band can obviously play well too, but the sounds aren't that hot. The guitar is lacking in lower-mid to bass frequencies and often presence, too, which places it in that unpleasant mid-frequency range which everyone seems to hate. It's a shame, because the songs are really catchy and I think the band have really got something. I especially enjoyed the French song 'Um Mama' (half the band are French) and the sort of quirky pop sloppiness which the likes of the Cure have managed to sell so successfully. ❑

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Happy Birthday MC!

ROLAND MC8 MICROCOMPOSER

Roland's MC8 began electronic music's move away from the limited compositional scope of the analogue sequencer, and left its stamp on some of the seminal pop of the 1980s. Chris & Cosey's CHRIS CARTER, a pioneering MC8 user himself, fires up the 20 candles on the MC8's birthday cake...

This year is the 20th anniversary of what many regard as a landmark in sequencer history, for 1977 was the year in which Roland announced the birth of the pioneering grandfather of the MicroComposer family, the MC8. The advertising byline read *A new concept of control for a new era in electronic music composition.*

The MC8 wasn't the first digital/analogue sequencer available for the '70s electronic musician: companies such as Emu, EMS and Oberheim also had sequencers available. But the MC8 and its descendants arguably had more impact on electronic music-making in the 1970s and 1980s than any other family of sequencers. The introduction of the MC8 also saw the beginning of an inevitable move away from the prevalent 'running light' 12-step analogue sequencers from Moog, ARP, and Roland themselves. While analogue sequencers were definitely sexier looking, especially on stage, they were severely limited in the memory department.

THE BIRTH OF THE COOL

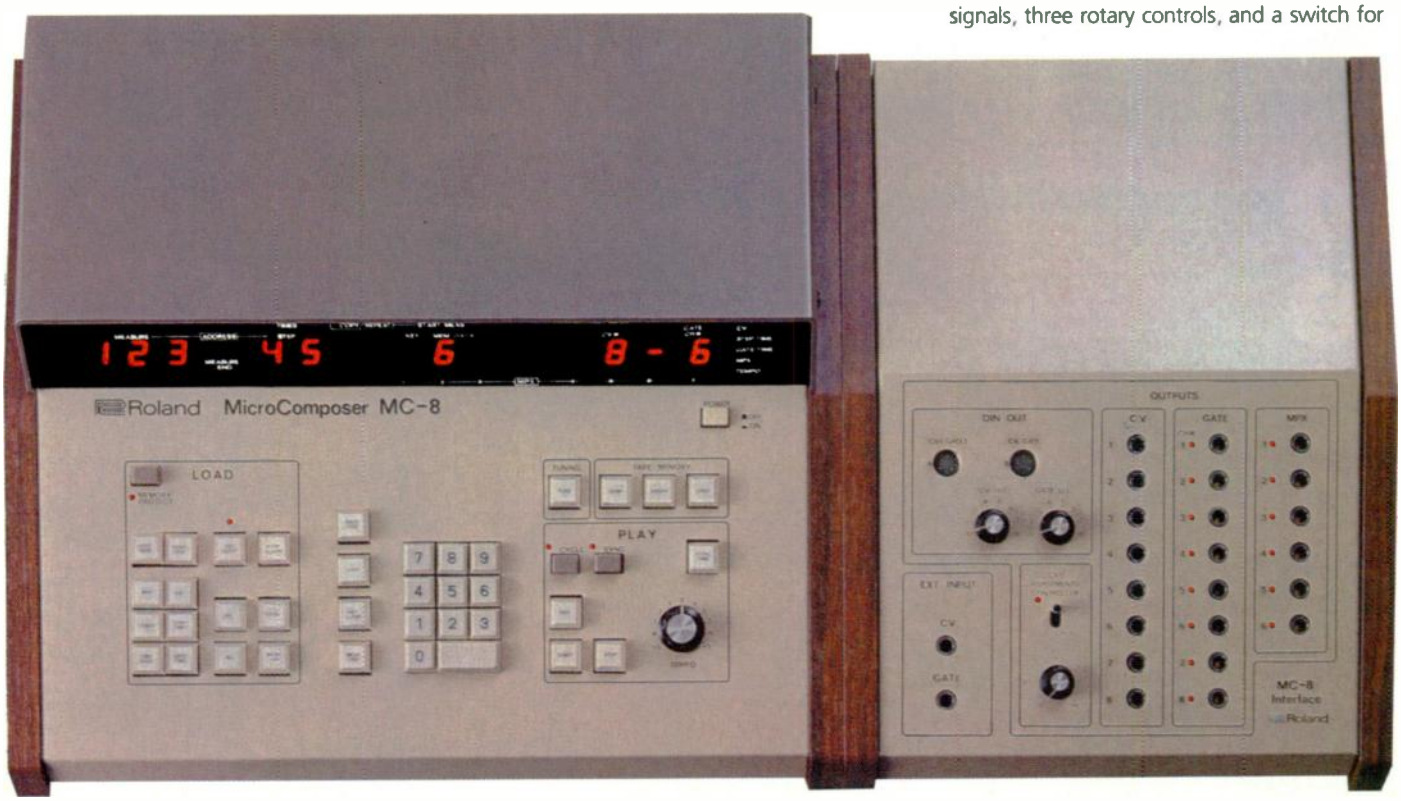
First let me enlighten you as to how this '70s electro-icon came into being. In 1971 Canadian Ralph Dyck developed a prototype single-channel digital sequencer built from discrete components based on TTL logic circuits. Note information, such as pitch, step time, and gate time was entered using a 10-key calculator keyboard, and up to 1024 notes could be recorded. Unfortunately, he couldn't find an American company interested enough to manufacture it. Then, in 1976, Roland president Ikutaro Kakehashi saw the prototype and decided to manufacture a sequencer based on Dyck's ideas — but featuring more memory and eight channels, and incorporating what was then a state-of-the-art 8080A microprocessor. The MC8 was born.

It's built like a tank, to almost military specification, and is physically quite imposing, consisting of two separate units: the main MC8 unit and the MC8 Interface, connected together at the rear by a substantial umbilical cord with massive 60-pin plugs at either end. The main unit has a large, single-line, 12-digit red LED display, 30 push buttons for navigating through the various modes, a rotary tempo control, and a 10-key, calculator-style keypad for entering data. The interface unit features two DIN sockets and no fewer than 22 quarter-inch jack sockets for outputting gates, control voltages and MPX signals (see the glossary for an explanation of this), two jack sockets for inputting CV and gate signals, three rotary controls, and a switch for

HOW MUCH?

In 1977, the Roland UK price list put the cost of a new MC8 at £4,522.85p, whereas in the States it was listed as $4,795, approximately half the UK price. Roland admit that they under-estimated production costs and it actually cost more to manufacture than it sold for, which is probably why they hiked the price up in the UK. Only 300 were manufactured; but, while the MC8 may have been a financial failure for Roland, it was an undoubted milestone in sequencer history and was the first of a line of distinguished and sometimes quirky MicroComposers.

The advertising literature of the time often showed the MC8 with a Roland System 700 modular synthesizer, and the MC8 manual often refers to specific System 700 modules and connections to them. So how much would a setup like this have cost you in 1977? Well, allowing for a UK list price of £9,038.46p for the full System 700, plus the cost of the MC8, you get a total of £13,561.31p for an up-and-running system. For that much you could probably have bought a house, a car and a decent meal.



selecting output channels and portamento. Fourteen small LEDs give a visual indication of the state of the gate and MPX outputs, and there's a toggle switch on the rear to select positive or negative gate polarity.

Both units are finished in a beige and grey livery with fetching wooden end-cheeks. With both units placed side by side (and neither can be used without the other) the MicroComposer measures 27" wide by 15" deep, is 6" high, and weighs in at a very hefty 35lb. Portable it is not.

Interfacing on the MC8 is pretty comprehensive, with CV and gate signals available for all eight channels and a separate MPX gate output available on channels 1-6. Outputs for channel 1 are also available via a 6-pin DIN socket, with another, switchable DIN socket for channels 2-8. These DIN sockets are compatible with the Roland System 700 or System 100M modular synthesizers. On the rear of the main unit are quarter-inch jack sockets for Remote Start/Stop, Tape Memory Dump/Load, and Sync In/Out. On a few MC8s there's also a Sync 24 DIN output socket (see 'It's in the Sync' box).

MUSIC BY NUMBERS

The instruction manual for the MC8 is a huge tome an inch thick, weighing over 2lb and full of terminology left over from 1960s computer programming. You are expected to understand instructions like: 'Establish an Address' and 'Set a Measure End Flag' but I won't go into detail about how you program the MC8, as it could take up most of this article and would be pretty boring. Examples are included for programming a Brahms waltz, a mambo rhythm, 'Yesterday', and 'God Rest Ye Merry Gentlemen', and blank programming sheets full of grids are provided, for you to work out your own songs on.

Once you get your head around the concept of writing music by tapping out numbers on a calculator keyboard, the MC8 isn't especially difficult to use. However, when you find that you have to tap out hundreds of notes just to programme a four-minute song, things get pretty tedious, and you find yourself using the copy function an awful lot. Data must be entered in a very specific order, or the display tells you in no uncertain terms that the MC8 is unhappy by flashing on and off. This is called the Error function. To quote the (sometimes hilarious) manual: 'The Error function is activated whenever you do something which is beyond the capabilities or comprehension of the MicroComposer". Intuitive is not a word you could use to describe working with the MC8.

WHAT PRICE MC8, MC4 OR MC202?

I bought my MC8 in 1982 for £1400 secondhand (from Landscape) — but how much would an MC8 cost today? The simple answer is: I don't know, and I don't know a man who does know either. Colleagues and dealers I have spoken to haven't seen any for years, and the last MC8 I saw for sale was in a free ads paper about six or seven years ago for £500. Unless you are an avid retro collector, however, or run a museum, a more reasonable price would probably be around £200-£300, mint. MC4s, on the other hand, do turn up occasionally (in the January issue of *SOS*, no less), sometimes with an MTR100 data recorder. The MC4/MTR100 combination is probably a better buy than an MC8 in terms of features and backup speed, but make sure an instruction manual is included. Expect to pay about £200-£300. The other alternative is an MC202. These appear more frequently but are not as collectable as they used to be, so their price has come down in recent years. Don't pay more than £100-£200 for one in mint condition.

If you come across an MC that suits your price range, and you aren't afraid of getting your hands dirty, give it a chance. Don't forget, though — no MIDI, no undo, no monitor screens, and no mouse... Can you handle it?

Transposing notes is also very difficult, as — strange though it may seem — there's no transpose function and absolutely no way to transpose parts while you're in edit mode, other than stepping through each note and entering a new amount with the keypad. You could always use the transpose function on your CV synth keyboard or modules, but that would transpose everything.

The MC8 was one of the first sequencers to adopt the technique of cutting and pasting note information from one location to another, and although it's pretty rudimentary, you can perform basic copy, insert and delete functions across all eight tracks. This technique becomes an essential procedure for most users. Of course, we take the cut-and-paste approach to song construction pretty much for granted these days, but it was quite an innovative feature at the time.

It's slightly easier to enter notes if you connect a keyboard with CV and gate outputs to the MC8 Interface unit, and play notes in from that. You're also *supposed* to be able to record from a CV keyboard in real time, but the MC8 insists on imposing its own idea of timing onto whatever is recorded. Playback can speed up or slow down, with notes randomly getting longer and shorter. Only the pitch bears any relation to your input, and the only way of quantising is to edit notes individually.

REMEMBER ME?

Original MC8s with only 4k of RAM have the capacity to hold approximately 1100 notes. This was pretty meagre even in 1977, so an upgrade was offered by Roland, which took the total capacity to 16k. On later models 16k was included as standard, which gave enough memory for about 5300 notes. Using the MPX outputs doesn't affect the memory that much, but using all eight CVs and gates simultaneously can fill up the RAM pretty fast, and when its memory approaches maximum programming, the MC8 tends to get sluggish, and lock-ups sometimes occur. However, oddly enough, if you assign more than one CV to a single channel (that is, four CVs to one gate output) then more than 10,000 notes are possible. Hmmm...

Backing up data is a pain — very slow, and probably the cause of most complaints from MC8 users. A good-quality cassette ▶

IT'S IN THE SYNC

The MC8 has basic and sometimes frustrating synchronising facilities, which encouraged users all over the world to find ingenious and resourceful ways of hooking up supposedly incompatible equipment with it.

A common method is programming short gate pulses on spare MC8 channels to drive the sync inputs on other sequencers or drum machines, though this can seriously eat into the available memory. It requires some experimentation to achieve the correct sync signal, but once this is accomplished the code can be saved to tape and loaded in when needed. Another popular trick is using an MPX output to trigger the start/stop function of a drum machine or sequencer set to the same tempo as the MC8.

When I bought my MC8, Roland UK were providing a modification that installed a Sync 24 DIN socket on the rear panel. This worked fine with all manner of drum machines and sequencers but was only an output, which meant that the MC8 could not itself be driven by a sequencer or drum machine. However, some years ago, and quite by accident, I came across a way of synchronising the MC8 to MIDI and Sync 24 even though the MC8 doesn't have a sync input. The MC8's tape sync system uses a standard Roland FSK signal and will respond to an FSK code recorded onto tape by another Roland drum machine or sequencer. If you connect the tape sync output from a Roland drum machine such as a TR707/727 to the tape sync input on the MC8, the two machines will sync up. The TR707/727 is an ideal bridge between old and new technologies, as it incorporates MIDI In/Out, Sync 24 in/out and tape sync in/out, and will output all the signals simultaneously to drive all manner of equipment.

machine is essential (preferably one optimised for data recording) and premium-quality cassettes are a must. Once you've set up your input and output levels, the process of dumping and verifying can begin. On average, a four-minute song using four channels and MPX outputs can take in excess of 10 minutes to save and another 10 minutes to verify. If you're in a rush you can dispense with verifying the data, but sure as eggs is eggs you can bet that it will refuse to load up the next time you try. And what happens if the verify fails? You spend another 20 minutes going through the whole bloody process again!

HANDS ON

Understandably, the MC8 doesn't excel at playing (or recording) fancy stuff like keyboard solos and lead lines. What it does do exceptionally well is tight multitrack sequencing, bass lines and rhythm patterns, frequently all at once. With the benefit of eight separate CV/gate channels, the MC8 can produce very complex polyrhythmic sequences with comparative ease, and you can also manage complex chords without a problem (assuming your synth is multi-voiced) by assigning multiple CVs to one channel. One of its best features, shared by many sequencers and drum machines, is its rock-solid timing. In full flow with all 14 channels outputting signals, it always manages to steam along without taking a breath.

The only time the MC8's timing does fluctuate is when the unit is synchronised to tape and its timing is governed by the fluctuations and variations of a tape machine. Synchronising to tape is achieved with an FSK tone, which means always having to start the tape machine from the beginning to achieve proper sync — very irritating. In 1977 many studios were still using 8- and 16-track tape machines, and the MC8 allowed another 14 channels of MicroComposer-controllable instruments (synths and drum modules) to be synchronised in return for the sacrifice of only one tape channel for the sync tone (see the 'It's in the Sync' box). Although Roland probably had the System 700 synthesizer in mind when they designed the MC8, it's quite content driving much smaller keyboards and synths. I've always used an evolving System 100M and various Roland SH-series synths with my MC8, but it is just as happy connected to ARP, Oberheim, Prophet and Moog equipment.

A unique feature for the time was the inclusion on the MC8 of programmable tempo which could vary from note to note if needed. Other innovations included a real-time display showing minutes and seconds, and a 'Total Time' button. When this mode is used, the MC8 can calculate the length of a song for you — but, more interestingly, if you adjust the tempo control the MC8 will recalculate the length of the song until you find the length you want, with accuracy to a tenth of a second — ideal for film and TV work. This was a pretty innovative use of technology at the time, and it's easy to see why it caused such excitement.

OTHER PRE-MIDI MICROCOMPOSERS

- **MC4: A single-piece unit with fewer channels than the MC8, but in most respects an improvement on it. Includes a transpose function, much better synchronisation, CV input calibration and 48k of RAM, enough for 11,500 notes. Optional extras included the MTR100 digital data recorder and the OP8M CV-to-DCB/MIDI interface.**
- **MC202: A battery-operated, 2-channel MicroComposer with a built-in SH101 synth, a mini keyboard and very comprehensive interfacing. A very underrated machine, apparently Roland's worst-selling product. (See the *SOS* retro in our August 1995 issue.)**

TERMS AND ABBREVIATIONS

- **CV: Control Voltage.**
- **MPX: Multiplex.**
- **MEASURE END FLAG: Signifies the end of a bar — the measure end flag would be the eighth note in an 8-note riff.**
- **FSK: Frequency Shift Keying, a synchronising code.**
- **SYNC 24: A synchronising interface used on most pre-MIDI sequencers and drum machines.**
- **STEP TIME: The length each note is held before moving on to the next. A channel must have a step time programmed before it can accept CV information.**
- **GATE TIME: The length each gate is held at 15V before moving on to the next. Gate time is never longer than step time.**
- **VCO: Voltage Controlled Oscillator.**
- **VCF: Voltage Controlled Filter.**
- **VCA: Voltage Controlled Amplifier.**
- **DIN: Small multi-pin connector.**
- **RAM: Random Access Memory.**
- **EMS: UK Synth manufacturer.**
- **ARP: US Synth manufacturer.**

CV, GATE & MPX

• CV

CV signals produce a programmable voltage of 0-11V. A value of 0 equals 0V, 12 equals 1V, 24 equals 2V, 36 equals 3V, and so on, with a value of 60 being equivalent to middle C on a keyboard. The MC8 has eight CV outputs and can control eight VCOs (Voltage Controlled Oscillators) simultaneously. Alternatively, output 1 could control the pitch of one or more VCOs, output 2 the tone with a VCF (Voltage Controlled Filter) and output 3 the dynamics with a VCA (Voltage Controlled Amplifier). More than one CV can be assigned to a channel. You could, for instance, have channel 1 simultaneously controlling four CVs (two VCOs,VCF,VCA), a gate signal and six MPX signals.

• GATE

A gate signal produces an output of 15V for triggering envelope shapers or other triggerable sources. The length of the gate is programmable:

0=NO GATE
16=SHORT PULSE
255=EXTENDED SUSTAIN

... and so on. The MC8 has eight gate outputs, and the polarity of the gates can be set (globally) to positive (for Roland and ARP equipment) or to negative (for Moog and Korg equipment, for example).

• MPX

MPX is a feature unique to Roland MicroComposers and is essentially six additional gate signals assigned to one channel. Each time a note on the specified channel occurs, you can assign up to six MPX triggers to output a 15V signal at that step event, with the length of the note deciding the length of *all* the MPX triggers at that point. There is also a seventh MPX signal to switch the portamento function on and off for channel 1 only. MPX outputs 1-6 are capable of triggering various drum pads, electronic drums, percussion modules, envelope generators, or other sequencers and drum machines.

WHO'S WHO?

For classic examples of outstanding MC8 programming, just listen to early 1980s albums by electronic bands such as Kraftwerk (*The Man Machine*), Human League (*Dare*), and Landscape (*From the Tea Rooms of Mars*). Other notable users of the time were myself and Cosey, Tangerine Dream, producer Martin Rushent (Altered Images, Pete Shelley, Human League), Hans Zimmer, Toto, Tomita and Suzanne Ciani, the last pair employing assistants to enter note numbers for them! A number of artists used multiple-MicroComposer setups. Tomita used at least two, one being the first model off the production line, plus an MC4. Toto used three, each one extensively modified by the original designer Ralf Dyck. Hans Zimmer used three, one for each of his various Moog and Roland modular systems, while Martin Rushent used an MC8 and an MC4.

HAPPY BIRTHDAY

A lot of people (OK, 300) have sweated blood over and cursed this machine through the years — I know I have. But even with the ever-present lure of the mouse and monitor, I often find myself strangely drawn to the MC8. These days I tend to program it to play some fab sequences or bass lines, leave a DAT in record and then sample from DAT later, but that's another story. My MC8 has made an appearance on at least half of the 30 or so albums and singles I've released, the most recent being last year. Sure, it's beginning to show its age now, but until it actually packs up I'll continue to go back to it.

All together now... "Happy birthday to you, Happy birthday to you..."

WIN A Soundcraft Ghost worth over £5500

OR (if you've already got one)... a 24-channel Expansion Console worth nearly £4900!

Soundcraft's Ghost is a highly-versatile professional 8-buss 24- or 32-channel mixer, packed with facilities for all kinds of recording and mixing applications. Some of its features are normally only seen on far more expensive consoles, such as the stunning 4-band parametric EQ, the 10 (yes, 10) auxiliary busses (including 2 stereo pairs), and the MMC-compatible transport controls and MIDI muting (compatible with all industry-standard analogue and digital 8-track, hard disk, and 9-pin VT recorders). Of course, for the cost-conscious, the Ghost is also available as a cheaper, automation-less version, the Ghost Le. Now, the Ghost's already-vast capabilities can be enhanced still further with a 24-channel expansion module, which has just been released. The Ghost haunted David Mellor so much in his October '96 *SOS* review that he was moved to comment, "I doubt such sound and build quality, and well-directed facilities have ever been available before at such a canny price". It seems to have captivated plenty of others too — in the short time since it was launched, the Ghost has gained a number of high-profile users, including Virgin Radio, techno outfit Bandulu, and remixer Phil Kelsey.

But although the price of the Ghost is indeed keen when you consider the facilities it offers, it's still a sizeable hole in a bank account — for example, a 24-channel Ghost, with meterbridge and stand, would set you back a massive £5792.75! And that's why *SOS* have teamed up with Soundcraft to offer a Ghost of precisely these specifications as this month's incredible competition prize. Those who have already bought a Ghost needn't feel left out — they can win one of the new 24-channel expansion modules instead, worth £4894. Even if you don't win the big prize, you needn't be too despondent, as Soundcraft are offering Rugby shirts as runner-up prizes for the best 10 tie-breakers.

