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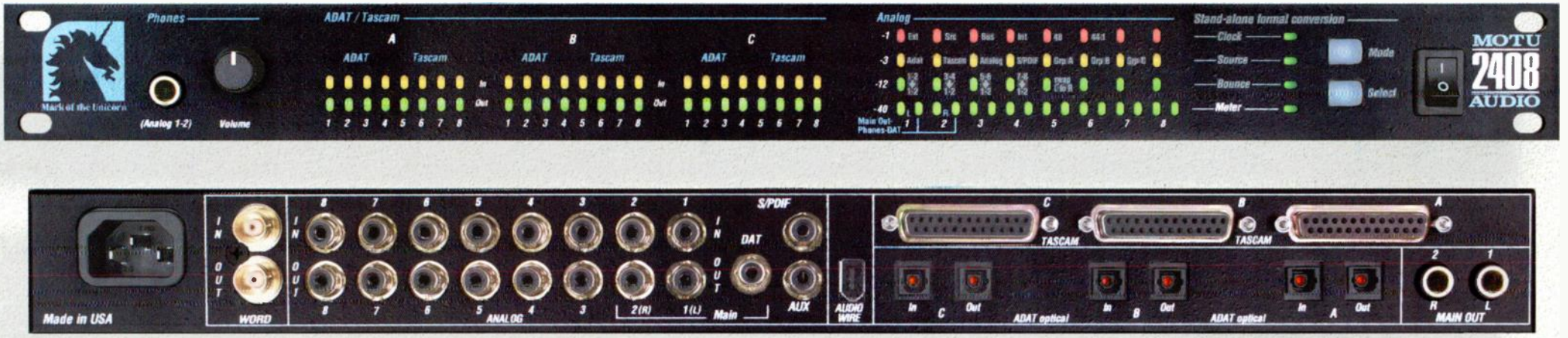

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leader

Firstly, thank you to those of you who've got the ball rolling by making use of the new conferencing section within the *SOS* web site. While email can be sent to *SOS* for inclusion in Feedback in the usual way, you can also post queries or join discussions in the *SOS* conferencing forum — this way you often get useful feedback from other readers. For example, if you're having problems with a certain combination of equipment, it's useful to find out if anybody else is being affected by the same problem, because if they are, it gives you more clout to get the manufacturers to do something about it.

There's also a section called Beyond 2000, which invites your contributions and ideas relating to the way recording equipment ought to be evolving. Again, if you think most software is too non-intuitive, or if you have ideas for improving user interfaces, we'd like to hear them, and don't forget that manufacturers and distributors also visit our site to find out what's going on, so it's an easy way to get your point across to the people who count.

One popular area of discussion is the future direction of audio recording, and indeed, whether it will survive long term without becoming part of the audio/visual, multimedia industry. My own viewpoint is that if you try to gather too many disciplines under one umbrella, the quality suffers as the operator has to become a jack of all trades, and you know where that leads! I think we'll see audio standing on its own feet for many years to come, but the way we work will continue to change. As to where the project studio is going in the long term, some see everything disappearing inside the virtual world of the computer, and at the low to mid end of the market, this is probably a realistic projection, with packages like Steinberg's *VST* already pointing the way. However, I can't agree with those people who say that just because computers are getting faster by the month, we'll soon be able to run a whole pro recording studio on a desktop PC without the need to use any additional hardware. Recording, editing, effects, mixing, EQ, sampling, synthesis and so on can already be done using little more than a soundcard and a fast computer, but as we've seen from other areas of software development, the software writers' need for power always escalates at a greater rate than the computer's ability to provide it.

To maintain cutting edge performance, I feel the computer is always going to need specialised help, and that can come in the form of general-purpose DSP expansion or smaller dedicated hardware devices in the form of cards. Cards we already have, but there's only so much card space inside a computer, and the electrical environment is hardly conducive to clean 16-bit audio, let alone 20- or 24-bit audio. So, will the studio of the future consist of a card racking system under the central control of a computer? If it does, the rack system will need to be an agreed standard, because users don't want to invest large sums of money in either hardware or software that ties them to one specific platform. And then there's the control surface to think about. Have we all gone so far down the line with computers that we're now prepared to do everything from the mouse and keyboard, or do we still feel the need for hardware knobs and faders? I have my own ideas on the subject, but what we at *SOS* would really like to know is what you think. Do you approve of the way music technology is going or do you feel that everything is moving so quickly that you never get a chance to assemble a stable, working system that you are completely familiar with? Indeed, is the technology that's supposed to help us actually getting in the way of making music? If you're on-line, please submit any ideas or opinions you feel strongly about via our web page conference forum, email directly to *SOS*, fax or even good old fashioned paper. After all, if we don't say out loud where we want the future to go, we can hardly complain if it goes somewhere else!

Paul White *Editor*

SOUND ON SOUND

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150
Korg Trinity V3

REVIEWS

32 **KRK V8 Active Monitors**

34 **Philip Rees MIDI Mergers**

36 **DACS Ring Modulator**

38 **Dbx 266XL Compressor/Gate**

42 **LA Audio Source Switcher**

44 **Beyer MCE7 Miniature Mic**

46 **Roland DJ2000 DJ Mixer**

48 **TL Audio Ivory Valve Compressor**

50 **Native Instruments *Generator* Software Synth**

70 **Alesis M20 ADAT Recorder**

76 **Yamaha DJX Sampling Workstation**

80 **SEKD Pro Dif 96 Card**

98 **Roland SC880 GM/GS Sound Module**

108 **Kurzweil K2000VP Workstation**

138 **Lexicon PCM 81/91 Effects Processors**

150 **Korg Trinity V3 Workstation Synth**

160 **Marantz CDR630 CD Recorder**

180 **Digidesign *Pro Tools* v3.4 Software**

194 **Sonorus STUDI/O PCI Soundcard**

212 ***Cakewalk Pro Audio* v7.0 Software**

216 **Opcode Studio 128x MIDI Interface**

228 **Yamaha A3000 v2 Sampler**

258 **Brief Encounters:** *Canford Audio Check Disc, BBE DI-10 DI Box, Twiddly Bits Programmers Toolkit, MIT Ripcord Guitar Lead, 32Midiworks Macintosh MIDI Interface, Focal Press Digital Audio CD*

Volume 13 Issue 11 September 1998

in this issue

Computer notes

Apple Notes.....240
PC Notes.....244
Atari Notes.....248

FEATURES

92 Bob Reardon of Lexicon

174 Marius De Vries: Programmer

266 Retrozone: Oberheim OB-Series Synths

SOUND WORKSHOPS

67 20 Tips: Monitoring

84 Solving MIDI Problems

102 Creative Sequencing: Part 2

142 Improving Studio Acoustics: Part 3

166 Recording Options: Part 3

184 Synth School: Part 11

202 Yamaha's XG Soundcard Explained

220 Digital Basics: Part 5

REGULARS

4 Crosstalk

10 Shape Of Things To Come

234 Sample Shop

252 Demo Doctor

270 Readers Ads

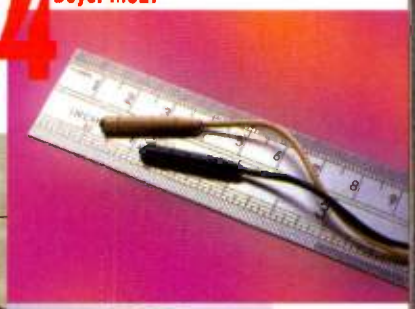
280 Mail Order

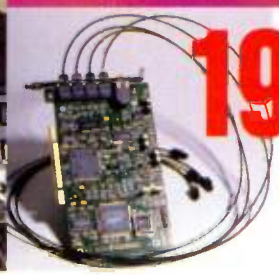
285 Classified Ads

304 Sounding Off

46 Roland DJ200

44 Beyer MCE7





194 Sonorus STUDI/O

174 Marius De Vries

WIN TC ELECTRONIC FIREWORX & SOFTWARE PLUG-IN EFFECTS p238

48 TL Audio Ivory C5021

PC MUSICIAN Optimising PC Hard Drives p126

38 dbx 266XL

Crosstalk

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Over spending?

Hugh Robjohns' articles on digital theory in recent issues of *Sound On Sound* have been most interesting and illuminating.

Could Mr Robjohns shed any light on the fact that whilst manufacturers such as Mytek, Totalsystems, RTW and Genesis can produce digital meters which reliably show Over conditions (with accuracy of just one sample), most manufacturers of DAT recorders are unable to provide meters which show any Over conditions whatsoever when the recorder is fed with a digital signal from an up-stream external A-D converter. The only exception which I know of is the Panasonic SV3800.

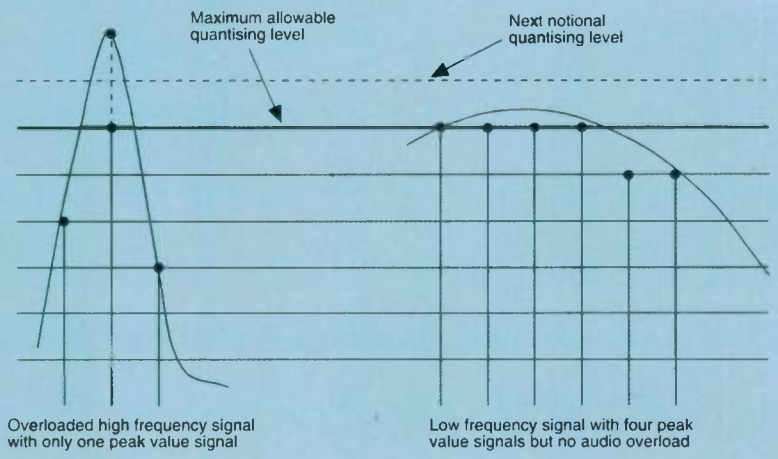
If the meters on the external A-D converter are operating within the analogue world (as, I believe, most do), then any Over lights on the A-D converter are likely to be highly inaccurate (the meters will never react fast enough to incoming transients).

In other words, if you spend £1000 or more on a good A-D converter, you will need to spend another £1000 on a digital meter (unless you are content to make 13- or 14-bit recordings).

Dr N Sackman
Director of Electronic Studios, Department Of Music, University of Nottingham

Technical Editor Hugh Robjohns replies: *The term 'Over' in the context of digital metering derives from the condition of over-modulating the PCM signal — something which can happen in one of two ways. The first is when an analogue input signal exceeds the maximum permitted quantising level provided by an A-D converter, and the second is when a digital signal is manipulated in a signal processor or mixing desk (particularly when floating-point arithmetic is employed) and ends up being larger than the available output resolution. In both these cases, even a small overload will sound pretty ghastly with most sources because the distortion products are not related to the source harmonic structure in a musical way.*

The stand-alone digital meters to which you refer typically indicate an 'Over' condition when one or more peak value samples are encountered, but this does not necessarily represent a true overload. For example, a full-amplitude low-frequency signal may include many peak value samples without being over-modulated, whereas a single peak value sample in a high frequency signal may represent a gross overload (see diagram). Consequently, to establish whether a peak value sample really does represent an overload condition requires complex examination of the signal involving oversampling and sophisticated frequency analysis — something usually only found in the very best and extremely expensive stand-alone digital meters. None the less, indicating a 'potential overload' condition when one or more peak value samples is encountered is a useful facility — there is only 0.0015dB between a true peak signal and an overload in a 16-bit system after all!



In the majority of A-D converters, the Over lights are typically driven directly from the quantisation process and are illuminated when the sampled analogue signal is found to require quantising levels beyond those available. Thus, in general, the Over indicators provide a totally accurate indication of a genuine overload condition, and are completely separate to the form of input metering employed (analogue or digital).

Most professional and semi-pro DAT machines employ signal metering derived from the digital output data stream with no attempts (in most cases) to analyse the significance of the data, and there is thus no point in illuminating the Over indicators. If the bar graph hits the end stops, you have a peak value sample — why would you want an Over light to illuminate as well? The Over indicators provided on DAT machines are driven from the built-in A-Ds as described above and thus when recording with the machine's own A-D, the Over lights will illuminate when it has run out of quantising levels in the usual way. In the situation you describe where an outboard A-D converter is used, the machine's own A-D is redundant and so are its Over indicators. The DAT's output metering can only register the incoming sample values and the Over indicators wouldn't illuminate even if every sample had peak values! I believe this to be a perfectly valid way of working, as the assumption is that the A-D converter is being used correctly — the place to monitor for overloads is at the device which is being overloaded — and the DAT machine simply has to record and replay the data sent to it.

As for having to spend £1000 on a decent meter in order to make the best of a £1000 A-D converter, I can't agree. If the money was available then, yes, I would certainly advocate investing in a decent digital metering system, but any DAT machine or other recorder with true digital metering provides all the information required to make a perfectly well modulated recordings — especially if there is a 'Margin' indicator to register precisely how closely peak levels encroach on the full scale.

If you like to watch flashing Over indicators, I can assure you that the ones on any £1000 A-D are perfectly trustworthy, and there really is no need to purchase a stand-alone meter just for the light show! Personally, I would rather not have flashing Over indicators at all, and I normally try to under-modulate my recordings by a couple of dBs in order to exercise 15 bits or so, hopefully with the full 16 on the very loudest transients.

In all this talk of Over indicators it is easy to forget that the whole point about sound is what your ears make of it. Your ears are perfectly capable of informing you when the system is being overloaded, and most people can detect high-frequency overloads before the Over indicator on many digital meters lights too! And just what is wrong with a 13- or 14-bit recording anyway — a dynamic range greater than 70dB is usually more than adequate for the vast majority of material and listening environments! ❑

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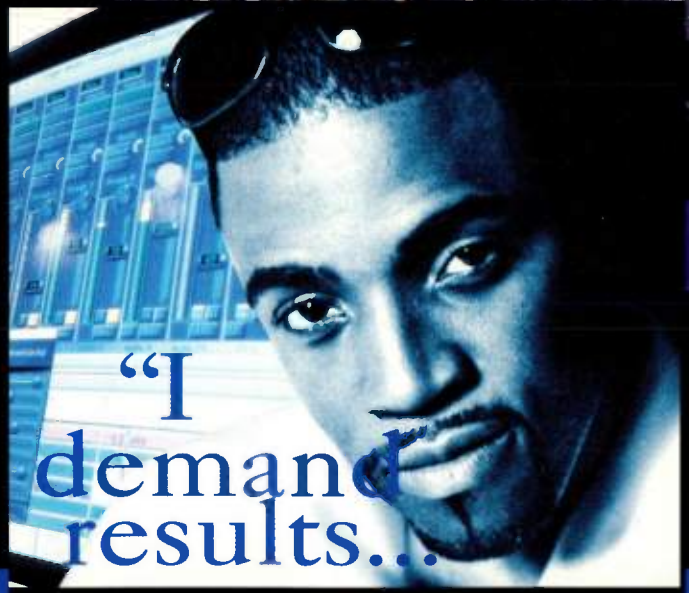

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Crosstalk

After the Event

I recently built a PC for our commercial studio, and chose an Event Gina soundcard based on a balance of three factors: price, features, and the information and opinions given in your publication (there is also, of course the availability factor, which ruled out the much advertised Layla card). Installation was easy, and with a fairly decent bundle of demo/feature-stripped software we were up and running, editing a backlog of tracks and burning them to CD. Clients were pleased to be taking tracks home on CD.

This was when the problems began. I'd receive a phone call a few days after the session, or word through a mutual friend, that the client was not happy with the sound from the studio. Nothing too easy to pinpoint: 'it sounds flat', 'it's got no space', 'the stereo doesn't sound right on our surround system', 'the hi-hats sound like shit'. They might come over to the studio where we'd play the DAT back, which would sound great, or I'd visit their home to try to understand better what the problem was. We were struggling to maintain their confidence in us.

I came up against another recurring problem as well: WAV files transferred from DAT via S/PDIF would often show quite serious errors on peaks when there had been none on the original recording. I found that by recording a 32-bit file and converting to 16-bit this could be avoided, though tedium could not. I browsed back issues of *SOS*, hoping to find some reference to the bug and perhaps a solution. I found none, but I did turn up Event's URL. On checking their site I was pleased to find two new drivers: 2.05c for Darla and Gina, and 3.05 for Darla, Gina and Layla. 2.05c claimed to fix this bug but also another that caused a phase problem on the S/PDIF input. I zoomed in on some WAV files to check them out, and to my horror every damn piece of stereo sound on HD or CD had the right channel lagging behind the left by one sample. I edited a file to correct the problem and burnt it to CD to A/B with its previous version. Not surprisingly there was a distinct difference. The new version sounded more open, more focused. I sent it off immediately to the client who had produced the tune and he rang back immediately to say that whatever I had done, I'd fixed it. Crisis averted — though not before I'd spent three days in another studio with him due to mistrust of our sound. A note on Event's web site advised downloading 3.05 unless specifically advised otherwise by tech support. I did. 3.05 fixed the peaking problem but not the phase problem. I downloaded 2.05c and it contained both fixes. I have spent almost two weeks redoing work spoiled by this fault. Through a mix of amenability and apology I believe I have avoided any long-term damage to our business.

My question is this: why did the review of the Gina in your December '97 issue fail to point these bugs out? The S/PDIF I/O on the Gina is one of its key features. I did not test the card rigorously at installation since I had read your glowing review which most definitely gave the impression of being an in-depth test. Hence I failed to pin the symptoms of the phase problem on the Gina, but the problem was evident and the peaking problem could be missed only by someone deaf AND blind, since the sporadic errors are plain to see on any wave editor's screen. Our card was purchased since the review and came with the bugs, so it seems safe to assume that your test card presented the same problems. Why then were the public left in the dark? Conspiracy theories abound.

Event Gina soundcard — now with new drivers.

As you can see from my experience, this is not just a minor quirk, but potentially a very serious problem. It is the very difference between the 'entry-level for professionals' product as described in your review and a rather expensive toy to allow one to pretend one's computer is a recording studio. Now that there is a fix for these bugs publicly available, perhaps, given the popularity of this card, it would be the responsible thing to do to report that this problem exists and advise people how to identify it and where to find the solution (www.event1.com).

I have been a religious reader of *SOS* for seven or eight years, and it is fair to say that I have learnt a large proportion of what I know about music technology from between its covers. I hope it will continue to be this trusted source for long to come and that its features, dare I say it, will always be written for the readers rather than the advertisers.

Graham at the Ultimate Brain
via email

Martin Walker replies: *Sorry to hear about your problems with the Event Gina card. When I reviewed it in the December '97 issue I was particularly impressed with its low-noise analogue performance and multi-channel capabilities, and the bulk of the review reflected these important features. However, I did try out the S/PDIF I/O at the time, but experienced no problems with it.*

The peaking problem apparently only occurred when the drivers received a '0dB full-scale 16-bit S/PDIF input', so the reason this didn't happen to me must be that none of the files I used reached 0dB level. Although this has now been cured in the latest drivers (and never occurred with 20 or 24-bit files), if you experienced this quite often, then your DAT recordings might be running into mild clipping. This might not be at all audible when replaying through most D-A converters, but is the only reason that the peaks would have appeared during digital transfer with the earlier drivers.

The 'one sample offset' bug is rather more subtle. Event confirm that the 2.05 drivers cured this, and that unfortunately the offset is back in the 3.05 version. Following your tip-off, the problem was corrected within 24 hours, and a new driver should be on the Event web site very shortly. Layla has always remained unaffected, since although one driver is used for all three Event cards, there is separate code for each within it.

However, let's put this into perspective. A single sample offset in one channel at 44.1kHz is equivalent to a delay of about 23 microseconds. Since the speed of sound in air is about 1120 feet per second, this delay is roughly equivalent to moving the right-hand loudspeaker backwards by about a third of an inch (you can simulate this by turning your head slightly). An offset of a single sample is virtually undetectable (and yes, I tried a blind A/B test to confirm this).

The one clue to your problem is the mention of the word 'surround'. If the stereo channels later undergo any further processing where they are mixed together, then the effect might well be audible — I could immediately hear the difference when I listened to the two channels in mono. The dreaded mono compatibility is something that few people check, but this situation shows its importance, and would explain why your customers could hear a problem when you originally heard none in your studio.

However, your story does highlight the importance of keeping up to date with software releases. I did publicise the new Event drivers in PC Notes (June '98 issue), but in general, it is impossible for SOS to publish details of every bug fix and update for every piece of software. This is not a conspiracy, or a cover up, but simply due to lack of space. No piece of software is completely bug-free (otherwise upgrades wouldn't exist).

If you suspect problems with any piece of software or hardware, on any platform, the first port of call should be a phone call to the UK distributors, who are normally the first to be aware of any problems reported by users. Anyone who buys software should register it, and if they have Internet access, regularly visit the manufacturer's web site to keep up to date with any new releases. I visit as many sites as I can, but am still largely reliant on the developers themselves keeping me informed.

I hope this puts everyone's minds at rest. Readers rule! OK? ❑

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If imitation is the sincerest form of flattery, we have a lot to be flattered about. But now that some competitors are even borrowing our ad copy, we figured it was time to come up with a devastatingly nasty come-back.

Greg Mackie put a quick stop to that idea. He pointed out that the REAL test of a mixer is how it sounds. And the more you listen, the more our CR1604-VLZ's low noise, high headroom, pristine mic preamps & natural EQ put it ahead of the pack.

Musician Magazine thinks the original is clearly the best.

Sound quality, Greg pointed out, is why the CR1604-VLZ has a longer roster of famous users than any other 16-channel compact mixer... major groups & artists, Emmy-winning TV composers, Academy Award-winning sound engineers, network news & sports departments. So why dis the competition?

Call your Mackie distributor for complete info and that long list of famous users. Then make your final mixer buying decision with your ears. Anyone can write an ad. Only Greg can make a mixer as good as the CR1604-VLZ.

Below: a few of the 300+ folks (and one incontinent Chihuahua) who work at Mackie Designs in Woodinville, WA 20 miles north of Seattle.

www.mackie.com • email: sales@mackie.com

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Crosstalk

Noisy computer fan

I write concerning Paul White's second article in the Hard Choices & Soft Options series (*SOS* August '98). This article was, in my opinion, one that would have been appropriate a year ago, but not any more. For example: it was suggested that even the fastest widely available computers can have insufficient processing power to do adequate real-time processing. This, in my opinion, gives a completely inaccurate perspective of computers. As of this month the Pentium II-450 is available, maybe not at a price everybody can afford, but still a lot cheaper than outboard effects of the same quality. Plug-ins are flooding the market, the AMD K6 and Cyrix MII are at unbelievable prices, and backup of material is not a problem now that cheap CD writers are available. If you still don't have enough processing power to run effects in real time, moreover, you can always calculate them to disk.

The article also complains about software-based systems being difficult to learn, without mentioning the advantages they have over other equipment. It was also stated that computers are noisy; but it's possible to buy fans that are much less noisy than the standard ones, and there are even specialised companies who deal with this problem. It was also suggested that you should do nothing other than music on your computer, for fear of possible compatibility problems. Well, maybe I'd have needed a different computer to send this message from two years ago, but not today.

Of course there are some problems. But there are easy, and cheap, solutions to these, most of which can be found on the Net. I'm sorry, but I felt as if I was reading an article which was a year out of date.

Andre Oosterkamp
via email

Editor Paul White replies: *I appreciate all the points made in your letter, but my Hard Choices & Soft Options article was prompted by the number of phone calls we get from desperate computer users experiencing terrible problems that don't have easy solutions. What's more, I can't agree about native effects and processors being as good as outboard gear — I haven't yet heard a native reverb that comes close to a mid-priced Lexicon without taking up nearly all the CPU power, while digital EQ still has a long way to go before it can compete with analogue. Writing effects to disk works, but then you lose the real-time advantage.*

I don't even know if I agree about native systems being cheaper than hardware: Lexicon's new MPX100 reverb, for instance, sounds better than anything I've yet heard from a computer, though it costs less than most reverb plug-ins. You also have to remember that hardware has a resale value, while plug-ins tend not to, and hardware is compatible with any system, so you can take it round to your friend's house and plug it into his analogue desk if you need to. You can't do that with plug-ins.

I'm not anti-computer technology, as I use it myself, albeit on a Mac, but I felt it fair to describe the strengths and weaknesses of each option and I stand by every point made. Computers are great for some jobs but less good for others, and one reason for writing this series was to help newcomers to recording realise that using a computer for audio isn't always as straightforward as the glossy ads would have you to believe.

The harsh reality is that a great many people do have problems with unreliability, crashes, timing problems, hardware incompatibility, latency, computer noise and the need to upgrade every few months. With each upgrade comes new problems, and even you can't have had everything work first time, otherwise you wouldn't have had to search the Net for solutions. I still feel that most people want to get on with making music rather than having to become experts in computer fault diagnostics.

On the subject of physical noise, I've tried some silencing options myself, but many are impossible to fit in a standard machine because of space restrictions (some of the hard drive sleeves, for example), and even a low-noise fan is noisier than no fan. Personally, I'm surprised that even office workers, let alone studio engineers, put up with the dreadful noise that modern computer hardware makes.

Having said all that, I appreciate your enthusiasm for computer music and we'll continue to praise its good points and criticise its weaknesses. After all, if we pretended it was perfect, the manufacturers would get complacent, wouldn't they? ❑

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Check out the Spirit Website:
http://www.spirit-by-soundcraft.co.uk

SOS

shape of things to come

by Derek Johnson

It's not the taking part, it's the winning...

It's been a while, but *SOS* is pleased to finally announce the lucky winner of the Roland VS880 V-Xpanded Digital Multitrack competition, which ran in the September and October issues last year. The most all-round amusing entry to slither from the competition sack (in our humble opinions, as they say on the Net) belonged to long-time *SOS* reader Mike Campbell of Darlington (pictured here). We know he's been reading *SOS* for some time, as he actually won a minor runners-up prize in a competition in 1995 (let that be an example to you!). Mike's VS880 is now firmly ensconced in his setup, and is being used together with *Cakewalk* v5 to capture sound from his Korg X5 and various guitars. As well as recording Mike's own material, the VS880 is apparently also being pressed into service making live recordings of his '70s rock cover band, Raw Deal! Congratulations to Mike, and many thanks to Roland UK (+44 (0)1792 515020) for supplying this great prize. Remember, it could be you, so keep those competition entries coming!

24 Bits to *Cubase*

Cubase VST/24 v4.0, the 24-bit version of *Cubase VST* has been released. Optimised for use with current Apple G3 computers, the program offers 96 tracks of 24-bit, 96kHz digital audio. With Steinberg's Virtual Studio Technology (VST), digital audio can be treated with up to four bands of new high-end EQ, four plug-in insert points and eight auxiliary sends per channel. The aux sends can feed effects or route audio to the new sub-groups. Audio can also be bussed to the individual outputs of a range of supported digital audio cards, such as the Korg 1212, Sonorus STUDI/O and the Lexicon Studio (which, Lexicon have just announced, supports 24-bit audio with the new software). Other new features include increased internal resolution (to 15360 pulses per quarter note); a new controller editor for detailed editing of parameters; MIDI track mixer; and drag and drop throughout the entire program for both audio parts and MIDI events. The scoring section has also been upgraded, to include enhanced layout options, symbol palettes, new ways of inputting lyrics and a choice of notation styles.

A Arbiter Music Technology, Wilberforce Road, London, NW9 6AX, UK.
T +44 (0)181 202 1199.
F +44 (0)181 202 7076.
E arbiter@cix.compulink.co.uk
W www.arbitergroup.com

Red Systems boldly go

British manufacturers Red Sound Systems, of Voyager 1 Beat Xtractor fame (see *SOS* February '98 for review) are launching another first — a "bpm-driven effects unit." The new £599 Federation BPM FX module (is a *Star Trek* motif creeping in here?) features four tempo-related DSP effects, and uses an enhanced version of Red's patented bpm engine to trigger the effects in sync with audio input. Users can choose from a range of musically correct timing presets (quarter, triplet, whole note, and so on), and the required tempo is calculated automatically in real time from the bpm tempo of the audio input. No tedious application of formulas or looking up delay times in little tables — the Federation does it for you. The four effects on offer are:

• Filter/LFO: a modelled 12dB/octave resonant analogue filter section with Frequency, Resonance and Envelope Mod controls.

• Cutter/Volumer: will either 'gate' an audio signal, to produce "dramatic chopping effects", or ramp up audio volume for "softer, more pulsing effects".

• Delay: featuring up to 1.5 seconds of delay time and a 'repro' control for giving the delayed signal a different quality — clean digital, vintage tape machine or "grunge echo", for example.

• Panning: a new Spatial Panning System splits the audio signal into low, mid and high frequencies, which are then panned across the stereo image in opposing directions or a 'chasing' pattern. The result, say Red Sound Systems, is "some amazing 3D effects."

Federation, which has a comprehensive MIDI spec, features an on-board sequencer, with real- and step-time input options, to record the user's own effects-triggering patterns, and all four effects can be used simultaneously, with a joystick mix control for real-time mixing of the four effects. An optional rackmounting kit is available.

A Red Sound Systems, Chancery Court Business Centre, Lincolns Inn, Lincoln Road, High Wycombe, Bucks HP12 3RE, UK.
T +44 (0)1494 429321.
F +44 (0)1494 446321.
E red@redsound.com
W www.redsound.com

Roland rack up 8000

Does a Roland JP8000 physical modelling synth in a module sound like a good idea? Roland think it does, so they're about to launch the JP8080, which packs all the physical modelling and hands-on knobs of the original keyboard into a chunky 6U box. In fact, the JP8080 actually improves on the keyboard (which was reviewed by *SOS* in March 1997) in a number of ways. First of all, it adds a couple of notes to the available polyphony (10-voice instead of 8-voice), and allows external audio (via mic or line inputs) to be processed internally — there's even a built-in 'Voice Modulator' which can use the human voice to shape and filter external audio. Roland have also provided the JP8080 with a SmartMedia slot, for storage of patch data on tiny SmartMedia cards. The module's 40 knobs and sliders mean you don't need to bother with menus or scrolling, and a new Unison mode turns it into a monosynth — unheard as yet, but potentially very powerful indeed.

This is a classic analogue simulation, so of course there's an arpeggiator: 90 variable beat patterns and 48 RPS (Real time Phrase Sequence) locations are available for creating your own rhythmic and melodic phrases. The JP8080's onboard effects section features flanger, chorus, phaser, distortion and delay, plus bass and treble tone controls. Effects control is accomplished via the LCD and a collection of dedicated knobs, while all effects and tone control settings can be stored with corresponding Patches for instant recall. All JP8080 knob and slider movements can, of course, be transmitted via MIDI.

Roland have also announced an upgrade to their VG8EX physical modelling guitar system (originally reviewed in May 1995), which offers new acoustic and hollow-body models, more pickup and amp variations, and expanded effects. The system, which utilises Roland's COSM (Composite Object Sound Modelling) technology, works with waveforms from a guitarists' playing and processes them using the COSM technology, producing the impression that you're playing through any one of a number of classic amps, with a variety of guitar bodies or pickups, as well as providing synth-type effects. Since processing is in real time, tracking errors and triggering delays are kept to a minimum.

There are some new additions to Roland's SR-JV80 family of wave expansion boards, which fit inside JV- and XP-series synths and modules. The SR-JV80-14 World Collection *Asia* board provides a wide range of Asian instrument sounds, carefully sampled with co-operation from local musicians in China, Indonesia, India and other Asian countries. Over 100 new waveforms are provided: if you need Chinese instrument sounds such as the er hu, yang qin or suona, Indonesian gamelan sounds, Indian instruments (tabla, dholak, dhol, sitar, and santoor) or Korean and Japanese instrument sounds, this is the board for you. There's even a collection of phrase loops than can be tempo-sync'd to the XP60/80 workstations and JV2080 synth module. If you need vocal sounds, check out the SR-JV80-13 Vocal Collection. Jazz scatting, gregonan chants, stereo classical and boys' choirs, and more, are on offer here.

A Roland UK Ltd, Atlantic Close, Swansea Enterprise Park, Swansea, West Glamorgan SA7 9FJ, UK.
T Brochure line +44 (0)1792 515020.
F +44 (0)1792 310248.
W www.roland.co.uk

MIDI Matters

BCK have brought a couple of neat new MIDI problem-solvers to our attention this month. First up is the Forefront Technology FT4 MIDI Filter, a simple £49.99 unit with both channel and system filters. Channel filters are: Notes on/off, Channel Aftertouch, Poly Aftertouch, Program Change, Pitch-bend, and Controllers, while System filters comprise Clock, Start/Stop/Continue, Active Sensing, Timecode and SysEx. The FT4 has a program mode so that you can filter out just selected information, or it can filter out all types simultaneously. Programming is via a connected MIDI keyboard, by sending a MIDI program change message, or using an optional Windows 95 program.

The new *MLI MIDI-Lyser* is a MIDI testing and analysis program for the PC. It costs just £14.99 and shows all received MIDI messages as virtual LEDs, with a further window having virtual sliders to show the value of messages that can't be represented as simply on or off. The program is recommended for MIDI studios, students, MIDI designers and even shops.

A BCK Products, Stationbridge House, Blake Hall Road, near Ongar, Essex CM5 9LN, UK.
T +44 (0)1992 524442.
F +44 (0)1992 524004.

HHB blank check

HHB's new bulk-packaged CD-R disc has a silver recording surface, rather than the gold or coloured finish that's more usual for CD-Rs, so that one-off or short-run CDs can look more like mass-produced recordings. The HHB CDR Bulk, which is the company's lowest-cost CD-R, comes shrink-wrapped in batches of 100, packed 600 to a box, and is a high-performance Pthalocyanine disc with a "stable archive period rated at up to 100 years", according to HHB.

Also new to HHB's blank media line is a 60-minute ADAT tape, the ADAT 60L, which offers increased recording time and comes with a professional library case for each tape — hence the L in its title. An ADAT 45L, running for 45 minutes, will also be available.

The new tape and CD-R are available now at HHB Advanced Media Products stockists.

A HHB Communications Ltd, 73-75 Scrubs Lane, London NW10 6QU, UK.
T +44 (0)181 962 5000.
F +44 (0)181 962 5050.
E sales@hhb.co.uk

shape of things to come

Steinberg's *Q-Metric* is a 7-band parametric EQ plug-in for PC and Mac versions of *Cubase VST*. It's claimed to be the first multi-band digital EQ with characteristics that emulate those of the best-sounding analogue EQs. A special filter keeps distortion down, while imparting a "warming" feel to the processed sound. *Q-Metric*'s seven bands offer three fully parametric mid bands, with adjustable Q, variable high/low shelving with switchable slope, and flexible high- and low-pass filters. The different bands can be activated separately, and the real resulting frequency response displayed for a convenient overview whilst the user is fine-tuning the filter shape.

T +44 (0)181 202 1199.
W www.steinberg.net

A number of upgrades are available for downloading from Akai's web site. First up is the latest version of *MESA* (Modular Editing System) for PC, *MESA II* (as mentioned in last month's Crosstalk pages). This allows on-screen editing and management for S2000 or XL-series samplers with the v2.0 operating system, and offers nearly all the features found in the Mac version of the software. Hardware updates come in the shape of v1.1 OS for the DPS16 digital multitrack, and v1.7 for the MPC3000 sampling/sequencing drum machine. If you don't have web access, contact Akai UK for assistance.

T +44 (0)181 897 6388.
W www.akai.com/akaipro/index.html

Emu's new EMU8710 PS PCMCIA 16-bit soundcard for Windows 95 laptop computers differs from their first-generation PCMCIA card in three key areas: an added mic input, an increase in SoundFont RAM from 0.5Mb to 2Mb, and an increase in wavetable ROM from 2Mb to 4Mb. The EMU8710 PS bundle consists of the audio card itself, a MIDI/audio breakout cable, and a suite of Emu and third-party software. Features include a 32-voice polyphonic synth, 16 effects, General MIDI/GS compatibility and an S/PDIF digital audio output. Minimum system requirements are a Pentium 100MHz or faster, Windows 95, and an available PCMCIA Type II or PC-Card slot.

T +44 (0)1753 630808.
W www.emu.com

education corner

UNIVERSITY COLLEGE SCARBOROUGH

The 3-year BA Combined Honours degree in Creative Music Technology at University College Scarborough aims to give students the opportunity to develop their creative skills while acquiring a thorough working knowledge of an industry-standard recording studio. The course also places emphasis on the creation of original music for the moving image, including composing for film, video, dance, and TV drama and documentary.
A substantial upgrade to the facilities at the college brings the studio total up to five: a 32-track recording studio, two 24-track mixing studios, a MIDI sequencing studio, a fully-equipped teaching studio, a dedicated vocal recording studio, a multi-user PC workstation-based editing/mixing studio, and a digital audio/video editing studio.

A University College Scarborough, Filey Road, Scarborough YO11 3AZ, UK.
T +44 (0)1723 362392.
F +44 (0)1723 370815.
E external@ucscarb.ac.uk
W www.ucscarb.ac.uk

ARNOLD & CARLTON COLLEGE

Over 500 people entered the national music sequencing competition co-sponsored by Nottingham's Arnold & Carlton College, the first authorised *Cubase* training centre in the East Midlands, and Steinberg. Ten finalists were chosen to compete in the final, held in early July. The winner (chosen by competition judge Augustin Bowsfield, who is currently doing production work on the Rolling Stones' forthcoming album) was Peter Bloor, a musician from Lancashire. His winning entry was a piece of ska/reggae-style dance music. Prizes for the competition included *Cubase* software, which was presented by Justin Baron, the educational co-ordinator for Arbiter, Steinberg's UK distributor.

A Arnold & Carlton College, Digby Avenue, Mapperley, Nottingham NG3 6DR.
T +44 (0)115 952 0052.
F +44 (0)115 953 1210.

TILE HILL COLLEGE

Coventry's Tile Hill College is about to start a fourth year of its successful BTEC National Diploma in Popular Music/Music Technology, a two-year course that offers students the chance to work in the college's two well-equipped studios and with its 20 PC workstations running *Cubase Score VST*. Since the course began, several students have released their own material commercially, one having a Top 20 hit with her band Solid Harmonie, and others have toured Europe with lecturer Martin Bowes' band Attrition.

A Tile Hill College, Tile Hill Lane, Coventry CV4 9SU, UK.
T +44 (0)1203 694200.
F +44 (0)1203 464903.

UNIVERSITY OF THE WEST OF ENGLAND

The Faculty of Art, Media and Design at the University of the West of England, in Bristol, is to launch a new post-graduate diploma course in Creative Sound Production this autumn. The course has been designed in conjunction with "key figures" in the radio and post-production industry and will make use of the UWE Media Centre's fully networked digital audio facilities, including radio studios, audio editing and dubbing suites and a computerised music lab.

A University of the West of England, Frenchay Campus, Coldharbour Lane, Bristol BS16 1QY, UK.
T +44 (0)117 976 2558.
F +44 (0)117 976 3912.
W www.amd.uwe.ac.uk/sound

APRS

The APRS Professional Recording Association has announced a new scheme for the industrial accreditation of professional audio training courses and has released details of the first courses to gain APRS accreditation. Surrey University, The Gateway School of Recording, Music Technology and Music Business Studies, Kingston University, and the Liverpool Institute for Performing Arts have received formal recognition, and no doubt other course providers will soon be applying for accreditation.

A APRS Ltd, 2 Windsor Square, Silver Street, Reading, Berks RG1 2TH, UK.
T +44 (0)118 975 6218.
F +44 (0)118 975 6216.
E info@aprs.co.uk
W www.aprs.co.uk

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DR16VGA Package £3099 (inc VAT)

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In the four years since Akai changed the future of recording with the 4 track DR4, the relentless pace of our development has produced the 8 track DR8 and the 16 track DR16 digital hard disk recorders fitted with custom designed LSI chips to allow highly sophisticated recording, mixing and EQ* performance in real-time. The magic of the DR Series is its high level of complexity and function, packaged to be as easy to use as a familiar, conventional MTR machine. And the DR system has a unique flexibility, it can be used as a dedicated, stand-alone product or can integrate easily with your existing system. It brings a highly cost-effective price level per track to high quality digital recording.

Now you have the option of the new IB807V graphics board for direct connection to an SVGA monitor, allowing the full 16/8 tracks of audio to be accessed and controlled on screen from a display based on the market-leading DD1500 post-production system. Edit, mix, record, playback and level are controlled simply and logically, with all tracks visible on screen, or a single track can be zoomed in for precise editing control. And all in real-time with no irritating screen re-draws, and no need for an external computer. We've added an ASCII input to the IB807V as well to let you work with a standard QWERTY keyboard as a full-function control interface with single keystroke shortcut facilities.

The Akai DR Series can grow from an 8 track upgrade for analogue MTR systems to a 128 track, multi-interface, multi-synched recording and post-production system with graphic based and remote operation and as cost is a factor we watch as closely as any other. Music to your pocket as well.

Akai is currently offering a special package which includes a DR16 fitted with 4 Gbyte hard drive, IB807V graphics board, S-VGA monitor and QWERTY keyboard. Imaginatively entitled **DR16VGA**, the package is available at **£3099 (inc VAT).**

Akai DR8 and DR16 Options

DL16 Remote controller.
DL1500 Multi machine editing remote.
EQ16 16 channel digital EQ. **EQ8** 8 channel digital EQ.
MT8 Mixer tab. **ALX50** Remote cable.
IB807V Graphics board. **IB801S** SCSI board.
IB802T SMPTE board. **IB803M** MIDI board.
IB804A/AEX ADAT® board. **IB805R** RS422 board.
IB806B Bi-phase board. **IB806G** GPIO board
IB809E Ethernet board (for use with DL1500)
IBD8MA AES/EBU board **IBD8TIF** TDIF board

*Optional

AKAI DIGITAL

Akai (UK) Ltd
EMI Division, Haslemere Heathrow Estate
Parkway, Hounslow Middlesex TW4 6NQ
Tel 0181 897 6388 Fax 0181 759 8268
http://www.akai.com/akaipro

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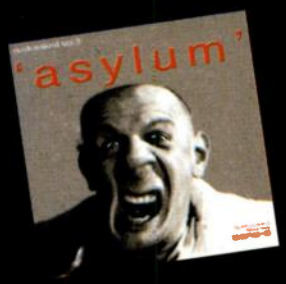
Time & Space: Mad for it!

Time & Space augment their range still further with the release of two new sample collections.

If you like your sample CDs mad, bad and dangerous to know, you'll want to check out Cuckooland volume 3, *Asylum*, from the team behind Cuckooland *Unhinged* and *Ghost in the Machine*. This "wild collection of strange loops, crazed voices and twisted noise" on audio CD only, is divided into 'Wards', to extend the atmosphere even further, and costs £59.95.



Chemical Beats is a CD-ROM packed with drum and percussion loops and grooves, basses, synth and guitar effects, featuring the new Beat Generator system. This uses Presets (five bass drum loops, seven snare loops and 10 hi-hat/ride loops, chosen so that every rhythmic combination works together). All the bass drum/snare combinations are offered on individual notes on the white keys of a 5-octave keyboard, while the black keys host the hi-hat/ride loops and velocity-sensitive bass and snare drum samples. The loops are all exactly the same length, so the user can hold the keys for any length of time and the rhythms will never drift out of sync, and modulation and pitch-bend wheels can be used to drop the bass and snare out at will, and then back in, still perfectly in sync. The whole thing is dubbed a Performance setup. If you're using a sequencer, so-called Sequence setups give access to individual sounds as well as loops.

Chemical Beats offers two Presets at each tempo, and 11 tempos between 64 and 144bpm. Time & Space calculate that without retuning it's possible to create 2800 unique loops at each tempo, a total of 30,800 loops. And if you're prepared to retune, T&S reckon that over 370,000 combinations are available. The CD-ROM version of *Chemical Beats* in Akai S3000-series format costs £119, while an audio CD containing a selection of loops and sounds can be obtained for £59.95.

A Time & Space Distibution Ltd, PO Box 4, Okehampton, Devon EX20 2YL, UK.
T +44 (0)1837 841100.
F +44 (0)1837 840080.
E sales@timespace.com
W www.timespace.com

Merger: No mystery

Prominent UK music retailer Sound Control has merged its digital division with KGM Studio Specialists in Wakefield, to form KGM Sound Control.

Sound Control and KGM have, between them, almost 40 years' experience in professional audio, and the merger underlines Sound Control's commitment to developing the professional audio market and expanding its existing service in post-production, broadcast, AV, education and digital technology. For KGM's part, the merger will free Ken Giles, who distributes Drawmer and Soundfield products worldwide, to focus more fully on manufacturing, distribution and export, with a huge range of new digital products to be launched this month. "I see Sound Control as the correct partner to continue to take KGM forward," comments Ken, and his enthusiasm is echoed by Sound Control's Sales Director Graham Bell, who says: "This move has advanced our Digital Division plans for development by two years, and we are looking forward to working together."

Two Managing Directors: Sound Control's Pat Kelly (left) and KGM's Ken Giles seal the deal.

A KGM Sound Control, 18/42 Charlotte Street, Wakefield, West Yorkshire WF1 1UH, UK.
T +44 (0)1924 371766/224744.
F +44 (0)1924 201618.
E sales@kgm.co.uk

Friendly Ghost at Steelworks

The Steelworks studio in Sheffield, home to successful songwriting/production team Eliot Kennedy, Tim Lever and Mike Percy, has just emerged from a £250,000 refit. Tim Lever and Eliot Kennedy now have identical pre-production studios, each equipped with 32-channel Soundcraft Ghost mixing desks, Alesis ADAT digital recorders and Emagic *Logic Audio* workstations. Kennedy explains why they chose the Soundcraft desks: "I'd used the Ghost on various demos, so I was familiar with the EQ, which I loved. The mic amps alone would be a reason to buy this mixer — they really are very good for the price."

Vocals are recorded in an adjacent live room, and tracks then progress to a large mixing studio, the domain of Mike Percy, which is equipped with a 40-channel Amek Mozart console. The studio, which occupies the premises of the old Fon complex, was featured in the *SOS* September '97 interview with the Steelworks team, whose credits include the Spice Girls, Celine Dion, Take That and 911. They're currently preparing to unleash a new all-girl act, the Paper Dolls.

A Soundcraft Electronics Ltd, Cranborne House, Cranborne Industrial Estate, Cranborne Road, Potters Bar, Hertfordshire EN6 3JN, UK.
T +44 (0)1707 665000.
F +44 (0)1707 660742.
W www.soundcraft.com

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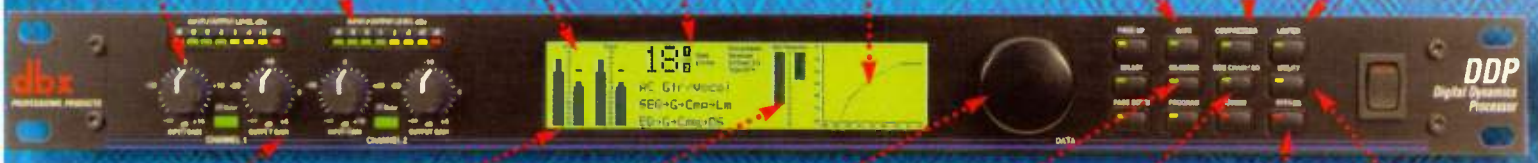

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Utils: sample rate, A/D input and output, Midi functions, Sysex functions.

Gate

Set parameters for threshold, ratio, attack, hold, release, and output gain. See the effect of your settings on the graphical display, as well as on the gain reduction and audio level meters, they all interact in real time with your manipulation of the parameters. Start with a threshold setting of about -60dB to clean off the noise in between the vocal takes.You can save your final gate settings as a "gate preset" building block and recall it into any other setup you do.

Compressor

The effects of the gate settings are visible on the graphic display to help you determine where to set your compressor threshold. Move through all the regular parameters (displayed in real time), like threshold, ratio, attack, release, and output gain. For vocals use a threshold of about -25dB, a ratio of about 3:1 or 4:1, and a slow attack and fast release for the most natural sounding effect. Your compressor settings can also be saved as a building block to be called up into any other preset.

Limiter

Changes you make to the limiter settings are also seen on the graphical display. You can adjust the level and also the speed at which the limiter lets go of the signal as it goes below the threshold. This is truly smooth limiting, with patented dbx PeakPlus™ algorithms, so rest assured that wherever you set your threshold level, your tape will not distort. And like the other parts of the processor, your limiter settings can be named and saved for later recall.

De-esser

De-essing works the same way; see the effects of your settings displayed on the graph. Parameters here are the common ones: threshold (800Hz to 8kHz), and amount (%). Other processing includes EQ - both in-path and sidechain - for special-effect types of processing. When you are editing any of the building blocks, its icon is visible on the display, and the parameters are shown on the graph, so it's always easy to know where you are.

and More

You can also work in stereo, or set up a completely different and independent processing chain for the other channel. Optional digital output with the TYPE IV™ Conversion System with TSE™ (Tape Saturation Emulation) provides up to 24-bit output in either AES/EBU or S/PDIF formats with the trademark digital processing of TYPE IV™. The DDP also has full MIDI/Automation capability, with separate midi in and thru jacks.

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1066 • Dual Channel Compressor /Limiter/Gate • V2™ VCA • Hard knee or Overeasy® compression • PeakStopPlus™ limiting

1086 • Mic Preamp/Processor • 48V Phantom power • Optional digital i/o • Variable frequency low-cut filter • VU meter

1605 • Stereo Compressor/Limiter • From industry standard 165 • High precision input stages • World's largest dynamic range (127dB) V8 VCA

786 • Solid State Mic. Preamp • Purest source reproduction electronically possible • 130dB dynamic range • 104dB S/N ratio

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shape of things to come

Millennium Mellotron?

The Mellotron Archives web site, including the full spec of the new Mark VI.

The latest development at David Kean's Mellotron Archives is... a new Mellotron! The MkVI will be the first new instrument using pre-digital, tape-based pseudo-sampling technology to be released for some time. Sporting something of the look of a Mellotron 400 (but taller), and plenty of original features, the MkVI will benefit from many improvements and modern design. Most significantly, the MkVI will weigh less than older examples; the Baltic Birch cabinet is stronger and lighter than the original, and a much lighter power supply also helps. Other enhancements include:

- New precision-polished, hard-wearing, stainless-steel capstan.
- Slightly heavier flywheel, providing more inertial mass for more stability.
- High-stability precision motor that is much better suited for constant-speed applications.
- Non-warping keyboard designed in collaboration with Herrburger, Brooks Ltd (the original manufacturer).
- More robust tape frame design that supports longer tapes (increasing the playing time per note by about 20%).
- Specially-built tube preamp, similar to that found on the MkII.

Other neat features include a two-speed motor control, a tuning indicator which shows when the flywheel is running at the desired speed, and pro balanced audio outputs.

The majority of Mellotron enthusiasts presumably won't be lining up to buy an electronic instrument based on its wood finish or lightweight PSU: they'll be after the traditional Mellotron sound. To this end, the Mellotron Archives are particularly well-placed to deliver: they own the masters of every Mellotron (and Chamberlin — another classic tape-based keyboard) tape, and they have all been re-mastered. Many sounds have never been available before, new sounds have been recorded and the Chamberlin tapes are now readily available to Mellotron owners. This production also means that many new parts and tapes are available for use as spares in original Mellotrons. The initial run of MkVIs will be very limited — 30 units — but part of that run has been allocated to Europe; demos are available in Los Angeles, Seattle, London, Frankfurt and Stockholm. The price is expected to be the original 1973 US price: $4500 (around £2800) plus shipping.

A David Kean, 4824 Craner Avenue, #201 North Hollywood, CA 91601 USA.
T +1 818 754 1151.
E mellod@netwood.net
W www.mellotron.com/

N-Vogue

New to the Korg family is the N1R synth module, which squeezes most of the features of the N1 AI2 synth (the smaller N5 was reviewed in March of this year) into a 1U rackmounting package. The N1R (£549) has plenty to offer: nearly 1700 sounds, 18Mb of sound ROM (comprising 563 multisamples and 304 drum samples), computer interface and 32-part multitimbrality. General MIDI is supported, and the N1R may well be the only instrument compatible with both Yamaha's XG and Roland's GS GM variants. Long-term users of Korg gear will also welcome the ability to use Combinations, as well as Programs, multitimbrally. Effects, including chorus, delay and rotary speaker, are provided in the shape of two independent digital stereo multi-effect units. The module's front panel is equipped with dedicated buttons for quick splitting and layering of patches, plus a dedicated Portamento switch, and real-time control knobs provide easy control of filter envelope attack and release time, and filter cutoff, though other parameters can be assigned to these knobs. An onboard arpeggiator offers 20 types of preset pattern, sync'able to an external MIDI clock source.

A Korg UK Ltd, 9 Newmarket Court, Kingston, Milton Keynes MK10 0AU, UK.
T Brochure Line +44 (0) 1908 857150.
F +44 (0)1908 857199.
W www.korg.com

Mastering and CD production specialists Hiltongrove have opened a digital video editing suite. The suite, which will complement Hiltongrove's existing mastering and design studios, means that the company can now offer a comprehensive enhanced CD service in addition to broadcast-quality video editing (enhanced CDs feature an additional CD-ROM data track that can include visual material, including full-motion video). Managing Director Guy Davis notes that: "The ability to film an interview with artists at the mastering stage and to include that footage on their CD release has proved to be a real bonus and has been very popular with customers."
T +44 (0)181 521 2424.

Sound Forge, the PC digital audio manipulation software from Sonic Foundry, has reached v4.5. New features include support for both Microsoft NetShow Services and Real Networks *RealAudio/Video* v5.0 (for Internet audio), a built-in batch converter for automated processing of multiple files, a spectrum analyser, and an advanced loop-editing tool set with support for Sonic Foundry's *ACID* loop-based music creation software.
T +44 (0)171 923 1892.
W www.sonicfoundry.com

Sennheiser UK have launched a colourful new Internet magazine. *Defining Sound* is a bi-monthly publication that will contain news and features on all the company's products and activities, as well as links to complete catalogues for all the company's distributed products. You can find the mag at www.sennheiser.co.uk.
T Sennheiser UK +44 (0)1494 551531.

Too late to make the main review of the STUDI/O card (see page 194), Sonorus UK distributor DDD have announced the availability of stand-alone 24-bit D-A/A-D converters, which each manage to squeeze eight balanced analogue XLR connectors, an ADAT optical connector and a word clock BNC connector into a half-rack format. The AD24 converts eight +4dB analogue inputs into a 24-bit ADAT optical output suitable for direct connection to either of the STUDI/O's two optical inputs. The clock can be switched between the internal sample rates of 44.1 and 48kHz, or the incoming sample rate at the BNC word clock input. Meanwhile, unsurprisingly, the DA24 works the other way, converting eight channels of 24-bit optical digital audio (switchable to 16-bit if required) to eight +4dB balanced analogue outs, suitable for connection to either of the STUDI/O's two optical outs. The AD24 retails at £499, the DA24 at £399, and both should be available by the time you read this.
T Direct Digital Distribution +44 (0) 181 642 6306.

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Scarcely was the ink dry on last month's review of the Aardvark Aark 20/20 PC-based digital recording system when The UK Office, Aardvark's British distributors, announced a substantial cut in the price. The 20/20 now retails for £775 including VAT, down from its old price of £999.

T The UK Office
+44 (0) 1442 870103.

Tascam have a new combined CD player and auto-reverse cassette deck, the CDA500. At just £295 including VAT, the new unit offers the usual CD functions you'd expect, plus Computamatic Programme Search, pitch control, CD sync and Dolby noise reduction on the cassette deck. Independent outputs are provided for both the CD and the cassette components, and a full-function remote control is supplied.

T +44 (0)1923 819630.

There's a new cassette-based 4-track on the way from Fostex. The X24 is portable and easy to use, with features including Dolby B noise reduction, an Auto Bounce function, balanced XLR mic inputs, and a retail price of just £249.

T +44 (0)171 923 1892.

Both Roland and Opcode have released products that support the new high-speed Universal Serial Bus (USB) connection protocol. Roland's Audio Canvas UA100 MIDI + Audio recording interface, currently PC only, offers dedicated guitar and mic inputs (with 20-bit converters and built-in multi-effects) side by side with two MIDI Ins and two MIDI Outs, and an optical S/PDIF digital out. Opcode's DATport is a simple device that allows any S/PDIF-equipped audio device (such as a DAT machine) to beam digital audio directly to any USB-compatible computer. It's PC-only right now, with Mac drivers due shortly. The DATport is, according to Opcode, 24-bit ready.

T Roland UK Brochure line
+44 (0)1792 515020.

The news, announced at the last Frankfurt Music Fair, that Ensoniq had been acquired by PC soundcard giant Creative Labs, left many of us curious as to their relationship with Emu, who are also owned by Creative. Any lingering questions have now been answered: Emu and Ensoniq have joined forces, with the combined companies now doing business as Emu-Ensoniq, as you may have noticed from their ads. The Ensoniq and Emu products you're familiar with will carry on being Ensoniq and Emu products, but with the current sharing of technologies and concepts by the two companies' engineering, production, sales and marketing teams, it's only a matter of time before a range of new, joint products hits the streets.

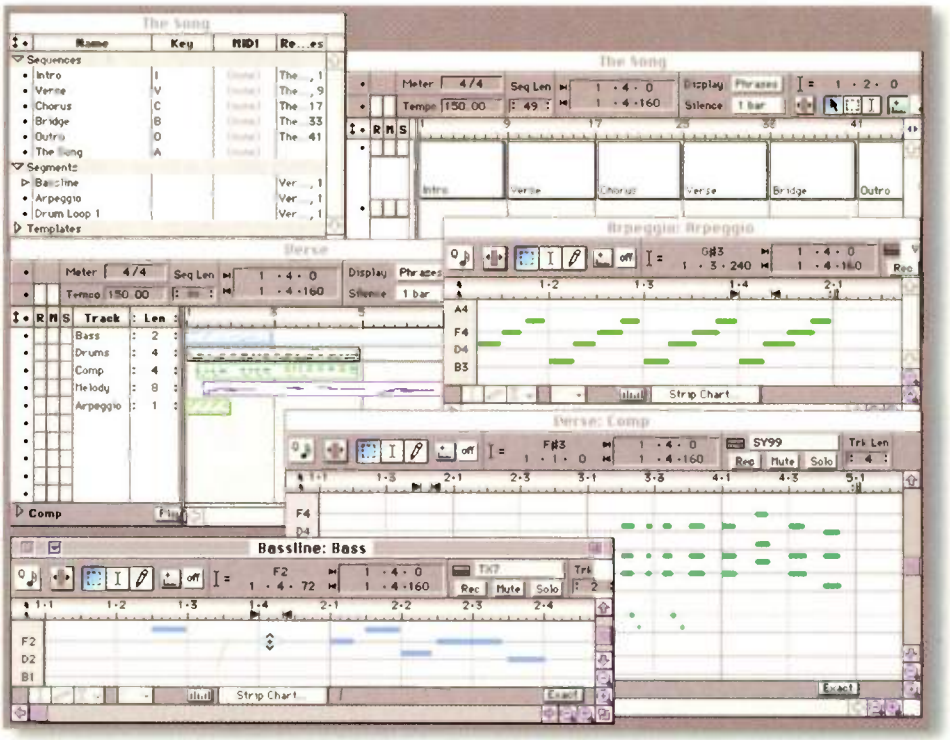
New look for *Vision*

Opcode's *Vision* v4.1 Mac-based sequencing software now features audio capabilities in its latest version. *Vision DSP*, as the software is known, offers many of the features previously only available in the top-of-the-line *Studio Vision Pro*. All of *Studio Vision Pro* v4.0's recent interface and editing enhancements have also been included, as have some features that won't be available until the imminent (free) v4.1 update for *SVP*.

Besides support for a number of popular PCI-format digital audio cards (via compatibility with ASIO drivers), the software now features support for Steinberg's *Cubase VST* audio plug-in format and new "studio-quality" parametric EQs. Each audio channel of *Vision DSP* offers four EQ 'slots' (with five varieties of EQ), four effects sends (which can also be used for internal routing and sub-grouping) and four insert points. Supplied effects include stereo delay, reverb, chorus, phaser, flange, and ring modulation.

Notable features from *Studio Vision Pro* that have been incorporated into *Vision DSP* include TruTone pitch-shifting, Adjust Audio Tempo, time-scale compression/expansion, formant-shifting for tone manipulation, and customisable audio crossfades for seamless edits. There's also a Pulse Edit window for quick creation of rhythmic parts, groove quantising on playback and record, a built-in arpeggiator window with full quantise options, programmable key commands for nearly all sequencer functions and menu items, and appearance control for altering the look of the sequencer. *Vision DSP* comes with a 'lite' version of BIAS *PEAK* sample-editing software, a drum groove CD from EastWest, and more, all at no extra cost. *Vision DSP* should cost around £329.

A SCV London, 6-24 Southgate Road, London N1 3JJ, UK.
T +44 (0)171 923 1892.
F +44 (0)171 241 3644.
E opcode@scvlondon.co.uk
W www.scvlondon.co.uk



Alesis go 0.1 better

Alesis have announced the advent of the QS6.1 synthesizer, which upgrades the previous QS6 in several areas, yet will apparently be the company's "most affordable" performance instrument (though unfortunately, no UK price is available yet). Sample ROM for the new synth has been doubled (to 16Mb), the display is larger, and dedicated Sequence Start and Transpose buttons have been added. The 6.1's collection of 640 patches includes Alesis' acclaimed Bösendorfer stereo grand piano programs from the QS7, QS8 and QSR. It also offers doubled expansion capabilities, with two PCMCIA-format card slots allowing an additional 16Mb of new sounds to be added. The slots are compatible with Alesis QCard expansions and Sound Bridge sample-transfer programs, for access to customised samples and sequences. The QS6.1 also expands the controller capabilities offered by the original QS6, with the inclusion of four control/edit sliders.

A Sound Technology, Letchworth Point, Letchworth, Hertfordshire SG6 1ND, UK.
T +44 (0)1462 480000.
F +44 (0)1462 480800.
E info@soundtech.co.uk
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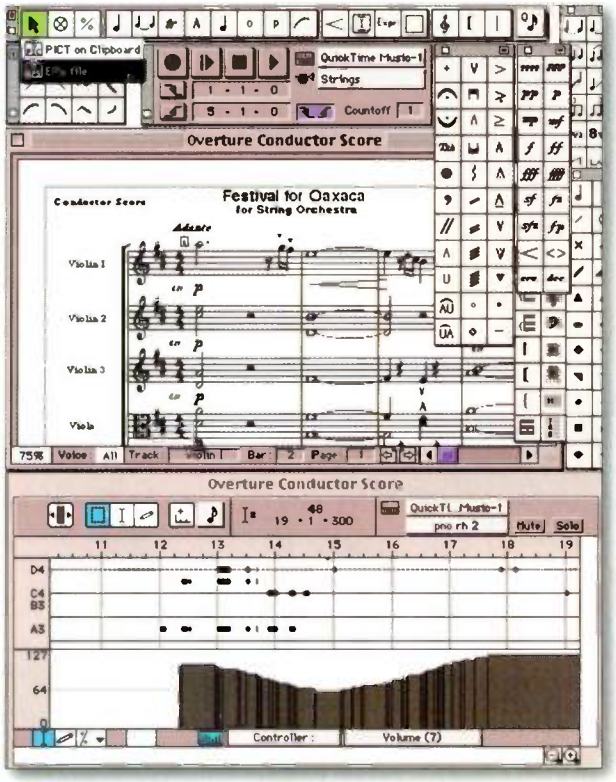
Marantz Professional

shape of things to come



Overture's new movement

Just a few months after the announcement that the development team behind the *Overture* notation package had left Opcode to join Cakewalk comes news of *Overture 2* for both the Mac and Windows 95 platforms. *Overture 2* combines quick note entry, via mouse or computer keyboard, with MIDI recording (for instant viewing of a performance) and playback. A wide range of editing tools and symbol palettes allows the user to create complete orchestral arrangements, lead sheets, and individual cues. Text tools make it easy to add or edit lyrics, page text, floating text, measure text and rehearsal marks. The software can read and write standard MIDI files, and comes with tape-deck-style transport controls, as well as punch-in/punch-out recording options. All dynamics, repeats and endings are played back over MIDI, and MIDI data can be edited via a graphical piano roll display. Finished work can be saved or output as a PICT or EPS file, and the program offers Postscript and Quick Draw printer compatiblity.

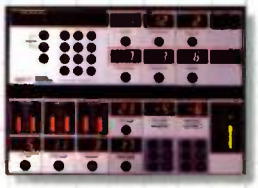
A Et Cetera Distribution, Valley House, 2 Bradwood Court, St Crispin Way, Haslingdon, Lancashire BB4 4PW, UK.
T +44 (0)1706 228039.
F +44 (0)1706 222989.
W www.etcetera.co.uk

SOS can be reached at sos.feedback@sospubs.co.uk or visit www.sospubs.co.uk

turnkey

dynaudio | lexicon | dbx

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.

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.

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

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

One side of the switcher-equipped recording room

Compare 6 mics by recording simultaneously to ADAT.

Waldorf Wave, ProTools IV and Big by Langley in Studio 1

Huge range across Mac, PC and Acorn platforms

turnkey LOOPSTATION DUBLIN
NOW OPEN
Same Products. Great Service.
Call 01677 9377 or visit 34-35 Wellington Quay, Temple Bar, Dublin 2.
Please note that Irish prices may vary due to currency fluctuation and local VAT differences.

INDEX
3 Turnkey Professional
4 Multitrack Recording
5 Multitrack Recording
6 Outboard
7 Outboard
8 Computer Software/Hardware
9 Computer Hardware & Samplers
10 Synthesisers
11 Synthesisers & Drum Machines
12 Keyboards & Guitars
13 Mics, PA/DJ, Mixers & Monitors

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

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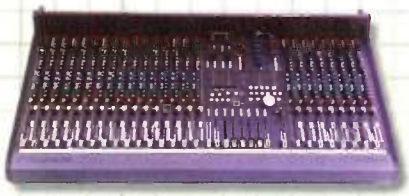
DREAM RECORDING PACKAGES AT DREAM PRICES

Soundcraft & ALESIS

GHOST CONSOLE

- Pristine Audio Quality Throughout
- 4 Band EQ & Fully Parametric Mids
- Up to 12 Auxiliaries
- MMC, Jog/Shuttle, Track Arming, MIDI Muting & Synchronisation Built-In (not LE)

The project studio has changed how professional musicians make and record music. Record advances used to pay for studio time, but now its for an artist's home studio utilising digital 8 track and a compact high quality console.



The Ghost, though, is more than a project console, you only have to look at the features to see this. Soundcraft continues to break new ground in analogue console manufacture bringing fully professional facilities: Ultra low noise inputs, 4 band EQ with 2 fully parametric mids, up to 12 auxiliary sends, MIDI mute automation and MTR transport control (not LE) are a few of the features that put other project consoles to shame. In fact the only comparison with a project console you could make is the price.

RRP £6729	RRP £7469	RRP £7575	RRP £8327
£3999.99	£4599.99	£4699.99	£5199.99
GHOST 24 LE + ADAT LX20	GHOST 24 + ADAT LX20	GHOST 32 LE + ADAT LX20	GHOST 32 + ADAT LX20
ALL PACKAGES INC FREE LOOMS	ADD £399.99 FOR 24ch METER BRIDGE	ADD £499.99 FOR 32ch METER BRIDGE	ADD £1499.99 FOR 2nd ADAT LX20

ADAT LX20 DIGITAL MULTITRACK RECORDER

- New 20 Bit ADAT Format for Superb Quality
- Ultra High Speed Transport
- Digital Dubbing Between Two Machines
- Fluorescent Bargraph Metering

Alesis pioneered low cost digital multitrack recording with the introduction of the ADAT, and changed the face of home and professional recording. The new LX20 version still plays tapes from the old machines, but now records at full 20 bit resolution - 16 times more detail than previously!

The clarity really must be heard to be believed, revealing the finest nuances in both acoustic and electronic sounds. Improved locking times make multi machine setups a dream to use.

digidesign

AMIII & G3 Pack

NEW G3 PACKAGE £3749.99 INCLUDING VAT

- G3/266 64/4000CD & Apple Design Keyboard
- Apple MultipleScan 720 Display
- AudioMedia III Toolbox Bundle
- Logic Audio Platinum
- MOTU Pocket Express
- 4Gb Fast & Wide Barracuda Hard Drive
- Sonic Worx Artist

ProTools III & G3 Pack

NEW G3 PACKAGE £7599.99 INCLUDING VAT

- G3/266 64/4000CD & Apple Design Keyboard
- Apple MultipleScan 720 Display
- ProTools III Refurbished Core System
- Digidesign 888 Interface
- 4Gb Fast & Wide Barracuda Hard Drive
- Sonic Worx Artist

ProTools 24 & 9600 Pack

9600 PACKAGE £12889.99 INCLUDING VAT

- 9600/350 64/4000CD, ZIP & Ext. Keyboard
- Apple MultipleScan 720 Display
- ProTools24 Core System
- Digidesign 888/24 Interface
- Adaptec 2940 Fast & Wide SCSI Accelerator
- 4Gb Fast & Wide Ykrta Data Barracuda Hard Drive
- Sonic Worx Artist

New Products:

Digidesign ADAT Bridge & 882/20 Interfaces: New Low Cost interfaces: the ADAT bridge provides 16ch digital I/o via ADAT Toe-link with 20bit DA for monitoring. Expanding upon the original 18-bit 882 I/O audio interface design, the 882/20 features 8 channels of 20bit analog I/o and two of 24-bit S/PDIF I/.

ProTools Plug-ins

t.c. tools £769.99

Arguably the best reverb plug-in available, TC Tools uses algorithms developed from the M5000 mainframe reverb. Great user interface allows you to visualise the effects via the graphics, making it intuitive and easy to use.

Dolby Surround Tools £1339.99

Produce Dolby Surround mixes entirely within the ProTools environment. Both Encoder & Decoder Plug-ins are available as a bundle providing digital implementation of encoding/decoding process.

Focusrite D2 £879.99

Based on the famed Focusrite Red 2 Dual EQ designed by Rupert Neve, the D2 plug-in matches the high-quality expected from the company, even down to the brushed aluminium front panel.

Antares Auto-Tune £579.99

The plug-in that many professionals have but none will admit to it! AutoTune identifies the pitch of a signal and corrects it to a defined scale, retaining original quality, making intonation problems a thing of the past. Available as a TDM or VST plug-in.

QUESTED

F11 SELF POWERED MONITOR

The F11's cabinet design is another Quested first, being made from a new mineral loaded material which offers excellent acoustic properties using a considerably smaller box than would be possible using conventional materials. The design is a self powered two way bi-amplified one, with 165mm bass driver, and 28mm soft dome HF unit. Months of fine tuning have resulted in a speaker which produces a superb sound, totally belying its size. Custom colours can be specified for bulk orders.

NEW PRODUCT £1149.99

Ask anyone in the know in the audio industry about who are the foremost acoustic designers in the business, and the chances are that the name of Roger Quested will be top of the list. He has built an unrivaled reputation for himself in a notoriously difficult process which is half science, half art.

Whilst his initial designs were all large bespoke projects for his studio installations, the last few years have seen the emergence of a very carefully thought out, high quality range of monitor speakers, to cater for the demands of the modern speaker market, from the innovative new F11, to the incredible HQ410.

The Quested range is probably the most comprehensive available, covering active, passive and self powered designs, as well as amplifiers and active crossovers, from subwoofers through nearfields to custom built soffit mounting units.

Call Turnkey Professional to arrange a demonstration, a free trial in your own studio, or to enquire about our generous part exchange facilities.

VS2205 SELF POWERED MONITOR

One of the most popular models in the Quested range, the VS2205 is designed as a highly accurate reference monitor, and its low profile and shielding made it ideal for a wide variety of uses. The built in amplifiers separately drive two 130mm bass units and a 28mm ferrofluid damped soft dome tweeter. Switches are provided for input sensitivity and HF and LF equalisation, to compensate for room conditions and positioning.

NEW PRODUCT £1699.99

We will beat any [illegible] from a UK or European dealer at the time of order. We must be able to [illegible] the quote and the goods must be available and in stock. Prices include 17.5% VAT and apply to current stocks only. Uk mainland carriage from £9.99. Please allow 10 working days for cheque clearance. Errors & omissions excepted.

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KORG ensoniq ALESIS Steinberg Technics Vestax FATA

EUROPE'S LOWEST

YAMAHA

STAY IN THE MIX WITH YAMAHA

PROMIX 01V Digital Mixer

Yamaha's fabulous new 01V replaces the ground breaking ProMix 01, and is basically a slightly cut down 03D, for a lot less money!
As well as a striking new silver paint job, the 01V also features 16 analogue inputs plus 8 digital ins and outs via optional cards in either ADAT, TDIF or AES/EBU format. There is 4 band fully parametric EQ for all the main inputs, 2 stereo multi effects processors, moving faders, dynamic MIDI automation, and of course, exemplary sound quality.

RRP ~~£1399~~
£1299.99

- Up to 24 Inputs In Total
- Moving Fader Automation
- 4 Band Fully Parametric EQ
- 2 Built In Effects Processors

Initial stocks are very limited - get your order in now!

03D Digital Console

Like the 02R, the 03D is a fully-automated digital mixing console set to have a large impact on the mixing market. With 26-inputs & 18-outputs the console features fast 32-bit internal digital audio processing, versatile analog and digital I/O configuration, new 32-bit onboard multi-effects processors with freeze (sampling) and guitar amp simulation effects, motorised faders, fader and mute grouping, surround sound mixing, onboard automation, MIDI remote capabilities and much more.

RRP ~~£2999~~
£1999.99

- Ultra Compact Format
- Moving Fader Automation
- Surround Sound Capabilities
- Takes ADAT, TDIF or AESEBU Digital Board

Call now for a Turnkey brochure and a free trial!

02R Digital Console

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~~
£4649.99

- Up to 40 Inputs In Total
- Moving Fader Automation
- Dynamics Processors on Every Channel
- Takes 4x ADAT, TDIF or AESEBU Digital Boards

TASCAM

564 MINIDISC PORTASTUDIO / EDITOR

MEDIA DEAL!

Tascam are the inventors of the Portastudio, and were also the first on the market with a MiniDisc based four tracker. The result, the 564 is triumph of engineering and heavily feature packed with it: up to 12 inputs at mixdown, built in MIDI Clock and Time Code synchronisation, 3 band mid sweep EQ, 2 individually adressable aux sends, full LED metering, jog / shuttle wheel, 4 XLR mic inputs with insert points, individual track outputs, SPDIF digital i/o, 37 mins record time per disc, whilst the unique bounce forward facility allowing retention of the original parts even after digitally bouncing tracks. Far too many specs to list here - a studio in a box!

ALMOST 55% OFF!

This is without doubt, the ultimate Portastudio. Excellent value for money at the original price, but Turnkey's exclusive offer makes this superb machine the recording bargain of the year - order now while stocks last!

RRP ~~£1099~~
£499.99

BUY WITH 10 x DATA MDs - ONLY £19.99 EXTRA!

DA20MkII DAT MACHINE

MEDIA DEAL!

The new Mk II version of the DA20 builds on what is already a quality machine: reliable tray-loading mechanism, switchable SCMS, analog and digital recording at all 3 sample rates and coax SPDIF i/o. New features include error counting & adjustable ID encoding.

RRP ~~£699~~
£499.99

BUY WITH 10 x QUANTEGY 90 min DATS - ONLY £49.99 EXTRA!

102MkII & 202MkIII TAPE DECKS

MEDIA DEAL!

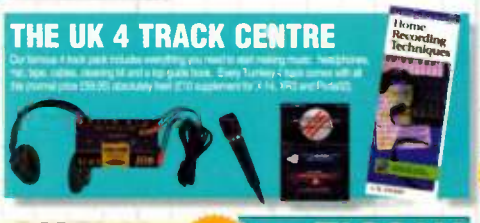
Fantastic deals on Tascam's superb professional quality mastering cassette decks. Both are full 19" rackmount units, the 102 MkII is a single deck unit, the 202 MkII as a double deck, which records on both decks. Limited stocks only at these prices, ideal for mastering and duplication.

RRP ~~£245~~
£199.99

RRP ~~£345~~
£269.99

BUY WITH 20 x XLII S 90 min TAPES - ONLY £29.99 EXTRA!

THE UK 4 TRACK CENTRE



YAMAHA

MT8X MKII MULTI-TRACKER

ALMOST 40% OFF!

MEDIA DEAL!

Best selling 8 track portastudio now brought to you at an incredible end of line price by Turnkey! Features 3band EQ, separate cue mix, full LED metering, insert points, dbx noise reduction, individual tape/multi outputs, 2 aux sends, double speed, logic controlled transport, auto punch-in/out, memory locations and cycle facilities. Only a handful left - grab one now!

RRP ~~£999~~
£599.99

MT4X MULTI-TRACKER

MEDIA DEAL!

The MT4X is Yamaha's top of the line machine, and has a specification to go with it! It's logic controlled transport means that as well as two autolocate points and 'return to zero' function, you also get a special 'rehearsal' mode, so that you can practice dropping in and out as many times as you like, without risking erasing your precious recording! Other great features include three band EQ, on each channel, two auxiliary sends, LCD metering, double or single speed operation and individual track outputs for use with an external mixer.

RRP ~~£569~~
£329.99

BUY WITH 20 x XLII S 90 min TAPES - ONLY £29.99 EXTRA!

SONY

MDS-JE510 MINIDISC RECORDER

Although DCC looks to have died as a format now, Minidisc is thriving, and rapidly becoming a standard in radio stations and other institutions around the world. With sound quality almost as good as DAT, and a range of editing features like Combine, Move, and Auto Cut, it makes an ideal choice for mastering on a budget. If MiniDisc is for you, there's no better value on the market than the MDS-JE510, with digital input, jog dial and full function remote control as standard.

RRP ~~£289~~
£199.99

MZ-R30 PORTABLE MINIDISC RECORDER

MEDIA DEAL!

Now available in this compact portable version of the MDS-JE510 as featured above. Price includes headphones and power supply.

This must be the neatest walkman you've ever seen!

RRP ~~£289~~
£199.99

BUY WITH 20 x MAXELL 74 min MDs - ONLY £49.99 EXTRA!

TASCAM

PORTA 02

MEDIA DEAL!

Brand new entry level portastudio from the inventors of the original portaStudio recorder.

ALL CASSETTE MULTITRACKS INC '4 TRACK PACK' ADD £10 FOR PORTA 02, XR-3, X-14

RRP ~~£149~~
£129.99

BUY WITH 20 x XLII S 90 min TAPES - ONLY £29.99 EXTRA!

FOSTEX

XR-3

MEDIA DEAL!

Tunkey's incredible buying team do it again! A double speed fully featured machine for under £150! Features include auto-bounce, built in mic and a high speed transport which gives fantastic sound quality when combined with the Dolby B noise reduction - there's even punch in/out and pitch control. *Very limited stocks only on this exclusive end of line deal - order now!*

RRP ~~£249~~
£149.99

BUY WITH 20 x XLII S 90 min TAPES - ONLY £29.99 EXTRA!

MD8 DIGITAL WORKSTATION

MEDIA DEAL!

If you thought 4 tracks on MiniDisc was good - check out the new 8 track Yamaha MD8. There are 8 mic / line inputs (2 with XLRs and insert points), 3 band mid sweep EQ, 2 aux sends and a jog / shuttle wheel. There are up to 20 inputs available at mixdown, so there's plenty of room for synth and sampler outputs, whilst the latest ATRAC compression algorithm means the sound is virtually indistinguishable from DAT. *This hot product is in short supply - call us now to reserve yours!*

RRP ~~£999~~
£949.99

BUY WITH 10 x DATA MDs - ONLY £19.99 EXTRA!

SONY

TCD-D8 PORTABLE DAT MACHINE

MEDIA DEAL!

Turnkey bring you the first stocks of Sony's brand new portable, the TCD-D8. Sturdily built with a backlit display, the unit features 48kHz and 44.1 kHz analog and digital recording. No other portable is available under £1000 - supplies are very limited, phone now to reserve yours!

RRP ~~£589~~
£399.99

BUY WITH 10 x QUANTEGY 90 min DATS - ONLY £49.99 EXTRA!

FOSTEX

DMT-8 VL DIGITAL MULTITRACKER

INC SCSI INTERFACE!

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 1.6 gig hard-disk (up to 40 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. Now with free SCSI interface!
Why buy 4 tracks when you can have 8?!

RRP ~~£1288~~
£849.99

KORG

D8 DIGITAL WORKSTATION

For the last few years, Korg's high end SoundLink hard disk recording system has enjoyed considerable success in post production houses around the world. Now they've used all that expertise to bring you the amazing new D8 - a complete digital recording studio in less than the size of a shoe box! The D8 records up to 8 tracks onto its built in SCSI drive, has digi i/o and SCSI ports as standard, a whole range of built in digital FX, and even a guitar level input to do away with DI boxes. *In stock and on demo at Turnkey - call now for further details.*

RRP ~~£849~~
£799.99

SONY

PCM-R300 DAT RECORDER

MEDIA DEAL!

A pro, full spec DAT machine at a bargain price! Just look at the features list: SPDIF optical and digital i/o, digital and analog recording at all three sample rates, full 19" rackmount unit, a full function infra red remote control, Sony's exclusive 'Super Bit Mapping' process can also be switched in, maximising the sound of 20 bits into 16! Stocks at this incredible price are limited - get your order in now!

RRP ~~£709~~
£475.99

BUY WITH 10 x QUANTEGY 90 min DATS - ONLY £49.99 EXTRA!

We will beat any genuine quote from a UK or European dealer at the time of order. We must be able to match the quote and the goods must be available and in stock. Prices include 17.5% VAT and apply to current supplies only. UK mainland carriage from £9.99. Please allow 10 working days for cheque clearance. E&OE & limited to stocks held.

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PRICES GUARANTEED*

Roland

VIRTUAL STUDIOS? VIRTUAL GIVEAWAYS!

VS-840 DIGITAL WORKSTATION

Want the advantages of a hard disk based recorder, but without the price tag? Roland's new VS840 should fit the bill, recording 8 tracks (up to 64 virtual tracks) onto its built in Zip drive, you still benefit from a fully digital mixer, and a built in FX processor, with 26 different algorithms and guitar level input. An all in one no-nonsense product with a no-nonsense price. Initial stocks will be very limited - get your order in early!

INCLUDES 10 FREE ZIP CARTS!

R R P £949.99

- Optional SCSI Port
- Full Editing Facilities
- Built in Effects Processor
- Records to Low Cost Zip Carts

VS-880P DIGITAL WORKSTATION

INC FREE RODE NT1 MICROPHONE!

Roland's VS880 has become the de-facto standard for compact digital eight track recording. Each track has 8 virtual tracks allowing you to record multiple takes, and then compare them, even if you've already recorded on the other 7 tracks. The built in digital mixer handles up to 14 channels, has 2 band parametric EQ, 1 external and 2 internal aux sends to the supplied FX board, and is fully MIDI controllable. The SCSI port allows connection of external SCSI devices for recording or backup, which can also be made to DAT or CDR via the digi i/o. MTC is standard to sync up your sequencer. New V2 software allows automation data to be recorded to the hard drive, and also gives numerous new effects algorithms, including mic emulation! 2 gig HD & FX board now standard!

R R P £1499.99

- Built In Effects
- 64 Virtual Tracks
- Built in MIDI Sync
- Digital Mixer with Automation

VS-1680 DIGITAL WORKSTATION

INC FREE AT4033 MIC & SHOCKMOUNT!

The VS-1680 from Roland takes integrated digital recording to new heights, featuring up to 16 tracks of 24 bit MT Pro recording, each track having 16 virtual tracks for multiple takes. A 2 gig drive is built in for up to 37 hours recording time, as well as one of the new VS8-F2 boards giving four simultaneous FX (a 2nd board can be fitted if required). There are 10 audio inputs including 2 balanced XLRs and 12 ouputs, a SCSI port is standard and CD writing software is built in. 3 band parametric EQ is easily edited via the huge LCD display. In stock now at Turnkey!

R R P £2199.99

- 24 Bit MT Pro Recording
- 16 Tracks with 16 Virtual Tracks
- Huge LCD Display for Easy Editing
- Up to Eight Independent FX Processors

D160 HD RECORDER

INC 3.6 Gb HD

FOSTEX

Price includes 3.6 Gb Hard Drive

RRP £2932 £2099.99

D90 BLX HD RECORDER

INC 1.6 Gb HD

Our price includes a 1.6 Gb drive, and balanced output kit!

RRP £1798 £1299.99

CR200 CD RECORDER

MEDIA DEAL!

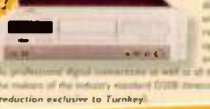
Flawless CD recording with Fostex reliability

BUY WITH 100 x PRO CDRs - ONLY £99.99 EXTRA!

RRP £1399 £999.99

D5 DAT RECORDER

MEDIA DEAL!



Huge reduction exclusive to Turnkey!

BUY WITH 10 x QUANTEGY 90 min DATS - ONLY £49.99 EXTRA!

RRP £1299 £499.99

CDR880 RE-RECORDABLE CD WRITER

MEDIA DEAL!

PHILIPS

Our incredible price even includes one free CD!

BUY WITH 20 x CONSUMER CDRs - ONLY £59.99 EXTRA!

RRP £499 £359.99

MDMX4 DIGITAL MULTITRACKER

MEDIA DEAL!

SONY

Stocks are very limited on this exclusive deal order now!

BUY WITH 10 x DATA MDs - ONLY £19.99 EXTRA!

RRP £999 £439.99

DAP1 PORTABLE DAT

MEDIA DEAL!

TASCAM

BUY WITH 10 x QUANTEGY 90 min DATS - ONLY £59.99 EXTRA!

RRP £1499 £999.99

DPS12 DIGITAL MULTITRACKER

MEDIA DEAL!

AKAI

BUY WITH 3 x JAZ CARTRIDGES - ONLY £99.99 EXTRA!

RRP £1299 £1179.99

TASCAM DA38

MEDIA DEAL!

- 8 track recording and playback on Hi 8 tape
- Ultra fast transport
- Link up to 16 units together for 128 tracks
- Get 10x 113 min tapes for only £30.99 extra!

RRP £2099 £1699.99

TASCAM DA88

MEDIA DEAL!

- Pro digital MTR
- SV88 timecode option
- 8 track recording and playback
- Link up to 16 units together for 128 tracks
- Get 10x 113 min tapes for only £30.99 extra!

RRP £2799 £2399.99

AKAI DR8

- 8 track hard disk recording
- 16 channel internal mixer
- Digital editing
- Huge range of expansion options

RRP £1999 £1699.99

AKAI DR16

- 16 track hard disk recording
- 8 inputs 16 outputs
- Optional mains output board for easy editing

RRP £2399 £2199.99

MARANTZ CDR

MEDIA DEAL!

- 19" rackmount CDR
- Uses pro spec blank CDs
- Transfer direct from DAT
- High quality converters
- Get 100x 74 min CDs for only £99.99 extra!

RRP £749 £649.99

ALESIS ADAT XT20

MEDIA DEAL!

- New 20bit ADAT
- Back-ends compatible
- 10 locate points
- Internal bouncing
- Get 10x 40min tapes for only £129.99 extra!

RRP £2299 £1999.99

HHb CDR 800

MEDIA DEAL!

- Pro spec CDR
- Balanced analog I/O
- AES/EBU digital I/O
- Get 100s 74 min CDs for only £99.99 extra!

RRP £1527 £1149.99

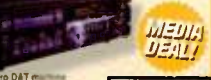
FOSTEX FD4

- Digital recording 4 track
- Records direct to Zip or Syquest
- 3 band analogue EQ
- No data compression

RRP £399 £359.99

TASCAM DA30MKII

MEDIA DEAL!



- Pro DAT machine
- AES/EBU digital I/O
- Balanced analogue I/O
- Jog shuttle wheel
- Get 10x 90 min DATs for only £49.99 extra!

RRP £1299 £965.99

PANASONIC SV3800

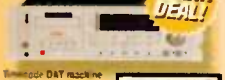
MEDIA DEAL!

- Industry standard monitoring DAT machine
- Equivalent to 2000
- AES/EBU and SPDIF
- Jog shuttle wheel
- Get 10x 90 min DATs for only £49.99 extra!

RRP £1099 £895.99

FOSTEX D15

MEDIA DEAL!



- Timecode DAT machine
- Balanced ins and outs
- AES/EBU digital I/O
- Pro build quality
- Get 10x 90 min DATs for only £49.99 extra!

RRP £2961 £2399.99

SONY PCMR500

MEDIA DEAL!

- Pro DAT Machine
- 4 shuttle direct transport
- Balanced ins and outs
- AES/EBU digital I/O
- Get 10x 90 min DATs for only £49.99 extra!

RRP £1375 £999.99

FOSTEX X-14

MEDIA DEAL!

- Entry level multitrack
- Built in microphone
- Simple to use
- 4 track pack only £49
- Get 20x 90 min XLRS for only £29.99 extra!

RRP £149 £129.99

FOSTEX X55

MEDIA DEAL!

- New 2a speed 4 track
- 2 XLR mic inputs
- 3 aux sends and 2 inserts
- Individual level outputs
- Get 20x 90 min XLRS for only £29.99 extra!

RRP £349 £299.99

FOSTEX X77

MEDIA DEAL!

- Records 4 tracks at once
- 6 inputs with 3 XLRs
- 3 band EQ with mid sweep
- Dolby C noise reduction
- Get 20x 90 min XLRS for only £29.99 extra!

RRP £499 £369.99

TASCAM PORTA 414

MEDIA DEAL!

- Records 4 tracks at once
- 2 band EQ
- Double speed
- DBX noise reduction
- Get 20x 90 min XLRS for only £29.99 extra!

RRP £349 £269.99

TASCAM 424mkII

MEDIA DEAL!

50% OFF!

- Records 4 tracks at once
- 4 XLR mic inputs
- 3 band EQ with sweep
- 2 auxiliary sends
- Get 20x 90 min XLRS for only £29.99 extra!

RRP £499 £249.99

YAMAHA MT50

MEDIA DEAL!

- Records 4 tracks at once
- 2 band EQ
- Separate auxiliary send
- DBX noise reduction
- Get 20x 90 min XLRS for only £29.99 extra!

RRP £399 £199.99

MAGNETIC MEDIA

TYPE	SIZE	PRICE	MIN ORDER QUANTITY
DAT	16 min	£2.99	10
DAT	34 min	£2.79	10
DAT	46 min	£3.49	10
DAT	80 min	£3.99	10
DAT	90 min	£5.19	10

DAT	124 min	£5.99	10
456	1/8" x 7"	£5.99	5
456	1/4" x 10"	£11.49	5
456	1/2" x 10"	£27.49	5
456	1" x 10"	£47.99	2
456	2" x 10"	£90.99	2
457	1/8" x 7"	£10.29	5
ADAT	42 min	£9.99	5
ADAT	80 min	£11.49	5
Hi8	2hr min	£5.99	5
Hi8	60 min	£7.29	5
Hi8	90 min	£9.99	5

*We will beat any genuine quote from a UK or European dealer at the time of order. We reserve the right to withdraw/change the quotes once the goods have been ordered and in stock. Prices include 17.5% VAT and apply to current stocks only. UK mainland carriage from £9.99. Please allow 10 working days for cheque clearance. Errors & omissions excepted.

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EUROPE'S LOWEST

LEXICON PRICE CRASH!

Lexicon break the price barrier with their all new budget machine, the MPX100. Previous cut price Lexicon units have had to cut corners on bandwidth and true stereo processing etc, but the MPX100 uses the state of the art Lexichip 3 in conjunction with 20 bit A/D and D/A convertors to bring you world class processing at an unbelievable price!

There are a carefully selected range of 240 presets, giving you all that's best in reverbs, (5 1/2 second) delays and ambience, as well as more unusual effects like tremolo, rotary, pitch shift and detune. The parameter adjust knob controls not just one, but a selection of usefully chosen parameters for each preset editing a breeze, and their are 16 user registers for storing your favourites.

The MPX100 also features a full MIDI specification with In Out and Thru, and even the ability to sync delay times to an incoming MIDI clock signal. The SPDIF output assures compatibility in an increasingly digital age, unique for a processor at this price point, and there's even a footswitch bypass facility for discerning guitarists and other live performers. Upgrade to Lexicon quality today!

MPX100

- Top Quality Lexichip 3 Reverb & FX
- Adjust Multiple Parameters Simultaneously
- Sync Delays to Incoming MIDI Clock
- Up to 5 1/2 second Delay Time with Reverb

NEW PRODUCT **£249.99**

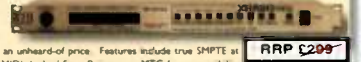
MPX1

For those of us who need top quality reverb & multi FX but cannot stretch to the expense of the PCM80 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 incredibly low price. 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. Megadeal only at Turnkey!

RRP ~~£1199~~ **£699.99**

XR300 SYNCHRONISER

FACTORY DIRECT!



Long the synchroniser of choice in professional studios, we now exclusively bring you this industry standard unit at an unheard-of price. Features include true SMPTE at all standard stripe-rates, MIDI clocks / Song Pointers or MTC for compatibility with all MIDI sequencers. Large LED time-code display. Merged MIDI input. Straight-forward operating system. Full 19" rack unit.

RRP ~~£209~~ **£169.99**

NANO COMPRESSOR COMPRESSOR

The ideal compressor for anyone on a budget. Sorts out vocals and basses etc, and it's also great for strapping across stereo mixes. Small size doesn't mean a lack of features though - hard or soft knee compression, peak or RMS detection, attack, release and ratio controls. Give your mix that professional sound!

RRP **£99.99**

COMPOSER PRO WORKHORSE COMPRESSOR

A natural sounding and fully featured compressor at a give away price! Built-in gate removes any unwanted noise, soft-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. New Pro version now includes threshold metering, switchable sidechain operation and illuminated controls.

RRP ~~£229~~ **£169.99**

1201 TRUE STEREO FX PROCESSOR

The 1201 is a full 19" rack unit, featuring true stereo 16 bit processing at 44.1kHz, with 64x oversampling convertors. The quality of the reverb alone would make it worth the price, but there's lots more: two simultaneous effects are offered, from a choice of 33 including delay, chorus, flanging, tremolo and pitch shifting, 'vocoder', karaoke, 'lo-fi' and vocal distortion effects as well as various reverb types including reverse. If one of the 363 presets doesn't suit exactly then using the two parameter knobs will allow you to tweak the program until it does, and the addition of 2 band EQ will further tailor the sound to your mix.

RRP **£99.99**

VC3 PRO CHANNEL

Legendary sixties producer Joe Meek was often asked the secret of his fantastic vocal sound. It was in fact a custom made 'black box' of electronics, whose contents he would not reveal during his life. Now JOEMEEK bring his designs to life, and with knobs on! In addition to the compressor and high headroom mic amp, controls like Drive, Enhance and Q make the VC3 one of the hottest ways to get your signal down. *Incredible low price - order yours today!*

RRP ~~£249~~ **£159.99**

1204 TRUE STEREO FX PROCESSOR

The 1204 builds on the success of the original 1202 by adding MIDI control, 100 extra user presets for storing your own edits, and a two digit LED display. On top of this, there is also a rotary speaker effect, and a vocoder - a front panel mic input is even provided for quick and easy setup. *Nothing else touches these units at the price - check one out today!*

RRP ~~£199~~ **£149.99**

104 AURAL EXCITER

ALMOST 50% OFF!

Unbelievable new low price on the Type C2 exciter from the inventors of the process, Aphex who have pioneered these designs since 1975. The two channel Model 104 excites high frequencies by generating extra harmonics, plus it features Aphex's "Big Bottom" low frequency enhancement which compresses the low end of the mix to increase punch without raising peak levels. Limited quantities only - buy now to avoid disappointment.

RRP ~~£299~~ **£149.99**

Studio Quad 4 CH. STUDIO FX

OVER 40% OFF!

At last - Multi effects as they should be! The new Digitech Studio Quad features not only their custom designed and ultra-powerful 'S-DISC' chip, but also 4 independent inputs and outputs, which using the built-in sub-mixer, can even be configured as 4 mono inputs feeding 4 effects processors, feeding 4 stereo outputs! The huge screen and new intuitive operating system make editing a breeze, 20 bit convertors give greater than 90 dB signal to noise ratio and the range of effects includes reverbs, delays, dreaming, chorus, flanging etc. Hundreds of other features too numerous to mention. *Exclusive end of line deal only at Turnkey!*

RRP ~~£449~~ **£259.99**

THC-00 RESINATOR

FAT

FACTORY DIRECT!

Freeform Analog Technologies FreeBass has become one of the most successful sound modules ever, and now the range expands further with the THC-00 Resinator and PCP330 Procoder.

Not one, not two, but three band pass filters with resonance! And we mean resonance! Feed any mono signal into this unit and get out some of the most wacky and groovy sounds you've ever heard in glorious auto panning stereo. Each of the filters has it's own cutoff point which is modulated in a selection of ways, by a combination of the built in LFO, the polarity reversable envelope follower and even an external control voltage. Ideal for processing loops, vocals or indeed any another signal, for results ranging from the sublime to the extreme!

NEW PRODUCT **£169.99**

Must be heard! More fresh thinking from F.A.T.

PCP330 VOCODER

One of the most asked questions in the industry must be "Why doesn't anyone make a vocoder anymore?" - well here it is, with a fantastic feature list, great sound quality and a down to earth price. The carrier can be either an internal VCO or external line input, whilst both line and mic inputs are given for the modulator signal. Eleven filter bands each have their own level knob on the front panel giving true hands on control of your sound, and the sibilance (unvoiced) control also has an external input if required. The final output can contain any mix of modulator, carrier, vocoded signal and a special filtered version of the signal. Remember, this doesn't only create robot voices, there are thousands of creative uses, and it's also ideal for processing drum loops.

NEW PRODUCT **£299.99**

Order now and own an instant classic!

DIGITAL PROBLEM SOLVERS

FRIEND-CHIP

In today's increasingly digital world, many people are still using their equipment's analogue ins and outs, because of the difficulty of interconnection and synchronisation. Friend Chip's new sensibly priced digital patchbays and 'black box' problem solvers end the misery and make the digital studio a reality! The DigiMax digital patchbay (£299.99) has 8 inputs and outputs (2 each on optical), can accept both AES/EBU and SPDIF signals, and is MIDI controllable. An XLR version (£499.99) is also available for greater AES/EBU reliability. The Audio Time Base (£499.99) is a 1u 19" rack which acts as a master clock source for your studio, outputting word clock, Digidesign Super Clock and SPDIF. The master clock can be internally generated, or a reference taken from mains, SPDIF word clock, Super Clock, video or LTC (SMPTE). Lockup from timecode is in around 1 second!