As this prize is such a biggie, we're asking a little more of you this time than in previous competitions. Of course, there's all the usual stuff — you still have to answer some pathetically easy questions and complete a tie-breaker in a manner guaranteed to have the *SOS* staff calling for a team of paramedics to attend to several bad cases of split sides — but this time we want a little *extra* commitment! Elsewhere on this page, you'll find a list of Ghost dealers located all around the UK, and in Eire. Each of these will be displaying a large Ghost serial number (different for each dealer) in their stores over the next couple of months. You need to include the name of one of the dealers and their Ghost serial number to validate your competition entry — and needless to say, incomplete forms will not be entered into the competition. If you can manage all that, we're certain you can ensure that you find a post box somewhere near you and send your entry so that it arrives before the closing date **(Friday April 4th, 1997)**. It's not really *that* much more to ask, is it?

Prizes kindly donated by Soundcraft (01707 665000). We regret that this competition is open to UK and Eire residents only.

questions

1. What type of EQ does the Ghost offer?

a. HF and LF shelving filters only ☐
b. 3-band, with sweep mid ☐
c. 4-band, fully parametric ☐
d. Grimethorpe Colliery Band, MFI shelving ☐

2. Which model of Ghost does not offer the automation facilites found on the standard version?

a. Marley's Ghost ☐
b. Caspar The Friendly Ghost ☐
c. The Ghost Busters ☐
d. The Ghost Le ☐

3. How many aux busses are offered by the Ghost?

a. 2 ☐
b. 4 ☐
c. Oh... most of London Transport's reserve fleet ☐
d. 10 ☐

4. How many extra channels are offered by the Ghost's new expansion console?

a. 8 ☐
b. 16 ☐
c. 24 ☐
d. Blue ☐

TIE-BREAKER

Complete the following sentence in not more than 30 words: "I think Soundcraft's desks are the dBs because..."

.....

.....

.....

.....

.....

Name .....

Address .....

.....

..... Daytime tel. no .....

Ghost dealer visited .....

Ghost serial no. at above dealer .....

Post your entry to: SOS Ghost Competition, *Sound On Sound*, Media House, Trafalgar Way, Bar Hill, Cambridge CB3 8SQ.

Would you like to receive further information on Soundcraft products? If not, please tick this box. ☐

Ghost Competition

PARTICIPATING DEALERS

- CTI Dublin (00353 1 454 5400)
- CTS, Nottingham (01623 721222).
- KGM, Wakefield (01924 371766).
- Marquee Audio, London (01932 566777).
- Raper & Wayman, London (0181 800 8288).
- Sound Control, Manchester (0161 877 6262).
- Sound Control, Glasgow (0141 204 0322).
- The Warehouse, Edinburgh (0131 555 6900).
- Turnkey, London (0171 379 5148).
- Way Out West, London (0181 744 1040).
- X Music, Bristol (0117 973 4734).
- X Music, Chelsea (0171 349 9444).

the small print

1. Only one entry per person is permitted. 2. Employees of SOS Publications Ltd, Soundcraft, 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. Prizewinners must be prepared to make themselves available in the UK for the competition organisers wish to make a personal presentation.

WRH

KEYBOARDS

AKAI MX73 MIDI master keyboard, £220, QSC USA 850 power amp, 425 watts per channel with rack bag, £470. ☎ Carl 01507 606956.

AKAI SGO1V vintage sound module, excellent warm sounds, especially basses, PSU and manual, mint, £225; Boss DS330 Dr Synth sound module, 16-part multitimbral, vgc, PSU and manual, £179. ☎ 0113 286 6848 (Leeds).

ALESIS QS6 excellent condition, 600 great sounds plus 500 mixes, fantastic internal effects, only £650. ☎ Mike 01442 874749.

ALESIS QUADRASYNTH S4 + only one month old, excellent sounds, still under warranty, 64-note poly soundcard slot, 20Mb sound ROM, many sounds, only £450; Roland Juno 1, £225. ☎ Phil 0181 5429940.

ALESIS QUADRASYNTH+ 1400 sounds including fantastic 8Mb piano sample, 76-note keyboard, £649 ono; Hohner D6 clavinet, working, good condition, 1974 funky classic, £200 ono. ☎ 0191 536 5084 (Sunderland).

CASIO CZ101 £120; Yamaha stereo comp, £150; ADC stereo graphic (12 bands per channel), £60; Maui sample playback card for PC, 4Mb, £110. ☎ Dave 01974 261318.

CASIO VZ1 PD Synth, programmer's dream, analogue-FM-PPG, multitimbral, ideal master keyboard, manual, card, immaculate, £260 ovno. Wanted: Tandy PZM. ☎ 01702 312748.

CASIO VZ1 8 operator FM synth complete with ROM cards and manual, mint condition, £275 ono. ☎ Mark 01484 472004 days.

CHEETAH MS6, good condition, manual, £150; Yamaha FB01, good condition, manuals, £75. ☎ Jim 01527 579735.

CHEETAH MS6 analogue module, 6-part, MIDI, hundreds of true analogue sounds, fully editable, excellent condition, manual, £200. ☎ Kez 01208 873649.

CRUMAR baby-grand-shaped electric piano, black case with chrome legs, built-in speaker, excellent condition, £295. ☎ 0121 742 0330.

EMU MORPHEUS rackmount sound module, mint condition, box, manuals and leads, £590. ☎ Sam 01359 270847.

EMU PROFORMANCE 16-bit true stereo piano module, boxed as new, £150. ☎ 01463 794120.

EMU PROTEUS FX professional sound module, brand new, £350, reluctant sale. Spirit Folio S1 mixing desk, superb condition, £350; Yamaha TG33 module, £150. ☎ Steve 01225 465730.

EMU PROTEUS, never gigged, breathtaking sounds, six outputs, superior piano, strings, drums, brass guitar etc, £260 ono; keyboard stand, £10; high-power computer speakers, £15. ☎ Steve 01827 58913.

EMU PROTEUS plus orchestral master performance system with keyboard, £500; Yamaha TG33 new, £200; Fostex X28H 4-track recorder, new, £200. ☎ Fumio 0181 365 7181.

FENDER STRATOCASTER, £350 ono; Marshall JCM800 Amp, £295 ono; Roland GS6 guitar processor, £175 ono. Swap or part exchange for Jupiter 6 or CS1X plus MC303. ☎ Ian 01539 723631.

GEM S2 TURBO WORKSTATION, great sounds, excellent master keyboard, functions with extra sounds and full flightcase. Hardly used, vgc, £900 ono with manuals and box. ☎ Paul 0181 9683623.

HAMMOND C3, made portable and flightcased ready for the road, £2500 ono. ☎ 01352 710151.

KAWAI K4 synthesizer with thousands of Atari sounds and editor, excellent condition with manual and power supply, £325; Philip Rees TSI synchronizer, £60. ☎ 01933 678608.

KAWAI K4R, boxed, manuals, eight outputs, nice filter, £250 ono; Korg Poly 800 analogue synth, MIDI controllable hard case, manual, £130 ono. ☎ 01745 590336.

KAWAI K5 SYNTH, employs additive synthesis, unusual package includes two ROM cards, Atari editor, extra sounds on disk and manual immaculate, £290. ☎ Phil 01253 824720.

KAWAI KIM digital synth module, excellent condition, boxed PSU, MIDI lead, £120 ono. ☎ Andy 01793 539993 evenings (Swindon).

KORG 01/WFD WORKSTATION complete with purpose-built full flightcase. In very good condition, £850. ☎ Dan 01962 882505 or 01962 861500.

KORG 01/WFD, boxed, hardly used. Includes stand, pedal and leads, £850. ☎ Jo 01803 328872 or email J.M.Hornsby@exeter.ac.uk.

KORG DW8000, £320; DW6000, £200; Roland D110, £170; Kawai K1M, £150; Boss DR5, £130; Alesis HR16, £110; Atari 2Mb high-resolution monitor software, £225. ☎ 0115 9782468.

KORG M1, 200 sounds. In your face, dance techno sounds, analogue synths, filter sweeps, organs, percussion, supplied on Atari format. £35. ☎ 0121 443 1922.

KORG MS10, £120 ono; Yamaha SK10, £80 ono. ☎ Eric 01492 879974.

KORG MS10 analogue monosynth, vgc, £160; Roland RS505 vintage analogue strings polysynth, flightcased, £550; Peavey Deuce 120W valve combo with black widow speakers, £300. ☎ Andy 0181 311 4453 evenings.

KORG 01W PRO X 88-note professional work station, 16-track sequencer, weighted keys, additional RAM cards, flightcase, stand, manuals, must sell, £950. ☎ 01295 812095/01628 482560.

KORG POLYSIX, £300; Roland SH09, £200; Korg Mini 700S, £150. All vgc. ☎ Andy 01962 861157.

KORG PROPHECY, boxed, mint, Roland Juno 6, Roland RE201 space echo, swap for either JD800 or MPC60 II or part exchange for VS880. ☎ Ian 01539 723631.

KORG WAVESTATION, A-D module, analogue inputs, vocoders, etc. Boxed, manuals, mint, £950 ono. ☎ Shaun 01273 690064.

KORG X3 SYNTH, excellent condition with thousands of extra sounds on disk, £800 ono. ☎ Jethro 01703 551164 or email JS696@soton.ac.uk.

KORG X3, excellent condition, music workstation plus manuals and extra sound disks, £620 ono. ☎ 0161 3682337.

KORG X5, only three months old, PC to last lead, video manual, additional sound discs, boxed with manuals etc, £450. ☎ Steve 0121 382 8285.

KORG X5DR 64-note module, great sounds, boxed with manuals and patch edit software, £450 ono. ☎ Dan 0121 5579392/ 0121 633 4742.

KORG MS10 mono synth for sale, £150, good working order, external signal input etc. ☎ 01242 237419 (Cheltenham).

KORG WAVESTATION AD as new with manuals etc, £750. ☎ 0973 304474 (mobile) or 0161 953 4003 (Manchester).

KORG WAVESTATION SR £550; Alesis Monitor ones plus RA100 AMP, £450; Roland MVS1 Vintage synth module, £250; Technics SL1210 plus Ortofon concorde, £250. ☎ Sam 0112 230 5175 pager 01426 620033.

KORG WAVESTATION EX keyboard, great condition, boxed like the original Wavestation but with added piano and drum samples (like the SR), £695. ☎ Nick 0121 354 3695.

KORG X3 music workstation, vgc, £750 ono; Ensoniq EPS16+ keyboard sampler, vgc, £650 ono. ☎ 0131 229 2930 (Edinburgh).

KORG TRIDENT MkII MIDI, three synths in one, £800; Prophet 5 MIDI rev 3.2, £1050; Akai S950, fully expanded, latest software, £675, all ono, vgc. ☎ 01202 739627 or 01202 294437.

KORG X5, excellent condition, boxed with manual, tutorial video, over 1000 sounds plus fab sound editing software, home use only, £400. ☎ 01592 882522 (Fife, Scotland).

KORG WAVESTATION A/D, £850 or swap for Korg BX3 organ, Cubase keys, £400; rack case 10 units, £200; first buyer gets free pitchbay! ☎ Henry 0181 840 3249.

KORG PROPHECY, £725 ono, mint, boxed, manuals or swap for mint Jupiter 6 or JV1080, possible part exchange for MPC60II or VS880. ☎ Iain 01539 723631.

KORG M1+1, £600; Korg DS8 synth, needs attention, £120!; Yamaha RY30 with FX drum card, £250; Yamaha FB01, £60. ☎ 01426 269029 (pager), leave name and number.

KORG PROPHECY with extra sounds, £800; Ensoniq ASR10R plus 540Mb hard drive, £1500; Yamaha Promix 1 18:2 mixer, £1300; Cubase Audio 16 for PC, £500; Steinberg Recycle v1.6 for PC, £200; QSC studio amp, £500. ☎ Shaun 01772 453 736.

KORG PROPHECY, unused with new sounds, £680; Akai SO1 sampler, £380; Novation Drumstation, as new, £360; Cubasis, £80. ☎ 0161 224 0035 evenings.

KORG WAVESTATION A/D extra card, £850; QuasiMIDI Quasar module and arpeggiator, analogue sounds, £750; Roland S760 sampler, 18Mb CD-ROM, digital board eight outputs, £1600, mint, home use only. ☎ 0181 998 8332 (Ealing).

KORG TRINITY, £1575; Korg 01/W FD, £875 ono. Both boxed with manuals, excellent condition. ☎ 01429 222517.

KORG PROPHECY, £650; Emu Proteus 1xR, £300; Proteus 2xR, £350; Roland Juno 6, £170; CSQ600 analogue sequencer, £100; DC30 analogue effects, £75. ☎ David 01563 540808 after 7pm.

KORG X5DR 64-note synth module, £345; Spirit Folio Lite 12:2 mixer, £155. Both three weeks' use, boxed, unregistered, as new. ☎ John 01543 360686.

KORG X3 boxed, £680; Yamaha SY55 (case), £375; Roland D50 (case), £375. All with manuals. ☎ Paul 01229 466238 (Cumbria).

KURZWEIL K200 8Mb sample RAM, boxed, manuals, 540Mb hard drive, £1800. ☎ Gavin 0181 552 5124 days.

KURZWEIL K2000, Korg wavestation, Roland Juno 2, ElectroVoice System 200 PA speakers, Soundtech PL500W Pro stereo power amp, plus Soundtech 12-channel desk. ☎ Lee 01594 823954 evenings or 01594 860381 ext 252 daytime.

KURZWEIL K2000, sample option, 16Mb hard disk version 3, offers; Kurzweil Pro 76, weighted keys, £800; Lexicon LXP1 and LXP5, £250 each. ☎ Paul 01480 391613.

MARION PRO SYNTH analogue rackmount module, brand new condition, £350. ☎ Gary 0151 2018490 eves.

MOOG MINIMOOG choice of two at £600 each; Roland TB303, £300; Oberheim Prommer mono sampler, £100. ☎ Clive 01603 861577.

NOVATION BASS STATION RACK, £240; Sequential Prophet 5, revision 2, fully serviced, £750; Cheetah MS6, faulty edit mode but plays fine, £90. Wanted: Roland D70, MKS50, PG300. ☎ Brian 01752 550199 daytime.

NOVATION BASS STATION, £250; Boss DR660, £250; Yamaha SPX90 multi-effect, £190; Digital delay, £50; Atari 520STFM upgraded 1040 complete with breakthrough sequencer, £175, all boxed with manuals. ☎ 01234 345752.

OBERHEIM OBMX, 4-voice, expanded, £1550; Korg Prophecy, £725; Roland SDX330, £325, Roland SBF 325 Flanger, £325; Korg A1, £625; Symtryx, £375; Zoom 9010, £375. Email storm@redestb.es.

QUASIMIDI TECHNOX ultimate dance module, 16-part multitimbral, 512 sounds, 100 performances, 32 kits, 909, 808, CR78, built-in arpeggiator, fully editable, excellent condition, boxed with manual, £420. ☎ Kez 01208 873649.

ROLAND AX1 strap-on portable master keyboard, never used, unwanted gift, all original packaging and extra cables, £200. ☎ Paul 0181 9683623.

ROLAND D5 multitimbral linear synth, £220 ono. Akai X7000 sampling keyboard with disks, six individual outputs, splitter box both with manuals, PSU and original packaging, £300. ☎ 01246 232842.

ROLAND D5 plus manual, £200; Zoom 9120 FX, £180; Akg C525S condenser mic, £50, 16U rack, £30; Hammond organ, offers. ☎ John 01438 310139.

ROLAND D20 8-track sequencer, floppy drive, LA synthesis, great workstation, looks new, boxed, manuals, stand, £425 ono. ☎ 01604 762195.

ROLAND U20 keyboard, flightcase, scissor stand and expression pedal also available, £400 ono. ☎ 01420 476994.

ROLAND D70, £800; Yamaha QY20, £225; Korg D3R/W, £500. ☎ Andy 0121 7124393 days or 0121 449 2035 after 6pm.

ROLAND D110 sound module, very good condition, £220 ono. ☎ Gary/Amanda 01239 615361.

ROLAND HP2900G digital piano, disk drive, mint, cost £3000, accept £1600, no offers! Swap brand new MC303 for Emu Orbit. ☎ Rob 0191 4422650 after 5pm.

ROLAND JD800, perfect condition, home use only, manuals, stunning machine, £1350. ☎ James 01480 52255 day or 01480 860656 evenings.

ROLAND JD800, two cards, perfect, never been out of my home studio, £1400. ☎ 01604 890772.

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ROLAND JV880, excellent condition, home use only, with manual, £450; Tascam MM1 20-channel, MIDI mute, 4 aux, manual, home use only, £399. ☎ Pascal 0181 368 1877.

ROLAND JX3P home use only, £350. ☎ Mark 01256 64599.

ROLAND JUNO 60 analogue polysynth, MIDI not fitted, excellent condition, £285 ono; Roland SH1000 analogue monosynth, excellent condition, any reasonable offer. ☎ David 0114 236 9260.

ROLAND JUNO 106, mint condition, includes manual. £380 ono. ☎ Andrew 01202 534310.

ROLAND JUPITER 8 TB303, SH101, Moog, Prodigy, all in good condition. ☎ +38 1 11 594533 (Belgium).

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ROLAND MKS80 with PG80, £1000; TR909, £505; Wavestation rack, £600; Oberheim expander, £950. Can deliver anywhere, foreign currencies accepted, swaps considered. ☎ Roberto 0181 771 4534.

ROLAND PC200 MKII MIDI keyboard controller, £110; Yamaha DB50XG daughterboard soundcard, £80; Digital Orchestrator plus hard disk, multitrack and MIDI sequencing software, unregistered, £40 all mint, boxed, warranty. ☎ 0171 371 1031.

ROLAND SC33 Sound Canvas, vgc, manual and box. £100 or swap for Casio CZ1000. ☎ 01332 773424.

ROLAND SK50 Sound Canvas in a keyboard, multitimbral with effects, built-in speakers, boxed as new, power supply, manual, £425 ono. ☎ 01763 838722.

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ROLAND D50 with manuals and three sound cards, fairly good condition, one key not working, £220 ono. ☎ Glen 01843 293210, 01843 293684.

ROLAND SH101, vgc, PSU, manual, £225, Boss SX700, two months old, £295; Yamaha TG55 vgc, £190. ☎ 01302 835653.

ROLAND JUNO 6, Juno Proformance plus Fender Strat Marshall JCM800 amp, Roland GS6 guitar processor. Swap or part exchange for MPC60II or JV1080 SY99, anything considered. ☎ Ian 01539 723631.

ROLAND D70 bargain, £495; Roland JV80, £495; Korg M1, £495; Yamaha TG500, £425; Kawai K4R, tatty but works fine, £165; Yamaha SK30 Polysynth, £165, will post anywhere. ☎ 01261 832898.

ROLAND JV1000 76-note workstation, 28-note polyphony, 40,000 note, 8-track sequencer, mint condition, boxed plus manuals, home use only, £1000 ono. ☎ 01279 428703.

ROLAND JX3P and PG200 programmer, mint, £350. ☎ 01708 250846.

ROLAND D70 76 key synth, £600; Roland GR1 guitar synth and GK2 pickup mounted on Fenix Strat copy (black), £800, both mint. ☎ Ian 01242 676788.

ROLAND XP10 synthesizer, 338 sounds plus drums, FX, GS, arpeggiator etc. As new with manual and PSU, £370; Boss Dr Synth sound module (GM), £140. ☎ 01933 678608.

ROLAND JUPITER 6 analogue MIDI synth, can be split to give one 2-voice and one 4-voice on different channels — read the retro reviews! £6695. ☎ 01268 525347 (Essex).

ROLAND D50 in perfect condition, manuals, £350. ☎ Roger 01923 266664.

ROLAND JV30 synth, £200; Alesis SR16 drum machine, £150; Alesis MIDIverb 3 effects, £150; Opcode translator MIDI interface, £80, all vgc with boxes and manuals. ☎ 0191 252 2888.

ROLAND JUNO 106, top condition with manual, £450. ☎ Dave 01933 405341 evenings.

SEQUENTIAL PROPHET 5 MIDI, £1000; Roland SH2, £295, Roland Jupiter 8 MIDI, £995; Emu SP1200, £1450; Sequential Pro One, £350; TR909, £995; OCS Oscar MIDI, £850; Prophecy, £750; Roland S220, £195, plus others. ☎ 0181 3090615.

SEQUENTIAL PROPHET 5 MIDI rev3.2, £1050; Korg Trident MkII, MIDI, 3 synths in one, £800, Akai S950, fully expanded, latest software, £675, all ono vgc. ☎ 01202 739627 or 01202 294437.

YAMAHA DX7, IIFD flightcase, loads of sounds, mint, all manuals, £425 ono. ☎ 01883 742006.

YAMAHA CP80 electric grand piano, have you got what it takes to make this baby rock, special buyer required, excellent condition, £650 ono. ☎ Jamie 01228 514104 eves/weekends.

YAMAHA CS70M 6-note poly analogue synth with sequencer, excellent condition with manuals, £595. ☎ Matt 01455 220665.

YAMAHA DX7 boxed with manuals and hundreds of sounds on disk for Atari, £180 no offers; Roland PG1000 programmer for D50, £175 no offers. ☎ 01255 431288.

YAMAHA DX7, excellent condition, scratchless, Yamaha sustain pedal, two ROM cards for DX7, Kwiklock 3-tier stand, Roland DAC10 amplifier, Absolute 2s monitors, cables, rack unit, speaker stands and some other bits and pieces. ☎ 0171 7203702.

YAMAHA SY85, home use only, many sound/sample disks, 2Mb RAM. Swap for good GM home keyboard with disk drive. ☎ 01908 618044.

YAMAHA TG300 with manuals, home use only, £300. ☎ Karl 01925 226005.

YAMAHA TG300, immaculate, manual, PSU, 456 voices, £260; Yamaha TG100, manual, PSU GM expander, £145; Roland Axis 'strap-on' remote MIDI keyboard floormount controller with sustain, £240. ☎ 01773 828379.

YAMAHA TG500 module. Like two SY85s in a box, mint condition with box and manual, £400; Akai ME255 MIDI splitter, £35. ☎ Steve 01207 270759.

YAMAHA TG500, mint condition, rackmount, SY85, 64-note polyphonic, 16-voice multitimbral, resonant filters, two RAM cards, over 1000 sounds on disk, £499. ☎ Shaun 01904 616695 day.

YAMAHA TG500, absolutely mint with all boxes and manuals, £400. ☎ 01207 270759, can deliver in UK.

YAMAHA TX802 FM sound module, 16-voice polyphony, 8-channel multitimbral, 7-stage frequency modulation, just £550. ☎ 0956 656333.

YAMAHA TX7 digital synth, DX7 in a box, with Atari editor and loads of sounds, £195. ☎ 01268 525347.

YAMAHA TX81Z 4-op FM MIDI module, 8-part multitimbral, loads of sounds, great '80s feel, superb basses, clang away, with manual, Atari ST sounds/editor, good condition, £195 ono. ☎ 01354 695239.

YAMAHA TX81Z, Atari Librarian, £120, Casio VZ8M, two sound cards, £130, Yamaha A100 AMP, £80, Kudos 12/2 mixer, £100, Steinberg dongle expander, £25, mint condition. ☎ Rob 0181 236 0193.

YAMAHA W7 WORKSTATION, home use only, with dance massive or rhythm section expansion card plus many additional voice files, £700. ☎ Nick 01283 539117 6pm onwards.

YAMAHA DX7S, immaculate, home use only, £250; Roland VS880 plus FX plus 1Gb hard drive, brand new, £1700. ☎ 01926 817877 (Midlands).

YAMAHA V50 £395 ono or swap for Roland R8 drum machine or SC1 Pro 1. ☎ Ian 01539 723631.

YAMAHA VL7 version 2, RRP £2500, I paid £800 (new), all offers considered, bright red bank balance forces sale. ☎ Lee 01222 705571 (Cardiff).

ZOOM 9030 guitar effects module, £300; Roland MT32, £120; Music X 2.0 MIDI sequencer for Amiga, £20 offers. ☎ Andy 01222 223173 (Cardiff).

RECORDING

ACES 24-BUSS MIXER, 48 inputs, 5-band EQ, 5 Auxiliaries, LED meters on all inputs, 26 VU meters, integral patchbay, bargain, £950 consider part exchange or swap effect units, guitars or equipment. ☎ 01482 448767.

ACES B2616 mixing desk 26:16:2, 6 auxes, sends and returns, metre bridge and flightcase, £650 ono. ☎ Tolly 01603 766314 (East Anglia).

ACES 24-track 2-inch recorder, plus four reels 2-inch Ampex 456 tape, £900 the lot ono. ☎ Mark 01295 261560.

ACOUSTIC STUDIO MONITORS 3311 USA made, 125 watt, 12" woofer, 5" midrange, 3" tweeter, liquid cooled. New, still boxed, £500 for pair. ☎ Tim or Steve 01242 526175.

ALESIS ADAT Tascam M2516 desk, all looms, Peavey Architectual Acoustic speakers, data sync, Sony DTC690 DAT machine, The lot, £3600. ☎ 01983 752990.

ALESIS ADAT V4.03, recent service, £1450 ono. ☎ 01234 272919.

AIWA XD-S1100 DAT recorder, digital in/out, 3-motor drive, remote, boxed, £450, Studiomaster Session-mix Gold 8:2 mixer, full flightcase, manual, £225. Both excellent condition. ☎ Peter 01827 880091.

AKAI DR8 with MIDI sync board and 1Gb internal hard drive, mint, boxed, £2500; Emu Morpheus with RAM card and dance card, £650. ☎ Ian 01772 461618.

AKAI MG140 plus Autolocator, £900, Studiomaster Mixdown Gold 16:8:16, £900, Akai S950 expander, £675, Roland R8 plus two ROMS, £260, Alesis S4+, £500, MMT8, £100, MIDIverb 2, £100, SE50, £200. ☎ 0191 4774367.

AKAI MG1212 12-track desk plus recorder including 40 tapes, still delivers superb quality, £1200; XR1300 SMPTE-to-MIDI sync, £100, Vesta Koveo Enhancer SIMM to Aphex C, £100; Ensoniq EPS 650 8-outs library. ☎ 01983 297110.

ALESIS ADAT, very good condition, £1200. ☎ 0171 727 3865 after 8pm.

ALEN & HEATH Sabre 24 16-buss MIDI muting, 4-band EQ, six aux sends, 44 inputs on mixdown modular, £3400; Tascam 38 plus two DX4D noise reduction, £875; Emax with disks, £600. ☎ 01923 231866.

BEHRINGER MDX2100 COMPOSER £180, Behringer Ultragain mic 2000, £150. ☎ 01270 872167.

BOSS pedals, turbo overdrive OD2, £30, Bass EQ GE7B, £35, compression sustainer CS3, £35, Alesis Microverb 2, £75 ono, all mint. ☎ Chris 0421 507144 (Cumbria).

BOSS RCL10 compressor/limiter, excellent condition, £60, Alesis Micro Limiter, excellent condition, £60. Both units boxed with manual and home use only. ☎ David 01908 676 957.

COLLECTOR'S MICS from the '50s: STC4033 Ribbon/MC heavy-duty table stand, boom mount, case, pristine condition, £750 pair, STC 4021A moving coil, £165; AKG 202, £150. ☎ 01286 35686.

DIGIDESIGN R1 remote controller, never used, still boxed, was part of a studio package, offers. ☎ 01324 610440 any time.

DIGITECH VOCALIST VHMS, **£350**, Yamaha TX7 expander, £150; Boss DS330 Dr Synth, £180. Wanted: Sony MZ1 mini-disc recorder. ☎ Simon 01803 882772.

FOSTEX 2016 16 channel line mixer, £100, Alesis MEQ 230, EQ, £100. ☎ Graham 01223 564577.

FOSTEX B16 1/2 inch, 16 track recorder, just serviced with stand, loom and tapes vgc must sell, £800 ono. ☎ 01908 606936.

FOSTEX CX8 8-track, Adat XT digital tape recorders, two of, £1800 ono each only six months old, neither used. ☎ 0181 4733350 or 01342 850507.

FOSTEX R8 8-track, reeel to reel recorder includes manual and remote extension cable, light home use only, £650. ☎ Adrian 0121 3595702.

FOSTEX R8 analogue 8-track, excellent condition with loom, £750, Syncman synchroniser, £80; Korg M3R synth module, £250. ☎ 01279 415712.

FOSTEX R8 wiring loom, stand, tapes and manual, £800 ono. ☎ David 01273 220047.

FOSTEX R8 excellent condition, £850, Roland R8 Drum machine with dance card USA power drums card, £375, Roland D110, £180, All with manuals. ☎ Vernon 01303 257714 (Folkstone).

FOSTEX DMT8 digital Multi tracker, £950 ono; Akai vintage synth module, £250, Yamaha QY10 sequencer, £110. ☎ 01273 748762.

FOSTEX M80 8-track recorder, immaculate condition, £650; Akai S900 sampler, £600; Atari 4Mb monitor SM125, printer citizen 124D, loads of software, £400 offers accepted. ☎ 01772 784788 anytime.

FOSTEX 380S brand new four track. Used less than 10 hours, first to view will buy-bargain, £400, Roland SH09, £150; Korg M3R, £280. ☎ 01268 590393.

FOSTEX XR7 multitimbral, new 12 hours use, boxed, still under guarantee. ☎ Bob 01992 893317.

FOSTEX M80 professional 8 track recorder in excellent condition, comes with a tape demagnitizer and manual, Yamaha SX7 with sustain pedal, two cartridges and X stand, Roland DAC10 practising AMP. ☎ 0171 720 3702.

FOSTEX XR7 Multitrack plus JL Cooper MIDI synchronizer, mint and boxed; Yamaha TG300 general MIDI tone module, home use only, any offers. ☎ Ian 01904 656573.

FOSTEX 280 4 track porta studio, excellent condition, £400. ☎ Amanda 01239 615311 after 6pm.

FOSTEX M80 8 track recorder, excelent condition, home use only with demagnetiser, remote and two ampex tapes, £550. ☎ David 01908 676 957.

JBC 4401 control monitors, high frequency shelving dial in good condition, excellent sound, never run hard, £400ono. ☎ David 01933 270930.

JL COOPER PS2 synthesizer cost, £249 new will sell for, £65. ☎ 0181 441 5250.

KLARK TEKNIK DN60 analyser, flightcased and in immaculate conditionc/w type 6051 microphone and manual. ☎ 01709 860321.

KORG SDD3300 triple digital delay/sampling effects unit programmable, MIDI, rare item, £395; Boss BX16CH MIC/Live mixer, two effects sends (boxed), £200. ☎ 01268 525347 (Essex).

LEXICON PCM70 £1000 or swap for NuVerb card. ☎ 01453 731933.

LEXICON ALEX mint, boxed, manuals, PSU, £195, Yamaha MT120 S 4-track, boxed, manuals, kept mint, £189; Casio VZ-8M, boxed editor, RAM card, £119. ☎ Dave 0191 3722621 (Durham).

LEXICON PCM70 £1150 MRC Remote, £220. ☎ 0973 304474 (Mobile) 0161 953 4003 (Manchester).

LEXICON 224 digital reverb with remote, excellent condition, £800 no offers. ☎ Jason 01932 854566 after 8pm.

MACKIE CR1604 professional mixer, boxed as new, unbeatable value, £595; Tannoy System 2 monitors, boxed, £175, Teac A3440 4 track, £225, record direct to video Sony PCM70IES, £240. ☎ 01507 480509.

MACKIE 1202VLZ mint condition, boxed with manual and plenty of leads. Rack ears included id needed, £260 ono. ☎ John 0181 524 0699.

MARSHALL 9004 rackmount preamp, great marshall stack sound, clean to distorted direct to tape, no neighbour problems, 2-channel professional unit, superb sound, excellent condition, £125. ☎ 01482 448767.

MESA BOOGIE MK1 original, £700 offers. ☎ Steve 01273 709029.

PHILIP REES TSI M101 tape sync unit as, £70 ono. ☎ 01827 53220.

PHILIP REES tS1 SMPTE/MIDI time code, FSK+, sync unit as new, £60 plus post. ☎ 01933 678608.

PHILIPS DCC730 stereo digital cassette deck with tapes, manual, remote, £165, Roland MS1 stereo sampler as new, £185. ☎ 01933 678608.

QUAD 405 series II power amplifier, £150; MM12Z mixer with flightcase (Jacks), £150 JSH DX99RM digital delay rackmount, £75. ☎ 01425 277167 Highcliffe.

QUESTED H108 monitors, £525. ☎ 0973 304474 (Mobile) 0161 953 4003 (Manchester).

REVOX STERO AMP 100 watts per channel, £150 ono. ☎ 01908 614534 eves/weekends.

REVOX A77 classic reel — reel mastering machine, £150; Tascam 34 4 track reel — reel, £175 both excellent condition and just serviced, priced to sell, offers invited. ☎ 01522 530605.

ROLAND VS880 with 1 gig plus FX, only 10 hours use, £1900 ono or will swap for D-80 plus Dat plus FX. ☎ Paul or Steven 01224 869503.

ROLAND DM80 8 track HD with MAC software, £1500 ovno; 24-16-2 console Bel Electronics, £750 ovno, Bel DBX 8 track, £100; Roland SCC1, £100; Roland S550 sampler SC51 500 power amps tannoys etc. ☎ 01767 631 544.

SECK 18:8:2 mixer, good condition, home use only, £600. ☎ Robert 01572 770038 after 7pm.

SIMMONS SPM8:2 MIDI programmable mixer, little used, box and manual, £150. ☎ 01271 24198.

SONY TLD D3 portable DAT, £275; Yamaha REV7 classic reverb, Drawmer DL241 auto compressor, £275, Drawmer LX20, £135, Roland Juno 60, £275, Sony 501, £75. All vgc. ☎ 01226 790541.

SOUNDCRAFT 760 III very good condition, manual and remote, £2400. ☎ 0171 221 3528.

SOUNDCRAFT SPIRIT STUDIO 16:8:2 unused, 6 months old with shop receipt, £850 ono. ☎ Chris 01708 670017 (Essex).

SOUNDCRAFT SPIRIT LIVE 4 24:4:2, mint condition with flightcase, £1500; Peavey 215C 15-band EQ as new, £300. ☎ Paul, Pam 0181 360 2856.

SOUNDCRAFT SPIRIT FOLIO 12:2 rackmount mixer, boxed, manual, PSU, £200. ☎ 0181 509 3471.

SONY RMD3K full digital I/O and IR remote for DAT walkman, cost nearly, £200, want, £125, Notator Logic (Mac) V2, 0 dongle manuals, £140 ono or swaps. ☎ 0181 692 8129.

SONY JAE3S Minidisc top of the range, £699 new, two months old immaculate sensible offers only. ☎ Roger 01293 525014 (Gatwick area).

SOUNDCRAFT SPIRIT Folio 4 20/4/2 as new with manuals, 20 channels, 4 subgroups, immaculate condition, £550. ☎ 0181 771 6045.

SOUNDCRAFT 24 track 760 MkIII 2 inch remoted high speed machine, loomed to ex-Abbey Road Dolby A and M250 autolocator/synchroniser, £3450. ☎ Steve 0181 675 9428.

SPIRT FOLIO 4 20:4:2, 6 aux, swept mid, £750ono; Zoom 9010 multifx, £350 ono; Digitech Dsp128+, £150. ☎ 01722 503809.

SPIRIT FOLIO LITE 12-2 2 band EQ, 2 AUX sends 1 pre/1 post, button faders, £175 ono; Phonic PCL 3200, gate, limiter, compressor, used once, still boxed, £125. ☎ 0181 207 6092.

STUDIOMASTER MIXDOWN GOLD 16:8:2 with MIDI muting and 6 auxiliaries, gives 32 channels on mixdown, £850; Roland R8, £300; Yamaha RX7, £225, D4, £250. ☎ 01733 370091.

STUDIOMASTER SESSIONMIX GOLD 12:2 rack mountable desk. Good condition, in SKB, pop up flightcase, £450 ono. ☎ Amanda 01239 615361.

STUDIOMASTER SESSIONMIX GOLD 16:2 mixer 4 band EQ, 4 aux sends, very solid, boxed. ☎ Andy 0181 570 7425.

STUDIOMASTER SESSIONMIX GOLD 8:2 mixer, full flightcase, manual, excellent condition, £225. ☎ Peter 01827 880091 (Leics).

STUDIOMASTER HORIZON complete with rackmounts, mint condition two months old, £950. ☎ Dave 01392 50055 or 01626 862506.

TAC SCORPION 24:16, £1200, Fostex E16,including multicore, £750; desk stand with 19" rack, £1800 for both. Garaged 1 year, hence price. ☎ Les 01494 813670.

TANNOY PBM 6.5 MK2 monitor speakers, very good sound for the money, strong bass end, lightly used, boxed, £180. ☎ 0161 8617261.

TANNOY SYSTEM 600 monitors, superb condition, brand new in boxes worth, £600 new, will sell for, £350 ono. ☎ Ian 00802 808822.

TANTEK TANRAK EFFECTS sampler/delay, flanger, comp, EQ, etc. Anyone interested in the old stuff? ☎ 01384 638222.

TASCAM 38 half-inch 8-track, with loom and two reels, £650 ono; Seck 12:8:2 mixer, £385 ono both excellent condition. ☎ Dan 01373 812674.

TASCAM 246 probably the best Portastudio Tascam made, fully serviced, new heads, costs over £1000, £395. ☎ 01908 614534 eves/weekends.

TASCAM 238 Dolby S NR 8-track, mint condition still boxed. Sale due to upgrade, top quality pro machine, £700 ono. ☎ Toni 01621 782874.

TASCAM 424 portastudio, boxed with manual, hardly used, as new, £329 only. ☎ Mr Yoon 0181 780 0023.

TASCAM 424 PORTASTUDIO boxed with manual, as new, £335. ☎ 0181 6416210.

TASCAM 488 8-track portastudio, home use only with manual, hardly used, £700 ono. ☎ Al 0181 9422281.

TASCAM 688 8-track MIDIstudio, 20-channel mixer, boxed, £1000. ☎ 0181 840 7029.

TASCAM 688 MIDI studio 8-track recorder, 20 input mixer, built in MIDI tape sync. Hardly used, excellent condition, £895 ono. ☎ 01733 314502.

TASCAM TSR8 half-inch, 8-track, DBX, Perfect condition, boxed, £1100; Seck 16:8:2 with mid-sweep, PFL, three aux sends, meter bridge, inserts, £300 ono. ☎ Mark 01646 697720.

TASCAM TSR8, 12 reels Ampex 456, £975, Steinberg Midex+, £199, Steinberg Cubase V3.1 for Atari, £199, Soundcraft Absolute 2s, new, boxed, £199. ☎ 0114 258 0273.

TASCAM MSR16S, mint condition, very low hours. Home studio use only, bargain, £1800. ☎ Steve 01507 463182.

TASCAM 38 1/2" 8 track tapes inc good condition, £600 ono. ☎ 01642 871606.

TASCAM MSR16 multitrack recorder, high quality machine featuring DBX, varispeed and sync lock also with head demagineriser, home use only, excellent condition, £2000. ☎ Gurj 01462 678685(Herts).

TASCAM 488 £400, Behringer composer, £180, Behringer Ultragain, £150, Boss DR660, £200. ☎ 01270 872167.

TASCAM M15 28:16:2 mixer, £945; Alesis MIDIverb 2, £150; MIDIverb 3, £175; Mackie CR1604, £545 ono; Korg MIR, £400; Drawmer DL221, £210; Mackie CR1604 VLZ, £700. ☎ 01903 755840.

TEAC A2340SX 4-track 1/4 inch simul-sync tape deck, manual cueing, 8 inputs, complete with original manuals/accessories, pristine condition, Offers. ☎ 01274 739622.

TC ELECTRONIC 1210 spatial expander, great time domain processor, see retro in *SOS* Feb/97, extremely rare second hand, just £750 ono. ☎ 01908 614534 eves/weekends.

YAMAHA MT120 4 track dual speed, DBX, graphic EQ, little used, boxed, manual, £175. ☎ 01273 208992 (Brighton).

YAMAHA MT3X 4-track, six channel, two aux sends, double speed, EQ, dbx, etc, little use, excellent condition, £250 or may swap for vgc small mixer. ☎ Alex 01524 782297 5pm.

YAMAHA MT8X cassette multi track, excellent quality occasional home use only, boxed, £650 inc delivery. ☎ James 01723 871146, 01723 396587 (N Yorks).

ZOOM 9050 pro multi-effect with rackmounting kit A1 condition, Fostex M80 8 track recorder with two tapes and de-magnetiser, Roland DAC 10 amplifier. ☎ 0171 720 3702.

SAMPLERS

AKAI CD3000I £1500, Soundcraft Spirit Studio 16:8:2, £865; Yamaha TG500, £485, JV30, £350; Matrix, £250, Lexicon Aslex, £200; Reflex, £270; four Drawmer gates, £350; LA Audio 4x4, £250; *Cubase Audio* v2 for Mac, £490. ☎ 0468 432528.

AKAI S1000 8Mb with loom, immaculate condition, home studio use only, £1050 ono. ☎ 0115 963 9643.

AKAI S2000, Evolution keyboard, Roland R8 drum machine, mixer, Atari STe 1Mb, offers. ☎ Simon 01376 320076.

AKAI S01 sampler, ideal for DJs, £350, Fostex X28H 4-track with 8 inputs, £225, Roland E16 keyboard, offer. All home use, excellent condition. ☎ Iain 0141 772 7594.

AKAI S2800 mint, £1000, Korg Prophecy plus disks, immaculate, £750, XRI 300 SMPTE, £100, Bit 99, £175, EDP Spider sequencer for Wasp, offers. ☎ Tim 01535 600882 days.

AKAI S3000 2Mb, £1000, Digi interface, £40, 8Mb RAM, £250. ☎ 01923 267733.

AKAI S3000 10Mb, 210Mb hard drive, full sounds, cd-rom drive, leads, immaculate, £1350; Akai S1000 10Mb, boxed, perfect, £1000. ☎ Andy 01482 448674.

AKAI S612+MD280 disk drive, in 4U rack sleeve with 60 quick disks, £230 Nearest thing to an analogue sampler — perfect for the experimental DJ. ☎ Gareth 01772 796011.

AKAI S950 fully expanded, absolutely mint, original box and manuals plus samples, £700 Will consider part exchange for Vocorder plus Cash. ☎ Bob 01524 382944 (Lancaster).

AKAI S3000XL latest sampler with 18Mb RAM, EB16 effect board zip drive, fine cartridges with 400Mb of sounds, REND 2xspeed CD ROM, Hallelujah CD ROM almost unused 6 months old, no dealers please. ☎ 0171 720 3702.

AKAI S950 fully expanded sampler, 8 outs time- ST reach massive library of breakbeats FX etc easy to use, great sound only, £645, Seck 12/8/2 desk, £395. ☎ Ben 01223 327002.

AKAI S1100 digital sampler 18Mb RAM, SCSI, SMPTE boards, in built effects, immaculate condition, manuals, boxed, £1600ono consider swap for Roland VS880 hard drive and effects board of similar condition. ☎ 01384 410853.

AKAI S950 boxed with manual, mint condition with over 50 discs, full of samples, £700. ☎ Bryan 0410 200571 or 01245 324126 (Chelmsford).

AKAI S1000 10Mb 240Mb internal hard drive SCSI version 4 software, mint condition, home use only, £1350 ono. ☎ 0973 195107.

AKAI S2000 eight outputs upgrade, £1200; QuaziMIDI Quazar module, £800; Novation basstation rack, £300, all perfect condition, home use etc. ☎ 01253 739540.

AKAI S2800 stereo sampler 10Mb fitted DAC rackmount optical drive, apple CD ROM drive, optical disks, full Akai library, CD ROMS, perfect condition. ☎ Ken 01270 820012.

AKAI S3000XL 18Mb, ER16 effect board, Reno CD ROM player Zip drive plus seven cartridges, Akai, Emu, CD ROMS all equipment 6 months old, home use only, excellent condition, must sell quickly, reasonable offers please. ☎ 0171 720 3702.

AKAI S1100EX expansion unit 10Mb SCSI: adds 10 more outputs to your S1100 sampler setup, offers welcome. ☎ Bob 01703 493441 or leave a message.

AKAI S950 vgc offers; Roland D110 synth with PG10 real time controller/ programmer for D110 both with manuals, make me an offer (within reason). ☎ Richard 01737 765296 (Surrey).

CHEETAH SX16 sampler 16 bit stereo inputs, eight outputs, reads Akai S950/S1000 disks, excellent condition with manual V, 3, 0. ☎ Simon 0161 737 4483 evenings.