Also in the range:

DP-CON: optical to co-axial and vice versa	£49.99
PRO-CON: SPDIF to AES/EBU and vice versa with SCMS stripping	£129.99
D-4-2 COPY CON: switcher with 1 optical & 3 co-ax ins, 2 co-ax outs and SCMS stripping	£119.99
SRM-1: converts almost any incoming sample rate to an internal clock for Prodikeys and our 44.1 DATs	£149.99
MAGNI: sample rate conversion to 32, 44.1, 48kHz, with lock to external word clock	£249.99
Super Clock Driver: converts DigiDesign superclock to word clock and vice versa, 3 outputs	£129.99
Word Audio Clock: converts Super Clock to word clock and vice versa with synchronous SPDIF signal	£129.99
ADAT Audio Clock: ADAT 9 Pin to word clock, Super Clock and SPDIF clock converter	£129.99
ADAT Word Clock Synchroniser: ADAT 9 Pin to word clock and Super Clock converter, also sends MTC synchronise your sequencer with MIDI merge	£199.99
ADAT SPDIF Synchroniser: as above but with converts only to SPDIF	£189.99
ADAT MIDI Machine Control: MIDI to ADAT 9 Pin converter with MIDI thru (sets to either of the above for full remote ADAT control from your sequencer)	£99.99
Rack Kit: holds up to three 'black boxes'	£49.99

FROM **£49.99**

266XL DUAL COMPRESSOR GATE

dbx

Two channels of classic dbx compression with new Auto-Dynamic™ 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 and at an unbelievable price. Now with new auto setup mode!

RRP ~~£249~~ **£149.99**

Entire dbx range also on demo at Turnkey.

Turnkey will beat any genuine quote from a UK or European dealer at the time of order. We must be able to substantiate the quote and the goods must be available and in stock. Prices include 17.5% VAT and apply to current stocks only. Uk mainland carriage from £9.99. Please allow 10 working days for cheque clearance. Errors & omissions excepted.

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AKAI MACKIE [illegible] YAMAHA TANNOY DENON AKG DigiTech [illegible]

PRICES GUARANTEED*

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! Many manufacturers use the word valve as an excuse to charge exorbitant prices for their product, but not Bellari, and our factory direct exclusive makes the range unbelievable value for money!

The RP583 Studio Tube Compressor / Limiter

has become an instant hit, 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, 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 £499.99 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 £499.99 FACTORY DIRECT

RP520 Studio Mic Pre Amp

A true dual tube mic pre amp at a bargain price, with tubes used at all the crucial gain stages, not just strapped across the outputs. Features include phase reverse, input and output pads, separate gain and output level controls, true 48v phantom power, jack and XLR ouputs and dual VU meters. ***Bypass you desk's mic amps and feel the quality!***

NEW PRODUCT £399.99 FACTORY DIRECT

RP562 Stereo Exciter

Traditional exciters usually do a good job of brightening up the extreme top end, but can often leave you with a rather harsh signal lower down. The incredible warmth of the Bellari Sonic Exciter ends all that, providing a sparkling top end with no harshness, and a huge bottom end to boot. The stereo unit has both Jack and XLR connectors, dual VU meters, and even a separate subwoofer output with it's own cutoff and level controls. ***Superb sound quality at a fraction of the price of similar devices.***

NEW PRODUCT £299.99 FACTORY DIRECT

ADB3 Stereo Direct Box

Stand alone 2 channel tube DI box

NEW PRODUCT £129.99

MP110 Direct Drive Mic Pre Amp

Stand alone single channel tube mic pre amp.

NEW PRODUCT £169.99

FOCUS EQ
PARAMETRIC EQUALISER

Focusrite

UNDER HALF PRICE!

The Focus EQ features an ultra high quality mic preamp complete with phantom power and phase reverse, as well as line and instrument level inputs, making it an excellent recording channel, or even a top quality preamp for bass or acoustic guitar. In addition to the four parametric EQ bands, there are also variable high and low pass filters, and the EQ and filters each have their own bypass switches. Typical Focusrite build quality can be taken for granted, as can some of the best sounding EQ you've ever heard. Very limited quantities available for this exclusive deal - order now or regret forever!

RRP ~~£939~~ £399.99

VC4 ENHANCER

JOEMEEK

The Joe Meek range has achieved great success since is launch only 3 years ago, with it's combination of dramatic tonal colour and superb value for money. The VC4 is no exception to this formula offering detailed control over two channels (stereo linkable) of possibly the best sounding enhancement around. Variable Drive, 'Q' and Enhancement controls help produce everything from refined definition on acoustic guitar to the ultimate breathy vocal sound. This ridiculous price makes it an unmissable offer!

RRP ~~£399~~ £199.99

4 POLE
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 sample player 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!

FACTORY DIRECT £269.99

X POLE FILTER

What do you get if you take two of Waldorf's 4 pole filters, put them in a rack and spice it up? The all new X-Pole! Maintaining all of the 4 Pole's great sound, MIDI and tactile controllability, the X-Pole allows you to treat two mono signals independently, or the two channels can be linked together for a stereo signal. 2u rack design makes for easy integration into your studio. Fatten up your sound today - your loops need never be the same again!

FACTORY DIRECT £439.99

NANOVERB
FX PROCESSOR

ALESIS

The Latest offering from the inventors of budget reverb. Superb quality, 18 bit reverbs and delays in a unbelievably small package. There are 256 presets in all, arranged in 16 convenient banks to enable you to find just the right effect for your application. True stereo processing, footswitch bypass, clip LEDs for input and output signals. The Nanoverb takes only 1/3 U of rack space and fits in neatly with its other Nano cousins!

New low price makes this an absolute bargain - call the Turnkey mail order hotline now!

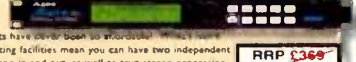
RRP ~~£199~~ £99.99

MICROVERB IV
FX PROCESSOR

The Microverb IV brings you programmable effects in an unbelievable price. There are 100 preset programs and 100 user editable patches for storing all your favourites using the two parameter adjust knobs. Processing is true stereo 18 bit, and there's even MIDI control of patch changes and modulation. An FX bargain to be reckoned with!

RRP ~~£269~~ £145.99

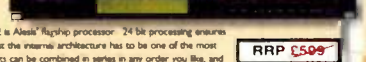
MIDIVERB IV
FX PROCESSOR



Fully programmable effects have never been so affordable! Whilst not quite the Midreverb's clever routing facilities mean you can have two independent effects with their own mono in and out, as well as true stereo processing of multi effects. The MIDI implementation allows control of multiple parameters via MIDI, and the long size screen makes editing simple. Alesis quality can be taken for granted!

RRP ~~£369~~ £195.99

QUADRAVERB 2
FX PROCESSOR



The incredible Quadraverb 2 is Alesis' flagship processor. 24 bit processing ensures premium sound quality, whilst the internal architecture has to be one of the most flexible around; up to 8 effects can be combined in series in any order you like, and as well as the usual reverbs etc, you also get rotary, pitch shifting, graphic EQ, overdrive and sampling effects, as well as surround sound encoding and a host of others. Includes ADAT format optical connectors.

RRP ~~£509~~ £349.99

WEDGE MASTER REVERB

The Wedge Desktop Master Reverb from Alesis is unlike any other in that it's designed to be used right in the sweet spot, not in your rack. The Wedge's reverb algorithms represent the finest creation's of Alesis' experienced DSP design team, and parameters like Early Reflection shape and stereo depth allow ultra detailed space emulation.

RRP ~~£449~~ £265.99

BEHRINGER ULTRAFEX PRO

- Bass Soft/Tight & Ultra-Low switch
- High mix from "Enhancer" to "Exciter"
- Stereo width, XLR & TRS sockets

RRP ~~£169~~ £149.99

BEHRINGER ULTRACURVE

- 2 (channel 31 band digital graphic
- 8 parametric EQs with auto Feedback Killer
- 31 band analyser & noise gate & limiter
- 110dB dynamic range converters

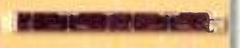
RRP ~~£349~~ £299.99

BEHRINGER VIRTUALIZER

- Digital reverb / multi-effects, 100 patches
- Twin 24 bit DSP engines for left / right
- Physical modelling of early reflections
- Vocoder, Leslie, pitch, chorus, delay etc

RRP ~~£169~~ £149.99

DRAWMER MX30



- Dual gated stereo Compressor
- Switchable release time
- Gain reduction and in/out metering
- Easy front panel layout

RRP ~~£269~~ £249.99

DRAWMER MX50

- Drawmer's latest easy to use De-Esser
- HF boost, stereo link & split-band option
- Find problem centre frequency...
- Turn threshold knob...
- Hey presto!

RRP ~~£289~~ £269.99

DIGITECH TALKER

- Mic or guitar input, footswitches
- Digitally mimics vowel sounds & FX
- Vocoder, Auto-wah, Talk box style
- Drone pitch, Alien, Gated vocoder

RRP ~~£289~~ £229.99

DIGITECH VOCALIST ACCESS

- 1u rack harmonizer with LCD display
- Creates 4 extra harmony parts
- Adapts to chosen key or scale
- Sequence harmonies over MIDI

RRP £449.99

DIGITECH VOCALIST PERFORMER

- Digital harmonizer with reverb
- XLR mic input. Adds 2 harmonies
- Major / minor chords adapted to key
- Presets allow A/B switchovers

RRP ~~£379~~ £329.99

DIGITECH VOCALIST WORK-STATION

- Adds 4 extra harmony parts
- Mic and line input & digital reverb
- Male / female effect & pitch shift
- MIDI arrangements possible

RRP ~~£749~~ £599.99

LEXICON MPX 100

- 20 bit Reverb and FX
- Supercedes the Reflex as a top entry level reverb
- Full MIDI control
- S/PDIF digital o.r

R R P £249.99

TC ELECTRONICS FINALISER+

- 3 band digital compression, 5 band EQ
- De-esser, Enhancer, Limiter, Expander
- Levelling, sample rate conversion
- Realtime, digital I/O, Auto Wizard setup

RRP ~~£1875~~ £1669.99

TC ELECTRONICS FIREWORX

- 24 bit multiFX & AES, S/PDIF & ADAT I/O
- 8 simultaneous effects, real time control
- Digital cruncher, ring modulator, vocoder, formant molding & more...

RRP ~~£1585~~ £1299.99

TLA IVORY 5021 COMP.

- Dual mono compressor with stereo link
- Valve output stage & retro VU meters
- Additional expander / gate
- High impedance guitar jack input

RRP ~~£469~~ £369.99

TLA IVORY 5051
VOICE PROCESSOR

- Channel strip with valve output stage
- Mic, line or DI jack input
- Compressor, expander & 4 band sweep EQ
- Retro VU metering

RRP ~~£469~~ £369.99

TLA IVORY 5013 EQ

- Dual mono 4 band parametric EQ
- Valve buffered output stage
- High impedance guitar jack input
- Input & Output trim & EQ bypass

RRP ~~£469~~ £369.99

TLA IVORY 5001 PRE AMP

- Quad mic pre-amp + valve gain stage
- 90Hz high pass filter & phase reverse
- Saturate valves with controlled output
- LED for valve drive level

RRP ~~£469~~ £369.99

TLA IVORY 5050
MIC PRE & COMPRESSOR

- Mic, line & DI jack input with HPF
- Manual compressor, GR meter & bypass
- Output attenuator & jack connection

RRP ~~£299~~ £229.99

DBX 1066

- Dual compressor with True RMS stereo link, RackLink™ faders
- Expander / noise gate
- Hard knee or OverEasy™
- Sidechain with HPF
- dbx's new V2 VCA

RRP ~~£479~~ £399.99

DIGITECH STUDIO 100

- Editable digital 20 bit multi FX
- Two effects in series or parallel
- Reverb, delay, flange, chorus, pitch etc
- Rear panel level trim & MIDI & footswitch

RRP ~~£179~~ £149.99

DUAL MIC PRE

OVER 50% OFF!

- Focusrite's best ever value dual mic preamp
- 2 channels with 48V, phase reverse & 75Hz HPF
- THD only 0.001% & headroom is +26dBu
- Remote mute channel facility

RRP ~~£869~~ £399.99

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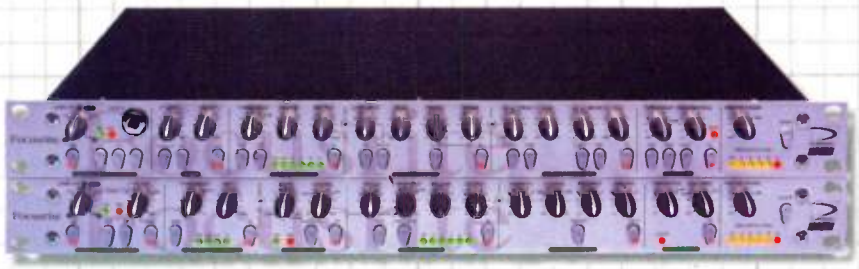
EUROPE'S LOWEST

Focusrite FOCUS POCUS!

The magicians in Focusrite's engineering department have pulled the rabbit out of the hat and managed to produce the fabulous new Platinum range, bringing you Focusrite quality and design values at a previously unheard of price!



The first model in the range is the VoiceMaster, an all in one recording channel for getting your signal to tape or disc in as clean and controlled a manner as possible. Both mic and line level inputs are given, followed by an expander/gate, saturation circuit for valve like tones, an opto-compressor, parametric EQ and opto de-esser. Focusrite have chaosen to use opto-compression circuits to avoid having to use cut price VCAs at this price point, but have cunningly used an extra photo-resistor in the feedback stage to linearise the gain and avoid the colouration which is normally associated with opto-compressors. Sound on Sound's Paul White said "This must surely become the project studio industry standard.

NEW PRODUCT **£379.99**

- *Focusrite Quality at a Ridiculous Price!*
- *Unique Processors for an Individual Sound*
- *Linear Gain Opto Electric Compression Circuit*
- *Mic, Instrument & Line Level Inputs*

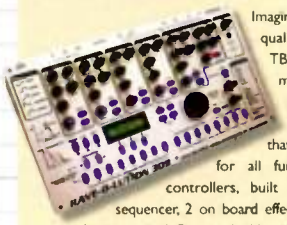
The second model in the range is someting of a departure for Focusrite, the ToneFactory actually takes pride in dirtying up your signal! You get instrument, mic and line level inputs making it ideal for either studio users or discerning guitarists, whilst the filters and opto-compressor are along the same lines as the VoiceMaster. Things really get interesting in the Tone Controller section, guitar amp style bass, mid and treble controls are combined with an Overdrive control and brightness switch, producing anything from subtle tape saturation effects to full on crunch! It's all topped off with two bands of parametric EQ and a handy noise gate to clean up any unwanted mess. Great for warming up vocals, screaming synth lines, fat guitar tone and much more.

NEW PRODUCT **£379.99**

Too good to be true? We can't believe it either! Check out the Focusrite Platinum range today - we guarantee you'll be impressed.

PRICE NOW INCLUDES AUDIO EXPANSION! — QUASIMIDI

RAVE-O-LUTION 309 DANCE WORKSTATION



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, 2 on board effects processors & EQ, 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. "superb bass synth ... excellent drum sounds ... one of the most immediately useable products on the market" - Sound On Sound. ***Call for a free demo CD. Money back within 7 days if not satisfied (ask for conditions).***

ALSO AVAILABLE WITH ALL 3 EXPANSIONS ONLY £569!

FACTORY DIRECT **£469.99**

SYNTH & DRUM EXPANSIONS ALSO AVAILABLE only £69.99

309 AUDIO-EXPANSION

Input / output expansion board now available only £99.99! 2 extra outputs, 2 inputs allowing you to route any 2 external signals through the AES synthesis. Also comes with new operating system with many new features.

FACTORY DIRECT **£99.99**

POLYMORPH SYNTHESISER

Coming soon, the Polymorph is a four part analogue style synthesiser, with 8 note polyphony, 4 outputs and superb 309 style realtime editing facilities and sequencer & FX. ***Call for more details.***

FACTORY DIRECT **£699.99**

MEGADEAL ALERT NEW LOW PRICE! — 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.**

RRP £199 — FACTORY DIRECT **£129.99**

DM5 DRUM MODULE — ALESIS

The DM5 offers superb performance features and an excellent selection of drum, percussion & FX samples putting over 540 all-new studio drum sounds into a 1u rack space, many recorded in true stereo and with ambient effects. It's Expanded Dynamic Articulation feature allows 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, 4 audio outputs and a backlit LCD display. The drum sound for you is waiting right here!

Another Turnkey megadeal!

RRP £429 **£269.99**

SYNTH MODULES — EMU

ORBIT

PLANET PHATT

Emu have taken their wealth of experience in making modules such as the Proteus, Vintage Keys and Morpheus, combined it with the filters from the incredible Emulator 4, and with their usual innovation, come up with the Orbit and Planet Phatt.

The Orbit is stacked full of classic drum sounds, puissting basses, ambient pads, as well as a huge variety of fxs and effects, whilst the Planet Phatt brings a new definition to swing.

The inclusion of the E4's 16 different types of 6 pole filters mean that these modules have 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!

V2 software now gives improved beats mode and many other enhancements.

Orbit upgrade available for only £69.99.

RRP £869 **£599.99**

ATC-1 ANALOGUE MONOSYNTH

Studio Electronics started out life as a company that serviced and modified old Moogs, moved on to producing remanufactured Mini Moogs in 19" rack form, and then developed the SE1 - a modern Mini Moog whose components were painstakingly researched to provide an instrument that was according to the reviewers indistinguishable from the real thing.

Most recently has come the ATC-1 Tone Chameleon - hand crafted in the USA in the same way as their previous products, but with reduced cost due to less knobs but a vastly increased sound palette thanks to the ingenious use of filter cartridges to emulate the best sounding instruments of yesteryear. Editing is a breeze thanks to an individual button for each function, and a large central parameter dial.

Circuitry is analog throughout - right down to the oscillators, and the sound is needless to say, superb. There are 2 LFO's (one syncs to MIDI), three envelopes, and virtually all parameters can be controlled over MIDI. The ATC-1 is supplied with the Mini Moog filter, and can also be fitted your choice of a TB303, ARP 2600 or Oberheim Xpander filter (only £69 each) and for the filter fetishists amongst you, the filter Selector (only £199) takes all 4 filters simultaneously, and the filter type is automatically stored with each patch, avoiding the need for swetching. The rear panel sports an audio input, and CV & gate ins and outs as well as the usual MIDI connections.

Incredible reduction on another Turnkey exclusive - quality doesn't have to break the bank!

RRP £899 **£469.99**

VIRUS VIRTUAL ANALOGUE SYNTH — ACCESS

Control specialists Access have used all their considerable expertise in the design of their new 'virtual analogue' synth, the Virus.

All major parameters have their own dedicated knob or switch, and an 'expert' mode allows super detailed editing via the LCD display and parameter controls. Of course, all edits send out controllers in realtime. Synthesis facilities are unparallelled - 64 oscillator waveforms (2 per voice), 3 LFO's, 2 multi-mode filters per voice, oscillator sync, filter overdrive, built in FX - you name it, it's got it!

12 note polyphony, 16 part multitimbrality, 6 outputs and 2 filter inputs mean you're not just limited to one sound at a time. We're so confident that you'll love this synth that we're offering a seven day money back guarantee (ask for conditions).

The most flexible and best sounding virtual analog on the market.

NEW PRODUCT **£899.99**

JV1080 SYNTH MODULE — Roland

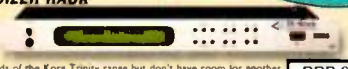
INC FREE CARD!

In the same way as the S1000 became the industry standard sampler, Roland's JV1080 has become the industry standard synth module. It's not hard to see the reason why - straightforward operation combined with top flight sound quality and a huge range of useable sounds.

One unpredictability of the machine is where it really comes into it's own. There are over 10 different expansion boards which can be fitted (up to 4 at once), each one with as much ROM as the original machine, covering sounds from Vintage to Orchesral and Dance to World. At Turnkey we have the full range in stock, as well as an unbeatable price on the machine itself.

RRP £1199 **£LOW**

TR-RACK SYNTHESIZER RACK — KORG



Love the sounds of the Korg Trinity range but don't have room for another keyboard? Here's the answer you've been waiting for! Huge screen for easy editing, four outputs, 32 polyphony, and the huge fat sounds that Korg are famous for - from long evolving pads to exciting effects.

Incredible new low price only at Turnkey - order now to avoid disappointment!

RRP £999 **£724.99**

JV2080 SYNTH MODULE

INC FREE CARD!

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!

RRP £1399 **£LOW**

"We will beat any genuine quote from a UK or European dealer at the time of order. We must be able to substantiate the quote and the goods must be available and in stock. Prices include 17.5% VAT and apply to current stocks only. UK mainland carriage from £9.99. Please allow 10 working days for cheque clearance. Errors & omissions excepted.

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PRICES GUARANTEED

TRAXDATA DIY CD PLANT

***CD** mastering has certainly come of age, and with blank disc prices at an all time low, making your own small production runs has never been more desirable. With this in mind, Traxdata have produced a superb range of duplication machines, which will not only cope with audio CDs, but also video and CD ROM formats making them ideal for multimedia producers and recording studios alike.*

The TraxTower 3000 and 6000 feature a built in 2 gig hard drive for uninterupted on-line storage and data transmission, plus either three or six quad speed CD writers allowing you to produce up to twenty full length CDs per hour! Custom software enables you to verify and compare your master image and the CD copies against the master, and all operations are carried out via the 4 x 20 character LCD display and keypad.

TraxTower 3000 & 6000

FROM **£4099.99**

For heavy duty users and the ultimate in unattended CD duplication, TraxData bring you the Trax Copier! Its robotic loading system means you can produce up to 150 CDs in a single run without once returning to the machine. What's more, because the TraxCopier automatically recognises master discs which are loaded in the same feeder, you can even produce multiple copies of different masters all in the same run; eg one master followed by ten blanks, another master followed by twenty blanks etc. The professional's machine!

TraxCopier

FACTORY DIRECT **£6999.99**

- *Duplicate Audio, Video & ROM Formats with Ease*
- *Produce up to 20 Full Length CDs per Hour*
- *Chain Towers Together for Even Quicker Performance*
- *Completely Unattended Operation (TraxCopier)*

Desktop CD Writers

If your ambitions or budget are not quite so high, we also supply TraxData's internal and external CD writing kit, both in standard format, and now also with full rewritable CD compatibility!

FROM **£269.99**

PressIt Labelling Kit

Recordable CDs are great, but how do you label them? With the Pressit CD labelling kit! The kit includes the custom label applicator, full colour software templates for most major graphics and word processing programs, and a selection of labels not only for the CD itself, but also for the jewel case inlay and spine. An essential CD writing accessory!

FACTORY DIRECT **£34.99**

CARNAVAL SOUND MODULE

OVER 65% OFF

EMU

Spice up your (musical) life with the fantastic Carnaval module from Emu, purveyors of fine quality sound modules! This unbelievable end of line clearance deal brings you hundreds of the finest Latin and dance sounds and grooves for an unrepeatable price. There are 640 fully editable presets covering a huge range of drum and percussion sounds, both acoustic and electronic, as well as organs, guitars, accordions, pianos, basses, vocal effects and synth waveforms. EMU's unique 'Beats' mode gives 100 different grooves programmed by top session players which can be synced to MIDI, transposed and 'time stretched', before being played on any combination of sounds you like, and joined together in one of up to 28 songs. The Carnaval is based on exactly the same engine as the Orbit and Planet Phatt, which means as well as 32 note polyphony, six +4dB individual outputs and tank-like construction, you also get 17 filter types of up to 6 poles from the legendary E4 sampler, and some of the most comprehensive synthesis facilities available at any price - ideal for dance music of all types. ***Stocks are very limited for this once in a lifetime offer - order now to avoid disappointment!***

RRP ~~£869~~ **£299.99**

RHYTHMTRAK 234 DRUM MACHINE

ZOOM

Whilst drum machines have remained little changed in recent years, the 234 certainly brings some fresh thinking with it, together with a fresh price! As well as all the usual drum and percussion sounds you would expect to find, the 234 also incorporates some of the best electronic kits we've ever heard, together with a huge range of Latin and other ethnic sounds, and 50 bass programs! Parameters such as level, pitch and hi-hat opening can be edited in real time, whilst pads can be set to trigger whole patterns for the ultimate in instant creativity.

NEW PRODUCT **£199.99**

QY70 WALKSTATION

YAMAHA

New from Yamaha, the inventors of the 'WalkStation' comes the QY70, a sound module, sequencer and auto accompaniser all in one! Packed full of sounds, styles, editing features and fun, the QY70 is an ideal mobile composition tool, as well as a high quality sound source in its own right.

RRP ~~£449~~ **£LOW**

P50-m PIANO MODULE

ALMOST 60% OFF!

At this price, can your setup afford to be without a piano module - no more need to load up lengthy samples or chew up valuable polyphony!! The P50M takes the dazzling sounds from Yamaha's flagship stage piano, the £5,000 P500, including grand and upright pianos, CP80, Rhodes, Wurlitzer, Clavinet and DX electric sounds. Many instruments are sampled in stereo for stunning realism, stretch tuned versions are available, and there are 22 different effect types (2 simultaneously) to choose from, as well as a 3 band equalizer. 32 note polyphony means you should never run out of notes, but for those with a heavy right foot, two modules can be connected in overflow mode for a whopping 64 notes, and there are seven velocity response curves to choose from to suit any playing style. ***A bargain at the full price, this amazing deal means that stocks will not last long - call for yours now!***

RRP ~~£369~~ **£169.99**

MC-303 GROOVEBOX DANCE WORKSTATION

Roland

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! ***Call for a special price and the best advice!***

RRP ~~£569~~ **£LOW**

MC-505 GROOVEBOX DANCE WORKSTATION

Take an MC303 Groovebox, add an extra effects processor, a D Beam infra-red controller, a RAM card slot, enhance the arpeggiator and what have you got? An MC505! Well not quite in fact - the MC505 also has up to 4 tones per voice, more user patches and patterns (256 and 200), and up to 64 note polyphony. 8 front panel sliders make mixing a doddle. ***On demo now, come in and check one out or call us for a brochure!***

RRP ~~£949~~ **£LOW**

MDF2 MIDI DATA FILER

Direct to disc MIDI data filer stores sysex files from virtually any MIDI device for sound storage etc, as well as recording and playing back Standard MIDI Files - ***perfect*** for live use as well as the studio! ***Exclusive end of line clearance only at Turnkey - buy now while stocks last!***

RRP ~~£379~~ **£199.99**

YAMAHA QY700

- King of hardware sequencers
- Huge graphic screen, piano roll edit
- XG 64 note poly sounds, 32 part multitimbral
- Auto backing, chord tracks, FX

RRP ~~£999~~ **£699.99**

ROLAND SPD20

- 8 full size pads & over 700 sounds
- Ideal for entering drum & percussion parts
- 14 note poly, built in FX
- Accepts external pads & triggers

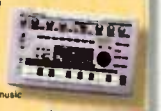
RRP ~~£549~~ **£LOW**

BOSS DR660

- 255 drum sounds
- 16 velocity sensitive pads
- 'Human Feel' control
- Editable reverb and chorus

RRP ~~£399~~ **£LOW**

ROLAND MC303



- One box dance music solution
- Analogue bass and drum sounds
- Step/real time sequencer
- 16 part multitimbral

RRP ~~£499~~ **£LOW**

WALDORF PULSE

- Acclaimed analog monosynth
- 3 fat sounding oscillators
- Offers a high degree of programming complexity
- All parameters send out MIDI controller data

RRP **£329.99**

WALDORF MICROWAVE II

- Genuine wavetable synthesizer
- 10 note polyphony
- 8 part multi-timbrality
- 4 individual outputs

RRP **£899.99**

ROLAND V DRUM MODULE

- Superb drum module / brain
- Modelling technology - change skin tension, add muffling, choose brass, wood or steel, change beaters
- 56 note poly, 650 sounds, built in sequencer

RRP ~~£1299~~ **£LOW**

NORD RACK II

- Clavia's great sounds with an enhanced control surface
- Great for polyphonic Moog style lead lines
- Digital memories, MIDI assignable modulators

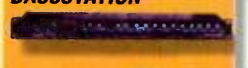
RRP **£1295.99**

NOVATION SUPERNOVA

- 3u rack, deep blue casework, loadsa knobs
- Proprietary DSP smoothes digital edges for better oscillators, filters, LFOs, envelopes
- 32 note poly. Great presets & effects!

RRP ~~£1299~~ **£1199.99**

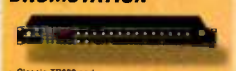
NOVATION BASSSTATION



- 3 oscillator monosynth
- Ring modulation and oscillator sync
- LFO to MIDI clock sync
- Built in arpeggiator

RRP ~~£399~~ **£349.99**

NOVATION DRUMSTATION



- Classic TR808 and TR909 sounds
- All original editing parameters
- Fully MIDI compatible
- 8 individual outputs

RRP ~~£399~~ **£349.99**

KURZWEIL KMP-I MICROPIANO

- Realistic stereo samples
- 32 note polyphony
- 32 piano, keyboard & string sounds
- Built in effects

RRP ~~£429~~ **£319.99**

ALESIS NANOPIANO

- Stereo Bosendorfer grand samples
- 64 note poly, 256 sounds
- Digital reverb / effects
- Handy pocket sized module!

RRP **£299.99**

ALESIS NANOBASS

- 256 bass sounds in this tiny box!
- Up to 4 voice layers
- 64 note poly & digital effects
- 3 LFOs and sweepable LP filter per voice

RRP ~~£215~~ **£189.99**

ALESIS NANOSYNTH

- 64 note poly, 16 part multitimbral
- Editable digital effects
- 640 sounds in 5 MIDI banks
- GM and User banks

RRP **£329.99**

HAMMOND XMI/XMIC

- Hammond organ in a module with a remote drawbar controller!
- Based on the XB3
- Leslie simulator built in
- Nothing as realistic on the market

RRP ~~£1069~~ **£999.99**

ROLAND JV / XP SERIES SOUND CARDS

- Specialised 16mb banks of sounds for your Roland synth - JV1080, XP50, XP80, XP80 take 4 boards, JV2080 takes 8
- Come with fitting kit and instructions
- Full range available from stock
- Choices from Pop, Orchestral, Piano, World, Vintage, 60s & 70s Keys, Session, Bass & Drums, Techno, Super Sound Set, Asian, Voice

RRP **£255.99**

We will beat any genuine quote from a UK or European dealer at the time of order. We must be able to substantiate the quote and the goods must be available and in stock. Prices include 17.5% VAT and apply to current stocks only. UK Mainland carriage from £9.99. Please allow 10 working days for cheque clearance. E&OE

Authorised Dealer Soundcraft DRAWMER MACKIE Roland SONY TASCAM FOSTEX

EUROPE'S LOWEST

SIRIUS
DANCE WORKSTATION

QUASIMIDI

NEW

The dance sensation of the year! Following hot on the heals of the award winning Rave-O-Lution 309, Quasimidi bring you the incredible new Sirius keyboard - a complete dance production workstation all in one.

The Sirius features the same acclaimed Analogue Emulation Synthesis as used in the 309, but gives you 3 synth parts with 12 note polyphony as well as the usual drum and percussion sections. But the innovation doesn't stop there, the built in Vocoder can take its modulator and carrier signals from any combination of internal or external sources (or the accompanying gooseneck mic), and for any budding DJ producers, the Sirius can be synced directly to a record deck or other audio source by automatic tempo analysis. Built in FX, a 4 octave velocity sensitive keyboard and a mod wheel that's assignable to multiple parameters simultaneously, round off a tour de force keyboard that is the hottest dance product of 98!

Call now for full details - we're so confident you'll love it, we're offering a 7 day money back guarantee! (Please call for full conditions)

FACTORY DIRECT **£799.99**

Wave
Synthesiser

waldorf

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

PRICES FROM **£6299.99**

K5000s
ADDITIVE SYNTH

KAWAI

In this age of many 'soundalike' sample + synth keyboards, it's not often you get something coming along with a completely fresh approach. Kawai have dared to be different though with the K5000S, and reintroduced additive synthesis. This has been tried in the past, but the limited DSP power has severely curtailed the possible results. The only method of synthesis that can theoretically produce any possible sound, additive has a palette which ranges from superb acoustic simulation, to timbres quite unlike those offered by any other synth. The inclusion of a traditional synthesis section complete with an incredibly powerful filter means it's also a cinch to create fantastic analogue style sounds, and a generous complement of knobs which all send MIDI controllers add to the ease of use.

Incredible new low price only at Turnkey!

RRP ~~£1199~~ **£849.99**

RACK VERSION ALSO AVAILABLE only £699.99

AN1x
VIRTUAL ANALOGUE SYNTH

YAMAHA

Incredible end of line exclusive deal on the Yamaha AN1X - widely regarded as the best sounding virtual analogue keyboard on the market! Yamaha's custom DSP chips provide immense processing power, and this combined with their R&D department's finest algorithms give the AN1X its huge sound. Many presets were created by top UK session programmers, so you can be sure they're spot on, and the array of knobs makes creating your own patches a breeze. With a 5 octave aftertouch sensitive keyboard, 10 note polyphony, dual timbrality, a ribbon controller, and built in effects, the AN1x was great value even at its original price - this deal makes it unbeatable. *Demand will far outstrip supply - get your order in early!*

RRP ~~£899~~ **£499.99**

TRINITY
KEYBOARD WORKSTATION

KORG

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!

TRINITY PLUS ~~£1499.99~~
TRINITY PRO ~~£1999.99~~
TRINITY PROX ~~£2999.99~~

RRP ~~£2345~~ **£1199.99**

QS8
EXPANDABLE SYNTH

ALESIS

The QS8 64 Voice Expandable Synthesiser starts with an 88 note piano weighted keyboard, and a powerful 64 Voice synth engine, powered by 8MB of sound ROM which is expandable to 16MB, either through the large range of Alesis QuadraCards, or blank Flash RAM cards for use with the included Sound Bridge sample transfer software. There are 640 programs and 500 'mixes', including a complete GM bank. Four simultaneous multi effects processors based on Quadraverb 2! Built-in serial port for direct interface to a computer, includes free CD-ROM of sequencers, editors, song files, and samples. Unbelievable clearance deal exclusive to Turnkey - *buy now or live to regret it!*

RRP ~~£1299~~ **£899.99**

QS6 ALSO AVAILABLE only £499 QS7 ALSO AVAILABLE only £699

CLP-411
DIGITAL PIANO

ALMOST 30% OFF!

YAMAHA

Excellent value CLavinova available now at fantastic new price! Featuring a fun 88- note weighted Action Effect Keyboard & 7 Stunning Voices, the CLP 411 offer s a real alternative to an acoustic combined with flexibility that only a digital instrument can give. Touch sensitivity, reverb levels and temperaments can all be adjusted to suit the needs of the player, and a PC interface together with MIDI-compatibility means that the possibilities for creative expansion are immense. The built-in metronome and simple recorder are extremely useful for learning purposes, and the two headphone sockets allow undisturbed practice. Available in a dark rosewood grain finish with sliding key cover, 3 pedals and matching bench, the CLP411 looks as good as it sounds. Limited stocks only available.

RRP ~~£1399~~ **£999.99**

CALL PIANO KEYBOARD ON 0800 783 0456 FOR DETAILS

Z-1
MULTI OSCILLATOR SYNTHESIZER

KORG

Korg's Z1 is probably the most comprehensive modelling synthesiser built to date, incorporating 13 different algorithms for scanning emulations of everything from classic analogue synths to incredibly lifelike strings and brass sounds. Phenomenal performance and 12 note polyphony (expandable to 16) mean this is a really sensible instrument, and there's even an optional ADAT lo-mac output board for those of you trying to maintain a fully digital system. Other features like the unique polyphonic arpeggiator and 15 effect types make the Z1 superb value. *Check one out today!*

RRP ~~£1599~~ **£LOW**

ST880
MOTHER KEYBOARD

INCLUDING FREE YAMAHA P50M PIANO MODULE!

STUDIOLOGIC

Turnkey's value fully weighted master keyboard from Italy, the world's largest supplier of keyboard actions. Features 88 notes with patented hammer action to realistically simulate the feel of an acoustic piano. Pitch bend and modulation wheels, full MIDI spec including dual outputs and sturdy build quality.

Ask about our package deals with other modules!

RRP **£599.99**

JP-8000
ANALOGUE MODELLING SYNTH

Roland

Until recently, modelling technology has been used to recreate acoustic timbres, but Roland were the first to specifically model true analogue synthesis with their new Analogue Modelling technology, and believe us, the results are spectacular!

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RACK-MOUNT DIGITAL TUNER

KORG

- Oversize easy to read LED meter.
- Auto tuning with 3 selectable modes: Strobe, Cent, Hz.
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- Built-in microphone is perfect for tuning acoustic instruments.
- 3-Octave reference tone. • Cable check function.

RRP ~~£249~~ **£169.99**

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RACK-MOUNT DIGITAL TUNER

- Rack-mount auto chromatic tuner with large LED meter.
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RRP ~~£149~~ **£99.99**

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XP-60
WORKSTATION KEYBOARD

NEW

Roland

Roland's XP60 builds on the success of the XP50 by adding a host of new features such as a 60,000 note sequencer with arpeggiator, king size LCD display as featured in the XP80, MIDI synchronization, and not forgetting of course the huge range of top quality sounds from the JV1080, and all the extra ones available via the SRJV expansion board series. Initial demand will far outstrip supply - get your order in early!

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CASIO

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DIGITAL 328
DIGITAL MIXING CONSOLE

SPIRIT Soundcraft

NEW

FREE STUDIO QUAD OFFER!

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Free Digitech Studio Quad with all advance orders only at Turnkey!

NEW PRODUCT

£3499.99

FOLIO NOTEPAD
PORTABLE MIXER

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For quality mixing on a budget, this has to be the nearest solution around. Typical Soundcraft quality has been further enhanced by the use of surface mount technology and custom designed rotary pots. 4 mono inputs are provided along with 2 stereo, which also feature RIAA preamps for record deck connection. 2 band EQ and an auxiliary send complete a highly flexible package.

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CONSOLES BY SPIRIT

SPIRIT Soundcraft

Soundcraft's Spirit Studio desks revolutionised the project studio market when they were introduced over 5 years ago offering sound quality and features only previously found on desks several times the price. Even then they were great value for money, but because Soundcraft have recouped their R&D costs, and because of our substantial buying power, they are now available at an unbelievable price. No other desks represents such fantastic value for money, just check out the feature list:

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RRP ~~£1537~~ £899.99 16 ch.

RRP ~~£2063~~ £1299.99 24 ch.

RRP ~~£2804~~ £1999.99 32 ch.

MONITOR 2
MID FIELD STUDIO MONITOR

ALESIS

TURNKEY MEGADEAL!

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Flat bass response down to 40Hz assisted by the substantial ported cabinets which come in a mirror image pair. The three way design with 10" woofer offers superior transparency with excellent quality reproduction across the whole frequency range. Power handling is up to 150w per speaker.

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FOLIO FX-16
16 CHAN MIXER WITH FX

SPIRIT Soundcraft

NEW

Buy a superb quality Lexicon effects unit, and get a fantastic Spirit by Soundcraft mixer thrown in free! The built in Lexicon caters for infinite reverb, delay, chorus and regeneration effects, whilst the mixer features16 mmin inputs, each with XLR and jack inputs, insert points and direct outs, UltraMic preamps, 3 band mid sweep EQ, 4 aux sends, solo in place, and 100 mm Alps faders, and there are also an additional 10 inputs available for stereo sources and FX returns etc.

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C1000 CONDENSOR MIC

AKG

The C1000 has become an industry standard amongst project studio owners and live performers alike, offering as it does a great frequency response, and extraordinarily rugged construction for a condenser mic. It can be phantom powered or used with a 9v battery, and even comes with a polar response adaptor to change from cardioid to hyper-cardioid.

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WMS51BT WIRELESS MIC SYSTEM

High quality diversity radio mic systems have always been the reserve of the professional, due to the high costs often associated with them. AKG's WMS51 system breaks that tradition, offering an unbelievable price / performance ratio. The system consists of a belt pack transmitter which can accept any of the Micro-Mic II series (handling anything from Lavalier applications to bass or electric guitar (extra lo-cutter) whilst reception is handled by the SR51, a half rack receiver featuring balanced and unbalanced outputs, a terminal for squelch OFF (microphone repeaters) and an auto mute facility. *Unbelievable clearance deal only at Turnkey!*

RRP ~~£316~~

£169.99

WMS51HT HANDHELD ALSO AVAILABLE only £199.99

C3000 LARGE DIAPHRAGM MIC

The C3000 uses all of AKG's experience in building large diaphragm mics such as the C12 and C414, but by using modern manufacturing techniques, and only offering two patterns (cardioid and hyper cardioid), the price has been kept to a minimum. Its open sound and superb frequency response make it ideal for vocals, as well as recording grand pianos and a variety of other instruments.

RRP ~~£389~~

£189.99

FOLIO SX
MULTITRACK RECORDING CONSOLE

Soundcraft

The Folio SX represents incredible value for money, offering as it does 12 mono and 2 stereo fader channels, 3 band mid sweep EQ, 3 aux sends and a whole host of other goodies. Optional rack ears also available.

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SERVO 170
AMPLIFIER

SAMSON AUDIO

Samson's Servo 170 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 85 Watts per channel RMS, making it an ideal partner for most of today's nearfield studio monitors. The standard 2u design means it fits nearly most 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 megadeal!

RRP ~~£289~~

£149.99

ABSOLUTE ZERO
by SPIRIT
NEW NEARFIELDS

Soundcraft

The latest addition 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~~

£189.99

ABSOLUTE 2
by SPIRIT
STUDIO MONITORS

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

RRP ~~£269~~

£LOW

CONTROL 5
STUDIO MONITORS

JBL

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 bass help to prevent blown tweeters and a compatible Turnkeysound sub-woofer is also available for only £199.99. Exclusive to Turnkey.

RRP ~~£435~~

£199.99

CONTROL 1 COMPACT MONITORS

These superb compact monitors (RRP £199) are ideal for accurate monitoring on a budget. Sturdy impact resistant casing makes them the only choice for location work.

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£99.99

BUNDLE WITH DENON PMA250 only £269.99

AT4033
LARGE DIAPHRAGM MIC

audio-technica

For years the Neumann U87 dominated the large diaphragm condenser mic market, but at a price. That was until the advent of the Audio Technica AT4033. For about one third of the price, it offers superb sound quality - sparkling vocals and acoustic guitars, and all the kind of qualities you would expect from the best of mic. Now Turnkey have secured a quantity at a new unbelievable price. If you're in the market for a serious microphone, you can't afford to pass this one by!

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RRP ~~£509~~

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RODE

Rode have quickly made a great name for themselves with the NT2 now the NT1 runs out of the stalls at an incredible price. The gold plated large diaphragm capsule gives a superb full frequency response, and a great for all round use and particularly good on vocals.

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SM58
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SHURE

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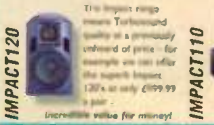

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FROM

£199.99

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TURNTABLE

Technics

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GI-10P
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OVER 40% OFF!

Roland

The GI-10 opens the world of MIDI and computer sequencing to any guitarist. Fast and accurate pitch to MIDI conversion, microphone input jack enabling voice to MIDI conversion, package includes GK-3A controller pickup which fits neatly and effortlessly onto virtually any guitar. *As ever, these will be sold on a first come, first served basis, as stocks are extremely limited.*

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£299.99

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MONITORS
FROM HARBETH ACOUSTICS

Many of today's popular budget monitors sound impressive in the store, with tremendous bottom end and sparkling treble. But mixes made on these monitors can still sound wrong when played on other systems. The problem? Lack of clarity and detail in the mid-range, particularly vital when working with vocals and lead instruments. Harbeth, manufacturers of monitors for the BBC and others for many years, now address this problem with their new expression two-way nearfield monitors, offering great frequency response, and excellent mid-range clarity.

RRP ~~£399~~

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POWERSTATION 600
PA MIXER BY SPIRIT

Soundcraft

The PowerStation has been revamped, and this is the first of a 3 model range. Power is up to 350W per chan, there are 6 mono and 2 stereo inputs, Lexicon effects get 2 editable parameters, there's 3 band mid sweep EQ and now 3 aux sends. Check out these amazing package deals:

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Add 4 SM58s + stands, nylon stands and cables for £499.00

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*We will beat any genuine quote from a UK or European dealer at the time of order. We must be able to substantiate the quote and the goods must be available and in stock. Prices include 17.5% VAT and apply to current stocks only. UK mainland carriage from £9.99. Please allow 10 working days for [illegible] & derivations excluded.

KRK V8

Active Monitors

PAUL WHITE cranks up his laser gramophone and takes the new KRK V8s for a spin.

KRK have been in the studio monitor market for a number of years, but it's only recently that they've made a serious effort to address the mid/low-price segment. This is precisely where their new, aggressively priced V8 monitors are aimed.

The KRK V8 is a two-way, active nearfield monitor in a conventional ported cabinet with the electronic crossovers and power amps built into the back. There are many design benefits from 'going active', not least the ability to optimise the crossover design to compensate for bumps and dips in the frequency and phase response. Sonically, the bass end generally sounds more solid from a well-designed active system. It's also usual to build in speaker protection and sub-bass filtering — both of which are included here.

LOOK 'EM UP

The V8s follow KRK's visually distinctive style — matt-grey cabinets, rounded corners and yellow, woven Kevlar drivers. Power the monitors up (a switch on/off delay prevents thumping) and a small yellow arrowhead lights up on the V8 logo. Built from heavy MDF, the V8 cabinets have a slot-shaped port at the bottom of the baffle. Each encloses 20 litres and measures a compact 11x16x12 inches. An eight-inch bass/mid driver with a roll rubber surround crosses over to a soft-domed, one-inch tweeter at 1.66kHz — a somewhat lower frequency than on most systems of this size. The tweeter is driven by a 70W amplifier and the bass/mid by a 130W amplifier. Both drivers are magnetically shielded to make the V8s suitable for use in audio-visual or computer monitor environments. Active speaker protection is included for both drivers with a reset button on the back of the cabinet. The sub-bass filtering prevents excessive driver excursions at very low frequencies: here a 12dB/octave filter is used that's 3dB down at 31Hz.

Audio connection is via a Neutrik balanced combo connector that can accept either an XLR or a balanced/unbalanced jack. A gain trim is provided to adjust the input sensitivity to suit the output from a mixer or other signal source. To help compensate for room acoustics, there are two three-way toggle switches to modify the frequency response of the system. The bass roll-off can be set to 45Hz, 50Hz or 65Hz; the HF can be set to +/-1dB, as well as flat. The overall frequency response is quoted as 47Hz to 23kHz, +/-2dB.

pros & cons

KRK V8 ACTIVE MONITORS £999

pros

- Clean, detailed sound with very good bass extension.
- Well engineered with electronic protection and response tailoring controls.
- Attractively priced.
- Magnetically screened.

cons

- Slight mid-range coloration, but not significant enough to cause problems.

summary

Though this section of the market is also addressed by the likes of Mackie, Event, Harbeth, Dynaudio, Spirit and Quested, the V8s stand up very well and represent extremely good value.

SOUND ON SOUND

"I've always had a lot of respect for KRK designs... their imaging is good, the sound is detailed without being abrasive, and, in the case of the V8s, the bass extension is so good that even those mixing dance music would probably find no need to switch to larger monitors."

REV 'EM UP

Of course, what really counts is a speaker's performance. As it's important to have a reference when checking monitors, I evaluated the V8s against my passive ATC SCM20s which are pretty neutral (though having said that, it is difficult comparing active monitors with passive ones). As soon as I switched on, it was clear the KRKs had a much 'bigger' bass end than the ATCs, but while some active monitors seem to generate bass for its own sake, here it was very much under control — well-extended, but not obviously exaggerated. The overall tonality is quite close to neutral, erring only marginally on the lively side. To

really nit-pick, the mid-range also seemed just slightly thickened or 'chesty'. But considering their price, these are exceptionally good monitors that are a joy to use.

The included information doesn't include a maximum SPL figure, but I had no problem in getting the V8s to go a lot louder than I would normally want to listen. Even with the 65Hz roll-off setting, the bass is still deep, full and very physical. I guess that if you opt for one of the higher bass roll-off settings, the overall headroom will increase further. In a typical small-to-medium project studio, you probably wouldn't want to use the deepest bass setting anyway, as it would almost certainly provoke room resonances.

PARK 'EM UP

I've always had a lot of respect for KRK designs because they provide a very workable solution to monitoring. Their imaging is good, the sound is detailed without being abrasive, and, in the case of the V8s, the bass extension is so good that even those mixing dance music would probably find no need to switch to larger monitors. Any deviations from absolute neutrality are so small that you would soon learn to work with them. In any case, there's no such thing as a perfect monitor, no matter how much money you have to throw at them. Fortunately, you don't need to throw that much money at the V8s, so if you're in the market for an active monitor in this price range, make sure you get to hear them. SOS

E £999 including VAT.
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DACS FwS ColOSCIL2

Ring Modulator

If you're after sonic strangeness, ring modulation is a good place to start. PAUL WHITE finds out whether the ColOSCIL sounds as big as its name.

Ring modulators have long been an essential ingredient in electronic sound design and advanced analogue synthesis — you only need to listen to some of the more creative dance records or sample CDs to see that it still rates pretty highly on the weirdness stakes. However, they're not often found in stand-alone form: DACS apparently made their versions because a reggae musician asked them for something that would "f*@k with the sound". The result was the FwS series of ring modulators, of which the ColOSCIL 2 is the first in production.

FWS?

Housed in a 1U rackmounting case, and with front and rear panels that look like a stomach's-eye view of an hour-old pizza, the ColOSCIL 2 comprises two independent ring modulators, each with a main input, a modulator input and a mono output, all on unbalanced jacks. (See the 'Ringing The Changes' box if you're not familiar with how ring modulation works) There's a single oscillator with a five-position switchable frequency range, plus both tune and fine-tune controls, and the main input passes though an equaliser (controls labelled Weight and Edge) before it hits the modulator circuit. The oscillator has a range of from around 0.2Hz to 16kHz, and it can be routed to the modulation input of either or both ring modulators by means of buttons on the front panel. These have status LEDs, as does the EQ, and there's also a power LED, but no power switch. When the EQ is switched on, the Edge control produces brighter harmonics, while Weight produces a warmer, deeper sound.

There are no input gain controls, no meters, and no clip LEDs — all signal level control must be done at source, and as the manual recommends input levels of between +4dBu and +12dBu to get a sensible output level, you'll probably need to use the device in conjunction with a mixer or other suitable preamp. Taking the input from a conventional keyboard's output jack results in virtually no output at all — you have to remember that this is a multiplier type of circuit so both signals need to be fairly large to give a sensible output.

MODULATE WHAT?

So what can you get out of it? The answer depends on what you feed into it, and the manual provides several useful suggestions. Feeding a sustained keyboard sound into the main input and a drum loop into the modulator input produces the kind of weird, grungy sound you get on a number of 'industrial' dance music sample CDs, and the nonharmonic elements often make the sounds seem distorted in unusual ways. Feeding the two outputs of a stereo keyboard into the two inputs produces something more like the old analogue synth ring-modulation sounds, and is particularly effective for turning limp bass sounds into FM basses from hell! Using the supplied oscillator as the modulator can produce strange bell-like tones at higher frequencies, whereas at lower frequencies it creates an unusual modulation effect that adds both chorus and strange harmonics at the same time. Most of the time, harmonically simple inputs produce the most musical outputs, with complex sounds or chords resulting in audio chaos. Often you'll hit on two inputs that produce something quite stunning, but you must experiment to give serendipity time to do its stuff. The result is rarely musical in the conventional sense, unless you're feeding the same pitch into both inputs, and even then you may find one note sounds great while another sounds awful. This is definitely a tool for creating one-off sounds that you can sample for later use.

LORD OF THE RINGS?

This is a particularly good ring modulator with no audible breakthrough when either input is removed, but I found the lack of input metering rather awkward, especially as the unit is pretty critical about levels. Similarly, the requirement for signals of up to +12dB cries out for a variable gain input control. Those comments aside, this device worked perfectly and enabled me to create an endless succession of fascinatingly weird sounds from the most innocuous of input sources. I feel it's a little on the pricey side considering its lack of facilities (though it isn't cheap to build), but its technical quality should endear it to serious sound designers, dance composers and anyone engaged in creating sounds for sample CD libraries. SOS

pros & cons

DACS COLOSCIL 2 £478

pros
- Excellent technical performance.
- Easy to use.
- An endless source of weird sounds.
- Two independent channels for creating two different weird sounds at the same time!

cons
- No input level metering.
- No input gain controls.

summary
A basic but high-quality pair of ring modulators suitable for serious sound design and electronic music experimentation.

SOUND ON SOUND

RINGING THE CHANGES

A ring modulator processes two inputs such that the output comprises the sum and difference frequencies of the inputs, but with the fundamental pitches of the inputs removed. This requires a balanced modulator circuit that in the old days was based around a couple of centre-tapped transformers and a ring of four diodes — hence the term 'ring' modulator. In up-to-date designs the process is more likely to be undertaken with four 'quadrant multiplier' chips. The important things to know are that the output is only present when both inputs are present, the sum and difference output frequencies will most likely be nonharmonically related to the input, and the original signals will not form a part of the output. Modulating a voice or instrument with a simple oscillator produces anything from robotic voices to atonal, bell-like timbres, while putting the same pitch into both inputs provides a harmonically changed sound that's one octave higher than the original.

info

£ £469.99 including VAT.
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W www.dacs-audio.co.uk

Roland

BLUE SYSTEMS

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Rolands new 16Trk, 24Bit digital studio, Call for details.

SP-808

Roland are about to change the face of DJ's for ever. The SP-808 features Rolands new D-Beam infra-red controller, intuitive sampler and digital recorder. A unit beyond words...

MC-505

The MC-505 builds on the successful MC-303 as a self contained, retro styled dance music sequencer. DJ, Hip-Hop, Techno or dance dream

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dbx 266XL

Compressor/Gate

Does the new 266 compressor from dbx really excel? PAUL WHITE finds out...

With the signal processor market so crowded it must be very difficult for a manufacturer to come up with a new product that will fire the imagination of the end user — which is probably why so many resort instead to building 'me too' products and trading blows on prices. Nevertheless, dbx have a long-held reputation for building VCA compressors that have a specific sound (as opposed to being transparent), so they've been careful not to change things too much when designing the new 266XL.

PHYSICALLY

The dbx 266XL is a fairly standard looking 1U rackmounting 2-channel compressor/gate, though the gate is actually a variable-ratio expander, making it rather more flexible. Much of the compression stage is based on that of the popular dbx 160, and to provide the greatest flexibility there's an OverEasy/Hard-knee switch and the option of manual or auto Attack and Release settings. OverEasy is, of course, dbx's own interpretation of soft-knee compression.

The unit is mains powered, though there's no mains switch, and the audio ins and outs are on both balanced XLRs and balanced jacks for convenience. Unbalanced jack connections may also be made using regular single-pole jack leads. Side-chain insert points for the compressors are also present, in this case on TRS jacks. RF filtering is provided on the main input and the insert send and return points.

Two controls, Threshold and Ratio, are used for the Expander section. At high ratios (4:1 is the maximum) the expander behaves much like a conventional gate, whereas at lower ratios the gain control is much more progressive, making it more useful for dealing with non-percussive sounds. A red LED comes on when the signal is below threshold and a green LED lights when the signal exceeds it. Any gain reduction due to the expander shows up on the main compressor gain-reduction meter which, quite frankly, I found confusing and rather unsatisfactory. In practice, you have to back off the expander threshold so that the expander isn't working before you can set up the compressor properly.

The compressor has rather more controls, featuring knobs for Threshold, Ratio, Attack, Release and Output Gain. Ratio is continuously adjustable from 1:1 (no compression) to hard limiting. A 3-LED system shows when the input is below threshold, above threshold or (when OverEasy is selected) in the OverEasy area. Gain reduction is indicated by a 9-LED meter. A button selects hard or OverEasy mode, and a second button overrides the Attack and Release controls to provide program-dependent operation.

> "On vocals it's good for creating an overtly compressed sound, and it also works very well on acoustic guitar."

pros & cons

DBX 266XL £300

pros
- Delivers the classic dbx compressed sound.
- Comes with a very smooth expander.
- Good technical spec.

cons
- Expander and compressor share the same gain reduction meter.
- Auto mode still produces audible pumping on some material.
- Less effective at routine gain reduction jobs where you don't want to hear the compressor working.

summary

A cost-effective way to acquire classic dbx compression, with a very nice expander thrown in.

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dbx 266XL

Auto mode is designed to duplicate the characteristics of a 'classic' dbx compressor, according to the manual, though elsewhere in the manual it's stated that setting both attack and release to their 12 o'clock position will also produce the traditional dbx sound. The term AutoDynamic (followed by the inevitable trademark symbol) is mentioned in conjunction with the attack and release characteristics of the unit, though no description of its operation is included.

SUMMARY

I get the impression that most dbx compressor fans treat these compressors more as effects than as a means of controlling dynamic range, and if you view the 266XL in this light it works very well indeed, especially on drums and bass. On vocals it's good for creating an overtly compressed sound, and it also works very well on acoustic guitar. However, if dbx have added the Auto mode and

"I get the impression that most dbx compressor fans treat these compressors more as effects than as a means of controlling dynamic range."

A single Bypass button works on both the expander and compressor sections, and both channels may be linked for stereo operation using the Stereo Couple button.

IN USE

I know a lot of engineers who love the dbx sound for treating bass guitars, and the 266XL doesn't disappoint in that area. It is also effective on individual drum sounds, though when you're processing a whole kit there's a tendency for the compressor to pump noticeably. Of course, pumping is a characteristic of many vintage rock and pop records, so it may be that this effect is exactly what you want. Oddly, even setting OverEasy and Auto together still results in a fairly obvious compression characteristic, and when using more than around 8dB of compression on vocals I found that the Auto setting sounded distinctly fluttery. I achieved better results by setting the time constants manually. Similarly, I found it very difficult to get any worthwhile results on complete mixes, as the compression was always too unsubtle for my taste — I like to use fairly transparent compression on mixes. Hard/Soft switching in an attempt to make the 266XL more of an all-rounder, I don't really think they've succeeded.

Technically and ergonomically this unit is excellent, with the exception of the shared gain reduction meter and the lack of a separate expander bypass switch. However, for me the 266XL is still best suited to getting those classic dbx 'compressed and loving it' sounds, and is less attractive as a general-purpose compressor. With that in mind, I'd recommend it to anyone who already has a reasonably transparent compressor, but I wouldn't want to have it as my only means of compression. SOS

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LA Audio SPX2

Source Switcher

PAUL WHITE switches on to a box which provides a dash of extra source for the smaller mixing desk.

The studio world is generally divided into 'must have' cutting-edge products and those boring but essential tools that make recording possible — patchbays, cables... that kind of thing. LA Audio's SPX2 definitely falls into the 'that kind of thing' category, but its usefulness is so obvious that I'm surprised nobody has done it before.

Large consoles have comprehensive source select sections so that you can choose whether to hear the stereo mix or the output from, say, one of your DAT machines, a cassette deck or a CD player. However, if you have a smaller mixer, you generally can't do this without repatching all your leads.

That's where the SPX2 comes in. This rather neat 1U, mains-powered, rack-mounting processor provides the means to connect up to six stereo sources and then route them to two pairs of switchable outputs, each of which has a separate level control. Even if your desk has no source selection at all, by connecting this box between your mixer out and one or two monitor amplifiers, you get all the monitoring flexibility of a big desk.

If that's all the SPX2 did, it would be useful, though not exactly scintillating. However — and pay attention because this is the almost exciting bit — each input has its own gain trim control that can accommodate anything from -10dBV to +4dBu, and if two or more sources are selected at the same time, they are mixed together. Moreover, the first input has its connection and level control on the front panel, making it easy to patch visiting bits of gear into your system. In addition to the two Level controls and On switches, the output section has a Balance control, a Mono button and a Dim button, just like a large console. Because the two outputs are independently switchable, the SPX2 makes it possible to feed two separate monitoring systems — for example, a main monitor amp and a smaller nearfield system. Switch-on clicks are prevented by muting relays and the input connectors come in various types to suit the equipment most likely to be connected. There's even a headphone output with its own level control.

The two main stereo outputs from the unit are on balanced TRS jacks, but there's also a pair of phonos wired as tape outs so that the selected source can be recorded pre the Dim, Mono, Level and Pan controls. Only three of the inputs are balanced. Input one is on XLRs, inputs two and three are on TRS balanced jacks, and the remaining three are on phonos (and therefore unbalanced). Signal levels of up to 20dB can be handled without clipping, with the gains of channels two to six adjustable via trim pots accessible by screwdriver on the front panel. Input one features two additional balanced jack inputs on the front panel complete with a -10dB to +10dB Gain knob.

Each of the inputs is activated by a non-latching button with accompanying amber status LED. To select more than one input, it's necessary to hold down all the buttons of the relevant inputs at the same time. Pressing any other button cancels the previous selection.

That's about is as far as the SPX2's functions go. However, because it has the ability to mix multiple stereo inputs, it can function as a very basic mixer as well as a monitor source selector. For example, if you have a small digital desk, such as Yamaha's 03D, that has only one stereo input in addition to the main input channels, you could use the SPX2 as an effects return submixer to combine the stereo outputs from up to three balanced and three unbalanced effects units. The preset gain trims would only need to be set once since, from that point on, the effect level would normally be adjusted by setting the appropriate send level.

pros & cons

LA AUDIO SPX2 SOURCE SWITCHER £299

pros

- Useful and versatile source selector/mixer.
- Clean signal path.
- Integral headphone amplifier.

cons

- Expensive.
- Select switch logic could be more logical (captain)!
- Some users would no doubt prefer all balanced inputs.

summary

Though relatively costly, the SPX2 does provide full scale monitor selection, complete with a headphone outlet, as well as having basic mixing capability.

SOUND ON SOUND

SUMMARY

A simple but functional product, the SPX2 does a pretty good impression of a Swiss army knife — even though it doesn't have a tool for taking stones out of drummers' hooves! It fills a genuine need, it has a clean signal path, and it's flexible enough to have a number of uses in the typical small studio or production suite. My only criticism is the selection procedure for multiple sources — having to hold down several buttons at once is a little awkward. Latching switches or the facility to select multiple buttons one at a time while holding down the first one might have been better. Try as I might, I can't find a way to justify the SPX2's cost, especially as you can buy a complete mini mixer for less. The reality is that most users are reluctant to spend any significant amount of money on anything that doesn't make an interesting noise, so unless LA Audio can find a way to make this product cheaper, I don't feel it will enjoy the success that it deserves. SOS

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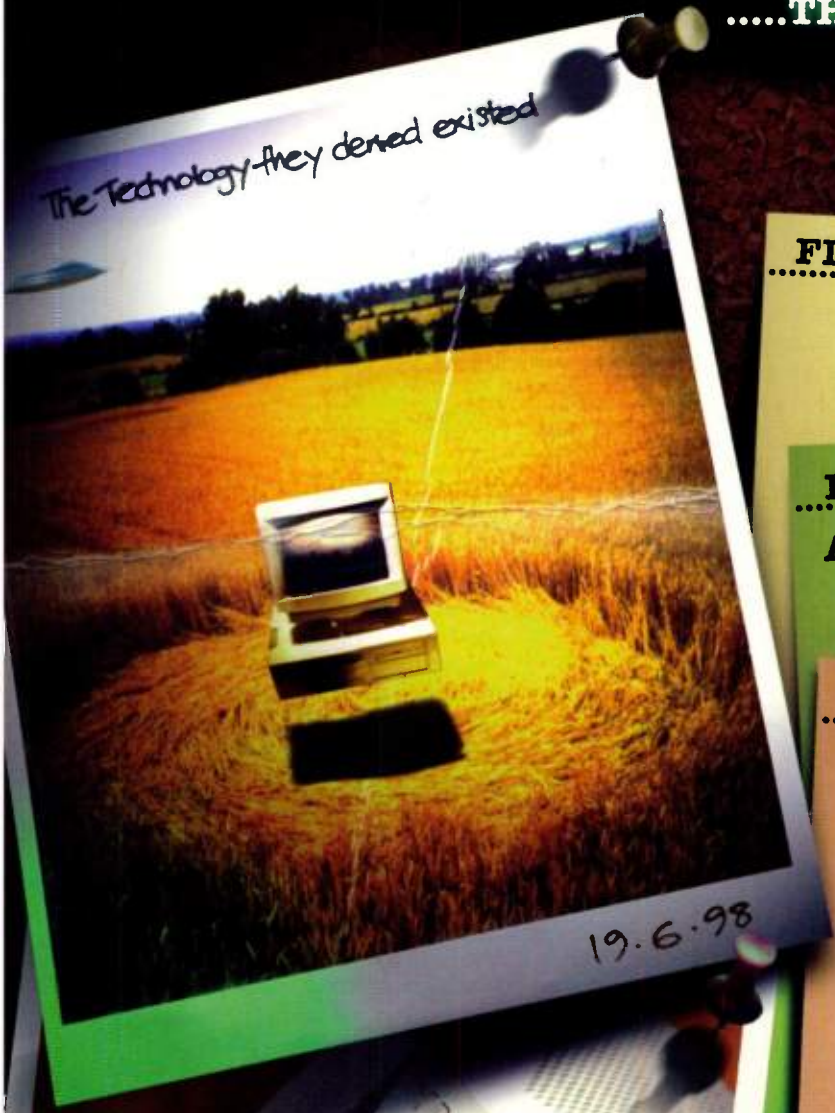

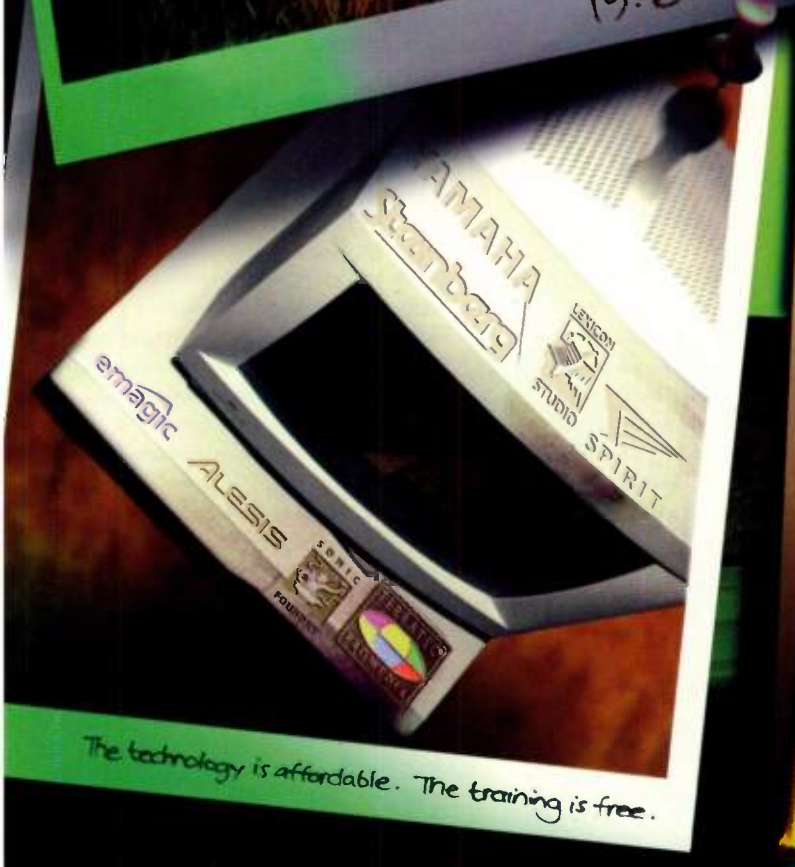

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Beyer MCE7

Miniature Microphone

Though they're usually not specifically designed for recording, miniature mics can be real problem solvers in certain situations. PAUL WHITE checks out a small wonder from Beyer.

Miniature microphones tend to be designed with live theatre sound or broadcast in mind. In these situations there's often a need to get a mic close to a person or other sound source without it being visually obtrusive. However, they can also be useful in live recording if you have a singing guitarist who wants to record vocals and acoustic guitar at the same time: using a miniature microphone attached to the guitar can help reduce the amount of vocal spill entering the guitar mic. Miniature mics are also very helpful when you're dealing with a performer who tends to move around a lot.

MIGHTY ATOM

Beyer's MCE7 is a tiny, electret, omnidirectional microphone available in both black and flesh-coloured finishes. Because the mic is so small, it comes bonded to a thin cable, and the review model was fitted with a Lemo connector enabling it to be plugged directly into a standard radio transmitter, though alternative terminations are available, including free ends for soldered connection. Whichever termination is used, the microphone requires a DC-bias power supply of between 1.5V and 10V, which isn't directly compatible with the 48V phantom power used in most studios — nor is the Lemo connector a natural mate for an XLR socket. This is where an accessory with the memorable name of a CV15PV-L comes to the rescue. Looking rather like an in-line transformer, this device accepts the Lemo connector at one end and a standard XLR mic cable at the other, at the same time converting regular phantom power to something the MCE7 can use.

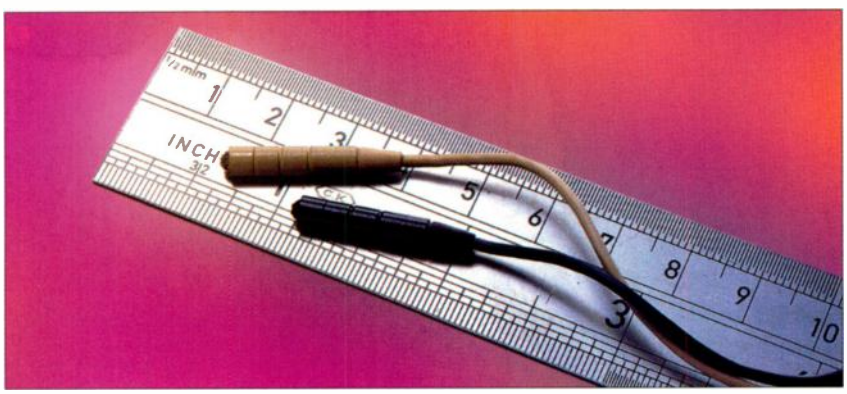
Technically, the mic has an impressive spec, with a response that's nominally flat from 20Hz to 20kHz, a presence lift at around 9kHz, and a very gentle LF roll-off below 100Hz. Between 100Hz and the start of the presence rise at around 4kHz, the response is ruler-flat. The maximum SPL is around 120dB, so although you don't get the same headroom as a really good conventional mic, there are few situations where it would run into trouble. Similarly, the sensitivity, of 28mV/Pa, is rather less than you'd expect from a normal capacitor model, but is quite adequate for the close-miking situations in which such a mic is invariably used. In fact, the only area in which performance is compromised to any noticeable degree is signal-to-noise ratio, a problem that besets all miniature microphones to some extent. This is quoted as 60dB, but in a real-life situation I found that the level of noise was not intrusive.

GIG TEST

Supplied with the mic is a tiny clip, little more than a bent piece of wire with a plastic pad attached. While this is ideal for use with theatrical clothing (it renders the mic virtually invisible), it leaves much to be desired for miking instruments, as there's no positional adjustment available at all. I tested the mic at a live acoustic gig and used it on the acoustic guitar, as the player has a tendency to move around a lot yet doesn't like the sound of his guitar DI'd. The clip gripped well enough on the edge of the soundhole, but because the mic couldn't be repositioned it was awkward to get it into a position where it produced a good sound and also wouldn't be hit by the player. Ultimately, this edge-of-the-soundhole position was abandoned because of the tendency of the mic to feed back at relatively low levels, so instead I resorted to clipping it so that the capsule was inside the guitar body rather than outside. As you might expect, this produced a noticeable rise in bass, but it also resulted in a much stronger signal with no feedback problems, so I decided to roll off a little bass on the mixer and stick with this new position. The outcome was a beautifully solid yet articulate guitar sound that seemed much more natural than you'd normally expect from a bridge transducer or contact mic. What's more, the mic stayed put with just a tiny strip of masking tape over the clip, and it also survived the player's attempt to walk off stage at half-time without unplugging it!

SUMMARY

Despite the inflexibility of the clip, this mic turned out to be a very good performer, and if I had been recording that gig it would have been well up to the task. The presence peak was probably responsible for the mic's tendency to feed back at high frequencies when used at high gain settings, but such spectral tailoring is common on miniature mics, to help compensate for the position in which they're generally worn. I wouldn't use any miniature mic through choice where a fixed mic could be used as an alternative, but when you're recording live acoustic players the compromise is often well worthwhile. SOS



pros & cons

BEYER MCE7 £175

pros
- Wide, flat frequency response (with presence peak).
- Very compact.
- Range of accessories makes it very versatile.

cons
- Supplied clip offers no means of positional adjustment.

summary
This is primarily a broadcast/theatre mic, but it has a number of recording applications, especially if you're working with live acoustic instruments.

SOUND ON SOUND

info

£ MCE7 £175; with CV15PV-L £304.32. Prices include VAT.
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PEAK LIMITER LED
Shows Limiter activity.

Roland DJ2000

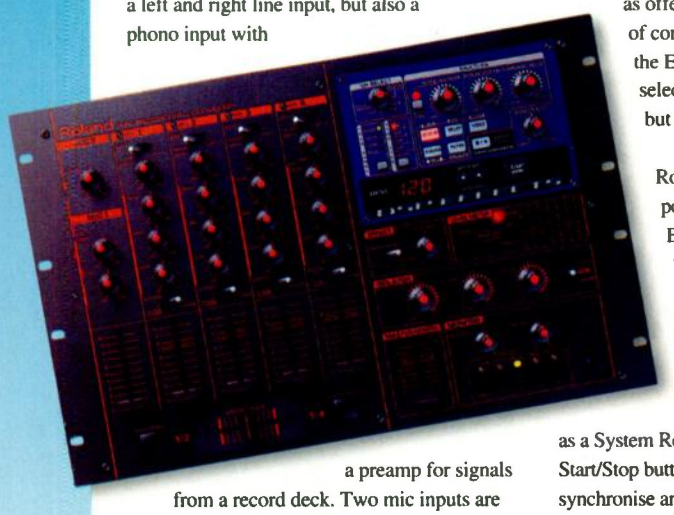
Professional DJ mixer

This DJ mixer boasts powerful effects and BPM-driven MIDI control software. Wearing his finest dancing trousers, PAUL FARRER finds out more...

As the European club scene continues to mushroom and club-goers become more discerning about a DJ's 'performance', so the DJs themselves are demanding higher levels of control and sound quality from their equipment. Enter the DJ2000, Roland's stab at providing as many features as the modern DJ could need in a single rack-mountable unit.

THE MIXER

The DJ2000's mixer section features four stereo channels, each with independent gain controls and 2-band EQ. The first channel has two sets of stereo line inputs (for two CD players, for instance) and the fader is switchable between these inputs. The other three channels each have a left and right line input, but also a phono input with



a preamp for signals from a record deck. Two mic inputs are available — one with both unbalanced XLR and quarter-jack options and a simple 2-band EQ, and the other with a single jack socket and gain control. Both inputs are controlled by a single fader, but unfortunately the XLR input isn't phantom powered, which limits the type of microphones you can use.

There's a large green LED, which acts as a simplified VU meter (or Beat Indicator, as Roland call it) at the top of each channel strip, and all four channels are assignable to either the master output directly, or to the horizontal cross-fader. The cross-fader will be familiar to most DJs, and allows signals from channels 1 and 2 to be mixed with those from channels 3 and 4, the centre position allowing equal levels of both signal groups to be heard. The cue section allows you to monitor incoming signals of each channel before they reach the master output stage, and the controls in this section are particularly clear and well laid out. The desk feels very sturdy and creates a real 'pro' feel.

MIDI CONTROL & EFFECTS

The effect section offers a small seclection of well-chosen and usable effects relevant to the dancefloor. If you're looking for tasteful reverbs, forget it, but if your DJ performance could use one of the most grainy and exciting pitch-shifters around, or a groovy filter-controllable flanger, look no further. Selecting an effect is a doddle, and you can specify whether you want it applied to all signals sent to the master output or just to the individual mic and line channels. The ratio of effect to dry signal is adjustable with the Effect Balance knob, and all the effects are editable using the three edit control knobs. These tweak the most obvious effect parameters and give the whole unit a real analogue feel, as well as offering the user a tremendous sense of control. On the downside, even with the Effect Balance knob at minimum, selecting a new effect sends a slight but audible click to the master output.

One of the biggest carrots that Roland are dangling in front of potential buyers is the DJ2000's BPM-calculation software. This 'listens' to the incoming signal from the selected channel and (to the nearest tenth of a BPM) works out its tempo. This is then displayed on the small LED screen and transmitted from the MIDI socket as a System Real-time Message. Using the MIDI Start/Stop button, DJs with MIDI rigs could synchronise and trigger pre-programmed MIDI sequences and sampled breakbeats live during a performance. Using the unit to trigger drum loops on my Emu Orbit module from a dance CD proved very successful. Unfortunately, unlike some other BPM-calculation tools such as the Red Sounds Beat Xtractor (see *SOS* February '98) the DJ2000 doesn't continually self-adjust for slight inconsistencies in tempo, and if it wanders away from the source signal too much you have to point it in the right direction using the Push/Pull controls. These slightly speed up or slow down the transmitted MIDI signal until it re-synchronises with the track. There's also a Tap Tempo button, which you can tap in time with the beat of your track and it quickly corrects the timing.

CONCLUSION

Understanding that these days the professional DJ is much more than a bloke down the pub with two turntables and a glitter ball, Roland have come up with a desirable piece of kit in the DJ2000. It's full of the kind of features that creative DJs, particularly those with more complex setups, will find invaluable. The MIDI implementation is good (if a little basic) and the effects are well suited to the club environment. The whole unit has a solid and dependable feel and gives you the impression that even if you spilled three pints of Grolsch over it, it would still perform brilliantly!

At £899 it's not cheap, but considering the features on offer (too many for a review of this size) is great value for money. Roland are obviously targeting a serious and professional type of customer with the DJ2000, and if you're either serious or professional the chances of being disappointed by this mixer are very small indeed. SOS

pros & cons

ROLAND DJ200 £849

pros
- Compact and highly versatile.
- Easy to use.
- Great effects section.
- Useful MIDI sync function.

cons
- No phantom power for the mic input.
- Selecting a new effect makes a 'click' at the master output stage.
- BPM tracking doesn't auto-correct itself.
- No MIDI thru.

summary

A highly specified, great sounding mixer with tons of creative potential. With its solid build and ease of use it deserves to be a big success, even though its price tag puts it towards the upper end of the DJ market.

SOUND ON SOUND

info

£ £849 including VAT.

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TL Audio Ivory

Two-Channel Valve Compressor

PAUL WHITE finds the best of both valve and solid state worlds in TL Audio's latest compressor.

TL Audio's C5021 is the latest in the Ivory series of hybrid valve/solid-state signal processors and combines a dual-channel compressor with a pair of gates. The valve circuitry is in the preamp and gain control stage of the compressor, while the output and side-chain circuitry is solid-state. In theory, then, the user gets the best of both technologies for far less than the cost of an all-valve design. The preamp valve stage has variable drive allowing the amount of valve 'flavouring' to be adjusted.

Packaged in a nicely-engineered 2U rack case and finished in 'intensive care' off-white, the C5021 offers a choice of a high Z jack, instrument level input, an unbalanced -10dBu line level jack input or a balanced, +4dBu XLR input. The outputs are also available on both jack (-10dBu unbalanced) and XLR (+4dBu balanced) with further TRS jacks providing side-chain insert points for the two channels. A nice touch is the provision of separate input and output gain switches on the rear panel to increase the jack operating level to +4dBu and the XLR to +18dBu. This could be useful for interfacing with digital gear that expects to see a level of around +14dBu to produce a digital full scale reading.

As with other units in the Ivory range, the feature set is simplified compared with TL Audio's Indigo range which it supercedes. For example, the compressor doesn't have variable attack and release controls, just a pair of Fast/Slow buttons, though there is some programme-dependent element that makes this arrangement rather more flexible than it first appears.

LIGHTNING TOUR

The Input Gain control, which sets the drive to the first valve stage, is monitored by an amber LED indicating the amount of drive, while a red LED warns of imminent clipping. Oddly, the compressor comes before the gate. Presumably this is so any noise generated by the compressor is also silenced, though working this way around can make the gate threshold more tricky to optimise. In addition to the Fast/Slow time constant switches mentioned, the compressor section has a fully variable +/-20dB threshold plus a Ratio control that extends from a gentle 1.5:1 up to a stiff 30:1. A built-in compressor hold time of around 10ms prevents distortion when working with low frequency sounds, and like some previous TL Audio designs, the soft-knee gain control circuit combines both feedforward and feedback signals to derive the sidechain signal.

The usual make-up gain control is fitted to the compressor output. However, a further output gain stage comes in series with this, after the compressor In/Out button, but before the gate. Even when the compressor is bypassed, the input valve stage is still in circuit, so you can use the preamp and gate without the compressor. Gain reduction is shown on back-lit, circular, analogue meters which may be switched to monitor the output signal level (post all gain controls). The gate section has only a single threshold control with the fully anticlockwise setting effectively disabling it.

pros & cons

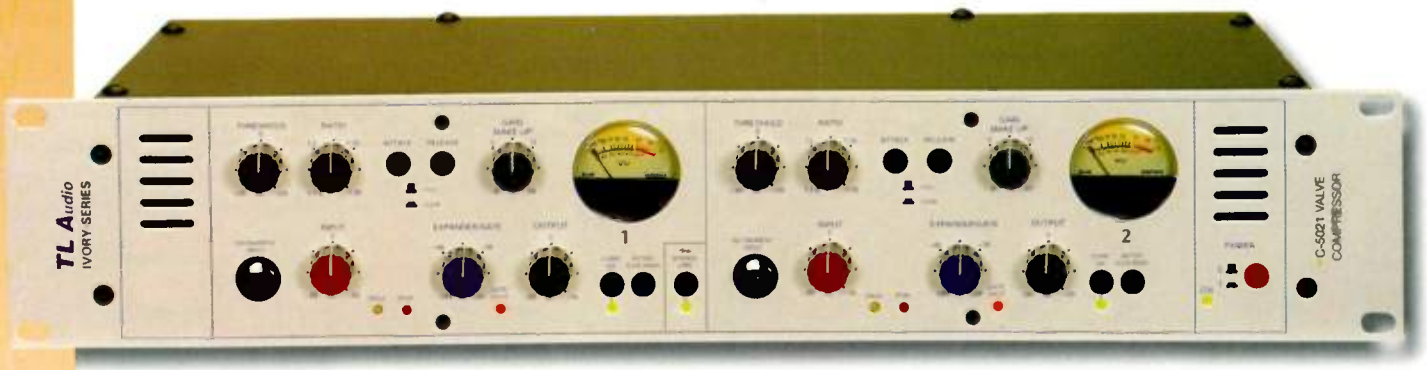
TWO-CHANNEL VALVE COMPRESSOR £469

pros
- Super smooth compressor.
- Effective tube warmth stage.
- Offers both line and instrument inputs.
- Realistically priced.

cons
- Gate a little fierce at higher threshold settings.

summary
A genuine bargain with very few shortcomings.

SOUND ON SOUND



"The compressor is a great all-rounder that sounds flattering, yet still very natural..."

C5021

IN USE

The compressor has the same gentle but flattering character as other TL Audio units I've tried. Though there are only two time constant buttons on the compressor, I didn't have any trouble at all getting the effect I wanted. Using the slow attack setting gives instruments such as acoustic guitar, bass and clean electric guitar a bright, well-defined attack, while choosing the faster setting produces a warmer start to the note. At modest settings, the compressor is both subtle and musical, while with high ratio settings and a fast attack time, it makes an effective limiter.

Being able to bypass the compressor while leaving the valve preamp active is useful, but I'd have liked an overall hard Bypass button so that I could take the whole box out of circuit in one go. The valve stage definitely adds warmth to the sound as you increase the input gain to the point where the amber LED starts to flash, but not in the coarse, muddy way that some competing units do. Bringing in the compressor with the threshold set so as to prevent any compression taking place seems to emphasise this warming effect slightly, presumably as a result of having two valve stages in series.

That leaves just the gate, which seems to have fast attack and a preset release of around one second. For signals with little in the way of background noise, the gate works perfectly, but if you have a noisy signal that necessitates a higher threshold setting, the gate can be provoked into clicking. A more gentle expansion characteristic would have been preferable, but for most routine jobs, the gate is fine.

VERDICT

On balance, the C5021 is an exceptional performer at the price. My only criticism is the provision of a rather fierce gate where a gentler expander would have been more forgiving.

The compressor is a great all-rounder that sounds flattering, yet still very natural, and the tube warmth circuit goes just far enough without letting you overdo the effect. Having an instrument input also means the C5021 works well as a deluxe DI channel, and I used it successfully with both electric guitar and bass.

Once again, a British manufacturer has proved that you don't have to buy an expensive import when the home grown equivalent is often both better and cheaper. SOS

info

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Softly does it!

NATIVE INSTRUMENTS *GENERATOR* v1.5 PC SOFTWARE SYNTH

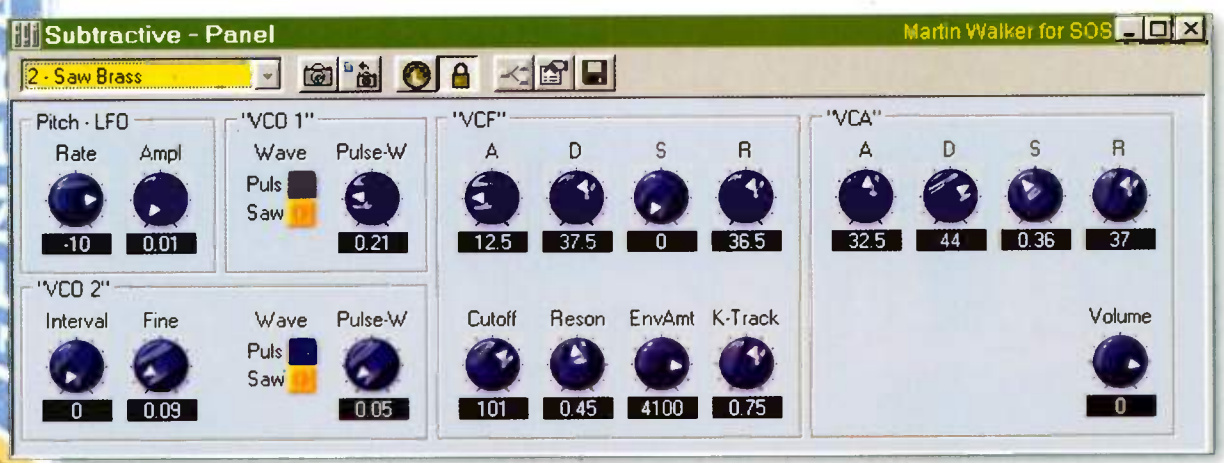
PC owners who fancy a full modular synth for less than £200 need look no further. MARTIN WALKER connects more virtual modules than you can shake a patchcord at.

Judging by the response to the recent review of the Clavia Nord Modular synth (see the two-part *SOS* review in April and May '98) there are plenty of people out there who fancy running their own modular monsters. Although the Nord Modular uses PC software for designing patches, it is the DSP chips in the hardware that actually do all the hard work. Taking this one stage further, various manufacturers have dispensed with the additional DSP circuitry, and created complete synths in software. Not only are the patchcords virtual, but the entire synthesizer (including all the oscillators, filters, and amplifiers) is also created inside the virtual world of the computer. Given the power of today's PCs, it is now possible to perform all the calculations in real time, so that you can audition the sound while you tweak the virtual knobs.

Generator (from Berlin-based Native Instruments) is a software synth that will run on any Pentium PC (100MHz or better). The more processor power you have, the greater the complexity and the more notes you'll be able to use. Much like the software for the Nord Modular, *Generator* uses a completely modular interface. You can assemble any desired combination of the building blocks provided and connect them with virtual patchcords. However, in addition to the more traditional synth facilities, the program also enables you to design your own circuitry from scratch, from the modules and connections, to the front panel, complete with knobs, faders and buttons. You are not restricted to synths either. The supplied library contains a ring modulator, vocoder and several step sequencers, all assembled from the lower-level building blocks. This gives *Generator* huge sonic potential... but it doesn't stop there. The program can also be used inside other applications as a DirectX plug-in, so that you can design your own effects and use them within, say, *Cubase VST*.

THE LAYERED LOOK

Once you have installed the software, you need to set it up for your soundcard. In the Options menu, Audio Port lets you choose between the standard MME driver, the Audiowerk8 (with lower latency), or the Native Instruments' Generator card, as well as DirectSound drivers (if your soundcard has them). If you open *Generator* from within another application like *Cubase VST*, ActiveMovie is used instead. The MIDI option enables *Generator* to be played from an attached MIDI keyboard, although you can also play notes using the computer keyboard, which is very handy during editing



The easiest way to use Generator is to leap straight into the front Panel of one of the supplied synth designs.

POWER AND PERFORMANCE

The two potential problem areas with software synths are overhead (in other words, the proportion of your processor power used) and latency (the time between playing a note and hearing the sound). The latency of *Generator* is very dependent on your soundcard. There is a Play Ahead setting in the Audio menu which you reduce until you start to hear clicks and glitches. At this point, edging the value back up will give the fastest glitch-free response for your system. The smaller the value, the shorter the delay, and the more responsive your synth.

I got very good results with my Event Gina, and found that I could reliably use the lowest setting of 10mS, which compares very favourably with Seer Systems' Reality (reviewed in *SOS* November '97), which I recently measured at 8mS. When switching to my AWE64 Gold card, I had to raise the setting for Generator to 20mS using its MME drivers, but this was still very usable.

sessions. Finally, the Audio Settings option determines the latency setting, both for input (Record Ahead) and output (Play Ahead). See the Power and Performance box for further details.

Once you have the main *Generator* window open, you will see the default building blocks ready for use. Audio Out is the interface to your soundcard, and also provides overall Level and Tune controls. The Audio In block is used if and when you need to record new samples, or when processing incoming audio. Apart from these, what you see is a dummy 'instrument' already connected to the Audio Out module.

Native Instruments have their own nomenclature for the program's building blocks at the various levels of operation. Thankfully for the casual user, there are about 140 ready-designed Instruments in the supplied library. These include a wide range of more than 70 synths neatly arranged in 10 folders with names such as Atmosphere, Basic Analogue, FM, Modelling, Organ, Pads+Strings, Percussion, Soundeffects, Various, and Vintage. Other available Instruments comprise the 41 effects blocks, which include chorus, compression, distortion, filters, flangers, delays, echoes, panning, ring modulation, tremolo and vocoder, plus step sequencers and samplers.

After selecting an Instrument, you simply connect it to the Audio Out module by clicking on its Out, and then dragging the resulting patchcord across to the Left or Right of the Audio Out, and then again for the other audio channel. The Instrument is then ready to play. If you want to add an effect, simply right-click again to choose one, and then re-connect this between the synth and the Audio Out.

The exciting part comes when you right-click on any Instrument. This brings up a further menu with editing options (Mute, Cut, Copy, Delete, Save As), followed by the three more advanced options of Panel, Structure, and Properties. Clicking on Panel launches a window with a set of virtual analogue knobs, switches and sliders. You can now start tweaking in earnest, and, whenever you create a good sound, save it as a snapshot. Snapshots appear in a drop-down list and can be stored, deleted or renamed, or selected using MIDI programme changes. You can save them as part of the Instrument before you exit, so that you build up a complete bank of sounds associated with each Panel.

There is one operational layer higher than the Instrument, and this is the Ensemble. This lets you set up an entire collection of instruments and position any combination of Panels on the screen. Each Instrument can be given its own MIDI channel for multitimbral operation, and when you next open the Ensemble, everything will be set up ready for use in just as you left it.

DELVING DEEPER

You can explore the design of any Instrument by examining its structure, and this is where the lower level components and their interconnections are found. Structures can contain Modules or ▶

DirectSound drivers should give lower latency if your soundcard has them, but make sure you have the latest version. *Generator* pushes the drivers hard, and you may get crashes with older drivers.

Running the huge number of complex calculations required to produce real-time audio will necessarily take a significant chunk of your processor overhead, and unless you can devote your PC to this single application, you will need to know whether there will still be enough power left to run a sequencer alongside. A basic VCO/VCF/VCA chain, with two ADSR envelopes and an LFO took 31 per cent of my Pentium 166MHz MMX machine for four voices at 44.1kHz. However, you can reduce overhead by selecting a reduced sampling rate. At 33075Hz and 22050Hz this reduced to 25 per cent and 17 per cent respectively.

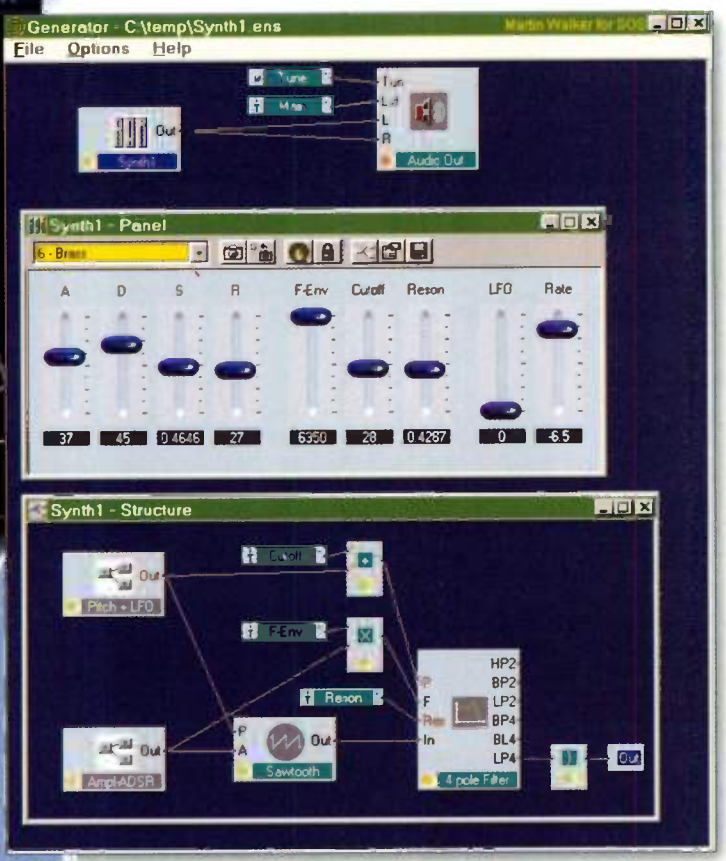
Another option is to adjust the maximum number of voices. A rough mock-up of the Minimoog Model A (three VCOs, one VCF, one VCA) took 17 per cent at 33075Hz sampling rate with a single voice, but this only increased to 44 per cent with five polyphonic voices. As always with software, you can expect proportional changes in processor usage in line with processing power.

Macros allow you to concentrate on the creative connections, rather than having to 'hand-wire' every knob and fader to each individual control point.

For each component, the Properties box lets you modify such variables as the range of a control, its response to MIDI, and how it will appear graphically in the Panel (knob, fader, switch, and so on). You can also edit the Panels themselves using click and drag to arrange the controls as you wish. There is a useful tutorial in the manual and a help file to guide you through the creation of your first simple synth using basic modules.

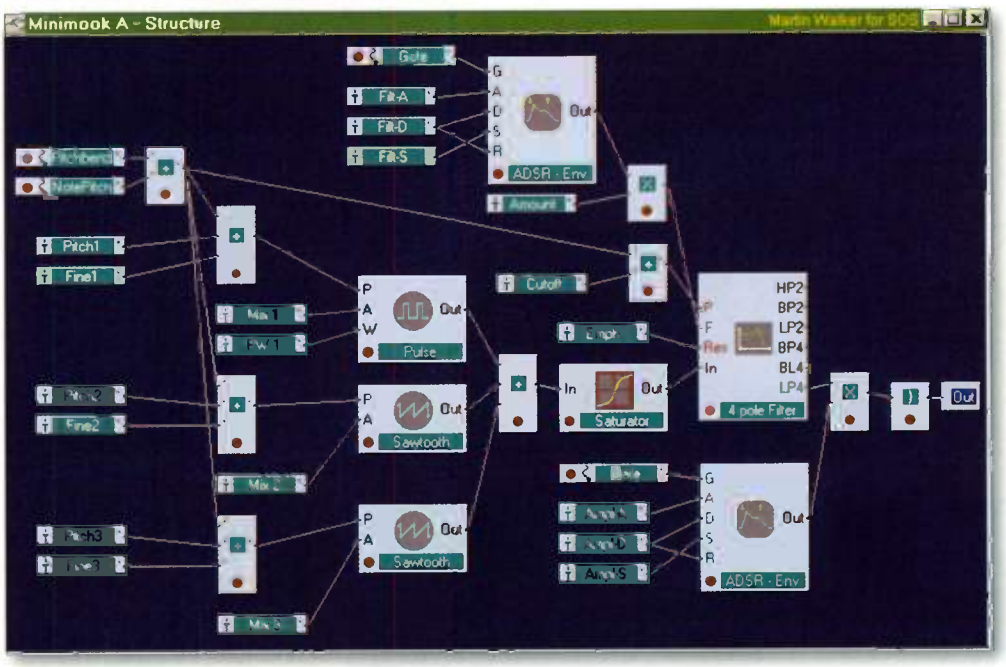
GETTING REAL (TIME)

For many people, one of the big attractions of the modular synth is the ability to tweak knobs in real time. Moving any on-screen control will generate



Left: The main screen of Generator shows the modules and their interconnections. At a higher level, the Panel (here superimposed) provides access to the actual controls for tweaking. The Structure of each module can be shown as well for design purposes. By keeping these separate, you can edit on a nice clean front panel.

Below: If you want to create your very own synthesizer, the Structure level allows you total control over every connection, while the Panel can still be a model of cleanliness.



Macros. Modules are the individual building blocks, ranging from switches, knobs and faders through to oscillators, filters and amplifiers. There is a huge range available (with 33 types of oscillator alone).

However, although you can get really deep into synthesis and delve into individual switches and amplifier stages, Native Instruments also provide more than a hundred Macros. Comprising advanced assemblies (such as RingMod which contains no less than 21 individual modules), these a MIDI output that can be recorded into a sequencer.