EMU E64 34Mb, 1.2gb HD, hardly used, immaculate, boxed, manuals, as new plus CD rom, £2500, Bass station keyboard, boxed, manuals, as new plus PSU, £250. ☎ Pat 0181 522 0577.

EMU E64 40Mb memory 1.7Gb internal HD plus external SCSI HD with six cartridges, newest v2.5 software and an immense sound library sell for, £2600. ☎ Julian 0115 981 0316.

EMU EMAX II 16-bit stereo sampler, 2Mb, as new, includes large library, £500. ☎ 0131 622 0159.

EMU ESI32 with 32Mb RAM SCSI leads vgc, boxed with manuals, home use only, plenty of sound library if needed, £950. ☎ Andy 0181 524 0224 www.s 01245 354 777 daytime.

EMU EMAX 2 4Mb, mint, boxed, £750, Roland MKS70 including PG800 programmer and 1 cartridge, £650, Yamaha REX50 effects, boxed, £90. ☎ Brian 01752 550199 days.

EMU EMAX II 16-bit sampler, £750; Deep Bass 9, £280, 14-inch SVGA monitor, £100,

Yamaha reverb, £100. ☎ Ian 0161 745 5246.

EMU E64 perfect condition upgraded to 64Mb RAM with ioMba Jaz drive and 2x 1Gb cartridges, £2500; Samson 2242 as new, £500; Aiwa XDS1100 DAT machine recently serviced, £450. ☎ 0117 949 8788/0468 061149.

EMULATOR E64 plus two CD ROMS plus 46Mb RAM, Akai S950 plus 80 sound disks; Roland A880 programmable MIDI patch bay; Korg KMX 62 keyboard mixer, IU rack 6 inputs, effects; Kurzweil P-RAM board, AtariMbA STU computer plus Cubase plus 60Mb hard disk. Must sell, all as new. ☎ Barrish 01207 290930.

ENSONIQ ASR10R rackmount sampler, extended memory, boxed with disks, manuals, mint, £1000; Alesis QS6 synth keyboard vgc, CD ROM, £650. ☎ Roger 01932 343135 (Surrey).

ENSONIQ EPS16+ rack sampler, 2Mb, sequencer, effects with disk library, MC202 CD, Sample tapes, £650 for quick sale. ☎ Rob 0116 2510405 day/ 0116 2761242 eve.

ENSONIQ EPS16R+ SCSI, Syquest drive, library, Waveboy effects, eight outs, £850, Ensoniq SQ80 analogue workstation, 8-part, drive, brilliant dance sounds, case, £450; AKG C535EB vocal condenser mic, £225. ☎ 0181 245 3033.

ENSONIQ EPS16R+ 2Mb, effects plus SCSI sysuest 80Mb hard drive, £750, Roland D10, £250, Drawmer LX20, £150, SR16 drum machine, £90. ☎ Mike 01744 614493.

ENSONIQ ASR10 keyboard 16Mb SCSI interface 8 hour video manual, hard disk recording reads Roland, Akai libraries, £1595 ono or swap for Roland VS880 with hard disk and effects. ☎ Steve 01429 222517.

KORG DSM1 digital sampling synth, features include harmonic synthesis, 48kHz, 22 seconds sampling, 16 individual outputs, 16 VCFs, rare, £750. ☎ Mark 01646 697720.

ROLAND S760 mint condition, £900. ☎ John 01902 372179 or 01902 850802.

ROLAND 14" RGB Colour monitor with Roland special cable, suitable for samplers S750 S760 S770 SM800 etc, good condition, can arrange delivery if required. ☎ 0181 668 6077.

ROLAND W30 sampling workstation 8 outs, sequencing filters etc, manual and Roland sample library, mint condition. ☎ 0117 904 6061 (Bnatol).

S3000XL unused 10 out boxed, £1290, Cheetah MS6 analogue MIDI module vgc, £190; Alesis Midiverb multieffects unit, vgc, no PSU, £100, no offers. ☎ 0976 686 590 (North London).

ROLAND W30 workstation, many extra disks, soft carry case, original manual good condition, £500 inv P&P. if required (UK mainland). ☎ 01634 826880.

ROLAND W30 WORKSTATION, manual, disks, excellent condition, £685; Roland E16, immaculate, £295 — must sell both, moving to USA. ☎ Simon 0468 405038, 0181 514 5153 eves (Ilford).

YAMAHA SU10 portable sampler up to 54 seconds sample time, filter scratch etc. Sample CD, manual, power pack, leads etc. boxed as new, £175. ☎ 01279 721587.

COMPUTERS/SOFTWARE

ATARI 529STE with 1Mb RAM, easily upgraded to 4Mb, with mouse and Atari hi res mono monitor, £200. Sorry, won't split. 520STFM, upgraded to 1Mb, can be easily upgraded to 4Mb, £140. ☎ 01354 695239.

ATARI 1040 STE 1Mb hi res mono monitor, mouse etc. *Cubase Lite* sequencing software, £199, Kawai R50 drum machine, £75 All mint condition, boxed, manuals. ☎ Phil 0113 2305036.

ATARI 1040 STE 4Mb upgrade hi-res monitor, manuals, screen filter, all leads. Boxed a1 condition. Home use only, £350. ☎ 0385 960022.

ATARI 1040 ST and Atari SM124 hi-res monitor vgc boxed, and Atari 520ST, £300 the lot. ☎ Jamie 0115 9561686.

ATARI 4Mb STE SM124 mono monitor, Cumana external floppy, 16+ MIDI cartridge, clock cartridge, mouse, £250, 105Mb hard drive, £150, all vgc. ☎ Dave 0115 9397354.

ATARI STE 1Mb various software plus Cannon bubblejet printer, immaculate, £200 ono or swap for budget mixer plus cash. ☎ Byron 01472 359489.

ATARI ST sequencing set-up, 1Mb high resolution monitor, great condition, used with cubase notator mixers etc. All leads and accessories needed to wire up synth, £200. ☎ 01884 257487.

ATARI FALCON 14Mb, *Cubase Audio 16, NVDI*, syquest 270Mb removable drive, other software included, £650 for everything. ☎ Geoff 0191 292 2246.

ATARI FALCON 14Mb RAM *Cubase Audio 16* V2.03, FDI digital interface external 1Gb SCSI drive, ideal 16-track recording package, £950. ☎ 0956 656333.

ATARI HI RES mono monitor, suitable for *Cubase, Notator* and WP software, two available, excellent condition, £85 each or £150 for both. Can arrange delivery if required. ☎ 0181 6686077.

ATARI STE 4Mb RAM, hi res monitor, mouse, sequencing software, plus Atari 1040 STF as spare, all in excellent condition, the lot for £270. ☎ Kez 01208 873649.

ATARI 520STFM with 4Mb upgrade, £100. ☎ Stephen 01246 410799.

ATARI 520ST 1Mb RAM good condition, little use, *K-spread* and *K-Word* plus Atari companion book included, £95 ono. ☎ Mrs Sheila Hearn 01354 655236 (Cambs).

ATARI 1040 STE 2Mb, SM124 monitor, trackball, two MIDI outs, *Cubase* V3.01 with manuals and dongle, various other software, serious sequencing at bargain price, £400. ☎ Roger 01633 861914.

CADENZA music sequencing software for IBM compatible pc. 3 1/2" and 5 1/4" disks plus manual, Still boxed, £100. ☎ 01977 791770.

C-LAB NOTATOR 3.1 and 520 Atari which can be upgraded, colour monitor all in good condition and working order, £250. ☎ Paul 0181 968 3623.

CODA FINALE for Windows, the most powerful music notation software available for the PC, as new, boxed, £260 ono. Write to: Mark Jex, 12 Pond End Road, Sonning Common, Nr Reading, Berks RG4 9SA.

DIGIDESIGN PRO TOOLS complete system including Quadra 650 three drives software includes DINR, Masterlist, SD2, etc, £3800, may split. ☎ 0171 251 6630, 0171 539 7643.

DIGIDESIGN SESSION 8 core system, 8-track recording system for PCs comprises two DSP cards and software, never used, still sealed, cost £1500, offers? ☎ 01752 605623.

VOYETRA DIGITAL ORCHESTRTOR+ digital audio/sequencer software, disks, manual plus companion CD with tutorials and additional software, £50. ☎ 01928 581456 (Cheshire).

DX4/133PC 32Mb RAM, 1.76bHDD, PCI motherboard, Yamaha DB50XG, Evolution keyboard, Windows 95, Office 95 sequencing software, 2S, 800 modem lexmark printer, 14" monitor, buyer collects, cash only, £1200 ono. ☎ Leigh 01782 264729.

ENSONIQ EPS sample editor for original version., runs on Atari ST 1Mb, cost £150 sell for £75, Microverb 2, £75. ☎ Chris 0321 507144 (Cumbria).

MIDILAND PCDGM MPU401-compatible soundcard, MIDI In/Outs with manual, quality sounds, *Cakewalk Express* sequencer with original disks and manual (unregistered), £150. ☎ David 01904 783881 (York).

MOTU MIDI EXPRESS rackmount MIDI interface, patchbay, filter merge and sync 192 channel plus full SMPTE as new, with manual and windows software, £280. ☎ 0117 9422 21 (Bristol).

PENTIUM PC 75MHz Cubase, Windows 95, 16Mb RAM, sound blaster, 520Mb hard drive, Microsoft office, Pro quake, CD Rom, Instant sequencing package, £699. ☎ Mike 01494 438965.

PENTIUM 133MHZ PC with Tahiti sound card, Yamaha DR50XG, *Logic Audio* 1.2Gb hard drive, 24Mb RAM, 15-inch monitor, printer, new £2400, selling price £1800. ☎ 01404 813931.

SOUNDSCAPE SSHDR1 SYSTEM inc 1.1Gb disk, time module, V2 software, guarantee, boxed, manual etc, £1999 inc delivery. ☎ 01246 410799.

STEINBERG AVALON universal sample editor with Steinberg 16 bit D/A converter for Atari, £195; Steinberg Midex Plus key expander and synchroniser for Atari, £195. ☎ Graham 0181 640 5280.

STEINBERG CUBASE AUDIO V3.0XT for Mac, unopened, unregistered and under priced at £400. ☎ Jason 0181 655 0526.

STEINBERG CUBASE SCORE V1.0 for Mac, £150 boxed, manuals dongle, Korg M1R cards and ST editor, £450. ☎ Chris 01296 386043.

STEINBERG CUBASIS AUDIO for PC brand new with manuals, dongle etc, £150 ono. ☎ Colin 01793 612378 after 6pm.

STEINBERG SYNTHWORKS Roland D-series and Kawai K1 family editor/librarian for Atari ST/STE/Falcon computers, £60 each, £100 for both, with dongle and manuals. ☎ 0181 883 4329.

STEINBERG AVALON 16-bit D/A stereo converter plus Steinberg Avalon V2.1 Universal sample editor for Atari computers with key (dongle) and manuals, cost over, £700 sell, £295. ☎ 0181 883 4329.

TURTLE BEACH Tropez + with 12Mb RAM and orchestral CD, £250, Tahiti with or without Yamaha DBX509 offers. ☎ 0973 332027.

TURTLE BEACH MAUI and Tahiti cards plus wave(se) sample editing software for PC, as new, boxed with manuals, original software, £400, £400 ovno. ☎ Mark 0181 641 0639.

DRUM MACHINES

AKAI MPC3000 sampling Drum Machine/Sequencer 10Mb offers. ☎ Elliot 0973 576 825.

ALESIS SR16 drum machine, £175; Yamaha R100 reverb, £100; Yamaha MT100 MkII 4-track cassette multitrack, £175. All units in great condition. ☎ Andy 0181 942 9741.

BOSS DR110 the original DR rhythm can be seen and heard in working studio, sold with rack lead and monitor, make me an offer and its yours, David Hancock, 39 Grays Inn Road, London WC1X 8PP.

BOSS DR5 221 sounds, drums, bass guitars, trumpets, orchestral. acoustic and electric guitars, strings, too much to list. with built in 4 track, immaculate, £175. ☎ 01708 670017 (Essex).

BOSS DR660 boxed with manual and PSU, great 909 and 808 sounds with individual control, only, £230 ono. ☎ Mark 0161 448 9989 after 6pm.

EMU SP1200 sampling drum machine/sequencer offers. ☎ Elliot 0973 576 825.

EMU PROCUSSION the only drum module techno heaven power supply plus manual, £320. ☎ Grant 0171 6864180 (North London).

NOVATION DRUMSTATION quality 909/808 drum sounds with 8 seperate outputs, excellent condition 1U rack worth, £450 new, will sell for, £320 ono. ☎ Ian 0802 808822.

ROLAND R8 drum machine including manual, 808 sounds card and memory card, excellent condition, 10 outputs, £250, may deliver. ☎ Steve 01203 417552.

ROLAND TR606 Drumatix classic drum machine, original excellent condition, boxed, soft case, instructions, £100. ☎ Paul 01708 722761.

ROLAND TR808 with MIDI retrofit, £500 perfect condition with original manuals. ☎ 0181 905 3539.

ROLAND TR808 with kenton MIDI fitted answer velocity, £750; Soundcraft folio 12.2 mixer, mint, £220. ☎ 0181 5573850.

ROLAND R8 drum machine with dance card and USA power drums card, £375; Fostex R8 excellent condition, £800; Roland D110, £180, all with manuals. ☎ 01303 257714 (Folkstone).

SIMMONS DRUM KIT, seven pieces including bass drum and tom stands with Alesis D4 drum module, Zildjian Avedis 14" hi-hats and stool, £600. ☎ Mick 0121 5251832 or 0402 305181.

SEQUENTIAL DRUMTRAKS six individual outputs, volume and tuning adjust per sound MIDI, good condition, £125ono. ☎ 01749 840115.

YAMAHA RY10 drum machine, mint condition, boxed plus manuals, home use only ideal first drum machine, £125 ono. ☎ 01279 428703.

YAMAHA RX5 drum machine inc sound card, good condition, complete with manual and PSU, £120. ☎ Chris 0115 962 2906 (Nottingham).

SEQUENCERS

AKAI ASQ10 sequencer 99 tracks SMPTE 4 MIDI outs, very robust, £450 ono; Evolution EVS1 module, £120 ono; Roland TR707, £140 ono; Yamaha RX5 drum machine, £150 ono. ☎ Michael 0151 475 7662 afyer 6 pm.

ALESIS MMT8 sequencer, never gigged, never crashed, doddle to use, good condition, £115. ☎ 01622 675456.

ARP 1611 analogue sequencer, rare early model, £500 ono, Yamaha DX100, £100 TX81Z, £150, CS01 monosynth, £80, Alesis Quadraverb+, mint, £225, Korg Micro Preset, £75 ono. ☎ 01352 712937.

ARP 1623 SEQUENCER mint condition, offers; Roland MKS70 with manual, mint, £550; Korg Mini 700, £120; Korg Micro Preset, £75; Roland PR100, £50. ☎ 0116 2835 455 or 0976 373857.

KAWAI Q80 32 track sequencer floppy disk drive and tape sync, £170. ☎ 01273 833950.

ROLAND MC303 music sequencer groovebox, unwanted win, still boxed sell for, £450 ovno. ☎ Pascal 0181 6428527 or 0973 983220.

ROLAND MC303 Groove box recording studio in 1 box, two months new, rare opportunity at, £450 write to Adam, 36 Downham Road, Ramsden Heath, Billericay, Essex CM11 1PZ.

ROLAND MC303 one month old, £500 or swap for Emu Orbit or Quasimidi Quasar. ☎ Rob 0191 469 4573 after 5pm.

ROLAND TB303 £695, Jupiter 8 MIDI, £995, Jupiter 6, £695, CR68, £150, CR8000, £140, TR909, £995, DSSO, £350, SH7, £895, Basstation rack, £295; Prophet 5 MIDI, £995, Pro1, £350, Drumtracks, £170, Oberheim OB8 MIDI, £995, Emu SP1200, £1450, Juno106, £440, Prophecy, £750. ☎ 0181 309 0615.

ROLAND MC500 hardware sequencer, including manuals and hard case, good condition, £200. ☎ 0181 883 5863 after 6pm.

ROLAND TB303 mint condition with original carry case, plus manual, £800. ☎ Stephen 0131 566 6769.

ROLAND TB303 £695, Jupiter 8 MIDI, £995, Prophet 5 MIDI, £1095, Juno106, £435, Oscar MIDI, £850 Wavestation AD, £795, Sequential Drumtrax, £175, Roland D550, £350, Prophecy, £795; MC202, £250, Octave CAT, £275 Pro 1, £350. ☎ 0181 309 0615.

YAMAHA QY300 music sequencer, great song writing tool, £500, Technics KN650 keyboard, £350, Digitach DSP 256 XL multi effects processor, £250. ☎ Phil 01484 659315 (Huddersfield).

YAMAHA QY20 pocket workstation, 100 voices, 8 drum kits, 8-track sequencer, 28 note poly, 16 part multitimbral, boxed. Music on the move for, £250. ☎ Mark 01646 697720.

YAMAHA QY20 music sequencer, boxed with manuals, mint condition, £190. ☎ Mike 01495 755067.

YAMAHA QY300 sequencer, £425 still under guarantee, Hughes & Kettner red box Cabinetulator AMP simulator, £30. ☎ Carl 01203 394737 (Midlands).

YAMAHA QY300 as new, manuals, demo disc, video etc, £475 ono. ☎ 01472 312815.

PERSONNEL

DANCE LABEL seeks demos from all aspects of dance music audio tapes or dats accepted please send to: Rockington Nursery, Blackness Road, Crowborough, East Sussex, TN6 2NB.

DANCE MUSIC programmer wanted to colaborate with myself, I have S3000XL MPC3000 Basstation X5 etc. ☎ Andrew 01372 376574.

DRUM plus BASS cabel based in Herts, looking for new artists to promote all the right contacts. Cash paid up front for good tunes! Don't delay. ☎ 0973 198225 24 hrs.

FEMALE VOCALIST wanted by gigging N'pton based 80's/90's chart covers group. Age 25-35 only, good range, transport essential, experience preffered. Mainly weekend work, good money. ☎ 01933 678608.

GREAT TRACKS need great songs, songwriter can help your grooves into chart hits, lets make money. ☎ Graham 01922 409188.

HARDSTEPPING COLLABORATOR needed to work on hardcore jungle demos. If you live in London, give me a ring. ☎ 0956 614808 (SE1 London).

KEYBOARD PLAYER programmer required by successful producer based in South Norfolk to collaborate on commercial dance tracks, own gear and transport essential. ☎ 01379 853 982.

MUSICIAN/SOUND ENGINEER wanted music — writing/studio work, computer literavy an advantage, friendly yound team, competitive salary and benefits. ☎ Annie 0118 958 4934.

PIT-TRAINED. drummer, experienced in all styles of music, seeks professional band, must have gigs, tours, summer season or cruise. ☎ Lee 01582 867169.

SAMPLING AND BEAT programme wizard wanted to complete line up to record and play live, from chemicals to death in vegas north london. ☎ Steve 0171 485 6831.

SEEKING GOOD SINGERS songwriters to form pop group, maybe we could be the next Take That, dedication essential, interested then. ☎ Keith 01462 441372 (Hitchin).

SINGER with heart and soul wanted for pop band. Must like the music business! Send demo, photo and reason for living to; Paul, 101 Sherborne Road, Peterborough, PE1 4RT.

SONGWRITER AND LYRICIST seek capable motivated female singers to sing their demos with a view to recording contracts. ☎ Radina 01628 473853/Chris 01494 721802.

SONGWRITER with a summer reggae hit, needs artist or producer to complete project, lets hit the charts. ☎ Graham 01922 409188.

SONGWRITER with track record, seeks lyric writer recording artists or making demo's but needs that magic song, lets make money. ☎ Graham 01922 409188.

TRANCEMISSION RECORDS require trance/techno tracks, submit your demo and info-material to TM Records, PO Box 7314, 6202VA, Maastricht, The Netherlands. All submissions guaranteed reply.

TRULY TASTY RECORDINGS Ltd, require demos for house, trnce, techo and B Beat contact TTA&R 20 Rennis Court, Aberdeen AB11 6N.

MISCELLANEOUS

ART POWER PLANT guitar preamp, £140, Alesis XT:c reverb, £130, Epiphone EMZ electric guitar, £175, Boss GE7 graphic EQ pedal, £40 all mint P/Ex Begringer composer. ☎ 01295 721696.

C AUDIO RA2000 power amp, 450 watts a side, excellent condition with mains leads, £350, 'Stomper' (foot) lighting controller, one channel faulty, £60. ☎ 01933 678608.

BEHRINGER COMPOSER MDX1200 compressor, mint 4 months old, boxed still under warranty, £185. ☎ Bruce 0113 278 7180 (Leeds).

CARLSBRO COBRA keyboard amplifier, 5 inputs, effects loop, 90 watts. Includes cover, reverb and reverb footswitch, £210. ☎ 01977 791770.

CARLSBRO PA AMP 6-channel, 150W, very good condition, never gigged, £120 ono. ☎ Keith 01506 825324.

CP RACK UNIT, portable, 6U, 19-inch, black with aluminium handles and locks, heavy duty and very light, cost, £140 sell for, £70, keyboard x-stand, £10. ☎ 0171 720 3702.

KEYBOARD/VOCALS foldback monitor rig, two floor monitors, HH 100 watts per channel amp, Tascam MM200 keyboard/mic mixer in flightcased rack, £450 for the lot, or will sell monitors for £150 and the rest for £350. ☎ 01908 614534 eves/weekends.

LESLIE 145 cab, excellent condition and sound, with 5 metre Hammond 5 pin lead, awesome tone, has to be heard to be believed, £300 ono. ☎ Bruce 01323 643341.

LUDWIG DRUM KIT black, immaculate, superb recording kit, bassdrum, 5 toms, hi hat, cymbal stands all blue/olive badge, £950 consider px/swap for recording equipment or outboard effects. ☎ 01482 448767.

ROLAND GR707 guitar synth controller in bits, complete except for pickups, ideal for spares with H/case, £120; Roland RE210 space Echo, £200. ☎ Andy 01222 493528 (Cardiff).

SIMMS MEMORY 72 PIN for Akai S2000, S3000x1 S3200x1 2x 16Mb, brand new, never been used, £75 each or, £140 for 2. ☎ Paul 01837 861455.

SKB MIXER CASE never used, £125, Yamaha DX7 with tqo ROMS, £300, Roland MT32, £130, Roland RA95, £575, Seck I8 8.2 mint, £675, Roland MK5-100, £225. ☎ 01621 740497 (Essex).

STUDIOMASTER VISION 350x350, £800, Pair Ohm speakers 300W each with stands, £300, Sabine feedback exterminator, £300, Carlsboro keyboard combo 65w, £200. ☎ John 01597 860509.

TECHNICS SBX700A honeycomb loudspeakers 3 — way 95 watts 8 ohms very good sound good condition, £175 ono. ☎ 01749 840115.

YAMAHA EMX8000 powered mixer plus flightcase, one year old, light use only, £800, Alesis nanoverb new, £115, Alesis SR16, £140 both under warranty. ☎ 0181 3118748.

WANTED

ADAT cash waiting. ☎ Andy 0121 449 8024.

AKAI MPC60 MKII drum machine required, cash waiting. ☎ 0181 883 4329.

ANALOGUE GEAR needed TR606, TR707, TR727, £75 SH101 MC202 WASP, £150 TR808, £300 TB303, £425, Oscar Jupiter 6, £500, TR909, Jupiter 8, £600, faulty gear considered. ☎ Kevin 01353 663613.

ANALOGUE RECORDER 16-track, preferably one inch in perfect condition for home studio, Mackie 1604 VLZ condenser MIC DAT machine effects wanted, Cash Waiting. ☎ Carl 0121 351 4827.

BSS DPR502 noise gate required, cash waiting. ☎ 0181 883 4329.

CAKEWALK pro Audio V5 (or delux) for IBM PC CD and manuals, must be original and include licence. Pirate copy not acceptable, £100 waiting. ☎ 01634 825880.

CUBASE AUDIO and Zero X for Atari. ☎ Nigel 01247 453812.

DIGITECH DSP2101 processor, MIDI controller control 1 of 7 wanted also portable rack case 4, 5 or 6 U must be heavy duty. ☎ 0171 720 3702.

DIGIDESIGN ADAT interface, DSP farm for Nubus Mac. ☎ 0121 449 8024.

EMU ORBIT wanted. ☎ 01773 872744.

HDR YAMAHA CBX-D3 or CBX-D5, £500. ☎ 0181 5573850.

HAMMOND B3 for private buyer, any condition considrred, willing to pay good price, can collect. ☎ 01226 790541.

HARD DISK RECORDING system preferably **PC** based with hardware and software. ☎ 0114 221 4727 afternoons or evenings.

HH V800power AMP 400 wanted per channel, good condition, £350 ono. ☎ 01239 615361.

JUPITER 8 with MIDI in good condition, £650 waiting for a Roland (or rather for the owner!). ☎ Stuart 0151 4265353.

JUNO 106 will pay, £400, Alpha Juno 1 will pay, £280. Also 3 tier A -frame will pay, £70. ☎ 01274 564301.

LEXICON MPX1 can pay £900, cash waiting ProTools Project also wanted. ☎ Darius 0181 808 5103.

NOTATOR for Atari ST sequencer manuals dongle, everything I need as I have songs I can't edit without it please phone. ☎ Nick 01344 426609 or 01344 51246.

PATCHBAYS WANTED 1/4" jack, Isopatch, Kelsey or similar, must be in good condition. ☎ 01482 448767.

RAM/ROM CARDS for Roland R8 MKII, please. ☎ Aled 01554 775248.

REMOTE UNIT for Fostex A8. ☎ Paul 0973 417032.

ROLAND SN550 voice eliminator wanted. ☎ 01846 683745.

ROLAND R8 ROM and RAM cards; Roland RC100 remote; Boss half rack flanger, half rack phaser. ☎ 01734 575207 or pager 01523 144877 (Reading).

ROLAND TR909 will pay, £500, TR808 pay, £250, TB303 pay, £450, SH10, MC202 pay, £150; Oscar pay, £450, Wasp pay, £100 Moogs Jupiters and others wanted. ☎ 0114 2482760.

ROLAND VS880 hard disk recorder with hard drive and effects option installed, will pay, £1400, must be in good condition. ☎ Steve 01429 222517.

SKB 4U RACK CASE must be as new, 1U rack tray wanted, cash waiting. ☎ 01773 828379.

ROLAND MC303 Groove Box and MC8 guitar effects wanted, cash waiting, please contact Keith Salmon, Flat 1 26 Nightingale Road, Southsea, Hants PO5 3JL.

ROLAND A880 MIDI patchbay or similar. ☎ Kev 01705 265950.

SEQUENTIAL CIRCUITS PRO 1 will pay, £320; Moog Prodigy, wp £170, Moog Rogue, wp £150, Moog Source, wp £300. ☎ 01274 564301.

SONY PCM coder(s) for VCR's i.e. PCM501ES, F1, F601, F701 Cash. ☎ Martin 01837 83164.

STEINBERG CUBASE audio for falcon dongles and manuals. ☎ Nigel 01243 829557.

SYNTHWORKS for Korg Mirex, Roland D50 Mex and Yamaha TX812 (any condition) Also session partner version 2 (AKA PROFIX) for Atari will consider trades, software or gear. ☎ 00353 21 778168.

UMI MIDI sequencer/software for the BBC MICRO computer, good condition, cash waiting. ☎ Steve 01332 521741.

UNITOR WANTED cash waiting. ☎ 0973 814745/0115 9528702.

WANTED ALESIS HR16B MIDIverb 3/4, Korg DW8000 JX8P DX100, sample C.D's, original cassettes by FAD Gadget Kitaro. ☎ 0115 9581216.

WURLITZER electric piano, will pay, £150 or swap for Novation Basstation. ☎ Jason 01932 854566 after 8pm.

YAMAHA DX7 Mark II Oberheim Matrix 6, Roland D50 Juno 106 Jupiter 4 Jupiter 6 Hohner clarinet 'D' Hohner Duo Korg M1 manual sensible prices, please. ☎ 0181 449 9698.

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2 Tracks

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NEW INDUSTRY STANDARD

The Panasonic SV3700 has been the industry standard mastering DAT recorder, and is now superceded by the SV3800. Using 1 bit, 64x oversamp ed (equivalent to 20 bit), you can be sure of the highest possible sound quality. Records and playsback at all 3 sample-rates via analog and digital inputs. Highly useable jog/shuttle wheel. AES/EBU and SPDIF digital connections, error counting and many other software features. In stock now!

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£POA

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Mixers

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OUTSTANDING OFFER on 16 or 24 CHANNEL DESKS

Almost everyone involved in music production at some stage dreams of owning a Soundcraft console - The legendary sound quality, reliability and ease-of-use, means that a Soundcraft equipped studio must be taken seriously. The SPIRIT Studio range represents a minor miracle, produced in Britain using the world's most advanced production technology and revolutionary manufacturing techniques to bring you Soundcraft quality at a previously unimaginable price.

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£379
NEW BOXED

FOLIO SX
Multitrack recording console
BRAND NEW DESIGN

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RRP £189
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P. A.

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300 watts

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R.R.P. £1299. £CALL

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HARD DISK RECORDER

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£1299
2 FREE LOOMS

SONY MDM-X4
MINI DISK 4 TRK RECORDER

NEW PRODUCT
£999
INC 4 TRACK PACK

AKAI DD8
NEW PRODUCT

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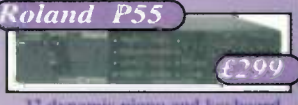

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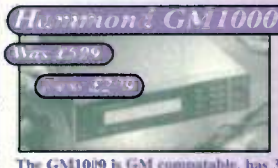

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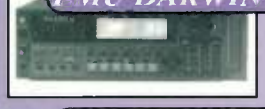
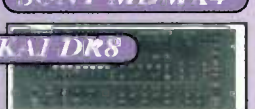
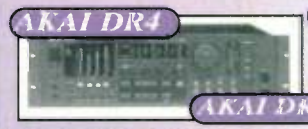


SONY MDMX4



AKAI DR8

AKAI DR4



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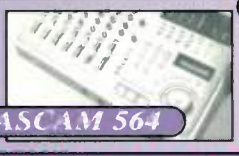

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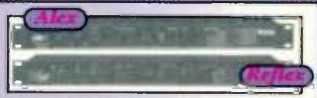

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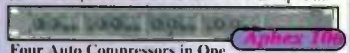

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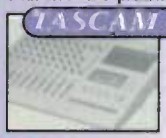

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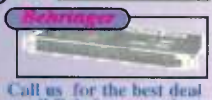

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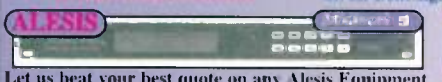

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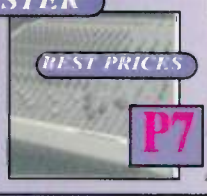

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Anatek Pocket Products to solve your MIDI headaches!

At *SOS*, we have regularly found ourselves referring readers to one or other of the Anatek Pocket range of MIDI accessories to solve their all too common MIDI interconnection and transmission problems. Trouble was, Pocket Products were previously hard to find... until now!

POCKET MERGE

• Merges 2 MIDI signals into 1 • Handles System Exclusive • Merges on all 16 MIDI channels • Merges Clock and MIDI Time Code • Merges all controllers • Handles large volumes of data • Stackable for 3 or more inputs

POCKET MERGE is an essential tool for sequencing or live use. Operating as a 2-In, 1-Out MIDI Merger, several Pocket Merges can be stacked to merge more than 2 inputs. Now any controller can be a 'master'. In live setups, POCKET MERGE allows any two controllers (keyboard, drum pads, guitar synth, etc) to share a sampler or sound module. Use one keyboard as a master, while using a favourite pitch bender from another, or combine two keyboards for a multi-tiered, organ-style controller. In the studio, POCKET MERGE is a must for sample dump editors, allowing a keyboard and a computer to be connected to the sampler at the same time. POCKET MERGE handles data very quickly, making buffer overflows a thing of the past.

Order Code: PP007 **£59 inc VAT.**

Postage: UK £2.50 Europe £4.95 ROW £8.95

POCKET FILTER

• Filter on all MIDI channels • Filter controllers, System Exclusive and real-time data • Combine data types/channels • DIP switch selectable filtering • Select channel from any keyboard • Filter all data on selected channels

POCKET FILTER is a vital tool for problematic setups. With MIDI data becoming increasingly complex, POCKET FILTER can unclog the MIDI data stream, sending only the most useful info. Use it to remove unwanted clock messages or System Exclusive data or memory-intensive aftertouch and controller information. POCKET FILTER frees-up unused MIDI Channels from multitimbral synths, making them available for other modules. In addition, it can be used to channelise older synths that only receive in Omni mode.

Order Code: PP008 **£69 inc VAT.**

Postage: UK £2.50 Europe £4.95 ROW £8.95

POCKET CHANNEL

• Remaps Receive channel • Remaps Transmit channel • Sends multiple MIDI channels • Velocity-switch mode • Footswitch controllable

POCKET CHANNEL takes data from any MIDI channel and remaps it on to one, several, or all 16 MIDI channels. Up to 16 different channel assignments are possible. A unique velocity-switch feature allows automatic switching between two different sound modules depending on the key velocity. Use POCKET CHANNEL to organise channel assignments for a multitimbral sound module, or send a controller's output to two or more MIDI channels. With POCKET CHANNEL, for example, two drum machines or two samplers can share the same note assignments and be set to two separate MIDI channels.

Order Code: PP014 **£69 inc VAT.**

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POCKET MAC

• Economical Macintosh MIDI interface • No external power supply required • 1 MIDI In, 2 MIDI Outs • LEDs indicate MIDI In/Out data • Uses serial or modem port • High speed CMOS design • Improves signal to minimise data errors.

POCKET MAC opens up a whole new world of MIDI programs for the Macintosh computer user. With many Macintosh programs simultaneously supporting both the serial port and the modem port, one POCKET MAC could be connected to each allowing access to twice as many MIDI devices.

Order Code: PP004 **£39 inc VAT.**

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POCKET SYNC

• 'Smart' FSK Tape-to-MIDI synchroniser • Starts anywhere in song • MIDI In to Out merging • Automatic read/write switching • 'Jam Sync' protects against tape dropouts • Records tempo changes • MIDI and FSK status LEDs

POCKET SYNC is the way to expand the capabilities of any multitrack studio. No longer is it necessary to allocate more than one tape track for sequenced parts. Now, shuttling to different points in the song is quick and effortless. POCKET SYNC writes a special FSK sync tone on one track of tape that is converted to MIDI Clock and Song Position Pointer on playback. Merging of data from the MIDI input to the output allows new sequencer tracks to be added while remaining synchronised to tape. Automatic switching between write (recording FSK) and read (playback FSK) cuts downs on confusing switches and buttons. Tape oxide dropouts are no longer a problem with POCKET SYNC's variable dropout protection. The sequencer can continue playing over a dropout for a short time, even if FSK code is completely lost!

Order Code: PP003 **£69 inc VAT.**

Postage: UK £2.50 Europe £4.95 ROW £8.95

POCKET PEDAL

• Sends on multiple MIDI channels • Supports 1 continuous controller • Supports 1 momentary footswitch • Sends pitch-bend, modulation, portamento time, and MIDI Volume • Sends sustain, portamento on/off, sustenuto, and start/stop • Auto pedal/footswitch calibration • Forward/Reverse pedal operation • 3 mode pitch-bend operation • Combine data types

POCKET PEDAL is an indispensible controller for the performing musician. Use it with an ordinary volume pedal and footswitch to send MIDI volume, modulation, and sustain controls on all 16 MIDI channels simultaneously. For owners of multi-effects processors, POCKET PEDAL provides a convenient cost-effective way of providing dynamic control over effects parameters. It is also a handy controller for automated mixdowns, converting any resistive input into MIDI Controller messages for VCAs. Connect a photocell to POCKET PEDAL and control MIDI parameters with a light source!

Order Code: PP009 **£69 inc VAT.**

Postage: UK £2.50 Europe £4.95 ROW £8.95

POCKET TRANSPOSE

• In-line 16 Channel transposer • +/- 5 Octave transpose range • Switch between normal and transposed modes • Separate intervals for each channel • Transpose key signature and octave simultaneously • All non-transposed MIDI data is passed • Harmonisation mode • Footswitch controllable.

POCKET TRANSPOSE is a performance-orientated transposer that supports separate transpose intervals for each MIDI channel. Although many keyboards have a transpose function, it's usually too cumbersome for live use. POCKET TRANSPOSE makes transposing easy. Intervals can be set while playing, and the user can select the normal or the transposed setting from a footswitch. Guitar synth players can use the POCKET TRANSPOSE to set intervals on 6 separate MIDI channels, or use it to transpose all strings by a certain amount. POCKET TRANSPOSE provides an easy way to try different arrangements without altering sequencer data. You can even set it so that the drum machine channel remains intact.

Order Code: PP011 **£69 inc VAT.**

Postage: UK £2.50 Europe £4.95 ROW £8.95

POWER PACK

• 'Phantom' powers all Pocket Products • Functions in-line with MIDI signal • Powered by most AC adaptors • Automatic polarity switching • Fully regulated supply • Passes all MIDI data • Alleviates hook-up problems • Boosts MIDI signal

POWER PACK provides power to Pocket Products in instances where upstream devices from other manufacturers have neglected to meet MIDI specifications, or in any instance where power is unavailable. POWER PACK can be placed anywhere in the MIDI chain and accepts power from a standard AC adaptor (not included). It provides additional power when more than 4 Pocket Products are used in a row or allows POCKET PEDAL and POCKET FILTER to retain their channel settings when the master device is turned off. What's more, POWER PACK can be used to boost the MIDI signal and extend the maximum distance between two devices.

Order Code: PP012 **£29 inc VAT.**

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POCKET SPLIT

• 8-Zone Keyboard Splitter • Range from 1 to 127 notes • Fixed boundaries • MIDI Channel/Zone assignment • Footswitch controllable • Floating split point

POCKET SPLIT is an 8-zone keyboard splitter. Each zone has its own MIDI Channel, and has a range of 1 to 127 keys wide. Zone boundaries can be set for hard or soft (overlap or splits). Use POCKET SPLIT to maximise the performance of your master keyboard, or create interesting performance possibilities with your guitar controller. An added feature is an 'intelligent' 2-way floating split that automatically tracks the keyboard player's left and right hands. Now any MIDI device can have the features of a sophisticated MIDI controller at a fraction of the cost!

Order Code: PP013 **£69 inc VAT.**

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POCKET MAPPER

• Remaps MIDI controllers • Maps Pitch Bend to Aftertouch • 'Set and forget' programming • Supports 15 controllers • Allows unconventional routings • Updates older keyboards.

POCKET MAPPER allows modulation routings to be customised to suit a particular need. Controller data such as Pitch Bend, Aftertouch, Breath Control and others is received and can be retransmitted as a different controller. For instance, DX7 Breath Control modulation can be rerouted to MIDI Volume to modulate synths that do not accept Breath Control. POCKET MAPPER is the most convenient and cost effective way of rerouting MIDI modulation. Now, MIDI wind instruments can remap mouthpiece Breath Control to Aftertouch quickly and easily.

Order Code: PP006 **£69 inc VAT.**

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POCKET THRU

• 1-In, 3-Out MIDI Thru box • High-speed CMOS design • Very low power requirements • Buffered outputs clean up data • Handles all MIDI data • Stackable for more outputs

POCKET THRU is an essential building block for any MIDI setup and an excellent companion product for all Pocket Products. POCKET THRU provides 3 buffered outputs from a single MIDI input. Use POCKET THRU to minimise MIDI delays, or expand the outputs of a POCKET MERGE unit. POCKET THRU also allows POCKET FILTER to be placed anywhere in the MIDI chain, when using it to channelise older synths. Up to 4 POCKET THRUs can be combined to provide a total of 9 outputs.

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• All Piranha cables come with a lifetime guarantee.

MICROPHONE CABLE - Twin Core oxygen-free copper cable made to the highest specification, using high density spiral braided shield to provide superior performance and rejection of hum and noise. Special supersoft Polymer jacket makes this probably the most flexible cable available, giving the ultimate in protection against mechanical interference noise. Overall cable diameter: 6.5mm.

INSTRUMENT CABLE - Single Core oxygen-free copper cable, as above spec. Overall cable diameter: 6.2mm.

QUAD MIC CABLE - Our Piranha supersoft mic cable is now available in a Quad version, offering further protection against susceptibility to outside interference. If you think of your cable as being 'double balanced', it is not difficult to understand the dramatic improvements in noise rejection that this cable affords. Overall cable diameter: 6.7mm.

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Please add your cable colour code R (red), B (blue), Y (yellow), G (green) or K (black) at end of each Order Code to specify cable colours required when ordering (use coupon at end of Mail Order section). Example: **INS-03JJ-Y** means a *3 metre Jack-to-Jack Instrument cable in Yellow.*

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5 metre XLR-to-Right-angle Jack	£11.75	MIC-05XRJ
6 metre XLR-to-Right-angle Jack	£12.75	MIC-06XRJ
10 metre XLR-to-Right-angle Jack	£17.50	MIC-10XRJ
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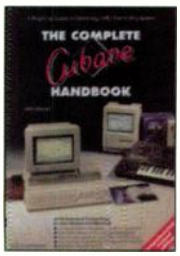

by Udo Weyers

After a short break, the definitive Steinberg Cubase Hanbook is back in print. This *new edition* is once again filled with real world applications and down to earth explanations of how to use all the powerful features offered by Cubase in all its many forms. *The book is now relevant to all three platforms (Atari, Mac and PC)*, and the main attraction of the revised text is its focus on Cubase Score. The Complete Cubase Handbook is a not-to-be-missed purchase for users of Steinberg's highly popular software.

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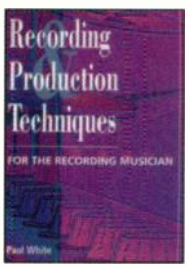
RECORDING & PRODUCTION TECHNIQUES



by Paul White.

This highly informative book by SOS's own Editor demystifies the techniques used by professionals in the recording of contemporary music.

It reveals how to make full creative use of all manner of studio effects and signal processors. These techniques can be utilised both in the home and commercial studio. The book concludes with an invaluable section on master tape formats and an overview of the various processes and vinyl records.

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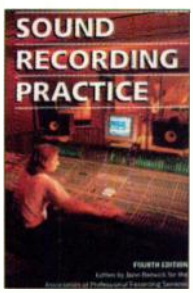

by John Borwick

This now classic text reaches its Fourth Edition, and has been *enlarged and revised* to cover up to date developments in the recording industry. The contents of this 600+ page is too diverse to summarise in such a short space. Suffice to say that every serious recordist, whether amateur, semi-pro or professional should have a copy of this book.

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RECOMMENDED READING

MUSIC & NEW TECHNOLOGY

by Gabriel Jacobs & Panicos Georghiades

Forward by Vangelis. A thorough guide to creating music with today's music technology. Covers music theory, MIDI and electronics principles, computers, what gear to use in your MIDI studio, and most modern MIDI production techniques. Ideal for beginners and advanced readers alike.

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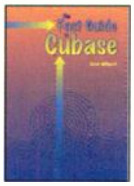
THE FAST GUIDE TO CUBASE



By Simon Millward NEW

This book aims to provide a quick and readable introduction to Cubase, saving you the trouble of wading through the bulky user manual. All platforms are covered — PC, Atari and Mac — with useful tutorials, 'smart moves', glossary and index. There should be something in this book for everyone, whether you're a beginner or established user, and all the program's essential elements are outlined, including the Arrange window, the Inspector, Key, List and Drum Edit, Quantise, Synchronisation, Master Track, the MIDI Effect Processor and special chapters on Score and Logical Edit.

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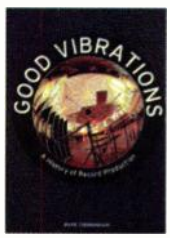
GOOD VIBRATIONS



by Mark Cunningham

Good Vibrations — A History of Record Production features a foreward by BRIT award-winning Best Producer of 1996, Brian Eno. The book chronicles the development of recording techniques and music technology, from the invention of sound-on-sound (multitrack) tape recording in 1949, to the current dramatic advances in digital technology. Also highlights the changing role of the producer and engineer, with quotes from George Martin, Brian Wilson, Tony Visconti, Trevor Horn, Hugh Padgham and Pete Waterman. Recordings discussed in detail include The Beach Boys' *Pet Sounds*, The Beatles' *Sgt Pepper's Lonely Hearts Club Band*, Pink Floyd's *Dath Side Of The Moon*, Queen's *Bohemian Rhapsody*, David Bowie's *Heroes*, and U2's *Zooropa*. Includes around 100 photos and illustrations, many previously unseen, plus extensive reference section.