The number of notes (or indeed multiple synths) that you can run simultaneously depends on how much processor power you can spare. With a Pentium 166MHz MMX processor, I had no problems running any of the supplied instruments and ensembles, but they did typically take between 25 and 50 per cent of my processor power. If you intend to run a sequencer as well, then you would really need a more powerful processor than this.

pros & cons

NATIVE INSTRUMENTS *GENERATOR* PC £169

pros

- Works with nearly all soundcards.
- Up to 64 voices/16 multitimbral parts.
- Can be used as a DirectX plug-in inside another application.
- Easy-to-use interface for both casual and expert users.
- Huge variety of sounds available.
- Knob movements can be recorded as MIDI events in a sequencer.

cons

- Needs a powerful PC if you want to run a sequencer as well.
- Performance can be dependent on soundcard drivers.

summary

A very well-designed and comprehensive modular synth system at a bargain price, which should provide a huge amount of programming pleasure to a wide range of people.

SOUND ON SOUND

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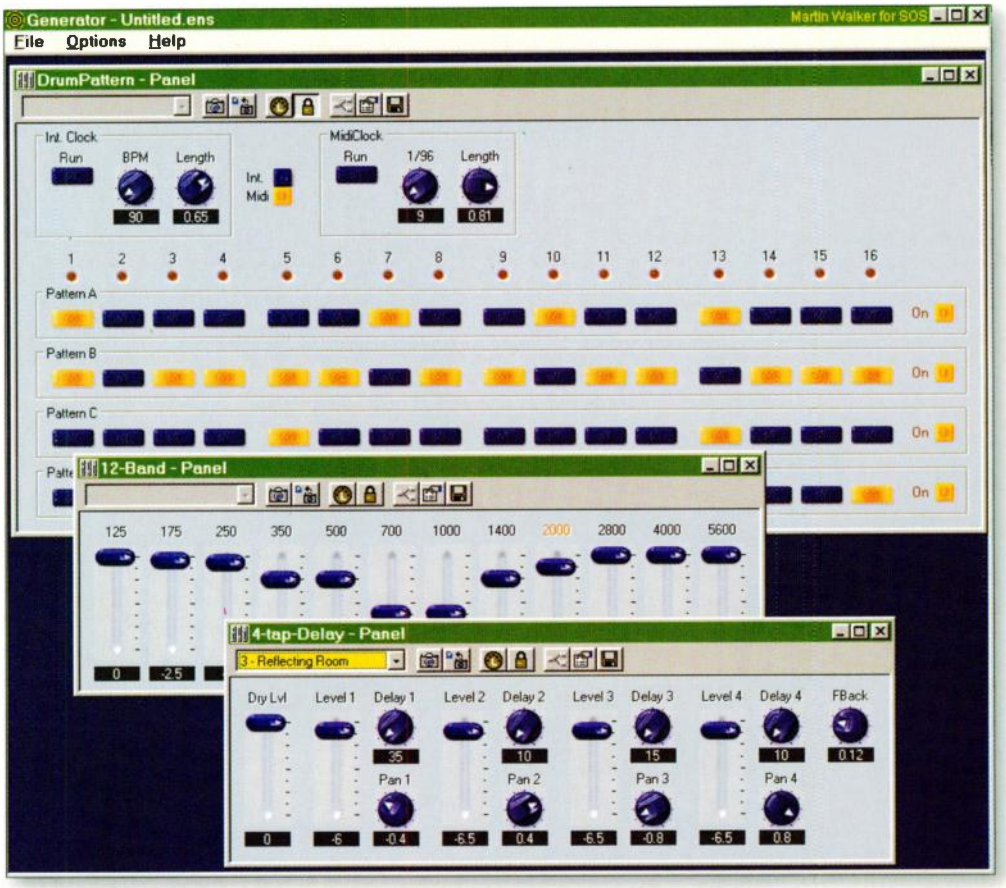
NATIVE INSTRUMENTS *GENERATOR*

You're not restricted to designing synths. Here is a pattern-based drum sequencer which can be linked to any four drum sounds, a 12-band graphic equaliser, and a four-tap delay.



Performance is also somewhat dependent on soundcard drivers, particularly on the input side, and it would be worth checking out the demo with your own soundcard for full compatibility.

I lost many hours working with the many synths already provided, as well as producing several variations of my own. Apart from creating more traditional oscillator/filter/amplifier designs, along with FM and modelling synths, there are many more possibilities for generating unusual sounds, or even new forms of synthesis. Native Instruments' web site also provides updates and designs from other users for free download.

Another joy was working inside *Cubase VST*. It only took me a couple of minutes to assemble a 'sample and hold flanger through four-tap delay' effect patch which I then used as a channel insert.

TO SUM UP

Generator is a very open system with an easy-to-use and attractive interface which offers a tremendous flexibility of approach. It enables you to work at many different levels depending on your particular interest and expertise. Those who lock themselves away for days could produce amazingly complex Structures, but then let other people access the sounds via an easy-to-use front Panel or Ensemble, which hides away the possible confusion of patch cords. Ultimately, sonic quality will be determined by your soundcard. If it has a flat and wide frequency response, low noise and low distortion, the software will provide you with an excellent-sounding synth with a huge range of possibilities.

> "I've tried out several software synths, but most of them are not a patch on this one!"

I was very impressed with it, despite some teething troubles with my soundcard drivers, which should be sorted out shortly. It will certainly appeal to the inveterate experimenter, especially at its bargain UK price of £169. You can also buy *Generator* directly via the Native Instruments web site by credit card, and a demo version is freely available. I've tried out several software synths, but most of them are not a patch on this one! SOS

info

£ £169 including VAT.
A Turnkey, 114-116 Charing Cross Road, London WC2H 0DT, UK.
T +44 (0)171 379 5148.
F +44 (0)171 379 0093.
E info@native-instruments.de
W www.native-instruments.de

MODULES AND MACROS

Although there is not enough space here to provide a comprehensive list of the Modules and Macros (there must be several hundred in all), here is a small selection to give you a taste. Many of the simpler Macros are in fact basic Modules, but with all the required controls already attached.

- **Control and Display (faders, knobs, buttons, and switches, lamps and meters).**
- **Delays, Samplers and Tapedecks (10 in all).**
- **Envelopes (10 types including AD, AR, and ADSR).**
- **Filters (10 types from one-pole to four-pole, and various EQs).**
- **LFOs (six varieties).**
- **MIDI Source (Gates, Note, Trigger, Pitch-Bend, Aftertouch etc).**
- **Mixers (including Crossfade and Pan).**
- **Modifiers (15 in all, including Clippers, Saturators, Dividers, Sample and Hold, and Randomiser).**
- **Oscillators (23 in all, including basic analogue waveforms, PWM, Sync, FM, Multistep and Noise).**
- **Sequencers (six- to 16-step).**
- **Switch matrixes (up to four-in, four-out patchbays).**

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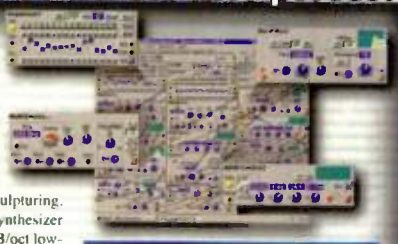
nord MODULAR



With the Nord Modular you are able to construct the "synthesizer of your dreams." Simply drag synth modules out onto the screen, make your connections using "virtual patch cords", and in no time, you'll have your new synthesizer in front of you. The innovative and flexible architecture of the Nord Modular allows for extensive sound sculpturing. How about a 5-oscillator-per-note synthesizer with 5 LFO's, two highly resonant 24 dB/oct lowpass filters with seperate envelopes or maybe a fat string sound with 14 oscillators - in stereo. Move your body to a megafat bass sound built-up with 4 oscillators and a distorted classic analog lowpass filter. Or, why not a classic 6 operator FM patch for that "electric" piano sound or a 24 sine wave oscillator patch for inharmonic spectrum generation.

Clavia proudly presents their new line of electronic drums. The ddrum4 is a new type of electronic drum system built around a newly designed percussion brain and a completely re-designed pad system - THE CAST PRECISION SERIES. The new, much more affordable ddrum4 system offers a large sound capacity, a vast collection of innovative playback features and a completely new pad concept. Check it out, ddrum4 will take your drumming one giant step further.

Features:

Flash memory system ensures sound flexibilty-download samples any time-free of charge!

1000 steps of dynamics

Unparalleled pad trigger interface- fast and precise!

Superior acoustic trigger interface. No need to muffle your drums!

Newly developed cymbal and hi-hat pads - with that right "metal feel"

True two zone cymbals-chokeable!

Groundbreaking hi-hat triggering interface!

Cast Hi-hat mounts onto a standard type of hi-hat stand.

Rugged Chromed Steel rackstand with heavy duty snare basket support.

ddrum 4

ELECTRONIC DRUM SYSTEM

nord lead 2

virtual analog

With the Nord Lead 2, a great concept is being improved upon in many ways. The Nord Lead 2 is actually 4 synthesizers in one. It has 4 multi-timbral channels, each with it's own fully assignable output. This is an essential feature for musicians who need to access sounds independently for further processing and mixing.

Nord Lead 2 comes with an "impressive" 16-voice architecture, a highly beneficial feature when creating layered sounds, "power pads", awesome leads and booming basses. 16 notes are also very useful in an instrument containing 4 independent MIDI channels. The keyboard can be split into two sections.

Also, since the Nord Lead 2 has the ability to use up to four patches simultaneously, each side of a split can contain one or two patches, creating "split/layers" for even more exciting sonic possibilities.

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And don't miss out on our special offer on the TR-RACK.

TR-RACK £699

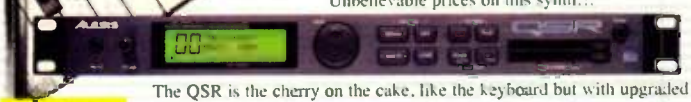
KEYBOARD £499

QS6

Alesis' QS6 synth may not be the latest 'trend' to hit the stores but it has proved itself as a great foundation to work with.
The reason?

- 64 Voices, each with sweepable lowpass filter
- 3 envelope generators & LFO's
- Programmable effects send and QS Modulation Matrix

Unbelievable prices on this synth!!!



RACK £475

The QSR is the cherry on the cake, like the keyboard but with upgraded features like: 16MB RAM expandable to 32MB, 2 PCMCIA card slots, ADAT Digital out and 4 audio outputs. And the fact that it is a rackmountable unit means that you will have more room for all your other goodies.

QSR™
64 VOICE EXPANDABLE SYNTHESIZER MODULE

MUSIC CONNECTIONS

Novation's Supernova has been in development since early 1997 and now has some of the most astounding features to ever appear on an analog synth. A 16 note polyphony, flexible effects structure, 8 audio outs and full MIDI control are just the starting points. Not to mention that this is expandable to double polyphony, programs and performances.

Based on Novation's propietary *Analogue Sound Modelling technology* the Supernova faithfully recreates the *fluid and liquid sound* that until now was only available with vintage analogue equipment. Analogue Sound Modelling Technology in many ways exceeds the capabilities of real Analogue equipment and *is not just a "virtual" imitation* of the real thing.

And don't forget Novation's other stunning products, the BassStation and the DrumStation.

Don't miss out, call now for more details.

novation

YAMAHA

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JOMOX

Roland®

Roland have come back harder than ever with their new sampling workstation and synthesizer. The Sp808 has been built for today's furious needs and deadlines. With it's extreme speed and ease of use it is quickly winning admiring glances from everyone in the sampling market. They haven't forgotten where the Sp808 evolved from either, it's enormous effects bank includes faithfull algorithms from 'Classic' Roland rack effects and Boss effects pedals from the last 20 years!

The JX305
In a world of techno, hip-hop and dance music, you need to be able to find and tweak sounds quickly, keeping the audience movin' as your inspiration hits. Needless to say, any performance synth worthy of taking to a dance or rave-type gig needs to be very tweakable, with lots of knobs and fat sounds at the ready. With this in mind, Roland brings you the JX-305 GrooveSynth.

SP-808 £CALL

JX-305 £CALL

ZOOM

We can now offer this amazing price on Zoom's drum & percussion monster; RhythmTrak 234, but catch it while you can as we can only do this for a limited period.

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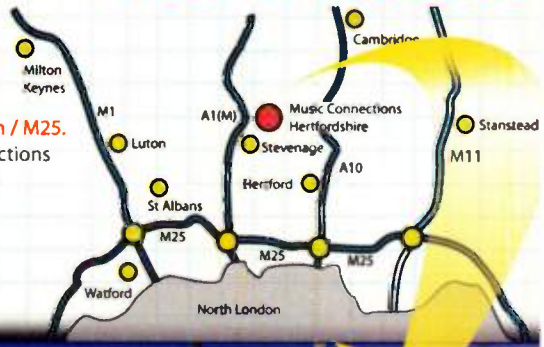


AKAI

The new AKAI samplers have all the capabilities that made the S3000 series the world standard for professional sampling, the new range add features like a powerful multi-mode for ease of layering and multitimbral sequencing, multi-effects card that provides four independent channels of effects, RAM expansion with readily available SIMM memory, flash RAM, MESA graphical Macintosh based front-end etc...

IB-208P

EB-16

IB-304F

FMX008

EQ8/EQ16

IB-8015

IB-802T

S3000XL

£899

Currently top of our hit list is the stunning CD3000XL, as standard this machine includes a CD-ROM player, 8 seperate outputs, 8 Mb memory and solely from Music Connections the brilliant EB16 effects board.

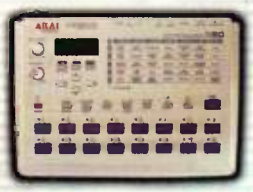
And with AKAI's range of accessories and boards your imagination is the only limit to your creation. Output expanders, Flash ROM, DSP Cards and SMPTE interface cards are all available not to mention all the other industry standard interfaces that we stock.

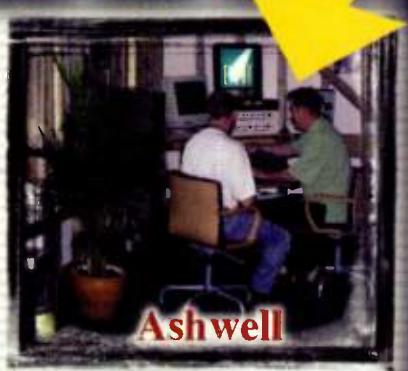
S6000

NEW

S5000

MPC-2000
£849





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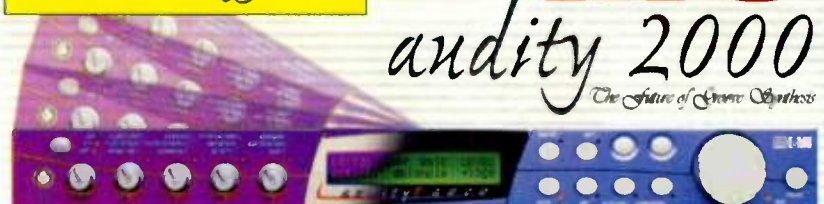
audity 2000

The future of Sound Synthesis



Emu's new Audity 2000 is the latest synth module that introduces synthesis and rhythm generation to give life to your music like never before. The feature list is too long to list please call for more information!

Just arrived from EMU, the stunning new E-SYNTH. Just study the specification below to realise what this new combination can do for you.

Up to 128 note polyphonic • Up to 32Mb High Quality ROM sounds • Up to 32Mb Multitimbral with voice card • 16 Outputs • Digital Modular Synthesis • 64 x 6 Pole filters with 2 filters • 24 bit stereo effects • Advanced 48 track sequencer • Stereo sampling up to 64Mb • Digital resampling • Pc & Mac Editor included • SCSI Interface & 2 Great CD-ROM's included.

As probably the country's largest EMU retailer, we offer the largest range and the best prices on all EMU equipment, you'll see it here first.

Orbit
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Phatt
£549

We believe that EMU equipment is second to none and we are proud to have their equipment on show & on demo in our stores. Great Deals are available on all EMU equipment, if you would like an example just check out the price on the Darwin Hard Disk Recorder on page 8. Even better look at the amazing deals on the Orbit and Planet Phatt and the unheard of deal on the new Audity 2000, pictured opposite.

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MACKIE.

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These consoles offer the highest audio and build quality with easy to use features that take the effort out of superb mixing.

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Still one of the leading mixing consoles in the world for reliability, sound quality, ease of use and ergonomics.
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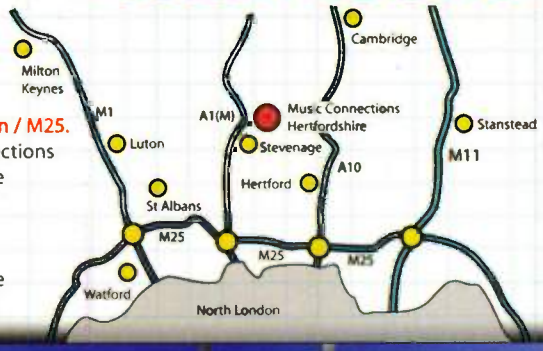

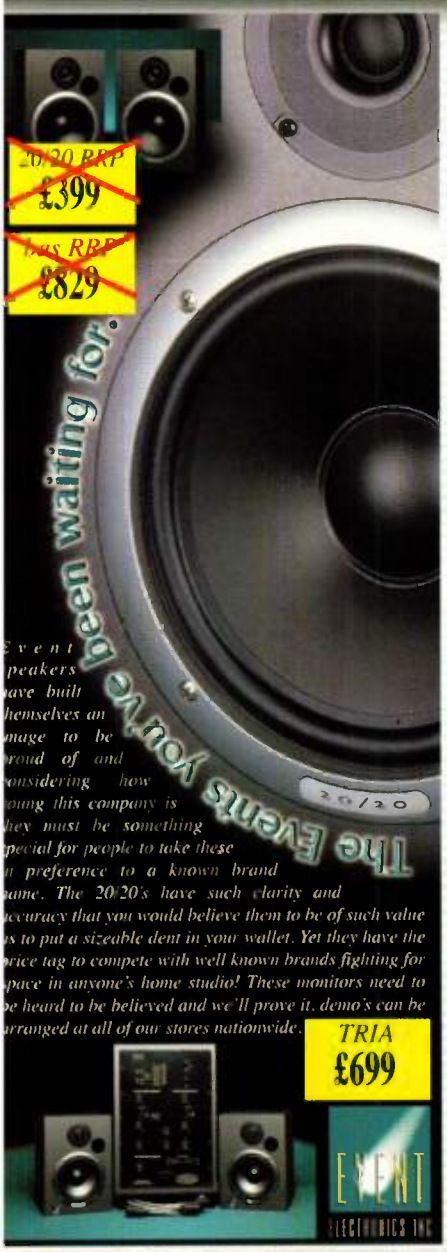

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Mackie's HR824 monitors are receiving rave reviews by magazines and users alike for their combination of servo feedback, passive radiators and waveguides. They offer such a high level of performance at such an attractive price that passing them by is going to be a hard decision indeed.The HR824's deliver main monitor performance for a nearfield price. What's more, the small size and reasonable weight means these make great portable references for the travelling producer. And Mackie's M1400 are just as good.

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Monitor manufacturers are constantly redefining the look of compact monitors and Tannoy are always leading the field in that department. But unlike many other manufacturers Tannoy have redesigned the speaker system aswell, making these little monsters hard to resist. Don't just believe the hype, try them for yourselves at your local Music Connections store.

Come and see what all the fuss is about you have to hear these to believe anything so small could sound so big!

M1400 £CALL

FX processors

DL8000R NEW

AM8000R NEW

Attention has been paid to every detail of the audio circuitry in the new DL8000R Digital Multi-Tap Delay and AM8000R Ambience Multi-Effects Processor. With high Quality sophisticated effects algorithms and parameters, these effect processors provide advanced sound processing power at an affordable price. Intuitive two-control user interfacing allows easy access to each units extraordinary processing power and ultra-large high-brightness vacuum luminescent displays allow effortless visibility under any lighting condition.

Platinum is a range of signal processing tools, for the serious recording musician and project studio owner. from Focusrite - the world's leading analogue processing brand. ToneFactory™ includes all the processing functions you need to give instruments impact, character and control. VoiceMaster™ includes all the processing you need between the microphone and the recorder.

Boss unleashes the SX-700 Studio Effects Processor, a 1U rackmount unit that features standard spatial effects like reverb and delay, the latest four-voice Harmonist (intelligent pitch shifter) and other modulation effects, as well as RSS 3-D effects that can place your sound anywhere in a three dimensional field. Overall, it puts more spatial processing at your fingertips than a whole slew of dedicated effects. And the SX-700 delivers better performance and a more user-friendly interface than ever before.

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NEW

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To find out more visit your local Music Connections store.

RØDE

Australian microphone designer Peter Freedman took the world by storm with his first release, the general-purpose NT2 large diaphragm condenser microphone. The mic features a low noise, transformerless design, a dual pressure gradient transducer with 1" gold-sputtered membranes, selectable high pass filtering, a -10dBV pad, and both omni and cardioid patterns. Yielding a crisp, pristine, yet smooth sound, the NT2 is an ideal choice for vocals and acoustic instruments. Comes complete with a shock mount, widescreen, and flight case.

NT1
£CALL

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audio-technica
The Complete Microphone Solution

The birth of Audio Technica's AT4033A has redefined microphone technology to the point that it is one of the most popular mics available today. A specially-contoured, vapor-deposited gold diaphragm provides accurate reproduction of even the most subtle sounds, especially at high-frequency signals not easily reproduced by conventional large diaphragm microphones. And that's not all, it's uncomparable performance and accuracy come at a surprisingly low price so anyone can afford excellent vocals for the most demanding of projects.

AT4033A
£BEST

NOW IN STOCK GROOVE TUBE MICS CALL FOR DETAILS.

GROOVE TUBES

C3000
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We will beat any advertised price on these two mics!

C1000
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SOLIDTUBE

In 1953 AKG's classic C12 set the standard in valve microphones. Following an extensive R&D program designed to make this legendary technology available to a wider audience, AKG are now proud to present the SOLIDTUBE. By combining the latest solid-state manufacturing techniques with traditional AKG tube technology, the SOLIDTUBE recreates the classic, warm sound of the C12.

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CAD

The introduction of the Equitek series microphones signaled the most significant improvement in microphone technology in decades. The extraordinary transparency resulting from our unique servo design and exceptional flexibilty have created a new 'bechmark' for cost and performance. These mics have received stunning reviews in all pro-audio and hi-tech magazines why not come in and let your ears be the judge!

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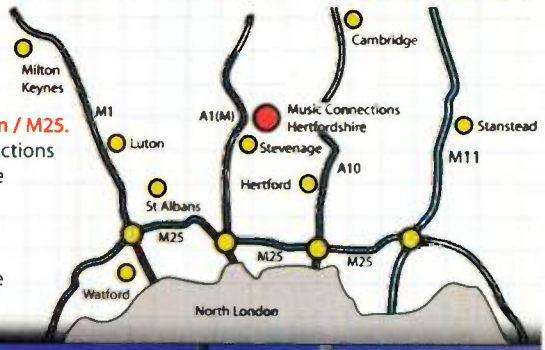

FOSTEX

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Choosing to 'go digital' is fast becoming one of the easier equipment decisions you have to make when considering a new multitrack. But choosing the right digital multitrack can be somewhat more difficult.

Before this decision can be made, you have to be sure that your chosen recorder excels in four critical areas: audio quality, expansion, synchronization and editing.

This is just what Fostex concentrates on when designing a product, their D90 8-track non-linear digital recorder provides all of these points in abundance as well as not breaking the bank. The D160 bears the same hallmarks as it's smaller brother yet with 16 tracks.

NEW FOSTEX FD-4!

The latest dream machine from Fostex promises to be a real winner for quality multitracking on a budget. Designed to look and operate like an analogue multitracker, the FD4 uses a SCSI II port so you can record directly to any suitable SCSI drive, including ZIP's Syquest EZ Flyer and Jaz formats. Call for the best prices!

Roland DIGITAL GROUP

Roland's new VS840P brings the technology of their acclaimed VS880 to the level of a home studio owner. The drop in price has not brought down the list of features, 8 tracks of digital audio, built-in Zip and multi-effects processor, 64 'virtual' sketch pad track and non-destructive editing just top of the list.

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We Will Beat Any Price On These Machines!

To put it in BLACK & WHITE any price that you can prove you have been qouted by another company on products included on this page, WE WILL BEAT.

Amazing Deal!

Roland's VS880 inc. Effects Board 2 gig Drive & Roland Cd-R writer for an unbelievable...

£1699.

Check out the new VS1680 Digital Workstation by Roland, 16 tracks of 24-bit MT Pro recording, 2 gig drive, 10 outputs and SCSI as standard. Specs not to be sniffed at!

KORG

Korg's new D8 digital multi-track recorder is packed with new and improved features for you to drool over. 16 - bit uncompressed recording and playback at 44.1 Khz, 12 channel 4 bus mixer, non-destructive editing and 1.4 GB internal hard disk come as standard and to list all it's other features we would have to double our advertising space.

To get the full details, come in and try one at your leisure.

The KORG 1212 I/O brings the price of full function multi-channel computer based recording to a point that just about anyone can afford. The card features 12 inputs and 12 outputs configured as two analog I/O's, an S/PDIF I/O and an 8 channel ADAT optical I/O. The only sensible choice for those looking for Professional quality at a sensible price!

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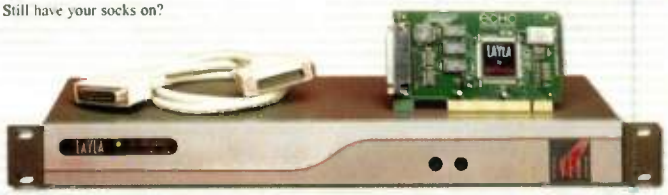
DSP·FX

First the basics: Layla is designed to knock your socks off. It starts with a cross-platform PCI bus-master host card that connects to the rack-mount audio interface. The interface sports eight balanced 20-bit analog inputs, ten balanced 20-bit analog outputs, and 24-bit S/PDIF stereo digital I/O. It's also got massive on-board DSP, word clock (for sync and expansion), a 24-bit signal path, and MIDI in/out/thru. Then we topped things off by giving the system broad-based software compatibility, making Layla perfectly suited for a wide variety of music production applications.
Still have your socks on?



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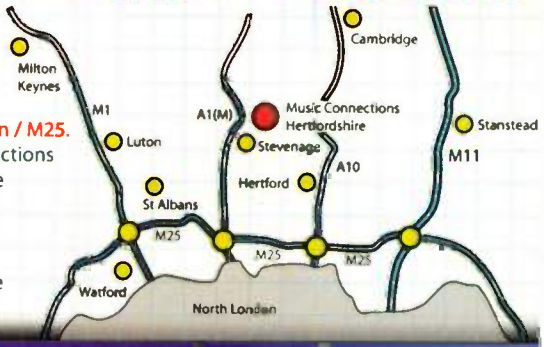

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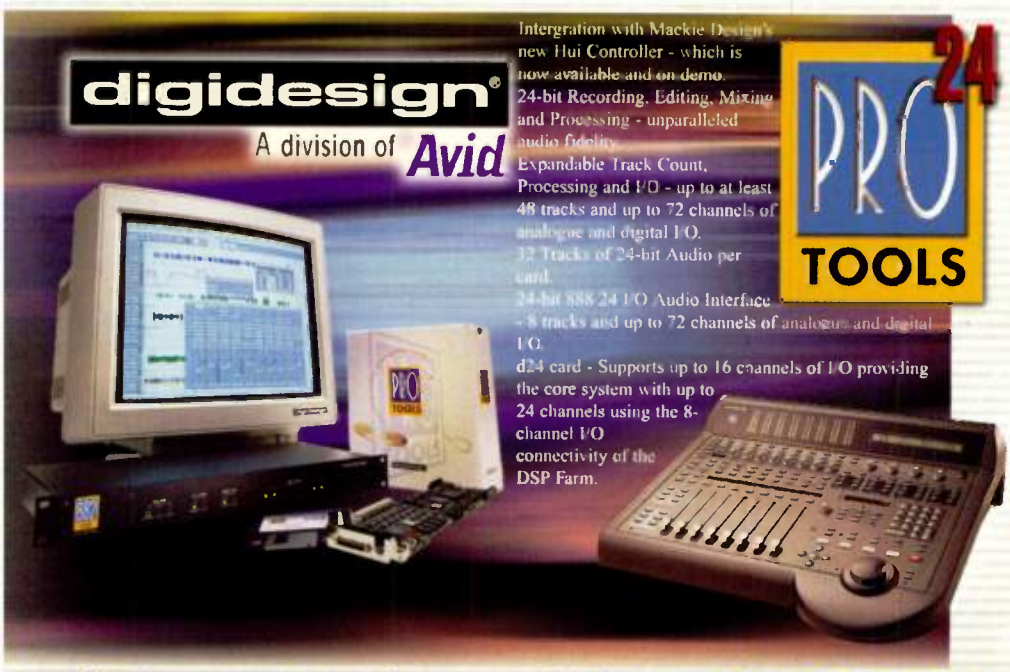

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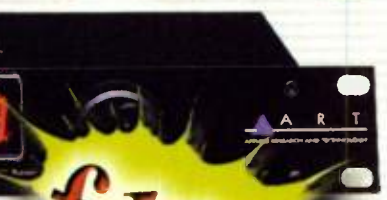

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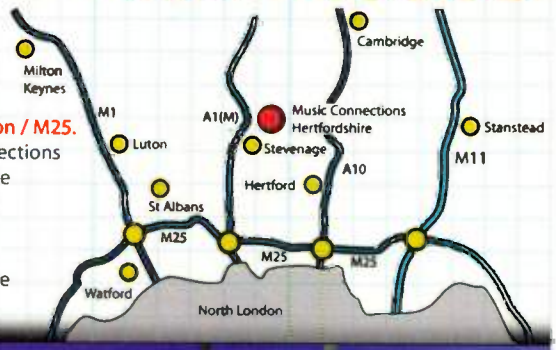

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For those of you with analogue desks who'd like the automation offered by a digital console the DCP-8 is the perfect answer . How about putting one across the outputs of your MDM or sampler for the ultimate in control and sheer audio punch?

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Blue Max is the world's first and only full-featured smart compressor/limiter - a true dream toy. Through innovation, comes a revolutionary product designed to take the worry out of using dynamics processingfor studio recording, live sound reinforcement, broadcast applications and permanent sound system installations.

Blue Max boasts fifteen studio proven preset compressor and limiting settings for those instruments that need dynamics processing the most. Imagine, dialling up the perfect compression setting for that killer snare sound or putting vocals in your face without losing the rest of the mix. How about getting that bass guitar under control? With Blue Max it's as simple turning the detnt knob to the setting you want. Don't worry about threshole and ratio, attack or release, soft knee or hard knee ever again. We did it all for you in one beautifully designed, easy to usehalf rack space unit'

In addition to fifteen presets, Blue Max can be run in manual mode that gives you full control over compression parameters including variable input-output, attack and release times as well as ratio settings from 1:1 to 20:1. Full on-borad metering allows shows input/output levelsand gain reduction. Blue Max can be operated in stereo or mono with high gain mono inputs for plugging in instruments. Blue Max aslo includes a side chain for de-essing, ducking and other forms of spectral processing.

Inputs and outputs are 1/4" TRS un-balanced. Operation is switchable +4dBu or -10dBV. The power transformer is switchable for international operation. Blue Max is housed in a single rack space, all steel chassis and in keeping with the Presonus "no wall wart" tradition has an internal power supply. Using our proven dynamics processing technology.

The ACP-22 is a two channel dynamics processor designed to provide compression, limiting and noise gating in a variety of applications; such as multitrack recording, live sound reinforcement and broadcastand permanent sound installation. In any application , the ACP-22 provides two echannels of crystal clear compression with full control over compression threshold, ratio from 1:1 to infinity, variable attack and release times and switchable hard/soft knee. An auto mode takes the worry out of setting the compressor by offering program dependent attack and release times. A link button allows for true stereo link operation. The ACP-22 has onboard metering for gain reduction as well as input/output meters. Independent LED's show soft/hard knee, auot in/out and channel bypass positions, de-essing, ducking and other forms of spectral processing can be accomplished using the sidechain provided on both channels.

The noise gates on the ACP-22 are unparalleled by giving control over threshold, variable attack and release and switchable gate range (-60dB/-6dB). The ACP-22 also has a unique Lo Pass gate filter which eliminates cymbals and other higher frequency range instruments from opening up drum and/or vocal gates without effecting the audio output. Independent gate key side chain is included in for external triggering and precise filtering. LED's on the gate show gate position open or closed and gate range (-60dB -6dB).

Inputs and outputs on the ACP-22 are either XLR balanced or 1/4" TS unbalanced. Each channel operates at +4DBU or -10DBV, selected via rear panel switch. The ACP-22 is housed in a one rack space, all steel cahssis. In keeping with the Presonus "no wall wart" tradition, an internal power supply with voltage (for international use) is standard.

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20 TIPS ON...

Monitoring

Not even the best monitor speakers guarantee good monitoring — so how do you ensure that you're mixing on the best possible system? Mixmeister MARTIN WALKER leaks some top speaker tweaks...

The final quality of your music depends not only on your skills at mixing — having a reliable monitoring setup is vital to the process. Perhaps the biggest problem faced by those who record in personal studios is that their mixes don't 'travel' — they may sound great on your own loudspeakers, but they sound decidedly unbalanced when played back through other systems. Although you can throw more money at the problem by buying more expensive speakers, this is only half the answer. Indeed, many people create wonderful mixes on very cheap speakers; the art is in knowing how the mix will sound elsewhere. No, the solution is to make sure that you are getting the best sound from whatever monitor speakers you are using, which doesn't necessarily mean spending any more money.

1. If you are about to buy new monitor speakers, or upgrade existing ones, choose something with a neutral sound. Although slightly aggressive, detailed-sounding speakers are very popular, using such monitors as a reference may make your mixes sound bland through more typical systems. One school of thought says that if your monitors have any tonal trend at all, it should be the opposite to that of your music — so if you want music with lots of bass, mix on speakers that are not bass-heavy, and vice-versa.

2. If you have the luxury of expensive monitors with a very clean and detailed sound, remember that subtle background details in your mixes may be lost on more typical systems which have more colouration. For this reason it is still useful to double-check on cheap and nasty speakers, and many engineers use two pairs of monitors — an accurate pair for detailed work, and a more 'typical' cheaper pair for checking how the mix will sound on a real-world system.

3. Choose a sufficiently powerful power amp to drive the speakers properly. It is better to have a powerful amplifier connected to small speakers, coasting along with a super-clean sound, than the other way round. Running a small amp flat out into expensive speakers is an easy way to get unexpected repair bills, since the amp may start clipping when you crank it up. Clipping removes the tops of the waveform, which generates lots of harmonics that could fry your tweeters. If you've ever had to replace your tweeters, this could be the reason, and a larger power amp may prevent the problem recurring.

Many engineers use a pair of cheap speakers in addition to accurate monitors.

4. Make sure that you use heavy-duty cables between the amplifier and speakers. You don't need exotic hi-fi ones — although some people swear by them — but cheap and nasty cable such as bell-flex will compromise your sound, particularly at the bass end. Thicker wiring (some people use solid-core cooker cable) results in a lower overall impedance, which in turn couples your amplifier more closely to the speakers, resulting in tighter and cleaner bass.

5. Speaker positioning can make a huge difference to the final sound. Nearfield monitors (used by most people apart from the dance fraternity) should ideally be about five or six feet apart, and about the same distance from your ears. You won't go far wrong if you position them on two corners on an imaginary equilateral triangle, with your head as the third corner.

6. Keep speakers well away from the corners of the room to avoid boomy bass, and follow the manufacturer's recommendations regarding position relative to the rear wall. Some designs rely on the bass reinforcement that you get when pushing the speaker close to the wall; others will sound balanced only when positioned well away from a wall in 'free space'. Try to place each speaker the same distance from side walls, otherwise they will sound different from each other and spoil the stereo image. It is also advisable to keep their distance from the rear walls as different as possible to that from the side walls, to minimise the effect of the room acoustics.

7. Tweeters should be at ear height, since high frequencies tend to be more directional. For the same reason most speakers benefit from being toed-in slightly, by turning them so that both ▶

MONITORING

Below: A good, simple monitoring setup. Speakers are properly spaced, firmly mounted and "toad-in" to point towards the listener's ears.

Above: A meter bridge may look like a convenient place to put your monitor speakers, but proper stands will give better results. Nor should nearfield monitors be placed on their sides.

▶ tweeters are pointing towards your ears. If you regularly have two people listening side-by-side, reduce this toe-in slightly by pointing each tweeter at an imaginary mid-point slightly behind your heads.

8. Check the speaker toe-in angle by moving your chair forwards and backwards. If you are too far forward, central mono sounds will be hard to pinpoint, and moving too far backward will reduce the width of the stereo image. You will probably find an optimum position for your chair, and if this is too far back then your speakers either need moving closer together (or toe-ing in more), and if you need to sit too close then they can probably be moved further apart. You'll soon get a feel for this, and it only needs to be done once.

9. If you can persuade some friends to help, speaker positioning can be carried out the other way round — by moving the speakers as you listen. Choose the most convenient position for your chair, and then have the speakers moved slowly further apart while you listen in mono. You should get a strong central image exactly halfway between the speakers, but after a certain width this will start to become indistinct.

10. Once speakers are roughly in the correct position, listen to a wide variety of well-mixed stereo material, and adjust the amount of toe-in in for the best sound 'focus'. Try moving your head slightly side to side to check for a suitably wide 'sweet spot' — although its size is dependent on speaker design, it is also affected by how you position the speakers.

11. Nearfield speakers should, as a rule, be mounted on rigid stands, although there are some heavy-duty wall-mounting stands available if you need a position close to a rear wall. If you are keen on DIY, you can find suitable plans for floor-mounting stands in the November '95 issue of *Sound On Sound*.

12. However your speakers are mounted, the idea is to fix them rigidly in the optimum position. Any wobble or rocking will degrade your sound. Think of it like this: every time the bass driver cone is forced forward by the amplifier signal, the cabinet will try to move backwards. If the cabinet ends up moving in time with the music, it not only affects the bass end, but also the high frequencies which are now emerging from a moving source. As the wavelength of sound in air at 10kHz is not much more than one inch, your top end clarity and focus may be seriously affected.

13. Don't perch your monitors on a meter bridge — not only does this compromise rigidity, but the entire top surface of the mixer then acts like a mirror and therefore artificially boosts mid-range frequencies. You can demonstrate this effect by putting a duvet on top of the mixing desk and listening to the difference this makes to the sound.

14. Many floor-mounting stands have adjustable spikes, which are ideal for ensuring that the speakers are both level and stable, even on uneven floors. Placing some pieces of Neoprene (or three or four blobs of Blu-Tack) between speakers and stands will provide a firm fixing, but still leave a tiny amount of 'give' so that bass frequencies won't rattle the floorboards and spoil the bass end.

15. After everything is in position, re-check your monitoring system by listening to some well-produced commercial mixes. If there are still problems in the sound, it will probably be due to the acoustics of your studio/room. Many books have been written about studio acoustics, and if you aspire to producing commercial releases you may need to consult an expert, but there are still many simple things you can do to improve most rooms...

16. Start by making sure that your recording gear is arranged in a reasonably symmetrical arrangement. To ensure the best stereo sound, the left and right halves of your room should ideally be mirror images of each other. You should also try to prevent strong audio reflections bouncing back from the wall behind you and interfering with the direct sound from the speakers.

17. Unless you have a large, acoustically treated room, avoid using monitors with an over-extended bass response as this will only excite troublesome room modes and give you a false idea of what the bass is doing. A low-end cutoff of around 60Hz is quite adequate for most small project studios. Furthermore, a high bass output makes it harder to concentrate on the crucial mid-range — whilst it may impress your clients, it will probably result in a worse mix.

18. Strong early reflections from nearby objects in the room will muddy the sound and cause problems with the stereo image. Imagine that each speaker has a laser beam emerging from it. The direct (and strongest) path is directly between the speaker and your ears. However, there are various other important paths that involve only a single reflection (for example bouncing off the ceiling, or the mixing desk).

You can check for strong reflection paths using a mirror — get someone to hold it on the walls, ceiling, and nearby large objects between your normal listening position and the speakers, and when you can see the speaker in the mirror you have found such a point.

19. Don't put nearfield monitors on their sides (unless they are dual-concentric types) as the sound from the tweeter and bass/mid unit will move out of phase if you move even slightly from the exact centre of the sweet spot. Sideways monitors may look trendy, but they don't work nearly so well as setting them up properly.

20. Finally, check your mixes on several other systems. There is no such thing as the perfect monitoring system and, even if there was, you would still need to check how your mixes are likely to sound on the more modest setups used by most normal listeners. If your mix still sounds good on the car stereo, and in mono through a single 3-inch speaker, you'll know you've done your job well. SOS

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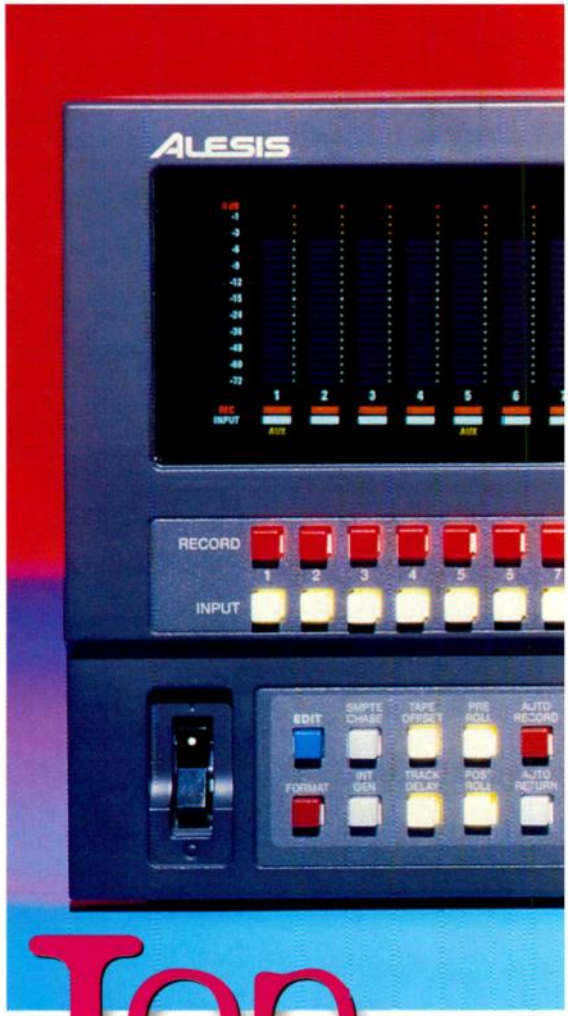
The ADAT format is more often the choice of personal studios than professional facilities —but the M20 is set to change all that. HUGH ROBJOHNS takes the new flagship ADAT for a spin.



Top 20

ALESIS M20 20-BIT PROFESSIONAL DIGITAL RECORDER

The Alesis M20 is aimed squarely at professional recording studios and post-production houses, offering full compatibility with all earlier ADAT recorders, 20-bit audio quality, a complete feature set of essential professional facilities, and a familiar, easy-to-use operational interface.

The main attractions of the M20 start with its ability to play both Type-I 16-bit ADAT tapes and 20-bit Type-II ADAT tapes. The internal converters boast 24-bit resolution, and the analogue I/Os operate with balanced +4dBu levels. On the digital I/O front, an optional card (which was, unfortunately, not available for this review) provides eight channels of AES/EBU interface in addition to the standard ADAT optical link. 20-bit recordings can, if necessary, be dithered down to 16-bit resolution on output.

A major advance is the jog/shuttle wheel which, in conjunction with a dedicated analogue Aux track, allows audio spooling and scrubbing that makes accurate searching easier. There is also a comprehensive set of digital synchronisation facilities, and the tape transport has been built to survive extended use. An integral timecode generator and dedicated timecode track also boost the professional credibility of the machine — though anyone feeling its sheer weight and solidity would, in any case, have no doubt about this.

One potential drawback of the M20, for some users, is that the M20 requires a new remote controller — the CADI (Controller Autolocator Desktop Interface), instead of the familiar BRC. Unfortunately a CADI was not available for this review, and I only have pictures to base my impressions on, but it appears to be well laid-out in terms of its ergonomics. It supports up to eight machines, with remote jog/shuttling facilities, and a full sized display panel to mimic that on the front of the M20. It appears to possess the same air of professionalism as the machine itself, and would not disgrace even the most prestigious console.

PROFESSIONAL QUALIFICATIONS

'Professional' is a word which will appear often in this review — the styling of the M20's front panel alone just oozes professionalism, with the large meter and alphanumeric displays surrounded by a wealth of neat illuminated buttons. With over 80 buttons on the front panel, you might think the M20 would be a daunting beast to operate, but actually the reverse is true. Thanks to the large number of dedicated buttons there are no nested menus, and the ergonomic layout means that functions are grouped sensibly, and buttons appear where you expect to find them. Any function is literally only a button press away rather than three buttons, 12 menu sub-levels, and 15 revolutions of the data entry wheel.

Though I am not an experienced ADAT user, being far more familiar with Tascam digital multitracks, it's a testament to the M20's ease of use that I had no problems at all in finding my way around the front panel, and was confident enough to use it in earnest after only five minutes of playing — and most of that was figuring out how to use the auto-punch modes and setting the internal timecode generator!

So, time to take a tour of the M20's controls. The front panel presents you with five main sets of buttons: the first grouped around the meter display; another below the central alphanumeric display; 17 configuration buttons are gathered in the bottom left corner; the main transport controls are in the centre; and finally there's a set of alphanumeric keys for data entry at the top right.

The transport controls adopt the standard layout, with Record and Play keys adjacent — it's a small thing, but Sony caused a lot of confusion on their version of the DA88, the PCM800, by locating Stop in between Play and Record. Above the Record key is a Rehearse button, for practice runs at automated punch-in/out, and to the left of the Rewind key is a pair of locate buttons. The smaller is a dedicated Locate-Zero button (always the absolute zero time on the tape), and the larger Locate button will take you to whichever of the 99 locate memories has been selected on the main display. Above and to either side of the Stop button are two smaller locate buttons; the left-hand one (Set Locate) saves the current tape position into the next available locate memory, whilst the right-hand one (Copy Tape Location) stores the

pros & cons

ALESIS M20 £7,044

pros
- A professional ADAT at last.
- Audio scrubbing in jog and shuttle modes.
- 20-bit audio path with excellent 24-bit converters.

cons
- Relatively expensive.
- Head-drum and fan noise.
- You'll need the new CADI controller, not the older BRC, to get the most out of the M20.

summary

A truly professional ADAT machine with every facility anyone could wish for and the ruggedness to survive. Expensive, but well equipped, easy to use, and sounds superb.

SOUND ON SOUND

current tape position into the current locator memory.

The large group of buttons to the left of the transport keys deal with the majority of the machine's configuration and utility functions. They are grouped into two sections, differentiated by a darker background under the first 10 buttons. These 10 buttons include the controls for tape formatting, editing of locator and punch memories, setting the timecode generator and offsets, pre- and post-roll times, individual track delays (up to 185mS at 44.1kHz), and automated punch-in/out.

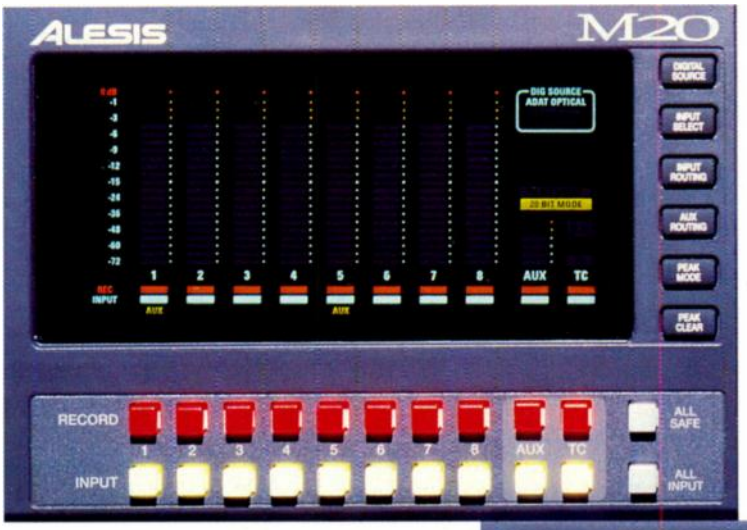
The second set of buttons offer automatic tape/input switching, varispeed, and auto-loop modes. There are also facilities here for metering preferences (peak hold and fall-back times, as well as a handy line-up mode), MIDI control and data dumps, and a wealth of Utility functions. This latter is one of the few control areas that involves any cycling around screen menus but, once the Utility functions are set up, they should rarely need to be altered. There are also facilities here to set the output bit resolution (20, 16-dithered and straight 16-bit), recording and monitoring modes, timecode functions, and to store or recall the selected user preferences on the tape — a very handy facility indeed.

Yet more buttons lurk around the metering display. Below are track arming and input monitoring keys — eight for the digital audio tracks, plus another pair to cover the auxiliary and timecode channels, together with All-Safe and All-Input functions. The column of buttons to the right of the metering display are used in conjunction with the metering display to select analogue or digital inputs (in adjacent pairs), the digital source (optical, optional I/O card, or internal track copying), and input routing. This last facility is a useful function which allows Input 1 to feed all the odd-numbered tracks and Input 2 the even-numbered tracks, or inputs 1-4 to double up on to 5-8, or inputs 1-8 to feed tracks 1-8 directly. There are even more elaborate facilities for internal routing of digital signals from the optical or optional digital I/O card to alternative tape tracks, enabling an input to be routed to any other track(s).

The analogue Aux track has a dedicated input on the rear panel, but selected tape tracks can also be recorded to it; an Auto mode copies the currently armed tracks, so that the last overdub is always available on the Aux track as a guide, and for audio scrubbing. The Aux track output is available on a dedicated rear-panel XLR, but it is also output on whichever channels were used to make the Aux recording. So, if the Aux routing took tracks 1-4 for the cue track, then the cue signal when jogging or shuttling would be carried by outputs 1-4 as well as the Aux output.

This is a great idea, and avoids the need for a dedicated channel on the desk just to provide audio scrubbing via the Aux output. Nonetheless, I spent ages (with my brain disengaged) trying to figure out why I couldn't make it work. In the end I realised what was going on: as jogging and shuttling messes up the sampling rate, the aux signal is not available on any of the digital outputs, only the analogue ones — which I wasn't using. Consequently, using the M20 with, say, a Yamaha 01V digital desk connected through the optical interface, requires a supplementary analogue feed to a spare channel or external monitor input just to hear audio scrubbing.

While I'm on the subject, the Aux track is clearly subject to some heavy compression and has a fairly poor signal/noise ratio, but is perfectly acceptable for the purposes of cueing tape and identifying punch-in/out points. Provided the jog wheel is turned ▶



A column of buttons to the right of the M20's metering display provide the user with a huge choice of internal routing options. Track arming and monitoring buttons are laid out below the display.

The large main display carries setup information including sample rate and clock mode.

monitoring position. Although the transport is commendably quiet when spooling, there is a constant whine from the head-drum, though this might become quieter as the machine beds in, and there is also some fan noise. The M20 was easily as noisy as the average computer, but I imagine that most installations likely to invest in M20s would locate them in a machine room.

All but three of the 100 locate memories are freely assignable: memory 00 is always the absolute-zero time on the tape, and memories 98 and 99 are dedicated to the punch-in/out points. The remaining locate memories should be more than sufficient for any application, and to make searching and recognition of locate points easier these may be given names from an extensive library (which includes options such as Verse, Chorus, Bridge), or alternatively you can create your own tags,

▶ smoothly the audio output is surprisingly smooth, and the output level automatically drops as the speed increases during shuttling, to protect tweeters.

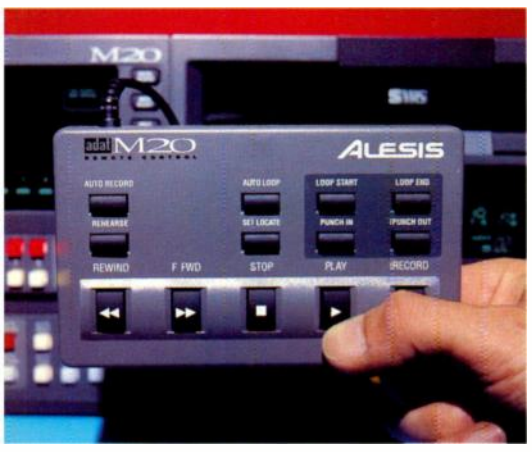
The last two buttons beside the meters select the way peaks are displayed (permanent hold, temporary hold or no peak holds at all), and allow held peaks to be cleared. The metering is very clear, with eight bargraphs scaled down to -72dBFS in normal mode, and over +/-2dB in fine mode (relative to the user reference point). The aux and timecode tracks have low-resolution meters sufficient to show the presence of signal. Red and white bars under each meter indicate recording and input monitoring, and to their right are a number of hidden-till-lit indicators confirming the status and modes of the set-up buttons alongside.

THE MAIN DISPLAY

The central display panel carries messages concerned with setting the machine up and confirming the status of various facilities, as well as showing the current tape time and the selected locator or punch-in/out times. One of the most useful elements is a row of indicators across the bottom of the display permanently showing the status of the machine — clock source, sampling rate, timecode frame rate and source, varispeed mode and selected locator memory. All of these are vital to the operation of the machine, and cause horrible things to happen if they are not set appropriately.

The two timer displays are large enough to be read from the back of the control room — which is just as well given that the machine is certainly not whisper-quiet, and you wouldn't want it anywhere near your

The LRC (Little Remote Controller), provides transport controls, auto-record and rehearsal modes, autolocate function, and loop facilities.



General housekeeping tasks like setting clocking, sample rates, and timecode are quite straightforward on the M20. The clock source functions are selected by pressing the second button under the main display; the first switches the tape counter mode between absolute, relative and timecode times. Clock options include internal, video, remote ADAT, external word clock, optional I/O card, SMPTE timecode, and the digital optical input — a very comprehensive list that should cover every eventuality. If a valid clock signal can't be found on the selected reference, the M20 reverts to the internal clock.

The timecode aspect of the machine is equally impressive, with support for the six standard frame rates (24, 25, and both drop and non-drop 29.97 and 30) and automatic identification when presented with a video reference or external timecode. The machine also features a built-in timecode generator which can be jammed to absolute time, existing tape timecode (with offsets if required), or set to start from a user-defined time. The timecode generator also allows the user to set User Bits to any hexadecimal (0-9, A-F) message, perhaps for logging a session ID number, or tape reels. Incoming User Bits on an external timecode, or already recorded on the tape, can also be displayed.

As this is a digital machine, timecode, word clock and video references (if used) must all be synchronous. The excellent handbook makes this very clear, and if you get it wrong, the M20 throws a bit of a tantrum by taking ages to chase, locate, or lock up properly... and who could blame it?

MIDI FACILITIES

The M20's MIDI implementation supports sending and receiving MIDI Machine Control (MMC), with ▶

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ALESIS M20 ADAT

The blank panel at the top right of the rear of the M20 can be fitted with the optional eight-channel AES/EBU card. The auxiliary input and output is available via XLR sockets.

unique device IDs in multi-machine configurations, as well as MIDI timecode. One of the most useful facilities, however, is the ability to send and receive MIDI SysEx dumps describing the machine configuration — so locator names and times, track delays, and tape timecode offsets can all be exported or uploaded via MIDI.

As an alternative to using SysEx dumps, you can also save the complete configuration of the machine to the data header at the start of the tape, so that all the appropriate settings can be recalled when a session has to be reworked. Saving data to tape is a surprisingly slow business, but you only need do it at the end of the session, and is a very useful aid if returning to the material at a later date.

Another useful SysEx facility is the ability to export or update the machine's complete operating software. The latest release is always available as a MIDI file on the Alesis web site, and a total update takes only 15 minutes. The machine's software can also be updated by allowing it to talk to another M20.

JOGGERS AND SHUTTLERS

The final batch of controls, over on the right of the machine, comprise an alphanumeric keypad and the jog/shuttle wheel. The numeric keys allow locator memories to be recalled and timecode values to be set. The keypad adopts the telephone approach of allocating three letters of the alphabet to each number — you need the letters when creating your own locator identifiers, and the system is just as easy to use as scrolling through the alphabet with a data wheel.

The Jog/Shuttle wheel is very similar to those found on professional video machines and the default mode is that, when turned, the tape transport enters the jog/shuttle operation immediately. Alternatively, the machine can be configured so that the Search button has to be pressed before the wheel becomes active.

The Jog wheel has no momentum, and driving it smoothly is an acquired skill, but I found that perfectly acceptable slow-speed scrubbing could be achieved quite readily (over a range of 1/8 to 1x play speed). Pressing and releasing the wheel engages Shuttle mode, which spools the tape against the heads over a range from 1/4 to 16x play speed. Again, I found the control to be easy and accurate to use.

PLUGGING IT ALL UP

The review unit was supplied with a very helpful manual, substantial rack-mount ears, a blank tape, an LRC little remote controller, a mains cable, an ADAT Sync cable, and a 1m optical lead (just the one!). The LRC panel provides transport functions, some essential autolocate and basic loop facilities, and auto-record and rehearse modes — enough to allow the majority of multitrack operations to be performed from the comfort of the mixing console.

Perhaps the most obvious declaration of professionalism (besides the word 'Professional' written on the bottom of the front panel), is to be found on the rear of the M20 where a wall of XLRs await connection. Eight analogue inputs and outputs are available on balanced +4dBu XLR connectors; the same connectors are used for the Aux and timecode I/Os. A standard multi-pin ELCO connector provides a parallel analogue I/O option, with Alesis' standard single-plug analogue interface.

Another row of connectors above the main analogue I/Os provides video reference in/thru BNCs, a 9-pin D-sub connector for RS422 remote control, word clock in/out on BNCs, timecode in/out on XLRs, MIDI In/Out, and ADAT digital optical interfaces. There are also two quarter-inch jack sockets for the small LRC remote controller and footswitch for punch-ins/outs. A pair of 9-pin D-subs allow synchronisation with other ADAT machines, and an RJ45 (telephone) connector links the machine to a remote meter bridge or the CADI remote controller.

THE BIG BOY'S ADAT

The machine is impressive before you lay a finger on it — and as soon as you start to use it, 'impressive' gives way to 'professional'. This is a serious machine for serious users (with serious bank accounts) which is slick to operate, fast and accurate in auto-location and chase-synchronising, and sounds absolutely superb. The only thing I can complain about is the annoying fan and head-drum noise, and I would recommend putting the machine in a remote corner or, better still, a separate machine room.

It is, however, an expensive machine. For the same money you could buy two XT20s, plus a BRC controller, and have enough change for a small library of tapes. Compared with the obvious competition from Tascam it is still expensive, but it should earn its keep in facilities that can justify the initial expenditure because of two important advantages over DTRS format machines — 20-bits and audio scrubbing.

And for the average ADAT user? The M20 represents a very big step up from the other Type-II machines, yet there is nothing on it that could be described as frivolous — every feature is well thought out and I could find nothing the M20 could not do, and do well. You won't out-grow this machine in a very long time! SOS

Info

E Alesis M20 £7044.13 including VAT.
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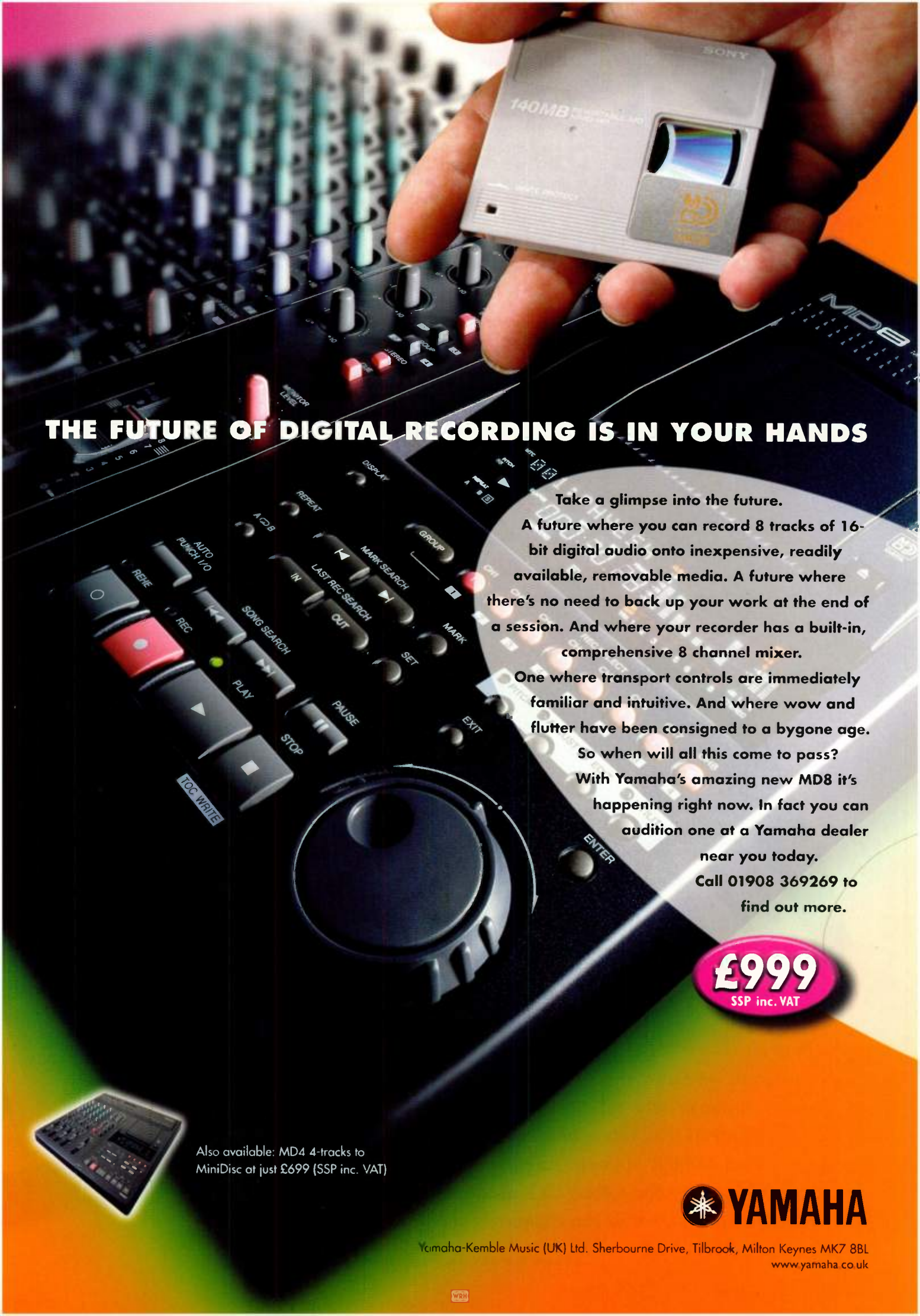

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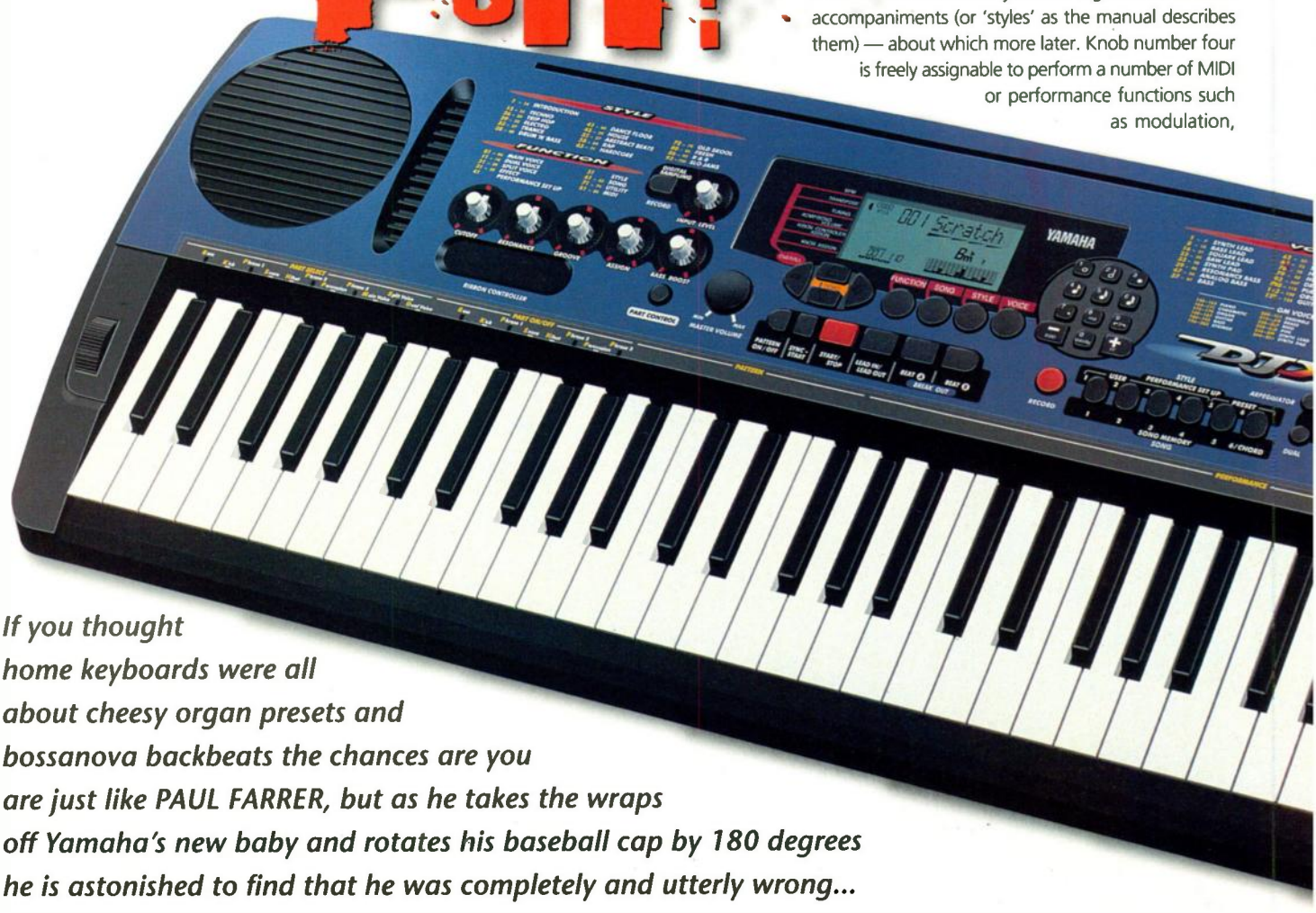

If you thought home keyboards were all about cheesy organ presets and bossanova backbeats the chances are you are just like PAUL FARRER, but as he takes the wraps off Yamaha's new baby and rotates his baseball cap by 180 degrees he is astonished to find that he was completely and utterly wrong...

Let's face it, we all hate home keyboards with their nasty 'Come Dancing' rhythms and their cheesy 'even the family pet can play it' accompaniment sections. These days, the mere mention of a keyboard with built-in speakers, auto rhythms and battery power is enough to evoke dormant feelings of quiet unease. Not the best time, you might have thought, for Yamaha to launch a massive advertising campaign promoting a new home keyboard that does all of these things and is proud of it.

What makes Yamaha so sure they have a winner on their hands is, of course, the fact that this particular home keyboard comes dancefloor ready with 284 presets (many of them classic retro analogue instruments), 15 drum kits, a DSP effects processor, an arpeggiator, a sequencer, MIDI programmable resonant filter sweep controls, sampled drum loops, vocal samples, a ribbon controller, pre-programmed grooves and loops, a touch sensitive keyboard, a 16-part multitimbral General MIDI synth, oh....and a built-in sampler with waveform editing. And the family pet can still play it!

MEET THE BEAT

Physically speaking, the DJX is a fairly large (but lightweight) instrument. I suspect the heaviest things inside it are the two 6W speaker cones that kick out much more of a punch than you might expect. The full-size five-octave keyboard feels responsive and comes with a smallish pitch wheel on the extreme left-hand side. The whole thing is powered either by six 'D' sized batteries or an external 12 volt DC power supply, which is included. There is a large and clear LCD screen which helps you navigate through the various pages, but unfortunately this is neither contrast-adjustable nor backlit, which in a dimly lit studio or night club (both obvious environments for the unit) could prove to be a bit of a sticking point. On the rear panel there are both mic and line inputs in the form of two mono jack sockets for the unit's sampler, MIDI In and Out, a footswitch socket, and a single stereo headphone socket that also acts as the main keyboard output, cutting off the built-in speakers when a plug is inserted.

The DJX is a little different to most home keyboards. It still has the friendly colours, large squidgy buttons, lots of writing on the panel and so on, but the design is both very '90s and at the same time very retro. There is an analogue feel to the front panel, with its six large white real-time knobs and ribbon controller. The first two of these knobs control the frequency cutoff point and resonance of the preset you have selected. Knob number three allows you to re-groove the auto accompaniments (or 'styles' as the manual describes them) — about which more later. Knob number four is freely assignable to perform a number of MIDI or performance functions such as modulation,

effects level and even preset attack/release times. This knob, along with the Cutoff and Resonance knobs, transmits data via the MIDI Out so you could use it to record to a sequencer.

After using the ribbon controller for a while, you begin to wonder why more keyboards aren't equipped with one. It can be assigned to a large number of MIDI controls, one of the most useful being the 'turntable' effect — a sort of cross between a spring-loaded pitch bend and a tempo changer, which has the effect of treating your MIDI sequence, drum loop, preset or sample literally as if you were scratching on a real record deck.

PRESET PARADISE

The arrangement of presets (or voices) is roughly divided into two main sections, contemporary sounds and General MIDI sounds. Voices 001 to 155 are given over to the kind of noises that this machine really shines at, namely classic dancefloor sounds gleaned from a host of the best retro analogue instruments around. Heavy use of samples taken from old instruments like the TB303, Minimoog, ARP and Prophet means that the voices in this section are nearly all perfect dancefloor fodder. They range from wonderfully fat analogue basses and whispery pads to the famous DX7 electric piano sound and abrasive acid-house style synth lead lines. The resonant bass section is particularly juicy and authentic, and when flicking through any of these sounds the combination of the resonant filter sweeps, the ribbon controller and the touch-sensitive keyboard gives the DJX a totally pro-keyboard feel.

In amongst this section of voices are a large number of much longer samples. There are about 15 sampled drum loops in total ranging in tempo from 91 to 137bpm, and a host of vocal soundbites ('Ooh yeah!', 'Come on!' etc) as well a good number of really useful sound effects, hits, guitar samples and stabs. Again, all are totally suited to the dance music scene and most are very usable. The drum kits are also stuffed full of heavy electronic sounds alongside more conservative acoustic kits. The familiar sound of the TR808 and 909 drum machines is given a good airing, but there are also large numbers of percussion and drum samples that I hadn't heard before — again, all well suited to their various genres and intelligently presented.

Voices 156 to 283 are the familiar General MIDI set (128 voices from 'Grand Piano' through to 'Gunshot'), and although these sound tame in comparison to the majority of the DJX's sounds, the ability to play GM files is a welcome inclusion. Unfortunately, editing any of the voices outside of adjusting their attack/release times or the resonant filter sweeps is not possible. Giving people what they want seems to be the order of the day with this collection of voices, and instead of coming up with new and innovative forms of synthesis to dazzle us with (what did you expect for this sort of money — a Wavestation?) Yamaha have wisely plumped for instant gratification by providing a host of familiar traditional and contemporary sounds. One area that might prove to be fun, however, is the built-in sampler assigned to preset 284...

SAMPLE THIS!

The DJX comes equipped with a modest but none the less useful sampling feature, which records sounds in mono either from the line input or direct from a microphone. There is a maximum of about six seconds of mono sampling time available, and you can have a total of 12 samples in memory at any one time. No single sample can be longer than 3 seconds and to be fair, the recording quality isn't exactly hi-fi. But for nicking the odd drum loop or vocal line from your favourite CD and building a track around it (purely for recreational uses you understand, your honour) it is more than good enough.

Sampling itself is very easy: the display shows you a small VU meter reading of the incoming signal (adjustable from the front panel using the input level knob), and also allows you to assign the sample to a particular note of the keyboard and set the recording trigger threshold. This is actually very important, as it doesn't let you trim the front end of any samples once they are recorded. What it does allow you to do, though, is to see a simplified version of your sampled waveform (at various zoom resolutions) and accurately trim the end point. Once you have done this you can set the sample to loop and away you go. Important samples you want to keep forever can be dumped via MIDI to a sequencer or similar data storage device.

Incidentally, the manual claims that samples remain in memory even with the power off provided that the mains adapter stays connected and/or there is a good set of batteries in the unit — but the review model retained all the samples I made with neither batteries nor the power adapter plugged in. Perhaps if I leave the DJX near to my ▶

Ever wondered why the quality of PC audio recording systems is generally so poor? - One word: Jitter! Now here's the solution: The Aark 20/20 from Aardvark, the makers of the professional digital master clock generator, the AardSync II.

This is a multichannel system with eight 20 bit A/D & D/A's plus SP/DIF i/o - 10 simultaneous channels of record and playback. The software includes standard Windows drivers to fully support Sound Forge, Emagic, SEK'D, Cool Edit Pro, Cakewalk, etc... Plus custom ASIO drivers for Cubase VST. Then the control panel includes comprehensive routing and mixing. **It's simple to use, quick to install, and the audio quality will blow you away!**

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It's in stock now, and will cost you well under eight hundred pounds. Ring us and we'll tell you where you can get one today.

pros & cons

YAMAHA DJX £270

pros

- Massive number of usable contemporary sounds with a real analogue feel.
- Usable and flexible pre-programmed 'styles'.
- Incredibly cheap.
- Easy to use and nicely presented.

cons

- LCD display not backlit.
- Not that easy to use purely as a multitimbral sound source.
- Slightly noisy.
- No MIDI Thru.

summary

As close to an all-in-one dance music production tool as you could possibly ask for at this price. Huge numbers of big, solid dancefloor sounds that will impress your friends/clients/audience for hours.

SOUND ON SOUND

ARPEGGIATOR & EFFECTS

The DJX includes a built-in arpeggiator, triggered from the front panel with its own dedicated button. This automatically works in time with the tempo setting of the currently loaded auto-accompaniment style (regardless of whether or not the style is playing). The arpeggiator transmits via MIDI and there are 16 styles to choose from, ranging from simple Up, Down, Up and Down and Random to several interestingly syncopated techno styles. If you want, you can assign arpeggiator speed to the assignable knob or even the ribbon controller, which again adds to the analogue-feel fun factor.

There are three other effects on offer. The first is simple reverb (choose from two each of halls, stages, rooms and plates) and, like the arpeggiator, is triggerable from the front panel. To switch on the other two effects sections, Chorus and DSP multi-effects, you have to wade a little deeper into the edit pages. There are just two choruses and two flangers to choose from in the Chorus menu, but the DSP section contains a total of 34 effects, including the usual reverbs, choruses, flanges and delays, as well as some more interesting and very usable wild EQs, auto-wahs and symphonic effects. The dry-to-effected signal ratio can be controlled by the assignable knob, but other than that, the effects themselves are not editable. Before you think ill of this, however, remember that the entire DJX still costs less than the VAT on a Lexicon PCM90!

Akai samplers overnight it might convince them to develop the habit!

In practice, I feel the sampling side of the DJX probably won't be a huge draw for most serious users (unlike the amazing preset voices) and it is obviously meant much more as an introduction to sampling for the studio novice rather than a serious production tool. The beauty of this instrument, however, is that despite its limitations it's still very easy to keep forgetting you aren't dealing with a £1500 music workstation.

STYLE AND CONTENT

One of the main features of the DJX is its comprehensive 'style' section. This is a form of pumped-up intelligent auto-accompaniment on steroids. Forget the awful 'Country and Western' and 'Pop Swing Beats' auto rhythms of home keyboards of the past — techno, trip hop, jungle, drum & bass, hardcore, ragga, old skool, and R&B are the kind of styles this keyboard deals with, and most of them can only be described as jaw-droppingly good. Many come with programmed drum, bass, keyboard and even some vocal lines built into them, and each of the 100 different styles have infinite versions of track combinations.

Each style has two main sections — one for verses, one for choruses perhaps — and you can deconstruct, regroove, and remix them as they go along using the part on/off section of the keyboard. Muting various parts of the loop as it cycles round is a doddle, and in place of the dreadful 'drum fill' buttons of the past the DJX allows you to trigger an intro or outro appropriate to that particular 'style' using the 'Lead In/Out' button. You change the key of the accompaniment using the familiar bottom octave of the keyboard, and nearly every possible chord type is catered for by using one or other combination of keys within that octave. Yamaha's attention to current dancefloor styles, coupled with as open and easy an operating system as you could hope for, elevates the DJX into the professionals' league for this feature alone. You really won't believe how current and meaty these 'styles' are until you hear them, and without exception, everybody who has seen the review model in my studio over the past few days has listened in wonderment and awe when I flick through a quick demo of just a few of them.

As with Emu's excellent Orbit and Planet Phat modules, all of the pre-programmed styles can also be transmitted via MIDI, allowing you to dump them into your sequencer to remix them, tweak them, re-assign sounds to parts of them, or even just look and learn how they were put together. Of course, with the styles happily taking care of drums, bass and keyboard accompaniment, there's still three and a half octaves' worth of keyboard space left for your scorching lead line solo, not forgetting those resonant filter sweeps for added analogue wonderment!

The onboard sequencer is also very well specified, if a little fiddly, and allows three songs to be programmed and recorded in memory at any one time. Those familiar with Yamaha's QY-series Walkstations will feel very much at home here and songs, like samples, can be dumped via MIDI for storage. There are even built-in effects and an arpeggiator (see box for details).

One slight difficulty with operating the DJX is that although you can use it purely as an excellent-value 16-part multitimbral sound module, the manual makes no mention of how to set this up, or how best to utilise this feature. A quick word with Yamaha reveals that its Japanese inventors apparently underestimated how well the DJX would be received, and so aimed the manual more at the home keyboardist rather than the serious programmer looking for access to a massive library of the latest sounds to put in their MIDI rig. Luckily, however, Yamaha UK are working on an addendum to the manual that better explains how to set up the General MIDI side and how to use the keyboard as a master controller and sound generation unit, which should be ready by the time the DJX hits the shops in August/September.

CONCLUSION

With the DJX it looks as if Yamaha have finally achieved the impossible and come up with a home keyboard that not only delivers fun by the truckload but is amazingly well specified, and so brimming with useful features that I can see professional studios and programmers snapping them up with as much enthusiasm as teenage wannabe DJs. Perhaps this is the CZ101 for the millennium? Whichever way you look at it, the DJX is a serious piece of equipment, and behind its funky plastic exterior (and the instruction manual seemingly aimed at 13-year-olds) lies a sound engine with enough sonic potential to keep even the hungriest dance composer busy for ages. By presenting so many great pre-programmed but flexible grooves and loops across a broad range of current musical styles the DJX succinctly encapsulates what music making in the '90s is all about.

Nothing is ever 100% perfect, and the DJX certainly has its shortcomings, the most obvious being the non-backlit LCD screen, the lack of a MIDI Thru socket and its fairly limited sound editing. All of these would be justifiable gripes in a high-end synth, but at under £270, you really can't complain. Whether or not the DJX will become a cult classic like the CZ101 or TB303 remains to be seen. Yes, it is a home keyboard, it can take batteries, it has a pair of built-in speakers and will doubtless be annoying thousands of parents across Europe come Boxing Day — but if you let any of that put you off, you will be missing out on one of the most innovative and fun products I've seen in years. If Yamaha want their review model back, they're going to have to prise it out of my dead fingers! SOS

info

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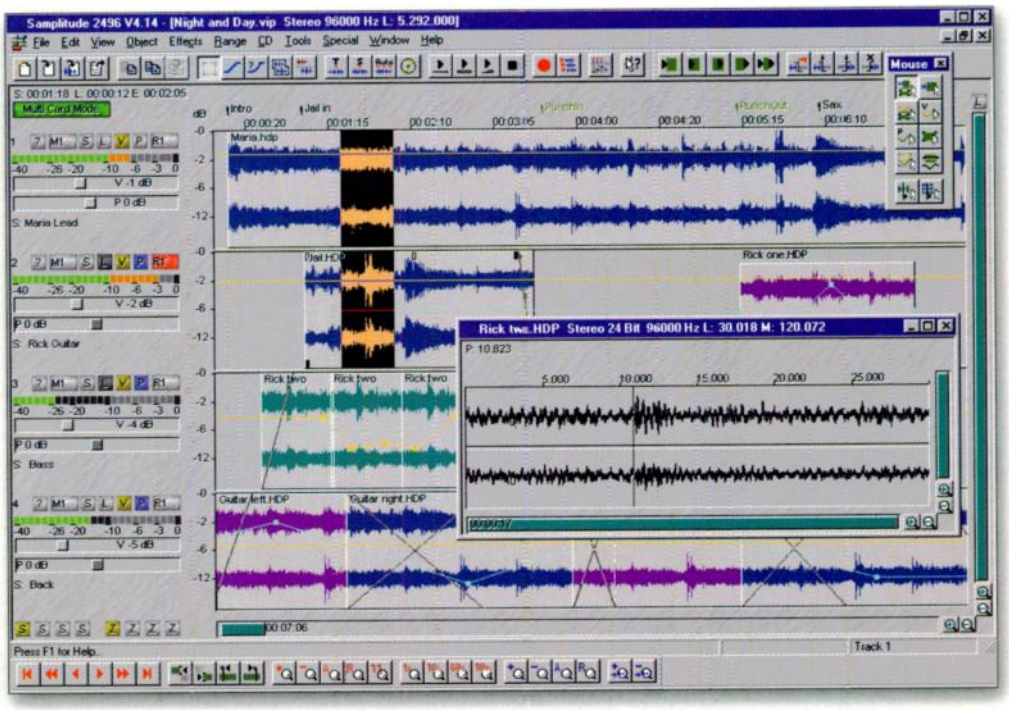
SEKD PRODIF 96 PCI SOUNDCARD

If you want more of everything digital, why not try 24-bit recording at a 96kHz sample rate? MARTIN WALKER is floored as his dynamics increase in leaps and bounds.



One software package that fully capitalises on the Prodif 96 is Samplitude 2496, also from SEKD. This provides a comprehensive multitrack audio recording environment.

As regular *SOS* readers will be aware, it is becoming increasingly common to carry out digital recording, processing and mixing at greater resolution and a higher sample rate than the 16-bit, 44.1kHz standard of commercial CDs. This has led some people to believe that recording at 16 bits and 44.1kHz cannot produce recordings of sufficient quality for commercial release.

One of the problems is that while the final product can use the full 96dB dynamic range of 16 bits, digital audio recordings must always be made with some headroom to avoid the possibility of digital clipping. So, in an effort to use as much of this dynamic range as possible, many people's eyes stay glued to the meters to get a hot signal level. To cope with unexpected peaks when recording live music, however, a typical safety measure is to work at nominal levels that are 12dB or more below digital clipping. (That's in addition to using a limiter as an emergency 'brick wall'.) Clearly, under these conditions, the dynamic range is reduced to 84dB and only uses 14 of out the 16 available bits.

A second problem is that because so many software processes are now being used to modify digital audio data after recording, the quality can suffer during the application of the many arithmetic processes involved.

The answer is to start with a higher bit resolution, which instantly gives a much greater dynamic range. You can then operate with a higher headroom, without worrying so much about compromising audio quality, and you can also keep your eyes fixed on the performance rather than the level meters. The current goal seems to be 24-bit, and to cater for future commercial formats, having the option of a maximum sample rate of 96kHz is also advisable, although this only extends the frequency response to about 40kHz, and has no effect on dynamic range.

CARDS ON THE TABLE

Enter then the SEKD Prodif 96 soundcard. This is a PCI card providing extensive stereo digital I/O and a D-A converter for analogue monitoring. The digital I/O handles 16, 20 and 24 bit depths (but not 8-bit), and supports sample rates of 32, 44.1, 48, 64, 88.2, and 96kHz (but not 22.05kHz). All digital inputs and outputs are stereo, and are provided in optical (Toslink) and coaxial (phono and XLR) form. Input and output format can be either S/PDIF (consumer) or AES/EBU (professional). I/O is transformer-coupled for hum free operation.

The optical sockets are mounted on the backplate, but the phono and XLR sockets are at the far end of a supplied nine-inch flying cable, which attaches to the soundcard via a 9-pin 'D'-type connector. There is also an additional internal digital

pros & cons

SEKD PRODIF 96 PCI SOUNDCARD £599

pros
- Excellent audio quality.
- On-the-fly digital recording.
- Comprehensive digital options.

cons
- Needs an additional A/D converter for analogue recording.
- No support for 22.05kHz Multimedia sample rate.
- Manual is confusing.

summary
A versatile, high quality soundcard, lacking only A-D converters, which could also solve a lot of digital compatibility problems in the studio.

SOUND ON SOUND

input on the card for the direct connection of a suitable CD-ROM player. A single error LED is also provided on the backplate, and this stays lit until a valid digital signal is detected at any digital input.

For monitoring purposes, there is a 20-bit D-A converter, which again supports sample rates of up to 96kHz. This line output is from a quarter-inch stereo jack socket. This option is better than the usual 3.5mm stereo jack socket, although you may have to make up a special splitter cable to separate the two output channels at the other end of the cable (none is supplied). There is also a switch for line output level between +6/-6dBu — an unusual pair of values, but still in the right ball park for typical +4/-10dBu mixer inputs. SEKD say that since the impedance is low, you can use this output not only to feed a mixing desk, but also for headphones.

To achieve the required data transfer rates, most soundcards use software drivers to control their many features directly, an approach which can place a considerable load on the CPU. The Prodif 96 uses a high speed XILINX 4006 programmable FGPA (Field-Programmable Gate Array) chip which the driver software is only called on to configure and thereafter leaves well alone. Essentially, the software is running inside this hardware chip (see the review of the Digital Wings soundcard in *SOS* February '98 for more details of FGPA technology). With drivers available for Windows 95, Windows NT and, soon, for MacOS, this spec looks ideal for recording high quality audio. But, as always, the proof of the pudding...

INSTALLATION

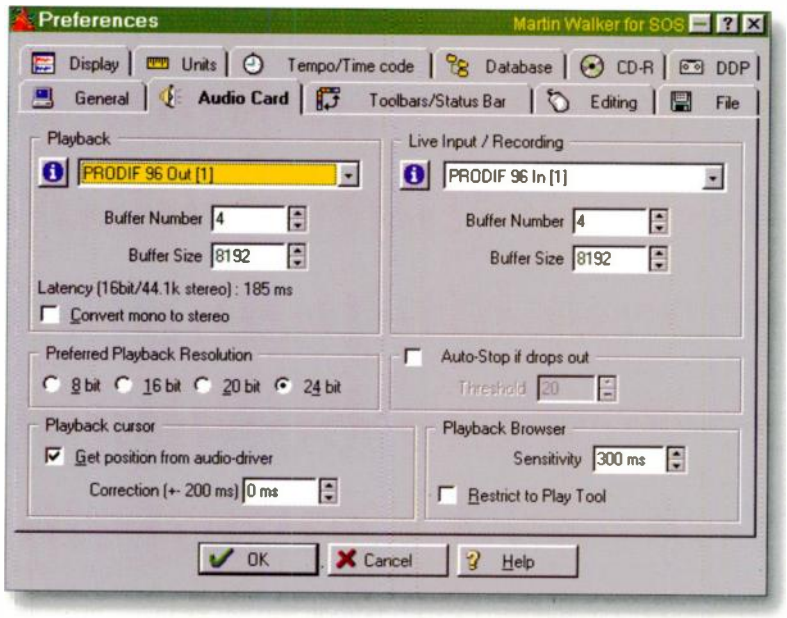
The PCI card is just short of five inches long, and so should fit into virtually any available slot on your motherboard. I only had a single slot left on mine, and initially had some conflicts with existing hardware. This was quickly resolved after I removed my Event Gina card during the review (although it may well be possible to get both cards running side by side with a bit more tweaking).

The Prodif 96 hardware was recognised on the next boot. I inserted the driver floppy disk and looked for the Windows 95 folder mentioned in the manual. Unfortunately, there was no such folder, but it didn't take long to contact SEKD distributors SCV London to discover which of the five sets of drivers was the one to use. I was soon back to my Windows 95 desktop with the new driver in place, along with an extra desktop shortcut to the Control Panel/System window (which, as I explain later, you are likely to need on a regular basis).

Actually, the manual needs updating, since apart from the problem with the driver software, it also apologises for a hardware limitation that has now been solved, and has an uncredited screenshot of the *Wavelab* Preferences page showing suitable soundcard settings for 24-bit operation. I use *Wavelab*, so I recognised it, but anyone without this software might be very confused.

ANALOGUE AUDITION

As I already had some 24-bit WAV files on my hard drive, I started by auditioning the D-A converters. These are 20-bit devices from AKM, and have a claimed dynamic range of >94dB. I could just hear 1kHz tones below -100dB, which is pretty good going. In general, playback quality was excellent, with very low noise. I also plugged in a pair of 60Ω headphones, and got a healthy level with the output level switch at its higher, +6dBu setting. For anyone mainly using external converters, this would be a useful extra function.



These are suitable buffer settings for trouble-free operation in Wavelab at 24-bit resolution. The Get Play position from audio driver option is also checked, which ensures that the cursor and level meter will be in sync with the audio signal.

When used at the maximum 96kHz sample rate, your bandwidth will be much higher than normal. Although SEKD don't quote a figure, AKM claim that the frequency response extends to 40kHz at +/-0.5dB, and +/-0.1dB at 20kHz. I was able to try out some audio at 88.2kHz, and this certainly sounded very good. Mind you, despite taking twice as much space on your hard drive as a 44.1kHz signal, the actual improvement will be comparatively small — such is the stuff of high-end audio.

Incidentally, you may be wondering why SEKD don't provide a 24-bit D-A converter. Well, I suspect that they wisely decided that 20 bits is quite sufficient for general purpose monitoring. After all, it can be argued that 24 bits are needed more at the recording end of the chain. A 24-bit D-A device would not only be significantly more expensive, but would probably be better placed in an external rack unit (see the Suitable Partners Box) as the insides of computers are not renowned as being pristine audio environments.

A FEW BITS MORE

On the digital side, the Properties page provides a host of useful options and information. Unlike analogue signals, it is sometimes difficult to work out why a digital one is not working, but here you can click on any of the four inputs (Optical, Coaxial, XLR, and the internal one on the card) and, as soon as a valid input signal is detected, the Sample Frequency is shown. This is updated twice a second, and makes fault-finding a lot easier. If you are round the back of the computer, plugging in a valid digital signal causes the red error LED to go out.

The Outputs have three selectable modes. Automatic is the normal one, where the input signal reaches the output only during recording. However, if you are using a digital mixing desk, you can change this to Play Only, to avoid getting feedback when you start the recording software. The third ▶

SUITABLE PARTNERS

For recording, you will ideally need an external A-D converter capable of 24-bit/96kHz operation. As you might expect, SEKD have one of these in their range — the 2496 A-D/D-A, at a retail price of £999 including VAT. This claims an A-D (input) dynamic range of 128dBA, and a D-A (output) one of 123dBA, as well as being able to store 24-bit, 96kHz audio information to a standard 16-bit DAT recorder. It can also convert between 16- and 24-bit signals.

However, having advanced hardware is only half of the story, and to really take advantage of the Prodif 96 card you need to have suitable software packages. As I said in the PC Soundcard Buyer's Guide (*SOS* March '98), if you aspire to greater than 16-bit recording, talk to a specialist dealer. Getting hard disk recording packages to work at 44.1kHz and 16 bits can be tricky enough at times. A 96kHz sample rate and 24 bits will generate three times as much data, and often four times as much, since storing 32 bits at a time is often more time efficient than 24. To cope with the extra data you will need a faster and larger hard drive than normal.

For PC users, an ideal candidate for stereo recording would be Steinberg's *Wavelab*, since this already supports 32-bit resolution at up to 96kHz. Sonic Foundry's *Sound Forge* currently supports sample rates up to 96kHz, but no more than 16-bit operation. Do take care when testing the capabilities of different packages, as some have a tendency to emit ear-piercing screeches when called upon to play unsupported 24-bit WAV files — turn your monitors down!

SEKD PCI CARD

option is Input, and this lets you continuously monitor any signal appearing at the input, without having to run other software in Record Ready mode.

With AutoSync activated, you can start recording on the fly, as the card is constantly searching for a valid input signal. This is clever, since in the absence of a valid input, the card uses its internal quartz clock, and as soon as the PLL (Phase Locked Loop) circuitry on the card can generate a clock from an input signal, it switches over automatically. You can also use this feature to lock several cards together during playback, by chaining each output to the unused input of the next. The input of the first card would still be available for recording. AutoSync can be disabled if you are connecting the inputs and outputs of a DAT machine for example, where it would lead to a local feedback loop.

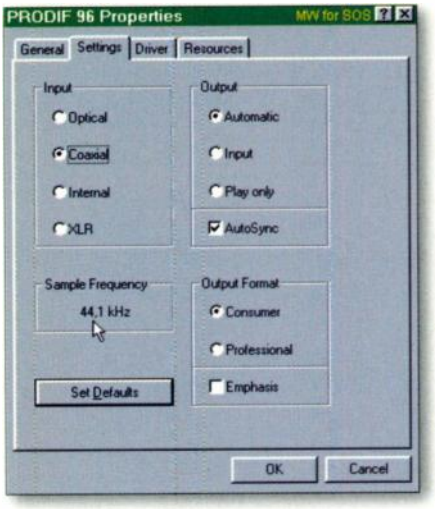
The output format is switchable between Consumer and Professional, and rather than just passing any status information from input or output, the Prodif 96 creates a new header. This has been optimised to be widely compatible with other hardware — the appropriate bits are set according to the selected format, and the copy bit is set for No Copyright/Copying Permitted. This should ensure that even budget DAT recorders with optical or coax S/PDIF inputs accept the signals. Finally, since the incoming status bits have been discarded, ticking the Emphasis box allows you to set this bit for recordings that need it, and you can immediately hear the corrected frequency response through the D-A converter. I had no problem connecting a variety of digital devices, and even my sometimes truculent Sony DAT recorders seemed quite happy to send and receive data.

SUMMARY

SEKD manufacture a wide range of PCI soundcards, but the Prodif 96 is among the most expensive. This is hardly surprising (24-bit/96kHz capable chips don't come cheap), although at £599, the price has come down a bit since the card appeared in the Buyer's Guide in *SOS* March '98. According to the current manual, initial models were only capable of digital transfers at up to 50kHz, but the digital I/O chip has recently been upgraded to the 96kHz capable version (the Crystal CS8414 chip was only released in February '98).

I didn't really have the Prodif 96 long enough to extensively explore the improvements inherent with a 96kHz sample rate, but 24-bit resolution certainly made a significant difference to the noise floor (as you might expect), and allowed me to concentrate more on recording the best performance to disk by leaving more headroom, rather than having to worry about compromising dynamic range. The onboard D-A converter also acquitted itself well. Obviously I cannot comment on recording quality, since there are no analogue inputs, but the digital recording options are comprehensive and well thought out, and should resolve most of those niggling incompatibility problems when interfacing consumer and professional gear. The Prodif 96 should provide any user with a fairly future-proof interface for high quality hard disk recording.

One multitrack package that does fully capitalise on the capabilities of the Prodif 96 is *Samplitude 2496*, from (you guessed it) SEKD, which also retails at £999. This provides comprehensive recording facilities, and not only supports third party DirectX plug-ins, but also has facilities to burn a CD directly from within the same environment. SOS



All the operational switches are found in the Properties page. The sample frequency appears as soon as a valid signal has been detected at the selected input.

FEATURES AT A GLANCE

Digital sampling rates supported: 32kHz, 44.1kHz, 48kHz, 64kHz, 88.2kHz, and 96kHz.
Bit depths supported: 16bit, 20bit and 24 bit.
D-A converter: 20-bit, up to 96kHz supported.
Quoted dynamic range for D-A converter: >94dB.
Copy protection: Ignored (can be used as copy stripper).
Digital formats: Professional, Consumer.
Digital Inputs: Switchable during operation.
Digital outputs: Simultaneously usable for signal distribution.
Digital Connections: Transformer coupled.
Low Jitter Design: <2nS in PLL mode @44.1kHz/optical in.

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If your MIDI data refuses to emerge properly from the end of the cable, why not try these handy tips. MARTIN WALKER helps you thru your Ins and Outs.

MIDI Mayhem!

IDENTIFYING & SOLVING MIDI PROBLEMS

For every musician, there comes a time when MIDI tracks start to exhibit strange glitches — notes get cut off in their prime, go missing altogether, or simply refuse to stop, providing unwanted and endless drones. Sometimes these strange happenings occur on every playback, at a specific point in a sequence; at others you can listen for ten minutes with no problems, and then without warning one or more notes will misfire.

The ones that make you tear your hair out are those glitches that corrupt MIDI data — notes can turn into controller messages, and sometimes a MIDI device may even crash, requiring a full reset by switching off the power for a few seconds, and then powering up again. The worst case is a normally well-behaved synth that starts to crash on a regular basis (thankfully a fairly rare occurrence). This can be the symptom of some stray corrupted data permanently stored in its memory, which requires a special combination of front panel controls to be pressed simultaneously to reset the device completely.

There are various things that you can do to track down all of these problems, and to help prevent them in the first place. The first thing to do is to narrow down the cause of the problem.