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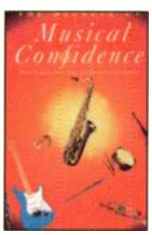
THE SECRETS OF MUSICAL CONFIDENCE - How to Maximise Your Performance Potential



By Andrew Evans

Written by a musician and psychologist, this is claimed to be a first for musicians:
a book aimed at maximising performance potential and increasing confidence.
A series of questionnaires and exercises allow you to analyse your abilities and needs and allow you to deal with stress, creativity and career management, amongst other topics.

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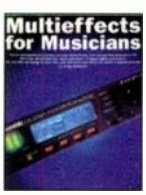
MULTI-EFFECTS FOR MUSICIANS



by Craig Anderton

Occasional SOS contributor Craig Anderton adds to his long list of music technology-based books with this comprehensive look at multi-effects units. The book helps you with what to look for when buying a new unit, how to use it when you've got it home, and provides a collection of tips to help you get the most out of your device. 137 Pages.

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TECH TERMS - A Practical Dictionary for Audio and Music Production

by George Petersen and Steve Oppenheimer

This is a concise collection of definitions of electronic music and recording terms; 300 words and phrases are given quick accurate definitions in plain English. So if you're new to recording, synths, samplers and MIDI, this book could be a big help in getting your mind into the terminology.

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THE COMPOSER'S GUIDE TO MUSIC PUBLISHING (2ND EDITION)

written & compiled by Annie Gunning

This book has been produced by the Association of Professional Composers and examines the business of musical copyright and music publishing from the composer's point of view. It aims to educate composers of all kinds of music in the operation of the music publishing business to help them obtain, negotiate and benefit from publishing agreements and avoid expensive mistakes. Apart from publishing, the book also covers copyright legislation, performing and mechanical rights, the royalty administration societies, music in film, broadcasting, theatre and ballet and commissioning agreements. There is also advice for composers setting up their own publishing companies. An exhaustive and useful book.

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If the terminology of musical technology and recording leaves you gasping, then this is the book for you! With clear explanations of 1500 terms and concepts, amidst illustrative graphics, the whole work is extensively cross-referenced, and worth its weight in gold.

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HARD DISK RECORDING FOR MUSICIANS

by David Miles Huber

More of a digital recording overview, this book looks at digital audio in all its forms. Huber discusses the equipment, the techniques and processes of digital audio. Computer-based sound editing, digital audio workstations, digital signal processing techniques, sampling and real-world applications in music, film, video and broadcast environments are covered plus multimedia. The text is designed to be understood by newcomers, while delivering information of value to professionals.
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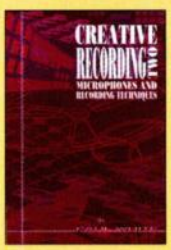

by Paul White

A complete guide to understanding and using microphones in a recording environment.

In plain English, it explains how the different types of microphone work, discusses the advantages of the various different types, and shows how they can be used to get the sound you want onto tape.

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By Paul White

Soundproofing, Acoustics and Monitoring is designed to take the mystery out of studio design, whether you run a bedroom studio or a commercial recording facility.

In plain English, it explains how soundproofing works, how you can change your room acoustics to give the optimum monitoring environment and how to choose and use your monitor system.

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RECORDING

HOT TIPS FOR THE HOME RECORDING STUDIO

by Hank Linderman

Learn how to lay down music the way you want it to sound, with advice for getting the best from your mixer, multitrack, compressor etc. Discover tricks and what traps to avoid, unlock the mysteries of timecode, prevent noise problems. Packed with sound advice.

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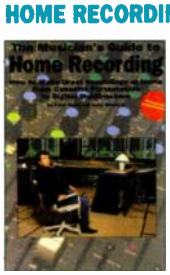

by Peter Mclan & Larry Wichman

(Revised and Updated)

This is the book every serious songwriter, musician, and home recordist needs, with a new chapter on MIDI and the lastest digital recording technologies. A problem-solving guide as well as an instructional text, it is designed to expain in simple terms how professional recording techniques can be applied at home.

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by Rudy Trubitt

Journey through the design and features of mixers so you can maximise the use of this essential and very flexible audio component. Using Mackie's wildly popular MS1202 and CR1604 mixing desks as a foundation, the book explains general concepts as well as model specific operating tips. Topics include: mixing basics, real world applications, hooking things up, mixing tips, block diagrams and a glossary.

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PRACTICAL STUDIO TECHNIQUES

by Tom Misner

This book and audio CD package comes from the School of Audio Engineering's Tom Misner. It's an excellent source of basic recording facts and figures, and if you want concrete examples of the subjects discussed, then listen to the free mixdown demonstration CD.

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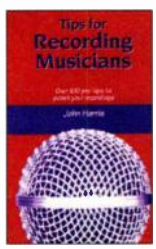
TIPS FOR RECORDING MUSICIANS



by John Harris

Today's studio equipment is affordable but sophisticated, and it takes a lot of know-how to use all this technology effectively. This book details the equipment you need - mics, effects, tape machines, etc. It has separate sections on recording of vocals, electric guitar, drums and acoustic instruments, as well as the use of MIDI in the recording process. You will learn how to get the best from delay and reverb, as well as effects like compression and gating. There are some useful tips on using the mixing desk and post production work. All in all it's a handy guide that will improve your recording techniques at a stroke.

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RECORDING TECHNIQUES FOR SMALL STUDIOS

by David Mellor

This well written, user-friendly book is designed to offer accessible and helpful tips on how to get the most out of the equipment in your studio. Chapters cover: mic techniques; musical arranging for recording; 4-track recording; the mixer; preparing for an running a session; recording drums; recording vocals; integrating MIDI; using effects and signal processing; location recording, and digital recording. The book is rounded off with an "any questions" section, a glossary and a list of recording studios in the UK. As you would expect from a book based on an SOS series, this is a *must have!*

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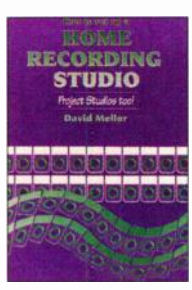
HOW TO SET UP A HOME RECORDING STUDIO



UPDATED & EXPANDED

By David Mellor

If you are thinking of setting up a home studio, a project studio or a DJ studio, this book is the place to start. It takes a highly practical 'nuts and bolts' type of aproach to help you produce an efficient and productive studio. It covers soundproofing, keeping the sound in and the noise out, acoustics, studio layout, and studio equipment, and advice on the kit you are likely to need. The book ends with an invaluable questions and answers section, a glossary of terms and a list of contacts.

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SAMPLERS

WHAT'S A SAMPLER?

By Freff

Ideal starter book for sampling novices. Whether you are serious about sampling or merely curious, this book is for you.

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by Sheila Davis

Superb guide to the art of writing words to music. Learn how to create a memorable song title, choose the best music form for each idea, apply writing principles and avoid common pitfalls, write with both sides of your brain, find your voice. Includes songwriter's bibliography and lists over 60 songwriting organisations to help you connect with your chosen marketplace.

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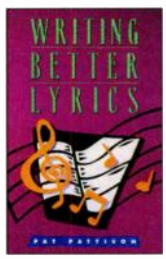

by Pat Pattison

In-depth approach to lyric writing examines 17 songs to discover what makes them so effective. Learn a warm-up exercise that will revolutionise your songwriting imagery, how to use a rhyming dictionary to unlock fresh, unexpected rhymes, avoid cliches and create imaginative metaphors and similes.

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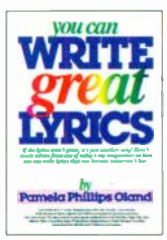

by Pamela Phillips Oland

This book helps you develop your own philosophy and style. Its plentiful techniques, combined with practical advice and exercises, will have you writing great lyrics before you know it!

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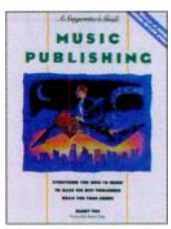
MUSIC PUBLISHING



by Randy Poe

This book demystifies music publishing, explaining what it's all about and what it means to a songwriter. Learn what your publishing options are, from a single song contract to a staff writer to a self-publishing operation. By the time you have finished this book you will never make an uninformed decision about publishing your songs that you will later regret.

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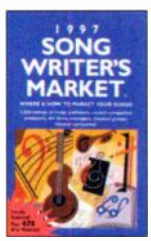
SONGWRITERS MARKET 1997



To get your songs published and produced, you must know who the music industry's players are and how to approach them. This directory identifies those seeking the work of songwriters. Lists 2500 lyric and music markets, clubs, associations, contests, workshops and songwriters publications. Includes 'The A & R Roundtable', where pros discuss their role in a songwriter's career, business side of songwriting, music industry trend report, and interviews with music industry professionals.

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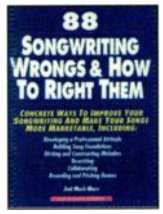

by Pat & Pete Luboff

This is a real workbook for songwriters, dealing with both the craft and art of songwriting. Song structure, rewriting, matching lyrics to music, collaboration, making the right demo, pitching the final result, and business matters.

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CAN YOU SING A HIGH "C" WITHOUT STRAINING

by Thomas Appell

This book features extensive coverage of the vocal cords and explains clearly how to sing high notes without going into falsetto, and without straining. You'll learn how to extend the range of your voice, and why most singers either strain or "break" into falsetto when attempting to sing above their normal range. It comes with 2 CD's jam-packed with over 2 hours of vocal examples and exercises that you can practice with. Many singers have increased their range by several notes after the first week of practice. If you can't sing high notes without straining, but would like to know how, then this book is for you. 122 pages.

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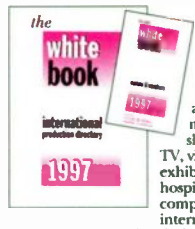
THE WHITE BOOK INTERNATIONAL PRODUCTION DIRECTORY 1997



This is the latest edition of the essential source of contacts for artists, performers, venues, services and facilities associated with music, concerts, shows, festivals, film, TV, video, conferences, exhibitions and corporate hospitality - there's even a comprehensive international section. The layout is logical and an index makes fact finding an easy task - altogether an indispensable 864 pages. The new edition once again comes with a complementary copy of The Little White Book, which distils the contents of the larger volume to a pocket-sized list of names and phone numbers.

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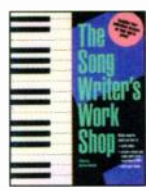
SONGWRITER'S WORKSHOP



Edited by Harvey Rachlin

If you want to work systematically at improving your songwriting skills, then try this book: it's divided into four individual 'lessons', each of which is backed up by audio material on cassette. This allows you to listen in the car or walk around with your personal stereo and still absorb useful information. The four sections are: On Songwriting by Janis Ian (yes, *the* Janis Ian); Making Demos by John Barilla; Understanding MIDI by James Becher; and The Art of Pitching Songs by Teri Muench (ex-A&R director with RCA and publisher). Also included is an intro, a quick and breezy glossary and an index. Includes two cassettes.

CODE B260 **£15.95**

Postage: UK £2.50, Europe £5.50, R.O.W. £8.50

SHOWCASE INTERNATIONAL MUSIC BOOK 1997

"The Bible of the music industry" - all the contacts you need in one handy volume. 544 pages, thoroughly researched and totally updated. This is the book the professionals within the industry use to find studios, producers, manufacturers, record companies, publishers, management, promoters, venues, tour support services, etc. UK, plus sections of Europe, Middle East, USA/Canada, Australia, South Africa. Accurate, comprehensive information in a well thought out and easy to use format. Highly recommended.

CODE B192 **£35.00**

Postage: UK £3.50, Europe £6.95, R.O.W. £9.50

CREATING MELODIES

by Dick Weissman

Learn how to create memorable melodies, from love ballads to film scores and jingles. Using lots of examples of popular songs and styles by top-name musicians, Weissman covers the full range of melody writing. Learn how to marry music to lyrics, relate rhythm to the message of your song, read and write musical notation, write instrumentals for films, TV, commercials and theatre, and put together a demo tape.

CODE B322 **£12.99**

Postage: UK £2.50, Europe £5.50, R.O.W. £8.50

THE SONGWRITER'S GUIDE TO COLLABORATION

by Walter Carter

This book describes what to expect when entering into a co-writing situation and how to make the arrangement work. Covers the pros and cons, how to find a partner, publishing your songs, who writes what, money matters, sharing success and rejection, growing together or apart plus co-producing and pitching.

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Postage: UK £1.95, Europe £5.50, R.O.W. £8.50

NETWORKING IN THE MUSIC BUSINESS

by Dan Kimpel

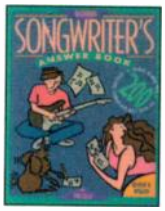
Think of this book as a popular psychology course for musicians. If you feel you could benefit from developing a positive attitude to getting ahead in your area of the music business, then *Networking* is for you. There's nothing like it for good, sensible advice: it's often not enough to have talent. To be successful, you'll need to persevere, have good "people skills", and exercise good networking skills. Success depends on what you know, who you know, and perhaps most importantly, who knows you. An essential book, and a snip at £11.95. Hardback.

CODE B251 **£11.95**

Postage: UK £1.95, Europe £4.95, R.O.W. £7.50

BEGINNING SONGWRITER'S ANSWER BOOK

by Paul Zollo



If you're just starting out as a songwriter or haven't progressed very far, perhaps you have questions about the art and business of songwriting that you can't find answers for. Chances are, they're covered in this book. Over 200 of the questions songwriters most often ask are answered in this book. There are 11 chapters, covering subjects such as lyrics, theory, song structure, collaboration, demos, publishing and the music business. Some answers - such as "What makes a professional-sounding demo?" are actually mini-articles - and an index allows you to target subjects without wading through the text. A friendly, informative read.

CODE B253 **£10.95**

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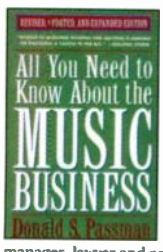
ALL YOU NEED TO KNOW ABOUT THE MUSIC BUSINESS



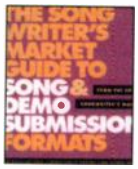
by Donald S Passman

This book is a must: the author manages a portfolio of high profile clients and teaches music business law at the University of Southern California, and has produced a clear overview of the music business. He starts at the beginning of your career, with advice on choosing a manager, lawyer and agent, and moves through getting a record deal, songwriting and music publishing and finishes with details of copyright, mechanical royalties, songwriter deals, films and more. An exhaustive and entertaining read. 415 Pages.

CODE B302 **£19.99**

Postage: UK £3.50, Europe £5.50, R.O.W. £8.50

THE SONGWRITER'S MARKET GUIDE TO SONG & DEMO SUBMISSION FORMATS



From the Editors of Songwriter's Market

If you've got the songs and you've got the contacts, this book will help you to choose a format that will get your demo heard as well as overall packaging and presentation and dealing professionally with publishers, A&R reps and other industry people. Plenty of example documents (lyric sheets and letters) are given, and the book is nicely rounded off with a glossary and index. Hardback.

CODE B258 **£12.95**

Postage: UK £2.50, Europe £5.95, R.O.W. £9.95

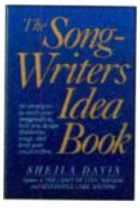
THE MUSICIAN'S GUIDE TO READING & WRITING MUSIC

It's an entertaining but practical introduction, well, to reading and writing music. This is as friendly as it comes. Learning to read and write music isn't easy, but at least the process is lightened up with considerable doses of wit.

CODE B224 **£8.99**

Postage: UK £1.95, Europe £4.95, R.O.W. £7.50

SONGWRITERS IDEA BOOK



by Sheila Davis

If you want a textbook, this is it: 250 pages of serious, intelligent insight into songwriting. Loads of good advice and a friendly tone make this a useful read to anyone, whether beginner or seasoned pro. The focus is firmly on lyrics rather than music, and the prominent references to poetry terminology shouldn't really be a surprise. Use Davis' 40 strategies and you to could soon be "designing distinctive songs". Hardback.

CODE B250 **£9.95**

Postage: UK £2.50, Europe £5.50, R.O.W. £8.50

SINGING FOR A LIVING

by Marta Woodhull

The title says it all. If you're already a singer, this book gives you everything you need to know in order to exploit your talent further: looking after your voice and voice exercises, business advice and marketing and audience interaction are all covered in this straightforward book.

CODE B252 **£12.95**

Postage: UK £2.50, Europe £5.50, R.O.W. £8.50

MIDI INFORMATION

THE MIDI FILES

By Rob Young

This book comes from Prentice Hall and aims to help you get the most out of your MIDI system, by providing loads of tips on programming realistic instrument and rhythm parts, using sequencers to create advanced effects. Basic MIDI concepts are covered, along with advice on setting up a MIDI-based home studio. More advanced discussions cover specific types of MIDI messages and what you can achieve with them. All the techniques in the book are illustrated on a supplied floppy disk.

CODE B334 **£19.95**

Postage: UK £2.50, Europe £6.95, R.O.W. £9.50

MAKING THE MOST OF MIDI

By Paul Overaa

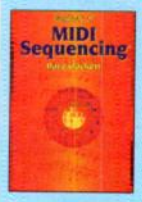
This is a MIDI book unlike any other. It explains the fundamentals of MIDI and MIDI sequencing for the beginner, and it goes much further, dealing with issues that will be of help to more established users. Advice on MIDI fault finding, help for musicians using sequencers with live bands, MIDI messages and MIDI files, plus programming material. So if you are a keen first time user or a MIDI veteran, there will be something in this book to interest you.

CODE B321 **£14.95**

Postage: UK £2.50, Europe £5.50, R.O.W. £8.50

HANDBOOK OF MIDI SEQUENCING

NEW



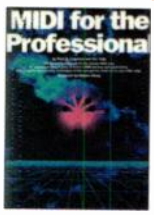
by Dave Clackett

Hands On MIDI Software's Dave Clackett has boiled his knowledge into a collection of tips for getting the best out of hardware or software sequencers. Dave covers the hardware and software you need to get sequencing, and introduces the basics of sequencing and notation, with particular emphasis placed on using General MIDI/GX/XG sound sources. Recommended.

CODE B333 **£13.95**

Postage: UK £2.50, Europe £4.95, R.O.W. £7.50

MIDI FOR THE PROFESSIONAL



by Paul D Lehrman and Tim Tully

Co-written by SOS contributor Paul D Lehrman, this substantial, exhaustive work covers pretty well any aspect of MIDI that you could think of. As an overview of what MIDI is and does in 1994, this 239 page book couldn't be better.

CODE B227 **£11.95**

Postage: UK £4.50, Europe £7.50, R.O.W. £14.50

PRACTICAL MIDI HANDBOOK (3rd Edition)

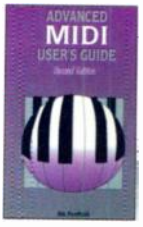
by R A Penfold

This book is completely updated, and features a section on General MIDI. It provides a "straightforward, non-mathematical introduction to MIDI", and features a full glossary of MIDI terms.

CODE B273 **£9.95**

Postage: UK £1.95, Europe £5.50, R.O.W. £8.50

ADVANCED MIDI USER'S GUIDE (2nd Edition)



by R A Penfold

Most MIDI users do no more than scratch the surface of MIDI's potentialities. But dare to dig a bit deeper and you'll find a whole new world of creative possibilities.

With the Advanced MIDI User's Guide, you'll learn how to optimise your MIDI system to get the best results from your particular setup, and you'll find out how to use gadgets like switchers and mergers to enhance your system. If you want to incorporate a multitrack tape recorder into your MIDI system there's a section on synchronisers, SMPTE and MIDI time code, and retro freaks will learn how to hook up that dusty old analogue synth to their MIDI systems.

CODE B152 **£10.95**

Postage: UK £1.95, Europe £3.95, R.O.W. £5.50

MUSIC TECHNOLOGY REFERENCE BOOK

by Peter Buick & Vic Lennard

Written by Peter Buick and Vic Lennard (author of SOS's Atari Notes column), this book offers information at your fingertips and is an indispensable reference source for the musician or sound professional in the recording, broadcast, live, video, computer, multimedia, post production and theatre industries. It includes comprehensive MIDI spec, General MIDI, MTC, MSC, and SysEx information. It also includes charts, check lists, useful hints, tips, and ideas, plus a glossary, list of contacts and a comprehensive indexed, it is also organised into convenient sections. 150 Pages.

CODE B305 **£12.95**

Postage: UK £1.95, Europe £5.50, R.O.W. £8.50

A BEGINNERS GUIDE TO MIDI

by RA Penfold

The title says it all: all aspects of MIDI are explained, and many common beginner's problems are discussed.

CODE B287 **£4.95**

Postage: UK £1.50, Europe £3.95, R.O.W. £5.50

MIDI SURVIVAL GUIDE

by Vic Lennard

Whether you're a beginner or a seasoned pro, the 'MIDI Survival Guide' shows you the way. No maths, no MIDI theory - just practical advice on starting up, setting up and ending up with a working MIDI system. Contains over 40 cabling diagrams, and how to: connect synths, sound modules, sequencers, drum machines and multitracks; how to budget and buy secondhand; using switch, thru and merger boxes; transfer songs between different sequencers, get the best out of general MIDI , and understand MIDI implementation charts.

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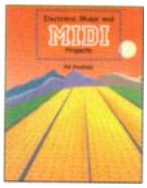

by RA Penfold

Want a MIDI THRU box, patchbay or switcher? Well they're all here. And you don't need a degree in electronics either. All the projects are explained in detail, with full instructions on assembly. So if your into MIDI and you want to expand your system without taking out a second mortgage, fear not. Here's the book to help you build up your MIDI system without laying out thousands on hardware.

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Postage: UK £1.95, Europe £4.95, R.O.W. £7.50

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THE ARC MUSICIANS' DIRECTORY

The new Musicians' Directory from Arc Publishing aims to provide all things to all musicians: whatever your style of music, the comprehensive listings offer you the contacts you need, whether it's labels, studios, venues, music shops or management - and that just scratches the surface of the dozens of topics covered by the book. Apart from being a directory proper, the Handbook also includes a selection of useful articles, including subjects such as how to be a session player (by SOS's very own Paul White), music publishing, releasing your own record, copyright protection, accounting, legal advice and more. The Musicians' Directory offers over 380 information-packed pages for little more the price of a new CD.

CODE B219 **£14.99**

Postage: UK £3.95, Europe £6.95, R.O.W. £9.50

SYNTHESIZERS

KEYFAX 5

by Julian Colbeck

The latest instalment in the intrepid Keyfax series offers potted specifications and concise mini-overviews of digital pianos, home keyboards, General MIDI modules, stage organs and computer sound cards. Look out for company backgrounders, contact details and cross-references to earlier Keyfaxes.

CODE B231 **£12.95**

Postage: UK £1.95, Europe £5.50, R.O.W. £8.50

SOS Book Shop

VINTAGE SYNTHESIZERS

By Mark Vail

This well-illustrated, 300 page book covers synth history, interviews with designers and overviews of important instruments. Mark Vail's book could be the most entertaining and useful synth book yet – check out the definitive history of the Minimoog, complete with pre-production designers' sketches. While not strictly a buyers' guide, there is a comprehensive section to sourcing, valuing, upgrading and servicing classic instruments.

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THE A-Z OF ANALOGUE SYNTHS

PART ONE: A-M / PART TWO: N-Z

by Peter Forrest

Complete rundown of all the major analogue synths and keyboards ever made, spread across two books. Each is a testament to the massive amount of research and effort put in by the author. Featuring pocket company histories and detailed data on the instruments produced, each book provides a comprehensive overview of the qualities of various instruments; charts and tables assess second hand values and maintenance levels necessary to keep a given instrument playable as well as such intangibles as sound quality, collectability and user interface. Includes colour photos of many classic instruments.

PART ONE: A-M CODE B294 **£14.00**

Postage: UK £1.95 Europe £5.50 R.O.W. £8.50

PART TWO: N-Z CODE B338 **£16.00**

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KEYFAX 2

by Julian Colbeck

1989 version of Keyfax provides individual summaries and specifications of the last of the great mono synths, digital pianos, and classic polysynths like the Roland JX10 and Prophet VS -forerunner of the SY22 and Wave Station Early Keyboard and rack-mount samplers are covered in this indispensable guide. Still a great buy.

CODE B096 **ONLY £5.99**

Postage: UK £2.50, Europe £5.50, R.O.W. £8.50

THE MUSEUM OF SYNTHESIZER TECHNOLOGY

by Martin J Newcomb

If you liked our feature on the opening of the Museum of Synthesizer Technology in October, but haven't got the time or the cash to visit in person, then the next best thing has to be the museum's guide book. This 118 book is printed on glossy paper and contains full-colour pictures of a large selection of exhibits from the museum, together with some descriptive text and company backgrounders. The text reads a little like a fanzine, but the hardcore synth fanatic will want this book for the pictures. In these pages you will glimpse instruments that you are unlikely ever to experience in the flesh: an exceedingly large Roland System 100 modular set-up, an EMS Synthi 100, an ARP 2500, a large Emu modular and what must be the comprehensive collection of Moog equipment anywhere.

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DRUM MACHINES

DRUM MACHINE RHYTHM DICTIONARY

By Sandy Feldstein. For use with Roland drum machines or any grid-based pattern system. First 75 pages on programming huge range of rhythms in rock, latin, jazz and funk styles. Remainder analyses styles and patterns of world's top drummers - Phil Collins, Billy Cobham, Steve Gadd, Stewart Copeland, etc. Highly recommended.

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RHYTHMICAL GROOVES & PATTERNS

By Siegfried Hoffman. Looks at how drummers compose rhythm patterns to add emotion, swing or groove. Contains examples for you to programme into your drum machine or sequencer.

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260 DRUM MACHINE PATTERNS

By Rene-Pierre Bardet. Even more drum pattern styles (paso doble, charleston, etc)

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DRUM MACHINE PATTERNS

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Postage: UK £1.95, Europe £4.95, R.O.W. £7.50

PLAYING TECHNIQUES

SOLID GROOVES

By Dieter Petereit & Herb Quick

128 pages dealing with both bass and drums, the 'heart' of the pop group, together. Although written primarily for drummers and bass players, anyone interested in understanding rhythmical music in popular styles will find this book invaluable.

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CLASSICS IN SEQUENCE

by William Lloyd & Paul Terry

Takes concepts behind Music In Sequence and applies them to all-time favourite classical music scores. Authors show how to make fresh, exciting interpretations of classic scores. Info on reverb and effects, interpreting scores, editing synth voices. Highly creative—an ideal workbook for the music classroom. Covers Medieval, Renaissance dance music, Bach's Toccata in D minor; Vivaldi, Purcell, Handel; opera excerpts from Rossini, Verdi, Borodin; Mozart, Schubert, Tchaikovsky, music from Carmina Burana; Debussy, Satie, Steve Reich's Piano Phase and more. Highly recommended.

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MUSIC IN SEQUENCE

by William Lloyd & Paul Terry

Still one of our best-selling books. Easy to follow, practical guide to making real use of your sequencer, written by people who really understand music and how to create it using today's technology. This brilliant, unique book carries the SOS seal of approval.

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1000 KEYBOARD TIPS

by J Dreksler & Q Harle

The hi-tech musician's guide to the basics of music, scales, chords and harmonies. 256 pages covering chord relationships, improvisation, suggested drum machine patterns, plus comprehensive chord table. Too good to miss!

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Postage: UK £3.50, Europe £6.95, R.O.W. £9.50

ROCK IN SEQUENCE

by William Lloyd & Paul Terry

The latest book from the authors of Music In Sequence and Classics In Sequence is now available: Rock In Sequence offers detailed scores of 17 rock and pop hits from the '50s to the present day, alongside a collection of helpful sequencing tips. Songs are included from the likes of Eurythmics, Blur, The Beatles, Led Zeppelin, Abba and others. 112 pages.

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Postage: UK £2.50, Europe £5.50, R.O.W. £8.50

COMPUTERS & MUSIC

THE DESKTOP MUSCIAN

By David M Rubin

A comprehensive guide to MIDI and audio on PC and Macintosh computers. Purchasers are provided with a CD-ROM full of MIDI software demos to get them going, and the text — over 400 pages of it — covers all aspects of music and computers, from first concepts to advanced arrangement techniques.

CODE B335 **£27.95**

Postage: UK £3.95, Europe £7.50, R.O.W. £14.50

COMPUTERS AND MUSIC

By R A Penfold

2nd edition. Covers hardware and software applications. Excellent glossary of jargon, and now bang up to date.

CODE B098 **£8.95**

Postage: UK £1.95, Europe £4.95, R.O.W. £7.50

MULTIMEDIA ON THE PC

By Ian R Sinclair

If you want to know what multimedia is and what it can offer you, then this is the book for you. Much of the information is general enough for everybody, but as the title suggests, the book is aimed at PC users. The book explains the installation and use of a CD ROM drive and a sound card and covers all key concepts behind multimedia. As an added incentive, if you buy this book, you can send away for a free copy of *Picturebook*, a multimedia authoring package.

CODE B272 **£11.95**

Postage: UK £2.50, Europe £4.95, R.O.W. £7.50

PC MUSIC HANDBOOK 2nd Edition

by Brian Heywood & Roger Evan

This book will show you how to turn your PC into a creative music making machine. It explains how you can create very sophisticated music on your PC by running sequencing software, how to create your own sounds with a soundcard, how to use your PC as a sound librarian, or a sample editor, or even use it as a hard disk recorder or a sound sampler. All these things are possible with today's sophisticated PC.

The use of sound in multimedia applications is also covered, and there is a chapter on PC hardware with advice on which type of PC is best for your particular needs.

There's advice too on getting connected to the Internet, where you can contact other PC music aficionados world wide!

CODE B332 **£10.95**

Postage: UK £1.95, Europe £5.50, R.O.W. £8.50

THE COMPLETE SOUND BLASTER

by Howard Massey

Explains in simple, non-technical terms: how to install the Sound Blaster hardware and software for use in both the DOS and Windows environments, the two sound processes used by the card, MIDI, the Sound Blaster's MIDI capabilites, and the many different applications for the Sound Blaster, including the various software utilities provided with the card, and many of the third party support products that enhance its operation.

CODE B313 **£10.95**

Postage: UK £1.95, Europe £5.50, R.O.W. £8.50

SEQUENCER SECRETS

by Ian Waugh

Ian's book aims to "go beyond the manual" in telling you how to get the best from your sequencer. The book features 29 hands-on sequencing projects and is suitable for use with all software sequencers. The book hopes to help you optimise your MIDI system and use your sequencer to create all sorts of useful effects. A troubleshooting section helps you track down stuck notes, double notes and so on.

CODE B299 **£7.95**

Postage: UK £1.95, Europe £4.50, R.O.W. £6.50

MUSICAL APPLICATIONS OF THE ATARI ST's

By R A Penfold

Includes a general introduction to MIDI, a handful of MIDI add-on circuits (Thru box, MIDI switcher and so on), plus a collection of programs, in Fast BASIC, that allows you to use the ST's internal sound generator and create little MIDI applications.

CODE B280 **£5.95**

Postage: UK £1.95, Europe £4.95, R.O.W. £7.50

LIVE SOUND

LIVE SOUND

Peter Buick has produced a book written for live sound engineers and gigging musicians with practical applications and real life scenarios very much in mind. The whole ambit of live sound engineering is addressed, including the equipment used and how to get the most out of it, the problems you will confront and how to fix them, and various other related subjects such as safety, feedback, as well as automation and MIDI in the live sound field.

CODE B337 **£14.95**

Postage: UK £2.50, Europe £5.50, R.O.W. £8.50

PUBLIC ADDRESS LOUDSPEAKER SYSTEMS

by V Capel

All aspects of PA speaker systems are covered in this book, including low-impedence matching, 100V systems, transmission lines and how to install inductive hearing aid loops. At the heart of the book is the Line-Source Ceiling Array, a system that is claimed to improve clarity, even coverage and reduce feedback. Full step-by-step construction and installation details are given.

CODE B283 **£3.95**

Postage: UK £1.50, Europe £5.50, R.O.W. £8.50

SOUND REINFORCEMENT HANDBOOK

by Gary Davis and Ralph Jones

From recording to broadcast, fixed installations to touring, this 400 page reference covers live sound setups, equipment, techniques and jargon.

CODE B105 **£27.95**

Postage: UK £4.50, Europe £7.50, R.O.W. £14.50

INTRO TO LOUDSPEAKER& ENCLOSURE DESIGN

by V Capel

The book provides both useful background to speakers and enclosures in general, plus practical information on crossovers and full details on constructing the so-called 'Kapellmeister' design of speakers.

CODE B281 **£2.95**

Postage: UK £1.50, Europe £6.95, R.O.W. £9.50

LIVE SOUND MIXING

by Duncan R Fry

This is a hands on, friendly introduction to all aspects of mixing live. It hails from Australia, and is an SOS Bookshop exclusive. The author is an experienced live sound engineer and has packed his book with loads of information, diagrams and hints to take you from basic principles through to trouble shooting when things go wrong.

CODE B256 **£19.95**

Postage: UK £1.95, Europe £5.50, R.O.W. £8.50

PLEASE REMEMBER: POSTAGE IS PAYABLE ON ALL MERCHANDISE

EMAGIC NOTATOR VIDEO TRAINING MANUAL

This video manual is detailed and helpful, and is presented in a most friendly and approachable manner by session musician Tim Walter, whose tone throughout the video encourages and inspires confidence. If you are new to Notator and are still in awe of its power, this is the video to bring you down to earth. An introduction and 28 tutorials take the user from the absolute basics - including plugging in the dong'e - to working with Unitor and SMPTE, and synchronising to video. As well as actual recording of MIDI data and sequencing, comprehensive coverage is given to using the score layout and printing facilities that are so much a part of Notator. Topics covered include; sequencing page, score editing, lyrics and text, graphic arranger mode, hyper edit, the printer page, using the part box.

CODE V012 **ONLY £19.99**

Running time: 2 hours 20 minutes Format:VHS(PAL)
Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

WINDOWS 95: WHAT WILL YOU LEARN TODAY?

CODE V065 **£19.99**

Running time: 74 minutes
Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

MACKIE ULTRA MIX VIDEO GUIDE

CODE V066 **£9.99**

Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

ROLAND GR09

Presented by Roland UK product demonstrator Nick Cooper, this application-based tutorial video for the Roland GR09, produced in association with Roland USA, covers every function completely. Covered topics include; the GK2A Synthesiser Driver, pickup sensitivity, use of the tuner, what a patch consists of, use of the pedals, patch edit 1 & 2 (including layering and detune, chromatic function, reverb & chorus, edit target, pitch shift), the use of external midi devices, saving to an external sequencer & more.

CODE V061 **£19.99**

Running Time 57 minutes
Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

ROLAND JV-1080 VIDEO MANUAL

Roland's amazing JV-1080 synthesizer module is covered in detail in this informative video. Presented by Tim Walter the video the video guides you through the basics, and leads you painlessly onto the advanced features. The video even shows you how to fit the expansion boards & gives demonstrations of some of the wonderful sounds they contain. Once again this video has been produced in association with Roland UK & USA to ensure that everything it contains is accurate, and relevant to the new and more experienced users alike.

CODE V046 **£19.99**

Running time: 80 minutes Format: VHS (PAL)
Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

LOUDSPEAKERS FOR MUSICIANS

CODE B284 **£3.95**

Postage: UK £1.50, Europe £3.95, R.O.W. £4.50

HOW TO GET A RECORD DEAL

The facts you need from the people who know. How To Get A Record Deal contains vital information and insight that you will not find anywhere else, from artists and executives who have made it and know what it takes.

On this video music industry pros give you the straight facts on how to break into this extremely competitive business. Because sometimes the difference between success and failure is information.

Presented by the National Academy Of Songwriters

CODE V003 **£14.95**

Running time: 1 hour 7 minutes
Format: VHS (PAL)
Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

ROLAND TDE-7K DRUM SYSTEM

CODE V045 **£19.99**

Running time 65 minutes
Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

STEINBERG CUBASE

This manual is presented by Chris West, Steinberg expert. It's very much a practical, 'get up and running' video, showing the novice user exactly how to install and begin using Cubase, whether they're running the program on an ST, Mac or PC computer — there's even a basic background on using the computers themselves! All of Cubase's controls are shown, explained and demonstrated in depth. Once you're familiar with the basic controls, Chris takes you slowly through recording your first session, followed by overviews of the various edit screens. It's rather like having an expert tutorial that you can run again and again in the comfort of your home, until you can use Cubase like a true pro. Topics covered include; the main screen, customising names and outputs, copying and pasting between arrangements, MIDI filter, cycle mode recording, the tool box, all edit screens.

CODE V011 **£29.99**

Run time: 1hour 30 minutes Format: VHS (PAL)
Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

ROLAND MS-1 VIDEO MANUAL

CODE V047 **£24.99**

Running time: 50 minutes (approx)
Format: VHS (PAL)
Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

BOSS DR-5 DRUM MACHINE

Presented by Nick Cooper (Roland UK Product Specialist) this video covers all the functions of the DR-5 in a clear and concise manner. Produced in association with Roland UK & USA. By using the information gathered from Roland 'helplines', particular attention has been paid to the areas that many users find most difficulty in. This makes it of interest to beginners and experienced users alike. Nick imparts the information with ease and a professional manner, making it enjoyable and entertaining.

CODE V043 **£19.99**

Running time 57 minutes
Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

ROLAND XP-50

This XP-50 video owners manual is produced by Roland Corporation US and covers all the major features of the instrument in detail. This is an application based video that provides many examples of how your new found knowledge can be applied. Just a few of the 30 separate topic areas covered are: Effects, Choosing Sounds, Loading a Song, Loop Recording, Copying a Track to Pattern, Making an RPS Set, Track Editing, Multitrack Recording, Patch Editing, Creating Splits & Layers in a Patch.

CODE V063 **£24.99**

Running time: 63 minutes
Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

SOS Videos

ROLAND G800

Presented by Roland UK's product demonstrator Sara Reybould, this video covers every essential feature and function of the Roland G800. Sara provides the user with a wealth of knowledge on this sophisticated instrument, with recourse to many practical examples and close-up shots of the LCD screen. The video was produced in association with Roland USA and Roland UK to ensure that the content is accurate and informative.

CODE V060 **£19.99**

Running Time 92 minutes
Postage: UK £1.75 Europe £4.95, R.O.W. £6.95

YAMAHA PSR6000 KEYBOARD VIDEO MANUAL

Yamaha's PSR6000 is a home keyboard with a difference, and offers many professional features plus excellent sound quality. Tim Walter starts at the beginning and makes the instrument look easy and fun. His enthusiasm is catching, and, yes, the PSR6000 is a very capable instrument. The tape runs to 75 minutes, which makes for excellent value.

CODE V029 **£19.99**

Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

ROLAND GR-1 GUITAR SYNTH

CODE V014 **ONLY £29.99** ***FOR 2 VIDEOS***

Total Running time: 4 hours. Format: VHS (PAL)
Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

BOSS ME-8

Nick Cooper (Roland UK product demonstrator) explains every single feature and function of the ME-8 in detail. The unit is clearly explained in a logical sequence with examples given of how the functions effect the available sounds, a perfect aid to new users of the ME-8 and those who would like to get that little bit more from it. Just some of the main points covered are: What is a Patch?, Selecting a Patch, Copying a Patch, Edit Mode, Using The Effects, Control Effects, The Tempo Function, Manual Mode, and lots more.

CODE V064 **£19.99**

Running time: 72minutes
Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

JUST ARRIVED!

MACKIE 8•BUS VIDEO MANUAL

NEW

Almost 60 minutes of fun-packed, detailed explanation of the various features of Mackie's popular range of 8 buss mixing consoles (16•8, 24•8, 32•8, 24•E) and how best to utilise them. Onscreen numbers allow quick searching to desired topics.

CODE V068 **£9.95**

Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

KORG AX30G TONEWORKS VIDEO MANUAL

ORDER CODE V028 **£19.99**

Postage: UK £1.75, Europe £4.95, R.O.W.£6.95

ROLAND GP100

CODE V062 **£19.99**

Running Time 45 Minutes
Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

EVERYTHING YOU WANTED TO KNOW ABOUT PCs BUT WERE AFRAID TO ASK!

CODE V048 **£19.99**

Running time 91 minutes
Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

KORG PROPHECY VIDEO MANUAL

Written by Phil MacDonald

Korg's new Prophecy Synthesizer now has its own video manual!

The video covers all the major features over 6 sections, with lots of examples of the amazing effects that are available using the 'log' and 'mod' wheels. The video's visual interest is maintained by the extensive use of Chroma-Key and multi camera effects. This is a video that is ideal for new owners, and those who want to know more about the Prophecy before they make a purchase.

CODE V049 **£14.99**

Running time: 36 minutes
Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

HOW TO GET THE MOST OUT OF HOME RECORDING

3 TOP CLASS VIDEOS

A superbly presented set of videos which no home recordist should be without. Have you got your set yet?!

LEVEL ONE

This well presented video explains how to set up and operate a simple cassette-based multitrack home studio. It clarifies all the basic terminology and demonstrates the recording of a song from beginning to end, covering how to record guitars, keyboards, vocals and drum machines; which microphones to choose; how to patch in effects units and use them well; what makes a good arrangement; what makes a good mix; plus what to master on to and why.

Full of professional tips and clear examples, this superb video offers the musician with no recording experience a fast route to successful operation of a simple home studio.

CODE V005 **£24.95**

Running time: 1 hour 10 minutes
Format: VHS(PAL) HiFi Stereo
Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

LEVEL TWO

This is, in our opinion, the *best ever* guide to the equipment and skills needed to produce high quality results from a home studio.

Full of clear examples and graphic information, the video majors on effects and how to use them well. It also covers the do's and don'ts of track bouncing; microphones and mic techniques for different applications; getting the most out of multi effects units; plus an analysis of guitar effects with top session guitarist Milton MacDonald and an enlightening interview with ace producer Alan Parsons.

Writer/ presenter Julian Colbeck packs the programme with professional tips, allowing musicians of all kinds to get the most out of their home studio.

CODE V006 **£24.95**

Running time: 1 hour 45 minutes
Format: VHS(PAL) HiFi Stereo
Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

LEVEL THREE

This video is packed with information and professional tips on advanced MIDI applications in the home studio, including interfacing with sequencers, which sync code is best for which application and why. Hit producer Martyn Phillips (Erasure, London Beat) discusses modern recording techniques, and top programmer Paul Wiffen examines the opportunities and benefits offered by hard disk recording. It offers practical advice on sampling - how to save time and tracks; plus professional tips on advanced arranging and mixing techniques, including spectrum mixing.

CODE V007 **£24.95**

Running time: 1 hour 30 minutes
Format: VHS(PAL) HiFi Stereo
Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

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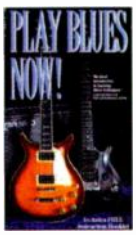
KORG X5 SYNTH

Korg's new X5 synthesizer, reviewed in SOS' January 1995 issue, now has its own video manual. Presented by Tim Walter in an entertaining and lighthearted manner, and explains all basic aspects of Korg's highly affordable instrument in very clear terms. If you're in any way daunted by your new purchase, or want to get a feel for the instument before laying out your cash, this is the video for you.

CODE V027 **£19.99**

Running time 55 minutes
Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

PLAY BLUES NOW!



A complete guide to blues guitar playing that shows a variety of blues rhythm and soloing styles — for both beginners and advanced players alike.

Learn the blues style of Eric Clapton, Stevie Ray Vaughan, Peter Green, etc. The programme not only covers the usual blues shuffles and scales but using 4 complete songs, gives you the resourses and techniques to create professional blues parts and solos in a wide variety of blues styles.

CODE V051 **£12.99**

Running time approx 50 minutes
Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

ROLAND JV-90 SYNTH

Roland's JV-90 synthesizer gets the treatment in this informative Labyrinth production. Virtually every facet of the JV-90 is covered, from the basic functions to more advanced programming. Chris Allen guides you through the powerful features this instrument has to offer. Produced in association with Roland UK & USA to ensure that everything it contains is accurate, and relevant to new and more experienced users alike.