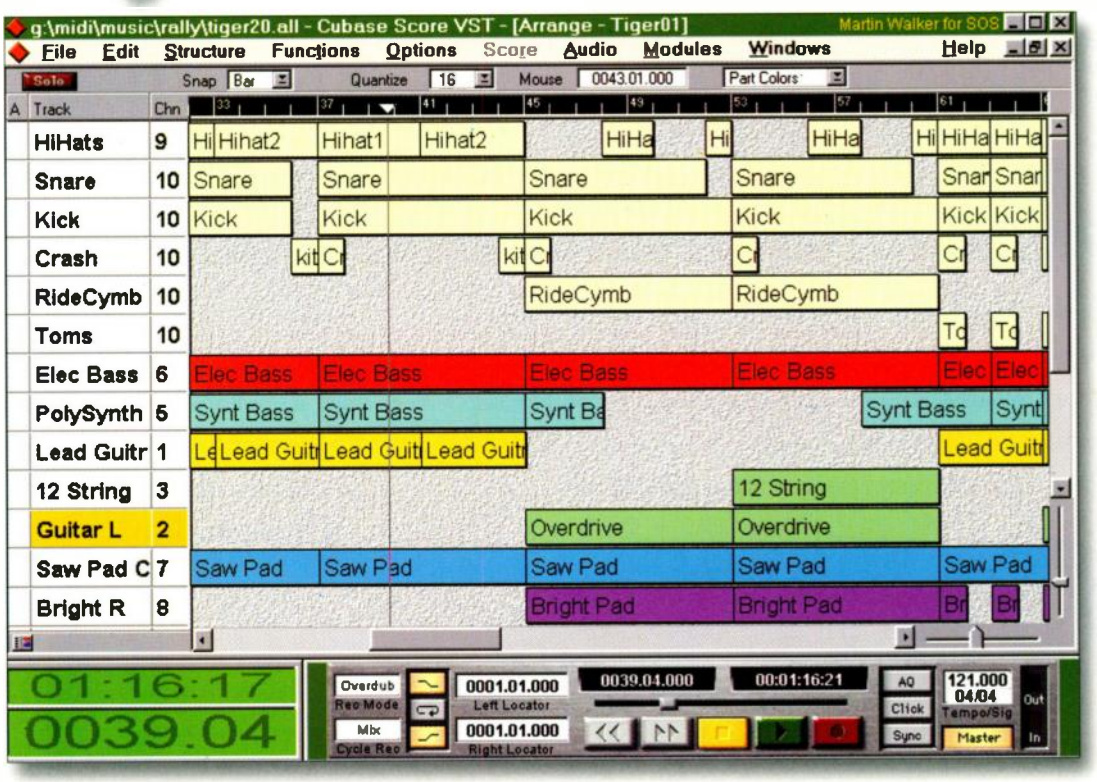
OCCASIONALLY MISSING NOTES

These can often be caused by note-stealing, which happens when every note available on a synth is already playing, and you try to play another. When you reach maximum polyphony something has to give way, and normally it is the oldest note that gets discarded to make way for the new. Despite the fact that modern synths have a typical polyphony of 32 or even 64 notes, it is surprising how easy it is to use up this quota when monster patches use two or four layered voices just to play a single note. The problem may be more obvious when you are working in multi-timbral mode, since playing an extra note in a busy keyboard pad part may completely cut out a one-note bass line on another track.

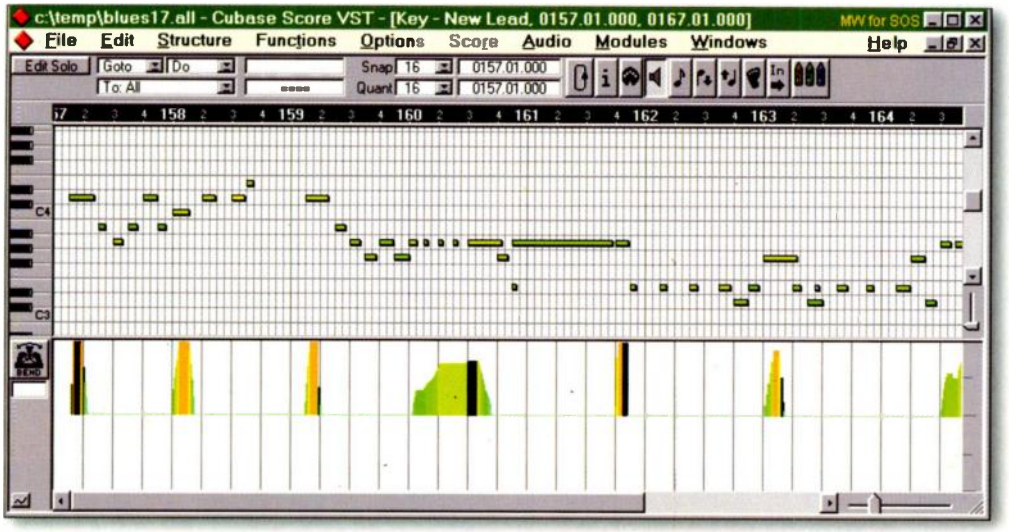
If you think you have heard an odd note in one track cut off unexpectedly, but it sounds fine on the next run-through, try to isolate the problem area by temporarily turning the volumes of any other sounds played by the same MIDI device to zero. You can do this by editing the appropriate synth parameters, or by sending a MIDI controller message. The object is to leave all the other channels playing (so that they still consume notes), but actually listen only to the problem channel.

There are various simple ways to minimise the risk or cure it if the worst happens:

- The easiest option of all is to find out if your sequencer has any in-built priority settings. For instance, *Cubase* is supposed to give higher priority to the topmost eight tracks in the Arrange page. It makes sense, therefore, to use these tracks for sounds where note-stealing would be most obvious — drums and percussion first, then bass



Check if your sequencer has any in-built track priorities. Cubase gives higher priority to the top eight tracks on the screen — these are therefore prime candidates for drums and bass.



Reducing MIDI Controller Data can help to prevent glitches — here the black areas in the pitch bend data are redundant, and stripping them out (see main text) will reduce the load on your MIDI Outs.

— and let the chordal sounds move down a bit (see figure 1). These tracks will then be dealt with first, and any note-stealing should occur elsewhere, where it is less noticeable.

- Avoid overlapping notes by taking advantage of any Legato functions in your sequencer. These adjust note lengths to reduce the total number of notes playing at any time, though if there is any decay after the Note Off you will still be using more than one note until the end of the decay phase.
- If you record from a guitar synth or wind controller (or even a keyboard), it is worth examining your performance in a piano-roll-style sequence editor, and stripping out any stray notes at low velocities, or with very short lengths — these are rarely heard in the final mix, and the cleaned up version will sound a lot better, as well as requiring less polyphony.
- For bass and melody lines, use a Monophonic mode if one is available. Many real-world instruments can only play a single note, so why waste polyphony? Many analogue sounds will also benefit from this, as the lines will emerge more cleanly, and you may even have a portamento function, so that you can glide in pitch between notes in this mode.
- Most synths offer some sort of priority system to ensure that the method of note-stealing can be set to suit the user — there may be options to switch between oldest note or quietest note when note-stealing happens. Depending on the sort of music you are playing, you may find it useful to change the default option.
- Remember that real drummers normally possess no more than two arms and two legs — for a more realistic performance that reduces polyphony, try to ensure that your drum patterns have a maximum of four simultaneous notes (unless you are using extra percussion sounds).

MIDI GLITCHES

If your notes dry up altogether, it could be due to a dodgy MIDI cable, but this rarely seems to happen in practice. Much has been written over the years about overloading a MIDI interface by trying to send more data through it than can be handled by its memory buffers — if too much data is sent, and the buffers overflow, it is possible that a MIDI message may emerge in a corrupted form, leaving a note hanging because its Note Off message was not received by the synth. Stranger things may happen when corrupted bytes emerge from your MIDI Out that are interpreted by a MIDI device as other commands — volume or pan changes for instance. Sometimes you might get a sudden burst of unexpected sound from your synths, or the sequencer may stop altogether.

Luckily, running out of MIDI bandwidth in this way doesn't happen as often as some people think, but unexpected glitches can be caused by attempting to run several synths from a single MIDI Out, while simultaneously sending lots of real-time MIDI controller information, or lots of real-time SysEx data. The solution to this sort of problem is to remove the logjam by 'thinning out' the MIDI data, which can be done in various ways:

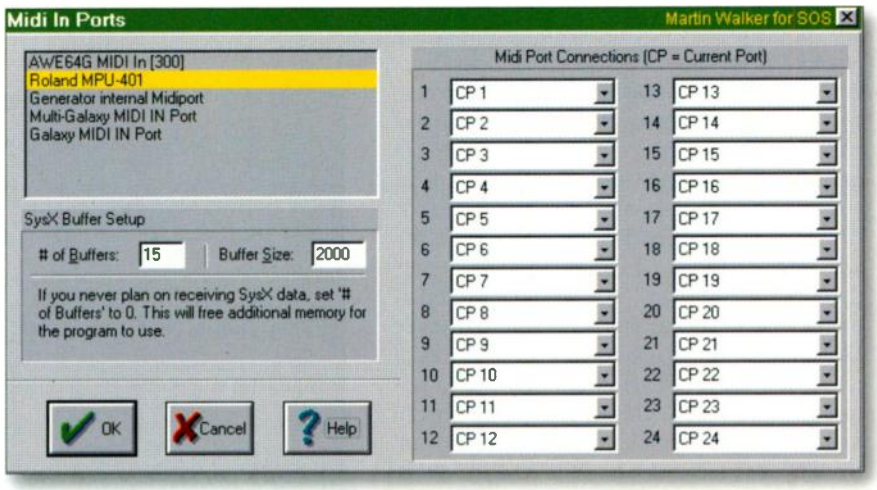
- Make sure that any synth that is being sent a lot of real-time controller information is connected via a dedicated MIDI Out which is used only for that synth, and consider buying a multi-port interface for this purpose if you don't already have one.
- Check in your sequencer editor that you are not pressing too hard on your keyboard during recording, and thus generating lots of extra aftertouch information. If you do find unwanted aftertouch data, most sequencers will allow you to selectively filter it out and delete it, while leaving the remaining data untouched.
- If you are using a lot of real-time controller information, try thinning it out if there is a suitable option in your sequencer. Don't worry that you will lose any expressive nuances — these algorithms normally scan for and remove identical adjacent values, which can often be created when drawing in ramps of controller values. The extra bytes don't do anything, and can be safely deleted.
- If you suspect that your playback timing is suffering due to a large amount of MIDI data, make sure that the drum and bass sounds get the highest priority, since timing problems with these will be more obvious. Use the same solution in your specific sequencer as for note-stealing, for the same reason.

"If you suspect that your playback timing is suffering due to a large amount of MIDI data, make sure that the drum and bass sounds get the highest priority."

- Try delaying lower priority tracks such as keyboard pads by a few ticks — this will also ensure that the sounds that need the tightest timing are dealt with first. Since the timing resolution of many modern sequencers is of the order of 384 ppqn (pulses per quarter note), it is unlikely that the overall tightness of your song will suffer, but at least you will ensure that the sounds you have prioritised are further ahead in the MIDI queue, so that they emerge first.

SYSEX PROBLEMS

While missing notes and timing problems are annoying, there are at least plenty of solutions to try out. Where SysEx data is concerned, the problems can be harder to track down, and many people find downloading large banks of synth patches a hit and miss experience, with random crashes and lockups at the synth end due to corrupted data being received. Some older computer soundcard MIDI designs left a lot to be desired, and caused many problems where SysEx was concerned. Thankfully, most modern MIDI Ins and Outs can cope with even the larger SysEx dumps with few problems. If you suspect a SysEx problem, try the following:



If you have problems receiving large SysEx dumps, you may have to increase the size or number of software buffers. MIDI Quest has options for both of these.

- Avoid long daisy chains of MIDI cables connecting a series of synths to a single MIDI Out. Whilst this setup may work fine for MIDI recording and playback, SysEx transfers are particularly demanding of both software and hardware. Make sure that you have enough MIDI Ins and Outs to keep a maximum chain length of two or maybe three synths, or failing that, use a MIDI Thru box so that your connections spread out from one point rather than in a long line.
- If you have one synth that has particularly large SysEx data banks, and have it connected in a MIDI chain, make sure that it is the device that is closest to the sequencer MIDI Output — this will ensure the cleanest signal.
- Make sure that you have the latest version of your MIDI driver, and that it is set up correctly — some provide special options for dealing with the special problem of large SysEx dumps. I remember reviewing an interface that exhibited all sorts of problems until a tick box was checked in the driver software.
- Modern SysEx software tends to default to high speed settings that may cause problems with an older MIDI interface, and particularly those on early PC soundcards. By reducing the send speed you may get more reliable dumps — check the manual or helpfile of the SysEx software you are using to see if you can reduce this data transfer rate.

"Try delaying lower priority tracks such as keyboard pads by a few ticks."

- If you have a synth that sends particularly large SysEx data banks, you may have problems receiving them reliably, even if you have no problems with any other synth. It may be possible to cure these problems by increasing the size or number of the input buffers in the receiving software (see figure 3). Alternatively, some synths may allow you to send the same data in several smaller chunks, rather than in a single huge one.
- If you are having problems downloading sounds to a particular synth, and have access to the Internet, see if there is a user group for this model. Once you subscribe to the list, you can post a question to other users who may well already have found a solution for your particular combination of hardware and software. Remember that many groups post FAQs (Frequently Asked Questions) or monthly digests — it is polite to look here first before steaming in and asking the same question again.

GETTING FURTHER HELP

Curing obscure MIDI problems can be time-consuming, but most of them succumb in the end. Most manufacturers have websites, and these usually contain technical support information. Many also have telephone helplines, but these are often extremely busy. Do keep trying if you can't get through at first, but when you do get through, try to keep your query short and to the point, and have the gear in question powered up and near the phone. If you still can't find the answer to that elusive problem, you can often email the symptoms to a technical support person, but do bear in mind that email queries are often handled by the same tech people who answer the telephone helplines — they may only have time to answer emails when the phone stops ringing. Good luck!

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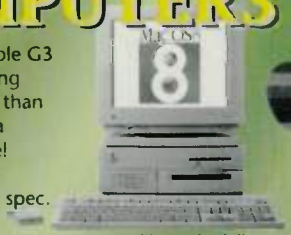

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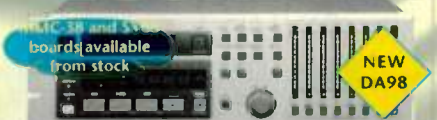

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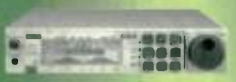

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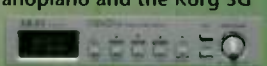

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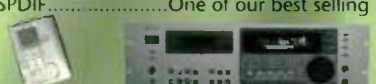

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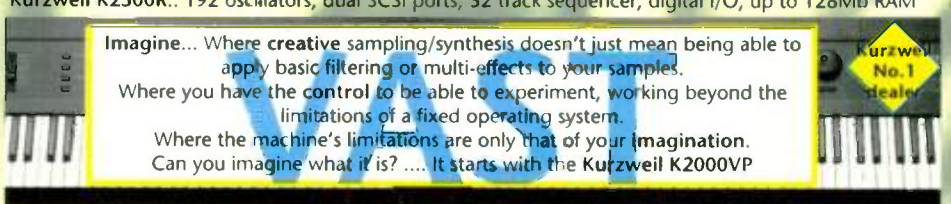

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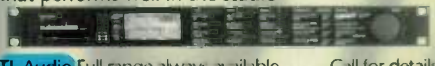

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Spatial Awareness

The head of the design team behind the Lexicon Studio talks to PAUL WHITE about the Lexicon sound and the benefits of the Studio approach — and offers some practical tips on optimising PCs for audio recording.

BOB REARDON OF LEXICON

Bob Reardon headed the team that designed the Lexicon Studio digital system, but he's also the right guy to ask about the technology behind the legendary Lexicon reverb sound. Before talking about the new Studio system, I just had to see if I could get any closer to understanding what makes Lexicon reverbs sound the way they do.

Why is it that Lexicon reverbs sound different to the competition?

Bob Reardon: "The core stuff is based on David Griesinger's [distinguished acoustics specialist whose work has been central to the Lexicon sound] research, and it really comes from not trying to sample a room, analyse it, and then recreate it technically from that point of view. That's not going to produce all the right characteristics over time, and even if you do a more in-depth analysis over time, and improve the model, is it still going to sound right when you start to adjust things like the room size? David uses the same techniques as everybody else for analysing acoustic spaces around the world, but when the analysis is complete, he's looking for some fairly easy code ways to execute the job. He tries to reduce the problem to simple variables.

"In terms of the basic blocks that make up reverb, those are now fairly well known. It's more to do with how they are connected together and how they interact, especially when you change parameters."

I remember when I spoke to David a number of years ago, he told me that the shape of the reverb build up and decay is very important in defining a space, and very often the decay isn't a simple exponential.

"That's exactly what I'm talking about — decay shape is very important, as are the diffusion characteristics, and how that relates to reverb time. If you take a look at our programs, there's actually a link parameter that links shape size and spread."

There seems to be something very different about the way a Lexicon reverb starts because, with a lot of competing designs, if you take the dry sound out of the mix you're left with a rather disembodied sound. With a Lexicon, however, as you fade out the dry sound, it just seems the source moves further away, but it still appears to be there.

"It's based on a lot of listening experience, and when I talk to David about it, he always goes back to the ears. There has been a big increase in the understanding of sound behaviour over the past couple of decades, and David has intuitively put together some of these interactions, often before other acousticians.

"The onset of reverb is also very important, and if you look at what other people have done, they've taken an early reflections section, and if you turn it off, it sounds as though everything comes all at once. Maybe the decay is OK, but the onset doesn't sound realistic. You have to add the early delays back in to create the illusion of a real acoustic space.

"Although we have delay shells around our

large hall algorithm to simulate early reflections and to add detail, those aren't required to be there to have it sound like an acoustic space. What happens with early reflections in the first 50mS is particularly important."

So what you're saying is that early reflections also feature as an integral part of your algorithm, rather than just being superimposed over the reverberation the way most of your competitors do it?

"That's correct. And to do reverberation properly requires a great deal of processing power, which is one reason we decided to add hardware reverb to the Studio system."

LEXICON STUDIO

"I'm personally very much a believer in what you can do with a computer, but there are certain things that can be done more nicely in specialised custom hardware. We've developed our own custom LexiChip ASICs, optimised for reverb, and what it comes down to is that different types of processors are good for different things. For example, the Motorola 56K family of DSPs is very good for linear maths and so is good for doing multiply-accumulates — for doing mixers and things like that. You can even do a pretty good filter, though floating-point will always yield better results on filter design.

"We made a custom chip to do our reverb because none of the processors out there are optimised for the job, so it's not as if we could have done it some other way. Reverb is a complex process that combines time processing with filtering — you're trying to recreate the acoustics of a real room, and that's a very complex algorithm. If you look at axial room modes that involve just two surfaces, the math is well known, but as soon as you get oblique or tangential modes that include multiple surfaces, the math gets very complex.

"With Lexicon Studio, we talked to a number of software companies and said, 'If you had somebody who was good at the hardware portion of this equation, what would you like them to do?' The answer was that, as well as I/O synchronisation of word clock and timing — which are big issues — they wanted good reverb that didn't depend on the host processor."

THE COMPUTER STUDIO

"What I notice is that there are lots more computers around in music and production, and they're increasing in number. What people need is a way to connect their computer to the real working world, and the concept of Studio is really summed up by a couple of things.

"We say that Studio is intelligent hardware for your software. There are software companies who say you can do everything in your computer, but in most cases that isn't true. For example, in post-production you're probably going to use external samplers for short duration sound effects, and of course for music you have synths run by sequencers. The challenge for most people is how do they intelligently interface their computer to the outside world? Also, people are using multiple software packages depending on whether they're doing audio, sequencing, PQ coding, mastering and so on, and there are some very nice offerings out there in any number of these areas. The point is that people don't want to have to buy a different set of proprietary hardware every time they want to use another nice software package, so we're there trying to be one way to address that problem by providing good synchronisation, good sample alignment, good quality outboard I/O and DSP effects.

"You have to get the converters out of the computer, because inside it's like a giant radio station! You also have to be careful ▶

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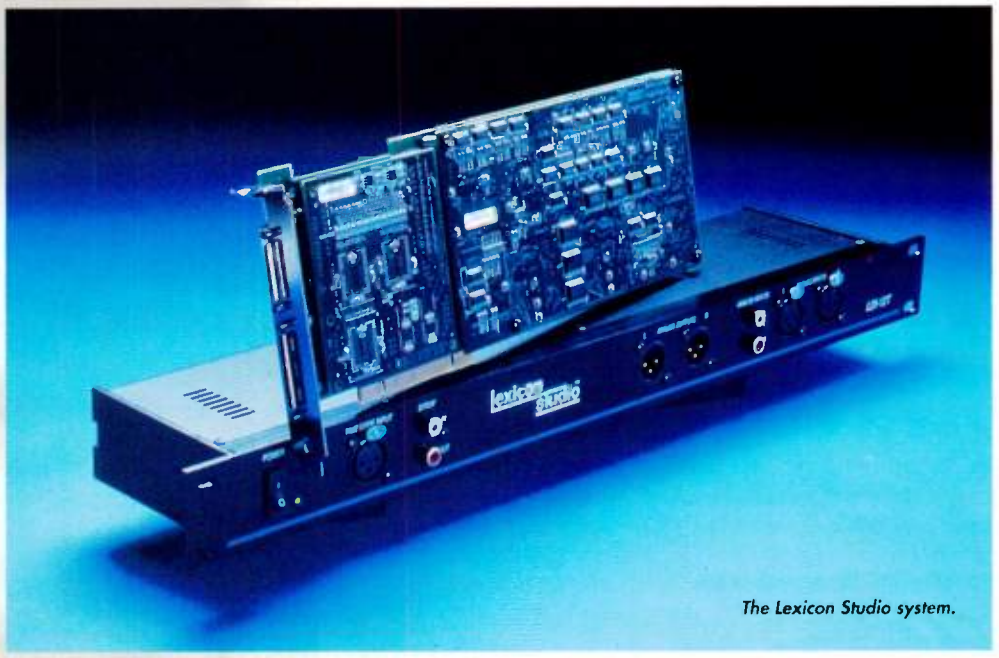

The Lexicon Studio system.

when you buy these systems that your converters really are outside and that you haven't bought on-card converters attached to a breakout box. Lexicon has not traditionally been a first time buyer's company — people come to us when they understand the difference in quality between our products and what they bought first time around. Then they understand what they're getting for their money.

"Another problem with inexpensive cards is that you have to have a mixer to deal with your cue mix — you can't listen to your source signal because the travel from the input, up onto the buss, onto the RAM and back means you'll get a delay. You'll strike a note and it will sound late, sometimes up to a second. There are problems with Windows 95 as to what the minimum delay can be and that's determined by the task-switching granularity of Windows, which has roughly a 20mS heartbeat. It works a bit like audio sampling where your sampling rate has always got to be at least twice as fast as your highest audio frequency, so it ends up that the practical limit is in the low 40s of milliseconds. This is true for everybody out there, so what we did is come up with a mode where you can mix the monitoring signal with the playback, right on the card, so you have a zero latency for overdubs."

David Griesinger's research has been influential in Lexicon's unique approach to simulating reverberation.

So you're intelligently handling the delays to make the system transparent to the user. In fact you should only be aware of latency when you either start or stop the audio, and with your short latency, even that shouldn't be a problem.

"Latency is one area where we've been able to make a lot of improvements, and this has to do with another aspect of soundcards. There's a lot of work involved to make a card that's both a PCI buss master — which that means you're controlling the traffic on buss and dealing with modem cards, network cards and all that kind of thing — to do that and still get a lot of channels takes some very serious coding. One way to test latency is to hit play, hit stop, hit play... Do you hear audio as soon as you hit play or do you have time to make a cup of coffee?"

It seems that a lot of your design work involves finding ways around the timing things that the PC doesn't normally handle too well.

"The PC is a challenging machine to write for, but there has to be a distinction between what's a limitation of the hardware and what's a limitation of the operating system. The latency is fundamentally a function of the operating system, and there are some specialist scientific and research operating systems, not widely available, that have very low latencies. Software drivers are also critical, and a lot of our work has been in the area of writing a good driver."

PC FRIENDLY?

This all sounds great, but I know from the reader phone calls we get that a lot of people have problems getting PCs to work properly. Tracks wander out of time, glitches or clicks turn up in the audio, and one piece of software either conflicts with or refuses to communicate with another. What's the ideal PC setup for music?

"Well, that's a big one. There are a number of problem areas, but I can go over some specifics that might be valuable to your readers. What makes a good PC for hard disk audio? Let's start with what people already have, because it's tough to tell people to throw away what they have and buy something new — they always suspect it's a plot to get them to spend more money. So instead of telling you what to buy, let's have a look at ways to optimise what you've got.

"If you're going to do multi-channel audio, about the minimum system is a Pentium I 166. I did say a Pentium, and a Pentium processor is an Intel product, but I'm not getting paid by Intel to tell you this. However, as a developer, it is likely to be the most solid processor choice. Yes, you can save some money by buying a Cyrix or AMD part, but in either case, the equivalent Intel part typically runs faster and if you buy one of the less expensive alternatives, often what will happen is that the manufacturers speed up the clock rate to make them behave more like an Intel part. That can cause problems where you're out of sync with your PCI buss. This doesn't affect word processors, but if you're streaming audio in real time, timing is critical and you can end up with glitchy audio.

"Let's say I've got a P166 and I want to optimise it. First go into System, go into Advanced Settings and there are three buttons there that control your computer's characteristics. You need to turn off the reader head for your disk. Often setting the machine up as a network server, even though you're not going to use it as a network server, also gives you a speed gain that is good for audio. And graphics cards can also be a real problem. In extreme cases, you run into a card that says it's a 32-bit card and it actually only uses 8-bit video transfers, which means it's hogging this big buss and you're not letting the audio or anything else go through. Hardware acceleration is also often a problem, and is not well written, so often you can turn the hardware acceleration off. Also, visit the web sites — don't presume that what you have in the box is the latest driver. You may also be able to find better video drivers.

"If you are going to buy something new, I'd look for an ATX motherboard that has an advanced graphics port which gets the

> "I'm personally very much a believer in what you can do with a computer, but there are certain things that can be done more nicely in specialised custom hardware."

video processing off your PCI buss. You might also look for onboard SCSI so that it keeps that off your PCI buss, so that the PCI buss can be used for your I/O. This way you distribute the load rather than always having everything fighting for space on the PCI buss."

When it comes to drives, nearly everyone advises you use SCSI for audio as it's faster, but is it true?

"Technically yes, but it's a statement in isolation so you have to look at the whole problem. For example, with a P166, if you get a SCSI card it's going to go on your PCI buss along with your audio card and video card. If you use a fast IDE drive instead, it'll reduce the traffic on the PCI buss, which can actually speed up the overall performance. If you get a modern extended IDE drive, you're going to get good performance, and on my P166, I've been able to pull over 24 tracks, 26 tracks off my IDE drive during playback."

Are there hidden aspects of drive speed that people need to be aware off?

"Sure — you have to look for a high sustained data transfer rate, fast access time and so on. A faster rotational rate generally mean ▶

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▶ you'll get data off the drive faster, and check out the sustained transfer rate in burst mode."

So, how may tracks is it realistic to expect to get off a single drive? We see so many systems offering huge numbers of tracks, but does that mean using multiple drives?

"Let's talk about tracks for a minute. An I/O system, like our Studio card, is handling streams of audio, and I find it more useful to think of the number of playable tracks in the same way as you might think of polyphony on a sampler. You might have a whole lot of samples loaded, but how many can you play back at once? During a mix you may be pulling 24 tracks off your hard drive, but if you're mixing internally, it's all coming out via two audio streams. The maximum number of tracks you can play at once is a function of the drive itself — if you're using SCSI, is it SCSI 3, is it IDE? What I can say is that with our hardware and using *Cubase VST* as a reference system, 24 is a rational number to focus on. With IDE drives, once you do a lot of punch-ins or overdubs and put other songs on there, you can get at the hairy edge if you don't defragment your drive. With SCSI you'll have a bit more bandwidth, and with SCSI you might be able to play back 32 tracks at once. But again, I must advise caution. It's one thing doing your tests on a freshly formatted drive, but after you've recorded a few songs and done a few overdubs, the performance is bound to be worse due to fragmentation."

> "Certainly Lexicon is a processing company, and there are plans for expanding Studio with a buss that is actually on the card. We're not announcing any DSP expansion to the system yet, but stranger things have happened."

If you have a separate drive for audio, is it sufficient just to erase all the files when you start a new project, or is it important to defragment?

"You can do that, but it's better to defragment or reformat, because as your drive ages sectors occasionally go bad and need to be mapped out. While I'm using a drive I'll do periodic defragmentations to keep additions to the drive efficient, and then when the project is done and you're backed up, reformat the drive. A short format is usually OK."

Being pragmatic, then, should you knock say 25% off the maximum quoted number of tracks and then use that as a guideline?

"With a high-end machine, 24 tracks is still a rational number to talk about, but with slower machines, you might get 18 to 20 tracks. Slower still you should still be able to get 16 tracks. It's also more work for the computer to handle the record side than the playback side, so another question you hear is, 'How many tracks can I play back while I'm recording how many tracks?' That's also a factor of the I/O system and the drive, and on a fast computer we feel a realistic figure for our system is 16 tracks of recording with eight tracks of playback, or vice versa. We aren't imposing the limit — it's down to the hardware, and though we can get 32 tracks on the fastest hardware, if you use older technology and have your drive fragmented, you should expect rather less. That's why you need a second drive for your audio. I've recorded stuff onto the main boot drive at trade shows where the second drive has been damaged, and it works. I've managed 16 tracks, including overdubs, but I wouldn't recommend it."

STUDIO OF THE FUTURE

People don't want to buy into a closed system, so what are you doing to ensure Studio grows with the needs of the user? At the moment it is only supported by *Cubase VST* PC, but surely Mac drivers must follow, soon as well as support for other major audio sequencers?

"This is going to be a big year for us, with a number of things coming on line with Studio. We're now out in the market with the PC version working with Steinberg, and the Mac drivers are expected by the end of the summer. We also have the 16S interface, which is the large I/O box expected in autumn. Also this summer there's the MM I/O multi-channel package that we're working on with SEKD, and of course we have other development parties coming on line, such as Sonic Foundry.

"We're also talking to other sequencer manufacturers — this is an open system with a lot of advantages, and the user wants to be able to use a number of software packages, not be extorted into a single hardware solution."

It would also seem logical to extend the on-board processing capabilities to include multi-effects, or even DSP areas where you or other developers can load more software-driven processes that you don't want to burden the computer with. Do you have plans in these areas?

"Certainly Lexicon is a processing company, and there are plans for expanding Studio with a buss that is actually on the card. We're not announcing any DSP expansion to the system yet, but stranger things have happened. Hardware effects and DSP-based processes are the two areas of most interest to the user, and there are some nice tools out there that do use generic DSP. Again, some tools work better with proprietary DSP solutions, so we can expand either way. Our expansion buss is 24-bit and has 288 channels. That's all I can say for now, but the system will evolve in interesting ways."

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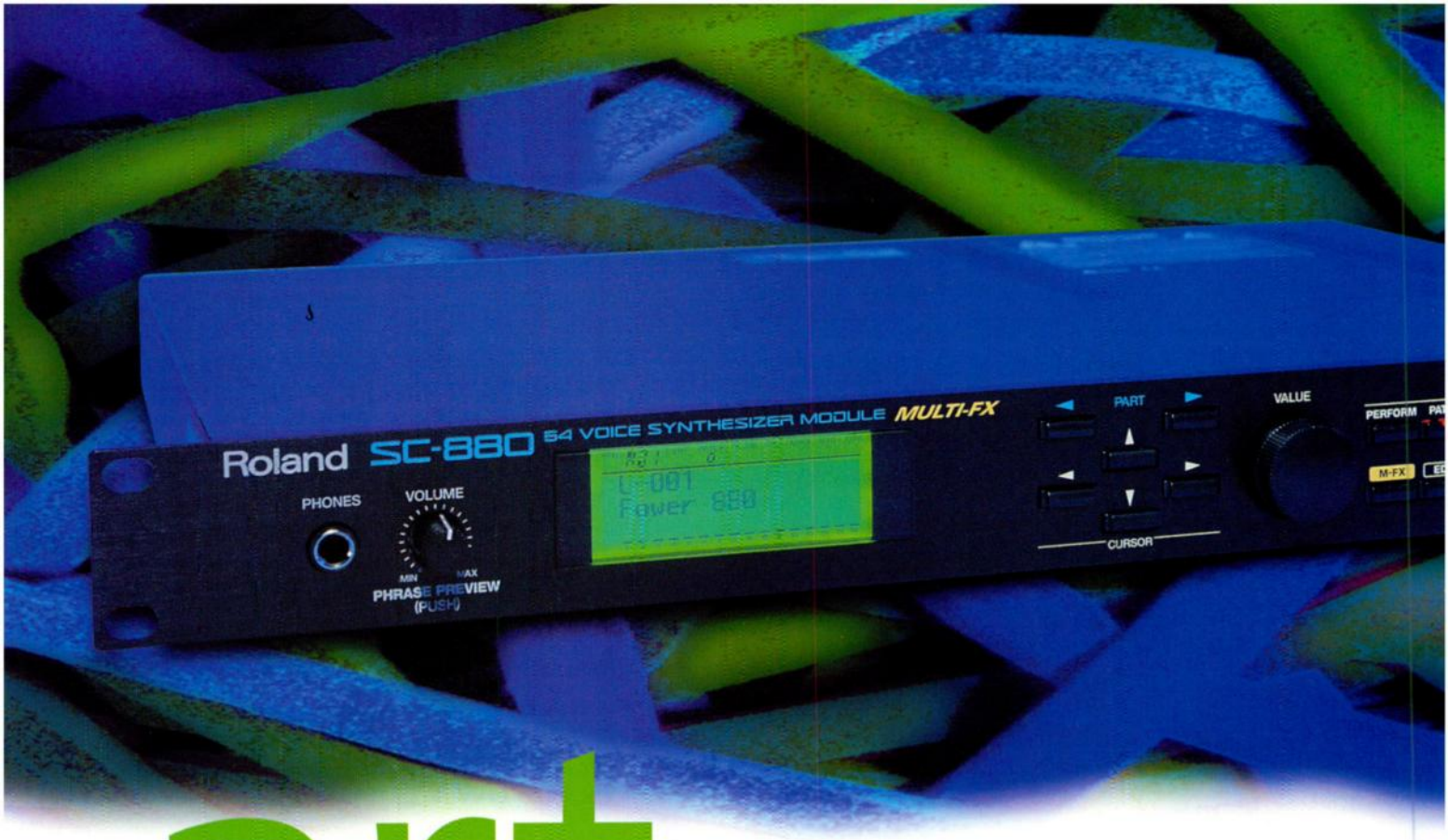


art attack

ROLAND SC880 SOUND CANVAS GM/GS MODULE

One or two General MIDI modules are simply a cut above the rest, and Roland's high-end Sound Canvases fit right into this category. PAUL WHITE retires to the studio with the latest in the line and dips into a seemingly limitless palette of sound...

General MIDI synths tend to be regarded as fairly unexciting by the majority of serious musicians — but although more esoteric synthesizers have a seductive appeal, most musicians still need at least one set of high-quality, bread-and-butter sounds at their disposal, ideally with plenty of variations to choose from. Perhaps budget soundcards are to blame for GM's distinctly unsexy image, but Roland want their SC880, with its huge library of hi-fi sounds and hefty 64-voice polyphony, to change all that.

The SC in this new module's name obviously derives from Sound Canvas, Roland's long running series of GM/GS modules, but the majority of sounds used in this model are more advanced even than the GM sounds used in the company's pro-level JV1080 and 2080. Furthermore, to retain backwards compatibility, the SC880 also features complete sets of sounds from the earlier SC55 and SC88 sound modules. Bank Select commands may be used to switch between the SC55, SC88 and SC880 libraries, and to select the GS variations of each sound. Of course, these may also be selected directly from the front panel.

Presented in 1U rackmount format (unlike its tabletop-format predecessor, the SC88) the SC880 is capable of 32-part multitimbrality via its two MIDI input ports, and the user has the choice of configuring it as one huge machine or as two relatively independent 16-part modules, the latter being at the expense of delay and EQ effects, which can't be accessed in Double mode. Navigation and editing is via the usual cursor buttons, data-entry Value wheel and LCD screen, though on this model the Value wheel also has a push switch built into it. Depending on what operation you're doing, pressing the Value switch will allow you to view certain parameter lists. The LCD features the familiar Sound Canvas bargraph display mode, showing the multitimbral MIDI activity of the instrument. To aid in auditioning sounds, pressing the Volume knob plays an appropriate demo tune or riff using the currently selected sound.

Though the front panel looks pretty simple, it provides access to all the SC880's sound and effect editing facilities, while the rear panel sports direct Mac and PC computer interfacing, along with regular MIDI sockets. Two MIDI Ins, A and B, handle the 32 parts of the SC880, so if you're accessing the unit via MIDI you'll need a MIDI interface with at least two ports (or two separate interfaces) to take advantage of its multitimbrality. Using a PC may or may not allow you to access the second set of 16 parts (B) depending on the software you're running, so there's a swap mode to change sections A and B around. This is useful for situations where you may want to play a live patch from section A while sequencing several parts using section B. A four-position slide switch selects between Mac, MIDI and two different speeds of PC serial port; the unit must be switched off before the interface mode is changed, in order for the change to be recognised. A single combined MIDI Out and Thru is also fitted.

On the audio side, there are two pairs of stereo outs, plus a pair of input jacks which allow a stereo source to be combined with the output of the SC880 without recourse to a mixer. With a synth that offers 32-part multitimbrality you can never have enough outputs, even though the internal effects reduce the need for external sound processing; Roland have made the effort to provide a reasonable amount of flexibility here by configuring the SC880 so that any sounds routed to Output 2 are stripped of their effects. Output 1 generally handles a stereo mix with effects, though inserting just the left jack provides a mono output when needed. The unit is supplied with nothing routed to Output 2, though the user has the option of routing any of the 32 Parts either to Output 1, Output 2 stereo, Output 2 Left or Output 2 Right. Note that sounds routed to Output 2 aren't affected by the front-panel volume control setting.

Inside the machine are the three sets of 128 Capital GM tones (for the SC55, 88 and 880) plus a large number of GS variation tones — 1117 tones and 42 rhythm sets in total, complemented by a very powerful effects section. Because there are so many variation tones, some sounds that normally wouldn't make the GM set have managed to find their way in, such as digeridoo and a number of vintage analogue sounds. But while in some areas you're spoilt for choice, in others it seems you have virtually *no* choice, with the SC55, 88 and 880 versions of some sounds seemingly identical. For example, I could only find one shakuhachi sound — and that was the old familiar Sound Canvas sample that sounds more like a harmonica than a shakuhachi.

On the whole, though, the palette of sound offered by the SC880 is impressive, not just because of the monstrous GM/GS library, but also because of the excellent range of drum kits on board. All the standard acoustic and electronic sounds are there, but there are also kits of sound effects, ethnic drums and weird combinations that can be used in anything from ambient techno to mainstream pop.

SOUND STRUCTURE

In Roland terminology, a Tone is a basic sound such as a piano, guitar, bass, or synth, though some Tones actually comprise two Voices, which reduces the available polyphony accordingly. Each Tone has eight editable key parameters:

- Vibrato Rate
- Vibrato Depth
- Vibrato Delay
- Filter Cutoff Frequency
- Resonance
- Attack
- Decay
- Release

This might not seem like a lot of editing depth compared to what's provided by some instruments, but in practice it allows fast and easy tone shaping over a surprisingly wide range, and parameters can be changed over MIDI using a remote device — a hardware controller such as the Peavey PC1600 or the Keyfax PhatBoy, for example. Once Tones have been edited, they can be saved in one of 256 user locations.

When one or more Tones are used together, with effects, the result is known as a Patch, which can comprise layered Tones or keyboard splits. There are 128 factory Patches and a further 128 user Patch memories. The 42 rhythm sets are configured as drum sets with one percussive sound per key, and though some sounds are common to several kits there's still a huge range on offer, including a number of Roland's classic 808 and 909 sounds. It's probably fair to say that the SC880 offers more in the way of drums and percussion than some dedicated drum machines that cost almost as much.

The next level of sound construction is the Performance, which groups together Tones and Rhythm sets to form a multitimbral ensemble that can be accessed from a sequencer. The SC880 includes 16 Performances, eight of which are Presets, with one specifically designed as a sequencer starting-point template. Eight more may be saved by the user.

These days, effects are pretty much *de rigeur* on a decent general-purpose sound module, and the SC880 offers two types: System effects are applied to all Parts, with user-adjustable amounts per part, while Multi-effects are applied to specific Parts. The System effects comprise reverb, chorus delay and EQ, while the Multi-effects section offers a library of 64 different treatments. The latter can be configured in series or in parallel, and it's possible to store 64 of your own Multi-effects creations.

SOUND IMPRESSIONS

The SC880 is always played in either Patch mode or Performance mode, and from either of these you can move into Tone, Rhythm or Multi-effects mode to access specific settings. Normally ▶

pros & cons

ROLAND SC880 £699

pros

- 32-part multitimbral, with 64-voice polyphony.
- Loads of good sounds, augmented by powerful effects.
- Vast choice of quality drum kits.
- Built-in computer interface for Mac or PC.
- Useful Audition feature.

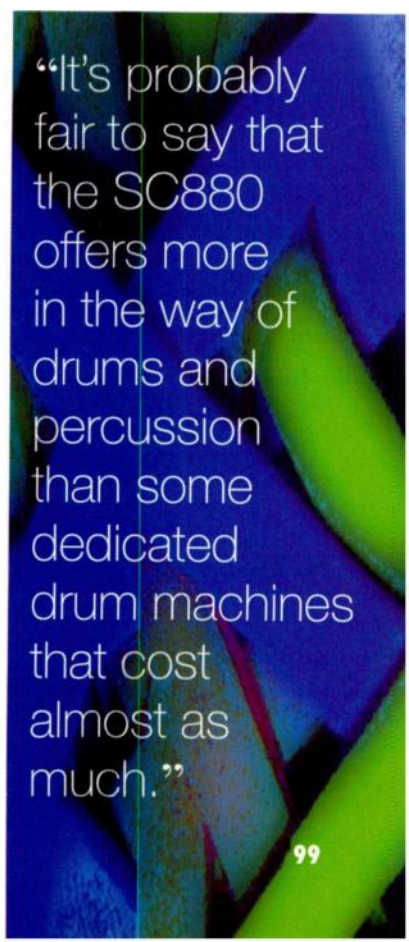
cons

- A few of the sounds are let down by being lifted directly from older Sound Canvas models and having no (audibly different) variations.
- The Audition riffs are usually better than the stuff I'm trying to write!

summary

While the SC880 has a distinctly Sound Canvas flavour, the sounds are technically good, with numerous variations on most, making the unit much more flexible than its predecessors. This is a GM module to be taken seriously.

SOUND ON SOUND



> "...though the number of editable Tone parameters is relatively small, you can reshape a sound beyond recognition in almost no time at all."

▶ Performance mode is used when the SC880 is linked to a sequencer and Patch mode when it's being used as a live sound source controlled from a MIDI keyboard.

The manual makes it clear that some of the SC880 Tones don't play across the whole width of the keyboard because they have been constrained to the natural range of the instrument in question. Some of the instruments have also been designed for legato playing (shown by a colon at the end of the instrument name) so that if you don't end one note before starting another the second note will be played without its attack portion. This is obviously useful for emulating instruments such as violin, that can jump to different notes within the same bow stroke.

On a technical level, the sounds themselves are clean, with a creditably low background noise level. Immediately you notice that plenty of memory has been dedicated to the pianos to ensure natural, seamless sounds with no obvious loops. There's also a good range of organ sounds, and if you're into guitars you'll discover a comprehensive selection of acoustic, electric and distorted sounds to choose from. I was also pleased to see a musically relevant range of bass sounds on offer — the regular electric and fretless bass sounds are particularly strong, with plenty of depth and definition. This section also includes a whole load of synth basses, including (but not restricted to) classic Roland models such as the TB303, the JP8 and the SH101.

So far so good — but the quality shifts up a further notch when you get to the orchestral sounds. These are really excellent, with plenty of variations to choose from. The string ensembles are especially convincing, as are the brass and reed sections, and the only slightly weak point of this section is the Pipe sounds, where the various flutes sound very much like their regular Sound Canvas counterparts. I've never found Roland's flutes to be totally convincing, and even the pan pipes and bottle-blows seem too aggressive and chiffy. There's also less choice in this area than in most of the other sections.

Things pick up again with the synth leads, pads and FX. A few Patches, such as 'Fantasia' and 'Atmosphere', sound rather dated, but the sheer number of other sounds on offer in this area more than make up for that. Again, the Roland arsenal of vintage machines has been brought into play, but the collection is not without examples from other manufacturers' instruments. A lot of what's included on a JV Vintage expansion board turns up here in one guise or another, as do a few FM sounds.

Having the facility to add so many variation tones elevates the Ethnic sound section from a token gesture to a worthwhile library, though to get a convincing sitar sound you still need to put the drones on one track and a the melody on another, so that you can pitch-bend the melody without bending the drone. Perhaps a new mode, with a keyboard split-point below which pitch-bend doesn't operate, would be useful for such instruments — bagpipes included?

I've already mentioned the drum sets, which are a tough act to follow, but there's also a percussion section, which is stuffed with gamelans, taikos, synth drums and reversed sounds, as well as tinkly bells and latin percussive noises. The melodic toms are both varied and powerful, yet musical — something that can't always be said of the final SFX section. How did helicopter, bird tweet and telephone make it into the original GM spec? With up to 13 variations on each of the 880's SFX sounds alone, you don't have to worry too much about these — though the bird has been joined by a dog, a horse galloping, a kitten, another bird and a growl! The good news is that there are many guitar string and fret noises, some genuinely useful sound effects, wind chimes, and a whole lot more weather!

MULTI-EFFECTS

The SC880's Multi-effects section is actually very powerful, and while it isn't possible to string together chains of effects, there are some preset chains on offer, as well as some unusual treatments that greatly enhance the SC880's ability to produce creative sounds. For example, in addition to the various conventional EQ options, there's also a spectrum filter, an enhancer and the Humanizer vowel filter. Additionally, there are various overdrive and distortion options, as well as wah, rotary speaker, and all the usual chorus/flange/pan/tremolo modulation effects. There are also processors such as compressors and limiters; effects featuring Roland's own RSS stereo enhancement; gates; pitch shifters; multi-tapped delays; and devices for turning all the pristine new sounds thoroughly lo-fi, if that's what suits your music.

Effect chains include guitar multis, comprising three or four effects in series, various keyboard multis, and a few dual effects, such as overdrive combined with rotary speaker, or phaser with auto-wah. Each effect has various user-accessible parameters, allowing fairly in-depth editing, and some parameters may be controlled in real time via MIDI if you're feeling adventurous. Effects such as EQ can obviously only be on or off, but reverb, chorus and delay have individual amount parameters that determine the feed levels to the System effects when in Multi-effects mode, so you have a lot of control over the effects applied to different parts.

Finally, though effects tend to be taken for granted these days Roland must be commended for providing very high quality in this area, with some useful and less obvious offerings in the Multi-effects section. Used with care, these can turn fairly standard GM/GS sounds into something a little bit special.

SUMMARY

While the SC880 inevitably has something of a traditional Sound Canvas flavour to it, both the quality and choice of sounds is to be applauded, as is the powerful effects section and quite magnificent drum section. Aside from a few weak sounds inherited from earlier Sound Canvas products, the overall quality is really very good. The manual makes the unit seem more complicated than it really is, but once you start to use the SC880 it's actually quite easy to find your way around.

When you get into editing Tones, then creating Patches from two or more Tones, plus effects, you can generate sounds that transcend the basic GM/GS repertoire. An external hardware controller makes creating new sounds especially quick and easy. The resonant digital filters have a nicely analogue edge to them, and though the number of editable Tone parameters is relatively small, you can reshape a sound beyond recognition in almost no time at all.

Not everyone will turned on by the prospect of more and better GM/GS sounds, but anyone working in traditional pop music areas could do a lot worse than choose an SC880 as the basis of a sound-generating system. In addition to massive polyphony, you get all the stock pianos, basses, guitars and organs needed for pop work, as well as a surprisingly large selection of classical and synth sounds, some of the best (and most varied) drum sounds going, and a powerful effects section. Having at least one GM-compatible instrument also gives you a means to exchange song data with other musicians, as well as the wherewithal to build up mixes from commercially available MIDI files. If you feel lacking in the GM department, you need to listen to the SC880 to see what you're missing out on. SOS

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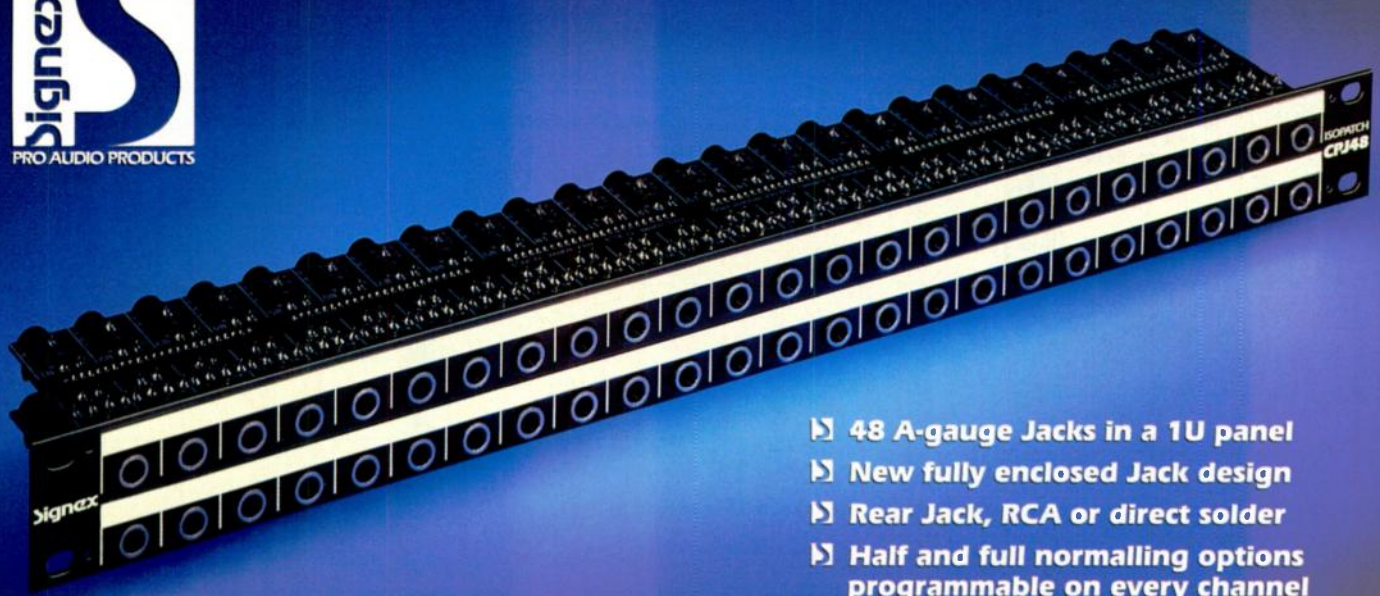

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THE CRAFT

CREATIVE SEQUENCER TIPS

Part 2: Controller freak NICHOLAS ROWLAND wiggles his magic mod wheel and transforms your sequenced sounds into something just a little more spellbinding...

In the first part of this series (*SOS* August '98) I looked at some simple ways in which you could use the copy, cut and paste functions of a typical software sequencer to generate compositions and arrangements without really trying. In this second article I want to explore a few ways of manipulating *sounds* to create various musical (and some not-so-musical) special effects.

Last month I touched briefly on a few techniques which make use of MIDI controllers such as volume and pan to create fade-ins, ping-pong echoes and gratuitous sweeps across the stereo spectrum. But this is only scratching the surface of what can be done with MIDI controller information — particularly those hundred or so other controllers that people often don't bother about.

PITCHING A WINNER

First, though, let's take common or garden pitch-bend. Tiny touches of pitch-bend are useful for adding a human dimension to certain types of sound. For example:

- Applying tiny pitch offsets to sounds such as guitars, bass guitars and other stringed instruments helps to simulate that natural bend of notes that occurs during enthusiastic fingering of the strings.
- Huge swathes of pitch-bend are also useful for adding authenticity to ethnic-style sounds. Instruments such as koto and shamisen, to name but two from the standard GM soundset, all sound much more 'authentic' (I use the term loosely here) with a bendy little twiddle at the beginning of each note — and even more so when they're bent so hard that they feel as though they're going to snap. Ethnic drum sounds (tablas, talking drums and taikos) also sound much more like the real McCoy with lots of pitch-bend applied.

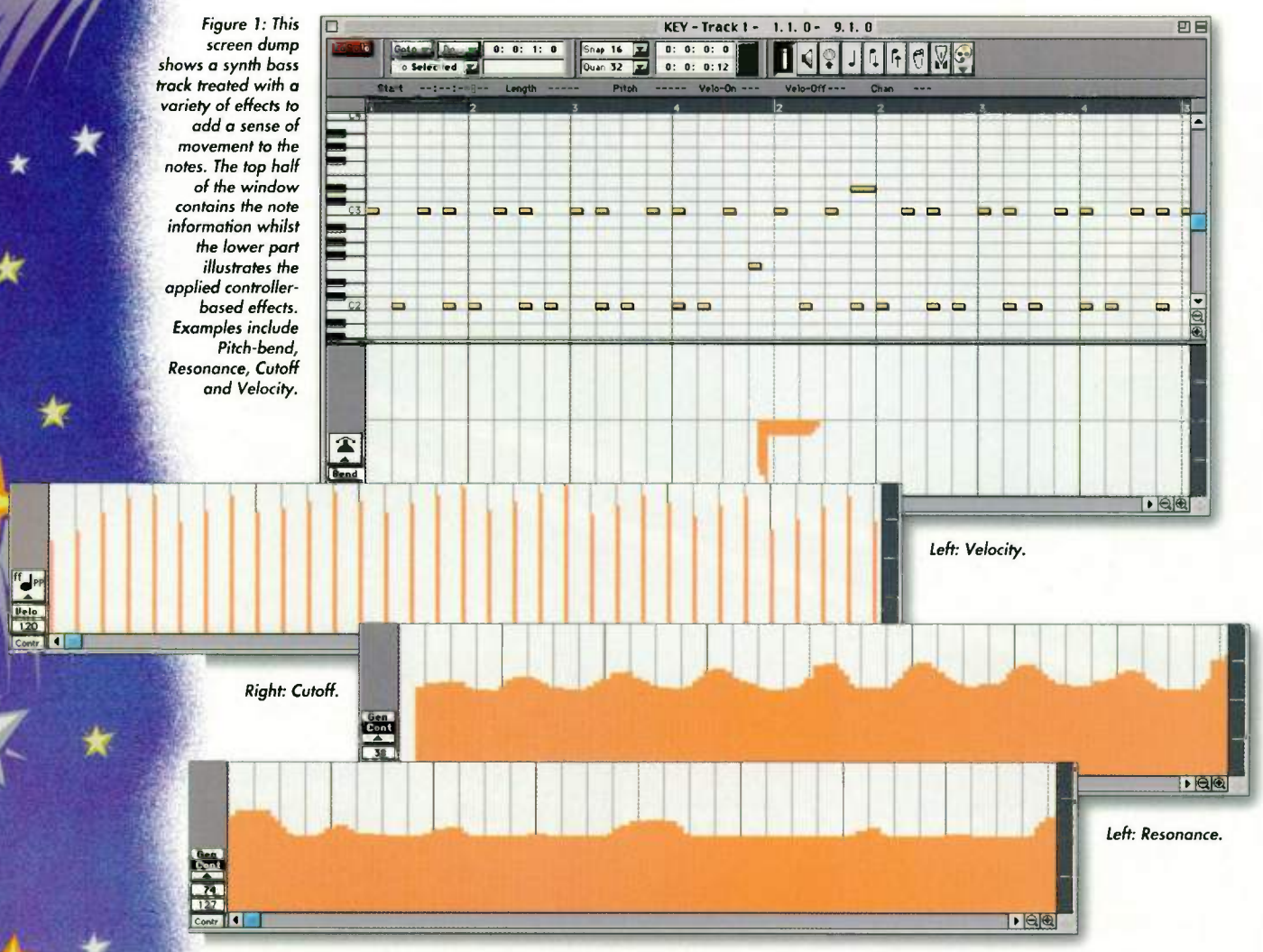

Figure 1: This screen dump shows a synth bass track treated with a variety of effects to add a sense of movement to the notes. The top half of the window contains the note information whilst the lower part illustrates the applied controller-based effects. Examples include Pitch-bend, Resonance, Cutoff and Velocity.

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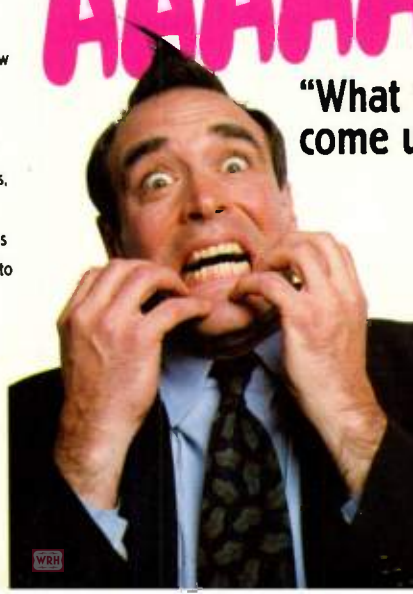
Opcode: Vision, Studio Vision Pro Bias: Peak
Macromedia: Deck II
MOTU: Digital Performer
Audiosuite format:
Digidesign: Pro Tools 4.0

Direct X Media (Active X, Active Movie plug-ins) Cakewalk Pro Systems: Cakewalk 9.0 Sonic Foundry: Sound Forge 4.0: Steinberg: Wavelab 2.0

AAAAARRHH!

"What will they come up with next??"



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▶ While not all modules allow you to pitch-bend the drum sounds from the drum kit banks, you often find various drum and percussion sounds scattered among the melodic voice banks. In the GM sound set, for example, there are instruments such as agogo, tom and syntom, which will usually respond to pitch-bend in interesting ways. You could also try:

- Layering them (ie. by playing chords) then applying loads of pitch-bend and marinating in reverbs with long decay times.
- Combining big, long pitch-bends with very fast modulation applied just to the tail end, to create laser-like stabs.

In Figure 1, on page 102, and in the box below, you'll see how a rapid-fire application of pitch-bend (along with various other MIDI 'treatments') has been used to liven up a synth bass track. The beauty of sequencers is that if you overdo any real-time application of controllers such as pitch-bend or modulation, you can always go into the appropriate editor and modify the data until you get the effect you want. You can also take the opposite approach and, rather than entering data in real time using the pitch-bend or modulation wheel, you can simply draw in the desired controller information and see what effect it has. Again, if you don't like what you've done, it's a simple matter of going back to the drawing board (or rather editing screen) to change things.

"Sequencers make it very easy to take information created for one scenario and apply it to others."

Many sequencers will allow you to map synth hardware controllers, like the modulation or pitch-bend wheels, or the data-entry slider, to any other controller you like. This means that you can easily access those parts of your synths and sound modules you might otherwise be unable to reach easily, because of a lack of knobs. For example, you can use the modulation wheel to control, say, the filter cut-off or resonance on a GS or XG synth and then record the changes as part of the sequence. In many cases, synths or sound modules use controllers which are dedicated to specific parameters. It really is worth familiarising yourself with your MIDI spec sheets so that you know which controllers do what. Then map them to the modulation wheel and record the edits in real time.

LOOP OF THE DAY

If you want to build some simple variations into otherwise repetitive loops:

- Try using controller information to tinker with the envelope of the sound. With GS and XG synths and sound modules, for example, you have full control over Attack and Decay as well as Sustain and Release. Start with a slow Attack and a long Decay. Then, as the riff loops around, shift (quickly or slowly, as the mood takes you) to a fast Attack and short Decay. Depending on the sound chosen, your riff should gradually 'emerge', all hard and brittle, out of what can best be described as a sonic mush.
- If your synth supports it, you can also achieve a similar effect, only much more wobbly, using Portamento — or glide, as it's also known. This time you set your loop a-looping and gradually reduce the portamento time from full on to zero. With a sequencer like *Cubase* these kind of effects are dead simple to program: you just draw in a suitable curve for the appropriate controller (in the case of Portamento Time we're talking controller number five) and then stand well back.
- With sounds that have velocity control patched to filter cutoff frequency, you can create that classic analogue-style burbling effect by changing the velocity of the notes while keeping the pitch fixed.
- Don't forget that you can also use controller information to control parameters such as the send levels for the reverb and chorus effects on ▶

SEXY SYSEX

Sometimes when you're in full creative flow you can forget exactly which patches and sounds you've been using as the foundation for your masterpiece. Unless you make a point of noting down this information, when you switch everything back on the next day you will find that the sequencer has forgotten which patches it's supposed to be playing.

Simple sequencer housekeeping tip number 456 is always to use the first few bars of a composition to dump all the patch information for your synths and sound modules. When you fire up the sequence the next time round, all the appropriate sounds will be ready and waiting for you.

SEQUENCE SORCERY

The simple graphical example on page 102 is designed to give you an idea of how you can make a fairly ordinary loop sound more interesting by using a combination of relatively low-level techniques, as discussed in this and the previous article.

The bass sequence, which drives a Moog-style patch on my Yamaha CS1x, started with a row of notes 'painted in' using the *Cubase* brush tool. Every third note was then manually transposed down an octave, with the odd note at the end of each bar moved by a fifth to give a kick to the sequence.

You can see, from the various screens beneath, how the sequence is then modified through continuous controller data. First I drew in a volume curve for each bar, then added a rapid touch of pitch-bend to provide a kick to the notes at the end of each bar. Filter cut-off frequency and resonance were also recorded in. Finally, I added a bit of gratuitous panning for good effect. Note that you can also go to the List edit window for more precise editing of these data mountains.

It was easy for me to input all this information as part of the sequence because of the CS1x's six dedicated controller knobs. But if your sequencer allows you to map keyboard controllers to different types of controller information you'll be able to achieve the same effect using, say, the mod wheel or data-entry slider.

Even if the sequence was repeated over and over again, a program such as *Cubase* allows you to put a different spin on each repeat through the information in the Inspector window. This allows you to globally change the length of notes (between 50 per cent and 200 per cent of their original length) and also compress them, evening out their relative volumes.

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▶ GM and XG synths. You can easily use sequencer edit pages to fade reverb or chorus effects in and out. Or you can apply them in short bursts to small portions of the mix — even just single notes.

And while we're on the subject of effects, even relatively humble outboard effects units allow you to select different patches via MIDI program change numbers. Other, more sophisticated units allow you to map certain parameters to a range of different MIDI controllers, allowing you to control reverb decay times, for example, via the modulation wheel. You can program reverb decays so that they get longer the harder a note is struck, or try tricks like linking chorus depth to keyboard aftertouch. Again, by mapping the incoming MIDI data from your keyboard to the appropriate controller and MIDI channel, you can record the application of these effects as part of the sequence.

> "Tiny touches of pitch-bend are useful for adding a human dimension to certain types of sound."

Also be aware that you can apply controller information created for one element of your sequence to other tracks. Usually it's a simple case of creating a copy of your 'modulated' track or pattern, deleting the actual notes and then merging what's left (that is, the controller data) with the target track. Be warned, though: if you go completely over the top with continuous controller data, particularly during complex pieces of music, there will be so much MIDI information flying around that your system may well get indigestion. In the worst-case scenario it might even keel over and die. Fortunately, many sequencers offer an automatic pruning facility, which thins out unnecessary information to prevent clogging of the MIDI arteries.

Using controller data to manipulate track levels, pan positions, and so on, enables you to automate your mixes to quite a sophisticated degree. Obviously you can also use program change numbers to automate changes of voices, as well as changing effects types, either internally or on MIDI-equipped outboard gear. The point I really want to make, though, is that you can use rapid changes of program to create more interesting effects. For example, if you've got a chopped rhythm guitar-style part in a MIDI sequence, try rapidly cycling around different guitar patches (like changing the sound every other note, for example). While some synths will glitch as you change from one patch to another, the drop-outs that this can generate can add an interesting twist to the sequence or riff. And it will also help convince your friends that you possess loads more sound modules than you actually do.

TEMPO AGOGO

Because sequencers tend to be used mainly for music based around strict tempos, it's sometimes easy to forget that it really is OK for a track to speed up and slow down if the style warrants it:

- A well-worn programmer's trick is to nudge up the tempo a few bpms for the chorus then bring it down again for the verse. It can have the same dramatic heightening effect as a change of key.
- For quirky but bold bridges, middle eights and linking passages, try combining dramatic changes in tempo with dramatic changes in pitch or applications of serious amounts of pitch-bend. For example, you could simulate the 'record player slowing down' effect that you get when a sampled loop is played at a lower pitch with each subsequent pass. Applying sampling theory to this issue, if you transposed the sequence down an octave the tempo would halve: if you transposed it up the tempo would double. For points in between, you need the pitch/tempo formula kindly supplied by Wes Bird in response to my earlier series on drum programming, which goes:

$$C = (1200 * \log(f2/f1))/\log 2$$

Where:
f1 = original frequency or tempo
f2 = final frequency or tempo
C = number of cents shift required

- Another approach is to apply major pitch-bend (we're talking an octave or two up or down) to a riff or section of music which is also subject to a major change in tempo (like a sudden drop to half or quarter speed). The results are not always entirely predictable, but with a bit of trial and error you can create some weird-sounding sections which might be just the thing to spice up an otherwise monolithic dance arrangement.

And that, as they say, is all we have time for this month, kiddies. I'll have to leave the advanced stuff like MIDI delays, arpeggiators, the *Cubase* logical edit page and Interactive Phrase Sequencer until next month. In the meantime, be afraid. Be very afraid. SOS

IF IN DOUBT, STEAL

Creative sequencing rule number 1342 says that a good idea is always worth stealing. There are loads of different compositional aids that will help you come up with new ideas — from auto-accompaniment programs such as *Band In a Box* to bite-sized MIDI riffs like Twiddly Bits, and MIDI construction tools from the likes of Heavenly Music.

There's certainly nothing wrong with taking bits you like and using them as the building blocks for your own compositions. But, as with sampling, you earn yourself more creative brownie points if you use these ideas as the starting gun for your creative journey rather than the finishing tape. For example, a hand-held percussion line which has been recorded without quantise can be saved as a groove template, then used to 'over-quantise' a drum track you might have programmed yourself in a completely different style. You could also use it to add a particular feel to a melodic part. This goes back to a point I made in the first article in the series: sequencers make it very easy to take information created for one scenario and apply it to others. You might also want to look at the controller information created for commercial MIDI files and then apply this to your own tracks.

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SOMETHING OLD OR SOMETHING NEW?

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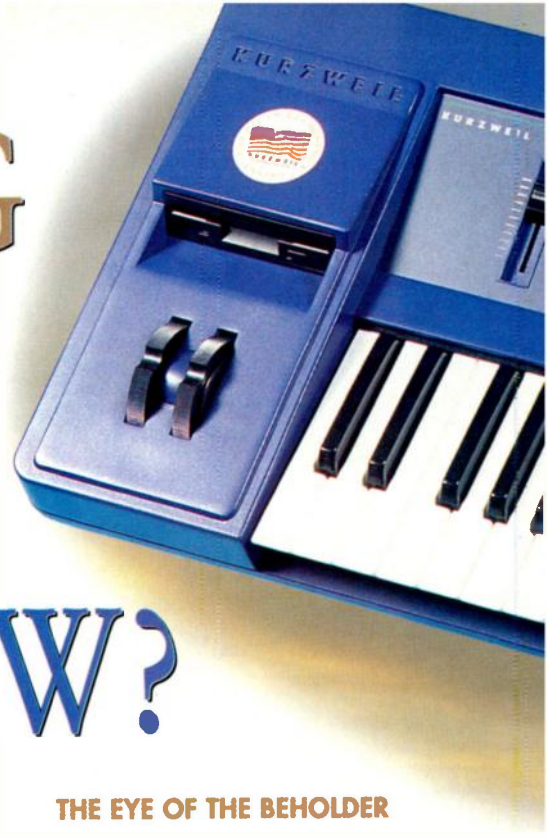

It's certainly borrowed (for the purposes of this review), and it's unquestionably blue, but is it old or new? Synth Guidance Counsellor and long-time K2000 owner PAUL WARD checks out Kurzweil's makeover of the legendary K2000 workstation to see whether it's a blushing bride or mutton dressed as lamb...

Sound On Sound first reviewed the Kurzweil K2000 way back in March 1992 — and mightily impressed we all were too. Many synths have come and gone in the interim, yet the K2000 still holds a special place for those seeking a machine of quality and flexibility.

From the very first, Kurzweil promised continuing support for the K2000. Well, actions speak louder than words, and over the years Kurzweil have proved themselves trustworthy. A steady flow of both hardware and software upgrades has kept their customers' purchases moving right along with the times. Major improvements in the operating system have brought along a powerful and highly usable 32-track sequencer, extensive third-party sampler compatibility, advanced disk operations and a whole host of useful tweaks. And for more demanding users, Kurzweil eventually introduced the K2500, with more processing power and double the polyphony of the K2000. Happily this still didn't stop the advance of the K2000 — the software updates continued, including several features introduced with the K2500, such as an increase in the number of drum channels to eight.

The K2000VP sitting here before me encompasses all of the previous improvements *and* now adds the waveform ROM of the K2500. In fact, the waveform material differs little from that of the original K2000, except that there is a completely new set of drum and percussion samples.

pros & cons

KURZWEIL K2000VP £1617

pros

- Powerful workstation/production capabilities.
- High-quality sounds.
- Proven expandability/upgradability.
- Slick, tried-and-trusted operating system.
- Compatibility with a wide range of sample formats.

cons

- Use of the onboard sequencer is fiddly for other than the basics.
- Limited assignment of global effects for multitimbral use.
- Limited polyphony by today's standards.

summary

The best of the S+S breed of sound engines. Powerful workstation features and 32-track sequencer are still amongst the best, and the user interface is still pretty good by modern standards. Its polyphony and effects capabilities are now looking fairly dated, but the latest version of the K2000 is still a solid workhorse of a synth.

SOUND ON SOUND

THE EYE OF THE BEHOLDER

The observant among you may have noticed one major difference between the K2000VP and the older K2000: the VP comes resplendent in a rather fetching shade of blue. I say 'fetching' because it nearly had me fetching a tin of black paint. I'm sure some will love it, but I've had the old and new side by side and the older livery exudes a far more professional image.

Despite my reservations about the colour, the build quality is beyond reproach. The feel of all of the controls suggest that they'll still be working in 10 years' time and all of the rear sockets are recessed out of harm's way. The 61-key, five-octave keyboard is blissfully clatter-free and feels very smooth and responsive to the touch.

On the rear panel is the VP's socketry, through which it communicates with the outside world. In addition to the main stereo mix sockets, there are four further analogue outputs in order to separate program material for external mixing. Lurking at the other side of these sockets are 18-bit D-A converters, which ensure a healthy and noise-free signal. Provision is made for two footswitches and a control pedal, all of which are freely assignable as controllers inside the VAST (Variable Architecture Synthesis Technology) synthesis engine. The usual trio of In/Out/Thru MIDI sockets is present and a SCSI port is included as standard. The K2000VP also implements the SMDI (SCSI Musical Data Interchange) sample transfer format for vastly increased data transfer rates between compatible machines.

At the time of the K2000's original release, the 240x64 pixel backlit LCD was looked on as being quite a generous display area. With the advent of bigger and better screens, such as that found on Korg's Trinity, this offering is starting to look a tad cramped, especially when dealing with waveform displays.

GOING IN

Just below the main display are the six 'soft' keys used to select the functions displayed above them

on the screen, and the Edit and Exit buttons sit either side of these. To the left of the display are the eight mode buttons that take us into the K2000's operating pages. These are labelled Program, Setup, Quick Access, Effects, MIDI, Master, Song and Disk.

- Program mode is the default mode of operation. Selecting a Program here assigns it to the currently selected MIDI channel.
- Setup mode permits three Programs to be zoned or layered on up to three MIDI channels.
- Quick Access mode displays Programs or Setups in named groups of 10 which are then easily selected by use of the numeric keypad. Kurzweil have provided some useful groupings for quickly identifying and auditioning similar, or associated, sounds such as orchestral, basses, or drums. New banks are easy to define and are particularly useful for live work where Programs can be grouped together by song.
- Effects mode accesses the K2000VP's internal effects processor.
- MIDI mode defines how outgoing and incoming MIDI data is to be processed. Kurzweil include a variety of options as to how the K2000VP will both transmit and respond to MIDI bank change messages — would that other manufacturers were so thoughtful concerning this difficult subject. The MIDI controller number of the physical control options is also determined here, so you can redefine the modulation wheel to send (say) breath controller data. A sub-screen accessed from here goes on to display settings for each individual MIDI channel, such as whether it is on/off, or whether it will respond to MIDI program change or volume messages.
- Master mode holds parameters that affect the machine as a whole, such as display contrast, tuning and keyboard intonation.
- Song mode throws you headlong into the K2000VP's sequencer.
- Disk mode typically handles loading and saving from or to floppy disk, or any attached SCSI storage device. Here also is a handy toolkit of various disk utility functions such as file Copy and Delete, and disk Format.

When in several of the edit pages the mode buttons also do duty for muting and soloing Program layers and provide a page mark/skip facility.

On the left of the front panel are the volume control and the data slider. Just to the left of the screen display are the up/down buttons, which have responsibility for scrolling between Program layers, MIDI channels and the Quick Access banks. To the right of the display are the alpha wheel, four directional cursor control buttons, a pair of +/- buttons (for fine editing) and the numeric keypad. Off to the left of the control panel is the floppy disk drive, which formats MS-DOS compatible disks, but will nevertheless read a variety of other disk types, including Akai and Roland formats. An internal hard drive to a maximum capacity of 850Mb can be accommodated, although use of an external drive allows up to 2Gb partitions to be accessed. To the left of the keyboard are the pitch and modulation wheels.

ROM AT THE TOP

The K2000VP's 8Mb of sample ROM contains a high-quality collection of 16-bit samples, even by modern standards — no mean feat when you consider that these samples are pretty much the same as those found on the original K2000. The old faithfuls, such as piano, synth, brass, strings and vocal samples are all included, but Kurzweil have added the drum samples which were first introduced with the K2500. ROM SoundBlocks are available as an optional extra which will expand the VP's sample ROM to a maximum of 24Mb. ▶

FEATURES

- 61-key mono-pressure keyboard
- 240 x 60-pixel backlit display
- 24-voice polyphony
- 8Mb sample ROM, upgradable to 24Mb ROM
- 2Mb sample RAM, upgradable to 64Mb RAM
- 32-track sequencer
- 4 audio outputs plus mix outs
- 25-pin SCSI port
- Dimensions (cm): 140 x 34.1 x 10.5
- Weight: 11.8kg

"The original K2000 was an impressive synthesizer that quickly grew into a powerful workstation. In many ways, however, the rest of the world has had time to catch up..."

THE K SERIES IN *SOS*

- K2000 review: March 1992
- K2000 sampling option: August 1993
- K2000/2000R ROM1 Orchestral board: June 1994
- K2000 v3 software upgrade: February 1995
- K2500R preview: September 1995
- K2500R review: October 1995
- K2500 preview: March 1996
- K2500/2500X review: April 1996

FAVOURITE PATCHES

If you want to impress your mates next time you're in the music shop, call up these Programs for instant credibility:

1: 'Acoustic Piano' — still sounding as good as ever.
9: 'Classic E Piano' — smooth changes between hard and soft sound, showing other manufacturers the way it should be done.
15: 'Big PWM' — you say this is a digital synth...?
79: 'Moogy Bass 2' — Mod wheel and Data slider vary cut-off and resonance. You *sure* this is a digital synth...?
87: 'Strummer Guitar' — Played well, this would fool most folks into believing you play acoustic guitar.
117: 'Stereo Slo Str' — Those famous K2000 strings, without which no film soundtrack would be complete.

▶ Three of these are currently available; an Orchestral block, a Contemporary block and the excellent 4Mb Stereo Grand Piano.

Kurzweil have blessed the VP with the K2500's ROM soundset of 200 Programs and 100 Setups. These are mostly very usable and provide a good starting point for anyone wanting to take the plunge into making their own soundset — which, on a machine of this calibre, is only to be encouraged. One particular delight the K2000 has always offered is the option to load user samples into up to 64Mb of RAM and use these in exactly the same way as if they were ROM samples. Imagine your very own sample material bending its way through Kurzweil's powerful VAST (Variable Architecture Synthesis Technology) synthesis engine, and I defy you not to salivate! 2Mb of sample RAM is included on the VP to get you going, and although this is welcome, it seems a little stingy by modern standards. Fortunately, the sample RAM is expandable up to 64Mb with standard Macintosh-type 30-pin SIMMs. The VP will read Roland, Akai and Ensoniq library disks, and can also translate AIFF and WAV sample files — so there's plenty of scope for quickly building a large sample library (I speak from personal experience!). If you want to use the K2000VP for sampling from scratch, you need to purchase the optional SMP-K sampling option.

All of your programs, keymaps and songs are held in the K2000's P-RAM, of which there is 120K, though this can be expanded by a proprietary memory upgrade to 760K. P-RAM is battery-backed (with three AA batteries in a door underneath the keyboard), so this data will be present in the K2000VP each time you switch on. Interestingly, the ability to use up to eight drum channels is dependent on the P-RAM upgrade being present, so if you need the extra drum channels this is a necessity. What's a drum channel? Let me explain...

Each 'standard' (ie. non-drum) K2000 Program consists of up to three Layers. A Layer is the home of a Keymap, which defines how individual samples are assigned across the width of the keyboard. Each Layer is assigned one of 31 possible algorithms, which delimits the type and configuration of up to five DSP (Digital Signal Processing) functions such as the filter, amplifier, high-frequency stimulator, EQ, and so on — in other words, the heart of the VAST processing engine (and a very potent array of sound-shaping processes it is too). A Drum Program contains up to 32 layers, meaning that 32 possible algorithmic treatments may be applied to 32 different voices simultaneously! There is, I think you'll agree, scope for a very neatly trimmed set of drum samples here! The important point to note, however, is that these so-called Drum Programs do not necessarily have to be used for drum sounds at all. Imagine a 32-layer bass patch running with that amount of power! Whilst the original K2000 limited the user to one such Program at a time, a K2000VP (with the P-RAM upgrade) always allows MIDI channels 1-7 to make use of drum Programs, and a parameter on the Master page now allows the user to define an eighth channel. If you're thinking that this sounds too good to be true, there is a slight catch. Each actively playing layer requires one note of polyphony, and with a maximum of 24 to go round, this is obviously going to be the limiting factor, although you can of course work within such a limitation quite easily.

CUTTING AND POLISHING

Far from the perfunctory 'scratchpad' sequencers built into workstations of old, the 32-track affair on the K2000VP is powerful and capable of very polished results. Many of the editing capabilities more usually associated with a software sequencer are included, such as cutting, copying, quantising and bouncing. There is even an event list editor, which, whilst a bit fiddly to use for major changes, is certainly welcome for last-ditch salvage operations.

Snatches of sequences may be assigned to play back when triggered from the keyboard, and the triggered key's pitch and velocity can be imposed onto the sequence, with the option to prevent drum and percussion tracks from being transposed.

I have used the K2000's internal sequencer while I've been away from my computer, and I can say

that I find it perfectly adequate for most of the basic tasks. Unsurprisingly, though, there usually comes a point where more editing is needed, where I like to turn to a mouse, a larger display and a more sophisticated set of tools, such as those available in *Cubase*. Well-thought-out instruments, of course, provide the option to move files between hardware and software sequencers, and the VP does not disappoint, being capable of reading and writing standard MIDI files with no problems.

If Kurzweil's K series has a specific weak spot, then, it must surely be the increasingly creaky effects section. The K2000VP either applies the amount of effect globally for all audio assigned to the group A outputs, or applies no effects at all by assigning to the B outputs. With many workstations and synths now offering multiple discrete effects processors, the K2000VP's provision in this department seems very limited.

However, this is mitigated to some extent by the fact that the effects themselves are generally excellent, and all of the standard EQ, modulation, delay and reverb effects that might be expected are there (the reverse reverb is particularly good!). Up to four effects can be used in series, although the algorithms provided determine the type of effects in the chain.

Bundled with the K2000VP is a generous set of 31 disks containing Kurzweil's very own Analogue Collection. The program material covers a bumper selection from a variety of vintage synths from Moog, ARP, Sequential Circuits, Korg and Yamaha. In particular I found much to enjoy in the Oberheim sounds, especially those from the mighty OB8 (see the Retro review starting on page 266). The Pro One bass samples were all quite inspirational, and I own a real one, so that's no small praise! All of the disks contain valuable and useful sounds which cover just about every analogue sound you could ever need. Rest assured that if any extra tweaking is necessary to get things just the way you like them, the K2000VP is more than up to the task.

CONCLUSION

The original K2000 was an impressive synthesizer that quickly grew into a powerful workstation. In many ways, however, the rest of the world has had time to catch up. 24-voice polyphony now seems very restrictive for a multitimbral instrument, and the single effects processor just looks tired.

As a committed user of the K2000 I would have no hesitation in recommending it to anybody, but whereas the K2000 once stood head and shoulders above the rest, it is now struggling to keep its head above the crowd. I had hoped that the VP would at least come bristling with all the expansion options as standard, a hard disk drive and bags of sample RAM — but a fully loaded K2000VP is looking quite an expensive proposition.

There is little doubt that the K2000 still has plenty to offer, particularly if you are prepared to go for the available upgrades. But with physical modelling showing the way forward and new analogue instruments taking the best of the past, it remains to be seen whether Kurzweil's lick and polish of the K2000 can generate as much interest the second time around. SOS

Info

£ £1617; Piano daughterboard plus Orchestral and Contemporary ROM blocks £577; Sampling Option £577; P-RAM upgrade £381. All prices include VAT.
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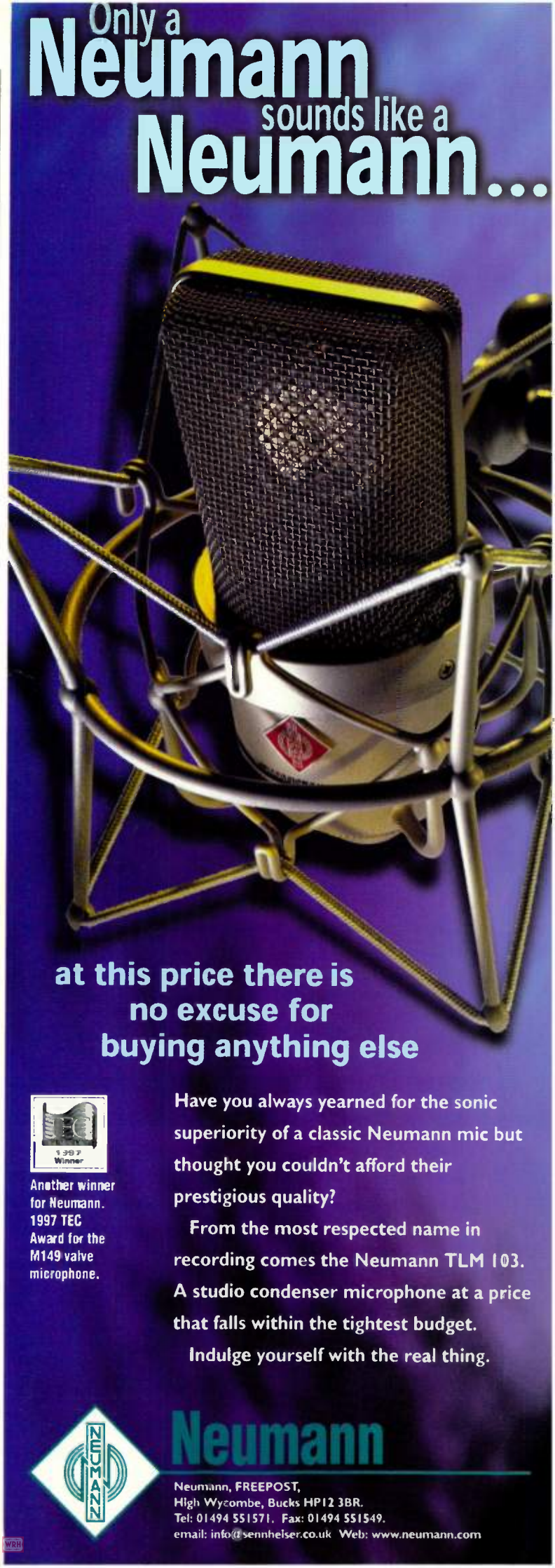

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ADVENTURES IN AUDIO

Digidesign Project Studio

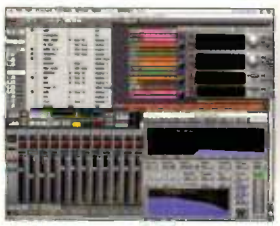
Those clever people at Digidesign have come up with another winner. Available in August, Project II is a 32 track, 24 bit-ready card which can be run with up to two interfaces allowing 16 tracks of Analogue or Digital input/output. The card should be supported by all the major sequencer manufacturers by the time the card is shipped and is designed for use with an Audio Sequencer. The first version will be for Powermac, Windows NT to follow.

- 24 or 16 bit
- Up to 16 way I/O
- Up to 32 Track.(depending on sequencer)
- Can be upgraded to Pro Tools 24 TDM for DSP power

RRP £525+VAT (also needs 882/20, ADAT bridge or 888/24 interface)

Digital Village Professional Macintosh G3 Packages

It's official – Mac's G3s ROAST Pentium II in the speed stakes. If you're looking for a complete computer based recording system there really isn't a serious alternative. If you're confused by the enormous range of options, we can help spec and supply complete systems. Give us a call and we will spec a system to your requirements.



Sample System

- Genuine Apple Mac G3 266, 64Mb Ram, 4Gb HD, Zip
- Additional 4.3Gb AV Drive
- 17" Monitor
- Emagic Logic Audio Gold
- Midi interface
- Emagic Audiowerk8 PCI card

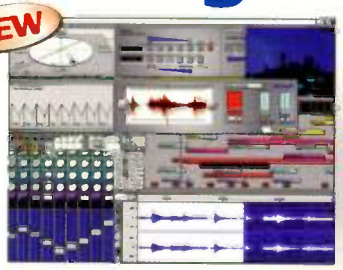
Package Price only **£2999** inc VAT

VST Version 4 for Mac – Now in stock, Call for a demo

Event Gina drivers coming soon for Mac

emagic Silver, Gold & Platinum

NEW



PC & Mac – Now in stock and on demo

For years it's been the professionals choice with top end ProTools users. Now with the latest release, Emagic have made these features available to native audio users:

- Up to 96 tracks of CD quality (or higher) Digital Audio
- Insert points on every track
- Ships with Reverb, Delay, Chorus, Parametric EQ & Flanger
- VST Plug-in compatible
- Audiosuite Plug-in compatible
- AMT – for DEADLY accurate Midi timing
- Hyperdraw on screen automation editing
- Premiere Plug-in compatible
- Groove quantizing of AUDIO
- Click & Hiss removal
- "Gender Bender" pitch shifting

£ GUARANTEED £ BEST PRICE

Audiowerk8

2 analogue ins, 8 analogue outs and S/PDIF In/Out. Bundle including FREE Logic Audio Discovery and Cool Edit Pro.

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Credit terms available subject to status. Call for a quote

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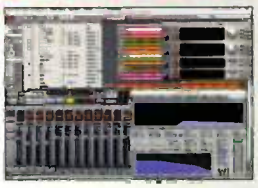
THE DIGITAL VILLAGE

THE COMPUTER EXPERTS

Steinberg CUBASE VST rules the world – it's official!



Still our best-selling Audio sequencer and now even more powerful on the Apple G3 (32 tracks of Audio playback, EQ on every track and 4 x FX without even trying).

Take the strain off your sampler – Use VST for vocals and drum loops etc, and keep the sampler for the keyboard parts. Audio is much easier to loop, time stretch and edit on a computer (and hard disk space is much cheaper than RAM).

Audio card support – VST supports the Korg 1212I/O card, Digidesign's Audiomedia III card (and Lexicon's new system) on the Mac and PC along with numerous PC sound cards.

New Free Plug-Ins – Along with VST, Steinberg have included a new Reverb, Binaural Stereo Enhancement, a Fuzz Box, a Chromatic Tuner and an Oscilloscope – **all bundled in FREE with VST!**

VST – £GUARANTEED BEST PRICE

STOP PRESS – VST HAS NOW GOT INSERTS ON EVERY CHANNEL ON THE PC VERSION (AND SOON ON THE MAC)

Plug-Ins Waves Native Powerpack (the same FX as ProTools TDM) can run on your VST system, including: L1 Maximiser – make your DAT or CD sound really loud, Trueverb – a great quality reverb, Q10 – fully parametric 10 band EQ, C1 compressor/limiter and S1 – stereo widening for just £399 Inc.VAT

Other recommended Plug-Ins Audiotrack – compressor / 3 band full parametric EQ ..... RRP £169
Magneto – tape saturation and analogue sound for just ..... RRP £299
Autotune VST – tune those dodgy vocals in realtime ..... RRP £299

We still don't think that many users have realised the power of plug-ins – which can greatly enhance your system.

If you own a computer and you make music, how could you possibly live without...
24 Ins + 24 Outs for under £1000

NEW

Mark of the Unicorn 2408

- 24 Digital Ins + 24 Digital Outs (both ADAT plus TDIF)
- Ready for **ANY** PC sequencer that supports Windows drivers
- Optimised for I/O to prevent strain on computer – Doesn't reduce FX or EQ
- 8 Analogue Ins & Outs plus S/PDIF
- Works with Digital Performer on the Mac
- Drivers being written for other Mac sequencers

At £995 Inc.VAT this system is simply amazing value for money!

Digital Performer – the feature loaded audio sequencer

Why buy Digital Performer over the other Mac Midi/Audio Sequencers? Here are 8 good reasons:

1. The E-Verb – a smooth brilliant sounding reverb that uses the Mac PowerPC processor as its engine.
2. Dynamics – Compression / Expansion / Limiting / Gating – this is the only sequencer with Audio dynamics available on each channel and on the master output (outside of ProTools TDM).
3. Harmonising – Still the best sounding software harmoniser (outside of ProTools TDM plug-ins).
4. Digidesign Cards & TDM support at no extra cost
5. Korg 1212 support at no extra cost
6. The EQ is modelled on a very expensive mixing desk (starting with N) – this EQ is excellent.
7. Inserted FX – Everb, Chorus, Delay etc, available on every channel (or you can set them up as aux channels)
8. Sample editing via SCSI – Import samples from your Sampler, edit and send them back without leaving the sequencer!

If you are new to Computer sequencers you should take a long hard look at Digital Performer and compare it facility for facility against the competition. Alternatively, if you already own another software sequencer (and are open to new things) the DP package is available for just £299 with proof of ownership.

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We will need intelligent, knowledgeable, friendly sales staff to keep up the standard you've come to expect from us.

We also need due to massive expansion, high calibre sales staff for our mega busy East London and North London stores.

Send CV's to Ray Edwards, c/o Eurotech House,
Rear of 31 High Road, Chadwell Heath, Romford, Essex RM6 6QW

The PC Centre of the Universe

An O2R for only £699.99?

At Digital Village we believe that the DS 2416 PCI Card is the most exciting product of the year. Imagine ALL the automation, all the dynamics and all the professional FX of the O2R inside your PC + 16 Tracks (expandable) of Hard Disk Recording without making your CPU break into a sweat. Check out these specs:

- 5 DSP3 DSP Chips = 24 Channels of O2R!!
- 20bit A/D & D/A Converters
- >100db dynamic range
- Stereo RCA Input & Output and Digital I/O
- Four Band Parametric EQ + Multi Dynamics on each channel
- 6 Internal Auxiliary Buses
- 2 x 32bit FX processors from REV500 / ProR3
- 2 x AX44 I/O Converters

PC and Mac direct to desk 16 track digital domain deal of the decade

Sonorus StudI/O card + Korg Soundlink 168RC desk
...The Perfect Partnership!

Village Exclusive £1299.99

Sonorus StudI/O £ 699.99
The Sonorus StudI/O card (24 bit ready) has 16 Digital ADAT ins & outs (by coincidence, so does the Soundlink 168RC), 18 bit stereo analogue outs, lives, breathes and reaches total fullfilment within the VST environment.

While stocks last add only £399.99 to this system for the Steinberg Producer Pack.

Alternatively Korg Soundlink + Korg 1212I/O card £ 1199.99

Korg 1212I/O RRP £ 599.99

Acid Instantaneous loop groove thang £ 249.99

MM Port
(I/O Card only) NEW £ 399.99

Masterport Now only £ 499.99

TripleDat Now only £ 899.99

Terratec
EWS64XL 4 In, 4 out, S/PDIF I/O, 32 channel Midi Daughterboard connector £ 379.99

Sonic Foundry
Sound Forge 4.0 Pro Audio Editor for Windows £ 299.99
CD Architect Red book CD creation tool plug £ 299.99

Waves
Native Power Pack
(C1 compressor,TrueVerb etc..) £ 399.99
NEW - Easy Waves Includes: AudioTrack (Compressor, Gate, Parametric EQ) and EazyVerb (Reverb) £ 120.99

Opcode
Studio 64X Interface
4x4 Midi Interface with SMPTE £ 249.99

Turtle Beach
Fiji £ Guaranteed Best Price
Malibu ISA Soundcard, 64 voice, Digital Out £ 119.99
Daytona PCI Soundcard (Coming Soon) £ 129.99

Pinnacle
Project Studio
8Mb Kurzweil Synth, Digital I/O £ 549.99

DigiDesign
Session 8 Core and 882 Interface 1 only £ 1499.99

Event
Darla £ 299.99
Gina £ 499.99
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Steinberg Producer Pack - Village Exclusive £449.99

RRP on individual items £1277

includes: **Cubase Audio XT (VST)** - Cubase VST with SCORE and full support for Akai DR16, Yamaha CBX0S Extensions etc. Plus with an upgrade to the new VST 24 you get full support of the 24 Bit Yamaha DS2416 Card RRP £649

PLUS Wavelab 1.6 (Includes upgrade to New Version 2) - Audio editor, Mastering Software can use VST / Direct X plug ins. True 32 Bit program that can run on Windows 95 and NT. Offers RED Book Compatible CD Burning. The upgrade to version 2 offers full sampler support a' la RECYCLE RRP £329

PLUS Waves Audiotrack - VST / Wavelab dynamics plug in offering Compression / Gate / EQ etc RRP £299 (EZ Waves!)

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THE DIGITAL VILLAGE & YAMAHA DIGITAL PARTNERS

Picking a Digital Mixer is as easy as o1V, o2R, o3D
The choice is yours...TALK TO THE EXPERTS

While other manufacturers are promising or unveiling prototype digital desks in the near future, Yamaha have been quietly supplying full recall Digital desks for years. These desks are working in professional studios all over the world and have all the advantages of Yamaha's 10 years of experience of digital desk design and the users feedback this generates which is put back into the next designs. On top of this Yamaha's proprietary processor chips give them a great price advantage.

02R

• Up to 44 Inputs, 4 band fully parametric EQ & dynamics on every channel • Sparkling 20 bit A/D and D/A • 16 track Digital I/O–AES/EBU, ADAT or TDIF via optional (8 in/out) cards • Perfect Partner for: Alesis ADAT, Tascam DA38/88 and many stand alone Hard Disk recorders like the Fostex D90/D160 and of course computer based systems – i.e. ProTools, Soundscape, Korg 1212I/O, MOTU 2408 etc. • Digital Cascade option for more inputs • 24 bit ready with Internal 32 bit processing

RRP £6999

Last months Village Price £4699.99

£ PHONE FOR £ NEW LOW PRICE

02R + TLAudio Classic PA-2 RRP £7,449	Village Exclusive	£ 4699.99
02R + TLA PA-2 + TLA Crimson 3011 RRP £8,200	Village Exclusive	£ 4839.99
02R + AKG Solid Tube Mic RRP £7,798	Village Exclusive	£ 4999.99
02R + TLA PA-2 + Neumann TLM103 RRP £8,155	Village Exclusive	£ 5299.99
02R + CD8AT (Yamaha ADAT Digital I/F) + Alesis ADAT LX20 + TLA PA-2 – Complete "Valve into Digital Domain" recording package	Village Exclusive	£ 6449.99

03D

Up to 26 Inputs / 18 outputs, 4 band fully parametric EQ & dynamics on every channel. The 03D is truly the son of the 02R, the same spec, just fewer channels.

RRP £2999

Last months Village Price £1999.99

£ PHONE FOR £ NEW LOW PRICE

03D + TLAudio Classic PA-2 + Audio Technica ATM4033 Was £4000	Village Exclusive	£ 2449.99
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01V

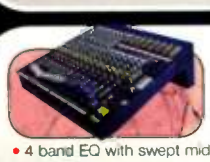
Up to 24 Inputs/14 outputs, 22 dynamic processors & motorised faders

• 99 scene memories for storing mix snapshots • Built In MIDI Interface • Host port for connection to personal computer

The 03D's baby brother, pretty much the same, but smaller.

RRP £1399.99

01V + TLAudio Classic PA-2	Village Exclusive	£ 1499.99
01V + Soundcraft Spirit Folio 10/2 Sub-mixer with swept mid		£ 1499.99
01V + AKG Solid Tube Mic	Village Exclusive	£ 1799.99



Allen & Heath MixWizard WZ20:8:2

Superb new true 8 bus mixer at an astonishing price!

• 4 band EQ with swept mids • 28 Inputs on mixdown • 6 Aux sends • 100mm Faders

including TLA Crimson 3011 Bundle RRP £1660 VILLAGE PRICE

or with Røde NT1 Mic £ 799.99

or with AKG Solid Tube Mic £ 1049.99

only £699.99

Mackie

Unbeatable deals on SR Series and 8 Buss Consoles

Compact desks at new low prices!

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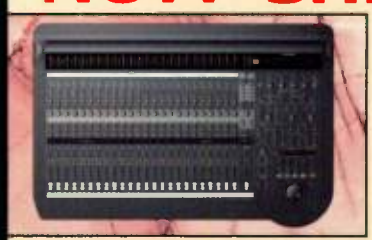
The digital desk deal of the decade!
Korg Soundlink 168RC

- 16 digital inputs and outputs (adat optical)
- 2 Superb internal fx processors
- 8 Analogue mic / line inputs (2 with phantom power)
- 3 Band EQ (sweepable with 'Q' on mid)
- Automation – 100 'scenes', MIDI control

(was £1899) **£699.99**

168RC + Røde NT1 Mic	£ 849.99	168RC + TLA Ivory 5021	£ 1079.99
168RC + Adat LX20	£ 2099.99	168RC + TLAudio PA2	£ 849.99
168RC + Adat XT20	£ 2499.99	168RC + TLA Crimson 3011	£ 799.99
168RC + Akai DR16	£ 2799.99	168RC + AKG Solid Tube Mic	£ 1249.99

Mackie Digital 8 Buss
NOW SHIPPING!