CODE V044 **£19.99**

Running time 70 minutes
Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

THE EMAGIC LOGIC TUTORIAL VIDEO VOLUME 1

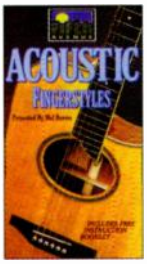
Produced by Emagic themselves, this video once again sees Tim Walter (featured on the excellent Notator video) in the tutor's chair. There are plans for a series of videos which become ever more detailed and informative, but for now Volume 1 takes you through the first steps of getting the software up and running, and covers virtually all the controls you'll need. *This video is valid for all versions of Logic, whether being run on an ST, Mac or PC.* Presentation is rather intriguing, with a mobile camera that helps to hold the interest more than the average training video and some interesting graphics that aid comprehension and help to quickly find specific tutorials and bits inside tutorials. Contents as follows:

- Tutorial 1: The Arrange window and basic sequencing
- Tutorial 2: Playback parameters & Toolbox
- Tutorial 3: Controlling MIDI data flow
- Tutorial 4: Manipulating sequence data
- Tutorial 5: Moving around in Logic
- Tutorial 6: Windows and key commands
- Tutorial 7: More sequencing
- Tutorial 8: Score
- Tutorial 9: Looking at the Event List
- Tutorial 10: Editing the Event List
- Tutorial 11: Using the Environment
- Tutorial 12: The best of the rest (HyperEdit, Matrix Editor, Cycle Mode and more).

CODE V023 **£29.99**

Total running time 70 minutes Format: VHS (PAL)
Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

ACOUSTIC FINGERSTYLES



Presented by Mel Reeves

In this video there are 5 major instrumental studies to work through including country, classical and blues. Each style is broken down into small sections allowing you to learn more quickly and efficiently. Each piece is demanding, but great fun to play.The final section looks at styles and techniques used by players such as R.E.M, The Eagles, Sheryl Crow and Paul Simon, and provides an insight into creating new and interesting fingerstyles of your own.

CODE V059 **12.99**

Running time approx 90 minutes
Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

KORG X3

This video offers an easy way in to this powerful workstation. It starts from absolute basics, including audio connections and volume levels, and the clear and helpful script covers all basic facilities of the X3. The video features a sophisticated use of picture in picture, with the X3's display cut into the main image to show you clearly what Phil is actually doing, and main points are reinforced with on screen text and graphics. The main section headings are:

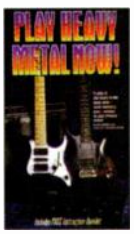
• *X3 Audio Connections* • *Getting Around the X3* • *Factory Disk* • *Disk Drive Modes* • *Selecting Sounds* • *Global Modes* • *Sequencer Mode* • *Quick Sound Editing* • *Playing MIDI Files on the X3* • *Using the X3 with an external sequencer*

Note that these are loose headings, with each section also containing information on connected subjects in varying amounts of detail. A lot of ground is covered, and we can recommend the tape to any X3 owner.

CODE V018 **£19.99**

Running time: 55 minutes Format: VHS (PAL)
Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

PLAY HEAVY METAL NOW!



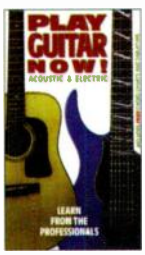
A concise, easy to follow video guide to real heavy metal playing for guitarists of all levels.

A guide to hard rock/heavy metal techniques for guitarists of all levels. The programme covers RHYTHM, SOLOING, and TECHNIQUE. All of the techniques, solos, etc are clearly demonstrated No need to read music. Free booklet contains tab, chord and scale diagrams.

CODE V052 **£12.99**

Running time approx 65 minutes
Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

PLAY GUITAR NOW!



ACOUSTIC & ELECTRIC

An easy-to-follow video to take you from the basics to a full rock solo.

The programme covers TUNING, CHORDS, FINGERSTYLE, 12 BAR BLUES, BARRE CHORDS and ROCK SOLOING for both electric and acoustic guitars. Includes free chord/tab booklet.

It is not necessary to be able to read music to learn from this video.

CODE V053 **£12.95**

Running time approx 51 minutes
Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

ACOUSTIC BLUES GUITAR

Presented by Mel Reeves

Whether you can already play fingerstyle guitar, or are simply familiar with basic chords, this programme will show you all of the necessary techniques to play great blues guitar. All of the technical aspects are explained in the clearest possible way before getting down to the real business of learning 5 real blues that are great to listen to and terrific to play.

CODE V058 **12.99**

Running time approx 63 minutes
Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

ANALOGUE HEAVEN

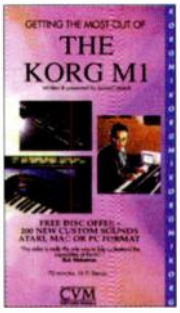
Remember our feature on the opening day of the Museum of Synthesizer Technology which we ran back in October 1994? Wish you'd actually been able to attend?

Well, now you can have the next best thing: the museum has released a fascinating 50 minute promo video that features footage shot on the day as well as a lightning tour of the facility. The programme is hosted by SOS contributor Julian Colbeck. The tape opens with synth pioneer Bob Moog making the inaugural speech and officially opening the museum, followed by a nostalgic run through one of his old modular systems. Analogue Heaven makes diverting viewing for anyone interested in vintage synths, represents good value, and offers the perfect companion to the Museum's guide book, also available from the SOS Bookshop.

CODE V026 **£12.95**

Running time: 50 minutes Format: VHS (PAL)
Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

GETTING THE MOST OUT OF THE KORG M1



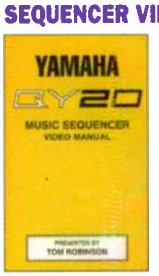
Written and presented by Julian Colbeck

The Korg M1 is a classic instrument. The range and quality of its sounds has made it one of the most successful synthesizers of all time. But because the M1 is so immediate, it's too easy just to scratch the surface, leaving many of its exciting capabilities undiscovered. This highly informative video enables M1 owners to unleash the full creative potential of this enormously powerful workstation. With plenty of musical examples, tips and inside information, the video offers clear, concise explanations of the instruments features and operating procedures, helping you to greatly expand your dexterity and creativity across the whole range of this world-beating instrument.

CODE V002 **£24.95**

Running time: 1 hour 10 minutes Format: VHS (PAL)
Postage: UK £1.75 Europe £4.95, R.O.W. £6.95

YAMAHA QY20 MUSIC SEQUENCER VIDEO MANUAL



by Tom Robinson

Yamaha's popular QY20 portable sequencer/ sound source is a deceptively simple device to use; if you think you might like some insight into getting that little bit extra out of the device, then look no further. Produced in co-operation with Yamaha, the video features mobile musician Tom Robinson showing you how to get the best from this portable marvel. Tom, who has used the QY20 extensively as a writing tool on the road, says: "I never leave home without it".

CODE V016 **£19.99**

Running time: 90 minutes Format: VHS (PAL)
Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

PLAY KEYBOARDS NOW!

Presented by Mel Reeves

An up-to-date video/booklet that gets to the heart of modern keyboard playing with no need to read music!

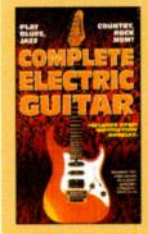
All you need to be able to create pop, rock and even jazz chord accompaniments using major, minor, seventh, sus 4th and added 9th chords. Learn arpeggios, random arpeggios, chord 'splitting', crushed tones, boogie blues, inversions and much more.

Free instruction booklet and stickers included.

CODE V054 **£12.95**

Running time approx 60 minutes
Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

COMPLETE ELECTRIC GUITAR



Presented by Mel Reeves

Learn how to create solos and rhythm parts in any style! The programme covers ROCK 'n' ROLL, BLUES, JAZZ, COUNTRY, ROCK and FUSION and much, much more. Plus the clearest possible guide to chord and scale construction, tonal centres and working out parts for yourself. Includes free construction booklet.

CODE V050 **£12.99**

Running time approx 65 minutes
Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

COMPLETE ACOUSTIC GUITAR

Presented by Mel Reeves

Whether you only know a few chords, or are already proficient, this easy-to-follow programme will show you all of the main guitar styles, as performed on the acoustic guitar. As well as learning tips and 'tricks of the trade' Mel Reeves will show you 6 great instruments, step-by-step and take your playing to new heights. Plus, open tuning, the capo, high-strung guitar, reading music and more!

Styles include: Guns 'n' Roses, Bon Jovi, Hendrix Blues, Mississippi Blues, Django Style Jazz, Nuits En Moscow, Classical, Romance, Carter Style, Buffalo Gals and Bottleneck/Slide Style.

CODE V056 **£12.99**

Running time approx 78 minutes
Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

PLAY KEYBOARDS NOW! MELODIES

Presented by Mel Reeves

This programme will not only teach you note reading, rhythm, rests, ties and how to move up and down the keyboard with ease, but will also teach you 6 complete melodies familiar to lovers of rock, pop and classical music.

In addition, there is a further look at improvising, making use of melody and scales combined.

Clear computer graphics and the booklet enclosed will mean you won't miss a thing.

CODE V057 **12.99**

Running time approx 25 minutes
Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

START HOME RECORDING NOW!

This is the ideal volume one guide to the use of home recording equipment. From the set up of basic 4-track cassette machines to sub-mixing Mel Reeves uses straight-forward language to talk to fellow musicians about the methods used to get the sounds in their heads onto tape. Includes free instruction booklet.

CODE V055 **£12.99**

Running time approx 55 minutes
Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

YAMAHA QY300 VIDEO MANUAL

Complete overview of Yamaha's new QY300 sequencer/sound source. Presented by Joe Ortiz of Heavenly Music, the video offers a hands-on tutorial on what is potentially a very powerful piece of hardware. Starts off with a runthrough of QY300 features, followed by a clear, step-by-step tutorial that introduces you to creating your own sequences and styles. As a bonus, the video comes with a free disk loaded with 6 new QY300 styles and 6 demo sequences.

CODE V025 **£19.99**

Running time 69 minutes Format VHS (PAL)
Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

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SOS CDs

SYNTHESIZER TECHNOLOGY

ASTRAL AMBIENCE CD

Hours of research and endeavour in the raw timbral archives of the largest collection of analogue synthesizer systems in the world have resulted in the release of the first in a long awaited series of creative resource CDs.

The vast psycho-acoustic spectrum of the Museum of Synthesizer Technology has now been opened up to the music-making populace — Over 1500 samples.

CODE CD036 **£32.95**

Postage: UK £1.50, Europe £3.95, R.O.W. £5.50

SOUND CHECK CD II NEW

Recorded & compiled by Stephen Court & Alan Parsons

Sound Check has become an international reference for producers, musicians and sound designers. The new version features all the test signals and reference recordings (made at Abbey Road Studios) of the original - including pink noise bands, 1/3rd octave bands, sine and square wave spot frequencies, sweep tones and SMPTE timecode utility tracks - plus some new operatic vocal and music items, to a total of 99 tracks. The major innovation offered by Sound Check II is that it is available in a special package that features a built in mic and spectrum analyser, for use with the CD's 1/3rd octave tracks. The package is thus a compact and convenient method of measuring frequency response, whenever and wherever you may need to.

CODE CD038
SOUND CHECK II **£28.99**
CODE CD038S
PLUS SPECTRUM **£73.50**

Postage: UK £1.50, Europe £3.95, R.O.W. £5.50

VOICE TRAINING

NEW NEW

VOCAL WORKOUT Video

by Sam West

Singers of varying abilities will find this video a great aid in assisting their vocal efforts. It begins by explaining the principles of voice production. Breath control exercises plus general vocal techniques are all explained and visually demonstrated. All the exercises are written out in an accompanying booklet, with piano accompaniment.

VIDEO CODE V067 **£22.95**

Running time approx 59 minutes

Postage: UK £1.75, Europe £4.95, R.O.W. £6.95

VOICE BUILDING Cassette/CD

by Sam West

Although geared towards singers of varying abilities, voices and styles, the contents of this recording are often challenging even to the professional singer! The video (code V067) goes into more technical detail, whereas the CD or Cassette concentrate on more intensive practising. First of all the exercises are sung, in various keys and then with musical accompaniment and melody line, so you can concentrate more on your voice while practising (karaoke style).

Vocal exercises can be boring, but this studio recording has been produced and presented to a very high standard, with interesting musical accompaniments to the exercises.

CASSETTE CODE MC001 **£6.95**
CD CODE CD037 **£9.95**

Postage: UK £1.50, Europe £3.95, R.O.W. £5.50

SOS Quality Cables

Due to the popularity of our range of affordable eight-way cable looms, SOS Mail Order can now offer you even more products in a similar vein. All cable is manufactured to the same high quality as the looms, and prices are once again excellent. Whatever your cable needs, you should find something in our list at a price that's right.

3m 8-way phono to phono

Code CRA803 **£27.90**

Postage: UK £2.50, Europe £5.95, R.O.W. £9.95

3m 8-way phono to jack

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Mystery Word Grid

	H				___
		E			___
P	I	N	C	H	W ___
	R				___
S					___

MYSTERY WORD

WORD LIST and LETTER CODE chart

PINCH .....W	PRESS.....K	BLAST .....A	WRECK .....D
BREAK .....Z	PUNCH .....S	SPRAY C	TURBO.....V
STOMP .....T	STAND.....R	PRESS .....E	DREAM ....O
CRUSH.....I	SCORE .....H	SLANT L	CHASE.....P

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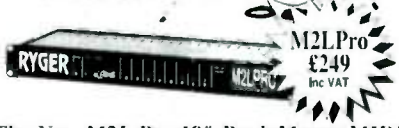

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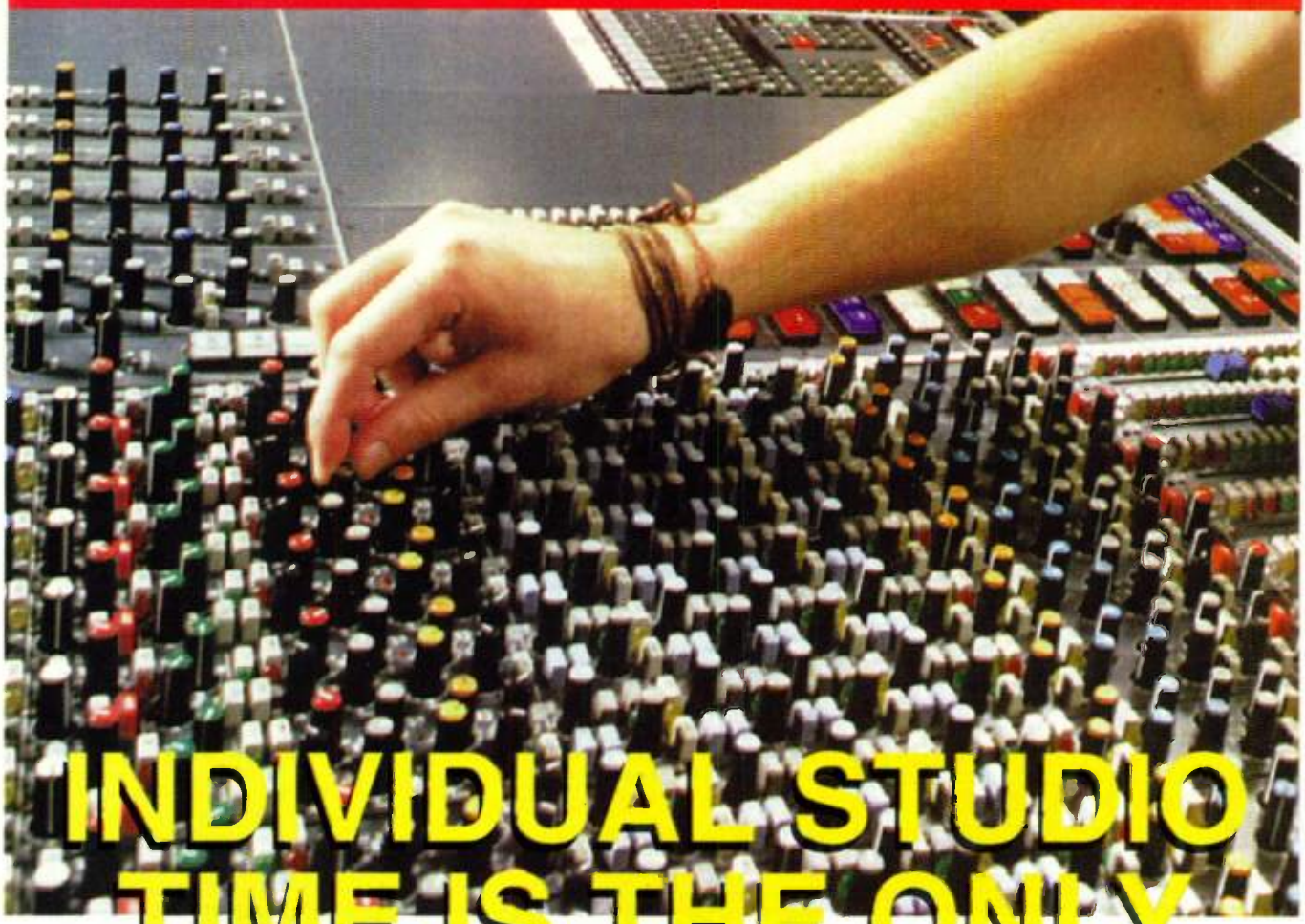

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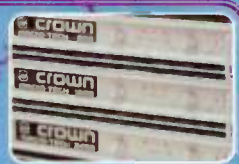

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sounding Off

Ever fancied a job as a beta tester of the latest products? CHRIS MADDEN's turning it down, thanks...

Every 10 minutes or so a new piece of ground-breaking audio equipment appears in the marketplace, boasting ever-increasing features, quality and functionality. The turnaround of product is so fast that some items seem to be out of date before they become readily available. Two questions spring to mind. "Where does it all come from?" and, much more importantly, "Who makes sure, before we all rush out armed with the necessary funds, that the prospective purchase works properly?" I've been a professional studio engineer for 14 years and in that time have seen equipment come and go, but over the last few years I have noticed a very worrying trend.

During the late '80s I became involved with various projects which involved using hard disk recording and editing systems, firstly for editing masters of projects I had worked on, and then later for recording parts of the project itself. The vast majority of this work I carried out on a well-known system based around a very productive personal computer. These systems — in both 2-track and, later, in multitrack configurations — worked quite well in my experience, making some tasks much quicker and easier.

Then in 1992, immediately before starting work on five tracks for Lulu's album *Independence*, I was asked by the production company to take a look at a new 8-track hard disk recorder — manufactured by a company famous for their keyboards and drum machines — with a view to its being used on this project. This I did; and I was, and still am, very impressed with its audio handling, editing capabilities and overall specification. After checking all the manufacturer's literature and being personally assured by the company that it was fitted with all the necessary equipment to enable it to lock to a tape machine via SMPTE, I agreed that it would be an asset to the project. With that, a machine was purchased by the production company.

The project ran smoothly until one day while recording lead vocals at a major London studio directly into the hard disk system, we encountered major and incurable timing problems, caused by the hard disk and the tape machine running at their own internal speeds — a most embarrassing situation for all involved, especially me. After further investigation it became obvious that the machine was not and would never be internally equipped with all it needed to chase synchronise. After much discussion we were supplied with a Band Aid solution, an Audio Kinetics ES buss which has solved the problem to this day.

More recently I got involved in some activities outside music involving IBM-based PCs, and as my interest grew I began to consider their possible music applications. I decided, after much consideration, that I'd put together a system to compile and master albums, possibly with some pre-production capabilities. I began by purchasing my computer, then acquired a CD writer, and then, in late October 1996, bought a PCI-based Windows-compatible soundcard with S/PDIF digital interface so that I could import audio directly from my DAT player. I had the supplier install the card in my machine to make sure that it functioned. It never did. At about the same time two friends of mine, both producers, purchased the same soundcard, although they were both more interested in multitrack work and therefore their systems were ultra-wide SCSI for faster hard disk access time. Their two cards don't work either. The three of us have spent endless hours on the telephone to the supplier, the manufacturer, and each other, not to mention the time we've spent fighting with these infernal cards trying to make them function — but they continued to produce random clicking and popping noises while recording and when playing back. At the end of January 1997, I returned my card for a full refund, explaining that I believed this was not a problem with my computer but that the card did not work. But my two friends are valiantly continuing the struggle, and I believe that the manufacturer is at worst much clearer about the types of problems to be expected and at best much nearer solving them at someone else's expense due to our involvement.

Both of the above examples show, in my opinion, that some manufacturers are knowingly releasing products into the marketplace that are not fit for their purpose. Using customers as beta test sites for their equipment results in massive savings in Research & Development costs, and so manufacturers see financial returns sooner than they should. What better than to let the people who are going to use your equipment to its full potential do it in their own time and at their own expense, rather than the old-fashioned way of giving it to them to test and then, once all the problems have been ironed out, letting them keep it for their troubles?

I believe that manufacturers and dealers need to be far more careful about issuing new models — one bad experience means that I will never buy from that manufacturer again, and this attitude can't be an uncommon one. Furthermore, in the situation involving the soundcard, consider what could have happened if I'd purchased yet another Windows-compatible add-on card of any type which was in the same state as the first. All hell might have broken loose due to one or both cards not liking the presence in the same machine of the other — and who would be to blame? Both manufacturers would undoubtedly lay the blame with the other and the person who ended up footing the bill would quite probably be the customer.

Looking back, I could possibly have been more diligent in my investigations into these two purchases — although, in my defence, both items were issued by reputable companies and carried advertising literature that not only painted an unattainable picture of smooth running but in some cases told downright lies about their capabilities.

My only advice to potential purchasers, including myself, is to look very hard before considering a small leap. SOS

Chris Madden has been a studio engineer since the early '80s. His work has included projects for Bobby Womack, Take That, the Stranglers, the Troggs, and Jaki Graham plus many big-band recordings, and lately he has branched out into PC-based recording and FOH live sound. He also demonstrates the Harrison Series 12 console in the UK.

If you'd like to air your views in this column, please send your ideas to: Sounding Off, Sound On Sound, Media House, Trafalgar Way, Bar Hill, Cambridge CB3 8SQ. Any comments on the contents of previous columns are also welcome, and should be sent to the Editor at the same address.

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