- Up to 56 inputs
- 24 as standard
- 96 moving faders
- 2 Buss internal effects
- Optional plug-in effects
- 12 Mic ins
- 4 Band EQ with filters
- 50 Dynamic channels
- Full dynamic automation
- 12 Auxiliary sends
- Infinite scenes
- Optional monitor, keyboard and mouse

RRP **£8999.99**

Best Behringer Deals

MX32/8/2A

- 32 Inputs
- 8 Aux sends
- 8 Groups
- 4 Aux returns
- 24 Mic inputs
- Sweepable mids

RRP £1495 **£839.99**

MX24/4/2A

- 24 Inputs
- 6 Aux sends
- 4 Groups
- 2 Aux returns
- 16 Mic inputs
- Sweepable mids

RRP £995 **£649.99**

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or with MBX8000 Meterbridge **£ 1059.99**

Professional Ultra-low noise 48/24 channel dual input 8-bus Mixing console

PLUS TLA Crimson 3011 **£ 1119.99**
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Professional Ultra-low noise 16 input 2-bus mixer

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MX2004 Professional Ultra-low noise, 20 input, 4-bus Mixer

VILLAGE PRICE **£ 259.99**

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Professional ultra-low noise 28 input 2-bus mixer, 3 band EQ on all channels, 4 aux sends

VILLAGE PRICE **£249.99**

or with TLA Crimson 3011 **£ 349.99**

MX2642

24 input, 4 buss mixer, 3 band EQ, mid band is parametric on mic channels, 6 aux sends

VILLAGE PRICE **£299.99**

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- 24 Bit with 128 times oversampling
- 100mm motorised faders
- Parametric EQ
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- 16 Mono mic/line inputs
- 2 x 8trk digital inputs and outputs in ADAT optical format
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Spirit Studio

There superb mixing consoles are available in 3 configurations: 16/8/2, 24/8/2 & 32/8/2 and feature:

- In line design
- Up to 72 inputs at mixdown (32ch)
- Up to 32 discrete tape sends
- 8 Buss group section and stereo master
- Fader flip to save repatching
- 6 Aux sends
- 4 Stereo FX returns with EQ
- 4 Band EQ (2 swept mid)
- EQ Switchable between signal paths
- 2 Band EQ on each group bus
- PFL soloing on all channel and monitor inputs etc.

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32-8-2 ONLY **£1995.99**

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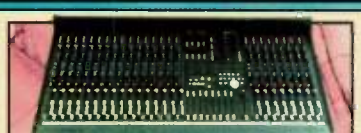

Ghost

LE and automated versions always available

- Ultra low noise inputs
- Up to 12 aux sends
- MIDI mute automation
- MTR transport control
- 4 Band EQ with fully parametric mids

GUARANTEED BEST PRICE IN EUROPE!

Folio FX16

- 16 channels, 4 buss with Lexicon DUAL FX!
- 26 Inputs to mix as standard
- 16 Mic/line inputs with ultra mic
- 4 Aux's
- 3 Band EQ
- Swept mid
- 4 Stereo returns
- 100mm faders throughout

FX16 including FREE pair of AKG 270s headphones RRP £129.95 or one Shure SM58 RRP £119 or 3 AKG D65s Mics worth over £150 Village Price £ 849.99

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Folio SX

- 20 Inputs as standard
- 100mm faders
- 4 Buss structure with rear subgroups routable to mix
- 3 Band EQ with swept mid
- 3 Aux's
- Direct outputs from channels 1 – 8 for multitrack recording

GUARANTEED BEST PRICE

Folio 10/2

- 6 Mono input channels
- 6 Mic inputs
- 3 Band EQ with swept mid and hi-pass filters
- Phantom powering for condensor mics
- PFL solo buttons
- 2 Aux sends

WORLD EXCLUSIVE **£199.99**

Folio F1

- 2 Versions: 14 & 16 input frame sizes
- 4 Stereo inputs & 100mm faders
- Inserts on every mono channel and mix outputs
- British 3 band EQ with creative swept mid control
- 3 Aux's with up to 2 pre or post-fader for foldback or FX

Including 2 FREE AKG D65s Mics worth over £100

from **£299.99**

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- 10 Inputs as standard
- 4 Mic inputs
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Errors and omissions excepted. Terms and conditions of sale available on request.

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All E6400's from the Village come with 5 FREE CD-Roms

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- 18 Filter types
- 64 Voices
- Expandable to 128 Meg
- Up to 10 outputs

Ex-demo ESI-32 (3 left) £549.99

Including FREE CD-Rom drive + 5 **FREE** CD Roms

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All the sounds of these classic EMU modules on one 16 meg Rom board – The ultimate dance upgrade for the E6400, E-Synth, E4X.

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Emu Audity 2000

Digital Modular Rhythmic Synthesizer (DMRS)

- 640 presets
- 16 part multitimbral
- 4 layers per preset

£1299.99

Emu Planet Phatt

The Hip Hop, Trip Hop, Swing, R & B, 70's Groove machine

Orbit The Ambient, Trance and Techno **TOTAL PRODUCTION TOOL**

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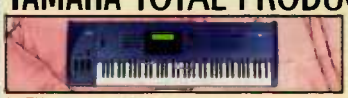
YAMAHA TOTAL PRODUCTION WORKSTATIONS



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Yamaha EX5, EX5R & EX7

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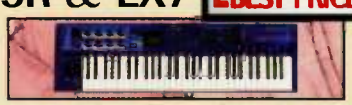

CS1X • Perfect analogue sampled waveforms • Control of resonance, filters etc, via knobs

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AN1X • Analogue physical modelling • Great arpeggiator • 10 note poly

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Total production in the palm of your hand – Living proof that small is beautiful. Unbelievable sound and features. We love the QY70 and promise you the best price.

GUARANTEED BEST PRICE

A3000

- Expandable to 128Meg
- On-board FX

GUARANTEED BEST PRICE

Check out these Mega Deals

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QY700 + S2000	£1249.99	QY700 + S3000XL	£1699.99
SU10 + MC303 + MK149 Keyboard			£649.99
SU10 (Including AKG D65s Microphone)			£229.99

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- 3U • 8 Outputs (exp to 16)
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- 15 Filter types as standard
- EB20 FX can be fitted

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- Removable front panel/remote controller
- 16 Outputs as standard • 128 note poly
- 15 Filter types as standard • 4U
- EB20 FX as standard

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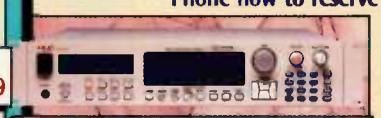

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Akai S3000XL

- Expandable to 32 Meg • 10 Outputs
- Industry Standard

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- Sequencing / Sampling Drum machine
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- Audio BPM to midi interface
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- 3 Oscillators • Arpeggiator • Matrix editing
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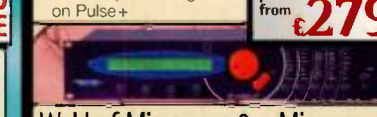
prices from £279.99



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The Microwave moves on

- 10 Note poly • Ring modulation • Arpeggiator
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- 8 Track total groove sequencing
- 6 Outputs
- D Beam MIDI controlling
- The slicer (MIDI gating)
- Creative scratch and radio noise
- Low Fi

RRP £949 TALK TO THE DEAL-MAKERS

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- Dance workstation
- 61 Note velocity sensitive
- All of the sounds of the MC505
- Extra sounds include: Piano, Strings, Organs etc
- Easy user interface

RRP £949 TALK TO THE DEAL-MAKERS

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If you've got a space in your JV1080, JV2080, XP50, XP80 etc.. and you're into any kind of dance music you can't avoid needing this new card – not just for Hip Hop, R & B, but for any style of dance production.

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- 8 Card slots
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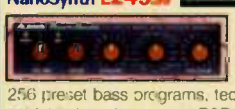

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256 preset bass programs, techno, jungle, acid, hip hop, house and R&B featuring resonant filter sweeps etc + all the classic basses.

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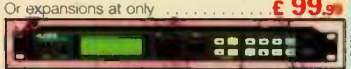

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SR16 £189.99

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Continuously variable upper and lower mids. Frequency response 20Hz to 40kHz, based on the EQ1

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Each band offers +15db of gain and variable Q between 0.5 and 5 front panel dual sensitivity input (for guitar, keyboards etc). Frequency response 20Hz to 40kHz.

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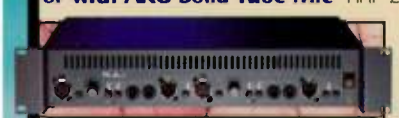

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- Classic valve sound for mics
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- Balanced XLR microphone inputs
- Balanced XLR outputs
- 48 volt phantom power
- Phase reverse switch on channel B
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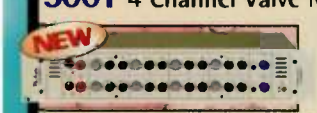
Very limited stock of Indigo 2011, 2 channel, 4-band valve EQ at only £199.99

New TLAudio Ivory Range

5001 4 Channel Valve Mic Pre-Amp . . . . . RRP £ 469.99



5013 2 Channel Valve Parametric Equaliser

Each channel has four band parametric EQ with variable control of gain, frequency and bandwidth. Input and output level controls are provided along with an EQ bypass switch and instrument input on each channel. 'Drive' and 'Peak' LEDs indicate how hard the valve stages are being driven.

RRP £469.99 or with Crimson 3011 £569.99

5021 2 Channel Valve Compressor

Each channel offers fully variable control of input & output gain, threshold, ratio & gain make up. Attack and Release times are switchable for fast and slow modes. An expander/gate is provided with control of threshold. Metering is via VU meters. Works in dual mono or stereo linked mode and a sidechain insert point is included on each channel.

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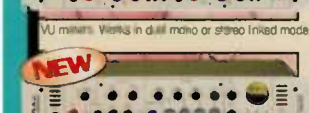
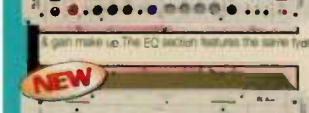


5051 Mono Valve Voice Processor

Combines a pre amp with a compressor, expander and an EQ section. The pre-amp features input gain control, 48V low cut filter & an instrument input. The compressor section provides fully variable control of threshold, ratio & gain make up. The EQ section features the same type of 4-band shelving/peaking arrangement as the Classic EQ1

RRP £469.99 or with Crimson 3011 £569.99



5050 Mono Valve Mic Pre-Amp & Compressor

Combines a pre-amp with a compressor. The pre-amp features input gain control, +48V low cut filter and an instrument input. The compressor section provides fully variable control of threshold, ratio & gain make up, with a choice of 2 attack and release times. The master section includes an output gain control with LED meters showing gain reduction and output level.

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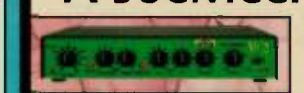

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compressor & enhancer. RRP was £299

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Digital 24-bit dual-DSP Digital Mainframe

• 31 band graphic EQ • Real-time Analyzer

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20 bit digital tape recording on a budget. Offers the same 20 bit ADAT type 2 digital recording format as the Alesis XT20 and M20 recorders.

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Twelve tracks of Akai Technology

- 12 Audio tracks • 16 Bit linear (no compression)
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- 16 Tracks • 26 Channels
- 24 Bit MT Pro recording • 256 Virtual tracks
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FREE TLAudio Classic PA2 worth £410

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VS-880 VXPanded

- Fully automated mixer • 64 Virtual tracks
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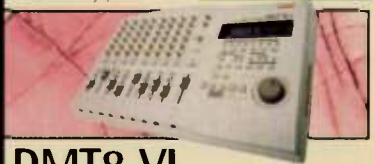

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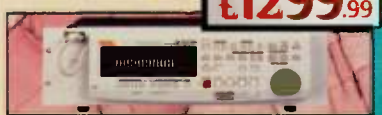

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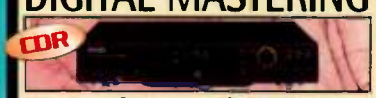

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Pack 2 (worth £100) AKG D65s mic and Cable, CD quality Headphones, 3 Maxell 90 chrome tapes, Cables, Head Cleaning Kit.

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Fostex X55	£289.99	£309.99
Tascam Porta 02	£139.99	£159.99
Tascam 424 MkII	£329.99	£349.99
Fostex XR3	£199.99	£219.99
Fostex X77	£369.99	£389.99
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Yamaha MT50s	£279.99	£299.99

Second Hand

Key: Ch=Chadwell · B=Barnet · C=Cambridge · Cr=Croydon

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Alesis 1622	£ 399	Ch	Carlsbro 24/8/2	£ 799	Ch
Yamaha MV1602	£ 299	Ch	Tascam M16	£ 299	Ch
Fostex 812	£ 499	Ch	Fostex Mode 310	£ 149	Ch
Phonic MX880	£ 99	Ch	Studiomaster F7 16/8/2	£ 799	Ch
Studiomaster Diamond Pro 12/3	£ 249	Ch	RAM 10/8/2	£ 299	Ch

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Korg DW8000 x 2	£ 149	Ch	Korg 01W FD	£ 899	Cr
Novation BassStation	£ 199	B	Korg X3	£ 599	Ch
Fatar Studio 610	£ 99	Ch	Roland SH101	£ 249	B
Goldstar GMK49	£ 69	B	Korg Poly 800	£ 149	Ch
Roland D20	£ 299	C	Roland JX3P	£ 299	B
Yamaha SY22	£ 249	B	Hohner HS1 – Library	£ 499	B
Korg M1	£ 599	B	Roland JW50	£ 699	Ch
Korg DW8000	£ 249	B	Korg X3	£ 649	C
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Korg 01WFD	£ 599	Ch	Korg Wavestation	£ 599	B
			Roland A30	£ 249	B

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Akai CD3000	£ 999	B	Emu Proformance 1+	£ 149	Ch
			Roland U110	£ 199	Ch

Peavey SX	£ 129	Ch	Yamaha TX802	£ 199	Ch
Roland SC55	£ 249	Cr	Evolution EVS1	£ 149	Ch
Alesis S4	£ 299	Ch	Emu Morpheus	£ 599	B
Roland S330	£ 399	Ch	Roland WSE1	£ 299	Ch
Yamaha TG33	£ 249	B	Roland D110	£ 149	B
Emu Proformance 1	£ 129	Ch	Roland CM500	£ 149	Ch
Deep Bass 9	£ 249	B	Akai S01	£ 349	Ch
Roland MDC1	£ 299	B	Kawai K4R	£ 299	Ch

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Roland R8M + 4 Cards	£ 329	Ch	Atari 1040 + SM124	£ 199	Ch
Roland MC202	£ 249	B	Roland MC550	£ 249	Ch
Cubase V3 Atari	£ 129	Ch	Friendchip MM	£ 249	Ch

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Yamaha NS10	£ 199	Ch	Drawmer DS201	£ 199	Ch
Symetrix 501	£ 129	Ch	Sansui MR6 6-track	£ 299	Ch
Yamaha REX50	£ 99	Ch	Alesis A77	£ 199	Ch
Lexicon MPX1	£ 999	B	Tascam DA88	£ 1999	Ch
Lexicon LXP5	£ 299	Ch	Sony DTC1000	£ 449	Ch
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Fostex B16	£ 1299	B	Akai MPC60	£ 1499	B
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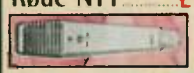

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Call us for great introductory offers on these high performance mics.
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Complete with 6m cable.

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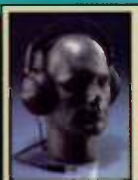

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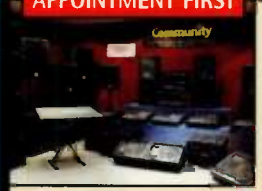

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200 watt 1x12 at new low price

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Own the ultimate one-box gigging machine for less than half price! 10 channel, 14 input mixer section with 3 band mid-swept EQ and vocal enhancer on first six. **Two** 18-bit Dynacord effects with individual sends. 2 x 500 watt LPN power amplifier. 2 x 7 band graphic EQ. **All with a 3 year Warranty!**

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Packages with Stands and Cables

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Folio FX8/16

The new FX8 and 16s are now in stock. Compact, powerful mixers with on board **Lexicon** effects.

Call for best possible deal Guaranteed.

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New EMX2000 Powered Mixer

NEW

- 12 Channels, 16 Inputs
- Simple to use, great sounding digital reverb
- EEEngine power amp technology means its powerful (2x200watts) but lightweight (14kgs)
- 2 on-board 7 band graphic EQs for overall sound shaping
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RRP £649 **VILLAGE £549.99**

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6 channel PA head with digital reverb and **two** 200 watt amplifiers. All in a compact, heavy duty carpet finished box – Just add speakers!

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12 channel mixer with integral digital reverb and graphic EQ.

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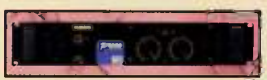

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New series of 2U power amps offering outstanding watts per pound value. Using EEEngine technology, these amps have very high power output in compact chassis at great prices.

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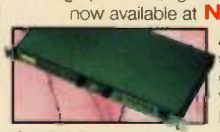
A-Series Power Amplifiers

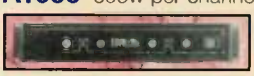
Chevin Research A-Series amps are state-of-the-art high powered, lightweight, compact power amps now available at **NEW LOW PRICES!!**



A500 takes up just 1U of rack space and weighs only 4kg, yet it delivers 2 x 350 watts RMS with total reliability.

RRP £846 . . . . . **£579.99**

A1000 600w per channel, 2U, 8.5kg . . . . **£Call**



Q6 Now how about this – 2400 watts (4 channels, 600 watts each), 2 units high, 12kg. Imagine a single power amp that could drive your full range speakers, your bass bins and maybe even your monitors aswell, that is this small and lightweight! **Less** weight, **Less** rack space, **Less** setup time, **Better Sound!! What's the catch? There isn't one!** This amp is now available for the same price as equivalently powered stereo power amps.

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Great new deals on Animation Series 1 high powered systems

G1 is a 500 watt 1x15 system with 1" compression driver. Essentially, a pair of these cabs is a 1 kilowatt system with a maximum average SPL of 128db in just 2 small boxes.

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Stageworks New System 8 bass bin

NEW

- Dual channel system – Which means you can just use one
- Bandpass design, so you don't need a crossover
- Compact and lightweight
- Ideal compliment to almost any full range system.

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4 band EQ with 2 sweeps on all inputs. 6 auxes and 100mm faders on all channels.

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MixWizard 14-4-2

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12, 16, 24 and 32 channel

Versatile 4 bus live desk with front-of-house and monitor mode. 4-band EQ with 2 sweeps, 100mm faders and 8 auxes.

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Multicore Stagebox

30 metre high quality 20-way balanced stage box fitted with 16 XLR inputs and 4 outputs (left, right and 2 sends) with numbered tails also on XLRs.

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only **£99.99**

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Vive Le Resolution!

OPTIMISING PC DIGITAL AUDIO QUALITY IN SOFTWARE

There is now a bewildering array of audio options inside most PC audio recording packages, and if you understand the reasoning behind them you can get a bit (or even a few bits) more quality out of your hard drive audio. MARTIN WALKER explains.

Until recently, unless you could spend a lot of money on a high-end audio recording system, you would be unlikely to worry too much about software compromising your audio quality — the limiting factor was far more likely to be the budget A-D and D-A converters used in many soundcards. However, now that budget audio has improved it's far more likely that choosing the correct software settings will result in audible improvements. Also, now that more and more people are buying CD-R drives, and burning their own one-off CDs for duplication, software settings become even more important — once you create a CD, every bit is transferred faithfully on to the final product, so the more bits you can get on there in the first place, the better.

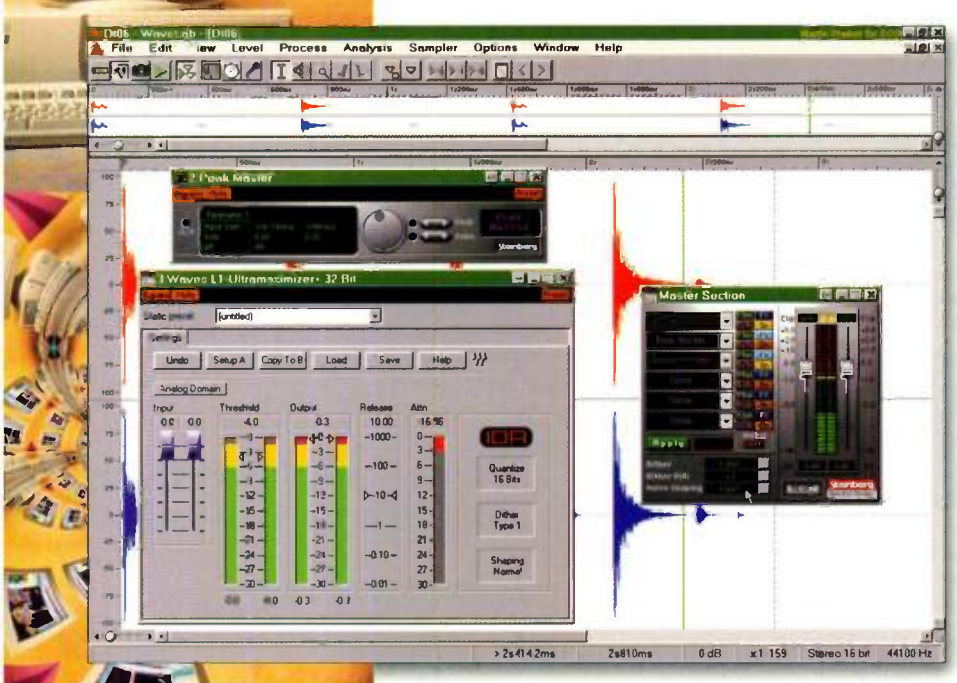


Figure 1: You can insert up to six real-time plug-ins in Wavelab 2.0, and then apply them simultaneously with 32-bit calculations. Two dynamics processors are also shown here: Peak Master is included free with Wavelab, and Waves' L1 Ultramaximiser is part of the famous Native Power Pack. Notice that both the L1 and Wavelab's Master Section currently have dithering enabled. You should choose one or the other for best results.

FOR A FEW BITS MORE...

Although it's easy to understand the signal path in high-end packages which maintain a 24-bit path throughout (from A-D conversion before recording, through hard disk storage, to D-A conversion on playback), the situation can be a lot more confusing in mixed systems. For instance, several cheaper PC soundcards now offer converters with 20 bits, and with 24-bit internal resolution — but what exactly are the advantages if the audio is still stored on your hard drive in 16-bit form?

Many PC applications also offer a choice of working resolutions when running — *Wavelab*, for instance, has options for 8-, 16-, 20-, or 24-bit Preferred Playback Resolution (whatever the number of bits in the file being played), and when running DirectX plug-ins inside *Sound Forge* you can switch between 8-, 16-, and 24-bit processing. But if you have 16-bit data files on your hard drive, what's the best choice?

When it comes to DirectX plug-ins that are primarily intended for mastering (such as the *L1 Ultramaximiser* from Waves), the permutations increase even further, since you may be offered additional choices for dithering and noise shaping (see 'All About Digital Recording' in the June '98 issue of *SOS* for a full description of these). While most people can see the point of these options when preparing 8-bit multimedia files from 16-bit recordings, or mastering to CD at 16-bit resolution from 24-bit files, how about when you're processing 16-bit files that remain 16-bit? Are these options valid when you're maintaining the same resolution, and if they are, what settings do you choose? Also, if you've already carried out some processing on a file, can you use dither and noise shaping more than once if you need to further edit your audio? Let's see.

INTERNAL POLITICS

Most people understand that, in order to maintain high audio quality, internal mathematical calculations need to be carried out at a high resolution. This minimises rounding errors that accumulate and give rise to grainy artifacts at low audio levels (such as the end of reverb tails and fade-outs). Normally, when a system is working with 16-bit audio data the internal resolution used for audio processing will be 24-bit or even 32-bit. There's understandable confusion when applications are said to contain 32-bit-compatible code. This refers to the way

computer data is addressed, and not audio data. Having 32-bit code doesn't mean that you're dealing with 32-bit audio data — the two are quite separate. However, the internal processing resolution used by software is a fundamental choice of the developer, and you would expect that it would be set to an optimum value and left alone.

The problem is that every time you process a 16-bit audio file, further rounding errors are created — with each operation the losses accumulate, and the fidelity of your audio degrades a tiny bit more. For example, if you EQ a 16-bit file the calculations may be carried out internally at 32-bit resolution, but when you click the OK button your data emerges as a 16-bit file. If you then add some reverb to the sound, another set of 32-bit calculations is carried out, followed by truncating (chopping off the extra bits) to a final 16-bit file. Finally, you normalise the file to bring its peak value to the maximum digital value — yet another set of calculations, followed by more rounding errors. Although each process has been carried out accurately for the optimum sound, the final audio quality has been compromised.

There are normally two ways to minimise this problem: either you carry out all intermediate processes at a higher resolution of 20, 24 or 32 bits (converting back to 16-bit audio only at the final stage), or you apply dithering at each stage, which converts the low-level rounding errors into a steady hiss (which can be made less obvious by 'shaping' the noise so that it occurs at frequencies to which the ear is less sensitive). However, many dithering systems are not designed to be used more than once; they're intended to be used as the final process in the audio chain, just before mastering. If high levels of carefully tailored noise have already been added, adding yet more may cause audible problems at high frequencies. So the best option is to try to ensure that your audio stays at a higher resolution throughout editing, reducing it with noise-shaped dither only at the final stage, before saving it at 16-bit resolution.

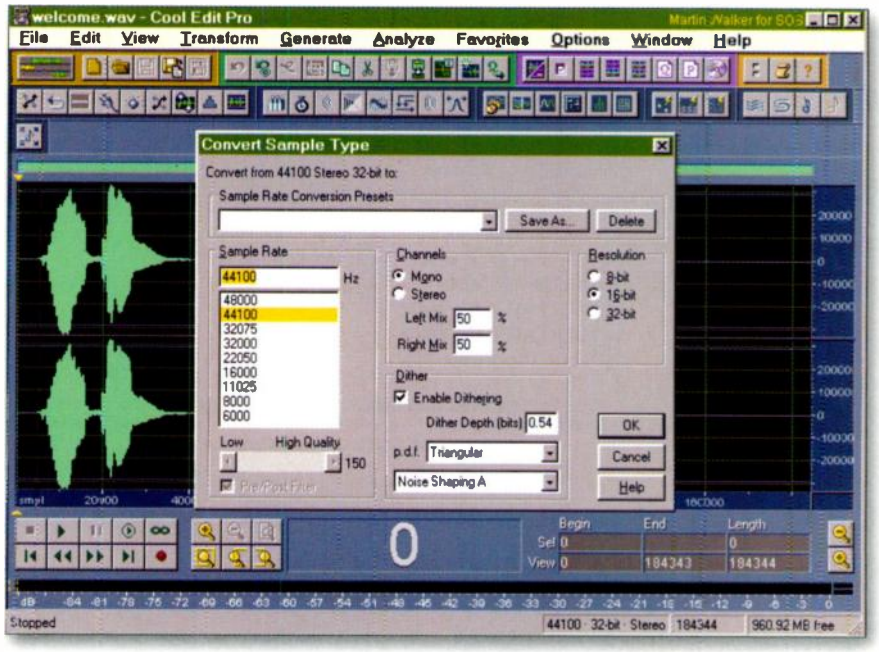


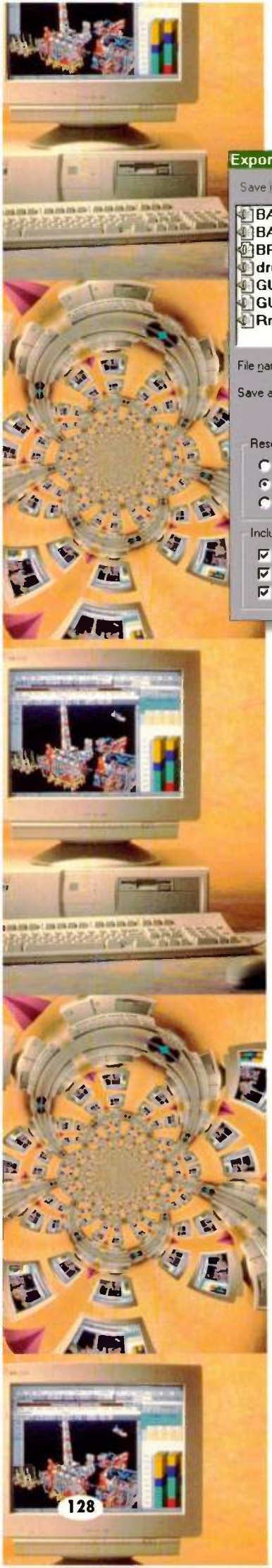
Figure 2: If you 'Auto-convert your files to 32-bit' on opening, you'll need to dither the final edited file before saving it, using the options in this window.

HERE'S A BATCH I MADE EARLIER

If you want to apply more than one process to any 16-bit file, you ideally need to carry out the intermediate stages at a higher bit resolution. There are various ways to accomplish this. Batch Converters are normally used to apply the same set of processes to a number of files, and are used a lot by multimedia musicians who need to convert files between Mac and PC formats, or change CD-quality audio into the best sounding set of 8-bit, 11kHz files for a game or other multimedia title. It's boring work, and once you establish the best sequence of normalisation, bit-reduction, and dithering options, you can point the Batch Converter at hundreds of files and leave it to get on with the nitty-gritty.

Likewise, if you know exactly what editing stages you need to apply to a single file, you can also use a batch process, so that all editing stages are part of the same set of calculations. This should ▶

Optimising PC Digital Audio



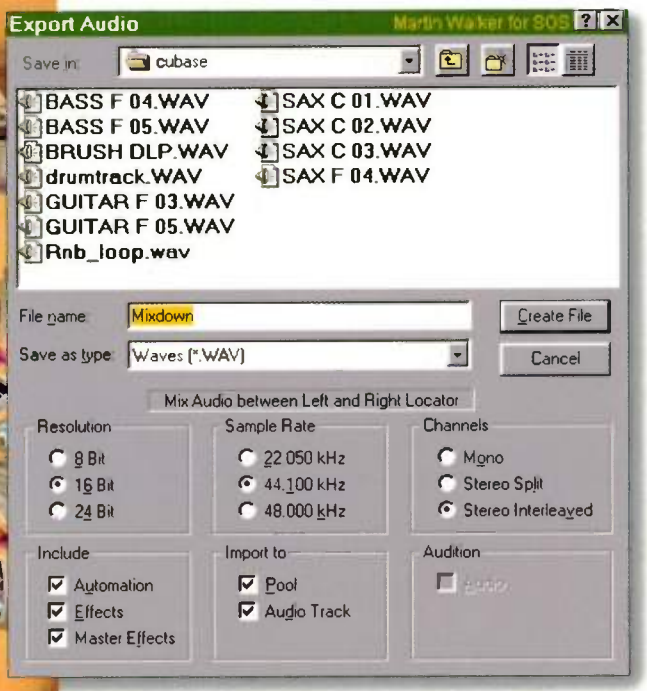


Figure 3: The Export Audio window in Cubase VST allows files to be created at 24-bit resolution, for further editing inside a package such as Wavelab, which already supports this format.

result in the final audio signal having better quality than if each process was applied individually, since the audio will stay at the higher internal resolution during the entire process.

However, you normally need to audition the audio before committing yourself to what may be a lengthy procedure. Fortunately, real-time batch processing is available, and two good examples are the *Sound Forge* Audio Plug-in Chainer, and the *Wavelab* Master Section. These both allow multiple processes to be applied to any file in real time, so that you can hear the results before you commit yourself to writing the edited file to your hard drive.

A particularly elegant approach is that of *Wavelab*, whose Master Section allows up to six processes to be used (each occupying one of the available 'slots'), followed by a Dithering Processor (see Figure 1). Normally, all of the processes occur in real time (subject to enough CPU power being available), and all you need to do to maximise audio quality is to ensure that the best resolution is being used during any intermediate editing, by setting up all temporary files with a higher resolution of 20 or 24 bits. However, when you want to Apply the Master Section processes permanently to a file, and then save it, it works as a batch processor (the Batch Processor menu option has more options, and is an extension of this).

The latest version of *Wavelab* carries out the processes as one complex set of calculations, by treating small chunks of the file separately in turn (applying every chosen process), and saving these directly to the final file. This has two big advantages: it's carried out much faster than if the entire file had to be written to disk after each stage, and because no temporary file is created the audio stays at the internal 32-bit resolution until the final save.

However, despite being able to listen to six or more processes in real time, you're still likely to need other, more basic, editing for your audio files. Apart from topping and tailing (to remove unwanted material before the first note starts, and after the final one has died away), most other editing processes will ideally need a higher than 16-bit resolution. Most PC digital audio recording packages have various options in their Settings or Preferences menus, and these are the secret to getting the best results during basic editing.

COOL EDIT PRO

When creating new files, *Cool Edit Pro* can edit at up to 48kHz, with 8-, 16-, or even 32-bit resolution. Most people working with 16-bit data tend to initially select 16-bit options, but this is not the best solution. If you're working with *Cool Edit Pro* and prefer to stick at 16-bit during your editing, you should enable the 'Dither Transform Results' option, so that you retain as much dynamic range as possible when each 32-bit Transform is reduced to a 16-bit result. However, as Syntrillium themselves say, this will add a small amount of noise at each stage, although this is still preferable to simply lopping off the extra bits.

A better solution is to use the option in the Data page of Settings, to 'Auto-convert all data to 32-bit on opening'. All subsequent editing will then be carried out at 32-bit resolution, but it is up to the user to convert to a 16-bit format, after editing is finished but before saving the file. You do this in the Edit/Convert Sample Type window (see Figure 2), which provides a more than comprehensive selection of dither and noise-shaping options. Even if you only have a soundcard capable of 8-bit playback, you can edit other file formats by choosing the 'Play 16-bit files as 8-bit' option in the Settings section.

There are also two relevant settings when multitrack recording: Playback Mixing can be either 32-bit or 16-bit, when combining the tracks for monitoring purposes before sending them to the soundcard. The default is 32-bit, but 16-bit can

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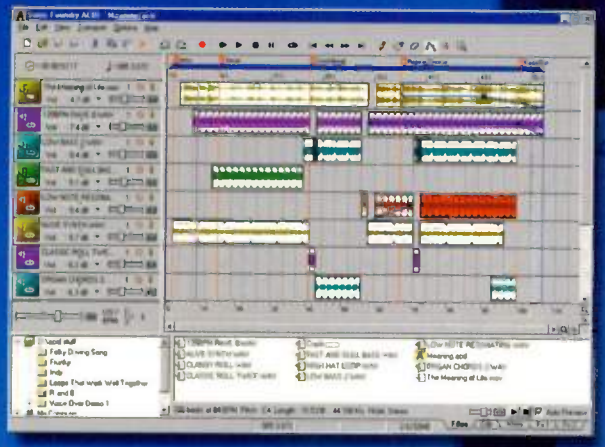

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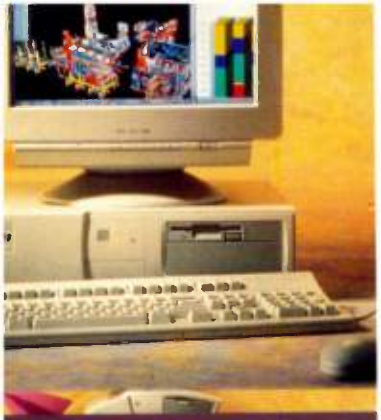


"The problem is that every time you process a 16-bit audio file, further rounding errors are created."

Optimising PC Digital Audio

▶ be used on slower hard drives. Mixdowns can also be 16-bit or 32-bit, depending on whether further editing is likely to take place.

SOUND FORGE

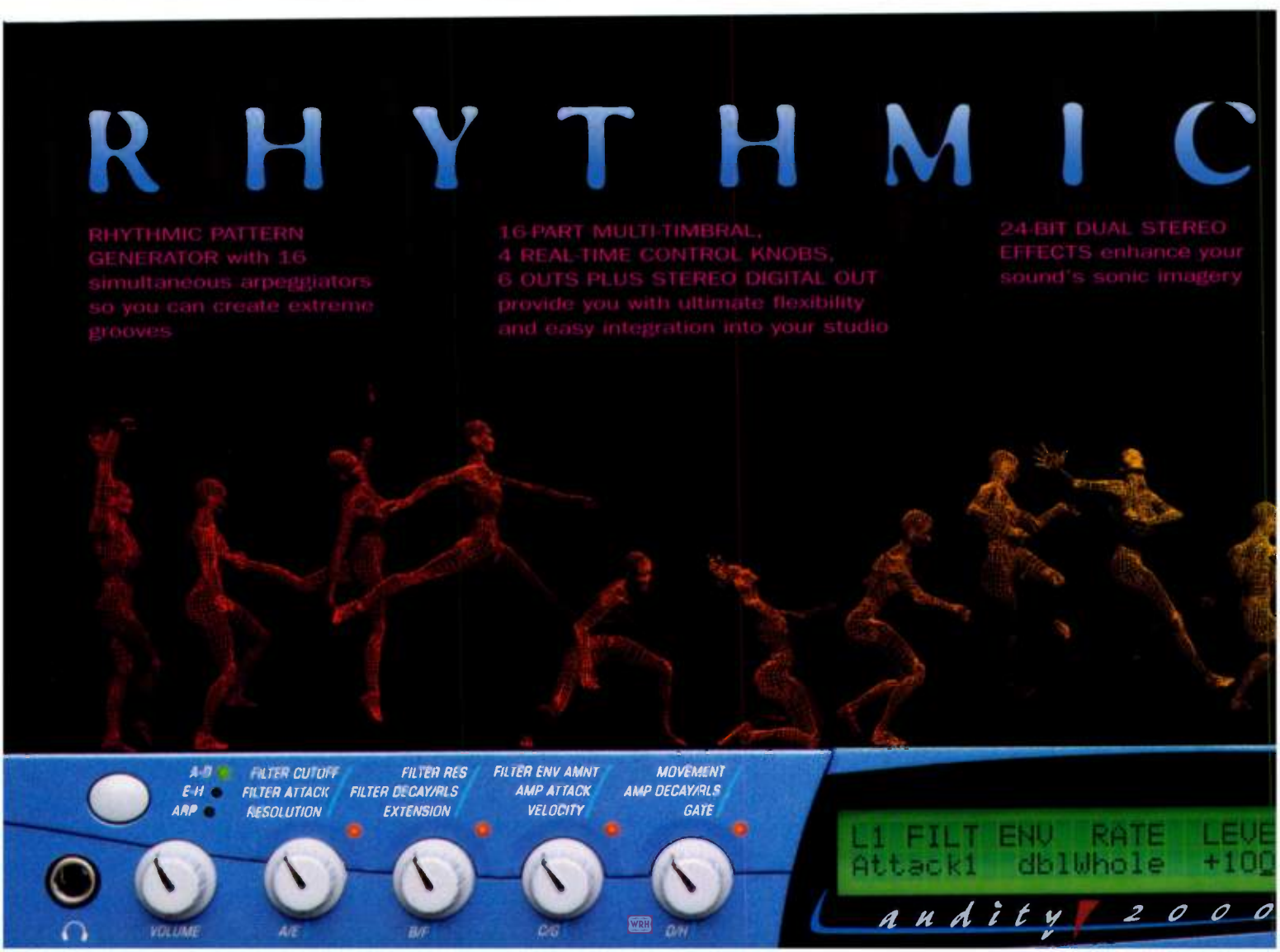
Sound Forge can work with any 16-bit file, up to a 96kHz sample rate, but there are few internal options to worry about. Inside any plug-in you can select 8-, 16-, or 24-bit processing by right-clicking on the current value shown by 'CPU %'. This determines the resolution of the data both entering and leaving the plug-in, although most plug-ins will operate internally at an even higher resolution. *Sound Forge* operates internally with a 16-bit resolution, but the 24-bit CPU% setting becomes valuable when using the Audio Plug-in Chainer — the chainer will then pass 24-bit data between each chosen plug-in, to maintain the best audio quality between each process. At the output of the chainer the data returns to its normal 16 bits, but of course you can use noise-shaped dither as the final stage, to ensure that you squeeze the last drop of quality into these 16 bits (a dynamic range equivalent to 18 or 19 bits is claimed for some dither algorithms).

WAVELAB

For many people, *Wavelab* is a perfect partner to *Cubase VST*, since its comprehensive range of audio treatments are the final icing on the audio cake, both for off-line treatments of *VST* tracks, and for mastering to CD after the mixdown is finished. *VST* tracks are normally 16-bit, apart from the export function (see later), but *Wavelab* can handle a variety of sample formats: 8-, 16-, 20-, 24- and 32-bit, and from below 11kHz right up to 96kHz.

Whatever the number of bits in the audio file, there are various choices to be made in the Preferences section. In the Audio Card page you can select from four Preferred Playback Resolutions: 8-, 16-, 20-, and 24-bit. Whatever the format of your audio data, Wavelab converts it to the chosen resolution 'on the fly,' before sending it to the soundcard. This is useful if, for instance, you want to edit 24-bit data, but your soundcard only supports 16-bit playback. If you have the luxury of a soundcard that supports 24-bit playback, you can hear how the data will sound when dithered to 16 bits. However, if you try to play back at a resolution not supported by your card, you will get an error message to this effect.

In the File window you can select between three types of temporary file: 16-, 24-, and 32 -bit. Steinberg only recommend using 16-bit temporary files where speed and disk space are crucial. If you ever plan to export 24-bit files, the 24-bit or even 32-bit options will be preferable, but even for



general-purpose 16-bit work, 24-bit temporary files will maintain audio quality when performing more than one edit. The 32-bit option is only useful if any of the temporary files is likely to generate levels greater than 0dB, since it avoids clipping. This is unusual, so for most purposes the 24-bit option will be the best choice.

Incidentally, if you have two or more hard drives it's well worth placing the temporary files on a different drive to your main audio data. When processing, the source file will be read, and then a temporary file written. If both are on the same drive the heads will be constantly swapping between two positions on the same drive. By using a second drive for the temporary file it's possible, in some cases, to double processing speed.

AUDIO SEQUENCERS

Apart from ensuring that you get the maximum possible level before clipping whenever you record a track, to ensure the widest possible dynamic range, there are rarely many options that concern basic audio quality in MIDI + Audio sequencers (unless you have a more expensive system with options for 20- or 24-bit recording). The internal processing resolution may be high (*Cubase VST*, for instance, uses 32-bit floating point), but since both input and output signals are normally 16-bit there are seldom any decisions to be made. People do routinely normalise their recorded tracks to bring them to similar levels, but this won't affect their quality.

The only basic choice is likely to be that of sample rate, but for most purposes 44.1kHz is the best option. The 48kHz option may be required if you're importing tracks digitally from DAT or ADAT, and some people do use 32kHz if they have borderline systems (to gain a few more tracks), but this should only be done if absolutely necessary, as any transfer to CD later will require a sample-rate conversion anyway. Few applications allow mixed sample rates, so this tends to be a set-and-forget decision.

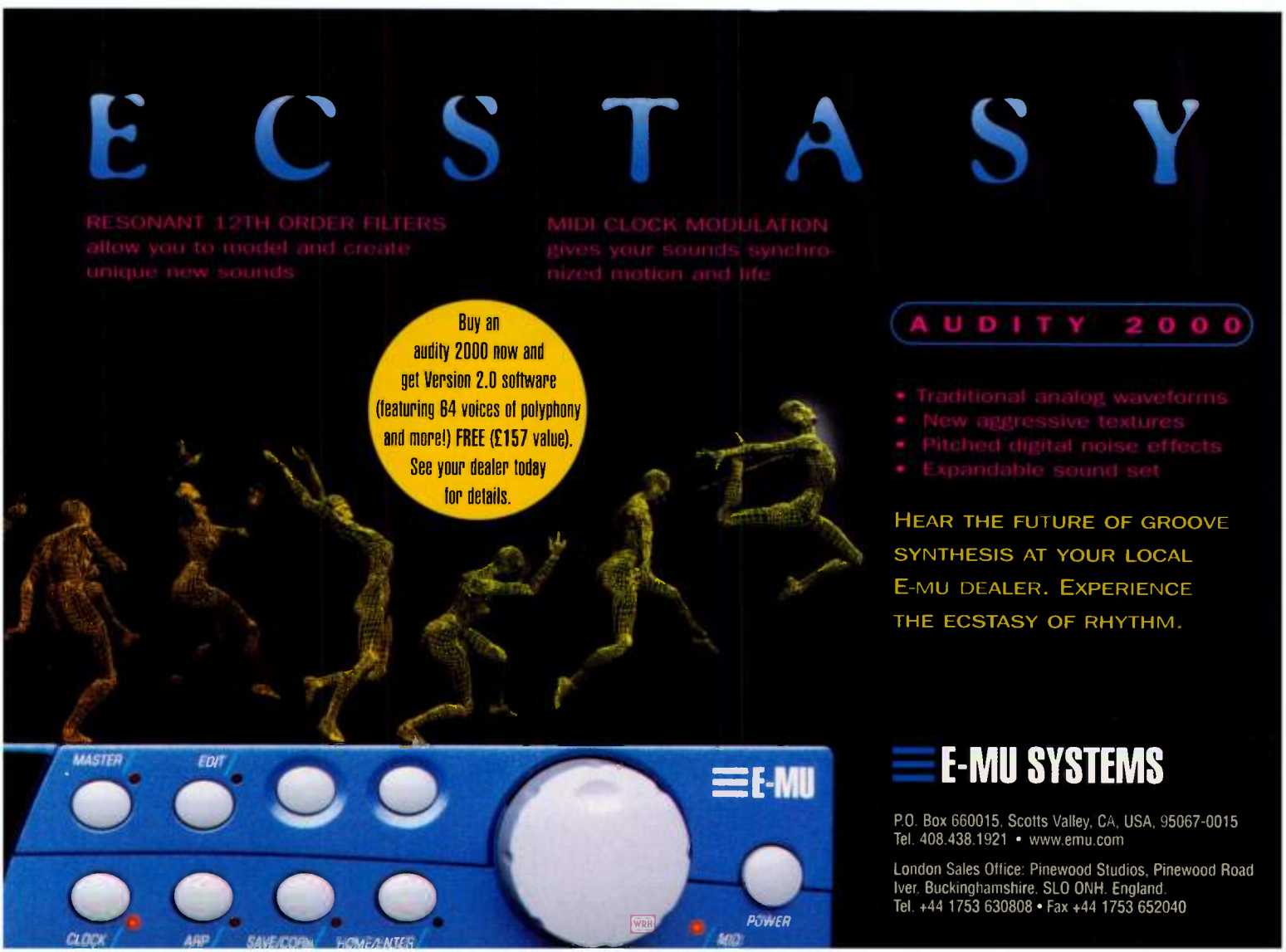
The only time when you're likely to have a choice of bit resolution is when exporting audio during ▶

FROM THE OUTSIDE IN

Many modern soundcards have 18-bit or 20-bit converters, and although some, like the Event Darla and Gina, allow 20-bit recording as well as 16-bit, others still only offer 16-bit recording. However, you are still likely to get a cleaner, quieter 16-bit signal than with 16-bit converters.

Some proprietary dithering, like Sony's Bitmapping process, takes place at the A-D stage during recording, when using converters with more than 16 bits. Dither is added before the signal is saved onto the DAT tape, which preserves more of the dynamic range of the original signal coming from the A-D converter. Once on tape, this improvement can be heard when played on any other machine, since it is part of the recording itself. The reason that Sony provide a switch for the process is that further editing may cause problems with an already dithered signal. If you need to treat your DAT recording in an editing package, Bitmapping should be switched off, and dither applied at the final stage of editing, as normal.

If your D-A converters are 20-bit, and the internal path is 24-bit, the hardware will normally provide its own dithering to give the best possible 20-bit signal when playing back 24-bit files. If you're only recording 16-bit analogue data to your hard drive, you can still use a 24-bit internal path during multitrack and mastering work when a higher resolution is being generated, and for importing and exporting digital data.



Optimising PC Digital Audio

Figure 4: The Audio Plug-In Chainer of Sound Forge allows 24-bit processing to be carried out on a chain of plug-ins, without ever dropping back to the 16-bit resolution of the file itself.

▶ final mixdown (if this is provided as an option). *Cubase* has this, as do the new versions of *Logic Audio Gold* and *Platinum*. In *Cubase*, you can access this either by clicking on the Create File button of the Master Section, or by selecting the Export Audio File function from the File menu (see Figure 3). Here there are various choices to be made: final sample rate, whether to save in Mono, Stereo Split (a pair of mono files), or Stereo Interleaved format, and whether to include any of the real-time Automation and Effects that you have added.

The only other option here is Resolution, and the choices are 8-, 16- or 24-bit. You would choose 8-bit only for multimedia applications, where audio quality is not as important as small file size. If you want to do any further work on the exported file inside *VST*, the 16-bit option is the one to choose, since *Cubase* can only currently work with 16-bit files. However, when mixing many 16-bit audio tracks, the resolution of the mixdown file will be much higher.

The highest resolution, 24-bit, would be ideal if you anticipated applying any further processing, perhaps before final mastering. This would be the most suitable setting, for instance if you wanted to later import your audio into *Wavelab*, since you would then maintain highest audio quality until the very final stage of saving a 16-bit master file to DAT or CD-R.

PLUG-INS

Most plug-ins do just that — plug in and go, without needing any user adjustments other than the creative ones providing the effect. However, the Waves *Native Power Pack*, which is widely used on the PC (as well as the Mac), comes with extensive options for dithering, notably in the *L1 Ultramaximiser*. All the normal rules apply, but there are several special things to note. The IDR (Increased Digital Resolution) system is claimed to be one of the few that have truly random noise added during the dither process, so that it can be used several times without causing problems. Despite this, if you are using the NPP inside *Wavelab*, it's sensible to make sure that you use either the NPP dither options, or those of the *Wavelab* Master Section, but not both. Internal processing is carried out at 24-bit resolution, but of course it is the supporting application that determines the resolution of what goes in, and what comes out at the other end.

MULTITRACK MIXDOWN TO STEREO

When you're editing a single track inside a MIDI + Audio sequencer, you will probably have a different set of priorities from when you're mixing down every track to a single stereo file. However, some tweaks are easier to do while still at the multitrack stage. The first thing you should do is to listen through carefully on both loudspeakers and headphones. Any clicks, glitches and hums should be noted, and their causes narrowed down — it will be easier to edit these out of a single track than a combined mixdown. They can be carefully edited out before the mixdown is carried out, but you may be able to sort the problem out and re-record the offending track. Unavoidable hums and hisses may be reduced in a variety of ways, from notch filtering right through to adaptive noise-print restoration, using DirectX plug-ins.

When you do the final digital stereo mixdown, it's normally best to use the same sample frequency as the final intended product, even though most modern software has resampling options to change between different formats. For instance, if you want to burn a CD, recording at 44.1kHz is best — yes, you may get a gnat's whisker more top-end response by initially recording at 48kHz, but no conversion process is perfect, and what you initially gain will be lost when you down-sample later. The only situation in which a higher resolution is worth having is if you have the option to record the final ▶

ON THE LEVEL

Although there are many useful tools available within the latest digital audio editors to adjust levels, there's no substitute for getting the maximum possible dynamic range into your WAV file recordings in the first place. If your peak levels are 6dB below clipping, you're only using 15 of the available 16 bits during recording.

Normalising scans the file for the highest peak, then increases the level of the whole file so that the peak is at the maximum possible digital level. This doesn't increase the dynamic range: all it does is make the audio louder. However, unless you have already applied compression or limiting, normalising may still leave the audio at a comparatively low level, since there will be a few short transient peaks that are significantly higher than the remainder of the material. There are several mastering tools that can provide a much greater average level, such as the Waves *L1 Ultramaximiser*, Spectral Designs' *Loudness Maximiser*, Emagic's Audio Energiser, and the Peak Master included with *Wavelab* 2.0.

What these plug-ins do is to raise the overall level by a chosen amount (to increase the perceived volume), while altering the sound as little as possible. Most of the audio will simply have its level increased, and only the short peaks that exceed the chosen threshold will be treated. Some of you may even have attempted a similar thing by hand, using a pencil tool to round off the tops of a few stray peaks that clipped during an otherwise perfect recording. Even a normalised file, whose peaks are already at digital maximum, can be treated in this way, to further increase level, with minimal audible changes to the sound. Essentially, this is peak limiting, but these plug-ins have the advantage over hardware devices of being able to look ahead in the waveform to anticipate and shape signal peaks in a way that produces the bare minimum of audible artifacts.

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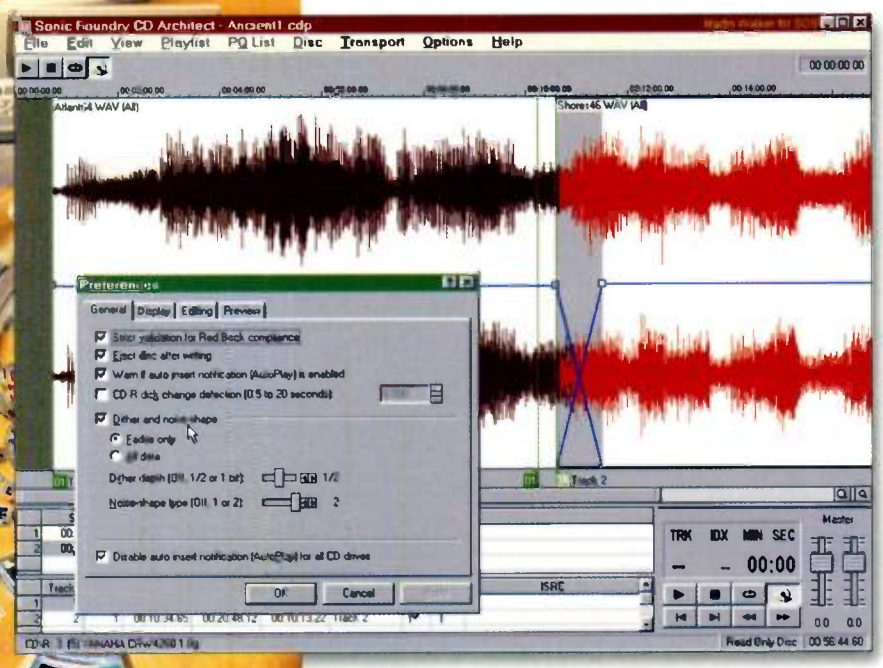

Figure 5: CD Architect, from Sonic Foundry, can carry out fades in real time during a CD burn. The preferences page allows you to add dither to these to maintain optimum audio quality.

track at 24-bit (as you do in *Cubase VST*). If this track is going to be further edited, 24-bit should give you a better final result, even though you dither down to 16-bit at the end.

By the way, if you intend to have a fade-out on your track, leave this until the pre-mastering stage. Although it's possible to add global audio fade-outs in many MIDI + Audio sequencers, it's safest to wait until you have carried out any global EQ and level tweaks, and then you'll get the cleanest result.

PRE-MASTERING

When you have a final stereo mixdown track recorded, it can still be tricky knowing where to begin. Don't immediately start by normalising the entire track, since there may yet be other edits to be made that later change levels, making this superfluous or even undesirable.

The first operation is normally topping and tailing, to remove any superfluous data from before the start of the first note, and after the final note. However, before you do this, listen to these two parts of the track carefully. Since they are probably the most exposed areas, any hiss or hum may be more noticeable than in the rest of the track. If you have left a second or more of this background noise after the final note, and have some noise reduction software (included in *Cool Edit Pro*, and also available as plug-ins from Sonic Foundry and Steinberg, amongst others) you can get a noise print from this, and then use it to treat just the initial and final few seconds of the track. As long as you're careful that no changes of timbre are evident at the joins, this can clean up tracks very well.

Once this has been done, and topping and tailing carried out, you need to consider whether any other corrective EQ, compression, or overall treatments such as enhancement are needed. If you like to compare the track to commercial releases in a similar style, you may want to add a little EQ. Plug-ins like Steinberg's new *FreeFilter* (reviewed in the July '98 PC Notes) make this process easier, by allowing you to directly compare the two tracks and generate a filter response for correcting your track to sound more like the commercial one, but there is still no substitute for a good pair of ears.

Before you start applying effects one at a time, remember the improvements available if you use a batch process. The final treatment will probably be to ensure an optimum level, either using normalising or peak limiting, to bring the overall level up without compromising the sound (see the 'On the Level' box for more details).

Having got the sound exactly as you want it, you can now add a fade-in or fade-out, but here it's advisable to make sure that you're using 24-bit temporary files if available, since you want to keep these higher resolution calculations intact before applying the combined batch effects with dither. There's some dispute about whether these fades should be done before or after final level tweaking. Logically, the fade is best left until every other process has been carried out, but if you want to use dithering as the final stage in a batch, it is probably best to do the fade first. However, if you are intending to burn a CD in Sonic Foundry's *CD Architect*, you can leave the fades till later, since this program allows you to create them 'on the fly' during the CD burn, complete with dither.

THE FINAL BITS

Here's a summary of all the procedures mentioned so far:

- During recording, try to get the highest possible signal level without clipping, to make the most of the available dynamic range.
- Any editing operation on a 16-bit audio file that changes its level (including fades and EQ) will generate a result with more than 16 bits.
- Always use batch processing if available — you can still normally audition the combined effect in real time before committing yourself, but you will get 24-bit or even 32-bit resolution for the entire set of calculations.
- If, for some reason, you can't use batch processing, select 24-bit or 32-bit temporary files if available, to maintain highest audio quality during your intermediate editing stages.
- Use 16-bit temporary files during editing only if your PC struggles with the extra overhead of writing 24-bit data, or you are running out of space on your hard drive.
- Always leave any dithering and noise shaping until the final stage, and unless your software manual states otherwise, don't attempt to add more dither to an already dithered file.

Armed with these tips, and with the reasoning behind them, you can now add a bit more spit and polish to your digital audio, and you should emerge with a clearer, more detailed sound. SOS

"Having 32-bit code doesn't mean that you're dealing with 32-bit audio data — the two are quite separate."

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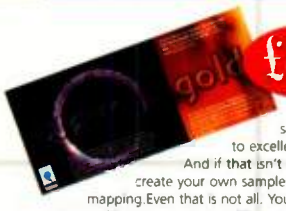

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As Lexicon introduce new processors to replace the acclaimed PCM80 and PCM90, PAUL WHITE takes a look at how these classic units have been further improved to create the PCM81 and 91.

LEXICON PCM81 & PCM91 DIGITAL EFFECTS PROCESSORS

one~upmanship

You may have noticed that Lexicon's PCM80 and 90 have been superseded by virtually identical-looking models that still cost less than their forebears did a year ago. This has resulted in end-of-line 80s and 90s being offered at bargain prices — but before you all whip out your credit cards, it would be wise to see what the new models have to offer that their predecessors did not. It would also be useful to remind ourselves where these products sit in the marketplace, in particular the PCM80, which is often mistakenly perceived as a reverb unit, whereas it's actually a very powerful effects processor that just happens to include an extremely good dedicated reverb section.

Like the PCM80, the PCM81 is built around two processing engines — a LexiChip looks after the reverb at all times, so there's no resource sharing, and a Motorola 56002 handles the rest of the effects. This hasn't changed, but for both the PCM81 and 91, the earlier 18-bit input converters have been replaced by 20-bit converters. Some people will wonder why they didn't go the whole hog and move up to 24 bits, but the truth is that even the very best 24-bit converter only manages a true resolution of around 21 bits. However, the internal signal path is 24-bit, and a 24-bit signal can be taken into the unit via the digital I/O if required.

Another new addition is a pair of AES/EBU balanced XLR digital connectors which augment the S/PDIF phono connectors already fitted to the older models. Both digital outputs are always active and present the signal in either S/PDIF or AES/EBU format depending on the digital input format selected. However, Lexicon have opted not to fit word clock inputs. According to the spec sheet, these improvements extend the signal-to-noise ratio and dynamic figures by around 4dB.

Technical improvements are all very well on paper, but will you be able to hear the difference? As an existing PCM90 owner and frequent PCM80 user, I've never had any complaints about their sound quality, but there's more to the new models than a better signal path. The PCM81's factory library has been extended to 300 presets, and the algorithm set now also includes the pitch-shifting capability of the Vocal Fix card, for which PCM80 owners have to pay extra. These algorithms provide the tools to repair badly pitched vocal tracks as well as to create vocal harmonies and guitar effects, and the delay memory has been increased to a massive 20 seconds of stereo delay. Pitch may be controlled manually or via MIDI.

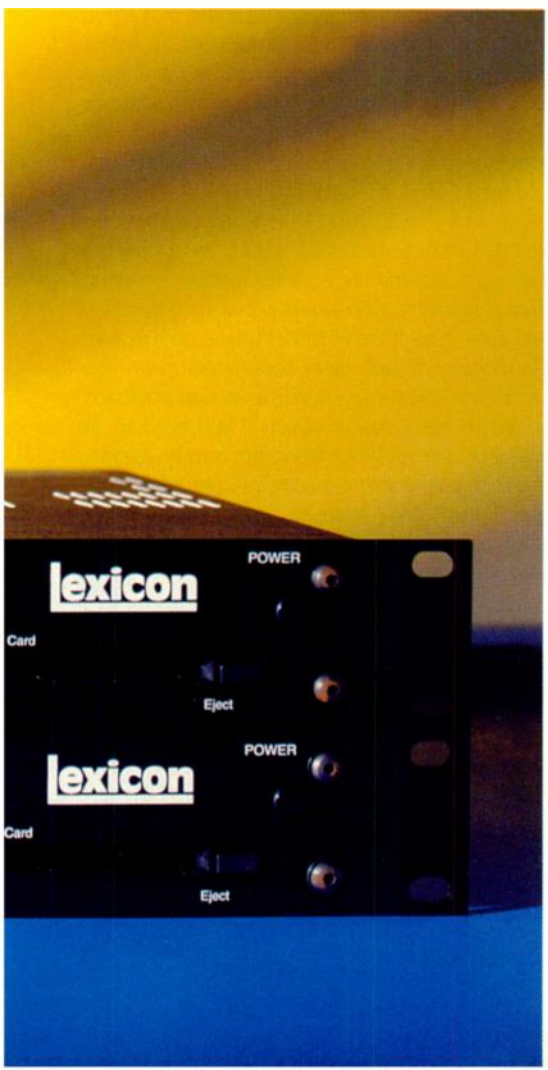
There are now 17 effect algorithms in all, categorised as 4-voice, 6-voice or pitch algorithms. The 4-voice algorithms are Concert Hall, Plate, Chamber, Inverse and Infinite. These all combine the reverb type listed with a general-purpose, 4-voice effect algorithm which Lexicon refer to as a 'toolbox', as well as additional post-reverb

processing. The 6-voice algorithms are Glide>Hall, Chorus + Reverb, M-Band + Reverb, Res1>Plate and Res>Plate, where the '>' symbol signifies a serial connection and the '+' a parallel connection. Each of these is combined with a 6-voice stereo effect toolbox. Finally come the Pitch algorithms: Quad>Hall, Dual>Chamb, Dual Plt, Dual Inv, Stereo Chamber, VSO-Chamber and Pitch Correct. A number of these algorithms include parameters that make it possible to create dynamic effects that translate into surround when the signal is played back via a conventional surround sound decoder. The review model came bundled with a Dual Effects ROM card providing 25 further algorithms and 250 factory presets. This card allows the PCM80/81 to operate as a dual effects processor with each of the two inputs feeding a different effect algorithm. The two stereo effect outputs are then summed at the output to provide a composite stereo signal.

As the original PCM80 was reviewed in depth back in *SOS* November '94, instead of covering all the same ground again I'm going to concentrate on what I think makes the PCM80 concept, and now the PCM81, so special. Lexicon units are sometimes criticised for being over-complex, but that would be unfair. The truth is that they provide access to a vast number of parameters that enable the user to produce some of the most powerful and creative effects around, but you only need to get involved at this level if you want to. The effect parameters are best visualised as a matrix where the most often accessed parameters are available on the top row. As you go further down the rows, the parameters become more obscure. Lexicon do two useful things to take the pain out of operation: firstly, they have a choice of Go or Pro mode. Go mode exploits a row in the matrix known as the Soft Row where up to ten parameters can be assigned for easy access. When Go mode is selected in the global setup of the machine, only the ten most useful parameters for each algorithm are available — all the scary stuff stays out of sight. In Pro mode, you get to access anything you like. The second great idea is the Adjust knob, a rotary controller that can be assigned to control several functions at the same time. Within the factory presets, this is set up to provide a lot of control over the current effect using just a single control. For example, you could have a chorus effect where the Adjust knob controls the depth, rate and delay time simultaneously.

For the more creative effects programmer, the beauty of the PCM80/81 is that it has a modulation matrix to rival that of a modular synth, which allows the user to set up effects that vary dynamically depending on signal levels, envelopes, LFOs, incoming MIDI data, MIDI Clock tempo and a host of other things. What's more, the PCM80/81 has Lexicon's famous Resonant Chord program, which has to be heard to be believed. It works by setting up several delays to resonate at different musical notes, and these may be controlled via MIDI. Any sound fed into the resonators will be dramatically altered, and even unpitched sounds come out playing the notes of the selected chord — this is especially effective on percussion. The process has something in common with vocoding, but it's not exactly the same thing and the results are sufficiently different to be worth pursuing. Indeed, you'll hear the effect on a number of sample collections and in a good many sci-fi film sound tracks.

All the usual modulation and delay effects can be set up, but because of the modulation capabilities and the multi-voice architecture, these can be either very rich or very abstract — you often imagine you're hearing a very complex multi-effect when you're actually listening to a single algorithm. Furthermore, any of these effects can be combined with a reverb that approaches the quality of the PCM90/91 dedicated reverbs and, because the reverb is produced by a separate dedicated processing engine, you never have to settle for a crude or coarse reverb because you've used up most of the DSP power generating the other effects.



THE PCM91

The PCM91 features exactly the same hardware additions and refinements as the PCM81, so you have 20-bit converters, a 24-bit digital signal path, and AES/EBU sockets on the back. Unlike the 80-series machines, however, the 90s are all about dedicated, high-quality reverb, and inside the box you'll find two LexiChips, rather than one LexiChip and one general-purpose DSP engine. The algorithms are spin-offs from the legendary Lexicon 480 and 300 high-end machines, and although the PCM91 doesn't have the same processing power as these models, it gets surprisingly close. What impresses me most about my PCM90 is the way in which it emulates small spaces with extreme realism. The test of a good reverb isn't how long it can go, but how short it can go while still sounding real. This is especially important in modern music production as a lot of records are mixed to sound very dry, yet

pros & cons

LEXICON PCM81 £1999
PCM91 £2199

pros

- Dedicated LexiChip means superb reverb at all times, even when other effects are in use.
- Previously card-only algorithms now included as standard.
- Digital I/O on balanced AES/EBU connectors as well as S/PDIF.
- 20-bit A-D converters replace the 18-bit converters of their predecessors.

cons

- PCM81's pitch-shifter exhibits some warble on polyphonic sources when shifting over a large range.

summary

Versatile processors with outstanding audio quality that build very successfully on their recent forebears.

SOUND ON SOUND

"The test of a good reverb isn't how long it can go, but how short it can go while still sounding real."

LEXICON PCM81 & PCM91

"Lexicon seem to be one of those high-end companies that don't mind bringing a cheaper product to market if they can still do it properly."

still alive, and a cheap reverb won't let you do that convincingly. The PCM91 does everything the PCM90 does, but it now comes with 450 presets and 10 additional dual reverb algorithms drawn from the PCM90 Dual Reverb ROM card. In all, there are now the five stereo algorithms of the PCM90 plus the new algorithms that provide both dual-effect operation and the ability to cascade two reverbs in series. The single algorithms include additional tools for ambience, post-processing, compression, expansion and modulation, so even the simple reverbs don't have to be that simple. The dual-reverb algorithms contain two reverb algorithms plus all the modulation and patching features of the single reverbs.

ROOM TEST

Taking the PCM81 first, this is a real powerhouse of a machine that does everything that a PCM80 plus a set of plug-in ROM cards can do. On top of that you get more delay time, a slightly improved technical spec, and those professional AES/EBU digital connectors. As I said earlier, the PCM80 was often misunderstood — numerically, it fell between the PCM70, which was a reverb unit, and the PCM90, which was also a reverb unit, so there was a tendency to think of the 80 as a reverb unit. The fact that it produced great reverb didn't help clear things up. In reality, it's a hugely flexible multi-effects processor capable of producing both the weird and the wonderful, and although it doesn't let you cascade 10 effects at once, it often sounds richer and more complex than those processors that do. What's more, its vast library of effects, plus the two-tier editing system, make it easy to tweak a patch and then store it as your own if you don't want to program something from scratch.

The additional pitch algorithms are well worth having, and although they can't match the ability of Antares' *Autotune* software to patch up suspect vocal takes, they do provide a number of useful and practical tools that allow you to fix the odd off-key syllable or word. They also provide a means to create the more familiar pitch-based special effects. The pitch-shift section includes intelligent algorithms that adapt their splicing regime to the pitch of monophonic signals for much smoother pitch-shifting so that, when you're harmonising a single line or correcting the pitch of an off-key lyric, you get far less of that unwanted burbling that afflicts most general-purpose pitch-shifters.

The PCM91 is simply a logical extension of the PCM90, and putting the dual algorithms in the box as standard, rather than charging extra for them, really helps when you want two really high-quality reverbs at the same time. What's more, moving some of the algorithms from cards into the standard box means that the card slot remains free for running other algorithms or patches. This really is an exceptional reverb processor at the price, which features acoustic environments that other machines would never dare attempt. The small rooms are exceptional, but if you want the big Lexicon cathedral or concert hall, they're in here too. And with so many library patches, there's a ready-made preset for just about every occasion.

SUMMARY

Lexicon seem to be one of those high-end companies that don't mind bringing a cheaper product to market if they can still do it properly. Their MPX1 multi-effects processor is currently excellent value, though compared to the PCM81 it behaves more like a conventional multi-effects processor in which several effect algorithms are combined to produce an end result. The PCM81 takes more of an holistic approach in which a single effect algorithm provides all the complexity and movement that's needed. If you want lo-fi effects, vinyl scratches or simulated analogue filters, then the PCM81 won't satisfy you, but if you need clean, powerful, and sonically complex effects capable of baffling the senses — or if you need access to the more conventional delay, pitch and modulation effects but to an impeccably high standard — then the PCM81 should make you very happy. The only less-than-pristine aspect of the machine is the pitch-shifter's slight warble when shifting polyphonic source material over a large range, but that's not surprising when you consider what a good dedicated pitch-shifter costs, and the PCM81 still performs better than most.

For pure reverb, the PCM91 is probably the next best thing to a Lexicon 480 or 300, and it's my bet that in a typical mix there are few people, including studio engineers, who would know the difference. And even though the PCM91's brief is pure reverb, the modulation and delay parameters mean you can create quite a few treatments that encroach on the realm of special effects if you need to. In dual-effects mode, each algorithm runs on its own LexiChip, so the reverb quality is still excellent and, as with the PCM81, there are so many great library patches that you don't have to get bogged down in heavy editing to get what you want. SOS

info

£ Lexicon PCM81 £1999; Lexicon PCM91 £2199. All prices include VAT.
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Room for Improvement

PRACTICAL ACOUSTIC TREATMENT

PART 3: PAUL WHITE looks at how you can calculate how much studio acoustic treatment you really need.

Last month we discussed acoustic absorbers in some depth, but since a successfully designed control room will use a combination of absorption, geometry and scattering to produce the desired acoustic environment, it would be wrong to regard absorbers as the sole solution to the design problem. Absorbers are important, however, in controlling the reverb decay time of the room. Other surface treatments may be devised for the diffusion or scattering of sound in order to further randomise the reflections arriving at the listener, and this important area will be covered later in the series.

Most of us will be familiar with reverberation, both as an artificial and as a natural effect. It occurs in all normal rooms, to the extent that music or speech sounds unnatural without it, but in a studio control-room environment, reverb characteristics need to be controlled within fairly close limits if the music produced in the room is to be evaluated with any accuracy.

Reverberation is created whenever sound energy is fed into a room and the room modes discussed the month before last are excited. When the source of energy is removed, the reverberation will decay at a rate determined by the geometry and absorbency of the room and its contents. Excessive low-frequency reverberation related to one dominating mode can cause serious problems for the engineer. The danger is that you may attempt to correct your mix using EQ to compensate for the apparent bass boost, but then when you play back your mix on a properly balanced hi-fi system, the result sounds bass-light. Furthermore, excessive reverb time at one frequency can cause notes to hang on, generally blurring the sound and making it more difficult to concentrate on fine details.

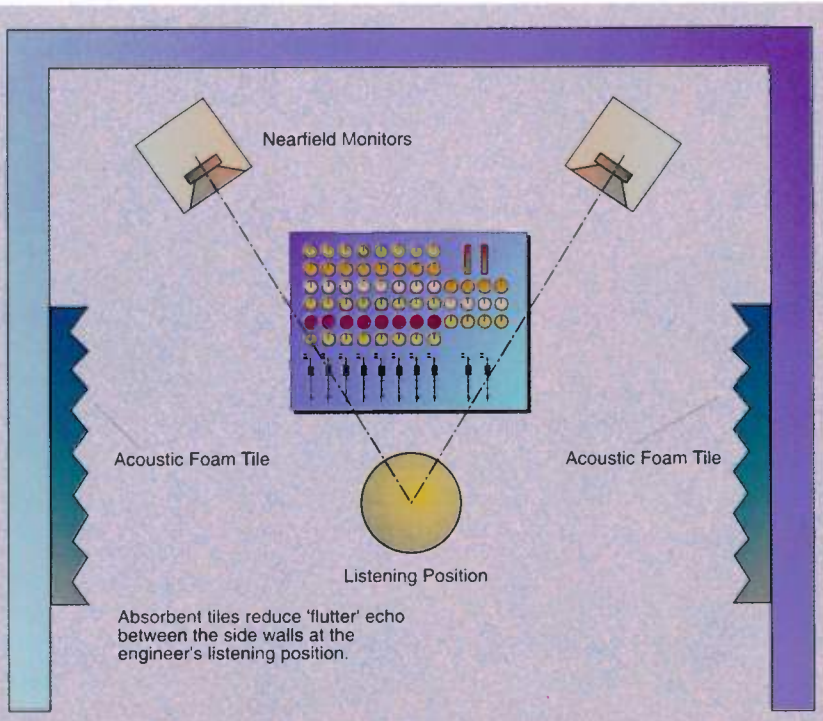
T60

Reverberation dies away exponentially, so some way of defining decay time in a repeatable and measurable fashion is required. Reverb time is conventionally defined as the time taken for a sound to die away to one thousandth of its original sound level; the resulting figure is called T60 (also known as RT60), because the reverb time is measured to the point where the sound has decayed by 60dB. The ideal reverb time varies depending on the room size and the type of material being auditioned, though for a control room it's likely to be around 0.3 seconds. In the studio area, an optimum reverb time for speech might be somewhere between 0.2 and 0.5 seconds, whereas classical music might require ▶

FLUTTER ECHO

Flutter echo is a distinctive ringing sound caused by echoes bouncing back and forth between hard, parallel surfaces following a percussive sound such as a hand clap. To minimise flutter echoes, which can plague even a studio having a perfect T60 across the band, certain precautions should be taken. If you're building from scratch, facing walls can be made out of parallel by at least 1 in 10, but if this isn't possible, some form of mid/high absorber can be applied to one or both walls to reduce the problem. In many cases, a pair of acoustic foam tiles fixed to the side walls on either side of the engineering position, as shown in the diagram here, will be all that's needed.

Note that some of the absorbers discussed last month, such as the panel trap, the Helmholz resonator and the slatted absorber, have flat surfaces which are reflective at mid and high frequencies. Consequently, when positioning these it's a good idea either to face them with acoustic foam or not to have them opposite each other across a parallel room. Alternatively, panel traps can be constructed with a sloping surface, where the average depth is maintained by making the halfway depth equal to the calculated value. Padded door surfaces can also be beneficial; one of the popular methods is to fit 2-inch foam to the door, then cover this with upholstery-quality vinyl or fabric which is fixed by tacks to give a quilted appearance.



Absorbent tiles reduce 'flutter' echo between the side walls at the engineer's listening position.

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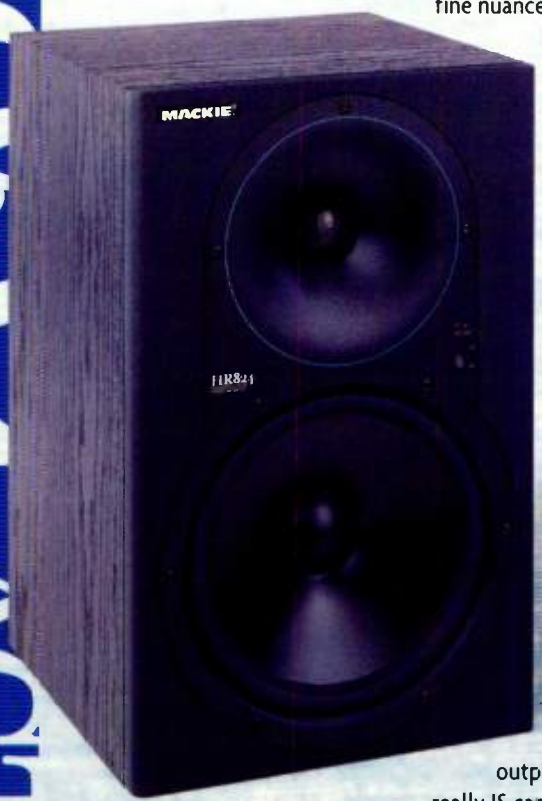

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* Electronic Musician, October 1997. All quotes are unedited.

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between 0.6 and 0.8 seconds of reverberation to add life and body to the performance. A typical living room has a T60 of around 0.5 seconds, and — unless you're going to spend a lot of money on studio design — that's not a bad figure to aim for in a project studio control room. Some people would disagree with me on this point, but I feel that unless you're doing the job properly, using qualified designers who have access to the correct measuring equipment, you can easily make the listening environment much worse by trying to do too much.

In a poorly designed control room, problems arise because the T60 tends to be different at different frequencies, though it's normally OK to accept a longer T60 at lower frequencies, as is typical of a furnished domestic room. The main thing to bear in mind is that if the room isn't designed with low-frequency reproduction in mind, it's invariably safer to use nearfield monitors with a limited low-end response. Studio design ideals are subject to changes in fashion, and no doubt the current interest in surround monitoring will complicate the issue still further, but the current consensus seems to be that, for small studio control rooms, we should aim for as constant a reverb time as possible up to 8kHz or beyond. Though a slight rise of reverb time at lower frequencies is permissible, it should not be excessive.

"If the room isn't designed with low-frequency reproduction in mind, it's invariably safer to use nearfield monitors with a limited low-end response."

SABINE

The maths needed to calculate reverb time or T60 is fairly straightforward using the formula devised by WC Sabine at the turn of the century, though this formula is more accurate when applied to larger rooms than to small ones. There is a more accurate and rather more complicated formula attributed to Eyring, but in order to illustrate the basic principles, Sabine will serve quite adequately. Sabine's formula states that:

$$T60 = \frac{0.05xV}{STxAave}$$

where T60 is the reverb time in seconds, 'V' is the volume of the room in cubic ft, 'ST' is the total surface area of the room in square feet and 'Aave' is the average absorption coefficient of the surfaces within the room. Imperial measurements are used here, but the metric equivalent is:

$$T60 = \frac{0.161xV}{STxAave}$$

where the volume is measured in cubic metres, and the surface area in square metres.

If the room is to be furnished, the surface areas, volumes and materials of the furniture should really be included in the calculations, but unless you're putting a lot of furniture into a small room it's easier to do your calculations based on the empty room, and then assume that adding any soft furnishings later will only improve things. It's possible to obtain tables of absorption coefficients relating to all the commonly used building, decorating and furnishing materials (check a good builders' supply company and get leaflets on specific materials for details), but a few useful ones gleaned from various textbooks are included below. Keep in mind that these can only be regarded as approximate, as no two manufacturers' products are identical.

ABSORBING READING: SOME USEFUL ABSORPTION COEFFICIENTS

Dimensions are given in imperial or metric, as originally published.

Material	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz
50mm Acoustic Foam	0.08	0.25	0.6	0.9	0.95	0.9
100mm Acoustic Foam	0.2	0.7	0.99	0.99	0.99	0.99
50mm Mineral Wool (Med Density)	0.2	0.45	0.7	0.8	0.8	0.8
Plaster on brick	0.013	0.015	0.02	0.03	0.04	0.05
Cotton drapes draped to half area. 15oz/sq yd	0.07	0.37	0.49	0.81	0.65	0.54
Foam backed carpet on concrete	0.05	0.16	0.44	0.7	0.6	0.4
Heavy carpet + heavy foam underlay on concrete	0.15	0.25	0.5	0.6	0.7	0.8
Coarse concrete	0.36	0.44	0.31	0.29	0.39	0.25
Painted concrete	0.01	0.05	0.06	0.07	0.09	0.08
Wood floor	0.15	0.11	0.10	0.07	0.06	0.07
Window glass	0.35	0.25	0.18	0.12	0.07	0.04
Plate glass	0.18	0.06	0.04	0.03	0.02	0.02
6mm glass	0.1	0.06	0.04	0.03	0.02	0.02
Plaster on brick	0.013	0.015	0.02	0.03	0.04	0.05
9mm Plasterboard over 20mm air gap	0.3	0.2	0.15	0.05	0.05	0.05
Brickwork	0.05	0.04	0.02	0.04	0.05	0.05
Vinyl flooring	0.03	0.04	0.05	0.04	0.05	0.05
Breeze block	0.25	0.40	0.6	0.5	0.75	0.5
LF panel absorber	0.28	0.22	0.17	0.09	0.10	0.11
Perforated Helmholz absorber, 4-inch depth, mineral wool damping, 0.79% perforation.	0.4	0.84	0.4	0.16	0.14	0.12
Perforated Helmholz absorber,8-inch depth, mineral wool damping, 0.79% perforation.	0.98	0.88	0.52	0.21	0.16	0.14
Broad-band absorber, 1-inch fibreglass slab at mouth of 7-inch deep cavity	0.67	0.98	0.98	0.93	0.98	0.96
Padded seat (unoccupied)	0.1	0.2	0.25	0.3	0.4	0.3

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The computer program Acoustic X by Pilchner-Schoustal works out the room mode distribution from your room dimensions. Check out the web site www.pilchner.com/acoustic-x/soft_welcome.htm

HERE COMES THE SCIENCE

Multiplying the total surface area of the room by the average absorption coefficient for the surface materials tells us how absorbent the room is, and this figure is expressed as so many absorption units — called 'Sabines'. Simply put, we can consider each area of different surface material separately, calculate the number of Sabines it contributes, and then add up all the Sabines for the room to give us the bottom line for the simple equation shown earlier. For example, assume that the absorption coefficient for concrete at 125Hz is about 0.01, which isn't very high. Five hundred square feet of concrete surface, such as a floor, would give us 500 x 0.01 = 5 Sabines of absorption. Add on the number of Sabines due to plaster walls, panel absorbers or whatever, and you end up with the total number of Sabines for the room at 125Hz.

To complicate the issue slightly, the absorption coefficient for a given material varies with frequency, but it isn't practical to do a different set of calculations for every possible audio frequency. Instead, we rationalise the audio spectrum to six discrete frequency values, at one octave intervals, from 125Hz up to 4kHz. Even so, that means working through the formula six times with six sets of values to give us six T60 times, one for each octave. Once this has been done, the figures tell us at which frequencies we have either too much or too little absorption. Then it's down to pencilling in a trap, a carpet or a few acoustic tiles, and then going through the sums again to see if things are better. Anyone capable of using a spreadsheet program should be able to automate this tedious calculation, but a simple calculator is quite good enough. Earlier in the series I mentioned a software package called *Acoustic X*, by Pilchner-Schoustal (see screen shot, left), that does all this for you. It also contains an extensive library of materials and their coefficients, so it could make the job a lot easier.

One limitation of Sabine's equation is that it assumes a perfectly diffused soundfield, which small rooms invariably don't have, and it also ignores any sound absorption due to the air within the room. That's another good reason why any result arrived at on this basis should be treated as a guide rather than as a rigorous analysis. Acoustic consultants make a good living out of weighing the results of these and similar calculations against reality, then applying their experience and expertise to come up with something that will actually work.

DISTRIBUTED ABSORPTION

It's good practice to try to balance the properties of facing walls, rather than calculating that you need a certain amount of trapping for the whole room and then sticking it all in one place. What's more, tuned trapping designed to combat specific room modes must go on the wall relevant to those modes. For example, if you have a mode which is due to the length of the room, the trapping must go on the end walls, not the side walls. When treating facing surfaces, it's most effective to distribute the absorptive material between them, rather than putting everything on one wall and leaving the other reflective; in the case of side walls, this is essential to maintain a nominally symmetrical listening environment. However, it's not always possible to treat opposing surfaces in exactly the same way, the floor/ceiling pair being the most obvious example. If the floor is carpeted, it will absorb the higher frequencies very efficiently but will hardly affect the bass or lower mid-range at all. One answer might be to mount bass traps in the ceiling to absorb the bass but to reflect back the mid and higher frequencies absorbed by the carpet.

Decisions about where to place absorbers will also be influenced by the underlying philosophy of the room. There are at least two types of LEDE (Live End Dead End) control room, there are rooms that rely heavily on scattering to diffuse reflections, and there are very dead rooms driven by huge monitoring systems. Indeed, there are so many design options that there will be a separate article covering that topic later in the series, so don't start sawing things up just yet. Ultimately, the only real imperative is that the room should work for creating mixes that sound 'right' when played on other systems outside the studio. Indeed, it is sometimes argued that, as most music is listened to in a domestic living room, we should model our control rooms on living rooms, but the reality is that if we're to produce really good recordings, we need a monitoring environment that's a little better than that enjoyed by the listener. Whichever approach you take, the room must be as acoustically symmetrical as possible about the monitor system, and any large windows in the side walls should be

"Ultimately, the only real imperative is that the room should work for creating mixes that sound 'right' when played on other systems outside the studio."

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"Studio design ideals are subject to changes in fashion, and no doubt the current interest in surround monitoring will complicate the issue still further."

▶ balanced by areas having similar acoustic properties on the opposite wall.

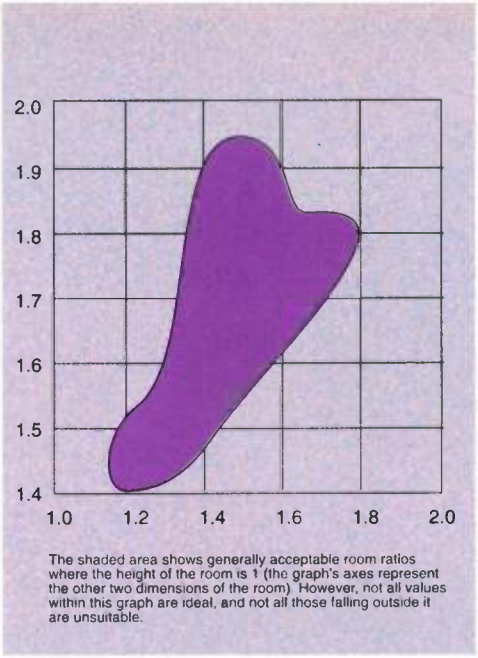
The design techniques are the same for the studio area as for the control room, though you may decide on a longer T60 for the studio, depending on the type of music you wish to record. Speech requires a fairly dry environment, whereas acoustic instruments thrive in a more lively setting.

DOING THE SUMS

Before getting down to working out the trapping for your room, you should decide on the basic room philosophy. Most small studios use a combination of diffusion and geometry to keep early reflections from the speakers away from the listening position, combined with trapping and diffusion on the rear wall, to prevent strong reflections from bouncing directly back to the 'sweet spot'. However, this is not the only approach, and the ideal solution will depend to some extent on the shape and size of your room.

Once you've decided on a layout for your room:

- Check the room dimensions to see if they fall inside Bolt's area (see the graph above, first shown in the July '98 issue, for more details).
- If they don't, plot out your main room modes and find out where trouble spots are likely to occur, so that you can employ some extra trapping if necessary. Even if the dimensions fall inside Bolt's graph, it's a good idea to calculate the room modes anyway, as you can still end up with trouble spots, especially in small rooms where the low-frequency modes are more widely spaced.
- Next, decide very carefully on what floor covering is to be used, as this will have a significant effect on the overall acoustics, due to the large area involved. At this point, you could use Sabine's formula to work out the T60s for the room as it currently is, at the standard frequencies of 125Hz, 250Hz, 500Hz, 1kHz, 2kHz and 4kHz. This will probably reveal an excessively long T60 at 125Hz, though if the walls are hard and reflective you'll probably find the room is very live in the mid-range too.
- With the help of the Sabine formula and a table of absorption coefficients for your room materials, you should be able to arrive at the areas of treatment that will be required to get the T60 close to your target figure at all six frequencies, though don't forget that tuned traps need to go on the walls relevant to the modes they're trying to compensate for. The best way to do this is to calculate how many Sabines you need to provide at each frequency and then distribute them according to the room philosophy and the most dominant room modes. Any surfaces not occupied by doors, shelves, windows, equipment and so on may be used to distribute your acoustic absorbers. Don't panic, though, because in a typical domestic room the amount of acoustic treatment needed isn't usually that great — it's not as if you have to cover all the available wall space with traps.



The shaded area shows generally acceptable room ratios where the height of the room is 1 (the graph's axes represent the other two dimensions of the room). However, not all values within this graph are ideal, and not all those falling outside it are unsuitable.

The procedure of calculating the amount of absorption required at each of the six standard frequencies sounds more complicated than it is, but it can be time consuming. What's more, the result is only going to be an approximation, due to the limitations of Sabine's equation when applied to small rooms, not to mention the uncertain absorption coefficients of various materials. Furthermore, the overall effect of the same area of absorbent material will be different depending on whether the material is concentrated in one place or distributed around the room. As a rule, distributed absorption works more effectively, but careful listening or specialised measurement is the only real way to determine whether you have a successful result.

Next month, I'll take a look at some of the more popular control-room design concepts and explore the roles of room geometry and scattering in producing a practical monitoring environment.

ACOUSTICS IN THE REAL WORLD

Few project studios are professionally designed and, to be perfectly honest, even if you apply the basic formulae to calculate the amount of absorbent trapping you need to add, the results are unlikely to be precisely right. Part of the problem is that materials never seem to behave exactly as their textbook values suggest, and it's also well known that the way in which absorbent material is distributed on the room's surface has a profound effect on the outcome. Even so, a mathematical analysis of the requirements should get you into the right ball-park, though I must emphasise again that the final design should be verified by measurement, after which further adjustments may be needed.

If the thought of wading through a load of calculations fills you with foreboding, don't worry, because there are more empirical approaches to acoustic design that can be applied by following very general and well-proven principles, and these will be covered later. Fortunately, you can tell a lot about the acoustics of a room by listening to speech and music in that room, and even if the design isn't quite as good as you might have hoped for, the human hearing system is capable of compensating for a multitude of sins providing it has some form of reference, such as well mixed commercial music played over the same monitors.

Though you wouldn't go designing a professional studio using only instinct and listening tests, you'd be surprised at how much you can improve the performance of a typical home studio by adhering to a few simple guidelines. One of the reasons why this works is that the smaller monitors used in project studios don't have the same extended bass as the main monitors used in typical commercial installations, so there is less low-frequency energy produced to excite the room where its T60 is longer than might be desirable. In addition, smaller monitors can be used closer to the engineer, so the ratio of direct to reverberant sound is higher, meaning that the room acoustics have less of an effect on the perceived sound.

Small nearfield monitors like Spirit's Absolute Zeros are more suited to the project studio environment than larger speakers typically used in commercial installations.

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Born Again?

KORG TRINITY V3 MUSIC WORKSTATION DRS

Korg have upgraded their well-established Trinity range of sample-based workstation synths with a new board offering the sonic capabilities of a Z1 polysynth. SIMON TRASK discovers if polyphony and additional physical models add new Z1ng to the Trinity concept.

It's now 10 years since Korg kick-started the workstation synth concept with the M1, and they have remained loyal to the idea over the years, gradually enhancing the basic approach through successive ranges. The Trinity workstation range, introduced around two-and-a-half years ago, represents the company's most sophisticated workstation offerings to date — and also the most expandable, with options like the Solo board, fitted as standard in all but the most basic Trinity, which allowed the sonic capabilities of Korg's physical modelling monosynth, the Prophecy, to be integrated into the Trinity's PCM sample-based sound world. Further options allowed the use of flash ROM for the addition of further samples, and there was even optional provision for onboard hard disk recording (for full list of all the Trinity's various incarnations and expansion options, see the box on page 152). Since the Trinity's launch, however, Korg have introduced the Z1 physical modelling polysynth, which offers not only 12-voice polyphony (expandable to 18 voices), but also additional models and multitimbral capability. Now the company are updating their flagship workstation range with a new board which provides Z1-style polyphonic physical modelling capabilities.

GATHERING MOSS: BOARD OVERVIEW

In the updated Trinity range, the Solo board of the Trinity Plus, Pro and ProX models has been replaced by the MOSS (Multi Oscillator Synthesis System, the name that Korg gave to the multi-synthesis technology used in the Prophecy and Z1) board. New Trinity models ready-fitted with the MOSS board are identified by a new suffix: V3. Korg also plan to make the MOSS board available separately as an upgrade option for existing Trinity owners, in which case it will replace the the Solo board where fitted.

The MOSS board doesn't give you an entire Z1, sad to say. It does provide all of the Z1's sophisticated and versatile multi-synthesis capabilities, but you get half the Z1's polyphony — ie. six instead of 12 voices — and no multitimbrality. The reduction in polyphony is because one MOSS DSP board provides six voices and there's only provision for one such board in the Trinity's hardware expansion architecture. The Z1, by contrast, is fitted with two MOSS boards and can optionally be upgraded to 18-voice polyphony with a third board. In Combi and Sequencer modes on the Trinity you can assign a MOSS Program to a single Part only; obviously this means that the Z1's MultiSets (multitimbral patches) have gone. The reason for the reduced spec in this case is that controlling MOSS Programs is the province of the Trinity's CPU, not the MOSS board itself, and handling multiple MOSS Programs and all their attendant live controller possibilities would have been beyond the CPU's processing capabilities. Of course, if you have the Trinity HDR (internal hard disk recording) option or another stand-alone digital recorder, you can work around the lack of MOSS multitimbrality by recording additional parts as audio tracks. While not ideal in the execution, perhaps, it will give you the result you want, namely more than one MOSS instrumental part at a time. With Combi mode's multi-Program keyboard textures, however, there's no way of getting around the limitation; only one Timbre in a Combi can be assigned a MOSS Program.

Also gone are the Z1's multi-effects and arpeggiator, while the ADAT multitrack digital audio interface available as an option on the Z1 is available on the Trinity via its DI-TRI option. The 128 MOSS Programs (half the number on the Z1), which are stored in Bank M, utilise the Trinity's own multi-effects; this commonality of effects processing helps to integrate the MOSS sounds into the Trinity sound world, while the superior quality and greater number and variety of Trinity effects gives the board a sonic edge over the Z1. The Trinity doesn't have the Z1's PCMCIA card slot for instant access to multiple Program banks; however, the Z1 doesn't have the Trinity's built-in disk drive, which ultimately is more flexible, if not as immediate. The Trinity's spacious graphical display and touchscreen make for a far more accessible user interface for editing than does the Z1's much smaller, non-touchscreen LCD. On the other hand, what you don't get with the Trinity/MOSS combination are the Z1's dedicated and assignable front-panel sound parameter edit knobs.

MOSS ARCHITECTURE

Like the Z1, the MOSS board gives you 13 models, or oscillator types. These can be assigned to the two main oscillators of a MOSS Program (also provided are a sub-oscillator and a white noise generator), while the oscillator outputs are routed through a subtractive synthesis architecture with two multimode resonant filters (with low-pass, high-pass, band-pass, band-reject and dual band-pass filter options and a choice of serial or parallel configuration) and an amplifier section. In addition there are four EGs and four LFOs, all freely assignable, and an amplifier EG. The output from the amplifier is then routed through the Trinity's multi-effects section, which has two master effects and up to three or four insert effects, for use with multisample and drumkit Programs respectively, or up to eight insert effects in Combi and Sequencer modes. Plentiful modulation routings are also a feature of MOSS synthesis.

pros & cons

KORG TRINITY V3 £1899

pros

- Rich, full professional sound.
- Combines sample-based and modelling-based synthesis methods.
- Polyphonic modelled sounds.
- More physical models than on the earlier Solo board.
- Very accessible editing via the large touchscreen LCD.
- High quality and large number of insert and master effects.
- Flash ROM and hard disk recording expandability.

cons

- MOSS polyphony is half that of the Z1.
- No MOSS multimbrality.
- 32-voice ACCESS polyphony may be limiting in multitimbral use.

summary

A thoroughly professional workstation synth with an impressive degree of expandability, now significantly enhanced sonically by the new MOSS board.

SOUND ON SOUND

The 13 oscillator types are:

- Standard Oscillator
- Comb Filter Oscillator
- Variable Phase Modulation Oscillator (VPM — Korg's version of FM synthesis)
- Resonance Oscillator
- Ring Modulation Oscillator
- Cross Modulation Oscillator
- Sync Modulation Oscillator
- Organ Model
- Electric Piano Model
- Brass Model
- Reed Model
- Plucked String Model
- Bowed String Model

Of these, the Organ, Electric Piano and Bowed String models and the Resonance Oscillator were only introduced with the Z1, while the single Cross/Sync/Ring Mod oscillator type of the Prophecy and the Solo board has been split into three separate oscillator types on the Z1 and the MOSS board. In addition, whereas the Prophecy and Solo board limit you to preset pairings, the newer instruments allow you to freely combine nine of the oscillator types (the Brass, Reed, Plucked String and Bowed String models can only be used on their own). So, these oscillator types can give you anything from a traditional analogue oscillator ▶

BRIEF TRINITY V3 SPECIFICATION

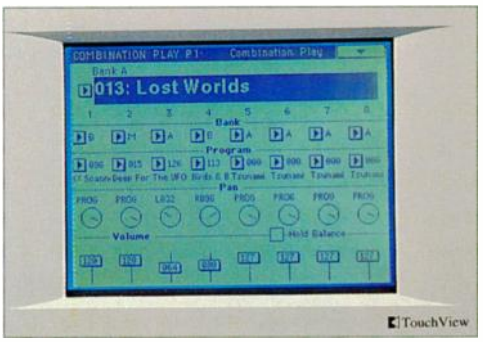
Synthesis Methods:	ACCESS (sample-based subtractive) + MOSS (modelling based subtractive)
Sample ROM:	24Mb
Polyphony:	ACCESS: 32 voices; MOSS: 6 voices
Programs:	ACCESS: 256 (Banks A and B); MOSS: 128 (Bank M)
Combinations:	256 (Banks A and B)
Effects:	100 Inserts, 14 Masters, 2 master effects in all modes, 3 (single/dual) and 4 (drum) insert effects in Program mode, 8 insert effects in Combi and Sequencer modes
Multitimbrality:	8 parts in Combi mode, 16 parts in sequencer mode
Sequencer:	16 tracks, 192ppqn resolution, 20 songs, 100 patterns per song, 80,000-note maximum capacity, Standard MIDI File compatible
Display:	TouchView 320- x 240-dot graphical backlit touchscreen LCD
Disk Drive:	3.5-inch DSDD/HD
Audio Outs:	L/Mono (1) and R (2), 3, 4; headphones
Foot Controller Sockets:	Sustain, programmable footswitch, programmable footpedal
MIDI:	In, Out, Thru

waveform through to a complete modelled instrument as the sound source for a Program; you can then use the multimode filters in the usual manner on these sources, or bypass the filters if you feel the source sound is all you need.

As you have two oscillators, the number and variety of potential oscillator combinations is very large, and so a good way to create new sounds is simply to take an existing Program and try out different oscillator combinations. For further editing, you can stick to the familiar territory of the MOSS board's subtractive synthesis architecture, or you can delve into editing the oscillator types. All Oscillator Type parameters are contained on a single LCD page (selected by pressing the front-panel P2 button), and the large graphical layout presents the parameters in an uncluttered and accessible manner; you can also switch quickly between pages for oscillators one and two using the Osc1 and Osc2 'tabs' at the bottom of the screen, so one moment you can be editing, say, a VPM oscillator and the next a Standard oscillator. For full details of what all these oscillator types have to offer, plus the rest of the Z1 synthesis architecture, I suggest you look back over the original Z1 review, as there's not space here to re-cover all that ground.

TRINITY RECAPPED

The Trinity was also covered at length and in depth in the original two-part *SOS* review and subsequent expansion options review (see box for dates). The focus of this present review is of course the new MOSS board, so here I'll provide an overview of the Trinity and its various options. Korg's flagship workstation range brings together the usual workstation ingredients of sample-based subtractive synthesis, multi-effects, an onboard 16-track sequencer, an LCD-based user interface, and a built-in 3.5-inch floppy disk drive; but like gourmet restauranteurs, the company have used only the very best ingredients, presented in a smart and stylish way. So you get high-quality 48kHz samples, a generous 24Mb sample ROM, the company's most sophisticated sample-based synthesis system



The Trinity's touch-sensitive LCD screen makes parameter editing easier than on the Z1.

(see the 'ACCESS All Areas' box for more on this) and multi-effects processing to date, and a rich visual interface complete with touchscreen access (as, er, touched on earlier). Korg have also added some special features to their menu, in the form of several additional boards which help to give the Trinity a special flavour by significantly expanding its sonic palette and recording capabilities.

The Trinity lags in the polyphony stakes, with just 32 voices where 64 is commonplace nowadays (even on less expensive Korg workstations and modules); Korg's argument here has always been that they chose to concentrate on getting the best sound quality and responsiveness rather than wringing the maximum number of voices out of the processor, and it's hard to argue with the results of that choice.

Combis have been a staple of Korg's workstation synths ever since the M1. These are patches which let you combine up to eight Programs in keyboard note and velocity split/layer textures or up to eight-part multitimbral configurations, or combine the two approaches — you could, for instance, have a couple of parts split on the keyboard for live performance and at the same time sequence additional parts from an external sequencer. A Combi has eight Timbres, each of which can be assigned a single Program; you can combine ACCESS and MOSS Programs, though of course you can use only one of the latter at a time.

The sequencer gives you 16 tracks (plus four audio tracks if the HDR board is fitted) and provides an accessible and fairly flexible recording and editing environment — though, like most keyboard-based sequencers, it doesn't match the approach or complexity of a computer-based one, despite the large graphical display. Overwrite, overdub, auto punch-in, manual punch-in and loop real-time recording modes and step-time recording are provided, and you can edit at event and bar levels in the usual manner.

Although you can use up to eight Insert effects in Combi and Program modes, the total number depends on the 'Size' of each selected effect; a slightly misleading term, it is actually a measure of the DSP power required to run each effect (the larger the Size, the more complex the effect). The Trinity can run any effects together provided the total Size does not exceed eight. There are three effect Sizes: one, two and four, but in all, 28 of the 100 available Insert effects are size one, so there's a lot of scope and variety. Not only does the Trinity give you one of the most generous and versatile

ORIGINAL *SOS* REVIEWS

- Trinity and Trinity Plus — December 1995 and January 1996.
- Trinity expansion options — January 1997.
- Z1 — October 1997.

V3 SOUNDS

The M Bank Programs which come with the Trinity V3 show that MOSS sounds integrate well into the Trinity sound environment while also enhancing the workstation's sonic versatility and providing a special kind of sonic responsiveness in performance, notably with the physical instrument models. While the 128 MOSS Programs provide a fair introduction to the quality, character, scope and versatility of MOSS synthesis, it doesn't take much editing to realise that MOSS has plenty more sounds to offer. To my mind the polyphony, extra models, and flexibility in combining oscillator types provided by the MOSS board really open up the sonic capabilities and broaden the performance possibilities of MOSS synthesis — even if the six-voice polyphony tends to be something you have to 'play within' with the likes of pads, organs and electric pianos.

THAT RANGE IN FULL — TRINITY TYPES & EXPANSION CARDS

- Trinity — 61-key synth-action keyboard
- Trinity V3 — 61-key synth-action keyboard + MOSS board
- Trinity Pro V3 — 76-key semi-weighted keyboard + MOSS board
- Trinity ProX V3 — 88-key fully-weighted keyboard + MOSS board

(The Trinity Plus model of the pre-V3 range has been renamed Trinity V3)

OPTIONS

- PBS-TRI (PlayBack Sampler) — sample playback/flash ROM (8Mb)
- HDR-TRI (Hard Disk Recorder) — two-track digital audio recording and four-track playback, SCSI port, S/PDIF stereo digital interface
- SCSI-TRI — SCSI port for connecting hard, optical and CD-ROM drives to the Trinity if you don't have the HDR option
- DI-TRI (Digital Interface) — ADAT digital interface for multitrack digital audio transfer (four tracks)

The following Korg sample sets are available for the PBS-TRI board: Orchestral, Mega Piano (SG ProX piano samples), Dance Waves and Drums, and M1 (the M1 sample ROM). These cost £35 each; the first three sets are 8Mb in size, the fourth 4Mb.

In addition, there are three newly available sets originating from Italian Korg distributor Korg.net: Bass and Drums (18 acoustic drum kits, 8 acoustic and electric basses), Groovebox (sampled drum loops, sub basses and so on), and Brass (mainly solo saxes).

These cost £65 each, and include an interactive 'Click 'n' Play' CD-ROM-based manual. All three sets are 8Mb in size.

All seven sample sets come on multiple floppy disks, which makes for slow loading, but once the samples are in the PBS-TRI flash ROM you can save them to a hard drive if you have the SCSI or the HDR option fitted.

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▶ collections of effects available on a workstation, but the quality of the effects is of a high standard.

The optional PBS-TRI board gives you 8Mb of flash ROM, allowing you to store up to 500 samples, 200 drum samples and 100 editable multisamples (sample keymaps) for use with the ACCESS Programs and Drumkits. You also get an additional 256 Programs and 256 Combis (Banks C and D in each case) and 12 additional Drumkits. Maximum individual sample size is 2Mb (there are 4 x 2Mb chips). A PBS-enabled Trinity can read Akai S1000 and S3000 CD-ROMs directly, and can load individual samples off floppy disk in the widely-used AIFF and WAV formats. For CD-ROM reading and hard disk storage convenience you'll need a SCSI interface. Rather than buy the £199 SCSI-TRI board, it makes more sense to get the £399 HDR-TRI hard disk recording board, which also provides a SCSI interface. With this board and a suitable hard drive (fixed or Jaz/Syjet removeable) you can record two audio tracks from analogue or digital inputs, and play back up to four tracks. You can also record the Trinity's master audio output internally, which is the way to build up multiple MOSS parts. Finally, the optional DI-TRI board provides an ADAT optical interface and word clock input for synchronised four-track digital audio transfer to another ADAT-compatible device such as Korg's 168RC digital mixer.

CONCLUSION

The MOSS board continues Korg's approach of bringing added value to the Trinity range through hardware-based expansion, in this case improving on the workstation's existing, Prophecy-based MOSS functionality by introducing polyphony and extra physical models as found on the company's Z1 polysynth. To my mind these features make the new MOSS board a valuable development for the Trinity environment, and Korg deserve credit for further enhancing the workstation for new and existing owners alike. At the same time, the lack of full Z1 polyphony and the absence of the Z1's MOSS multitimbrality show that there are limits to the Trinity's expansion capabilities; also, the absence of the Z1's sophisticated polyphonic, polyrhythmic arpeggiator may be disappointing to some, while the switch to Trinity effects for the MOSS sounds will require some readjustment in thinking for Trinity owners used to the dedicated multi-effects functionality of the Solo board (though the superior quality and variety of the Trinity's effects make it a pleasant switch). Solo board owners will be glad to know that they can get a free disk which contains the Prophecy/Solo factory sounds reprogrammed for use in the Trinity V3 environment.

While the MOSS board provides the full synthesis functionality of the Z1, then, it's best to think of the Trinity V3 and the Z1 as two different instruments for different applications. Basically, the MOSS board smoothly integrates Z1 sounds and editing functionality into an existing self-contained production environment centred on sample-based sounds, while the Z1's orientation is as a performance synth (though of course it can be used in a production setting, particularly with its MIDI multitimbrality). If you want up to 18 voices of polyphony, the ability to combine up to six MOSS sounds either in keyboard split/layer textures or multitimbrally via MIDI, and the immediacy of front-panel knobs, plus a rather neat arpeggiator, then the Z1 is the instrument for you. However, if the sophisticated and sonically well rounded sample-based production environment offered by the Trinity is more to your liking, and you're happy with using single MOSS Programs or laying additional MOSS parts to tape or disk in production, then the Trinity V3 is the instrument to look at. The Trinity is one of the best workstations on the market, and certainly the most expandable with its hard disk recording option, while the new reduced price of £1899 for the Trinity V3 (compared to £1999 for the Trinity Plus with its less sophisticated Solo board) makes it all the more appealing. The Trinity itself has also been reduced in price, to an impressive £1499 down from £1799, putting a top-quality professional instrument (which cost £2395 when it was first launched) firmly into the mid-range price bracket.

The first Trinity V3s are expected to ship during September, though in limited quantities, with production ramping up for bigger October shipments. Meanwhile, for existing Trinity Plus, Pro and ProX owners, the polyphony, extra models and freer configurations of the MOSS board make an upgrade from the Solo board worth considering — while owners of the base model Trinity should scrap any plans to add the Solo board and go for the MOSS board instead. Unfortunately, neither availability nor pricing of the new board could be confirmed by Korg UK at the time of going to press, though clearly it will cost at least the difference in price between a Trinity and a Trinity V3. SOS

info

E Trinity £1499; Trinity V3 £1899; Trinity Pro V3 £TBA; Trinity ProX V3 £TBA; PBS-TRI £399; HDR-TRI £399; SCSI-TRI £199; DI-TRI £99. All prices include VAT.
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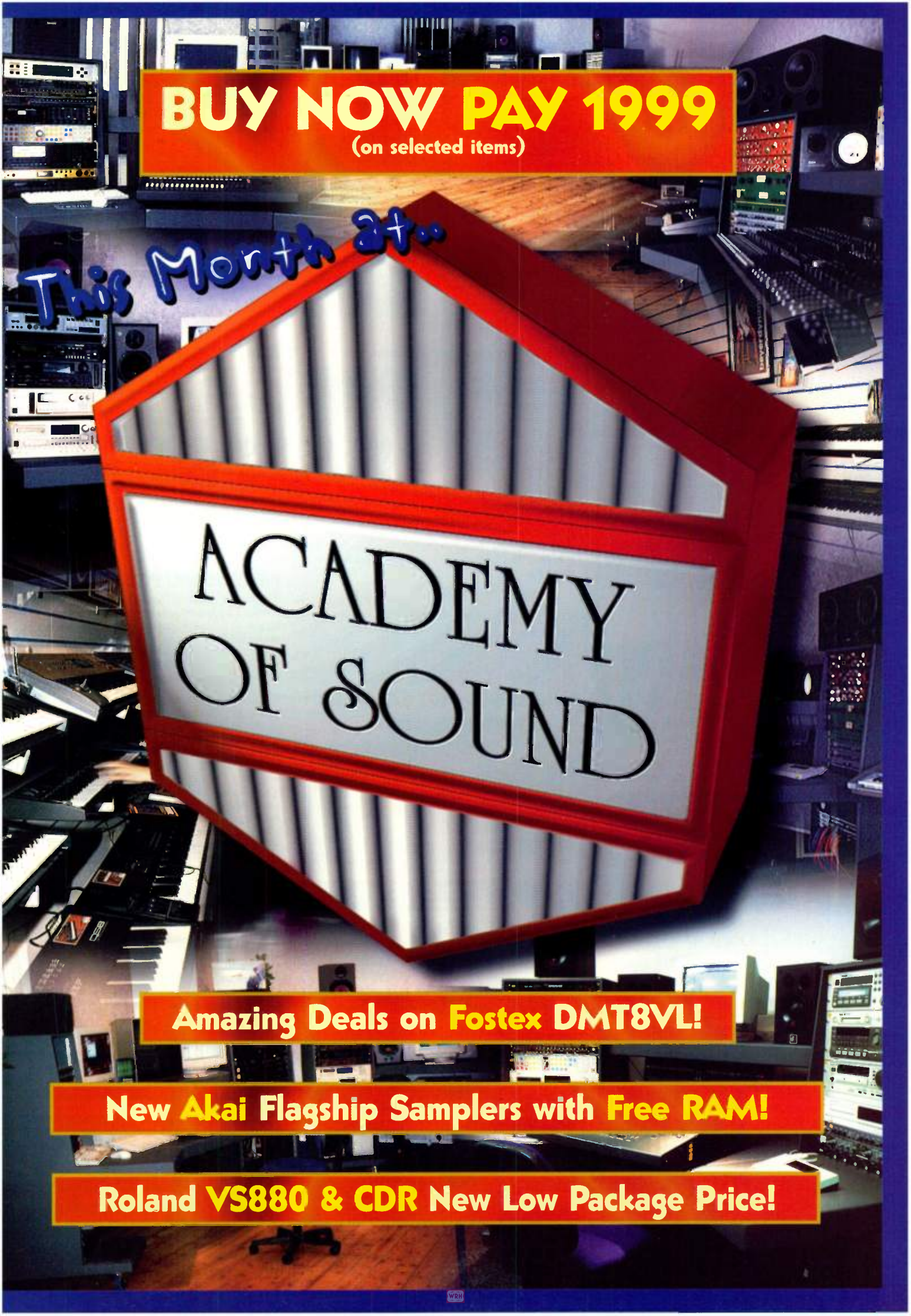
Each ACCESS oscillator is routed through its own filter section, which actually consists of two filters (A and B) that can be set to parallel, series, single (A only) or thru configuration. The filters are multi-mode resonant, with a choice of low-pass, high-pass, band-pass and band-reject filter types. Each oscillator and each oscillator's filter pair has its own EG and LFO, and of course there's an EG and an LFO for the amplifier section. Plentiful modulation routings are also the order of the day. All in all, ACCESS is a very versatile synthesis architecture, while the sound quality is impressively rich and smooth.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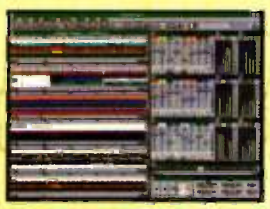

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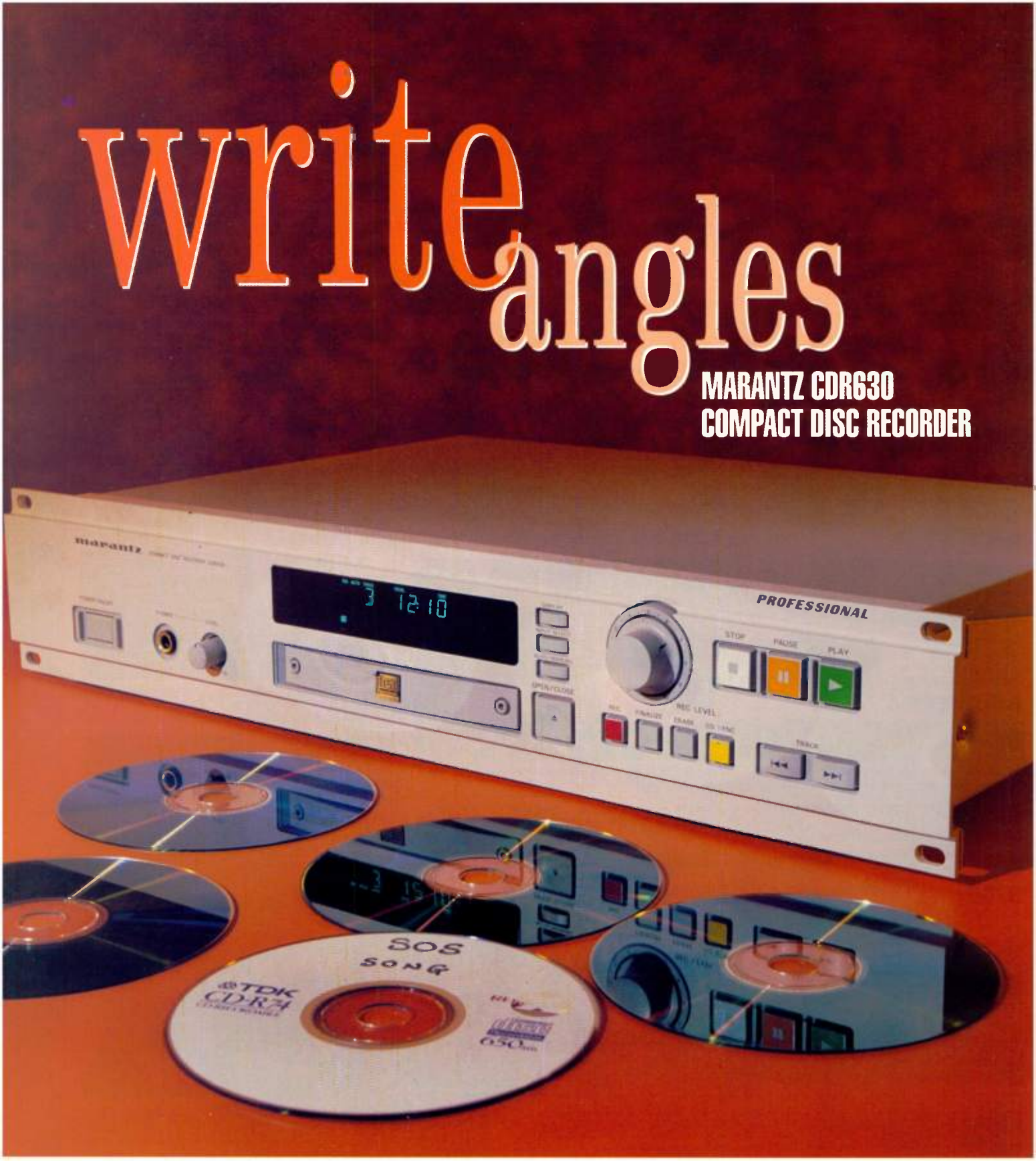


Thanks to the falling cost of CD-ROM recorders, most people interested in recording music at home can turn out their own audio CDs on their own computer, as well as using the drive to back up conventional computer data or audio files from a hard disk recording system. The majority of new CD-ROM drives will also work with CD-RW (or CD-Rewritable) discs, and when you consider that such a drive might cost under £250 the proposition looks very attractive, compared with stand-alone audio CD recorders costing three or four times as much. What's more, a computer drive will normally write a disc at four times normal speed, whereas a stand-alone CD recorder always works in real time, so at first glance the computer-based CD-ROM drive wins hands down. After all, why pay anything up to £1000, or even more, for a box that can only record audio (and only in real time at that), when for a quarter of the price you can record audio or computer data on to the same discs in a quarter of the time?

A QUESTION OF SPEED

The answer can be found in the fable of the tortoise and the hare, because although a computer drive is both fast and versatile, you generally have to spend a long time loading audio to disk and messing around with software before you can start to burn your CD. Whereas a stand-alone recorder can be used in much the same way as a cassette deck or DAT machine, a computer-based system expects you first to record all your audio material to a hard drive as separate audio files. Then you have to arrange these files (in the case of an album each track would be a file) in a playlist and specify the gap length between the tracks before you can start to burn your CD. If your experience is anything like mine, you also have to create a disk image file of the completed album, in order to get reliable copies. If you're lucky, it's plain sailing from there on, as the drive will record a typical CD album in around 15 to 20 minutes, but if you didn't make that disk image first you could be unlucky and fall foul of the dreaded buffer under-run error. This leaves you with nothing but an expensive coaster to show for your troubles.

A typical stand-alone CD recorder can't record computer data (although some of the more expensive models can) and everything happens in real time, but their strong point is that you can start recording almost as soon as you've connected the cables from the source machine. If you're recording from an analogue stereo master, or from a CD that has a particularly stubborn copy-protection flag, you can go in via the analogue inputs, but if you have a digital master, from a DAT machine or Minidisc recorder, you can take a digital feed from the source and record without even having to check the levels. Better still, most decent CD recorders can turn DAT start IDs into the corresponding CD track start IDs that form part of a CD's vital PQ coding. Fine-tuning the song start IDs on a DAT tape is a relatively simple task, and it's easy to verify that everything is correct before you burn your disk, so in theory it's a straightforward matter to go from master tape to master disc, without having to pass through the expensive coaster stage!

On the convenience and simplicity front, then, stand-alone CD recorders look pretty good, but before you get carried away there are a couple of other factors to consider. Firstly, there are two kinds of stand-alone CD recorder: the consumer model and the professional model. Consumer models are cheap but they can only record on to consumer blank discs, and these discs include a copyright levy, on the assumption that consumers will be recording commercial CDs or material from the radio rather than making up their own tunes. If you're making your own music and you buy a consumer machine, you're paying a copyright fee to existing artists every time you record your own material — think about it!

A blank disc for a professional recorder costs around £1, whereas a consumer disk costs over £3 — not an insignificant difference. Put a professional CDR blank into a consumer machine and it won't recognise it. Professional machines, on the other hand, can record on to either type of disc, though there's no reason to use expensive consumer discs unless you're desperate and they're all you can get hold of at short notice when an urgent job comes up.

DISC GUISE

The Marantz CDR630 is probably the least expensive machine of its type on the market that records on to the low-cost, professional CD-R blanks. It can also record on CD-RW, the rewritable equivalent, though most current hi-fi CD players aren't able to play these disks. However, it is expected that a number of new CD models will appear later this year that can replay CD-RW, which means that you could compile an album on CD-RW, check it thoroughly for problems, then use it as the master in a regular CD player to make further perfect digital copies via your CDR630. As things stand at the moment, though, CD-RWs tend only to play in CD recorders and CD-ROM drives, so if you're in the market for a new CD player as well, it might be wise to ask about CR-RW compatibility.

These days there are several ways of going about recording your own CDs. PAUL WHITE gives this new Marantz professional stand-alone model a spin and discovers a few advantages over using a computer and CD-ROM drive.

Packaged in a 2U rackmount case, the CDR630 is equipped with both balanced (XLR) and unbalanced (phono) analogue inputs, as well as both phono and optical S/PDIF digital I/O, though as you might expect, given the low price of the machine, there's no AES/EBU digital interface. The front panel is very simple, with only eight buttons over and above the usual transport and power buttons, and an infra-red remote controller is included with the package, along with mains, phono and S/PDIF coax leads. Most of the general descriptions relating to stand-alone CD-R recorders apply to this machine, including the 'auto stop after silence' function (see the 'Silent Scream' box), which in this case gives you 20 seconds before pulling the plug. This setting cannot be changed, and the same is true for the the auto track ID mode, which looks for a three-second period where the signal level is below -50dB.

When you're recording digitally, this can be directly from a 44.1kHz source or you can switch in a sample-rate converter to handle other rates. If the sample-rate conversion is switched off, the source sample rate must be accurate to better than 100 parts per million, otherwise the recording will either refuse to start or may stop part-way through. Some systems have automatic sample-rate conversion that only comes in when needed, but because sample-rate conversion can introduce audible (though usually subtle) side effects, it's good to be able to be sure that it's switched off when you don't need it. When recording from a commercial CD via the digital input, pressing the CD Sync button once will record one track at a time and then stop, while pressing it twice will record the whole album. Recording commences as ▶

pros & cons

MARANTZ CDR630 £749

pros

- Affordable.
- Includes switchable sample-rate conversion.
- Choice of balanced or unbalanced analogue and optical or coaxial digital inputs.
- Uses low-cost professional CD-R media.

cons

- Auto switch-off after 20 seconds of silence can't be adjusted or overridden.
- Auto track ID threshold and time are non-adjustable.

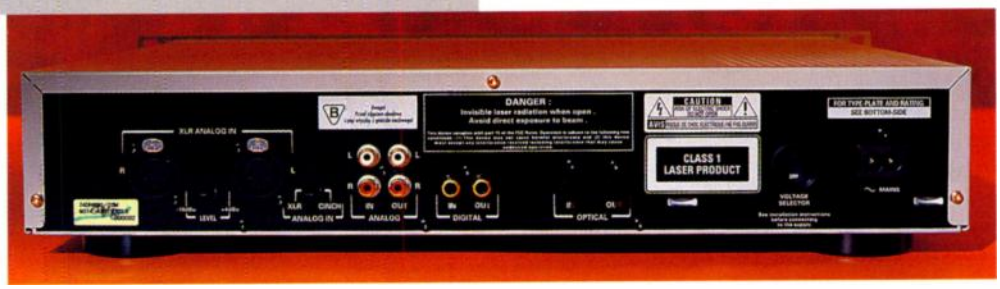
summary

The CDR630 is a low-cost, easy to use CD recorder that does what's asked of it with no fuss.

SOUND ON SOUND

Marantz CDR630

"The Marantz CDR630 is probably the least expensive machine of its type on the market that records on to the low-cost, professional CD-R blanks."



SILENT SCREAM

All the self-contained CD recorders I've tried include a system that switches off recording whenever the input is silent for more than a given number of seconds — usually between six and 20 seconds depending on the make and model. This prevents the recorder from continuing to record minutes of blank material at the end of an album, but it does mean that long gaps between tracks on an album, or very quiet pieces of classical music, can cause the machine to turn off — and there's no way around this. I had a recent mastering job where the client wanted a 30-second gap between the last two tracks on the album, but when I referred the disc copying to a friend with a stand-alone machine, there was absolutely no way he could do the job. Whatever he tried, the recorder switched itself off before the last song started to play. In the end I had to do the job myself, using Digidesign's *Masterlist CD*, which did the job perfectly, but it took quite a while to compile the album and create a disk image before I could produce a CD copy.

If any manufacturers are reading this, please provide a means to disable this function, and also the facility to halt recording automatically at a specific start ID. That way you could create a fake track directly after the last track on your DAT master tape to stop the recording in the right place.

Another silence-related issue is the means by which recorders insert track IDs when the source isn't digital. You can either sit there manually and enter them as you need them or you can select a manual mode that inserts a new start ID after more than two or three seconds of silence. This sounds fine in practice, but if you're trying to record an old vinyl album you may find that either the track gaps aren't long enough to register a new start ID, or the background noise between tracks prevents the recorder from ever recognising a silence.

soon as a CD track start ID is recognised, and these IDs are transferred to the recorded disc.

Once a recording has been made, the disc must be finalised to create a table of contents before it can be played on a regular CD player, but before that time it can still be played back, and new material added using the CDR630. Finalising takes just a few minutes. Note that if you want to erase a a CD-RW disc once it has been finalised, you have to erase the whole disk. Prior to finalising, it's possible to erase backwards from the last track recorded.

IN USE

Making recordings with the CDR630 is as simple as selecting the correct input source, setting 44.1kHz or sample rate conversion (in the case of a digital input), and then deciding on whether to use a manual or automatic mode of entering track start IDs. Levels can be monitored on the bargraph plasma meters prior to recording (only necessary when making analogue recordings) and then you can sit back and wait for your CD to finish cooking. If you're recording in 'track at once' mode, you can play back the partially complete disc on the CDR630, but to make the disk playable on your hi-fi you have to set your recording in stone by pressing Finalise, quickly followed by Record. After this step, no more recording is possible, and as mentioned earlier, even CD-RWs must be completely erased once they've been finalised, if you want to re-use them.

The sound quality of recordings made via the analogue inputs is comparable with that obtainable from a good DAT machine, while using the digital input should not affect the sound in any way — I certainly couldn't tell the difference between an original commercial CD and a digital clone (made purely in the interests of science, you understand!). All essential functions can be carried out without the remote control, the latter offering a number of repeat and program modes of the type that are often fitted to hi-fi CD players and seldom used. Up to 20 tracks can be programmed to play in any order.

DISC CUSHION

Though stand-alone CD recorders are a little restricted in what they can do, they still offer a self-contained, straightforward means of making low-cost audio CDs from either digital or analogue sources. This is important in a small commercial studio, as the CD recorder can get on with the job of making copies for the client while the engineer continues to make use of the computer in the studio. High-cost machines may have a few more bells and whistles than the Marantz CDR630, but in reality it has all the features you need to make CDs from DAT masters, open-reel tape, or just about any other source.

CD recorders have got past the stage of being glamorous devices, but they do complete the audio chain from musical conception to finished product, and with recordable blanks available for well under £1 each if bought in quantity, producing your own limited CD release for sale at gigs or over the Internet is no longer an expensive dream. Indeed, making CDs is now cheaper and more convenient than producing cassette copies.

At the moment, the Marantz CDR630 is the most cost-effective stand-alone CD recorder that can use low-cost professional media, and though the CD-RW side of things may seem of limited use at the moment, all that will change when the next generation of CD-RW compatible hi-fi players comes along. SOS

info

£ £749 including VAT.
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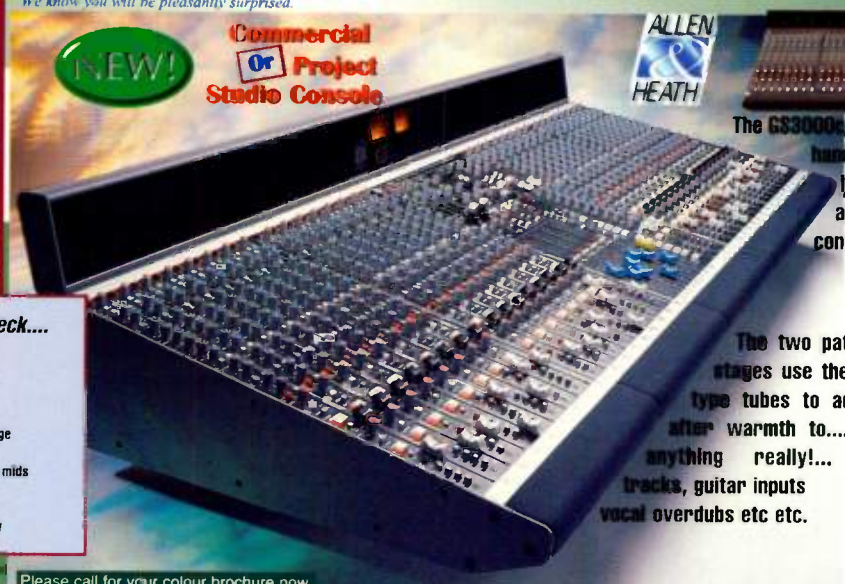

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Main picture: 02R + meterbridge

01V 03D

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LEXICON PRICE GUIDE

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ADAT TYPE II Price Guide

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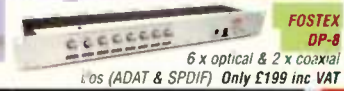

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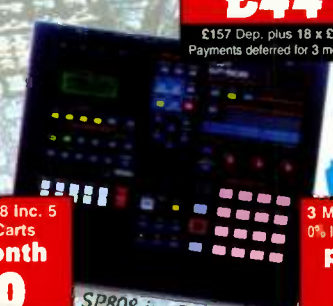

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HARD CHOICES & SOFT OPTIONS

PART 3: What do you need to put together to create your own studio? PAUL WHITE investigates practical options for a core system based on preferred methods of creating music.

CHOOSING A RECORDING SETUP

Over the past two issues, I've looked at the various recording options available, both analogue and digital, as well as touching on some aspects of digital mixers. Now it's time to put the various bits of equipment together to form practical systems.

At this point, it's also interesting to identify what support equipment is needed before your core system can actually function as a recording studio. For example, if you've decided to build your studio around a computer-based MIDI sequencer, you'll still need a MIDI interface of some kind as well as sound modules and some way to mix them — that's unless you're happy to stick with whatever the computer's internal soundcard offers.

But no matter what type of system you go for, you're going to need a monitoring system and a stereo master recorder. So rather than repeat what I've already said in the first two articles, I'll take it for granted that you have allowed for monitoring and mastering in your budget.

THE MIDI-ONLY STUDIO

Possibly the simplest studio setup of all is one where all the sound sources are controlled by MIDI and where any snatches of 'real' audio that are required come from a sampler. Here the choice is between a hardware sequencer and a computer sequencer. Computer-based systems are undeniably the most powerful, and the majority support MIDI interfaces with several ports so that you aren't limited to 16 MIDI channels. On the other hand, the systems are more difficult to learn, computers make a certain amount of physical noise, and, of course, software has a habit of crashing now and then.

Which approach is most appropriate to your working method is a matter of personal choice. The greatest practical difference between hardware and software sequencers is the ability to support multiple MIDI ports — an essential prerequisite if you have more than two multitimbral synths. Another important factor is that computer-based systems also offer a number of powerful editing features that make life easier for the less technically adept player (in other words, people like me!). While editing is quite possible on hardware sequencers, it generally tends to be less sophisticated and more long-winded to implement.

This is not the place to air the Mac v PC argument, but it is worth noting that Windows 95 can only support a maximum of 11 MIDI ports — and that's counting any 'virtual port' drivers that may have been installed along with your soundcard. If you have more than 11, the system will crash. Macs can, I believe, support up to 128 MIDI ports, though I don't know of anyone who has tested this limit.

PC users have the option of using external synths and modules or using the sounds from their soundcards. For serious use, the Yamaha XG cards are the only low-cost options we at *SOS* have tried that provide anything like professional results. If you're happy with your soundcard, then all you need to do is plug its output into a hi-fi system for monitoring and mastering, install your choice of sequencing software, and you're away. An ▶

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Paul Nagle, Sound On Sound, April 1998.

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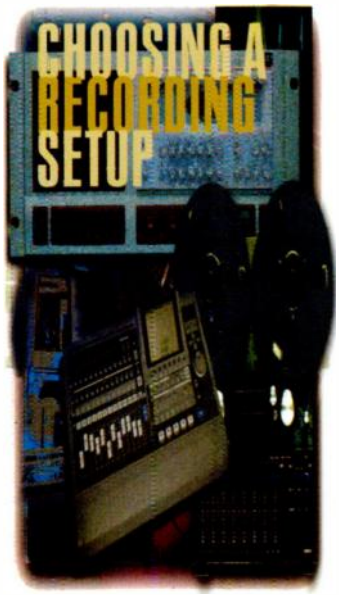

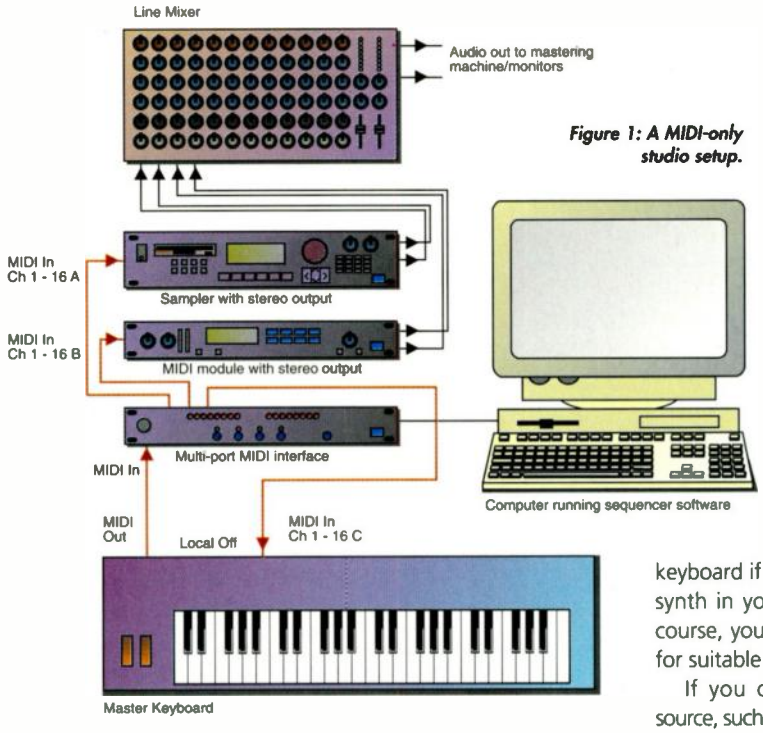

Figure 1: A MIDI-only studio setup.

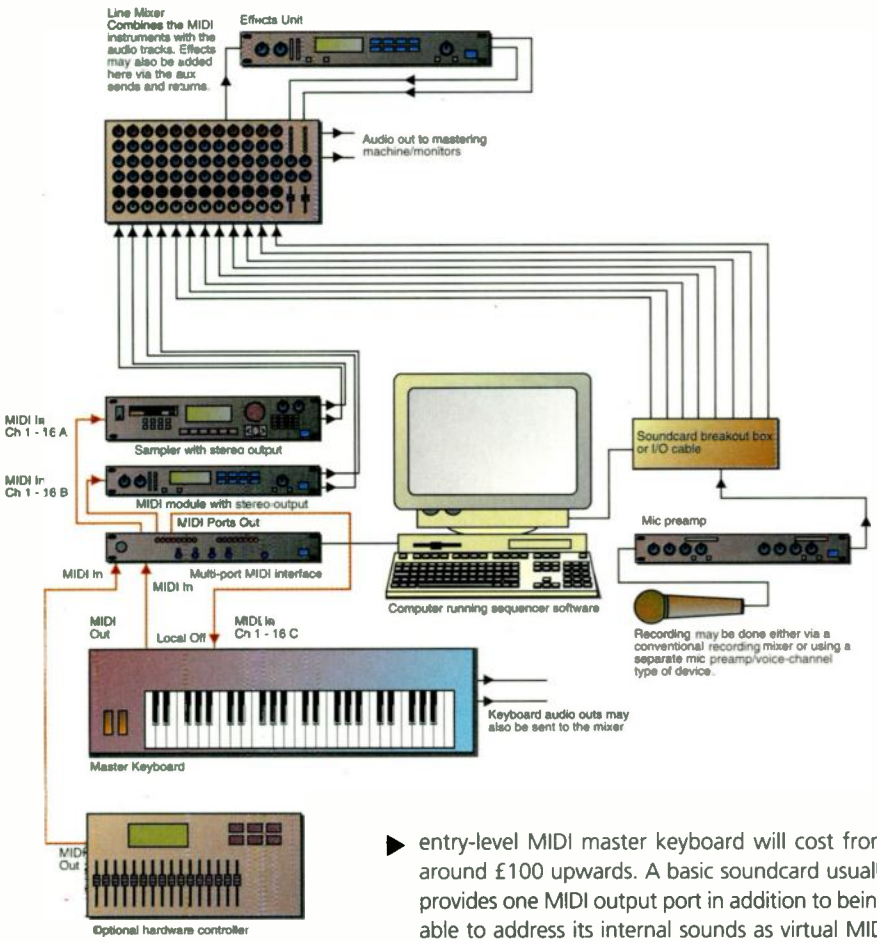

Figure 2: A recording setup based around a MIDI + Audio sequencer.

keyboard if you don't have a MIDI synth in your collection). And of course, you'll also have to budget for suitable software.

If you only have one sound source, such as a card or multitimbral synth, then you can record the output directly to cassette, DAT, MiniDisc or whatever takes your fancy. That then is your master. However, most MIDI studios comprise a number of modules, which may include samplers, synths and drum machines. As soon as you get two or more sound modules, you'll need some way to mix the various sounds together, so an external mixer becomes a prerequisite. This is the most likely scenario for a MIDI studio and a block diagram is shown in Figure 1, above. Though dedicated keyboard line-level mixers are available, if you don't have too many sound sources to mix, a simple 8:2 or 12:2 analogue mixer will work fine, but always try to have enough spare inputs for future expansion. In a larger system, a digital mixer may offer more controllability and the possibility of automation, but as most serious MIDI sequencers provide for MIDI control of volume, pan and other synth parameters, you can automate your mixes to a certain degree without having to buy an automated mixer.

MIDI + AUDIO ON COMPUTER

With powerful programs such as *Cubase VST*, *Logic Audio* and *Studio Vision* for both PC and Mac, it's tempting to go for the 'whole-studio-in-a-box' approach. The pros and cons of this approach have been discussed in the preceding parts of this series, but the main negative points are the restrictions on simultaneous processing due to available computing power. This is alleviated to some extent if you choose a system that has its own DSP capacity, such as Digidesign's Pro Tools. The physical noise of computers and hard drives can also be a problem when you're recording audio in the same room as the equipment. And, of course, you have to do all the mixing by mouse unless you buy a hardware interface, such as a MIDI fader controller.

If you're happy to mix and process entirely in the virtual world, and you only need to overdub one or two tracks at a time, then you only need a soundcard with stereo ins and outs. If you wish to ▶

▶ entry-level MIDI master keyboard will cost from around £100 upwards. A basic soundcard usually provides one MIDI output port in addition to being able to address its internal sounds as virtual MIDI ports, so if you need more, you'll need to budget for an external multi-port interface.

Mac users have fewer options when it comes to sounds inside the computer, though some of the software synths available are quite impressive. For serious work, you're going to need an external MIDI interface — ideally one with multiple ports to allow for future expansion — and one or more synths and/or modules (and a separate MIDI

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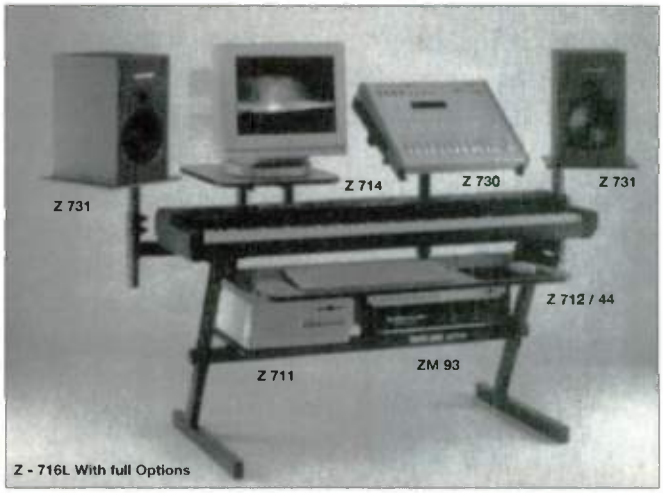

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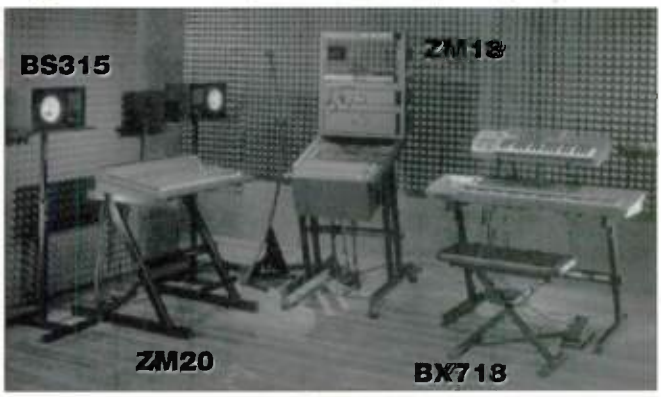

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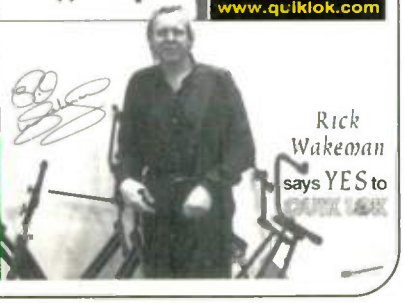
Rick Wakeman says YES to

record several tracks at a time, a multi-input/multi-output card or external breakout box is essential. ADAT users (or those with ADAT-compatible digital mixers) also have the option of buying cards with an ADAT optical interface so that the converters in the ADAT can be used during recording. This arrangement also allows data to be passed to and from an ADAT in the digital domain, which opens up a lot of new editing possibilities However, you will need a sync box for the ADAT, such as a BRC or a JL Cooper DataSync.

A basic system will need a MIDI interface, ideally with multiple ports, and an external mixer to combine the digital audio with the outputs from your MIDI modules. The system illustrated in Figure 2, on page 168, shows an eight-output soundcard — this offers more flexibility when it comes to adding external effects via your mixer. Because virtual reverb tends to take up a lot of processing power, it can be beneficial to employ an external hardware reverb processor. A similar wiring arrangement is used if you run a system such as Soundscape, SADiE or Pro Tools that provides dedicated hardware to relieve the computer from the full burden of hard disk recording, mixing and processing. A MIDI hardware control surface is also a worthwhile addition, hence its inclusion in the diagram.

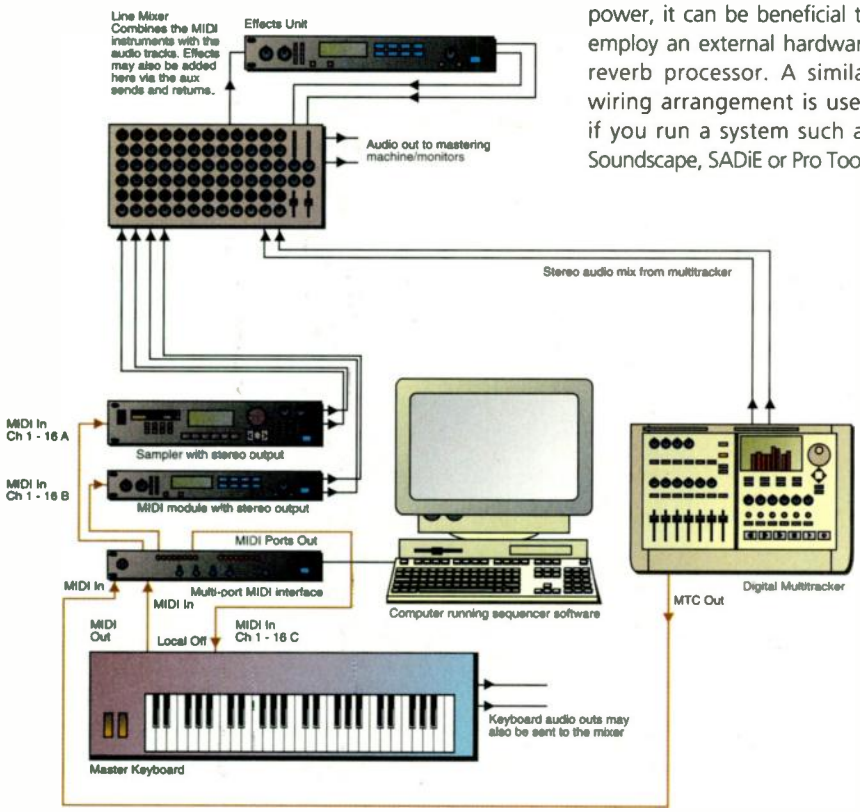

Figure 3: A setup in which MIDI sequencing is handled by computer, but audio recording is done on a separate digital multitracker.

MIDI SEQUENCER PLUS TAPELESS RECORDER

Letting your computer handle all the hard disk recording as well as MIDI sequencing can be problematic — we frequently get queries from users experiencing system crashes or drifting audio timing. A practical alternative is to use a separate hardware recorder, either in the form of a stand-alone hard disk recorder, or one of the new generation of digital multitrackers. The sequencer can then be slaved to the recorder using MTC.

Working this way means your computer isn't involved in the audio side at all, so MIDI timing is likely to be tighter. However, you can't use software-based effects. If you have only one or two MIDI modules, then a digital multitracker makes a lot of sense because there will probably be four or more inputs free at mixdown to handle your MIDI instruments. If you need more inputs for MIDI instruments, you could use a small line mixer, then feed the output of that into two of your multitracker inputs. Alternatively, pick a stand-alone recorder and an external mixer for maximum flexibility, especially if you already have a number of effects units and signal processors.

To get the best of both worlds, you could go for a stand-alone model such as the Akai DR8 or DR16 that can also be accessed via the audio part of your sequencer package. This will let you use the simple hardware interface for recording, but then you can retreat into the virtual world of your computer for editing.

Apart from taking the load off your computer, there are some very real advantages to using hardware recorders, not least of which is that most are somewhat quieter than computers. When recording critical audio parts, you can make a rough mix of your MIDI backing on one or two tracks of the recorder, shut down the computer and overdub just as you would when using a tape machine. When you're done, switch on the computer and you can mix all those virtual MIDI tracks with complete freedom.

Another major advantage of hardware-based systems is that they generally handle punch-ins and outs better than computer systems. The musician working alone generally needs a footswitch for hands-off, real-time punch in and out — something that most computer systems just don't give you. You have to be careful when choosing your external hardware because while some will let you punch in and out on the fly as many times as you like, others will only let you punch in and out once before you have to stop the recorder. For me, the former facility is essential for patching up vocal takes. Some computer systems will only let you punch in and out if you pre-program the punch points, then run the whole process automatically. I have to say that I've never in my life been tempted to use an auto-punch-in/out system — doing the job manually is just as easy and much, much faster. Figure 3, left, shows a system based around a computer sequencer and a digital multitracker with a small line mixer used to mix the MIDI instruments. A system using a dedicated hardware recorder and an external mixer gives the same flexibility as an all-in-one, disk-based studio, but gives you the benefit of greater flexibility in the way that external effects and processors can be connected. SOS

Next month, I'll be touching on both digital and analogue tape-based systems as well as looking at ways of using digital mixers.

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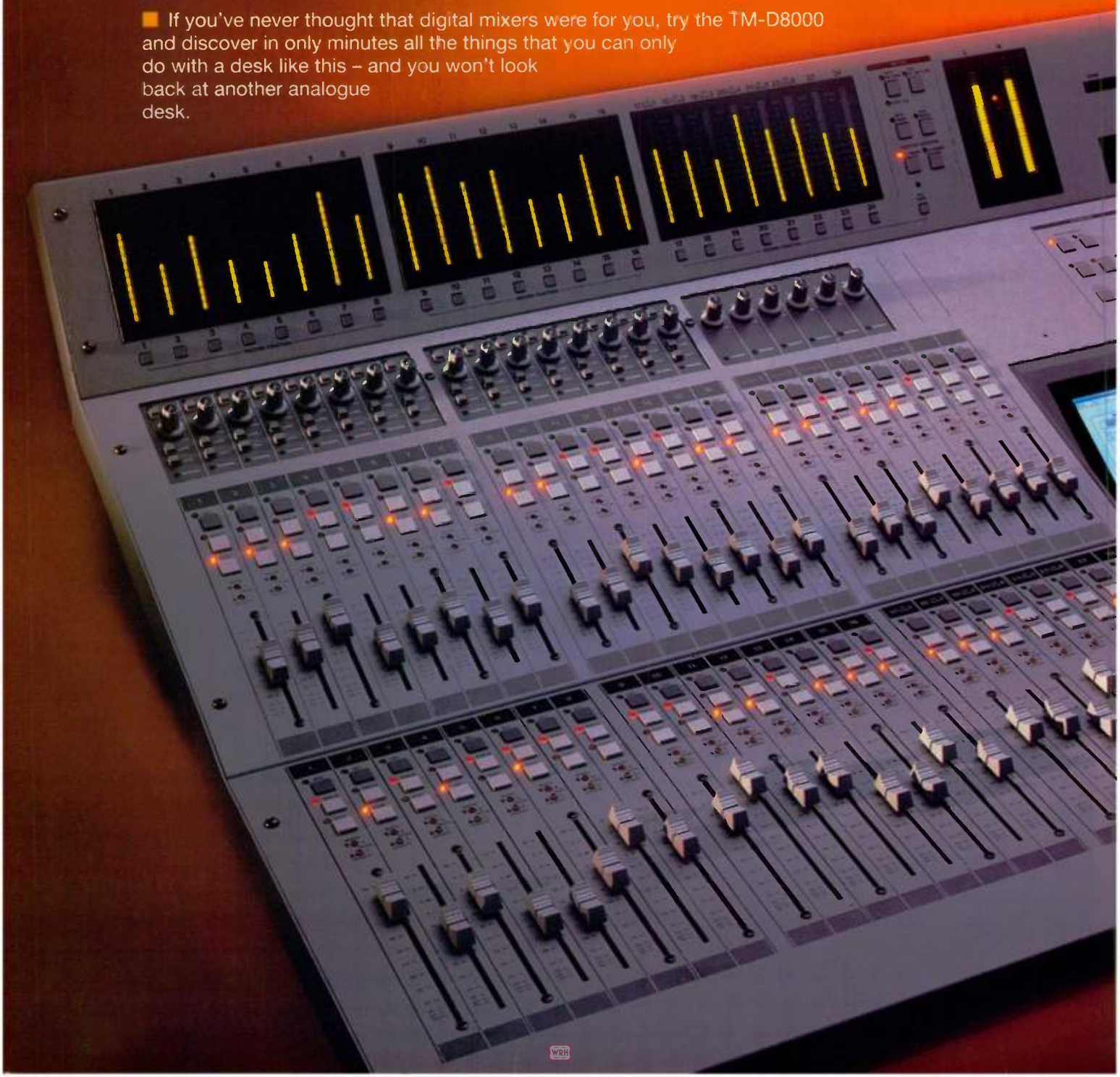

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MARIUS DE VRIES: PROGRAMMER & MUSICIAN

Are programmers musicians? Marius de Vries certainly thinks so, and he's better qualified than most to air an opinion. PAUL TINGEN meets the man who's lent his talents to everyone from Madonna to Massive Attack.

Suddenly Marius de Vries sounded almost indignant. For most of the interview he had been airing his opinions in a soft and friendly manner, but the issue at hand clearly stirred him up. The question was one which is central to the territory that *SOS* covers, and to Marius de Vries's work: is a programmer a musician?

Fifteen years ago, when sampling and sequencing still demanded expensive and monolithic machines like the Fairlight or the Synclavier, those who specialised in operating them became known as 'programmers' — and some, like the Art Of Noise's JJ Jeczalik, were quite happy to declare themselves 'non-musicians'. Since then, programmers have become more and more involved in arranging and writing music, but many people would argue that there is still a big difference between their role and that of a 'real' musician. They would, however, get short shrift from de Vries, who is in no doubt that programmers are musicians: "Of course they are! Pete Davis, who programs for me at the moment, is both a consummate musician and a programmer, as are all the best programmers that I know and have

worked with. Programmers who know the technology well, but who aren't very good musicians and don't get on with people in the studio, don't become successful. And there is a shortage of people who can work the technology, and who also have the right musical sensibilities and the right social skills... If you want to carve yourself a career as a musician in the record industry today, then the thing to do is to get right on top of the technology and learn how to capably run a good audio editing and sequencing system, and really master a few synthesizers."

BUZZ

One of the reasons why de Vries feels so strongly about this issue is probably because he started out as a musician, rather than an engineer or technologist. He was born in London in 1961, sang as head chorister at St. Paul's Cathedral Choir and received a piano and violin education there as well ("a wonderful general music education"). From 1984 to 1987 he worked both as a freelance music journalist (testing keyboards for *International Musician & Recording World*) and as a session musician, and played with The Blow Monkeys. He recalls: "I started out playing keyboards around the time when MIDI first came into the world. I remember going to a music shop in Denmark Street and seeing somebody play a DX7 which was connected to a Roland JX3P. There was this miracle of a cable allowing one keyboard to talk to another. It's something that seems so primitive now, but at the time it was a magical and exciting thing. When I was working with The Blow Monkeys, I met a technical assistant called Axel Kroll, who was the first person I saw who was what we would now call a programmer. He worked with a Linn 9000 and what he was doing crystallised for me the direction in which I wanted to go. So I became a programmer at a time when we were still very much regarded as kind of the magicians of the session world, because not many people understood what was going on under the hood".

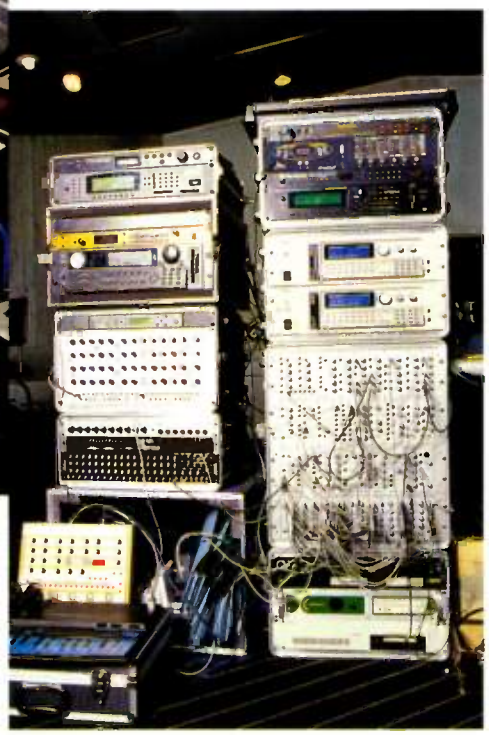
It wasn't long before de Vries could dump his journalistic distractions to concentrate fully on a blossoming music career that would not only see him work with many household names, but also be instrumental in the creation of some of the hippest and most cutting-edge music made in the last 10 years. As a programmer and keyboard player he has worked on all of Björk's three solo albums to date, Madonna's album *Bedtime Stories* and the single 'Frozen' from her last album, Eno and U2's *Passengers* album, U2's *Pop*, Annie Lennox's *Medusa* and *Diva* albums, Massive Attack's *Protection*, and Bono's and Madonna/Massive Attack's tracks on the Marvin Gaye tribute album, respectively 'Save The Children' and 'I Want You'.

On top of this, de Vries has a notable production career. It started with modest co-production credits for the 25th of May, The Soup Dragons and the Sugarcubes in the late '80s and early '90s. He then went through a spell when he was too busy programming for the greats, with only incidental co-production work here and there. Recently, however, his production career re-ignited with a string of prestigious co-production credits: five tracks on Robbie Robertson's *Contact From The Underworld of Redboy*, three tracks on Craig Armstrong's *The Space Between Us*, three tracks on Madonna's *Ray Of Light*, and seven tracks on Neil Finn's first solo album, *Try Whistling This*. What's more, all these albums were released in 1998! As if this was not enough he also co-wrote, programmed and co-produced the BAFTA-winning score and soundtrack CD for the movie *Romeo & Juliet* (1997, together with Nellee Hooper and Craig Armstrong), was music supervisor, executive producer and album producer for the forthcoming *The Avengers* film soundtrack album (featuring Grace Jones, Annie Lennox, Sinead O'Connor, Stereo MC's and others), and also did additional production and mixes for PJ Harvey's forthcoming album.

PRAYER

When I met up with him in the idyllic surroundings of the residential Hook End Studios in Berkshire, he was spending more time in his role of the 'definitive '90s musician', producing and programming the debut album of The Lucy Nation, a new signing to Madonna's Maverick label. De Vries first cut his programming teeth on an Roland MSQ700, and then moved on to the Atari, initially running Hybrid Arts' ▶

Above: Marius's much-used Nord Lead sits atop a Yamaha DX7 mk II, and next to a selection of analogue synths — Minimoog, OSCar and Roland HS60.



Above: An impressive collection of rackmount gear. Left, from top: Emu Vintage Keys, Korg 01R/W, Boss GX700 guitar effects, EMU Emulator 4 sampler and two modular synths — the Exclusively Analogue Aviator and the Analogue Systems FB3 filter bank and TH48 analogue sequencer — both with Kenton MIDI-to-CV converters. Right, from top, Opcode Studio 4 MIDI interface, Waldorf Pulse, Oberheim Matrix 1000, Roland JV1080, and two Akai 3200XL samplers. Above the Glyph hard drives resides a Doepfer A100 modular analogue synth. In front of the racks is Marius's EMS Synthi A.

Midi Track software, and then C-Lab's *Notator*. A few years ago he finally switched to Macintosh and Digidesign, on which he still runs C-Lab/Emagic software, namely *Logic Audio*: "I was quite slow switching from the Atari to the Mac, because I had experiences of working alongside people with Macs that appeared to be crashing all the time. But things are a lot better now, and I am really happy with my Macintosh, although admittedly the timing could be better on it. The timing of the Atari was probably more stable, but then, are you going to spend your whole life worrying about the fact that there is a millisecond delay on the bass drum, or are you going to listen to the music and try to make that sound good? The '80s ethic seemed very much to make sure that everything was very precise and glued to a grid, but there's room for things to be much sloppier now, and better for it."

De Vries explains that he learnt 'sloppiness' as an approach to programming from working with Nellee Hooper, initially on Björk's first album: "He has a real intuition for how space and untidiness can be a better approach to making music than trying to nail everything down." This, again, appears to touch on the dichotomy at the heart of de Vries's approach to music making; although throughout our conversation he de-emphasises the role of technology whenever we speak about things from a musical perspective, he clearly trips out on it when talking from a purely technological angle. A few weeks after our first interview at Hook End I visited him in his own studio near Cambridge, Blue Barn Studios, and when he showed me around the impressive hardware that he has collected there, he was as proud and excited as the proverbial kid in a toy shop. But he remarks that even though he did extensive programming when producing Robbie Robertson and Madonna, he now tries to take "less of a hands-on

FAVOURITE EQUIPMENT

"The core of my system are the Mac and Pro Tools 888s, driven by *Logic Audio*. All the Digidesign TDM stuff also works witnin *Logic*. The Digidesign hardware is the best available. There's no question about that. But it's expensive. If I was to collate all the Pro Tools systems I have into one system, I could have 128+ tracks into 64 channels.

"The Akai samplers are without question the most musical and best sorted out sampling devices on the planet. I have three 3200XLs now and I am waiting very impatiently for the 6000 series, which will be out in a few weeks, because it has a DOS-based file system. In itself that s a bit of a turn-off for me, because I am a Macintosh purist, but what it means is that you can have one huge hard disk attached to the sampler with all your sounds on it and a little laptop on the side with a database on it. It will finally enable me to begin to meaningfully organise a big sample library. At a the moment with my suitcase full of Syquests, it's impossible. All I can do is file everything carefully away by project and hope that one day the technology will allow me to do something meaningful with it. Until you get something where you can easily move large batches of data around and save and group them and manipulate them I don't see how it is possible to keep track of it all unless you spend your whole life being a librarian and forget about music.

"I often use BIAS *Peak*. It is sample editing software that speaks equally well to samplers and the computer, so it is like the central station from which you can grab samples from the Akais, and manipulate them in *Sound Designer*, *Logic Audio*, or *Sample Cell*. It almost works like a translation unit between all the different sample mediums and also gives you phenomenal control over the sound. They have a Premiere plug-in called *FX Machine*, which is a marvellous modular synthesizer-like plug-in. It has every sort of audio manipulation imaginable under one roof — a fantastic effects unit, with a very deep architecture inside of it. I also use *Recycle* a lot, my one concession to the Steinberg empire.

"I must congratulate Antares on their *Autotune* TDM plug-in. It does what it says. It tunes your vocals (or instruments) for you. You put the vocal in it and it puts it in tune, no fuss, no bother. It keeps bends and vibrato — it is really intelligent. You used to have to spend two days hunched over an S1000 over a lead vocal manipulating syllables when you were having problems with tuning, and now you just press a button or two and relax. You can go for getting performance and emotion and all those things that really matter in a vocal and not worry too much about the tuning. If in the end the second line of the third chorus is slightly dodgy tuning-wise, but the whole thing feels very good, you can keep the vocal and sort it out.

approach when I am producing. It's definitely possible to use technology to stamp the life out of musical performances. When you're programming you can spend a day comping and pitch-shifting various vocal takes and after having gone through every syllable you sit back and listen to it, and it is totally flat. In the beginning you often won't admit this to yourself, because you cannot believe that you just wasted a day making something worse. But the fact is there, you have taken all the life out of it. And the only remedy is to keep walking out of the room, and keep walking back in again once you have a clear head."

These days, therefore, De Vries leaves a lot of the detailed work to programmer Pete Davis: "Programming is all about going in and dealing with the details of the track, whereas producing is about being able to step back and hear what is going on and deciding whether something is good or not. Those are two very different dynamics. But programming is in my blood, and so I can't keep totally away from the computer. We had three Pro Tools systems up and running in Hook End, and I still get my hands dirty. During pre-production it is often just me and the artist working and sketching out ideas in the computer, and once I have a clear idea of what the song is going to sound like, I'll give it to Pete who will develop it, label things properly and organise everything for me. He also does a lot of archiving for me. I tend to rely on prayer for backup." De Vries laughs. "I sort of think, if God wants the data, he can have it."

RIDICULOUS INTERFACE

This is another sign of the apparent dichotomy between de Vries's total fascination with music technology on the one hand, and something between healthy disrespect and reckless disdain on the other. The same thing shows through when he enters the debate about the merits of 24-bit digital recording: "It has to be said that basically most people won't hear the difference — it's too subtle. Though personally I find that 24-bit has a better dynamic range, and crudely speaking there'll be less hiss on very quiet bits of an orchestra. So there are all these arguments whether to use 16-bit or 24-bit, or Neve or an SSL, or to mix to tape or DAT. There may be incremental differences in each case, but they are so marginal. When you have a great piece of music and a fantastic performance it doesn't matter what medium you're using. Though all credit to Digidesign for pushing the boundaries forward. And what's really great is that I can plug my new 24-bit TC Fireworks effects unit digitally into my 888, and that gives me a nice warm feeling because you know it's all talking in 24-bit, and so of course it sounds better, because when you feel better, things sound better." He laughs again.

These lines are obviously spoken by the technologist in de Vries, the man who loves state-of-the-art gear purely for its own sake. But he does not follow this philosophy to the exclusion of all other approaches. Answering the question 'how do you get the same sense of life and excitement when programming as musicians do feeding off each other?' de Vries offers "By getting musicians to play! Either guest musicians, or you get the people you're working with to play live. We started the Lucy Nation record by recording musicians live, and a lot of those recordings survived intact, and then some were chopped up, and some were mangled to such a degree that you wouldn't recognise the original performances. There are no rules about how to achieve a 'live' feel, but generally it is a good idea to get 'real' musicians in at some stage. The best ideas come from good musicians. But it can go either way, because sometimes you're lucky enough to program something that works perfectly, and may not be improvable. That's why you need to be a good musician as a programmer, because sometimes you'll be the main musician on a track."

QUANTUM LEAP

This is exemplified by de Vries's work on Robbie Robertson's excellent *Contact From The Underworld Of Redboy*. On this album Robertson has again gone back to his American Indian roots, following in the footsteps of his previous album, *Music For The Native Americans* (1994), which was a soundtrack. With his hands free to make a regular studio album, Robertson wanted to explore how to put native American music in a contemporary context, whilst avoiding the New Age pitfalls that have marred many other such attempts, like the abysmal Sacred Spirits. So Robertson enlisted the production assistance of a range of people with experience with technology, dance music, and hip-hop, such as Howie B., de Vries, Tim Gordine and Jim Wilson — the latter three all being keyboard players and programmers. De Vries was involved as a co-producer on five of the album's 10 tracks, co-wrote the music on two tracks with Robertson, and did programming on six. In several cases the only thing played by a 'real' musician is Robertson's electric guitar, and the rest of the material is programmed and/or treated in a computer. De Vries & Co nevertheless get some excellent grooves and feels going — and several of the tracks again highlight the issue of the blurring boundaries between technology and music.

De Vries: 'It's becoming harder and harder to distinguish between when something is a performance and when it's programmed, and so accreditation is becoming harder too. Robbie arrived at my studio here with a suitcase full of DATs, containing performances ▶

"I like using the RADAR hard disk recorder. I might soon be investing in one of the new 48 track RADAR systems, assuming it is going to interface well with Pro Tools. Having a dedicated multitrack machine at Blue Barn means I can do an awful lot of work here and I can whip everything I do in Pro Tools across to the RADAR and take it to whatever studio I am working in, plug it in and go. Once you start working digitally and you are moving from studio to studio a lot it can be very expensive and complicated to hire the necessary machines, and it can be a nightmare because some studios will have a Sony machine and others will have the Mitsubishi and some will have RADAR and every time you move you have to transfer the tapes to another medium. I love the RADAR, it still feels like a tape machine but it has all those wonderful things that you can do with random access hard-disk based recording. It sounds great, it is very easy to use, it seems totally reliable. I think the RADAR could become the standard within a couple of years."

BLUE BARN STUDIOS EQUIPMENT LIST

Our photos of the Hook End setup show Marius's gear with other equipment belonging mainly to his collaborator Pete Davis. Marius's own equipment comprises:

KEYBOARDS/SYNTHS
- ARP 2600
- EMS Synthi A
- Emu Morpheus
- Emu Vintage Keys (x2)
- Korg 01R/W
- Kurzweil K2000
- Nord Lead rack
- Oberheim Matrix 12
- OSC OSCar
- Roland MKS50
- Roland JV1080
- Roland MKS80 Super Jupiter (+ MPG80 programmer)
- Roland MKS900
- Roland JP8000
- Studio Electronics MIDI Moog
- Yamaha VL1
- Yamaha SY77

RECORDING
- Alesis Quadraverb GT multi-effects
- Alesis Quadraverb multi-effects
- Alesis 3630 compressor
- Eventide DSP4000 harmony processor
- Mutronics Mutator compressor
- Roland SDE3000A digital delay
- Soundtracs Solo Midi 32-channel desk
- Tascam DA30 DAT recorder
- TC Electronics Fireworx multi-effects
- Yamaha DMP7 submixer (x2)
- Yamaha MV802 mixer
- Yamaha REV7 reverb unit
- Yamaha SPX500 multi-effects

SAMPLING
- Akai 3200XL (x2)

DRUM MODULES
- Yamaha RM50

COMPUTER & SOFTWARE
- Apple Mac 9600/350, with Glyph 9Gb hard drives (x2), plus Jaz and DAT backup
- DAC MD4000 shell with 2 Syquest drives
- Digidesign Pro Tools 888 (2x24-bit, 3x16-bit)
- Emagic *Logic Audio Platinum*

MISCELLANEOUS
- Dimension Beam MIDI Controller
- LA Audio Midigate
- Opcode Studio 4 MIDI Interface
- Pioneer CDJ-500II CD player
- Tascam 103 cassette deck
- Yamaha CD7120 CD player

MARIUS DE VRIES

One of Yamaha's less professionally oriented products, the PSS780 home keyboard, shares studio space with the exclusive VL1 physical modelling synth and Roland's JP8000.

▶ that he had collected over the last two decades and said: 'let's make a record out of this'. I spent two months just listening and cataloguing and narrowing it down to one DAT with what I thought were the most promising bits. It was a big learning curve, because I knew little of American Indian music, and I had been in the first instance a little wary of the project anyway, because I was not aware of any records that had successfully put American Indian music in a contemporary context. So the whole thing was a real challenge. Then I threw the DAT compilation into Pro Tools and started experimenting with treatments. In some cases we did very little to the original recordings, like the vocals in the track 'Peyote Healing' (which were recorded specifically for the album at an actual peyote ceremony in Santa Fe). In other cases they were heavily treated and re-worked. Like on the track 'Sacrifice', everything on that was me and my Macintosh, apart from the guitar and vocals. There, flute and drum credits were samples that I had taken and manipulated and incorporated into the framework."

There are many great grooves on *Contact*, and with no 'real' musicians in the rhythm section, the simple question (that de Vries is reluctant to answer) is: 'how do you do it?' De Vries: "There are so many methods involved. It is very difficult to pinpoint a particular way. How do you program a good feel? It's impossible to describe. People have written many articles about drum programming, and with all respect for the thoroughness of their approach, I have not resonated with a single one of them. It all seems a bit academic to me. It runs counter to my whole approach to music."

Further prodding elicits a slightly more specific response: "OK then, probably about 80% of the backdrops that you hear on the records I've programmed are constructed of samples of one kind or another. I try to avoid using very obvious samples, partly for legal reasons, partly to try to keep things fresh. I sample from the same places that everyone else does, mostly records and previous sessions. I'm not too keen on sample CDs. I own about 10 that I think are worthwhile, amongst them *A Poke In The Ear With A Sharp Stick*, *Diffusion Of Useful Noise*, the two *Cuckooland* ones, Fred Frith's *Etymology*, and a Gamelan CD.

"I also learnt a lot from the whole Bristol thing, from Massive Attack and Nellee Hooper, and also earlier on from working with Danny D. They are real rhythm people, with a seminal approach to making music. I already mentioned that I learnt from Nellee about using space and untidiness. If in the '80s emotions were being quantised out of records, then the hip-hop movement was a reaction to that, deliberately avoiding that precision. The method is very simple: when you hear a good piece of music you preserve it. There is still an awful lot of looking at grids going on, both in MIDI and in audio, but now it is combined with the best of the mix and match approach of hip-hop. And the computer technology has now finally arrived at the stage where we can really play meaningfully with all those elements in a coherent single environment, in my case *Logic Audio* and Pro Tools hardware. For me, the first time I could use real audio and MIDI tracks together on one platform was the single biggest quantum leap in my whole career in music technology. It may not have worked properly for a while, but now it works brilliantly. It's absolutely fantastic. Use of space is also important in the way I approach drums. It's about being aware of what happens between beats. The sound between hits, the ambience if you like of what is going on, in terms of perceived drum feel is often more important than what the quantise grid is telling you. You can radically change the feel of a drum part just by putting a blanket sound effect behind it, whether it is the standard thing of adding vinyl crackle or whether you paste in more abstract ambient material. You find that without changing the actual rhythm, you can create a different mood, and groove is as much about mood as it is about rhythmical pulses."

MARIUS' FAVE KEYBOARDS:

"Keyboard-wise, favourites are the Nord Lead and the JP8000 and some of the old dinosaurs that I still carry around like the Oberheim Matrix 12, which is an important instrument for me. I have been playing with the Yamaha VL1 a lot recently, I do not know whether that is a passing phase, but it's really good fun. Good training for the lungs as well, because it is all breath-control driven. The Kurzweil K2000 is also important. It's nice because it reads your Akai samples and it is also a little bit more deep as a synthesizer than the Akai sampling devices. Those are the things that stand out.

"The other brilliant things are the Roland JV2080 and JV1080. They are multitimbral sample-based synthesizers in the good old Roland tradition. They're very expandable, you can fit in cards for your specialist applications. Whenever I'm mocking up orchestras I use its orchestral card. It may not sound like a real orchestra, but it will make you realise what the orchestra will sound like. There is also a fantastic card called "Keyboards of the Sixties and Seventies", that has Rhodes sounds and Hammond sounds — It's a good bread and butter unit. Also the Exclusively Analogue Aviator, which is a very obscure modular English synthesizer. It's a rack unit made to order by a guy in Derbyshire, I think. It is a unique sounding synthesizer, a little reminiscent of a very fierce sounding version of the Oscar, but much more controllable.

"The thunder sound on the track 'Glasgow' on Craig Armstrong's CD is from the Matrix 12. It's actually a preset. I think that synthesizer is still rare enough for me to be able to get away with using presets. When I first went down to Syco 15 years ago and tried out a Matrix 12 it was definitely the thing I most wanted in the world, and more than anything it was that thunder sound that sold it to me. It is one of those keyboards that I use on almost every record. I first saw it when I was probably 20-21 and just starting out as a keyboard player. At the time it represented the absolute Rolls Royce of synthesizers. There was no comparison, and to many people it still is the best analogue synthesizer ever made. For a non-modular system it is extremely deep, the modulation technology on it is extremely complex. The sound of it is glorious, it has the best filters and the best oscillators. They are very sophisticated filters for the time — you get notch filters and phase filters and comb filters, and all that back in the days when normally you would have been lucky to get more than one resonant low pass filter. So for all those reasons, and also the multitimbrality of it, it was a revolutionary thing at the time.

"I use the ARP 2600 an enormous amount, mainly for processing sounds. I stick samples or instruments through it. I also use the VCS3 a lot for processing sounds and for generating ring modulated weirdness. And for its curious button-and-joystick user-interface. I also like the Light Beam controller that Roland have started incorporating in their new gear. That is a great piece of technology — and my kids love it. I think anything that appeals to children like that is going to be a good instrument or a good controller."

COMPLEXITY

True to his assertion that there are too many methods to list, however, de Vries does not always work by using samples to create soundscapes and hip-hop grooves. On Neil Finn's *Try Whistling This* he stayed miles away from any hip-hop feel, instead helping the former Crowded House frontman to expand on the "multiple-chord tricks that are so easy for him to do, being one of the finest songwriters on the planet. To create something that justified him having become a solo artist we tried to make him sound a little darker and make the song structures a little bit more simple without losing his sense of melody. It was interesting to sit down with Neil and run a loop for five minutes and get him to write something on top. That's how the track which we co-wrote, 'Sinner', came into being. One of the seeds for that you hear at the beginning of the song: it's a sample from the wonderful very early Mellotron that Neil owns, one of those Rolls-Royce-like Chamberlains with the complete original tape collection, from the days when they recorded rhythm sections in the studio to create a collection of rhythm tapes to accompany the melody sounds, just like with modern home keyboards."

The rhythm of the Chamberlain sample is rather at odds with the rhythm of the rest of the track. When queried, de Vries explains that this was "another rhythm trick" developed in hip-hop, namely to superimpose samples with different rhythmic feels and get a kind of polyrhythm going, which results in things that are "much more interesting than you could ever get by working things out mathematically." Another trick that he divulges is the use of filtering — applying a strong low-pass on a sampled rhythm — and using the rumble that you get as a kind of bass line. Conversely, he might apply a high-pass filter, or sweep between the two. According to de Vries, Massive Attack applied this method to much effect on the track 'Exchange' on their new Mezzanine album. Finally, the fact that de Vries doesn't rely only on samples to create rhythm magic is demonstrated by his work on Madonna's *Ray Of Light* album, especially on the track 'Little Star' on which — with rhythm programmer Steve Sidelnyk — he did some masterful drum and keyboard programming. He was called in to the project at a late stage, when William Orbit and Madonna had already finished much of the album, and ended up co-producing 'Skin' and 'Nothing Really Matters' with Madonna and Orbit, and 'Little Star' with Madonna. He also did some additional programming on 'Frozen' at a point when Orbit and Madonna weren't quite clear how to finish that track and wanted some new energy and input.

> "...the trick is to create and maintain a core to your system that is simple and consistent..."

De Vries: "I had to be very sensitive with what I did, because the aesthetic of the album was already well established by William and Madonna. So I had to work within a well-defined framework. 'Nothing Really Matters' was almost like an older-style Madonna tune, and my work was to help keep the appeal of something that she might have done five years ago, and at the same time updating it and keeping it in sympathy with the stuff William had been doing. I did most of the handiwork on that track, though William was there with his ears and suggestions. 'Skin' was really a true multi-programmer situation, with both of us having our rigs in the studio and battling it out. The biggest challenge was 'Little Star' because it was a song that could easily have become sentimental. I wanted to keep the delicacy of the track above everything, but I also knew that it needed some energy for it not to be too fey. So what I decided to do was to create a fairly energetic double-time drum arrangement, but using very soft sounds. There were no loops on that track, instead Steve and I programmed everything by hand, using jazz brushes and brushed ride cymbals, ie. softly hit things, so that the whole track would have this gossamer, fluttery energy running through it. It was a fine balance. Whenever it got too heavy, it sounded like the track was weighed down by overproduction, and whenever it was too light, it just sounded sentimental. I orchestrated that track mainly with noises rather than keyboards, chasing the idea of things drifting in and out of focus to achieve a dreamy quality. I actually used a lot of the Waldorf Wave on the Madonna tracks. I borrowed one from Björk, and spent a couple of days generating hundreds of sounds which I fed into a sampler, and used one way or another for the backdrop for the songs."

Another well-stuffed rack: from top, Opcode Studio 4, Digitech Vocalist, Yamaha TX81Z, Emu Vintage Keys and Morpheus, Kurzweil K2000, Roland MKS50 and JV1080, Eventide DSP4000, two Pro Tools systems, and two Akai 3200XL samplers.

De Vries's programming on 'Little Star' is a brilliant — OK, let's call it 'performance' — that would make any 'real' musician proud. It shows what modern technology, used in the right way, is capable of. According to de Vries, the trick is to create and maintain a core to your system that is simple and consistent enough for you to work it totally intuitively. "The issue of complexity is very important, because together with simple technical failures it is one of the most distracting things when working with music technology. The way seems to be to have a central working space that is essentially simple and focussed and where there is a limited amount of things going on. For me that is when I sit in front of my computer screen with *Logic Audio* on it, with my Pro Tools hardware and Akai samplers close at hand. Add a master keyboard and that's it. That is where 95% of my work happens, and handling it is totally second nature."

'Magician', 'Definitive '90s musician', 'Non-musician' or simply 'computer-musician'? You tell us. Answers on a postcard, please. Ooops, better make that email... SOS

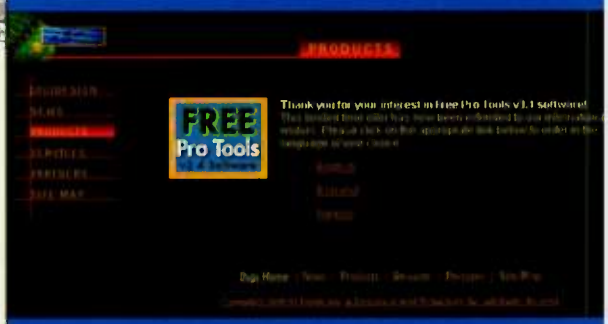
priceless Tools?

DIGIDESIGN PRO TOOLS 3.4

If the best things in life are free, then perhaps Pro Tools 3.4 is one of them — Digidesign are now giving away this version of their Mac audio recording and editing software. MIKE COLLINS looks a gift horse in the mouth.

Pro Tools v3.4 has the same sophisticated software interface as Digidesign's pro systms. The difference is that it's now free .

Digidesign's Pro Tools is one of the most widely-used multitrack digital audio editing systems on the planet. Unfortunately, it costs a lot of money to set up a professional Pro Tools system, which will give you between eight and 32 tracks of audio plus almost unlimited virtual tracks depending on your choice of Digidesign audio card and your computer configuration. You can, however, acquire a slightly older version of the *Pro Tools* software for free direct from Digidesign. The latest version of the 'paid for' version of *Pro Tools* is now up to 4.1; the version that Digidesign are giving away is 3.4, which will run using either a Mac's native audio hardware or an Audiomedia III card, providing better recording and editing facilities than the audio side of many audio/MIDI sequencers. You can also record MIDI into *Pro Tools*, but the editing facilities are so basic that you're better off importing a MIDI file to replay from within *Pro Tools* — or, better still, run a MIDI sequencer on your Mac at the same time as the *Pro Tools* software, synchronised via OMS.



... and it's available from Digidesign's web site.

Pro Tools is based around two main windows — one that looks like a mixing console with faders, pans, mutes, routing controls and insert points, and one that shows the waveforms of the audio in each track for cut-and-paste graphic editing. It's largely intuitive, although anyone who is new to using computers for audio will face something of a learning curve.

WHY FREE?

Obviously Digidesign hope to attract new users who will eventually progress to their fully pro systems based on Pro Tools hardware, which is

DIGIDESIGN TOOLBOX FOR MAC

Priced at £703.83 including VAT, Digidesign's Toolbox for Mac includes the Audiomedia III PCI card, *Pro Tools* 4.1.1 software, *D-Fx* and *D-Fi* plug-ins, *BIAS Peak LE* editing software and *SFX Machine Lite* effects software.

The Audiomedia III card gives you analogue and digital I/O, and has onboard DSP processing with eight bands of real-time parametric EQ, fully automated mixing for volume and pan, simultaneous effects send and return, and integration with supported MIDI sequencers. *Pro Tools* 4.1.1 software features non-destructive recording and editing, mix automation, and plug-in support. The *D-Fx AudioSuite* plug-ins include Reverb, Chorus, Flanger, Multi-tap Delay and Ping-Pong Delay, while the *D-Fi AudioSuite* plug-ins include Lo-Fi, Sci-Fi, Recti-Fi and Vari-Fi which let you create grungy, warped and other retro sounds. *BIAS Peak LE* is stereo recording, editing and processing software which is ideal for mastering, editing and multimedia/Internet audio content creation, supporting a range of file formats including AIFF, SDII, WAV and Real Audio. *BIAS SFX Machine Lite* features 20 multi-effects presets for use with *BIAS Peak*.

You can also run the *Pro Tools* 4.1.1 software with *PowerMix DAE*, using your PowerMac's in-built audio circuitry to provide up to 16 tracks of playback. System requirements for this include a minimum 48Mb of RAM with Mac OS 7.6.1 or higher.

supported by a huge range of third-party hardware peripherals and software. The basic operating principles of v3.4 are, however, pretty much the same. Using the *Pro Tools* software with a PCI PowerMac's built-in audio facilities (note that Nubus machines can't be used with this software) will get you straight into using the same software interface that the big boys use, and most Power Macs will let you replay enough audio tracks to do serious work. The actual number of tracks varies according to the speed of your CPU and hard disk — from eight tracks with a 75MHz machine up to 16 tracks with 100MHz or faster machines. What you don't get is the ability to run software plug-ins — big-league Pro Tools systems have DSP farm cards that allow sophisticated TDM plug-ins to be run without loading extra work onto the host computer.

Once you start using the software seriously, you may want to consider getting a Digidesign Audiomedia III card, which will give you two tracks of simultaneous recording and eight tracks of replay. The A-D and D-A converters on that card are far superior to those on a typical Power Mac and, most importantly, you also get a pair of stereo S/PDIF digital inputs and outputs. Using the digital input, you can synchronise the digital audio to external equipment — which you can't do with the Mac's in-built audio unless you buy a third-party digital I/O card from Lucid, Sonorus or others. You can also transfer audio in and out digitally via S/PDIF so you can sample digitally from CD, mix your music onto DAT in the digital domain, or transfer material from DAT into *Pro Tools* for further editing.

WHAT CAN I DO WITH *PRO TOOLS* 3.4?

Because all the MIDI + Audio sequencers on the Mac use Digidesign's *SDII* file format, you can open files in *Pro Tools* 3.4 which were originally recorded into *Digital Performer*, *Studio Vision*, *Cubase VST* or *Logic Audio* — and vice versa. You'll probably find that you can do some clever edits or processing of your audio files in *Pro Tools* which your sequencer won't do quite as well. Furthermore, if you have a MIDI-only sequencer, you could record your mixed MIDI tracks as stereo audio into *Pro Tools*, then overdub guitars or vocals. And if you do have an Audiomedia III card, you can work initially with up to 16 tracks using Digidesign's *PowerMix DAE* (more of which in a moment), then bounce these down internally to use no more than eight tracks via the Audiomedia III card. Then, for your final mix, you can use the Audiomedia III card at the stage where it matters — transferring your mix out to DAT or whatever via S/PDIF, or using the Audiomedia III's higher-than-Mac-quality D-A converters to go on to analogue tape.

WHAT CAN'T IT DO?

Version 3.4 software is similar to the last available version 3.x release — remember that you're not getting the latest version 4.x *Pro Tools* software. So you miss out on features like more flexible track grouping and automation, loop recording, 'edit during playback', and *AudioSuite* plug-in capability. In fact, there is no plug-in support at all — you can't use TDM plug-ins, as TDM requires appropriate hardware, and you also can't use the 3.4 software with any Digidesign hardware other than the Audiomedia III card.

Then there are the limitations of *PowerMix DAE*, the software interface which lets *Pro Tools* 3.4 use the Apple Sound Manager to route audio in and out of your Power Mac. This only works at a sampling rate of 44.1kHz, as the Power Macs' hardware doesn't support 48kHz. On-line operation is also unsupported, meaning you can't trigger *Pro Tools* from an external SMPTE source.

THE BOTTOM LINE

It may not be as sexy as a full Pro Tools 4.1 TDM system, but v3.4 is still immensely useful, and is an ideal introduction to Pro Tools. It's also ideal for Pro Tools III and Pro Tools 24 owners who want smaller, cost-effective workstations to do some preparatory work away from the main rooms.

For more serious work, consider buying the Digidesign Toolbox for Mac (see box, left), a bundle that includes an Audiomedia III card along with a selection of software including *Pro Tools* 4.1.1 software, for less than the list price of an Audiomedia III card with just *Session* software. The Audiomedia card can be synchronised to other digital audio equipment or to picture using an external synchroniser such as the MOTU Digital TimePiece. First-rate documentation and tutorial material is supplied on the CD-ROM, so if you want a copy, get onto Digidesign's web site right away and ask for your copy. SOS

SUPPORTED CPU MODELS & SPEEDS

The following CPU models and speeds are supported by Pro Tools 3.4 with *Powermix*:

CPU MODEL	SPEED
APPLE COMPUTER	
Power Macintosh 9600	up to 233MHz
Power Macintosh 9600mp	up to 233MHz
Power Macintosh 9500	all speeds
Power Macintosh 9500mp	all speeds
Power Macintosh 8600mp	up to 200MHz
Power Macintosh 8500	all speeds
Power Macintosh 8200	all speeds
Power Macintosh 7600	all speeds
Power Macintosh 7500	all speeds (eight tracks only)
Power Macintosh 7200	all speeds (eight tracks only)
Performa 6400	all speeds
PowerBook 3400	all speeds (only works with PowerMix)
POWER COMPUTING	
Power Tower Pro	all speeds
Power Center	all speeds
UMAX	
UMAX s900L	all speeds

COMPUTER REQUIREMENTS

- Mac OS 7.5.3 or higher (note that Mac OS 8.1 is not currently supported by any Digidesign software).
- 24Mb minimum RAM (additional RAM is required for simultaneous use with MIDI sequencers, and Virtual Memory is not supported).
- A suitable Digidesign-approved SCSI disk drive and a 17-inch or larger monitor are recommended.

pros & cons

DIGIDESIGN PRO TOOLS 3.4 FOR MAC

pros

- It's free!
- Very useful on its own or in conjunction with a MIDI + Audio sequencer.
- A good way to learn the Pro Tools interface and to see what all the fuss is about.

cons

- Only works on PCI PowerMacs, not NuBus models.

summary

This is too good an opportunity to miss if you have a PCI Mac. Shame about the PC users!

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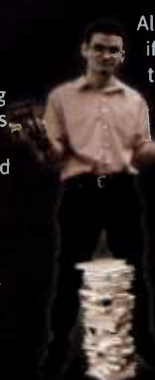
Plug Straight In

The D8's input connections accept anything from keyboards and samplers to guitars and microphones, and its S/P DIF input lets you record from DAT or CD digitally, keeping the original sound quality. The built-in sample rate converter ensures everything inside the D8 is at the CD-compatible sample rate of 44.1kHz. At mixdown, you can use the main and aux inputs to add an extra four channels.

Stacks of Built-In Effects

In addition to independent EQ settings for each channel, the D8 has a powerful built-in digital multi-effects processor featuring 50 different high-quality effects. 65 of the effects programs are specially created for electric and acoustic guitar, as well as basses, drums, vocals, sax, etc. Another 65 user locations let you store your edited versions of these. The D8's 12 channel 4 bus mixer allows the effects to be used as inserts during recording or as master effects during mixing.

Record to Built-In Drive



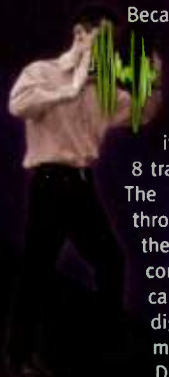
All this capability would be of little use if there was nowhere to record to, so the D8 comes with its own built-in 1.4Gb hard drive as standard, giving over 4 hours of recording time. This equates to more than 2 hours of stereo or around 35 minutes of 8 track. If you want to expand on this, the built-in SCSI interface lets you attach up to 7 external fixed or removable drives, not just for back-up but for direct recording as well.

creative dreams into reality

Operate & Edit with Ease

The D8's Random Access Technology allows you to cut, paste and copy any part of your track. Audio Scrub lets you hear and set Start and End location points. An undo function instantly takes you back to how things were before your edit. and the D8's 12 channel mixer can be automated during mixdown; all settings can be memorised as a 'scene' and up to 20 scenes can be stored for each song.

No Data Compression



Because the D8 doesn't use slow recording media like some other digital multi-track products, it doesn't need to compress the recorded material before storing it onto the drive to achieve 8 tracks of simultaneous playback. The data remain at 44.1kHz quality throughout recording and mixdown so there is no loss of quality due to compression. And the entire process can be kept completely in the digital domain through to the final mix, which can be output direct to DAT if required, at the proper sample rate for a CD master.

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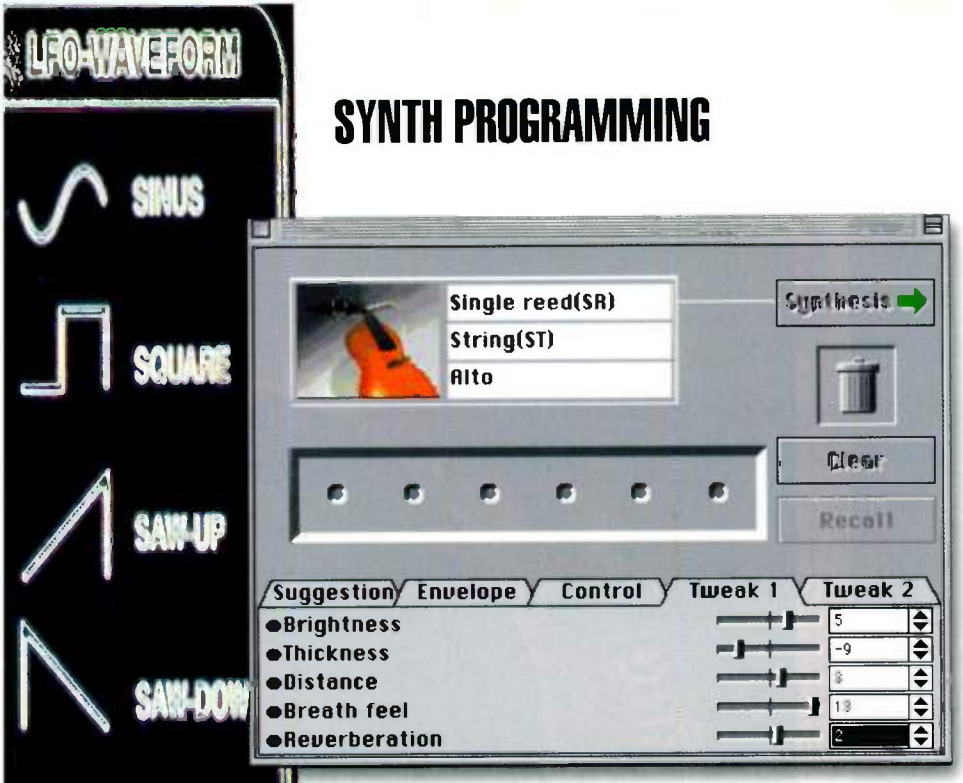

Yamaha's VL Visual Editor allows you to construct "hybrid" virtual instruments by combining drivers and modifiers from different instrument models.

▶ came down in price to the point where 12-voice polyphony (and 6-part multitimbrality) could be provided for £1699. The models provided were expanded from those in the Prophecy up to 13 by the addition of electric pianos and organs (which we looked at last time) and bowed strings (Prophecy had only featured a plucked string algorithm).

MODELLING THE COMPUTER WAY

One of the problems with physical modelling, especially once you break out of dedicated analogue re-creation, is that the number of parameters involved is huge and can be very tricky to program from the front panel of the instrument. If programming Prophecy from its rather obtuse user interface is proving frustrating for anyone out there, it may be some consolation that the great factory presets were created using custom software running on some obscure Japanese computer platform, rather than on the Prophecy itself.

In fact, the complexity of real instrument modelling is definitely something which benefits from computer software control, not just for the programming of sounds, but also for simply comprehending what is going on. Thankfully, then, both Yamaha and Korg have released programming software for slightly more widely available computer platforms to aid in sound programming. This has the extra advantage that I can use screen dumps from the different sound models to illustrate my descriptions!

Yamaha produce three different editors, Visual, Analogue and Expert, in versions for the different implementations on the VL1, VL1M, VL7 and VL70m (the fundamental difference being that the VL70m has only one element available per voice, whilst the more expensive units have two).

The Visual Editor is an ideal introduction to the concepts of physical modelling. By allowing you to mix and match drivers and modifiers, it really underlines the fact that Yamaha's modelling system will let you take the output of, say, a reed and modify it through the resonant characteristics of a non-wind instrument body, like that of a cello. By pointing and clicking at the energy input device (bow, reed, finger, mouthpiece) and the resonator (horn, f-hole body, etc), you can design your own hybrid instruments and then make them more bizarre still by processing the sound through something even more (conventionally) inappropriate like a humbucking pickup. Alternatively, you could be boringly conventional and put a bowed string through a violin body or a trumpet mouthpiece through a horn.

Once you have set up the basic configuration of your revolutionary instrument and decided whether you want an alto or tenor voice version (that's high or low to you), there are nice simple editing parameters which allow you to 'tweak' the brightness, thickness, distance, breath feel and reverberation characteristics of the sound. In fact these simple controls are hooked in software to multiple parameters in the VL system, but they provide a 'no fear' editing system. Clearly, the simplification of the parameters means that you cannot get the full capability of the VL system by using this editor, but it can provide an introduction to physical modelling which is free of technical jargon.

EXPERTS ONLY NEED APPLY

The Expert Editor is just the opposite, and within seconds of loading it you have access to the most alarmingly-named parameters — Slit Saturation Feedback Balance and Graham Function ▶

STRONG PLUCKED PREDECESSOR

Long before anyone succeeded in properly modelling plucked strings (see main text), there came the Karplus-Strong synthesis algorithm (after Messrs Kevin Karplus and Alex Strong, who developed it at Stanford University in California). A description of this algorithm was first published by its developers in the Computer Music Journal Vol 7 Part 2 in 1983. It is now often identified as one of the first physical modelling algorithms, as this technique anticipates modelling by defining the required stages using terms coined by physicists analysing components of a vibrating string. Essentially the way it works is to introduce a noise burst into a delay line whose time determines the resonant frequency of the string, pass this through a low-pass filter to simulate the energy loss caused by the reflection of the wave in the string and then feed back the result into the delay line.

The original version of the Karplus-Strong algorithm would produce two or three 'moderately realistic plucked string sounds' (to quote the humble Kevin Karplus) simultaneously in real time on an 8080A processor (imagine what it could do on a modern processor) and gained several US patents. It was licensed by several companies who have yet to produce a stand-alone product from it (although Kevin Karplus reports that a few companies have tried to market the technique without paying royalties).

Apparently, if the decay element from the filter is taken out then it performs a reasonable impression of a vibrating column of air in a tube open at both ends. This perhaps goes someway to explaining the similarity of Yamaha's string and wind models, in which some parameters do the exactly the same things but are given different names relating to the physical attributes of the instruments being emulated.

Most people who are familiar with Karplus-Strong synthesis will know it from its inclusion in Digidesign's seminal sample editing program from the '80s, *Sound Designer* (before it transmogrified into the proto-hard disk editor, *Sound Designer II*). Unfortunately, this implementation of Karplus-Strong, whilst producing some quite nice timbres, suffers from not being real-time. Once the computation has been done off-line, it is rendered as a sample so that it can be transferred across to whichever sampler your version of *Sound Designer* was supporting. This means that it suffers from the same problems in playback as all samples, ie. it gets longer the lower you play it and shorter the higher up the keyboard you go. It does, however, give you quite a nice flavour of the potential of the algorithm as a historical step on the road to current physical modelling techniques, so those of you who can track down the original version of *Sound Designer* (it was produced in customised applications on the Mac for the Emulator II, Prophet 2000, Akai S900 and E-max among others) can have some fun generating mutant guitars and mandolins.

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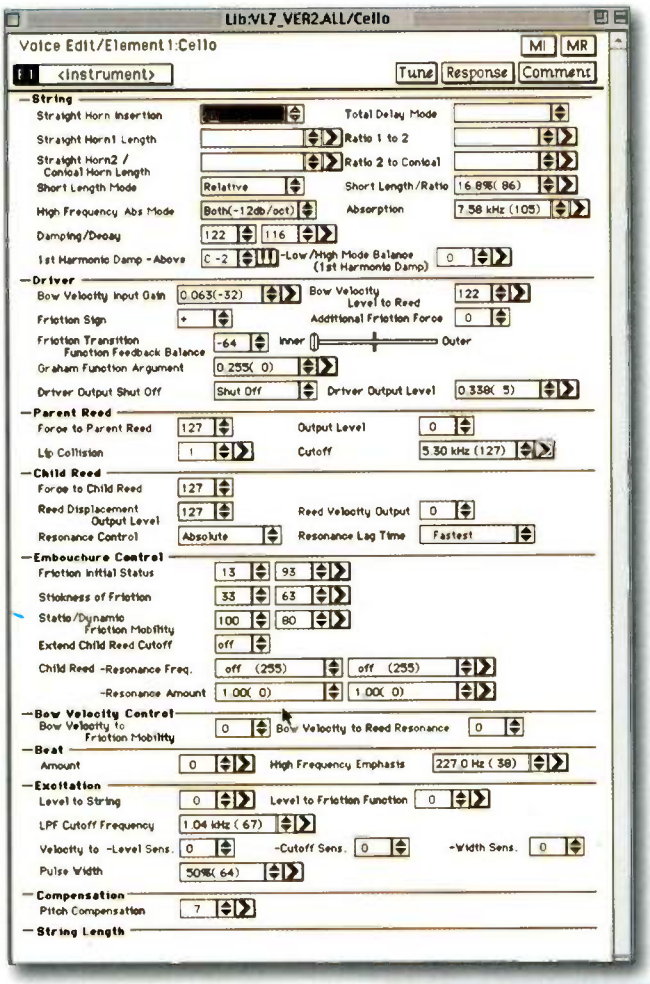
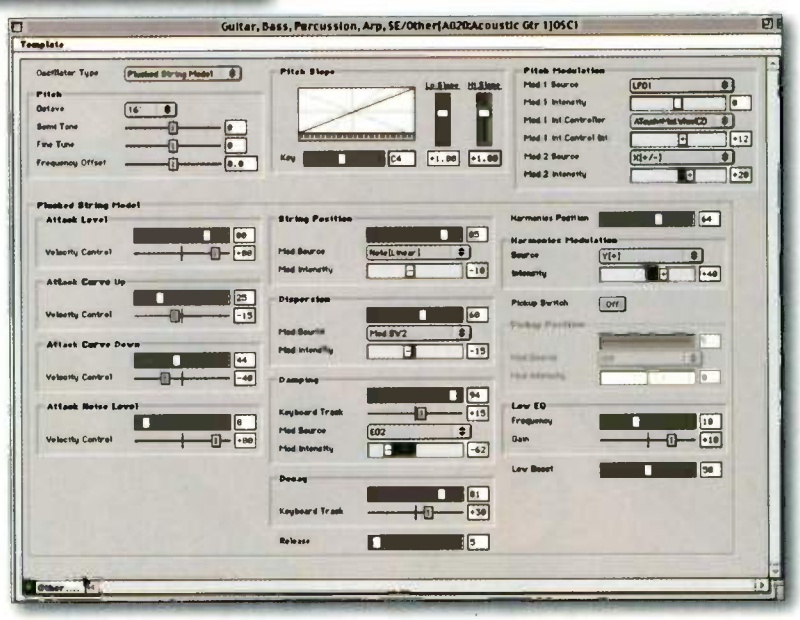


Above: Yamaha's VL synths use identical parameters to model string and brass instruments.



Right: Many of the parameters in Korg's Z1 Plucked String model can be modulated in real time.

▶ Argument had an old bluffer like me in a flat panic (a little research in the Penguin Dictionary of Physics tells me that the latter refers to Graham's law of diffusion). This editor is definitely not for the faint-hearted, because it really throws you in at the deep end, allowing access to every single parameter in the VL system via four or five tall windows (this software was clearly written on an A4 DTP monitor). However, as with most editing software the best way to learn about it (or any type of synthesis, in my view) is through grabbing the parameter bar, waggling it about, and seeing the effect it has on the sound.

I was a little confused at first to find that the string model had parameters for Conical Horn Insertion and other clearly brass-related terminology, but this turned out to be because the parameters for string and brass modelling on the VL are identical. This is apparently because the characteristics of a vibrating string are very similar to those of a vibrating column of air (see the box on Karplus-Strong synthesis). However, Yamaha's programmers have realised that this might be a barrier to thinking clearly about how you want to change your model to be more like a particular instrument, so there is a menu which lets you change the displayed parameter names between string and wind terminology. Thus the Slit Saturation Feedback Balance legend in a Wind model becomes Friction Function Feedback if you switch to String Terminology (whether or not this does help you to get your head round what you are trying to achieve is a debatable point!).

I have to say that this program really does deserve its 'expert' denomination, if only for the terminology — but don't let the jargon confuse you, it is fairly easy to use to get the results you want. The one problem I found was that the Expert editor does not allow you to keep several different windows open at the same time. This means that making simultaneous changes to the driver and the modifier is not possible, though separating the driver from the modifier by a different window at least leaves you in no doubt about the effects of each on the final sound.

The third piece of software from Yamaha, the Analogue Editor, really falls outside the scope of this piece, but briefly speaking allows you to turn the VL into a fairly simple analogue synthesizer, with all the standard components you would expect.

Z1 TO THE MACS

Korg's Z1 editor for the Macintosh is very different from the various different VL editors which Yamaha offer, being a much more integrated program. Analogue and acoustic instrument modelling are both covered in the same piece of software and, at another level, parameters for both driver and modifiers are all covered in one window. The plus side of this is that you can see all the parameters for the Reed model at once. The minus side is that if you are unaware of the driver/modifier theory side of physical modelling, this software will not make you aware of it — indeed, no knowledge of physical modelling theory is required at all to use this software.

For the most part the parameters (of which there are substantially more than in the Yamaha Visual Editor) are named much as a player of the instrument in question, rather than a physicist, would refer to them (see Bell Resonance and Lip Character in the Brass Model screenshot on page 190, for example), and even when more technical terms like Bow Differential or String Dispersion have to be used, you need only try switching it on and off to see what it does. The fact that everything within the individual model is available in one window also means that the mix and match approach of the Yamaha Visual Editor is not possible (no putting a cello bow across a flute tube in this implementation!). This is presumably because Korg's models are actually very different from each other, whereas Yamaha's VL is based around a single model which covers the territory between string and wind modelling.

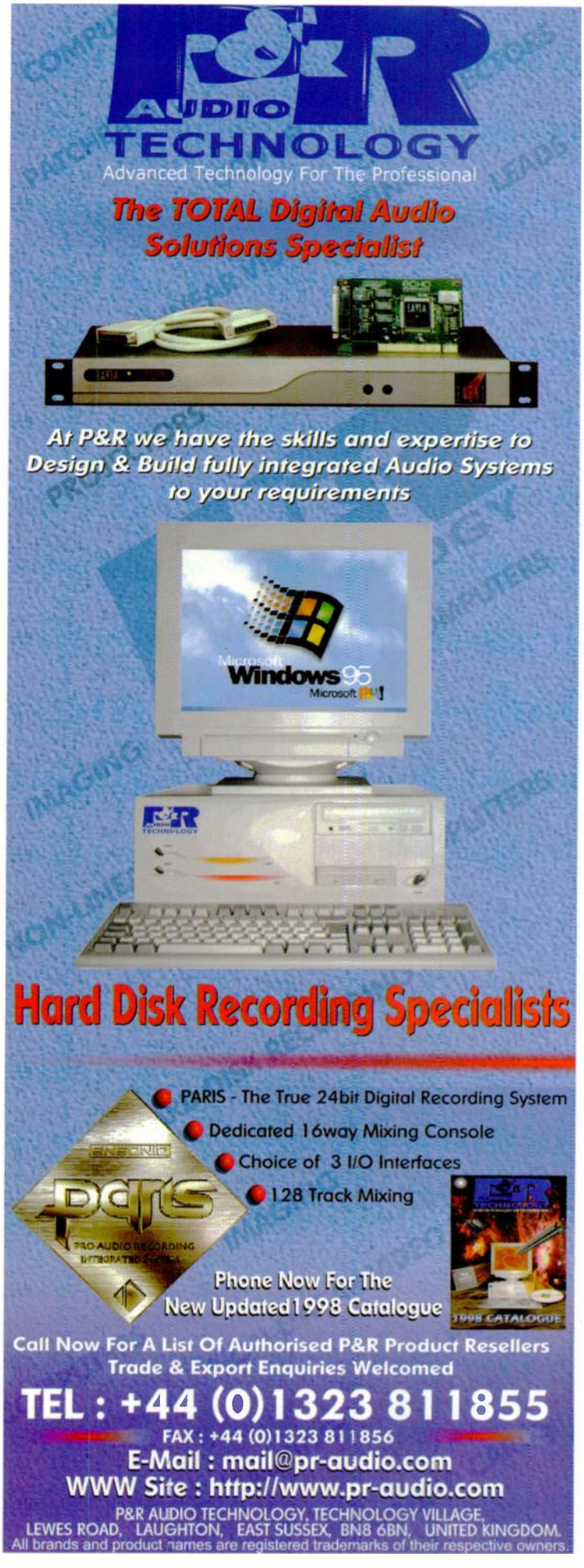
> "...the future probably lies in hybrid instruments combining the expression and real-time control of modelling with the authenticity of PCM."

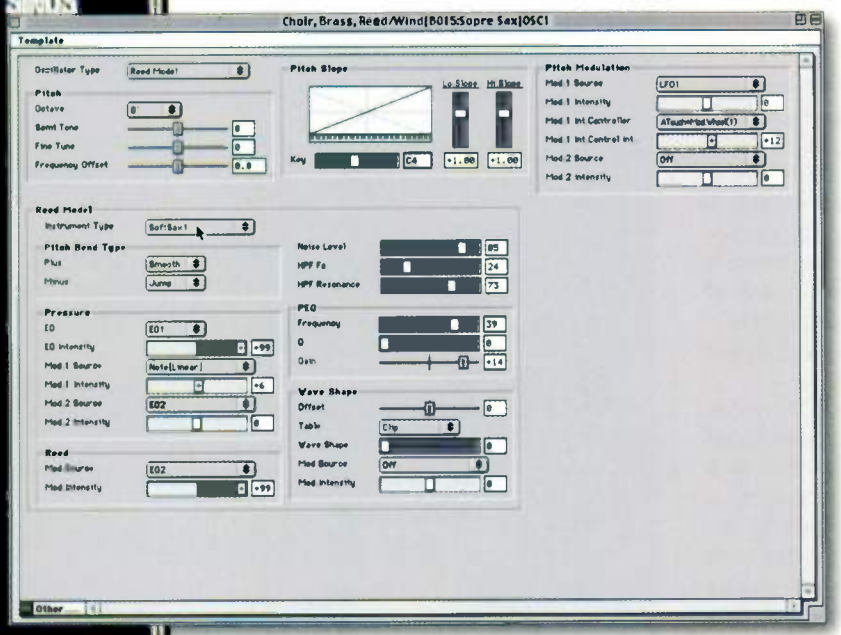
FULL OF PLUCK

The Plucked String model made its first public appearance on the Korg Prophecy, but as that was a monophonic instrument its use was limited to things like bass and lead guitars. On the Z1, the polyphony allows its use to be broadened to include strummed guitar chords and violin pizzicato as well as other instruments which you don't immediately think of as having plucked strings, like harpsichord and clavinet. Most of the parameters are fairly obvious (see screenshot opposite), with such factors as the position of the string pluck and harmonic stopping (as well as electric pickup if used), the force of the strike, the amount of damping and the dispersion within the string all not only accessible, but able to be modulated by keyboard tracking and/or all the real-time controllers.

ANOTHER STRING TO KORG'S BOW

The new string model in the Z1 is the Bowed String model, which of course means mainly members of the violin family. The real blessing of this is that finally strings which are both really responsive





The Z1's Reed and Brass models are divided into a number of sub-models, in which parameters for the length and shape of the instrument body are preset.

▶ and authentic are available polyphonically (Yamaha's VL series have an excellent solo violin which can be duophonic on the VL1). Sample technology gave really authentic strings in one bowing style (Marcato, Legato, Sforzando, etc) but by using the real-time controllers to change the Bow Speed and Pressure, you can now make smooth changes between these different playing styles without worrying about the artifacts which come from crossfading between different samples.

AMONGST THE REEDS

Both the Reed and Brass Models on the Z1 actually have a number of instrument sub-models (to take account of the individual differences between instruments). The parameters used do not change between different sub-models; the sound, however, changes fairly significantly as you switch from one to the next with exactly the same parameter settings. This is because the Korg models do not have parameters to describe the exact shape and length of the tube. Instead these are preset for each conventional instrument within the sub-model. This, again, fits in with the Korg implementation of physical modelling which aims for accuracy in the modelling of real instruments, rather than the ability to 'morph' between different instrument configurations as you can on the Yamaha. Here are the Reed sub-models available on the Z1:

- HardSax1
- HardSax2
- HardSax3
- SoftSax1
- SoftSax2
- Double Reed1
- Double Reed2
- Bassoon
- Clarinet
- Flute1
- Flute2
- Pan Flute
- Ocarina
- Shakuhachi
- Harmonica1
- Harmonica2
- Reed Synth

Because the size and shape of the instrument is fixed in the sub-model, the parameters which can be adjusted are principally things which may change due to the playing style, such as breath pressure. This means the expression available can be tailored very precisely to a player's technique or the style of music the instrument will be used for. Clearly, the way a clarinet sounds in classical music will differ greatly from its sound in jazz, yet the same physical instrument is used for both. It follows therefore, that it is the playing style which must differ. The parameters you see in the Reed model are what allow this difference to be made.

WHERE THERE'S Z1, THERE'S BRASS

As with the Reed Model, the Brass model copes with different sizes and shapes of instrument by having sub-models which you switch between. The user-alterable parameters are once again designed to elicit expression and feel from the model, by routing modulations to real-time controllers like the X-Y pad and the soft knobs below the display. The Z1 Brass Sub-Models are:

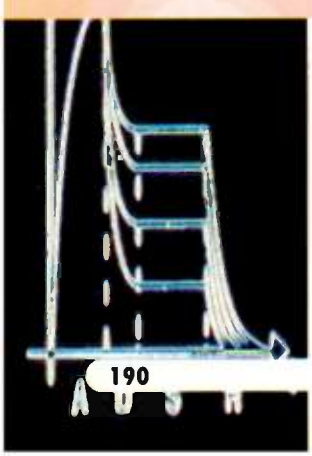
- Brass1
- Brass2
- Brass3
- Horn1
- Horn2
- Reed Brass

Here there are fewer sub-models than in the Reed Model, presumably because there are fewer differences between the different brass instruments than there are variations on the reed theme.

FUTURE MODELLING

The Z1 probably represents the pinnacle of modelling achievement to date, not just because of its 18-note polyphony or multitimbrality (although these are where the bulk of the DSP horsepower is expended), but because of its versatility. It covers the same analogue territory as Yamaha's AN1x, Roland's JP8000 and Clavia's Nord Leads, but allows more flexible imitations because it can have two models at once (as we saw in the first part of physical modelling), it does electric pianos and organs as well as the Technics WSA1 we covered last time, and now we find it a more specialised modeller for acoustic instruments in a similar vein to the Yamaha VL series. If you want to get a feel for the breadth of sounds and expression that physical modelling can cope with right now, the Z1 defines the current boundaries. If you want to really explore physical modelling for authentic sounds, then beg steal or borrow a Z1 and a Mac to run the editor on. Those of you who want to experiment with the grey areas between specific models and ▶

"Don't make the mistake of trying to do everything with one type of synthesis: give yourself as big a palette of sonic generation as possible!"



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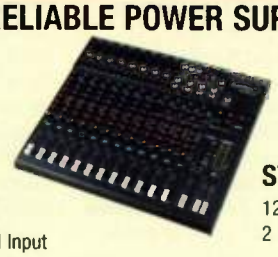

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▶ get into the more experimental side of modelling should look at some member of Yamaha's VL family, either a second-hand VL1/7 or the current VL70M module with one or more of the software editors (Visual if you want fast results or Expert if you really like a challenge).

COMBINING MODELLING WITH PCM SYNTHESIS

Whilst last year saw the release of a whole slew of new physical modelling instruments, including the Yamaha AN1x, Korg Z1, Roland JP8000 and Nord Lead II, this year has been very quiet. Apart from the rack version of the Roland, the 8080, which was shown for the first time at Summer NAMM in Nashville (see this month's News pages), the only really new development is the rackmount Supernova from Novation (reviewed in last month's *SOS*) which sadly I have yet to get my hands on. However, this does not mean that physical modelling is about to go away. On the contrary, the big news this year is that modelling is now being integrated into workstation synthesizers with a vengeance, allowing the solo instrument and analogue sounds at which it is particularly strong to be used alongside PCM-based synthesis. This year has already seen two Japanese manufacturers further extend the workstation concept with modelling and more must surely follow.

Actually, this is not that new an idea; two years ago, Korg's Trinity Plus, Pro and ProX included a solo board (available as the SOLO-TRI option), which added the monophonic capability of the Prophecy modelling synth to the Trinity's PCM-based synthesis. As the name implied, you could add a solo instrument, say a lead or bass sound, over the top of a polyphonic Combi or Sequence. As most of the sounds in the Prophecy were already designed for this kind of use, it made the Trinity workstation that bit more versatile especially for keyboard soloists who found PCM-based sounds great for backing tracks, but lacking the expressiveness needed when the spotlight fell on them.

However, users soon found that you often needed more than one sound from the S Bank (where the sounds were stored). The Solo board did great analogue or plucked string basslines as well as solo reeds and woodwinds or lead synths. The more creative Trinity owners added the HDR options which gave them four tracks of hard disk recording. This meant they could record four tracks of solo sounds to a SCSI hard drive and then have the fifth play back from the internal MIDI sequencer. Whilst not ideal, as only the last one was instantly available for editing, you could always keep the original MIDI solo tracks muted, so if they needed re-editing, you didn't have to play them in again from scratch. Then you would just re-record them to the hard drive once you had edited them.

This year saw a new range of workstation synths from Yamaha, the EX series (see review of EX5 in May's *SOS*). Along with their vast PCM-based polyphony there was also a duophonic An synthesis capability (monophonic on the EX7) and a VL synthesis capability (on the EX5 and EX5M only). This meant that EX owners could now also add an analogue lead or bass line or a solo reed or string sound to their sequences, perfect for bringing that expressiveness which only physical modelling can give to the most noticeable element of your sequences.

However, just as FM became truly usable and sonically pleasing (to this author's ears, at least) only when it could be combined polyphonically with AWM & User Samples on the Yamaha SY99 (my all-time favourite Yamaha product), the next big step for physical modelling will be when there is the DSP capability available within a synth to allow the polyphonic layering of a modelled sound with a PCM-based one. There was a certain element of this in the Technics WSA1 which we looked at last time, but this was still a bit of a compromise as the driver element of physical modelling was replaced, rather than augmented, by samples. In the past few months, I have been experimenting with this using a Trinity and a Z1 MIDIed together, and got some great results (once I thought to disable MIDI Program Change Receive on the Z1 — imagine the frustration when you haven't saved your editing on the Z1 and you change programs on the Trinity, thereby selecting a new Program on Z1 and losing your edits).

In the way that the future has of becoming the present sooner than you think, then, imagine my joy when the Trinity V3 turned up at Korg (for whom I consult as a part-time product specialist/tech support person) with a new six-voice MOSS synthesis capability (identical in structure to that of the modelling on the Z1) in addition to its 32-note PCM-based polyphony. This made my experimentation with modelling/PCM combination synthesis much easier (no more losing edits by changing programs) and I was also able to introduce my own samples into the equation from the PBS-TRI option. I have finally been able to get that elusive orchestral string sound, where the expressiveness of the bowed string model in changing from light strokes to the fierce 'digging-in' of marcato bowing can be combined in the same program with the rich texture of an entire string section which, for the time being, only samples can capture. The nearest I had before was on the SY99, where I used the FM element to get the variety in the playing style, but it never quite had the authenticity that you get from modelling. This instalment of Synth School was originally due to be published last month, when I wouldn't have been allowed to mention this latest development, but happily I waxed so lyrical about the modelling of electric instruments that the piece had to be split in two, and the V3 has now been publicly announced (and is reviewed on page 150 of this issue of *SOS*).

Perhaps one day the amount of DSP power available will be enough to generate the richness of texture which comes from 20 or 30 string players in unison, without needing samples and effects to fatten the sound up, but for the time being I am quite happy with this new combination of modelling and sampling which gets me closer than ever before. As a failed second violin player and would-be composer/conductor of orchestral music, this is the closest to heaven I have yet come. Those of you fortunate enough to have access to both modelling and PCM-based synthesis really should try combining the two, whether via MIDIed 'additive synthesizers' or internally within one instrument.

I get the feeling that the Z1 will look as relevant as the DX7 does now in 10 years time — an instrument that represented a quantum leap forward at the time of its introduction, especially in terms of allowing a player's individuality and expression to come through. Given another 10 years of DSP development, we can expect to find instruments that have the power and speed to tackle the really tricky timbres like the acoustic piano, modelling the interactions between the struck strings and the undamped ones authentically in real time.

Until then the future probably lies in hybrid instruments like the Yamaha EX5 for monophonic instruments and the Korg V3 for polyphonic ones (see box, left), combining the expression and real-time control of modelling with the authenticity of PCM for big ensemble sounds for which modelling still can't create the sonic complexity.

AUTHOR'S MESSAGE

As we near the end of this year-long round up of the different synthesis styles which have been made available commercially over the years, there is a thought I would like to share with you. My recent experiments in combining modelling technology with PCM synthesis (see box) served to underline a lesson I learnt years ago when first combining samples with analogue and digital synthesis, a technique which manufacturers eventually refined into the PCM-based synths of today. No one type of sound generation will give you all the different timbres and expressiveness you want. Don't make the mistake of trying to do everything with one type of synthesis: give yourself as big a palette of sonic generation as possible! Mix and match synthesis types to play to their strengths and cover their weaknesses. Mistrust those ads which tell you any one product will give you all the sounds you need, but encourage manufacturers who combine technologies within individual machines like the Yamaha SY99 or EX5, the Technics WSA1 or the Korg V3, as well as those who persevere with the more esoteric forms of synthesis like Kawai and Waldorf. It will be a very dull world, sonically speaking, if we all end up using PCM-based synthesis for everything (something which looked a very real danger a few years back, but which has now receded somewhat thanks to physical modelling and the re-emergence of analogue synths in dance music and the like).

Next time, we will finish off by taking a look at some more esoteric types of synthesis like granular and re-synthesis which are emerging from the less commercially driven areas of computer shareware and the Internet, further expanding the palette of sonic creativity. In the meantime, get your hands on physical modelling in some shape or form if you possibly can (remember you can now get a VL70m or a Prophecy for under £500), and don't forget to try combining it with the other synthesis types to which you have access, either in sequences or individual program combinations. Your music will be the more expressive for it.

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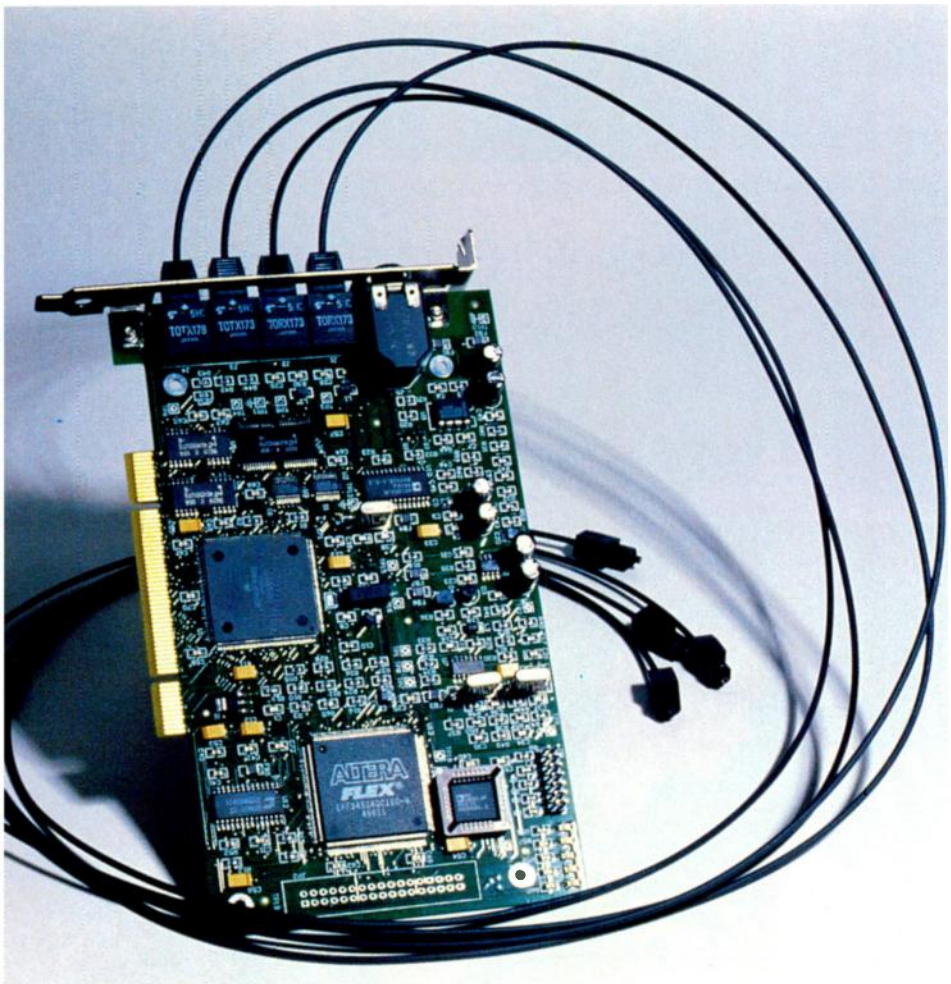


light fantastic

SONORUS STUDI/O MAC & PC SOUNDCARD

As the popularity of the ADAT optical 8-channel digital interface has grown, PCI soundcards have appeared to transfer this audio into and out of computers. However, Sonorus's STUDI/O has two optical connectors, permitting 16-channel operation. MARTIN WALKER makes light work of his optical cables.

Many manufacturers are adopting the ADAT-style digital interface as an ideal way to move multiple channels of audio around the studio, primarily because it allows eight channels of simultaneous audio to travel down a single optical cable (and also completely removes any possibility of hum loops). Computer soundcards are ideal candidates for this, but if you already have an ADAT machine, there are more benefits to be had. The beauty of partnering a soundcard with an ADAT machine is that not only can you transfer multichannel tape recordings 'en masse' to the computer, but the overall cost of the soundcard is kept down by using the existing eight sets of ADAT A-D and D-A converters.

We have already reviewed the Frontier Design WaveCenter card (*SOS* July '98), and the Korg 1212 (July '97), both of which feature a single pair (one in and one out) of ADAT-compatible Toslink optical connectors. The Sonorus STUDI/O takes things a step further with two pairs of ADAT sockets. Both inputs and outputs can be independently mapped as a total of either 16 mono devices, eight stereo devices, two eight-channel devices, or a single 16-channel device.

The hardware looks strangely similar to the soundcard supplied with the Creamware TDAT 16 (reviewed *SOS* Feb '98), although this package comes as a complete system with proprietary software, and is likely to appeal to a different type of musician.

To provide more versatility, each of the two 8-channel ADAT I/O channels can be switched via software to act in S/PDIF mode, with sample rate conversion also available. The internal architecture of the STUDI/O will support up to 24-bit data, and an 18-bit D/A converter is provided for monitoring purposes.

INSTALLATION

The STUDI/O is a PCI card, and both Mac OS and PC Windows 95 drivers are provided on floppy disk (Windows NT drivers will hopefully be released later this year). There is also a CD-ROM containing a variety of DAW demos. Physical installation is fairly simple, since the card is only seven inches long, and should therefore fit into most computers — I certainly had no problems. Its backplate has a stereo quarter-inch jack socket for the single stereo analogue output, and four Toslink optical connectors: In A, In B, Out A, and Out B. I'm pleased to report that four two-metre long optical cables are also provided, since these are not as easily available as co-axial ones. You will probably have to make up a stereo quarter-inch jack plug to twin mono jack plug lead if you intend to use the analogue output with a mixer, but it is encouraging to see a full-size jack socket rather than the far less robust 3.5mm variety. And, of course, this socket is also perfect for plugging in headphones.

Installation on the Mac proved very easy, but for my PC I decided to remove my Gina digital audio card in case of conflicts, as well as temporarily disabling its drivers. Despite this, Plug and Play didn't initially recognise the new STUDI/O hardware when I rebooted. The problem came to light after looking in Control Panel/System, since the Gina drivers were still listed (but disabled). Normally a PC won't load the drivers at all if the hardware isn't found. For some strange reason it transpired that my PC thought that the Sonorus STUDI/O was the Gina card, and therefore didn't see the need to install any new hardware drivers. Once I removed the Gina drivers altogether from my system, the STUDI/O was detected during the next reboot, and its drivers were installed with no further problems.

CAN I SEE THE MENU PLEASE?

Once the Windows 95 desktop appeared, a new applet appeared on the Taskbar, and this allows you to access various utility panel displays. The most comprehensive of these is the STUDI/O Properties page (see Figure 1), which can also be opened from the normal Control Panel. Since each of the optical inputs and outputs can be separately configured for either ADAT or S/PDIF standards, there is a host of possible configurations, and the most common are provided in the Format page.

After selecting from a drop-down menu of options, the In Routing and Out Routing are automatically re-configured, and you can view these separately (see Figure 2 overleaf). The preset options include two ADAT machines, as well as various permutations of ADAT, DAT, CD digital out, external A-D and D-A converters, and a Korg 168RC digital mixer. Other relevant devices mentioned in the manual are ADAT XT, Fostex CX8/RD8, the Yamaha 02R and 03D digital mixers. Direct Digital Distribution (the UK distributors of Sonorus products) also mention the new Spirit 328 digital mixing desk, and the Mackie digital 8-buss.

As expected, both the In and Out routing pages allow users to create and save their own patches. Also on the Format page is another window for Advanced Settings, and this provides a selection of extremely useful options. There is Phase Reverse for each of the digital inputs and outputs (to combat various known idiosyncrasies of early ADAT machines), 16/18-bit option for the D-A converter (the 16-bit option dithers the output, rather than simply truncating the extra bits), and DAC operating level (which defaults to -10dBm, but can be altered from -55dBm to +8dBm to suit your external equipment).

Options on the Clocks page allow you to select Main Clock (either locked to Input A or Input B), Lock to External Word Clock, Internal 44.1kHz, Internal 48kHz, and finally Internal Varispeed (between about 30 and 50kHz). The same options are available for the sample rate converter clock, and this is greyed out until you are using an S/PDIF output, when you can choose any option and perform real-time sample rate conversion. External Word Clock requires the optional Sync Backplate — this provides a BNC word clock input and a 9-pin ADAT Sync input (see the box on this elsewhere).

The Taskbar icon also indicates the current status. A green icon signifies that all is well, and a red one that something is amiss. To find out what is causing the problem, the Show Status/Errors window provides seven indicators for general status (such as input data errors, and problems with the sample or master clock), and a further six specifically for S/PDIF faults (such as No Lock, parity and CRC errors).

Mixing and metering displays are also provided, and what a list of options! The Monitor mixer can show all 16 input and 16 output faders, each of which has an associated Pan control and Mute and Solo buttons. There are also left and right Stereo Master faders with Mute buttons — a total of 34 faders in all, neatly displayed across the full width of a 1024x768 resolution screen. Labelling can be either 'logical' (for example In 1L, or Out 5R), 'physical' (for example S/PDIF In 1), or user defined. There are also two drop-down menus that let you route the monitor mix to any two pairs of digital outputs.

When it comes to metering, the same options for input, output and masters are available, but the range of the meters can be set to 30, 60, 96 or 144dB (for full 24-bit recording). The ballistics can be set to Instantaneous, Peak Hold or Infinite Hold, with variable decay rate. The full-scale reference level defaults to -14dB (a typical setting for digital recorders), but can be altered to 0dB and -24dB. I wish all such software metering was as comprehensive as this.

DRIVERS AND MANUAL

As far as Windows 95 is concerned, the Sonorus STUDI/O normally appears to the Multimedia section as 16 inputs (arranged as eight stereo pairs) and 18 outputs (Stereo Out 01 to 08, plus the stereo Monitor Out). This enables it to be used by any standard Windows 95 application that can access multiple stereo pairs. However, the Settings page in the Windows 95 Device Manager allows Windows 95 Multimedia to see the card as any number of stereo devices between one and eight, or as two 8-channel devices, a single 16-channel one, or even 16 mono devices. You can even enable all of these simultaneously.

ASIO-specific drivers are provided for both Mac and PC users, so anyone using *Cubase VST* gets the immediate advantage of much lower latency, with all the benefits this provides — in other words, less time lag when monitoring inputs during recording, and much more immediate response of all metering and transport controls.

Physically installing the Sonorus STUDI/O on the Mac is no different to doing so on the PC, but on ▶

pros & cons

SONORUS STUDI/O SOUNDCARD £599

pros

- 16-channel, 24-bit signal path.
- Versatile software switchable support for ADAT or S/PDIF digital formats.
- Comprehensive metering and monitoring.
- Four optical cables included.

cons

- No uninstall routine.
- Noisy right-hand monitor channel on review sample.
- Some configuration options missing on the Mac software.

summary

A versatile solution for anyone who already has an ADAT or two, and wants to take advantage of a full-screen computer editing environment.

SOUND ON SOUND

Figure 1: A host of options is provided in the Format page of Properties — many combinations of equipment are already included as presets, such as the ADAT plus CD digital inputs (10 input channels in total), and ADAT and external stereo converter (10 output channels) shown here.

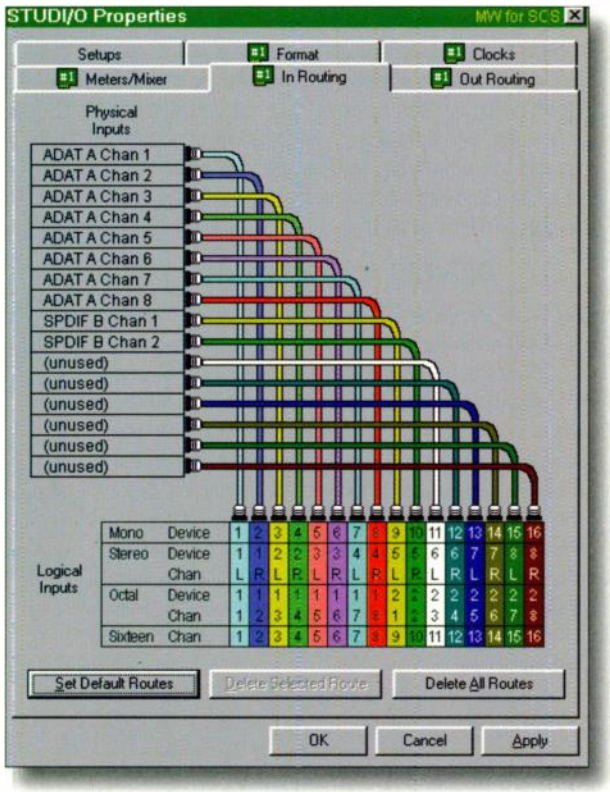


Figure 2: Every input and output can be interconnected using an electronic patchbay. If you don't like the default connections you can create your own.

"Mixing and metering displays are also provided, and what a list of options!"

▶ the software side only ASIO drivers are provided. These do however include a small Control Panel (launched from the *Cubase* Audio System Setup window), that allows adjustment of latency, number of bits (16 or 24), and D-A output level. I suspect that a more comprehensive utility may be provided in future. To provide some of the missing configuration options, three completely different drivers are available.

- StudIO-16ch (sic) gives you the dual ADAT capability.
- StudIO-10ch leaves the A channel as ADAT, but changes to S/PDIF on channel B, giving you a total of 10 channels, as well as sample rate conversion on the S/PDIF input.
- The StudIO-32ch driver is for two STUDI/O cards run in sync, which provides 32 ADAT channels.

Once your choice of drivers has been copied over to the *Cubase* ASIO folder, *VST* setup is carried out in exactly the same way as it is with the PC, and I soon had audio pouring forth from the card.

Both written and CD-ROM versions of the manual are provided, and in general these are quite helpful during installation and setup. The programmers' Mac bias is fairly obvious. They obviously took great delight in creating loads of possible Windows 95 error messages, although these do include many relating to problems with the soundcard hardware, and many more which have never been seen in practice. However, perhaps a little less enthusiasm for exposing possible problems with Windows 95 would have left more time to spot that, in at least one case, the screenshots in the written manual show different options from those in the CD-ROM manual, and both are different from the actual screens shown by the software!

In addition, no Windows 95 uninstall option is provided — there is simply a list of files that need to be deleted by hand, as well as instructions on how to remove items in the Registry (not recommended for those of a nervous disposition!)

TESTING ONE, TWO

On the PC, I decided to start by trying the simpler options first, and then work my way up to the dizzy heights of simultaneous multitrack recording. I used *Wavelab* to audition the 18-bit analogue output using existing WAV files. Initially the card played back at a too low a sample rate — this is something that can easily happen once you are working in a system that often locks its clock to an external source.

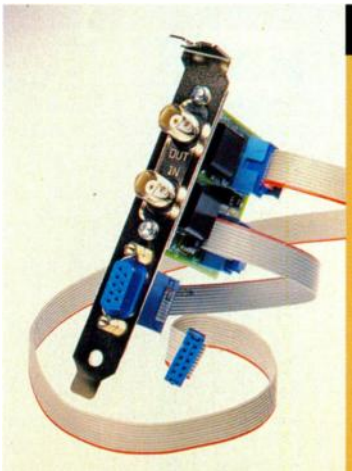
Sure enough, once I opened the Properties page (see Figure 1) and changed to a 44.1kHz internal clock, everything played back perfectly. Audio playback quality was fine, although I did notice that the right-hand channel had a much higher background noise level than the left (regardless of the setting of the output faders in the soundcard monitor mixer). I suspect that this may be a rogue, one-off fault, and despite this it was still fairly quiet at normal listening levels.

Moving on to stereo digital, I connected one of my Sony DAT recorders to Input A, and once the Main Clock had been changed to 'Lock to Input A', I experienced no problems recording from several of my DAT tapes. As always, my Sony DTC690 machine refused to recognise the existence of the Sonorus STUDI/O digital outputs, but this is because it is pernickety about the consumer/professional bit. My TCD-D7 portable had no such problems. Overall, I had no problems recording or playing back with *Wavelab*, *Sound Forge* or *Cool Edit Pro*.

MULTITRACK SUPPORT

When using *Cubase VST*, the ASIO drivers make a huge difference to performance. With typical settings, the multimedia drivers had a latency of 750mS, while the latest version 1.35 of the ASIO STUDI/O driver gave a much lower default figure of 128mS. It is possible for users to reduce this ▶

BACKPLATE OPTION



For an extra £116, the STUDI/O-Sync Backplate adds twin BNC sockets for Wordclock In and Out, along with a 9-pin ADAT sync input that reads timecode. It connects internally to the STUDI/O card using a ribbon cable, but uses no extra system IRQs or system resources (although it will of course prevent an expansion card being used where the backplate is situated). Drivers are provided which then allow you to directly read timecode from an ADAT and have it translated to MIDI Time Code — this avoids having to use special hardware. A Punch I/O control panel (PC only) allows you record and play between ADAT and computer with sample accuracy (with compatible software).

STUDI/O-Sync backplate option.

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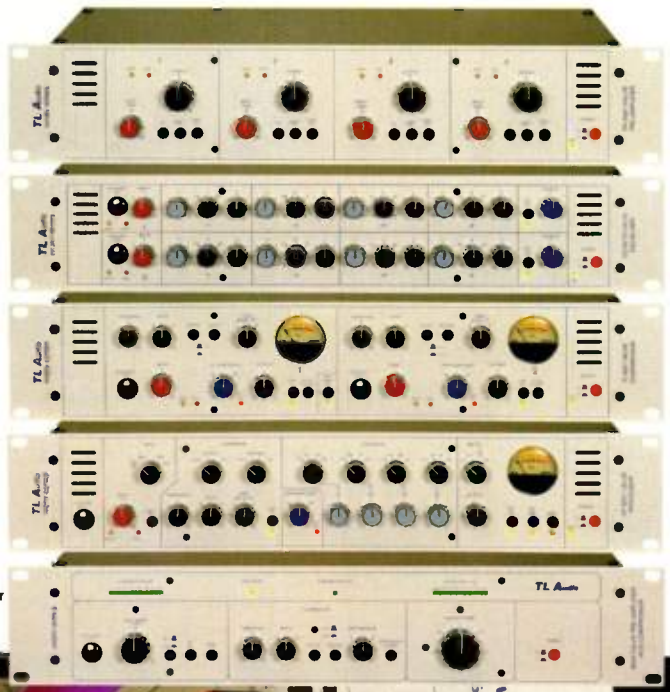

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Figure 3: The Sonorus STUDI/O interfaces easily with Cubase VST. Here eight pre-recorded tracks (moved en masse from an ADAT tape) have been routed back to the STUDI/O ADAT outputs.

"I liked the Sonorus STUDI/O for its versatile approach. It doesn't matter what digital outboard equipment you have — as long as it has optical connectors, it is likely to interface fairly easily."

down to 32mS with a fast PC, and even lower on the Mac.

Once I had connected an ADAT, and then recorded an eight-track test piece on to tape, I tried transferring the whole lot across to *Cubase VST* in one pass, using the sequencer's MultiRecord facility. This worked first time, with no noticeable side effects, which is pretty good going for my rapidly ageing Pentium 166MHz MMX machine. The manual contains a lot of useful information on how to deal with clicks or pops — these are most likely to be caused by incorrect clock settings, although the usual culprits such as PCI graphics cards may also be to blame.

If you have two ADAT machines, then the preferred approach is to sample-lock them together with an Alesis 9-pin sync cable. For the best results when recording, your A-D converters should provide the master clock for the rest of the system, since the recordings will then have the lowest noise. So, when one or more ADAT machines are being used, they should ideally be the clock source, and since clock jitter gets worse as you move down the chain, you should make your clock source the first one in the chain. However, there are situations when using the STUDI/O clock is preferable — for 44.1kHz recording for instance — since the ADAT clocks at 44.122kHz internally.

SUMMARY

I liked the Sonorus STUDI/O for its versatile approach. It doesn't matter what digital outboard equipment you have — as long as it has optical connectors, it is likely to interface fairly easily. The provision of sample rate conversion is also extremely useful for ADAT owners importing 48kHz recordings that need downsampling to 44.1kHz for final mastering. Some people addicted to numbers may wonder why the D-A converters are only 18-bit, but for monitoring purposes these are fine. If you really want higher-quality converters you will probably want to press those of your ADAT into service.

For once, Mac and PC owners are both catered for well, and although it is fairly obvious from the humorous carping in the manual that Sonorus prefer the Mac platform, this doesn't prevent the STUDI/O from being easy to use on the PC too. As far as comparisons with the direct competition go, the Korg 1212 and Frontier Design WaveCenter cards only have a single ADAT optical interface (eight channels) and as the WaveCenter is an ISA card, its use is restricted to the PC.

Of course, if you want more analogue channels, and/or DSP effects, there are many other systems to consider. However, if you want a basic 16-channel, computer hardware package as a partner for a pair of ADAT machines, and also want to continue using your existing software, then the Sonorus STUDI/O seems an ideal way to do it. As the publicity claims, this does seem to be about the cheapest 24-bit, 16-channel digital audio card on the market at present. SOS

I/O SPECIFICATIONS

Digital inputs: two off Toslink optical receiver.
Digital outputs: two off Toslink optical transmitter.
D-A converter: 18-bit.
Output THD+Noise: 0.004% (-94dB), unweighted.
Analogue Output: +10dBm into 60Ω.
SRC Dynamic Range: 96dB.
SRC THD+Noise: -95dB.

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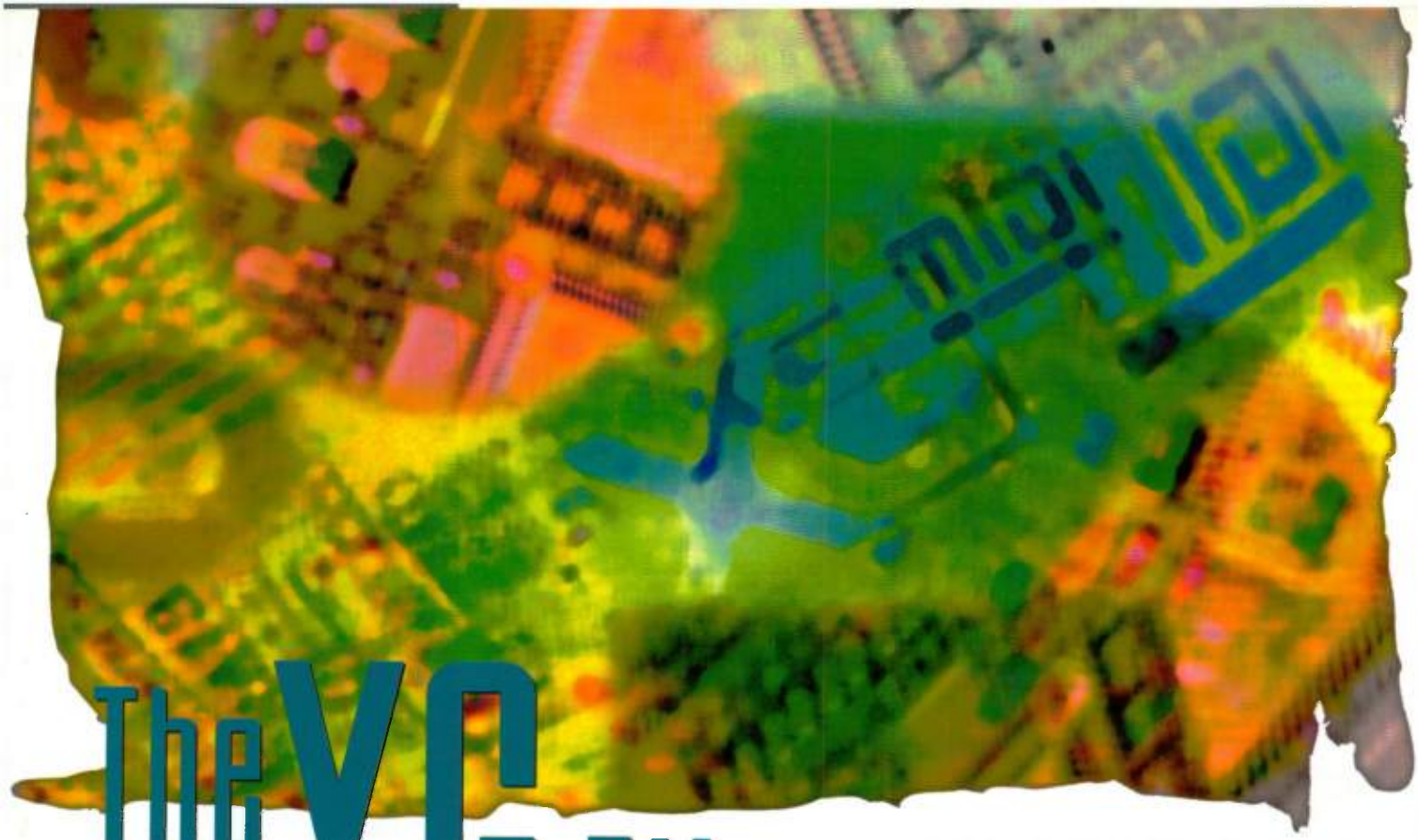

The XG Files

DEMYSTIFYING YAMAHA'S XG SOUNDCARDS

NICK HOWES of Yamaha's European Music Software Division

shows you how to get the best out of XG soundcards.

Like Roland's GS protocol, XG is an extension to General MIDI or GM (see the 'General MIDI: In General' box). XG is implemented both in stand-alone instruments and soundcards. The advantage of soundcards is that they are affordable, yet have technical specification that rivals many stand-alone synths. Many users, however, get no further than playing with the presets. The aim of this article is to explain a little of the technical background of the format and then suggest a few areas that XG soundcard owners might like to explore in more depth.

The concept behind XG is to provide greater scope than the original GM or GS specification by allowing upward expansion whilst maintaining backward compatibility. The three key features of XG are:

1: Compatibility: Any XG instrument, regardless of model or manufacturer, will provide faithful reproduction of XG music files and will also be 100% General MIDI-compatible, since it is an enhancement to, and not a replacement for, General MIDI.

2: Scalability: There are several different levels of XG compatibility. One level is implemented in high-end instruments such as the Yamaha MU80; another is implemented in mid-range instruments such as the Yamaha MU50; and details of additional levels will be announced in the future. These different levels should mean that we'll be seeing a wide range of XG instruments in the years ahead, each with its own character and each offering different feature sets at different price points. Each, however, will faithfully replay XG data in accordance with its level of sophistication — if a particular instrument doesn't support a variation voice, for example, it will automatically substitute the corresponding basic GM voice.

3: Expandability: The XG format, like MIDI itself, is an open architecture, which will allow for the addition of new enhancements as future technology continues to evolve.

CARD GAMES

The standard General MIDI format provides only 128 voices, and allows only limited parameter editing. The XG extension is designed to increase both the number of voices available, and the range of editing and processing possibilities. Yamaha's DB50XG daughterboard and ISA Buss SW60XG synth soundcard, for instance, feature not only substantial synthesizer sections, but also more than 60 24-bit resolution effects processor types, ranging from ▶

GENERAL MIDI: IN GENERAL

The continuing success of MIDI as a standard for interfacing musical instruments and controlling devices is probably due to its extreme flexibility. This flexibility, however, also means that MIDI files created for use with one instrument can sound utterly different when played back on another. In order to overcome this problem, a stricter protocol called General MIDI or GM was introduced in 1991. The General MIDI protocol specifies a set of 128 sounds with fixed patch numbers, the idea being that every synth or sound module which supports the protocol will play back General MIDI files using (its interpretation of) the appropriate sounds. On any GM instrument, for instance, patch number 13 will be "marimba", though different GM instruments may have different ways of synthesizing the sound of the marimba.

While the basic GM specification certainly allows MIDI files to be played across different platforms without compatibility problems, however, many users find its 128 voices and limited editing facilities too restrictive. Some manufacturers have, therefore, developed extensions to the basic ("Level 1") GM specification, the idea being to extend the number of voices and the degree of editing available while retaining the cross-platform compatibility which is GM's main attraction. The XG protocol is Yamaha's extension to General MIDI.

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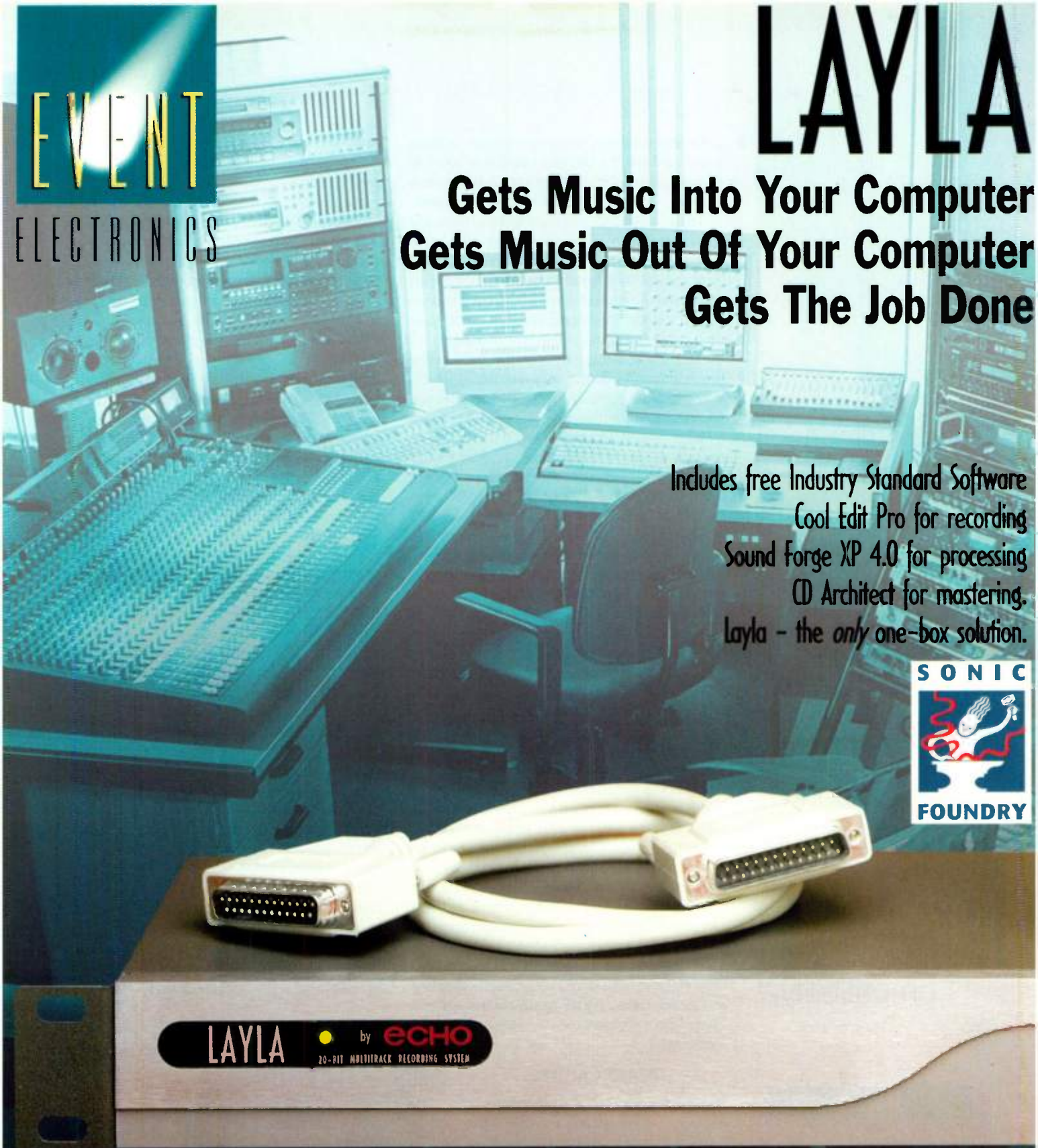

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To use a DB50XG you need to plug it into any soundcard with a 26-pin WaveBlaster-style connector. Most SoundBlaster compatibles (apart from the AWE64) feature this connector, which comprises two rows of 13 pins wired as shown in table 1 below. The sound from the DB50XG is then piped out through the host soundcard, so the ultimate sound quality is only as good as the host soundcard's output stage permits — which, in the case of many cheap or poorly screened soundcards, is far from ideal. In order to produce a cleaner sound and make mixing more flexible, therefore, some users have modified their DB50XGs so as to bypass this stage by providing a separate, direct output. Details of this modification were given by Martin Walker in the February 1997 issue of *SOS*. The SW60XG is a complete soundcard in its own right, and has its own 18-bit D/A converters designed to provide sound quality comparable to that of a stand-alone synth.

A major advantage to using a daughterboard such as the DB50XG is that it requires no software drivers — if the host soundcard works, the DB50XG will work just so long as the host card correctly feeds MIDI out of its WaveBlaster port. The downside of this setup is that most SoundBlaster type cards can only address 16 MIDI channels across both their external joystick/MIDI ports and the internal WaveBlaster connector. In practice, this means that whatever is coming out of the external MIDI socket is also being sent to the DB50XG. If this is too limiting, fitting an SW60XG is a better solution, as this card functions as an independent MIDI port, though it does take up an ISA slot. Ensure that you don't have a joystick plugged in when you're making music as these can sometimes interfere with MIDI operation.

Some of the more professional cards (like the Turtle Beach range) have independent access to their external MIDI ports, but even on standard soundcards there's still a way around this problem using system exclusive data — more on this in a moment.

"The concept behind XG is to provide greater 'scope than the original GM or GS specification by allowing upward expansion whilst maintaining backward compatibility."

TABLE 1

Pin out assignments for DB50XG conforming to WaveBlaster specifications:

24	LEFT OUT
20	RIGHT OUT
1,3,5,7,9,11	DIGITAL GROUND
15,17,19,21,23,25	ANALOGUE GROUND
6,10,14	+5V
18	+12V
22	-12V
4	MIDI IN
8	MIDI OUT

PRACTICALITIES

Because the DB50XG is a daughterboard and not connected directly to the PC-Buss, it will not appear as a device or driver in your PC multimedia-MIDI properties list. The option to select the DB50XG will usually be something along the lines of 'MIDI for External Port' or similar. This can normally be configured from the drivers for your host soundcard, and with the Creative Labs SB16, it should just be a case of plugging in the DB50XG and switching on.

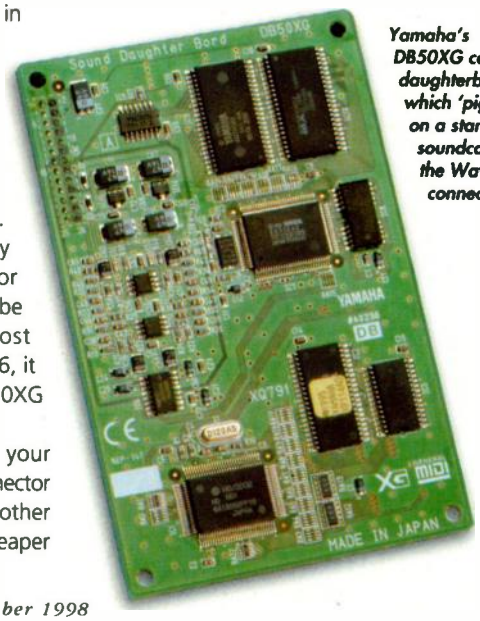
If you open up your PC and find that your soundcard doesn't have the WaveBlaster connector socket (for example, the AWE64), there are other options. One solution is to fit one of the cheaper MIDI interface cards with a daughterboard connector, but this takes up systems resources and may compromise the sound. The SW60XG is a more effective alternative.

Knowing the extent to which Plug and Play was fraught with problems, Yamaha decided to produce a stand-alone ISA buss card, the SW60XG, which was released about 10 months after the DB50XG. The card has analogue inputs that allow it to be used both as a synth and as a 24-bit multi effects processor (both the DB50XG and the SW60XG have three independent parallel effects busses). Yamaha decided not to give the SW60XG its own external MIDI interface, on the grounds that nearly all PCs are shipped with a soundcard of some description, all of which come with MIDI interfaces as standard; including an additional MIDI interface would have added significantly to the processor's interrupt burden.

The driver that comes with the SW60XG installs across Windows 95 and Windows 3.11 in exactly the same way, and uses only one port address, selectable from a range of options. If an external MIDI port had have been fitted onto the card, this approach would not have been possible. The SW60XG functions as an internal MIDI device and appears in the device list for multimedia devices in the Windows control panel, it can be accessed independently of any MIDI equipment you might have connected to another soundcard.

To run the card in Windows NT 4.0, select a port address that your existing cards aren't using (SCSI cards and SoundBlaster compatibles tend to use Port 300H or 330H, so it's best to avoid these) and installing the SW60XG as a generic MPU401 device. The same is true for for OS/2, and it's possible to run multiple SW60XGs in one machine (slots permitting).

For external use, the MU10XG (now discontinued) was produced using the same basic sound engine as a DB50XG but with direct computer interfacing for Macs, PCs and Atari STs as well as regular MIDI. The XG range of modules and keyboards has a common operating protocol, so if



Yamaha's DB50XG card is a daughterboard which 'piggy-backs' on a standard soundcard using the WaveBlaster connector.

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XGEdit allows you to use SysEx without all that tedious mucking about in hexadecimal.

▶ you have an MU50/80/90/100, or even a CS1x, then much of this article is still relevant.

NO SYSEX PLEASE, WE'RE BRITISH!

While it's quite possible to control XG instruments via raw SysEx as described in the box below, it's not everybody's idea of fun. Fortunately, however, there is a more user-friendly way to do so. *XGEdit* is a utility which was originally developed for parameter editing on the GS range of modules and keyboards. Its programmer, Gary Gregson, has since adapted it to work with the DB50XG, and it is designed to make editing the XG cards as easy as editing a conventional synth, by taking every parameter that you can access via SysEx and turning it into a knob or menu box. Currently, *XGEdit* supports Windows 95, 3.11, NT 4.0 and Macintosh (for the MU10/50 and 80). As Gary owns the rights to *XGEdit*, he charges £25 for the registered version; this and the shareware version are distributed via Yamaha's UK web site (www.yamaha.co.uk). If you own an XG card and want to do detailed parameter editing, it's well worth the money.

As with any synth editor, the full version allows you to save your edits, but it also allows you to load in a GM MIDI file and edit the sounds as the file is playing — *XGEdit* has a functional MIDI playback facility. You can then resave the resulting MIDI file with all of the correct XG voices (full access to every single sound, by name!), and settings, which can then be loaded back into your favourite sequencer so you can carry on with the composition process.

TURN ME OFF

As was mentioned earlier in the article, when the DB50XG is connected to a basic SoundBlaster-compatible card you tend to get everything that goes to the WaveBlaster socket coming out of the joystick MIDI port as well. The way around this is quite simple (though still frustrating when you want to use any card attached to the socket to its full 16-part capability) — you turn off channel reception on the DB50XG. Having first initialised the card in XG mode (XG On), as explained elsewhere in this article, a set of SysEx commands must be sent for each channel.

The command for turning off individual channels is:

F0 43 10 4C 08 NN 04 7F F7

Where NN is the part number, or MIDI channel (eg. 01 to 0F, corresponding to channels 1 to 16)

Put this SysEx message into your event list, and the DB50XG will no longer respond on whichever channels you've turned off until you next send an XGreset. ▶

CODE WARRIORS

Anyone who's read the manual that comes with the DB50XG will tell you that whilst it is certainly thorough, it's not exactly an entertaining read. I know from answering hundreds of calls and emails that to many, SysEx is a minefield of unintelligible code. It is, however, something upon which the XG cards and modules rely heavily. System Exclusive data is manufacturer-specific code that is normally entered in hexadecimal form, and makes up a string that points to a parameter. The easiest way to explain this is by example.

All SysEx messages start with the code F0, and end with F7. Let's consider the most important SysEx message for XG — the XG System On message:

F0, 43, 1n, 4C, 00, 00, 7E, 00, F7

As we have covered the F0 and the F7, let's skip on to the second data byte. For all Yamaha instruments this is also essential, as it's the Yamaha ID code. If the second data byte is not hexadecimal 43, any Yamaha piece of equipment will simply ignore the rest of the message. With respect to the third data byte 1n, n is the device number. This is normally set to 0 (0 to A are possible in Hex), in which case your data byte would appear as 10. The fourth data byte 4C is the model ID. This can vary from synth to synth, but for most of the XG range (all of the soundcards) is always 4C. Next comes the bit that actually does all the work. The four values represent the address locations of the parameter that you wish to access and the data value that you wish to assign to this address.

The XG cards have multiple editable parameters, so how for instance would you select one of these using system exclusive data? Well you would start by loading up your sequencer and using the event list option to enter SysEx (check your sequencer manual for how to do this). For this example I'll use *Cakewalk*, but any of the good pro sequencers on the market should do the job equally as well.

The example I'll use is the Pitch Envelope Initial Level. This can be represented in SysEx as follows:

F0 43 10 4C 08 00 69 NN F7

The data bytes in this message are 08, 00, 69 and NN. The 08, 00, 69 together make up the address location of the parameter for PEG INIT LVL (Pitch Envelope Initial Level) — locations for all the DB50XG's editable parameters are listed in the manual. NN is the value to be assigned to that location, and can be any value in Hex between 0 (off) to 7F (full on).

All parameters can be accessed in this way, and many of the common ones such as filter cutoff can also be accessed just by using standard MIDI controllers rather than SysEx, which makes life even easier. A full list of every XG parameter and more on how to use SysEx is available in a free booklet from Yamaha.

The key to success when manually entering the SysEx into your own composition is the data order. XG is rather strict about the order in which the initial data is sent and how far apart it should be spaced. A good idea is to look at the event list for one of the demo tracks that come with the cards on CD-ROM, but in essence it is always wise to follow these guidelines for data order. These should be inserted into your song before the note data starts (eg. at bar 1!).

1: Insert the GM system on message (SysEx).
2: Leave a gap of at least 200 milliseconds (This is the time required by General MIDI to reset and initialize itself).
3: Now insert an XG On system message.
4: Leave a gap of at least 50 milliseconds (the time required by an XG unit to initialize and reset itself).
5: Send all the system exclusive messages for the effects (variation connection type, variation type, and the effect parameters, in that order).
6: Send all of the bank select messages for each MIDI channel, followed by all of the program change messages.
7: Now send all of the required controller and NRPN/RPN messages (for example the filter cutoff settings of your sound).
8: Repeat the steps 6 and 7 for all 16 MIDI channels.

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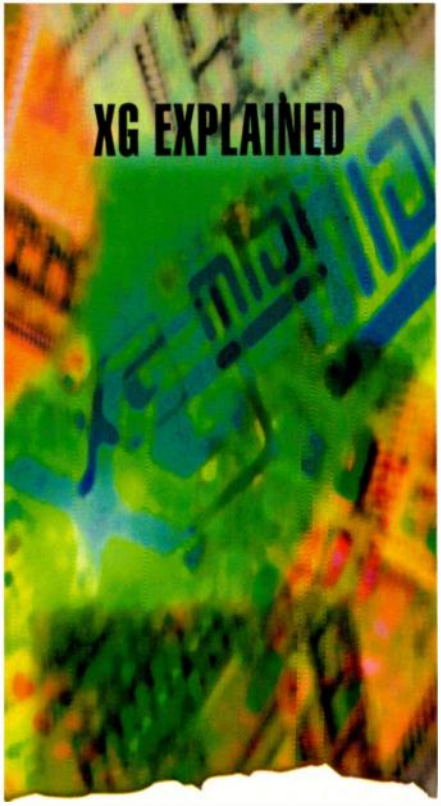

VARIATIONS ON A THEME

A common misconception concerning multitimbral soundcards is that you can use a different effects processor on every MIDI channel. Though the XG specification makes provision for multiple effects busses, no current XG device supports enough to make this possible (you would need as many busses as there are MIDI channels, ie. 16). While the new MU100R can effectively deal with seven, the DB50XG/SW60XG and the MU10 all have three busses. What this means in practice is that at one time, you can use only one effect from each of those available on each buss (Buss 1 is reverb, Buss 2 is Chorus, and Buss 3 is the Variation effect, where the bulk of the more unusual stuff is), but that each channel can use any combination of these, as each effect can have a different effects send setting for each channel. It's possible, for instance, to have reverb on channel one, chorus on channel two, reverb and lots of chorus and distortion on channel three, and distortion and less chorus on channel four. It's just like working with regular effects and a mixer with three aux sends, except that the effects sends are simply controller messages (MIDI controllers 91,92 and 94 respectively).

The Variation buss is best used in what is known as system mode. This mode, rather than locking a variation effect to a specific channel, allows the same effect to be used on all 16 channels with varying amounts (using controller 94). Putting the card into this mode requires either *XGEdit* or a simple SysEx command, which is:

F0 43 10 4C 02 01 5A NN F7

where NN is set to 1 to activate system mode and 0 to turn it off.

If you are using an MU50/80/90 or 100, an easy way to see what SysEx message you need to enter is by quickly hitting the enter key on the front panel twice whereupon either a controller message or SysEx message will appear in the display. It's worth mentioning that XG never requires you to calculate checksums as is necessary with some SysEx messages.

MULTI-CLIENT DRIVERS

A common tech support question is from people who can't figure out how to use their sequencer and *XGEdit* at the same time. All they get is 'Device already in use' errors. The solution involves multi-client software drivers, something Martin Walker touched upon some months back.

Most soundcards and MIDI interfaces come with a basic software driver, but back in the dark ages when MIDI implementation in Windows was just a glint in Bill Gates's eye, nobody really thought that anyone would want to access the same piece of hardware from more than one application, and so the concept of what is now called Multi-client MIDI didn't exist. For example, if you are running *Cubase*, *Cubase* talks to the multimedia subsystem of your computer and checks what drivers are installed. It will then give you the option to select one or several of these (depending on how many MIDI ports you have) to access your soundcards, MIDI ports or onboard sounds. If you try to run an application such as *XGEdit* at the same time, which is also trying to communicate with the hardware, and if you're not using a multi-client MIDI driver (such as the *Cakewalk* MPU401 MIDI driver), you are scuppered!

XG is also implemented in modules such as the MU50.

This is where a handy application called *HUBIs Loopback* comes to the rescue (all of the information for this is available in a read me file for the program). This driver acts as an overlay to your existing drivers and makes them multi-client. You can determine how many applications you want to access hardware items, such as the DB50XG, at the same time, and once installed (and after you have rebooted Windows), allows you to run *XGEdit* and your favourite sequencer at the same time. Providing you have your sequencer set up correctly, moreover, you can record all of your edits in real time.

I would still recommend using *XGEdit* to create the initial set up bar rather than loop recording your edits until you are happy with the initial sounds, however, as this can flood your sequencer with unnecessary data and cause problems with some soundcards (the Creative Labs MIDI driver, for instance, not being for a true hardware MPU401 device, can struggle with lots of SysEx and controllers). *XGEdit* can be used during the song for adding subtle changes as the track is playing, a facility which is particularly useful for dance music. A range of support and utility software is available from the Yamaha web site (see details on the left).

SOFT OPTIONS

As computers become more powerful, it becomes more practical to implement synthesis purely in software, and Yamaha's *SYXG50* is an entirely software XG instrument. You might think this makes cards obsolete, but the hardware tends to do a better job than the software-only equivalent, and none of the Yamaha XG cards make demands on the overall CPU power like software synths do. However, the *SYXG50* softsynth provides a revealing demonstration of the XG format at around 20 pounds for the fully programmable XG version. Yamaha are also planning more cards using the kind of advanced synthesis technology normally associated with stand-alone instruments, so it seems that XG can expect a long and interesting future. SOS

FURTHER MATERIAL

THE ALTERNATE DB50XG/SW60 GUIDE
Nick's 60+ page free complete guide to SysEx and every parameter on the XG cards:
T Yamaha +44 (0)1908 369252.
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***SYXG50* SOFTWARE SYNTH**
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BIOGRAPHY

Nick Howes works as a programmer for Yamaha MusicSoft Europe at their London office. He previously worked for several years as programmer for Ultravox, and was on the technical support staff at Yamaha-Kemble's Media Technology Division. He currently also runs Yamaha's European web site, and was on the team that voiced the AN1x, CS1x, QS300 and W7.

Nick Howes can be contacted on: nick@yamaha.co.uk

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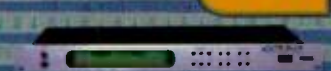

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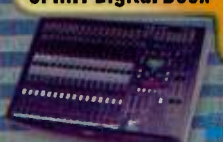

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Akai DR16/4gigHD				
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Korg Trinity Pro X	£1999			
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MRH

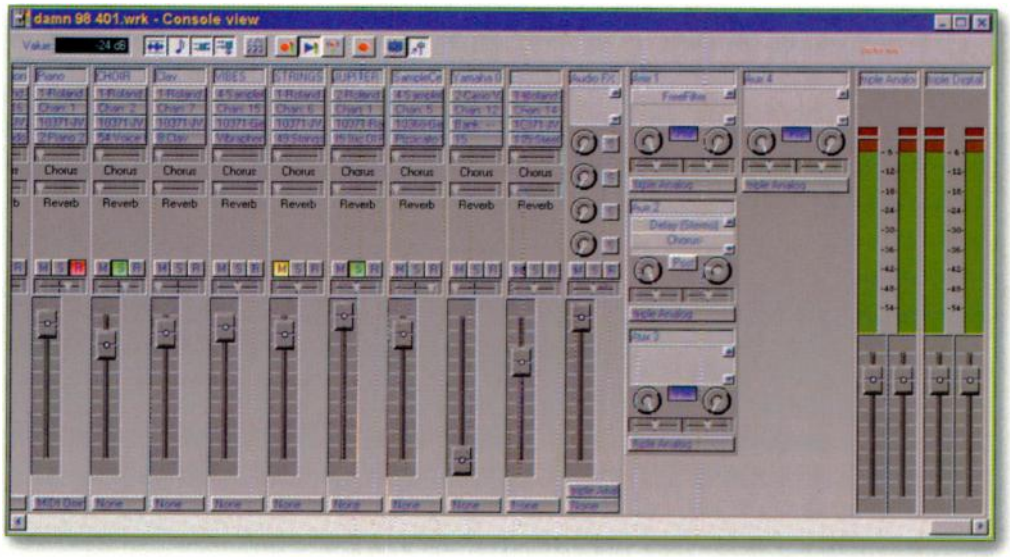
Left: The new DirectShow v5.1 audio setting dialogue.

Below: The Cakewalk Pro Audio 7 Console view presents a unified virtual mixer-style control surface for audio and MIDI track management.

The Magnificent Seven?

CAKEWALK PRO AUDIO 7

JANET HARNIMAN COOK goes great guns with the latest version of Twelve Tone's popular MIDI + Audio recording software for PC owners.



Although *Cakewalk Pro Audio* is regarded in Europe as very much the junior member of the big three of PC MIDI + Audio sequencing packages, *Cakewalk* so dominates the US market that it is claimed to be the world's best-selling sequencer. Whereas Steinberg's *Cubase* and Emagic's *Logic Audio* were originally developed for the Atari and Macintosh platform and subsequently ported over to the PC, *Cakewalk* is a native PC product dating back to the early days of DOS.

Cakewalk has been consistently at the forefront of PC sequencer development and was the first PC application to provide many of the advanced sequencing features that we now take for granted, such as support for multiple MIDI ports, multi-channel audio cards, multi-track hard disk audio using internal PC soundcards, on-board real-time audio effects processing, and support for DirectX audio plug-ins.

Cakewalk Pro Audio 7 provides many additional features and represents a consolidation and streamlining of the functions introduced in v6. As most *Cakewalk Pro Audio* facilities remain

unchanged and previous versions have been covered previously in *SOS* this review will focus primarily on what is new in version 7.

PACKAGING

The *Cakewalk Pro Audio 7* package has been given a makeover, with new logos and a distinctive blue and orange packaging. Twelve Tone Systems are to be commended for bucking the current trend towards exclusively electronic documentation by continuing to a provide a full printed manual. The redesigned manual, which runs to about 400 pages, is clearly written, indexed, and task-oriented, and contains a comprehensive explanation of the *Cakewalk Pro Audio 7* features and routines, plus tutorials and tips on troubleshooting, and PC system optimisation. It also contains a wealth of background information that will make an expert of any newcomers to MIDI + Audio recording.

INTERFACE

The most obvious change that existing users will notice is the vastly improved Track View graphic interface which now sports a snazzy 3D look and features ten dockable tool bars with associated tool tips. Toolbars can be placed anywhere in the workspace with the exception of those toolbars that contain time fields, such as the new, simplified Transport bar or the Tempo and Locator bars. These can only be docked to the horizontal upper and lower workspace perimeters. Especially useful is the new Views toolbar that enables instant access to the various editors.

A few menu items have been reorganised and some commands are relocated to other menus. For example, the View menu has been simplified, while CAL, Studioware and Playlist files are now to be found in the File menu. Audio housekeeping and export functions have been transferred to the Tools menu which also contains the new Global Options dialogue where the default settings for project file locations, MIDI filters and the Drag and Drop options are to be found.

TRACK SELECTION

Track selection routines have been changed to bring them into line with conventional Windows practice. Clicking on the track number now selects the track and also clears other existing selections; clicking with shift held down creates multiple selections; clicking with control held down de-selects individual tracks; and multiple selections can also be made by dragging over several track numbers. Additionally, mute and solo selection routines are improved to enable more than one track to have solo status, and the selection bar now includes Mute and Solo indicators.

PROJECTS

The new version now includes multiple song file support — in previous versions, if you wanted to copy material between songs it was necessary to import it using the File/Merge or File/Extract commands. Now parts can be dragged between projects using cut and paste routines, in the same way as is possible between *Cubase* arrangements. Each project has its own Undo history and the Clock, Metronome and MIDI I/O information for each Project may be individually defined.

CONSOLE VIEW

The MIDI + Audio tracks contained in the Cakewalk song project are displayed in the new Console view. This represents the track configuration elements in the user friendly form of a virtual mixing console and many track definition routines can now be carried out from the Console view. All tracks have Name, Volume, Pan, Mute, Solo, Record Arm and Record Source control buttons. MIDI tracks additionally feature Channel, Port, Bank and Voice Parameter definition, plus ▶

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pros & cons

CAKEWALK PRO AUDIO 7 £299

pros

- Improved 32-bit audio engine.
- New 32-bit onboard audio effects processors.
- Integrated MIDI and audio mix console.
- Improved interface.
- Elegant mix automation and editing.

cons

- No MIDI channel activity indicators.
- Limited MIDI drum editing.
- Slow zoom functions.
- No list-based global tempo editor.
- No audio track offset.

summary

Cakewalk Pro Audio 7 provides powerful, stable, easy-to-use MIDI + Audio multitrack audio recording and editing.

SOUND ON SOUND

"Cakewalk has been consistently at the forefront of PC sequencer development and was the first PC application to provide many of the advanced sequencing features that we now take for granted."

PC REQUIREMENTS

To get a satisfactory level of performance from *Cakewalk Pro Audio 7*, a minimum specification for the PC would be: genuine Intel Pentium 233MMX processor, 64Mb RAM, 4Mb video RAM, a fast hard drive and a 17" monitor. A similarly featured Pentium II system should fly!

Reverb and Chorus Sends. Audio tracks contain auxiliary send controls, together with insert effects and audio card output assignments.

The Console also includes audio master output faders and ladder-style LED audio output meters. The four audio auxiliary channels can be patched to multiple DirectX-compatible effects plug-in modules. The program ships with a much improved suite of seven 32-bit, floating point, stereo real-time effects processors (Reverb, Chorus, Parametric EQ, Delay, Flanger, Pitch Shifter and Time/Pitch Stretch) that feature extended parameter control. The original mono CFX modules are also included in updated versions.

Two varieties of mix automation are available: Snapshot and Real-time recording. Snapshot automation is the simpler of the two and consists of inserting mix scenes (hence 'snapshot') at designated points in time. Snapshots, which can be saved, can be taken at any time during recording or playback. Real-time recording mix automation allows you to record an evolving sequence of mix changes, in multiple passes if required, and then edit them. This is performed from the Piano Roll View Controllers panel which is opened automatically by right clicking on the Console fader or knob and selecting Edit automation data. In practice, this method of editing is both elegant and efficient.

TRACK ARMING

Cakewalk Pro Audio 7 includes track record arming, which not only acts as a safety measure to prevent the inadvertent overwriting of existing material, but also enables recording to take place simultaneously on multiple tracks. Track arming is implemented by clicking on the R button in either the Track or Console view, after which the Track Arm indicator in the status bar illuminates. To avoid unnecessary delays — for instance, during the white heat of inspiration! — the current track is automatically armed for recording if three conditions are met:

- first, the record source must be set to MIDI Omni;
- no other track is armed, and
- no other record source has been assigned.

AUDIO ENGINE

The audio mix engine has been revamped and now provides 32-bit processing throughout the effects chain bringing improved *Windows NT* performance and greater processing efficiency when using real-time effects. This means that more effects can be used. Real-time master effects can be applied to audio passing through the master outputs.

Audio levels in general feature more responsive linear scaling, making it possible to perform real-time level changes more precisely. Curiously, however, this appears to be accompanied by slightly increased timing latency that is revealed when audio tracks are muted during playback or recording. It should be noted that audio levels of parts recorded in previous non-*DirectShow* v5.1 compatible versions of *Cakewalk Pro Audio* may respond incorrectly when played back in version 7, unless the v6 compatibility option in Tools menu / Audio Hardware is selected. It is now possible to position mono parts across the stereo field, but to do so, the Mono Record/Playback option in the Tools/Audio Settings dialogue should be de-selected.

PREVIOUS *CAKEWALK PRO AUDIO* FEATURES & REVIEWS IN *SOS*

Cakewalk Pro Audio 4 ..... *SOS* June '96.
MIDI + Audio on the PC ..... *SOS* Feb '97.
Cakewalk Pro Audio 6 ..... *SOS* Aug '97.

MISCELLANEOUS

There are many other small but useful changes to be found. The Insert Measures command, absent from v6 is restored; the threshold units in Edit/Audio/Remove Silence and Edit/Audio/Extract Timing are now expressed more usefully in decibels rather than as percentages; holding the Zoom button provides continuous zoom in or out (though to my mind, while this is an improvement, it is a poor substitute for PC keyboard zoom control).

The AWE 64 interface is improved and the Wave Profiler now automatically checks the accuracy of the soundcard audio out. The Auto Shuttle anomaly that reset the playback loop to the current Now position during pause has also been corrected, and customised key binds are now reflected in the menu items.

CONCLUSION

Cakewalk Pro Audio 7 addresses many of the shortcomings of previous versions and includes many excellent new features. There are still important areas that need to be tackled — most notably the lack of full-featured, multi-instrument MIDI drum mapping and editing, the lack of audio track offsets, and the absence of individual MIDI channel activity indicators. That said, *Cakewalk Pro Audio* goes from strength to strength with each new version, and presents the user with an easy-to-learn, powerful feature set that will satisfy the sequencing needs of all but the most demanding of users. Rock on Cakewalk!

(Many thanks to Riz Rizwan for additional testing.)

SOS

info

E *Cakewalk Pro Audio 7* £299, *Cakewalk Pro Audio 7* Deluxe £369.
A Et Cetera Distribution, Valley House, 2 Bradwood Court, St Crispin Way, Haslingdon, Lancashire BB4 4PW, UK.
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big connections

OPCODE STUDIO 128X CROSS-PLATFORM MIDI INTERFACE

128 MIDI channels would have seemed like complete overkill ten years ago, but today's multitimbral voice modules can use them up at an alarming rate. MARTIN RUSS checks out an eight-port patchbay/interface from Opcode.

Opcode's Studio 128X is the "twice-as-big" (but in the same size box) elder sibling of the Studio 64X MIDI Patchbay and Interface that I looked at in the May 1997 issue of *SOS*, and has eight MIDI ports instead of the 64X's four. Having an extra four MIDI ports may not seem all that significant, but it says a lot about the user's studio: four ports might be described as 'compact', but eight ports is definitely 'serious'. Welcome to the big league.

Each port on a multi-port MIDI interface/patchbay can cope with 16 separate MIDI channels. An eight-port version, therefore, can cope with 128 individual MIDI channels or multitimbral parts — which explains the Studio 128X's name. Whereas 128 channels would have seemed like complete overkill ten years ago, today's multitimbral expanders can take up alarming numbers of MIDI channels. Using an eight-port interface and patchbay like the 128X, however, should give you access to more than enough sonic armoury to cope with all but the most demanding of applications.

What a patchbay does is let you hook all of that sound-producing power together in various combinations, whilst the MIDI interface lets you drive it all from a computer sequencer. You also get straightforward sync'ing to timecode on tape. (For more sophisticated synchronisation, the four-port Studio 64XTC provides a much wider range of additional sync features like ADAT and other digital audio compatibility. Mike Collins reviewed the 64XTC in the April 1998 issue of *SOS*. Will we see a similar 128XTC version in the future for anyone who needs these extra sync functions?)

ROUTING & INTERFACE

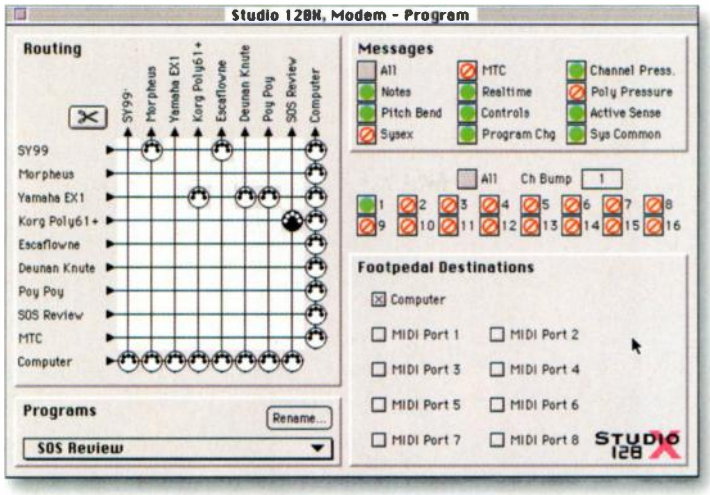
The Studio 128X allows you to route any MIDI input port to any MIDI output port, with channel-changing and filtering applied along the way. It's possible to merge two or more inputs together, or alternatively to drive several outputs from one input. You can store eight of your own routing programs inside, and three utility programs are permanently stored inside, along with five SMPTE striping programs. Editing of the user programs can only be done with a Windows or MacOS computer, but they can be used from the 128X alone once they have been stored in it.

When used with a sequencer, the Studio 128X becomes a Computer-to-MIDI Interface. Cables for serial data connection from the computer to the Studio 128X are included, and there's a 'thru' connection so that you can still use the serial port (to send to a printer, for instance) when you're not playing with MIDI. On the PC, the 128X is bound by Windows 95's device limitation of 11 MIDI ports, which can sometimes be exceeded by the combination of a sound card and a multi-port interface (the 128X actually uses nine MIDI ports, including the control port, when connected to a computer). MacOS users do not have the port limitation and can, if they so desire, use two Studio 128Xs to give a full 256 (16 ports-worth) MIDI channels.

OMS

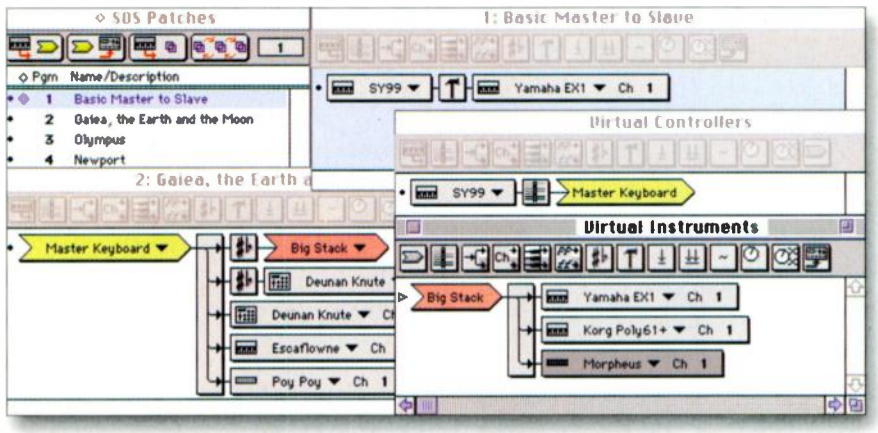
MacOS users also get the advantages of OMS-based MIDI processing. In addition to the Routing,

Footswitch (program advance and MIDI message send) and SMPTE windows, and the graphical representation of the studio in the Studio Setup window, the Studio Patches application allows you to use the Mac to process the MIDI information in ways that can make those eight ports much easier to live with, especially if you want to make the most of the opportunities offered by MIDI. You can define a processed version of a master keyboard with MIDI Clock filtered out, and a modified velocity curve, and then connect this 'virtual' Controller to 'virtual' instruments made up out of stacked, layered, transposed and split assemblies of expander modules, samplers, and the like. Once you've produced your own customised MIDI equipment, then hooking it together is much easier, and you have simple but detailed control over exactly what is going on — and it is all shown graphically!



Left: The routing program is shown as a cross-point matrix in the control window.

Below: OMS-based routing processing on a MacOS computer. The blue area shows a basic routing, while the 'Virtual Controller' window shows how a master keyboard can be filtered and given a 'generic' name. The 'Big Stack' is merely a short-cut for a big stack of instruments.



The two main tests of how good patchbays and interfaces are concern the time delay through a MIDI patchbay, especially with heavy processing, and the response to merging overload. The Studio 128X MIDI In to Out delay was about 500 microseconds, which went up to about two milliseconds for Mac-based processing — more or less the same as that of the 64X. Merge loading worked okay for a typical 'real world' test in which two sets of Notes and Pitch Bends were merged. When I tried one of the more extreme System Exclusive tests (two sets of Notes, Pitch Bend, MIDI Clock and SysEx all merged) the target expander module did exhibit some of the classic 'MIDI bandwidth exceeded/buffer overflow' by-products like notes not being turned off. However, this sort of thing is less a real-world test than a test to destruction!

VERDICT

I could complain a little. I want to gripe about the plug-top power supply's flawed power connector, which is located so close to the SMPTE jack sockets that it makes simultaneous sync, rack-mounting and power tricky to achieve for complex topological reasons which are obvious when you see them, but impossible to describe in words. Opcode haven't fixed the lack of a front-panel program display, nor the MIDI/Thru switches' annoying lack of any sort of easily visible indication — and these were both mentioned in my review of the 64X! But I won't press charges because...

The Studio 128X gets everything else just about perfect. It looks cool, it has flashing LEDs for each In and Out port, and the front panel operation is wonderfully simple. The eight ports will suffice for all but the biggest rigs, and the routing and filtering capabilities will cover just about any eventuality — and even if they don't, the Mac-based OMS processing will! Physically it is small and neat, and the cost fits the same descriptions. For anyone who wants to hook together more than three bits of MIDI gear, the 128X is well worth a very close examination. SOS

pros & cons

OPCODE STUDIO 128X £389

pros

- 8 ports, 9 MIDI Outs.
- 8 user programs.
- MacOS and Windows compatible.
- Easy-to-use front panel.

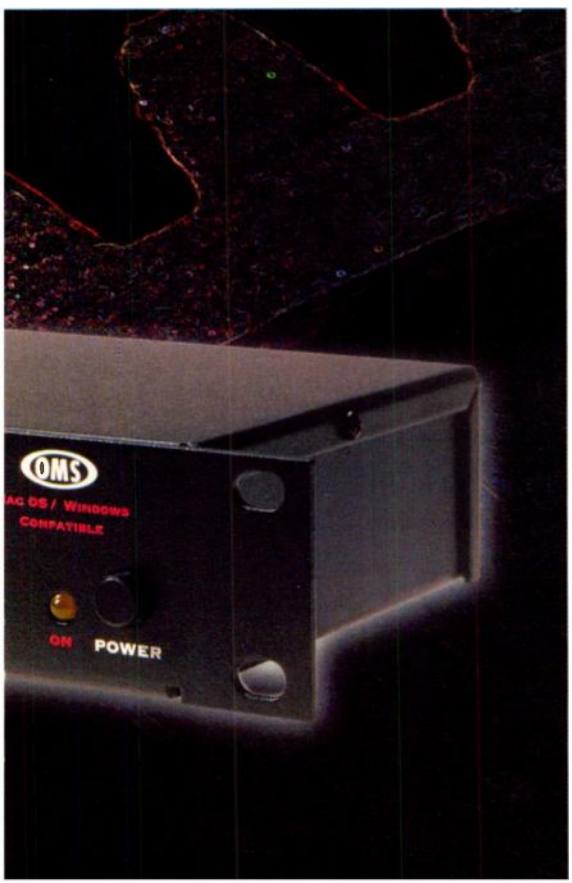
cons

- No front panel indication of current program.
- Patches can only be edited via a computer.
- Black switches and a black front panel can be tricky on a dark stage.
- The power connector topology.

summary

Well suited to the larger home studio or project studio. A worthy successor to the Studio 64.

SOUND ON SOUND



info

E Opcode Studio 128X £389 including VAT.
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WRH

One bit at a time

ALL ABOUT DIGITAL AUDIO

PART 5: Following on from last month's look at digital tape recording formats, HUGH ROBJOHNS turns the spotlight on the techniques and technology of disk-based recording.

If you read last month's article, you will recall that there are two fundamental approaches to the design of tape-based systems: rotary head and stationary head. There is a similar dichotomy within disk-based systems, this time between optical and magnetic formats. There is also an increasingly significant third option which represents a blend of the two.

OPTICAL DISCS

The most obvious digital disc format relying on optical technology is the CD — something which we all tend to take very much for granted fifteen years after its launch. However, it is worth revisiting the system as many of its concepts enable understanding of the newer formats.

CDs are 'pressed' in much the same way as vinyl records although the dimensions are obviously smaller and the tolerances much finer. The audio data is encoded along with timing and various other pieces of information as either pits or flats along a continuous spiral groove which starts close to the centre of the disc and works outwards at a fixed rate. The idea of starting on the inside edge of the disc was to allow production of discs with different diameters: the laser system would always start at the same point, but continue outwards until it found an 'end-of-disc' instruction. In the early days, for example, we had three-inch CD singles. However, these never really caught on and it has subsequently proved cheaper to release singles on standard-sized discs.

Once the blank polycarbonate disc has been stamped, the surface carrying the audio data is coated with a microscopically thin layer of metal. Usually, this is aluminium, although gold and silver are also used. This is then protected from oxidisation by 30µm-thick lacquer, which also carries the screen-printed labelling. Although CDs are extremely tough, damage to the lacquer layer usually means the disc no longer plays properly, so never place them label-side down. Ideally they should be put back in the caddy, or, failing that, it is safer to place them playing-side down. This might sound odd, but because the laser is focused onto the aluminium surface through 1.2mm of plastic, small scratches and marks on the 'playing' surface become insignificant (the laser beam is more than 1mm wide on the disc surface, but focused to 1.7µm on the reflecting layer). It is the same concept as not noticing the squashed bugs on the windscreen of your car while your eyes are focused on the cars in front. Small, troublesome scratches on the disc can usually be polished out quite successfully with toothpaste or the finest version of T-Cut car body paint restorer. Be warned that it takes time and patience. If it doesn't work, don't blame me or *SOS*.

Reading data from a CD is a marvel of modern technology and I am still impressed every time I think about it. The pressed pits in the disc are seen as raised bumps from the playing side and they are arranged to be 0.125µm high — a quarter of the wavelength of the 780nm infra-red laser light. To give

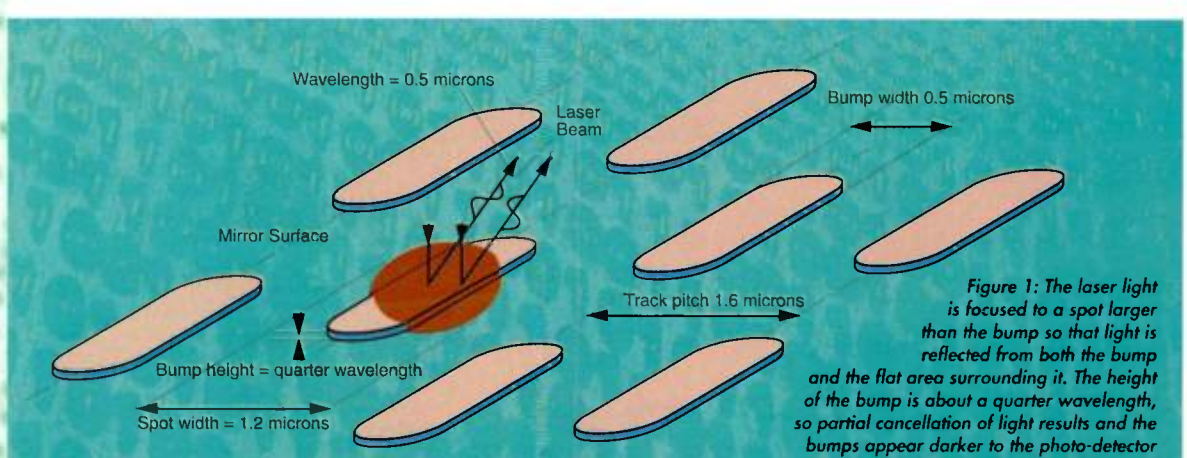

Figure 1: The laser light is focused to a spot larger than the bump so that light is reflected from both the bump and the flat area surrounding it. The height of the bump is about a quarter wavelength, so partial cancellation of light results and the bumps appear darker to the photo-detector in the optical pick-up than flat areas.

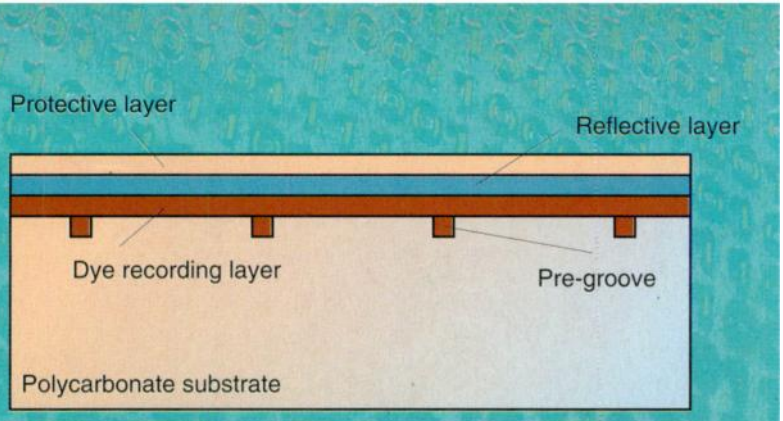

Figure 2: The pre-groove keeps the laser on track and provides timing information. The dye layer deforms under the action of a powerful laser to store the audio data.

you some idea of what that means, if the disc was scaled up so that the bumps were 1cm high, the disc would be around 10km across (just over six miles)!

A monochromatic and coherent light source is essential to 'read' the disc — the light must be at one frequency and in the same phase. The laser is focused to a spot about twice as wide as the bumps and therefore when one is encountered, light is reflected from both the top of the bump and the area around it. Since the bump is a quarter wavelength high, the light reflected from its top travels half a wavelength less than the light reflected from the surrounding surface, and is therefore out-of-phase with it, resulting in cancellation. The pressing tolerances mean that the bumps are unlikely to be exactly a quarter-wavelength high, but as long as they are close to that value, partial cancellation will result. The photo-detector in the optical pick-up simply has to be able to recognise the difference between lots of reflected light from the flat areas and the dimmer light reflected when a bump is present (see Figure 1).

Unlike vinyl records which rotate at a constant speed (33 or 45rpm), the rotational speed of a CD varies so that the laser passes over the data at a constant rate of 1.4 metres/second (1.2m/S in the case of 80-minute-plus discs). This means a rotational speed of 500rpm at the start of a disc, falling to around 200rpm at the end. It has to work this way because the size of the bumps is related to the wavelength of the laser light and cannot be changed. The mechanism for controlling speed is very simple. As the data is extracted from the disc, it is stored in a buffer memory before being passed on at the correct sampling rate to the decoding circuitry. If the disc is spinning too fast the memory fills up: if the disc is spinning too slowly the memory empties. A simple feedback system based on the memory capacity is used to control the spin-motor servo. The precise rotational speed of the disc is not important provided the data comes off at an average of 44,100 samples per second — hence the acceptability of linear speeds between 1.2 and 1.4m/S.

Embodied within the data on the disc are eight sub-code (auxiliary data) channels: P, Q, R, S, T, U, V and W. Of these, the most important is the Q sub-code as this carries the Table of Contents (TOC) at the start of the disc which says how many tracks there are, their timing information, running times, track and index identification, and copy-prohibit and pre-emphasis flags throughout the disc. The P sub-code, which provides a very simple means of locating the start of each track, was originally intended for 'dumb' portable players, but it is not particularly important for most machines these days. The rest of the sub-codes were unspecified in the Red Book (see the CD Colours box) and hence they are rarely used, although they have found applications in remote projector control for AV presentations, karaoke lyrics and other still graphics (the CD+G format), and computer data.

RECORDABLE CD

The CD-R is a WORM disc (write once, read many). Once an area has been recorded, it cannot be erased and re-recorded. There are no editing facilities, although discs can be recorded in stages with one or more tracks at a time up to the Red Book CD limit of 99 tracks. The prices of CD-R recorders and their blank media are similar to those of high-end cassette machines (£500 for CD recorders and less than £2 for a 74-minute blank), so they are becoming increasingly common as demo and master recorders in studios.

The construction of a CD-R disc is slightly different to that of a standard CD, featuring an additional layer in the disc construction. On top of the polycarbonate substrate (which is stamped with a 'pre-groove') a yellow/green dye layer precedes the reflecting layer (usually gold) before the standard lacquer and label printing (Figure 2).

The principle behind the CD-R is that if a high-powered laser (about 10 times stronger than a normal CD player) is focused on the dye layer, the green dye will absorb the red light and get hot. At around 250°C the dye deforms and shrinks to become much more dense and the substrate swells to fill the space, neither of which can be reversed. When played in a conventional CD player, the laser light is reflected from the gold layer in the usual way, but where the dye has deformed, less light is returned, thus resembling the appearance of a bump on a

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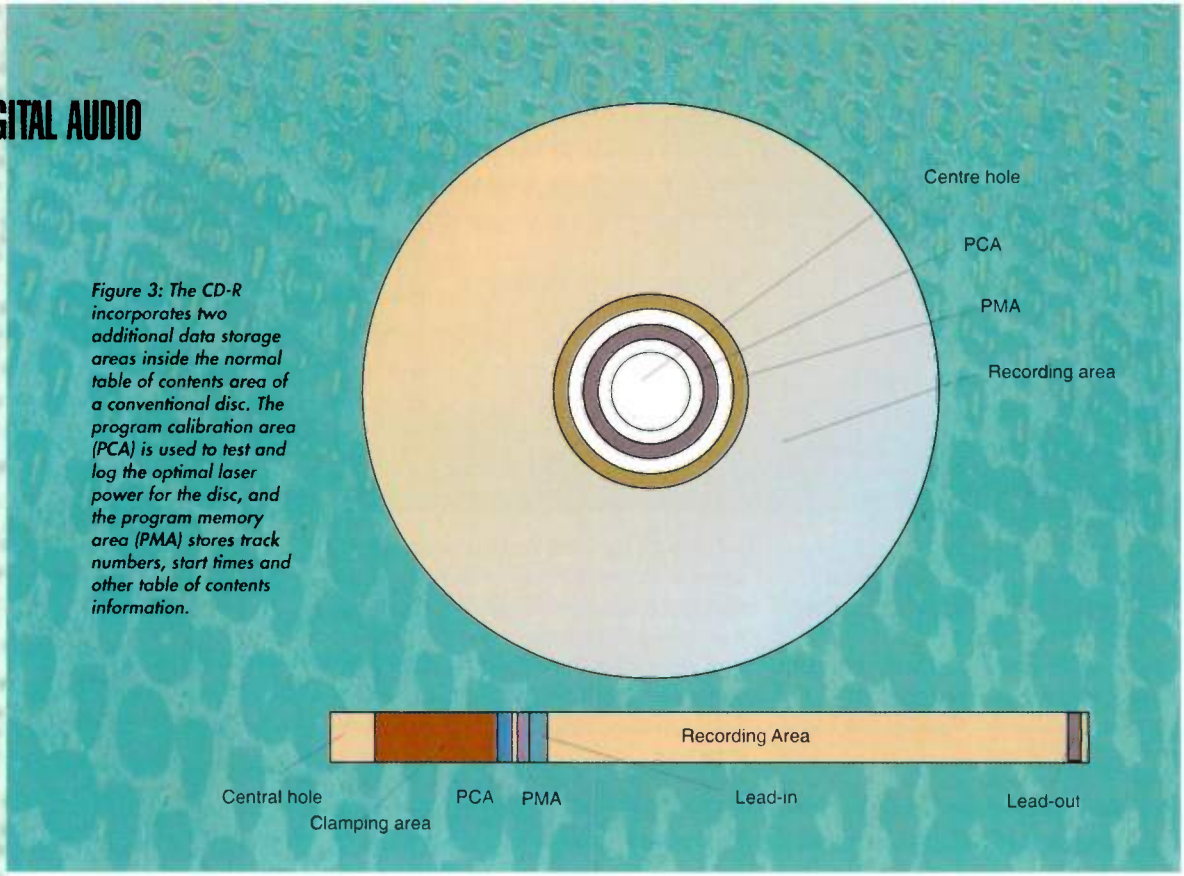

Figure 3: The CD-R incorporates two additional data storage areas inside the normal table of contents area of a conventional disc. The program calibration area (PCA) is used to test and log the optimal laser power for the disc, and the program memory area (PMA) stores track numbers, start times and other table of contents information.

conventional CD. The only snag is that because the light has to pass through the dye layer twice (ie, both on the way to the gold reflector and back again), the overall reflectivity of CD-Rs is lower than a normal CD and thus some older players are not sufficiently sensitive to read CD-Rs reliably.

Since the dye inevitably varies from batch to batch, CD recorders first perform what's called an optimum power check on each new disc to find out just how much power is required to deform the dye in the optimal way. When a new blank disc is inserted, the machine's display shows 'OPC' (or something similar) while the machine makes a series of test recordings with different laser powers in a dedicated area near the centre of the disc. The disc is then replayed to ascertain the best setting and the result is stored for reference in the Program Calibration Area (PCA) — a 'Regulo 6 for 20 minutes' kind of thing!

Once the OPC is complete, the display shows the available recording time, obtained from the data encoded in the pre-groove of the disc. The pre-groove is a wondrous thing, fulfilling several functions in a very elegant manner. It is cut at a precise pitch to define the spacing between adjacent turns of the spiral (specified as 1.6µm) which is critical to the correct tracking of the laser beam for both recording and replay. The pre-groove also has a small 'wobble' from side to side as it runs around the disc. When the disc is spinning with a linear speed of 1.4m/S, the wobble causes the tracking servos to oscillate at 22.05kHz (half the sampling rate), thus enabling the machine to maintain the correct linear disc speed throughout the recording. The wobble is itself wobbled in such a way that timing information can be encoded (known as ATIP or Absolute Time in Pre-groove) and this in turn allows the machine to know how much recording time is left and where the laser is within the disc — much the same as the Q sub-code information on a standard CD (Figure 3).

When a recording is made on a CD-R the audio data is recorded directly to the main data area of the disc, but the TOC information (track number, duration and so forth) is stored in a temporary area near the centre of the disc. This means that a partially recorded CD-R cannot be played on a conventional player as there is no recognisable TOC from which it can ascertain the number of tracks and where they start. However, a CD-R can be made playable by going through a process known as 'Fixing Up'. This translates the temporary table of contents into a Red Book-compatible version which is recorded in the lead-in area before the audio data section of the disc. The process also writes an end-of-disc scroll after the final track. The whole process can take several minutes and once done, no further recordings can be made to the disc. To a CD player, the CD-R now appears to be perfectly normal, albeit with low reflectivity.

The specifications for the CD-R, laid down in the Orange Book, permit the use of Skip IDs which allow unwanted tracks on the disc to be passed over during replay. However, conventional Red Book players do not recognise skip instructions, so this facility is of very limited use. If you make a mistake when recording a CD-R, I would advise ejecting the disc, adding it to your beer mat collection, and starting again!

CD-RW

CD-RW or CD-Rewriteable discs use a different technology called Phase Change. This is a reversible recording process taking advantage of a material which has two stable but very different states. Life expectancy of the disc is between 1000 and 10,000 recording cycles, a factor of a thousand worse than professional MO disks and MiniDiscs (described later). However, as an essentially domestic product, the CD-RW disc is perfectly adequate for typical audio and home computer

CD COLOURS

Although it was originally designed to carry audio data, other industries were quick to pick up on the CD format. We now have a range of inter-related formats, each identified by a different 'colour'. The basic audio disc is defined by the Red Book, with the Yellow Book dictating the specifications for the CD-ROM. This provides storage of either computer data or audio and video data, and has an extra degree of error protection in place of the interpolation strategies of audio-only systems.

The Yellow Book standard has been enhanced with the XA extension allowing audio and video data to be interposed with computer data on a sector-by-sector basis. This is the basis of the Kodak PhotoCD standard as well as the Green Book and White Book standards. The Green Book relates to Philip's proprietary CD-I format — a home entertainment system which has met with limited success. The same can also be said of the full-motion video format (using MPEG-1 data compression) covered by the White Book.

Writeable CDs (CD-Rs) are described by the Orange Book. This allows recordings to be made on a disc, either all at once or on a piecemeal basis — hence the term multi-session.

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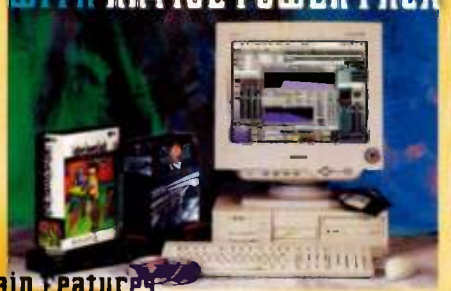

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ON TRACK

One of the biggest problems with CDs is that of mistracking, resulting in that 'stuck in a groove' effect we have all experienced. This is normally caused by tracking problems and has nothing to do with the error correction system which was essentially designed to cope with 'pin-holes' in the reflective layer which were a common problem with early discs. Try holding your oldest CD up to the light while looking at the playing side and see if there are any tiny pinpricks of light shining through. The error correction system of the CD format was designed to handle the complete absence of data caused by these kinds of gaps — a total gap of up to 2.5mm, which represents around 4000 bits of data, can be corrected perfectly.

Unfortunately, as we now know, holes in the reflecting layer are not the main problem with CDs. That honour goes to deep scratches and surface contamination by materials with optical properties such as grease... and marmalade! (*So stop bringing your CDs to the breakfast table — Ed*) What tends to happen is that the laser is happily tracking along the data when it comes across a scratch or patch of grease. The beam is then deflected (refracted) to some other part of the disc, typically a couple of tracks earlier or later. This does two things. First, it confuses the error detection system because the interleave structure of the data goes haywire. Second, the deflected beam probably doesn't fall exactly on the 'new' track, so the tracking servo has to re-align the beam.

With the error detection system completely confused, raw errors are going to slip through. Hence the audibility of clicks and splats because the interpolation and muting mechanisms are also both helpless. But worse is the chaos caused to the tracking servo. No sooner has it caught up and corrected the laser beam's alignment on to its new track, when the scratch or grease passes and the beam reverts to the original part of the disc, whereupon it is now misaligned with the original track. And so it all goes horribly wrong — tracking servos go into oscillation, error detection systems go home in disgust, the same bit of music is repeated over and over, and you end up hitting the box and wishing for a solid state recorder to be invented. (They have been, by the way, but they are expensive and don't play for very long... yet!)

applications, even though the blank media are ten mores more expensive than write-once CD-Rs.

In its original state, the recording layer of the CD-RW disc is polycrystalline, During recording, a high powered laser is used to change areas of the disc into an amorphous phase of the material. The amorphous areas have much lower reflectivity than the crystalline areas, so audio data is recovered as bright or dark areas, just as with CD and CD-R. When the disc is over-written, the amorphous areas can be returned to the crystalline phase by using lower intensity from the laser. CD-RW discs exhibit even lower reflectivity than CD-Rs and cannot be replayed in conventional CD players at all.

DIGITAL VERSATILE DISC

Long in gestation, the DVD has finally arrived and is now available as a format for video movies and for some computer applications. The audio-only version is still being held back because various hardware and software companies have failed to agree on a specification. Technology is available for both recordable and re-recordable versions of the DVD, but this is also being delayed to allow for greater penetration of the format into the market place.

DVD started life as two similar, but incompatible formats: the Sony/Philips Multimedia CD (MMCD) and the Toshiba/Matsushita/Time-Warner alliance format of the Super-Density Digital Video Disk (SD-DVD). Fortunately, common sense prevailed and the two formats were combined into DVD, which is now appearing on the shelves of the bigger video retailers across Europe.

DVD is nothing more than an increased density version of CD and takes advantage of improvements in CD manufacture and replay technology which have been introduced over the past 15 years. The disc structure is slightly different, comprising a pair of stamped, 0.6mm thick substrates, glued together with the data surfaces in the centre of the composite disc.

In order to accommodate smaller data bumps on the disc surface, the DVD laser operates in the visible-red at 650nm instead of the 780nm infrared of conventional CD players. This reduces the wavelength and allows the bumps to be smaller, but it also requires different optical arrangements which force the data layer to be brought closer to the pick up. A disc only 0.6mm thick is not sufficiently robust and hence the idea of gluing two together to make a composite as strong as a normal CD.

As the composite disc has two pressed surfaces, it can be made single- or double-sided (although double-sided versions don't leave anywhere for the label). There are techniques available to build up two data layers on each surface using a semi-transmissive reflector and a second data layer. The laser can be focused on either layer as required.

In terms of data storage, not only are the bumps smaller (in height, width and length), but the spacing between adjacent turns of the spiral is also halved. Consequently, a single-layered disc provides 4.7Gb of storage capacity as opposed to the measly 650Mb on a standard CDs. A dual-layer disc offers 8.5Gb which is enough to store the equivalent of about 1.5 million A4 pages of text (a pile of paper about 700 feet high) — rather more impressive than a standard CD-ROM which can hold 'only' 95,000 pages. A dual-layer, double-sided disc could potentially store 18Gb of audio, video or data.

The linear speed of the DVD has also been increased from the 1.4m/S of a CD to 4m/S in order to achieve workable data transfer rates for real-time video (albeit with MPEG data reduction) of 1.1Mb/S. This compares with 153Kb/S from a CD at standard speeds.

There are other enhancements built into the DVD format such as a different channel coding structure called EFM Plus and revised error protection which is around 10 times more robust than that of conventional CDs.

MINIDISC

Pre-recorded MiniDiscs are made in exactly the same way as a normal CD, even down to the channel coding and error protection systems. The only difference is that the disc is just 64mm (2.5 inches) in diameter, although the audio information is data-reduced by the ATRAC process to allow a full 74 minutes of replay time.

One of the recognised failings of the CD is its lack of resistance to damage on the playing surface which can result in tracking problems and replay glitches. Rather than redesign the error protection systems, the MiniDisc designers simply encased the disc in a plastic caddy to reduce the likelihood of scratches and marmalade reaching the disc surface! Re-recordable MiniDiscs will be covered in the section on magneto-optical discs.

MAGNETIC MEDIA

The alternatives to optical formats are formats that use magnetic technology similar to conventional magnetic recording on tape. However, erase heads and recording bias are not required as the digital media is fully saturated N-S or S-N. Linearity is also not required and the signal-to-noise ratio is minimal (about 10dB). Unlike tape recorders, a hard disk unit involves no contact between the record/replay head and the media surface — the head 'flies' just above the surface of the rapidly spinning disk on a cushion of air, so media wear is insignificant.

Depending on the design and capacity of a hard drive, there may be a number of aluminium disks within the unit, each coated with a magnetic layer and mounted on a common drive spindle. Each surface has its own record/replay head which is mounted on some kind of shared, movable arm assembly allowing the heads to be positioned accurately for record and replay of data (Figure 4). The main advantages of hard drives are the phenomenal storage capacity, rapid access times and high data transfer rates — all well in excess of any other medium currently available.

Data is organised on the disk according to the operating system of the controlling computer. That is the major reason for the incompatibility

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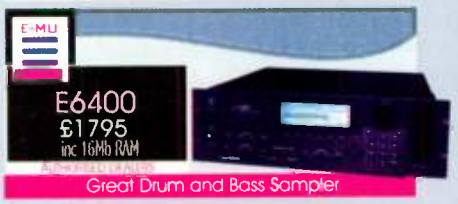

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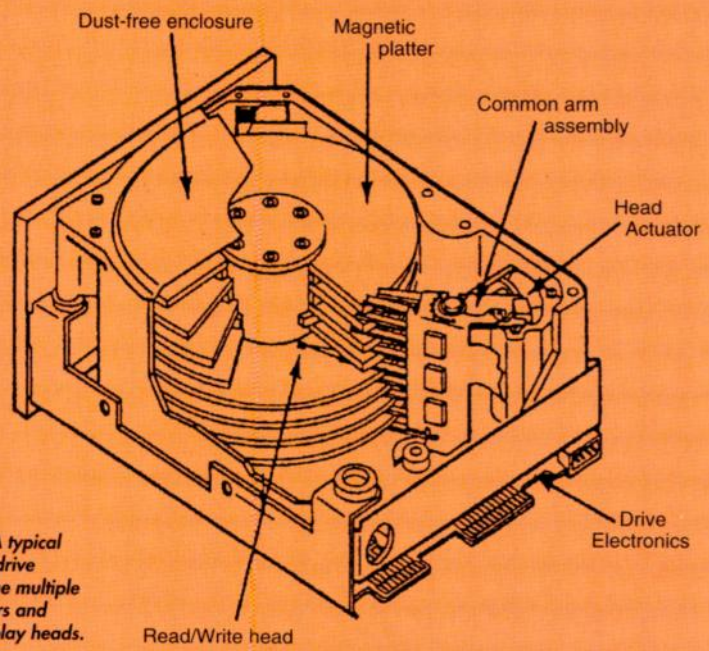

Figure 4: A typical hard disk drive showing the multiple disk platters and record/replay heads.

of disk drives employed in different audio recording and editing systems. However, the basic storage structure all relies on tracks, sectors, blocks, and cylinders. The disk is divided into concentric rings called tracks, each of which is sub-divided into sectors, and within each sector, data is grouped into blocks or clusters. A vertical column of tracks across all disk surfaces is called a cylinder, and the positioning of data on the disk surfaces is logged in a special directory (known as the File Allocation Table or FAT in Microsoft-speak), without which the stored data is meaningless.

At present, hard disk storage capacity is doubling (and the cost almost halving) roughly every three years. While this situation can't go on forever, the hard disk is likely to remain the most cost-effective rapid-access storage medium for some time to come.

"...a billion continuous replays of a one-second segment of audio will take more than 31 years."

MAGNETO-OPTICAL DISKS

Magneto-optical (MO) disks, which derive from the computer industry, combine both magnetic and optical principles. Their advantage is portability and re-recordability, combined with a virtually unlimited life.

The earliest systems were relatively slow compared with hard disks, both in terms of their access times and transfer rates, but the technology has improved considerably in recent years, and the latest generations of MO disks are certainly closing the gap.

The basic operating principle is that data is stored by a photo-polymer layer within a glass or plastic substrate. For the chemists among you, the polymer is usually something like ferri-terbium-colbalt (FeTbCo), a substance which exhibits a property called the Kerr effect. This material is sandwiched between a reflecting layer and protective, heat shield layers, and when heated to a high temperature known as the Curie Point (between 185 and 250°C depending on its exact composition) its crystalline structure becomes flexible and it can be altered between two stable states. The heating is achieved by a powerful laser (much like the CD-R) and the material's structure can then be changed by the application of a weak magnetic field. By switching between N-S or S-N fields, the required data can be stored in the physical structure of the polymer. Once cool, the material is perfectly stable with the data safely locked in place.

When polarised light is passed through the photo-polymer, its angle of polarisation is changed slightly, with the direction and amount depending on the magnetic field the material was exposed to. A suitable photo-detector, sensitive to light polarised in one specific direction, can be used to recover the stored data (bright where the polarisation matches that of the detector and dark where the polarisation is altered).

The life of a computer-standard MO disk is usually of the order of a million record passes and a billion replay passes — in fact, the bearings will give out before the polymer does. To give some practical meaning to these figures, a billion continuous replays of a one-second segment of audio will take more than 31 years.

The earliest computer MO drives were relatively slow, partly because of the way data was recorded. Typical systems required a three-pass approach: first, the whole disk was bathed in a fixed magnetic field and the sector to be recorded heated with the high-power laser. This effectively formatted the sector. Next, the magnetic field was reversed and specific data cells heated to change their state, thereby storing the required data. A third pass then verified the stored data. Due to this tedious process, recording took about twice as long as replay — a significant drawback in audio devices!

DIRECT-OVERWRITE MO DISKS

The big advance in MO disks has been the development of the direct-overwrite system. This is used on MiniDiscs, as well as the latest computer MO systems, and is also known as LIMDOW (light-intensity modulation direct-overwrite).

The system abandons the need for the initial formatting by modulating the magnetic field with the required data directly. The process involves heating the required sector of the disk while modulating the magnetic field to encode the data. A verify pass then confirms that the correct data is in place. It may not sound much of an improvement, but it is far faster and represents a significant step forward, allowing MO drives to take on a far more practical role in audio editing and recording systems.

Current 130mm MO disks are available in 1.3, 2.6 and 5.2Gb capacities, but disks with capacities of 7Gb up to 11Gb are being developed and there are already 640Mb versions of the 64mm MiniDiscs. SOS

Next month I'll look at connecting digital equipment together — and overcoming the inevitable problems.

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new wave

YAMAHA A3000 VERSION 2 PRO SAMPLER AND UPGRADE KIT

When Yamaha launched the A3000 a year ago their approach won quite a few fans, and now they're demonstrating their renewed commitment to sampling with a comprehensive upgrade. CHRIS CARTER's movin' on up...

pros & cons

YAMAHA A3000 V2

£1299/£100

pros

- New loop creation tools give the A3000 a whole new lease of life.
- Easier and quicker to use than the original.
- Reads Roland and Emu sample disks and CD-ROMs.
- Improved Akai compatibility.
- Saves across multiple floppy disks.
- Exports AIFF files.
- Improved SCSI transfer speeds (unconfirmed).

cons

- No new effects or oscillator waveforms.
- No improvement in waveform display.
- Wave and loop editing still a bit hit-and-miss.
- Floppy disk access still slow.

summary

A worthwhile upgrade that irons out quite a few shortcomings in the original and throws in some juicy new features. The new loop-creation tools alone will be worth the cost to anyone producing dance music. If you're currently using Version 1, the V2 upgrade is a 'must have' purchase. If you were considering buying an A3000, make sure you get V2.

SOUND ON SOUND

Exactly a year since the original was launched, Yamaha have released the new improved A3000 Version 2 sampler, plus an upgrade kit for existing A3000 owners. Current users have been waiting with breathless anticipation for this upgrade to arrive, judging by the comments on the net newsgroups.

The original A3000 had an impressive 'off the shelf' specification: 16-bit stereo sampling, AWM2 Tone Generator; 64-voice polyphony; 16-part multitimbrality; 64 digital filters; three multi-effects blocks; four individual audio outputs (expandable to eight); capacity for 128 Mb of RAM; external SCSI 2 interface (and space for an internal hard drive); real-time assignable control knobs; and a sequencer.

To briefly recap my original review (*SOS* July 1997), the A3000 is a monster of a sampler capable of some awesome sonic acrobatics, due to the impressive line-up of of features above. The audio quality couldn't be faulted, and there were more than enough editing and modifying options to please anyone. What it offered compared to the competition was value for money and features galore; where it fell over, for me, was in detailed sample editing and looping, due to its small, low-resolution display and quirky operating system.

Version 2 is purely a software upgrade and doesn't change the hardware or any of the above features. However, it adds some interesting new sample and program editing options and some new filter types, tweaks some of the disk and general housekeeping functions, and addresses some issues in the operating system (see box for a list of features).

NEAT TWEAKS

To begin with, the handy and often-used 'Easy Edit' feature has been given a face lift — it now displays more parameters per page and is grouped on to eight pages for easier accessibility. A new Program LFO has been included which allows modulation of all samples within a program and can be synced to an external MIDI clock, and you can now set pan, filter frequency and filter Q to vary at random with each new MIDI note received. MIDI note numbers can now be used as standard controller sources to vary parameters according to the keyboard pitch. The number of controllable parameters for varying the LFO, envelope generator, filter, sample level and so on has been greatly increased. In fact, almost anything in the A3000 can now be controlled or adjusted by a staggering number of internal or external MIDI sources and controllers.

In Version 1 you could only direct the effects to the main stereo output; with Version 2 there are no routing restrictions — you can send the effects banks, which also have two new configurations, through any output, including the digital outputs. A useful inclusion (although not implemented as fully as it could be) is the new Reset Value function. This allows you to instantly reset a parameter to 0 by pushing the relevant knob; pushing it a second time reinstates the previous setting. It's also possible to set Knob 1 either to turn pages or to select samples.

MR FREEZE

An overdue addition, and something that really should have been included in Version 1, is an input level meter on both the Recording-Standby and Recording-in-Progress pages. There's also a

new Map function that will automatically map a series of recorded samples across a keyboard or place them into a bank.

Sample management has been further improved with the Stereo-to-Mono option, which allows you to mix down both A3000 channels or just one channel to a single mono sample. The Move feature allows you to move samples from one program to another, or from a bank to a program, and the Freeze option allows you to transfer a program's Easy Edit settings directly into a sample, while Copy allows the copying or merging of parameters from one sample to another or one program to another. A new Arrange command will automatically remap samples within a program or bank to consecutive keys on your MIDI keyboard.

DIVIDE AND RULE

The new Divide Loop is an interesting, if slightly unpredictable feature. It splices an existing loop into bite-sized samples and automatically maps them across the keyboard as a new sample bank. The number of new individual samples produced is adjustable, from just two samples to a maximum of 32, and the length of each new sample is variable between 10% and 800%. At a default value of 100%, each consecutive sample slice exactly follows the previous one without any gaps in coverage of the original sample loop. At higher values (above 100%) each divided sample overlaps any consecutive samples, while values smaller than 100% will leave gaps in coverage of the original full-length sample. In practice it works a bit like Steinberg's *ReCycle*, but it's not quite as controllable, because the division points are always equally spaced and not individually adjustable, and unless your original looping points are spot-on you may find each new divided sample to be off the beat.

However, the Loop Remix function, with only two programmable parameters, is a whole lot more usable, and fun. Although Yamaha say it works best on accurately looped, rhythm-based patterns of only one or two bars, don't feel you are restricted to bass 'n' drums, as anything can benefit from this feature — I found it great for producing experimental voice cut-ups.

Loop Remix uses "intelligent but random" remixing parameters, called Type and Vari, to create a new sample loop made from rearranged chunks of the original loop and seamlessly spliced back together again. Depending on the parameter settings, a remixed loop will contain slices of the original sample that are reversed, duplicated or just rearranged, and each time you activate the Remix function you get a different remixed loop (which is placed in a temporary memory buffer). Depending on the type of material you're working with, this process can take a little while, but most of the time the new loops emerge sounding pretty good. As soon as you find a remixed loop you're happy with, press the Create button and your new funky looping sample is placed into RAM.

> "Divide Loop and Remix Loop are brilliant sampling tools for breathing new life into over-used, old and tired loops."

Divide Loop and Remix Loop are brilliant sampling tools for breathing new life into over-used, old and tired loops; a bonus is that, if you have enough memory, they perform their magic on stereo sample loops as well.

THE NEED FOR SPEED

One of the most often-heard gripes from A3000 users is the painfully slow hard drive and floppy disk access. Version 2 promises faster loading but, to be honest, loading and saving to floppy disk appears to have changed little since Version 1. I had words with Yamaha last year about supplying review models without a hard drive (or a SCSI 1 adaptor for an external drive) but my words seem to have fallen on deaf ears, as this A3000 also came *sans* hard drive or

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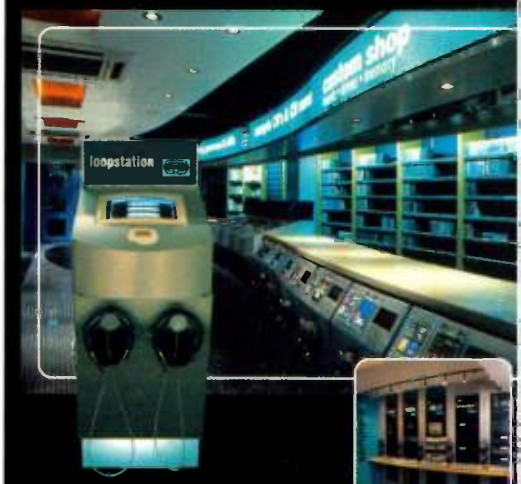

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SCSI 1 adaptor, though hard disks of up to 8Gb, with a maximum partition size of 1Gb, are now supported. However, the lack of hard drive or SCSI 1 adaptor with the review model means that I can't tell you what sort of improvements have been implemented with SCSI transfer speeds.

A welcome improvement is a safer disk saving routine that always confirms the destination when saving to disk, just in case you're about to accidentally overwrite or erase an important file. Also, you can now save the contents of the A3000's RAM (samples, banks, programs, and so on) across more than one floppy disk. I found that this worked fine as far as saving went, but I couldn't always load multiple floppy saves back in again.

Exporting AIFF-type samples onto PC-formatted disks is now fully supported, and version 2 will at last recognise Roland and Emu sample disks and CD-ROMs. Better Akai compatibility means Akai program velocity ranges and samples not grouped within programs are now correctly recognised, and native Akai S20 sample disks can also be read. The A3000 still insists that imported WAV or AIFF files adhere to the 8.3 DOS naming standard, so if you have a lot of Mac AIFF samples to load this could become a chore.

FILTERED OR PLAIN?

Yamaha have thoughtfully included an additional 10 dynamic, assignable filter types (see 'New Features' box), which now brings the total number of digital filters to 16. Seven of the new filters are dual types, with two filters running in parallel and a Distance parameter to set the tracking offset between them. All the filters are perfectly usable, but they sound a trifle cold for my liking, and I still find them a little too easy to overload.

HITS & MISSES

I haven't covered every improvement or addition Version 2 offers — just the major ones. In fact, there are so many system changes that Yamaha have produced a second instruction manual. This is not as gigantic as the one supplied with version 1, but it still runs to 50 or so pages.

For existing A3000 Version 1 users this upgrade is going to be pretty essential, as it will undoubtedly make using the instrument easier and quicker. If you're producing dance music, in particular, the new loop-creation tools were made for you.

Personally, I'd like to have seen a few new effect algorithms and oscillator waveforms included. I also feel that sampling can still be a slow process if Auto-Normalize is active, and you still can't edit a loop while pressing the Loop Monitor button. Waveform editing hasn't been improved at all, and trimming and looping can still be a little 'suck it and see'. But the inclusion of the input-level meter on the Recording Standby and In Progress pages is gratifying, and improves the sampling process no end.

> "For existing A3000 Version 1 users this upgrade is going to be pretty essential."

There are extensive system tweaks in V2 that definitely make the instrument easier to use than the original version, but I still can't bring myself to call the A3000 exactly user-friendly, though this is mainly down to the inadequate display — at least, inadequate for a sampler with so many programmable parameters.

VERDICT

Until recently, the A3000 was beginning to look a little over-priced (only 2Mb of RAM and no digital in/out). However, anyone who keeps a keen eye on dealer ads should have noticed that sampler prices (including that of the A3000) have been falling lately, and a canny buyer could snap up an original A3000 for a knock-down price (as low as £949, if you look at the right ads). So there's a choice of ways to go — either buy a V2 off the shelf, at the same £1299 price as the original, or track down a discounted V1 A3000 and add the V2 upgrade kit for an extra £100, probably saving yourself some money in the process. But there's no doubt that potential A3000 purchasers should go for V2, however they choose to do it — it offers so much more than the original. SOS

info

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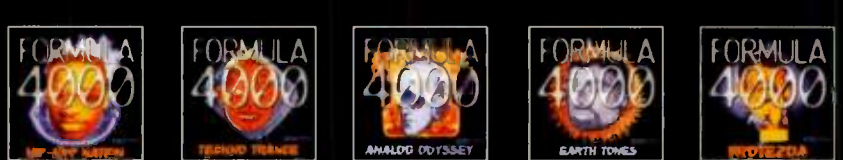

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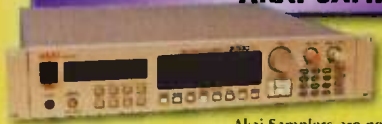

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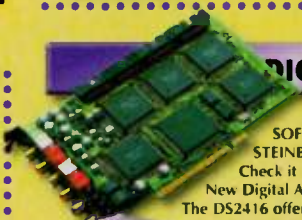

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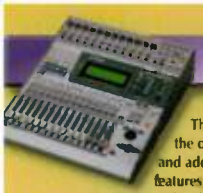

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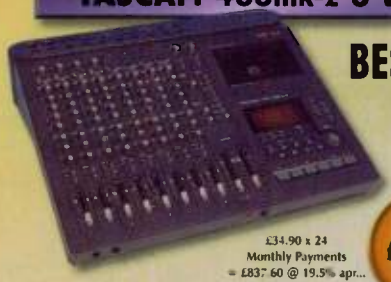

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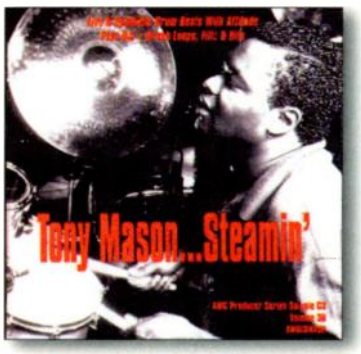

TONY MASON... STEAMIN'

(AUDIO CD)

Following on from volume one, *Smokin'*, AMG have invited top session drummer Tony Mason back to the studio to perform and record another selection of drum loops and breakbeats with the emphasis firmly on R&B, soul and funk. The disc starts out well with a section called 'Trigger Happy Drums', in which a contemporary set of sampled drum sounds are triggered from the live kit giving the user the best of both worlds with sounds that leap out of the speakers, but which have bags of feel and expression. Jazz funk fanatics will be extremely impressed by both the sonic depth and the funky performances that these triggered loops offer, hardly surprising when you consider that Tony has drummed with the likes of Ronnie Jordan, Gabrielle, Incognito and the Fine Young Cannibals.

The next section gives us more of the same, but this time concentrates on the sound of the acoustic kit without using triggered samples. Overall the kit sound works well and is very ambient, with more attention given to the overall sound than to boosting the kick and snare drum sounds too heavily. Following on from the massive 'boom-tick' of the triggered loops, you could argue that the acoustic kit (with minimal effects and compression) sounds a bit weak in comparison, but what you might lose in strength of sound you more than gain in the funky and expressive performances of each of the loops. The kit sound also varies quite a lot depending on the type of sound required for each loop or set of loops.

There are a large number of great live snare sounds in particular, and Tony's obvious talent for playing each style of breakbeat with authenticity and feeling make this release (albeit within a tight R&B/funk genre) both versatile and flexible. Each of the two-bar performances are grouped together with between four and five loops per CD track and all are listed with bpms. On the downside, however, there doesn't appear to be much in the way of a coherent structure to the layout and grouping of the loops. They just seem to 'happen' in the track listing with no hint as to their stylistic content. I can't imagine it would have been too much bother to compile the CD with all the jazz funk loops in one section, the R&B loops in another and so on. As it stands, though, flicking through all the tracks finding something suitable for your track could be a bit long-winded.

On the plus side, however, you do get a huge number of loops for your money, plus a good set of single drum hits and a few short fills as well. It would be fair to say that the sample CD market is awash with drumming CDs, but *Steamin'* stands up with the very best of them for sheer performance, versatility and value for money. It does unfortunately suffer a little from its layout and the fact that whilst it is always great to hear such an established session drummer giving us a host of instantly usable and funky beats, for my money, a little more in the way of 'wild' experimentation with both the kit and trigger sounds would have made this release absolutely fantastic as opposed to merely very, very good. Funk, soul and jazz programmers put this one very high up your 'must have' list, you won't be disappointed. *Paul Farrer*

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FINGERSTYLES

(AKAI-, SAMPLECELL, ROLAND-, KURZWEIL-FORMAT 2 CD-ROM SET/AUDIO CD)

Produced by American company Ilio, *Fingerstyles* is a compilation of fingerstyle acoustic guitar strums, phrases and melodies that sound extremely natural when played from a keyboard. The recording and playing is to a very high standard and the playing styles range from Celtic to Nashville, some using special tunings. Obviously it would be impractical to provide every possible finger picking pattern playing every chord in any key and over a range of tempos, so what the creators have done is to deconstruct some simple tunes into strums, phrases of two or more chords, melodies, endings and so on, then present these 'sets' as programs named after the song from which they were taken. Each of the 'ingredients' is then mapped to its own key on the keyboard.

Many have a relaxing, folky feel (though some are rather more driving), so they should be useful in folk, country and even new age compositions. The tempo of each example is provided in the sleeve notes, though not the

amount of memory required, which could be rather frustrating since the programs range in size from around 6Mb to almost the full 32Mb supported by current Akai samplers. In all there are 38 different 'titles' from which to choose as well as a section of 'bonus chords'.

The results that can be achieved using this disk are both beautiful and utterly convincing — but you are committed to writing your songs around the sequences provided, which can be seriously restricting. Unfortunately that's a fact of life when working with cut and paste samples, though it is occasionally possible to combine phrases from different programs (as long as they're in the same tempo) to produce something more complex. If each example had been accompanied by two or three octaves of multisampled guitar notes, it would at least have made it possible to modify chords, add your own melodies and even play new chords, but for some reason people producing phrase sample libraries rarely think this way. Even so, the quality of material provided here is so good that this package of discs has to merit a four and a half. *Paul White*

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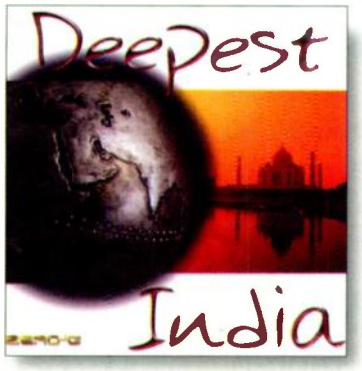

DEEPEST INDIA

(3 AUDIO CD SET)

Deepest India from Zero G is a three disc set of Audio CDs, though an Akai format CD-ROM set is expected later in the year. The three discs are divided into vocals, instruments and orchestra/ensembles, and as the name implies, all the samples hail from the Indian subcontinent.

The vocals on Disc one are mainly complete solo vocal performances or phrases, though there are some accompanied pieces in there too. Where there is a rigid tempo, the bpm is provided as is a translation of the lyrics so that you don't compile anything too embarrassing! The range of styles and emotions here is immense, from sad to exuberant, with both male and female singers, though the lyrics usually relate to that old chestnut, unrequited love! Overall, the recording standard is very good, though some pieces have obviously been close miked as part of an ensemble performance and a little of the instrumental backing is still audible.

Disc two focuses on solo instruments with phrases from flutes, dillrabar, violins, tablas, sitars and a whole host of other Indian fare. As with the vocals, the quality of the samples, both artistic and technical, is excellent, though most pieces seem to be collections of phrases from the same tune. Including multisamples of each of the instruments would have been immeasurably more useful as it would enable the composer to mix phrases and played lines freely. Perhaps the CD-ROM version will have these?

Disc three contains ensemble sections, starting out with phrases from the Bombay film orchestra — paste together the phrases to build your own symphony! The Disc actually comprises many different ensemble styles, some of which sound like Indian restaurant background music broken into sections for you to reassemble in the order of your choice. There are film orchestras, folk ensembles, brass orchestras and strangely named acoustic ensembles that all sound enchantingly authentic. Each of the discs then brings you back to earth with a 1kHz test tone at the end.

I certainly have no complaint about the quality and variety of the samples on offer here, but I'm not sure how I'd go about using some of them as they sound rather like complete performances cut into sections. This applies particularly to the orchestral examples. The vocal and solo instrument phrases are rather more adaptable, though I stand by my earlier comment to the effect that any such samples are very restrictive unless they include a properly multisampled example of each instrument and voice to allow you to 'play' the sounds as well as the phrases. This is a purely personal observation, however, and taken at face value, *Deepest India* is hard to fault. It's also very attractively priced and well documented, so it would be churlish to award it less than four points. *Paul White*

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SHAWN LEE'S PLANET OF THE BREAKS

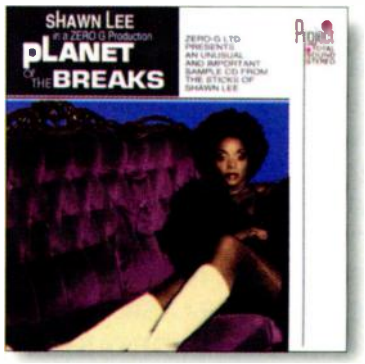
(AUDIO CD)

With a name like *Planet of the Breaks* and a funky retro blaxploitation cover, you get an immediate idea of what kind of drumming you might expect to find on this 61-track audio CD from sampling giants Zero-G. Shawn Lee appears to be a sort of high-octane bearded hippy for the '90s, proclaiming in the sleeve notes that each of the break beats that appear on this CD have been 'individually created with mad love'.

Mad love or otherwise, he does have an uncanny knack for giving us the kind of drumming that simply cries out to be sampled. Instead of a CD that bombards us with millions of mediocre one-bar loops, this release concentrates on 60 of his finest and presents them as fairly lengthy drum performances (some well over three minutes long) that evolve and develop without ever loosing sight of the original groove. Unlike many other drummers Shawn is clearly not averse to using electronic sounds, weird microphone techniques and even sequencing and sampling to get his rhythmical point across and all credit to him for that.

As you might imagine, there is a strong late '70s feel to many of the loops (helped greatly by the fact that the whole CD was originally mastered on to vinyl), but like all good retro releases instead of merely copying genres and styles wholesale, the beauty of these breakbeats is that they have more than enough '90s spin to make them both historically authentic, and yet scortchingly brand new at the same time.

You'll find almost every type of conceivable drum sound somewhere on this CD, but instead of trying to impress us with how much outboard gear he has to play with, the compression, distortion, reverb, flange and gate effects are all perfectly suited to the track they are used on. Performance-wise he always seems to hit the mark, and this CD is as much



about what can be achieved through classic musical understatement as it is about blindingly good dance floor material. All the loops are listed with bpms, and sampling various sections of a long performance is an absolute doddle. This straightforward and uncluttered approach is a real breath of fresh air after so many drumming CDs that waste our time with tons of individual single shot drum samples that you know you'll never get round to sampling and badly edited and performed tom fills.

It's good to see a release that doesn't take itself too seriously, yet never loses sight of the main reason people buy drumming CDs in the first place, namely to inspire great performances throughout the rest of the track. If it's inspiration you're looking for you'll find it in *Planet of the Breaks*. It sounds great, it samples like a dream and whatever the hell 'mad love' is, Shawn Lee obviously has it by the bucket load and I WANT SOME! *Paul Farrer*

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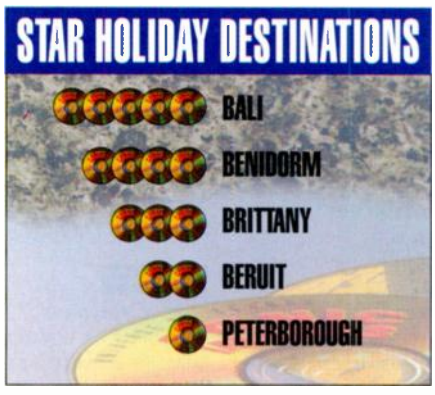

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ROLAND E500 INTELLIGENT SYNTH £1,129
YAMAHA EX7 ..... £1,199
YAMAHA CLP611 DIGITAL PIANO £1,199
YAMAHA P300 DIGITAL PIANO £1,199
KURZWEIL PC88MX KEYBOARD £1,299
ROLAND JD800 KEYBOARD £1,499
ROLAND HP530E DIGITAL PIANO £1,499
ROLAND HP730 DIGITAL PIANO £1,899
KORG TRINITY PRO X KEYBOARD £1,999

Mics

AUDIOTECHNICA ATM63HE MIC £19
AUDIOTECHNICA AT822 STEREO MIC £20
AUDIOTECHNICA ATM73A HEAD MIC £20
AKG D880S DYNAMIC MIC W/SWITCH £49
AKG CK91 BLUE LINE CAPSULE £69
AKG D3500 INSTRUMENT MIC £69
AKG SE300B BLUE LINE MODULE £89
BEYER TGX50 BD MICROPHONE £99
BEYER M201 BROADCAST MIC £149
SENNHEISER MD421U-5 DYN MIC £199

Miscellaneous

WALDORF DAVID GOULD ROM CARD £5
FOSTEX T5 HEADPHONES £35
EMU ORBIT V2 UPGRADE £39
PHILIP REES 3WAY MIDI MERGE £49
JL COOPER CS1 CONTROLLER £49
EMU ESI SCSI OPTION £99
VISCOUNT RD70 MIDI FILE PLAYER £99
XRI SYSTEMS 300 SMPTE SYNC BOX £129
VISCOUNT RD800 MIDI F/PLAYER £149
DRAWMER LA12 LINE DISTRIB' AMP £169
TLA CLASSIC VIS SWITCH UNIT £169
YAMAHA MDF2 MIDI DATA FILER £169
ROLAND MC50KM2 SEQUENCER £189
PEAVEY PC1600 MIDI CONTROL £239
ROLAND GM/GS MIDI FILE PLAYER £249
VISCOUNT MF01 FILE PLAYER/MOD £249
EMU LAUNCHPAD EDITOR £269
AKAI DR8/16 SVGA MONITOR BOARD £339
JL COOPER DATAMASTER (ADAT) £399

Mixers

SAMSON MIXPAD9 MIXER £69
DYNAMIX 16/2 MIXER £99
SOUNDCRAFT FOLIO LITE MIXER £99
SOUNDCRAFT FOLIO 12:2 RACK MIX £189
SOUNDCRAFT FOLIO F1 14CH MIXER £219
SOUNDCRAFT FOLIO F1 16CH MIXER £245
RDL 8.2 POWERED MIXER £249
SOUNDCRAFT RAC PAC MIXER £299
RDL 12.2 POWERED MIXER £349
SOUNDCRAFT FX16 MIXER £499
SOUNDCRAFT POWERED PA MIXER £599
MACKIE 1604VLZ 16-4 MIXER £729
SOUNDCRAFT SPIRIT AUTO16:8:2 ..... £999
SOUNDCRAFT SPIRIT STUDIO 24CH £1,249
SOUNDCRAFT SPIRIT AUTO24:8:2 ..... £1,399
SOUNDCRAFT SPIRIT STUDIO 32CH £1,649
MACKIE 24-8 MIXER £1,999

Multitracks

TASCAM PORTA 03 PORTASTUDIO £69
FOSTEX X14 PORTASTUDIO £99
FOSTEX XR5 DOLBY B HS 4TRACK £169
FOSTEX X24 MULTITRACK £169
TASCAM 464 PORTASTUDIO £199
FOSTEX X55 MULTITRACK £229
TASCAM 414 PORTASTUDIO £229
FOSTEX XR7 2 SPEED DOLBYC 4TK £249
YAMAHA 4TRK CASSETTE DESK £249
FOSTEX FD4 DIGITAL MULTITRACK £299
TASCAM 424MK2 PORTA STUDIO £329
YAMAHA 4TRK MINIDISK RECORDER £369
SONY MDMX4 4 TRACK MINIDISC £389
YAMAHA 8TRK CASSETTE RECORDER £549
FOSTEX D80 8TK DISK RECORDER £799
FOSTEX CX8 DIGITAL MULTITRACK £999
FOSTEX D90 8TRK HARD DISK REC. £1,199
ALESIS ADAT XT DIGITAL REC. £1,199
TASCAM DA38 8 TRACK RECORDER £1,499
TASCAM DA88 8 TRACK RECORDER £2,199

Outboard

APHEX EASYRIDER 4 CH COMP £69
BBE 461 SGL CH SONIC MAXIMISER £69
DBX 290 STEREO DIGITAL REVERB £69
DBX MONO COMPRESSOR / LIMITER £79
LA GX2 DUAL NOISE GATE £79
BOSS AD5 ACOUS INST PROCESSOR £89
DIGITEC TSR6 STUDIO MULTI-FX £89
ALESIS MEQ230 DUAL GRAPHIC EQ £99
APHEX 109 TUBESSENCE PARA. EQ £99
JOEM VC4 ENHANCER £99
BEHRINGER EX3100 ULTRAFEX II £119
LEXICON ALEX FX PROCESSOR £119
DBX 266 DUAL COMPRESSOR / GATE £129
BBE 362NR SONIC MAXIMISER £129
JOE MEEK VC3 PROCHANNEL £135
BEHRINGER MDX2100 COMPOSER £139
SPL 2CH MIC PREAMP £139
DBX 286 MIC PREAMP & PROCESSOR £139
LEXICON REFLEX MULTI FX £145
APHEX C2 AURAL EXCITER £149
JOE MEEK VOICE CHANNEL £189
TLA INDIGO 2011 VALVE EQ £199
DIGITEC MIDI VOCALIST £199
TLA INDIGO 2001 VALVE MIC AMP £199
FAT PCP330 ..... £229
ALESIS WEDGE DESKTOP REVERB £229
SPECK MODEL 316 EQUALISER £249
YAMAHA REV 500 FX UNIT £249
ALESIS QUADRAVERB 2 FX £299
BOSS SX700 FX PROCESSOR £299
DRAWMER DS201B GATE XLR £299
DRAWMER DF320 DUAL NOISE FILTR £299
DIGITECH RP20 FX PROCESSOR £369
DRAWMER DL251 COMPRESSOR £399
DIGITEC VOCALIST 3 WORKSTATION. £399
DRAWMER DL441 QUAD COMP/LIM £429
TLA CLASSIC PA1 VALVE PRE AMP £549
YAMAHA STEREO DIGITAL MULTI-FX £599
AMEK 9098DMA DUAL MIC AMP £669
TLA CLASSIC EQ2 VALVE EQ £849
AMEK SYSTEM 9098 EQ MIC AMP £869
JOE MEEK STEREO COMPRESSOR £999
AMEK SYSTEM 9098CL COMP/LIMIT £1,169
LEXICON PCM80 FX PROCERSSOR. £1,299
LEXICON PCM81 EFFECTS PROCESSR £1,399

Speakers

TEAC LSX8BL SPKR BLACK £3
ROLAND MA20 MONITOR(pr) £19
RDL 110 SPEAKER £49
DYNAMIX WEDGE MONITOR £49
DYNAMIX 12" POWERED MONITOR £49
RDL G115 CABINETS (pr) £69
ROGERS LSI MONITORS (PAIR) £69
JBL CONTROL1 MONITOR (PAIR) £85
RDL R4120 ..... £99
CARLSBRO ALPHA 12 SPKR SYSTEM. £119
TURBOSOUND IMPACT 110 ..... £149
JBL CONTROL 5 MONITOR (PAIR) £169
TANNOY PBM6.5MK2 SPEAKER(PAIR) £179
DYNAUDIO BM5 MONITOR (pr) £279
ALESIS MONITOR 2 SPEAKER EACH £299
DYNAUDIO BM6P MONITOR (pr) £449
TURBOSOUND IMPACT 121 (EACH) £599
JBL EON15P PWRD SPKR (EACH) £699
ELECTROVOICE SX300 (pr) £999

Samplers

AKAI S20 PHRASE SAMPLER £299
ROLAND DJ70MK2 SAMPLER £529
EMU ESI4000 SAMPLER W/TURBO £899
EMU 64 VOICE SAMPLER £1,299
AKAI S3200XL SAMPLER £1,399
EMU E6400 SAMPLER £1,469
EMU E4X SAMPLER £2,199

Samplers

PG MUSIC MAC NEW ORLEANS £1
PG MUSIC BAND IN A BOX ATARI £1
CLARIS EMAILER MAC £1
VOYETRA SUITE SOFTWARE £1
PG MUSIC PC POWERTRAX PRO £1
PASSPORT MASTERTRAX PRO AUDIO £1
VOYETRA DISCOVERING KEYBOARDS £3
PGMUSIC PIANIST VOL 3 PC £5
MUSICWARE PERSONAL PIANO 1 PC £5
MUSICWARE PIANO COURSE 3 PC £5
VOYETRA DISCOVERING MUSIC £9
EMAGIC MAC MICROLOGIC £9
CAKEWALK HOME STUDIO £9
EMAGIC HEAR PC PROGRAM £10
EMAGIC TDM AUDIO MAC EXTENTN £15
VOYETRA DIGI ORCHESTRATOR PRO £19
EMAGIC DISCOVERY AUDIO PC £29
MOTU MAC PERFORMER £49
PASSPORT PC RHAPSODY £69
DIGIDESIGN P/TOOLS POWER MIX £99
DIGIDESIGN DFX PLUG IN £99
PASSPORT MAC ACADEMIC ENCORE £149
EMAGIC LOGIC AUDIO SOFTWARE £149
PASSPORT MAC ENCORE £199
STEINBERG MAC CUBASE SCORE £269
STEINBERG PC CUBASE SCORE £269
STEINBERG PC CUBASE AUDIO £299
STEINBERG PRODUCER PACK PC £339
STEINBERG MAC CUBASE AUDIO SEQ £349

Sound Modules

FAT FREEBASS MODULE £99
ROLAND SC50 PIANO MODULE £99
ROLAND P55 PIANO MODULE £129
NOVATION BASS STATION KYBD £169
YAMAHA RY20 DRUM MACHINE £199
KURZWEIL MICRO PIANO £269
YAMAHA MU90R £269
OBERHEIM MATRIX 1000 ..... £289
MARION ANALOG PROSYNTH £299
ROLAND SC88VL MODULE £299
QUASIMIDI QUASAR FULLY EXPANDED £399
QUASIMIDI RAVE-O-LUTION MODULE. £399
ROLAND TD10 PERC MODULE £399
STUDIO ELECTRONICS ATC1 ..... £399
TECHNICS SXWSA1R RACK SYNTH £449
EMU ULTRAPROTEUS MODULE £499
ROLAND SC88PRO SOUND MODULE £499
EMU ESYNTH RACK £1,899

• • • PLEASE NOTE • • •

All prices include 17.5% VAT E&OE. Most items are new or in near new condition, many are ex demo / repair or secondhand. Very heavily reduced items are likely to be in need of attention. All non new items are sold as seen without warranty.

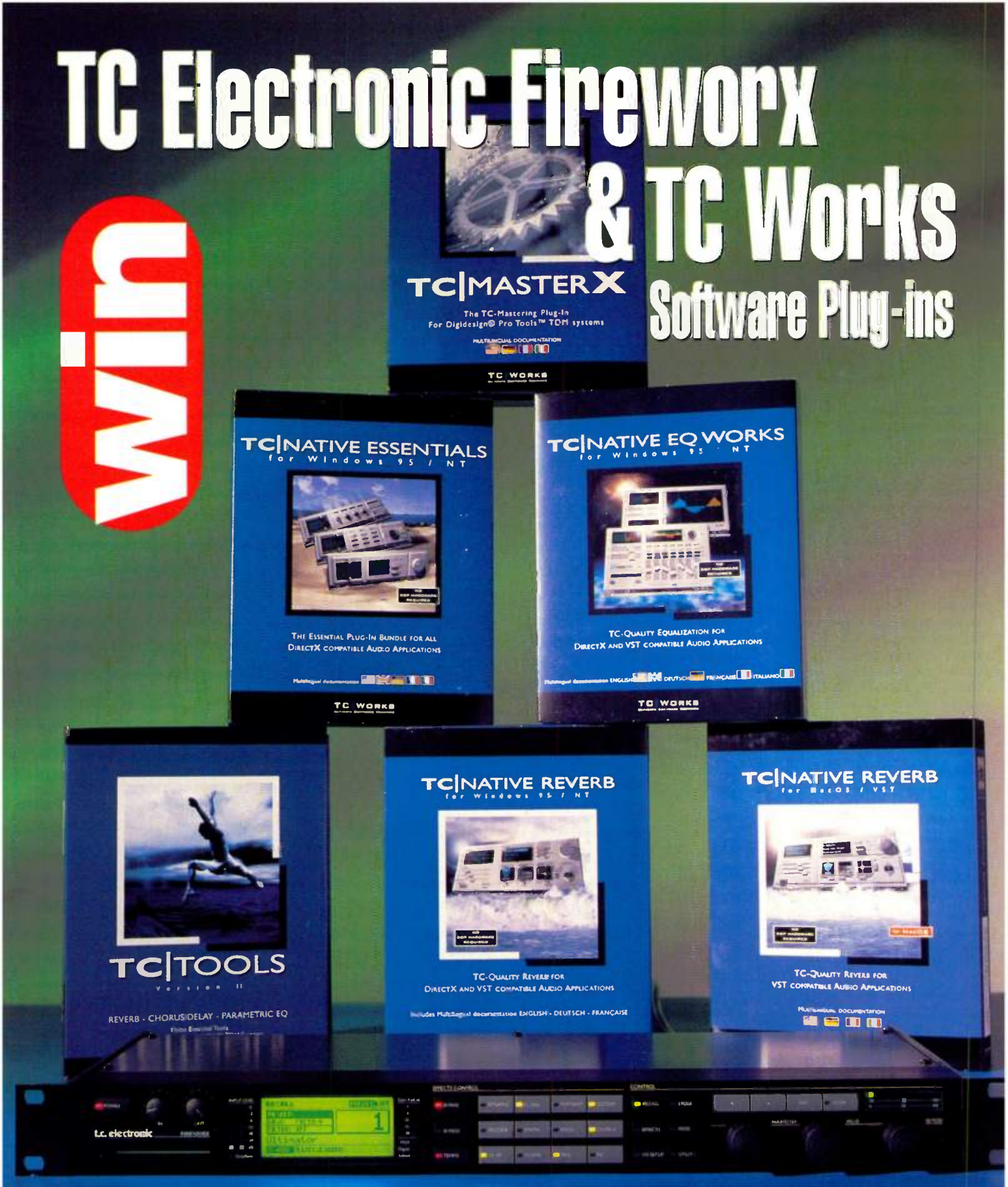
Products are sold on a strictly first-come first-served basis. Personal callers on the evening of Thursday September 10th will take precedence. The first received telephone, fax or mail order (which must include full payment + £9.99 P&P) will be held until Monday 14th September and then only cashed if the item is still available. The item (or your cheque if your are unsuccessful) will be sent to you to arrive no later than the following Saturday (cheque clearance allowing)

The bigger the reduction, the more likely it is that the item will be sold on the night of the 11th. Please don't waste your time enquiring about the £1 items !

turnkey 0171 379 5148 turnkey 0171 379 5148
Fax: 0171 379 0093 114 Charing Cross Road London WC2H 0DT E-mail: sales@turnkey.demon.co.uk Web site: http://www.turnkey.uk.com

TC Electronic Fireworx & TC Works Software Plug-ins

win



Prizes kindly donated by TC Electronic.

win win win

The new Fireworx from TC Electronic, which was reviewed in the June 1998 issue of *SOS*, is one of the most versatile professional multi-effects units on the market. Its impressive DSP effects algorithms can be chained together in innumerable combinations, permitting the construction of sophisticated patches. The 12 basic blocks out of which patches are constructed include not only high-quality dynamics, EQ, chorus/flanger and delay, but also more unusual effects such as vocoder/ring modulation and formant filters which create pseudo-human vowel type sounds.

You can take the Fireworx straight out of the box and use the preset chains to obtain reverb, compression, EQ and other essential standard effects; but it's also flexible for creating, editing and fine-tuning patches to suit your exact requirements. Its powerful yet intuitive user interface includes features such as a Tempo button which is tapped to set sweep rates or delay times that complement the rhythm of your track, and there are also facilities for comprehensive control via MIDI. The alpha modulation wheel can be allocated to a huge variety of individual or multiple parameters in an effects patch, allowing fast and flexible real-time control over the sound.

The Fireworx retails at a competitive £1699 — but one fortunate *SOS* reader will be getting one for the price of a second-class stamp, as first prize in this month's competition. But that's not all. As well as this highly desirable unit, we also have a whole load of other goodies to give away!

In addition to making hardware effects units like the Fireworx, TC Electronic also produce a wide range of effects plug-ins for PC- and Macintosh-based digital audio recording systems through their software arm, TC Works. Thanks to their generosity, two other winners will be getting their hands on some of the best native effects packages around.

Second prize is the *TC Native* suite of audio plug-ins for DirectX-compatible PC applications, which contains *TC Native Reverb*, *EQ Works* and *Native Essentials* multi-effects. Alternatively, if you're a Mac owner, you'll get two Pro Tools plug-ins — the finalising and mastering application *TC MasterX*, and the *TC Tools* suite which offers reverb, chorus/delay and parametric EQ. Our third prize is a copy of TC Electronics' dedicated reverb plug-in *TC Native Reverb* or, if you're a Mac owner running Pro Tools, *TC Reverb for Pro Tools*.

Native EQ and *Native Essentials* were reviewed in the August issue of *SOS*, and like all TC Works plug-ins are designed to provide top-class effects without eating up excessive processor power. Both *Native EQ* and the EQ and compressor modules included in *Native Essentials* employ TC Works' unique SoftSat algorithm, which aims to reproduce the warm sound usually associated with analogue EQs and compressors.

To be in with a chance of winning one of these splendid prizes, all you have to do is complete our short survey about computer audio, answer our tie-breaker, and then post your entry to the address, right.

the small print

1. One entry per person is permitted. 2. Employees of SOS Publications Ltd, TC Electronic / TC Works GmbH, 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 event that the competition organisers wish to make a personal presentation.

SURVEY

1. Which of these best describes your recording setup?
- Professional Studio ☐
- Project Studio ☐
- Home Studio ☐

2. What segment of the market do you work in?
- Music Production ☐
- Post Production ☐
- Broadcast ☐

3. What sort of computer configuration do you use? (please circle the descriptions that apply):

Windows 3.11 / 95 / 98 / NT
CPU: 486 / Pentium / Pentium II / Other
RAM (Mb): 8 / 16 / 32 / 64 / more
Clock speed (MHz): 133-200 / 233-300 / faster

MacOS System 7.x / System 8.x
CPU: 68K / PPC 601 / PPC 603 / PPC 604 / G3
RAM (Mb): 8 / 16 / 32 / 64 / more
Clock speed (MHz): 80-120 / 133-200 / faster
Other (please specify):
.....

4. What soundcard do you use?
- Mac internal / SoundBlaster ☐
- Digital card (please specify model): .....
- SoundScape ☐
- Digidesign Pro Tools NuBus / Project / PCI / 24 ☐ (please circle)

5. Which audio recording software do you use? (please tick all that apply):
- *Cakewalk* ☐
- *Cubase* ☐
- *Logic Audio* ☐
- *Peak* ☐
- *Performer* ☐
- *Sound Forge* ☐
- *Studio Vision* ☐
- *Wavelab* ☐
- *Pro Tools* ☐
- Other (please specify): .....

6 (i). Do you own a digital mixer?
- a. Yes ☐
- b. Not yet, but I plan to buy one ☐
- c. No ☐

6 (ii). If (a) or (b), which model?

Yamaha 02R / 03D / 01 / 01V (please circle)
Other (please specify): .....

7 (i). Do you own any DSP plug-ins?
- Yes ☐
- No ☐

7 (ii). If yes, which plug-ins do you own?
.....
.....
.....

7 (iii). If yes, how happy are you with the quality of the plug-ins you use?
- Not satisfied ☐
- Reasonably satisfied ☐
- Very satisfied ☐

7 (iv). If no, why don't you use plug-in effects? (tick all that apply):
- Quality ☐
- Price ☐
- Too complicated ☐
- Too much processing power required ☐
- Other (please specify): .....

8. What DSP effects interest you the most? (tick all that apply):
- Reverbs ☐
- Compressors ☐
- Maximisers ☐
- Equalisers ☐
- Tube EQ or Compression ☐
- Effects (such as chorus, delay...) ☐
- Pitch-shifters/harmony processors ☐
- Filter effects (such as modulated filters) ☐
- Other (please specify): .....

9 (i). Do you prefer plug-in or hardware effects?
- Plug-ins ☐
- Hardware ☐

9 (ii). If you prefer hardware effects, why?
- Better value ☐
- Better quality ☐
- More flexible ☐
- Other (please specify): .....

9 (iii). If you prefer plug-in effects, why?
- Better value ☐
- Better quality ☐
- More flexible ☐
- Other (please specify): .....

10. What would you like to see improved in plug-ins?
.....
.....

TIE-BREAKER

Imagine you are in charge of product development at TC Electronic. Explain in 30 words or fewer which effect or process you would next bring out as a plug-in, and why.

.....
.....
.....
.....
.....

Would you like to receive more information on TC Electronic & TC Works products? If not, please tick this box. ☐

Name .....

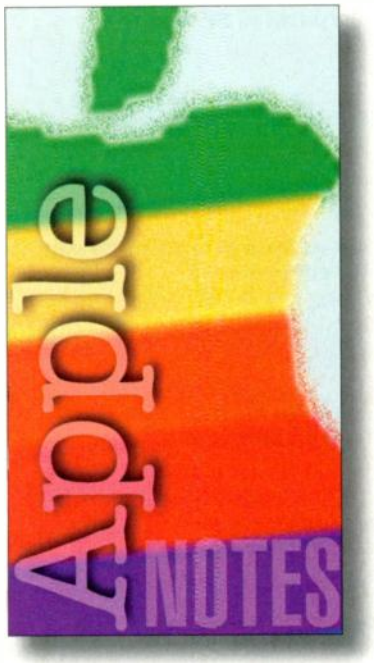
Address .....
.....

..... **Daytime tel. no.** .....

Post your entry to: SOS TC Electronic Competition, *Sound On Sound*, Media House, Trafalgar Way, Bar Hill, Cambridge CB3 8SQ, UK

WRH

TC Electronic Competition



Good news, good news and more good news. MARTIN RUSS just can't believe his luck.

It has been a good month. First, it looks like the iMac may well turn out to be priced at just less than £1000 including VAT (and some people are apparently already taking advance orders as I type this.) Second, the influential US computer magazine *Byte* has published some interesting processor power comparisons. Third, Apple seem to be firmly back on course. And finally, I solved my SCSI problems...

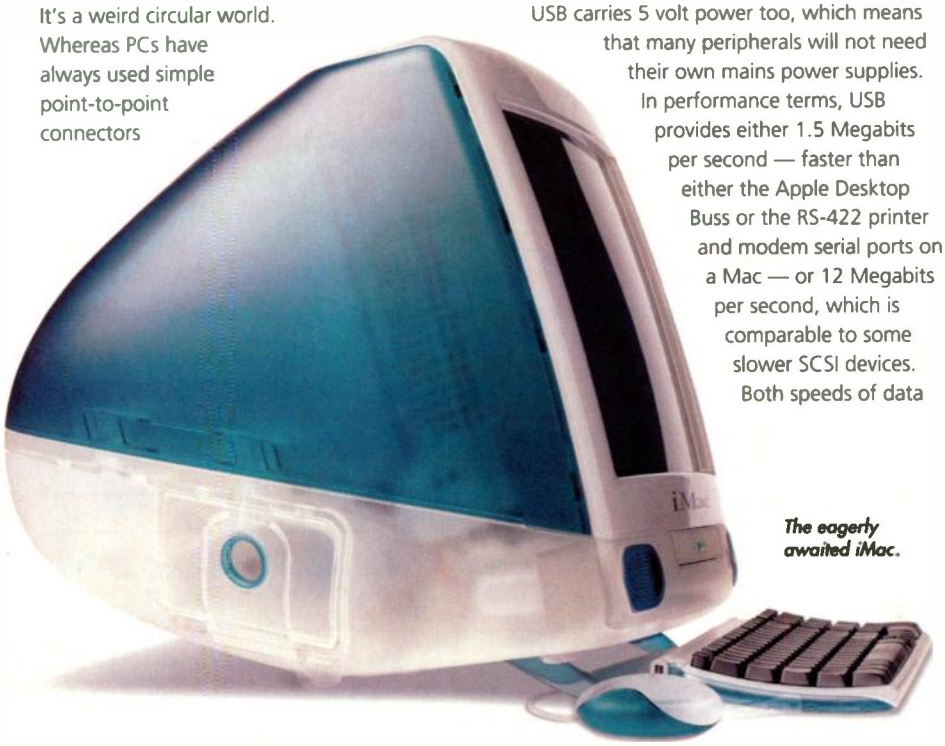
THE UNIVERSAL SERIAL BUSS

It's a weird circular world. Whereas PCs have always used simple point-to-point connectors for connecting the keyboard and the mouse to the computer itself, Apple have for a long time had the Apple Desktop Buss which is a 16-device mini-network. You've been able to buy disc drives, scanners and a few other goodies which used the Desktop Buss, but the idea never really took off.

Well, now it has. Compaq, Digital, IBM, Intel, Microsoft, NEC and Northern Telecom got together a couple of years ago and developed the Universal Serial Buss (USB), and many of the same low-bandwidth peripherals are now starting to appear with USB sockets. With the PC industry behind it, USB promises to be what Apple's Desktop Buss ought to have been in a sane world. For Mac users it opens up a world of low-cost, ubiquitous peripherals that will work on a Mac or a PC.

Not only will USB joysticks and other game-playing related add-ons soon be appearing, but other peripherals including printers, video cameras, hard and floppy disk drives, infra-red device interworking, digital still cameras and digital audio. Connecting a pair of digital speakers to your computer via a serial data buss might appear strange, but the Philips web site already has details! USB is designed to be completely 'plug and play', so you can simply connect your devices up and use them. No configuration, and no hassle. Innovative for PC users, normal for Mac users — but there are some surprises even for hardened Applephiles.

USB appears as a simple four-pin socket, often with two sockets together as a pair. Unlike most computer connections, USB can be 'hot-plugged', which means that you can plug and unplug at any time, and without turning the power off. If only SCSI was like this! The USB carries 5 volt power too, which means that many peripherals will not need their own mains power supplies. In performance terms, USB provides either 1.5 Megabits per second — faster than either the Apple Desktop Buss or the RS-422 printer and modem serial ports on a Mac — or 12 Megabits per second, which is comparable to some slower SCSI devices. Both speeds of data transmission can coexist on the same USB cable. Whereas SCSI is limited to seven devices, and the Apple Desktop Buss to 15, USB can potentially support up to 127 devices — you use little extender boxes called hubs.



The eagerly awaited iMac.

In keeping with the low-cost world of keyboards and mice, USB isn't expensive to add to a peripheral, and the volumes of the PC marketplace mean that prices will be aggressive — some US web electronics suppliers are already selling USB PCI cards for less than $60. If digital audio cards for the PCI buss haven't completely taken over, then USB could provide a way of hooking audio into and out of your PC. Philips' digital speakers will carry digital audio over the USB — and so have no audio connections at all!

Despite what I've said in the past about using a search engine instead of explicit URLs, USB seems to be an exception. Visit these pages for more information:

- W **www.usb.org/**
- W **www.developer.apple.com/dev/usb/**
- W **www.amp.com/product/usb.html**
- W **www.usbstuff.com/**

THE IMAC

At present, some PCs are shipped with USB sockets, but not Macs. However, this situation is about to change with the introduction of the iMac. Although aimed at the mass-market with its clear plastic, all-in-one design, the iMac is actually very much in the same mould (all puns accidental) as the Mac Plus and Mac SE models that were used by MIDI professionals before software got too big for little screens and also went colour. While PCI slots have become

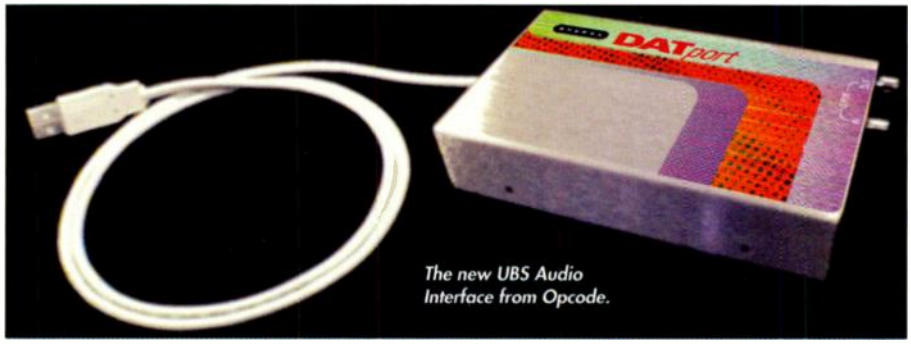
HOW IT WORKS: COMPARISONS

You can't trust numbers. Intel Pentium IIs running at 400MHz must be faster than a 233MHz Motorola G3 chip, surely. Apparently, according to *Byte* when you measure something more related to computing power, then the reverse is true. Steve Jobs took great delight in mentioning this to July's New York MacWorld.

The speed at which a processor runs is not necessarily a good guide to how much it can actually accomplish. It has much more to do with how efficient the chip is. With the right design, a slower chip may well achieve faster raw processing. At least, that's the technologist's answer. A marketing person might well point you to phrases like: "This Operating System runs up to 33 per cent faster" where the 'up to' can include 0 per cent, or even negative speed increases.

But for the ultimate comparison-busting, power ratings for audio systems must be well in the lead. 'Total music power' and its many variants seems capable of turning a few watts of real power into something much more impressive.

Yep, numbers. Wonderful things. And in the hands of a trained expert: completely meaningless. You have been warned!



The new UBS Audio Interface from Opcode.

standard on both Macs and PCs, however, the iMac has no internal card slots at all. Nor is there the familiar SCSI socket and the printer/modem ports have also gone.

In their place, as you've probably guessed by now, comes the Universal Serial Buss. The iMac uses a USB to connect the keyboard and mouse to the main unit. It will also take a floppy disk drive (already available) and there are hard disks and more to follow. Since this is a 'Good news for Apple' month then you won't be surprised when I reveal that Opcode have just announced a brand new USB peripheral — a USB Audio Interface that, by converting between USB and S/PDIF, will enable you to connect DATs, CDs, A-D converters and other audio devices to an iMac for less than $200. Which leaves me asking when the first USB MIDI interface is due...

PROFIT

Apple have announced their third quarterly profit — $101 million, up from the previous quarter's $55 million, on sales of $1.405 billion (thousand millions!). Things have really turned around over the last year. After a period of doom and gloom, the G3 PowerMacs, PowerBook G3s and the iMac suddenly deliver leading edge performance at low prices. Although many people raised the odd eyebrow when Microsoft invested $150 million in Apple, it has already resulted in *Office 98* appearing on the Mac first. There is now a dedicated team of 200 programmers at Microsoft who are dedicated to programming better Mac applications. Even top games are migrating back to the Mac — with PC and PlayStation favourites like *Tomb Raider II* due for Christmas.

ADVICE

I'm often asked by people which computer to buy, and I always tell them a Mac. All too often they then come back and tell me that they have bought a PC instead. Prime motivations for not following my advice are cited as low cost, easy availability and "Windows 95 being the same as Mac OS". These same people then come back later on and ask about driver problems, MIDI port limits and other niggles at which point I tell them that there are still good reasons for buying a Mac. Visit www.apple.com for some biased opinions.

THE ANSWER

After a couple of months now of living with *Studio Vision Pro* v4, I'm running v4.0.1, and looking forward to the free download of v4.1. Life with a combined MIDI and digital audio sequencer is certainly different, but I'm surprised at how MIDI retains its usefulness even in the face of very powerful audio capabilities. You see, although I can treat the audio and the MIDI with very similar processing and editing features, there are still certain times when it's useful to be able to quickly throw a generated sequence of jangly MIDI notes together. Also I'm astonished at how quickly I use up audio polyphony. It all makes me more confident that the future is increasingly about integrated MIDI+Audio sequencers, with software synthesizers available as plug-ins. All this and USB too! As increasingly seems to be the case with computers, we're going to see the development of many different elements working together as one even more capable whole.

SOS

TIP OF THE MONTH: SCSI BUS 2

At the risk of this becoming a soap opera, I'm going to mention my long-running SCSI problems again. It started with the mysterious freezing of my PowerMac when copying files, and more recently it has caused my CD-R/hard disk combo to suffer from errors. But hey, this is a good month, and so here's how I solved everything.

Although my Mac already has an internal and an external SCSI buss, experimentation had shown that there was a limit to the number of SCSI peripherals which I could connect at once. So the solution was to add another SCSI buss via a PCI SCSI card. Installation was a 'plug and play' breeze and after rebooting I now had buss 0, buss 1 and buss 2 all up and running. With the CD-R/hard disk combo connected to the new buss card, everything worked perfectly. The new card may have represented an extra £100 or so on top of the CD-R budget, but my system is now reliable again and I don't need to replug things just to blow a CD-R.

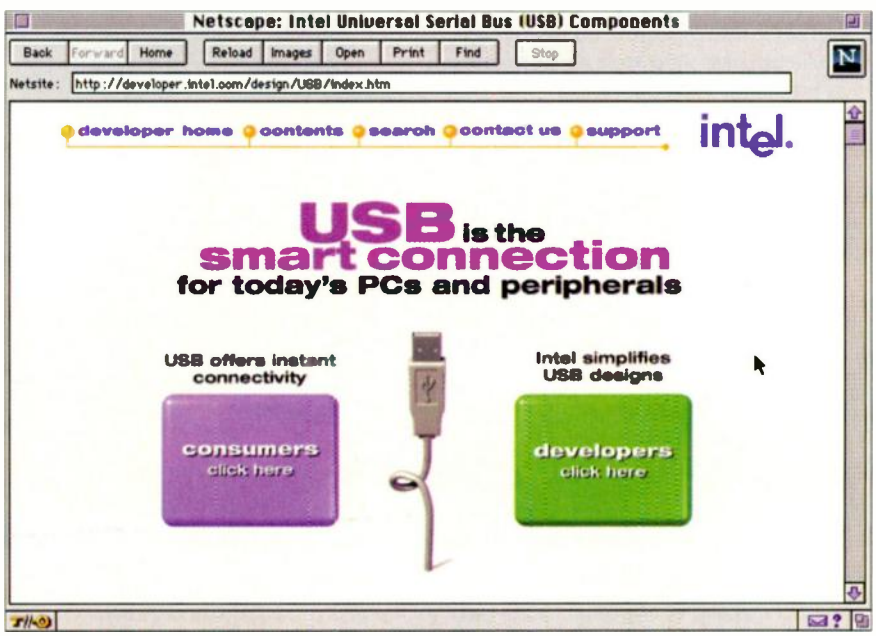
APPLE NEWS IN BRIEF

• 56K IMAC MODEM

Early reports of the iMac claimed that the modem would be a 33.6 kbps model, but the latest indications are that it will be 56 kbps. September should see the first of the blue and clear curvies in the UK.

• V-TWIN

I remember attending a talk by one of Apple's top R&D gurus about 18 months ago when he extolled the virtues of their V-Twin search engine. Well, it has taken a while to reach the real world, but it looks like System 8.5 will get the benefit of V-Twin, only renamed Sherlock. Imagine a web search engine inside your operating system and you get the flavour of this program.



Want to know more about USB? Here's the first ever Apple Notes pointer to an Intel web page!

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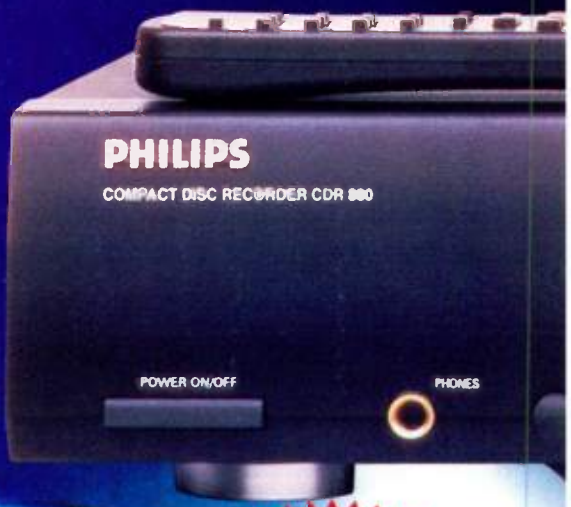

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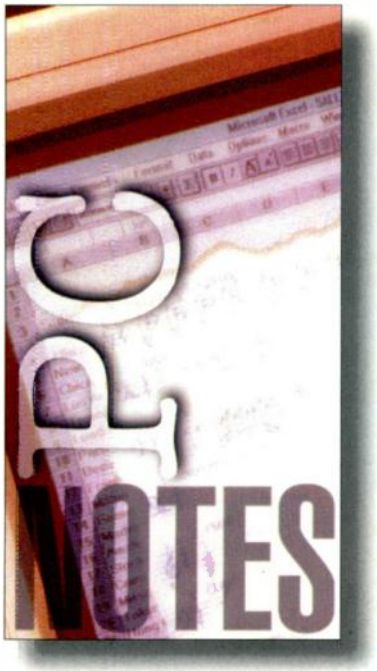
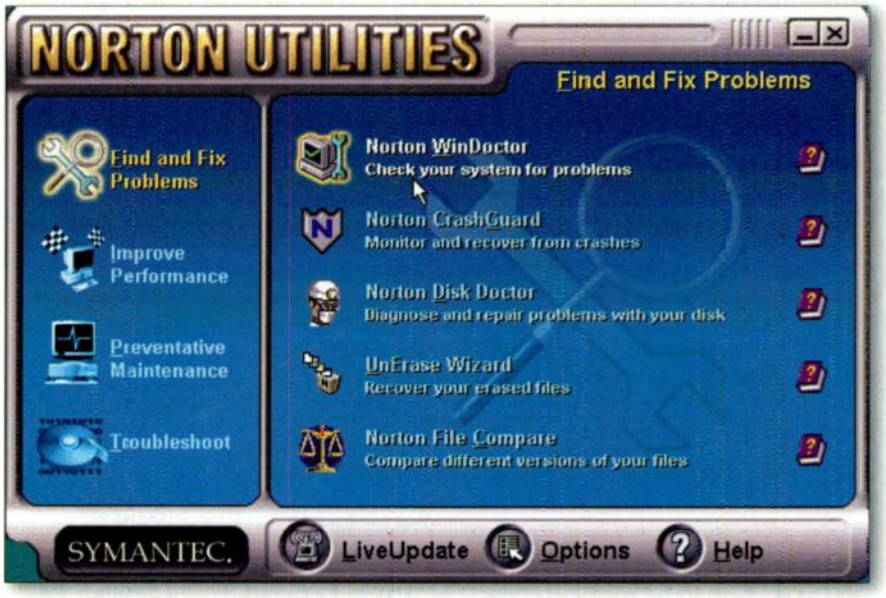




The latest version of Norton Utilities for Windows 95 has a handy front end (the Integrator) for quick access to any of its components.

This month, after a bit of clock-watching, MARTIN WALKER looks at a utility which should keep your PC running for longer.

There seem to have been a lot of new developments in the PC world of late, and since many are relevant to PC musicians I intend to open up the cupboard, probe into its darkest recesses, and reach for a change of clothing. Yes, it's anorak time again!

CLOCKING ON

Let's dive in at the deep end. Your PC's system buss controls communication between the processor and other parts of the computer's motherboard, and for some time overall performance of PCs has been held back by the 66MHz buss speed. However, although Intel motherboard chipsets were supposed to run at a maximum of 66MHz, others have been available which can achieve higher speeds, of up to 83MHz. Some people even 'overclocked' the Intel chips, to these higher buss speeds, by changing jumpers on their motherboards, although warnings are normally issued with instructions on how to overclock, since the practice causes the processor chip to run hotter. Depending on the quality of your motherboard (and the RAM chips), you might then be prone to random crashes and other reliability problems. In other words, on your own head be it!

However, overclocking can produce problems in another area for musicians: the speed of the PCI buss is normally half the system buss speed, and some soundcards (and any other PCI card for that matter) might suffer from erratic performance after such overclocking. They're only designed to run at 33MHz (half the normal 66MHz buss speed), and although many will run at the slightly higher speeds of 37.5MHz (with a 75MHz buss speed) and 41.5MHz (with an 83MHz buss), others will exhibit glitches, or even lock up the PC altogether.

One reader recently emailed me after suffering a complete lockup every time he booted his Cyrix 6x86 PR200 MMX-powered PC after installing an Event Darla soundcard. This processor uses a 75MHz buss speed by default, so I suggested that he try reducing buss speed to 66MHz. The Darla card worked perfectly after this, although his PC would also run significantly slower. This is not a criticism of Cyrix processors — it just illustrates once again that unexpected things can happen when you attempt to mix and match hardware from different manufacturers.

PARENT POWER

The reason I mention all this is that, along with the many new processors I discussed in last month's PC Notes, there's a significant new feature appearing on systems with the fastest 350 and 400MHz Pentium II processors — the 100MHz front-side buss (and yes, unfortunately there is a back-side buss as well). The secret is the new Intel 440BX chipset, which has been designed for these new devices. New motherboard designs based on the 440BX chipset can support any Pentium II processor, from 233MHz to 400MHz, but the two fastest models can now run with a front-side buss speed of 100MHz, rather than the 66MHz of the others.

As always, the overall system improvement is not as high as one might initially expect, but it's causing some people to worry that their existing PCI cards may not work properly if they buy a new system with a 100MHz buss. However, in such systems the PCI buss actually runs at one third of system buss speed and so returns to the safe value of 33MHz, which prevents problems with PCI expansion cards.

Mind you, the 100MHz buss is not just for those with bottomless wallets and purses who can afford the latest high-speed Intel processors, since there are various manufacturers developing a Super7 chipset, which will work with Socket 7 processors (such as the AMD K6 series). Industry experts are actually predicting that the 100MHz buss will give greater improvements for the Super7 motherboards than for Slot 1 Pentium II systems. This is because the two major areas of improvement for Super7 are the increased clock speed of the Level 2 cache, and that of the entire system RAM. Since the Pentium II chips already feature a Level 2 cache that runs either at the processor clock speed, or at half of it, the improvements with the 100MHz buss are not

MICROSOFT NEWS

Microsoft have made yet another attempt to clarify audio streaming technology: we now have DirectShow audio plug-ins. This name change does help to reduce the current confusion between the DirectX foundation layer (which includes DirectSound soundcard drivers), and the DirectX media layer (which includes DirectShow, and controls media streaming). However, the poor software houses will soon have to refer to audio plug-ins as using DirectShow — formerly known as DirectX Media Streaming Services, formerly known as ActiveMovie, formerly known as Quartz!

More pleasing is the news that the infamous Windows 95 11-device MIDI limit is reported to be vanquished forever in Windows 98. Although I haven't yet confirmed this for myself, I have just received the full shipping version of Windows 98, and hope to report on this in more detail soon. General impressions seem to be that it is more stable than Windows 95 (not surprising, since many people consider it to be a bug-fixed version of the same). No major incompatibilities with music software have apparently been reported, although I did spot one user reporting a crash with the *Cool Edit Pro* 1.1 Noise Generator option. Mind you, it's always wise to wait a month or two if you can, to give developers a chance to produce bug-fixes if necessary.

so dramatic — but, of course, the 350 and 400MHz processors themselves are faster.

Unfortunately, there are other components that will normally need upgrading to run reliably with any motherboard featuring the higher 100MHz buss speed, and the eagle-eyed among you may already have noticed PC memory ads quoting different prices for SDRAM suitable for 100MHz operation. Memory with Intel's new PC100 spec will cost significantly more than the 66MHz-rated version, and while some people have managed to use their existing memory modules with 75 and even 83MHz buss speeds, 100MHz really does need these faster memory chips.

NORTON UTILITIES VERSION 3

The *Norton Utilities* suite for both the Mac and PC seems to be the standard by which most other toolkits are judged, so when a major update appears it's worth examining what's new:

- The Integrator (see screenshot, left) provides quick and easy access to the other programs in the suite, and this is similar to the approach of both *Nuts & Bolts* (which I mentioned in PC Notes October '97) and *First Aid* 97 (mentioned in the May '97 PC Notes).
- System Doctor now repairs as well as detecting viruses.
- Rescue Disk (which creates floppy disks to boot into Windows 95 if your hard drive causes problems) now has options to use Zip or Jaz drives. The original floppy disk option is still available, and this will get you as far as DOS, so that you can use other DOS-based *Norton Utility* programs to solve your problem, but the Zip/Jaz version boots directly to Windows, where the Rescue Recovery Wizard starts up to get your system running properly.
- The Crash Guard 3.0 utility runs in the background, using 150K of memory, and intercepts crashes, with an Unfreeze option that allows you to save your work before closing the offending application.
- LiveUpdate Pro claims to find and install the latest updates for all your software applications, using the Norton Web Services web site, but as always its usefulness depends on what manufacturers it has in its database — music software is still unfortunately a minority interest, so you'll probably still be better off perusing the appropriate web sites for yourself.
- Norton WinDoctor is a new addition which scans for problems with the Registry, file associations, and shortcuts, and then offers manual or automatic repair facilities. This is very similar to the approach taken by *First Aid 97*, and is just as useful.
- The Optimisation Wizard reorganises your Registry data for optimum performance (there's a similar option in *Nuts & Bolts*), as well as adjusting the swap file. This latter option is the only area in which you may want to tread carefully, since I ended up with a swap file that had a minimum size of 96Mb. The idea is that setting a large minimum swap file size reduces or eliminates swap file fragmentation. You can benefit from this, but you may want to reduce its value (I reduced mine to 32Mb).
- The final new option is Speed Start. I made some comments about Windows 98 in the August '98 PC Notes, and consider that one of the three main reasons to buy it is its much faster loading of applications, due in part to reorganisation of the file order on the hard drive. Norton's Speed Disk has similar options, but Speed Start monitors disk accesses when loading any application, and can subsequently give much faster loading times — I certainly noticed a significant improvement, although you may want to disable this background utility when undertaking hard disk recording.

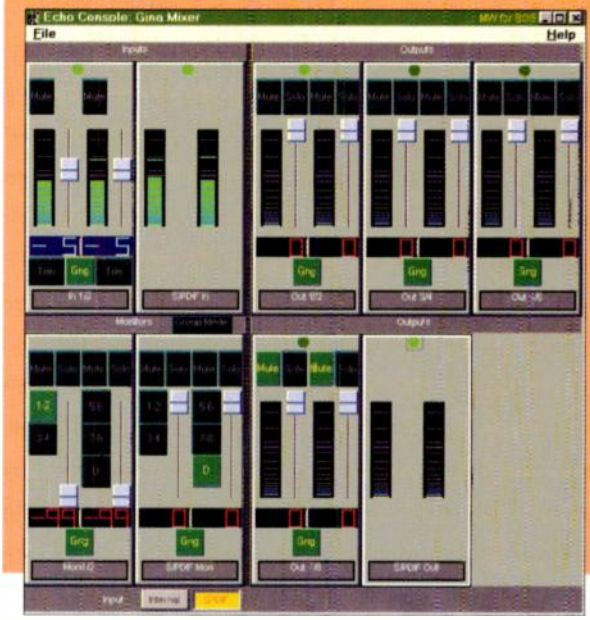
For those who have not used these utilities before, it's worth pointing out that although many of them default to being loaded automatically every time you start your PC, you can disable this and only use specific modules as and when required. This saves memory and resources, and should be the preferred option for PC musicians. The only one I leave running permanently on my system is CrashGuard, which, according to its Statistics page, has intercepted four *Cubase* crashes since its installation, letting me save my music before re-booting.

Norton Utilities 3 may be the most expensive toolkit (street price about £70, or upgrade from version 2 at £40), but it's still the best, with few unnecessary frills. For example, even though the Rescue options may rarely be used, when something goes wrong you'll be very glad that you have them. Highly recommended. SOS

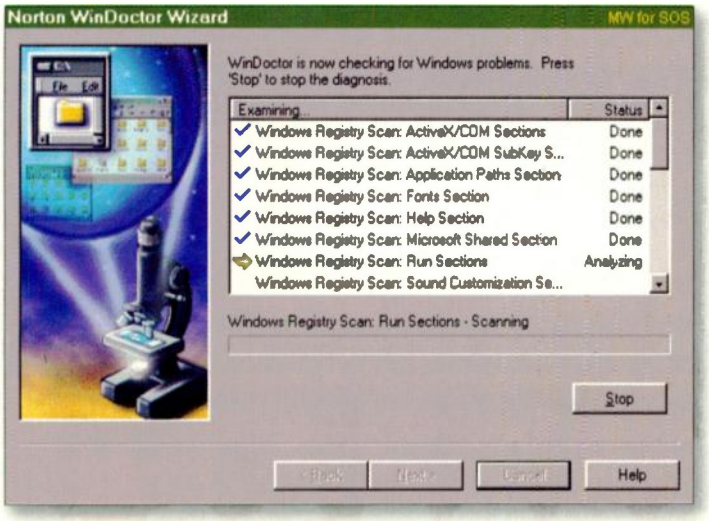
PC UPDATES

Akai have posted a new improved PC version 2 of their *MESA* sample editing software on their website (www.akai.com/akaipro). This includes many of the features of the Mac version 2, although neither the press release I have nor the web site specify exactly what these are. Note that it still only currently supports the XL-series samplers (S2000, S3000XL, S3200XL and CD3000XL).

Now that the Layla soundcard has finally emerged from hiding, Event have released yet another set of drivers, which work with Darla, Gina, and Layla (version 3.05). Sadly, a tiny bug has crept back into the S/PDIF input function on Gina only, but by the time you read this a fix should be available on the web site (www.event1.com). However, probably a lot more interesting to most people is that the so-called Echo Console has been released along with the drivers, and this gathers all routing and monitoring functions into one easy-to-use panel. It may look slightly 'clunky' (see screenshot), but that's because it's fully resizable (the slider caps, buttons, and meters all change to suit the current Console size), and you can change the colour scheme as well. A comprehensive *Acrobat*-format manual is also included, which should result in a lot less confusion all round.



The new Echo Console for the Darla, Gina, and Layla soundcards makes monitoring and metering a lot easier. Inputs are top left (with associated monitoring routing functions beneath) and outputs are on the right.



If your PC has problems, the Norton WinDoctor will diagnose and repair them. Particularly thorough is the Registry scan (shown here). Once this is complete, the repair window appears and you can decide on the best course of action for any faults found.

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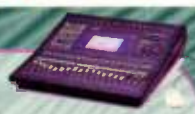

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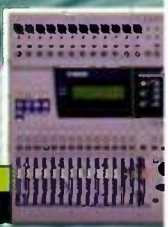

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The DS2416 offers the mixing power of the Yamaha O2R digital mixer, complete with 24 channels of digital mixing, plus 16 tracks of h hard disk recording with 32 bit resolutionn.

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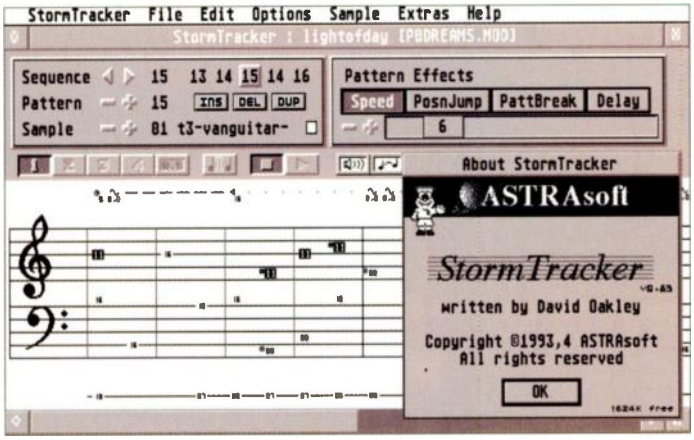
DEREK JOHNSON unearths a simple but fun Atari tracker and sound chip synth, and explains how your ST can help you train your ears...

Back in December 1994, Vic Lennard, when he was still in charge of this column, gave a rave review to a shareware 'tracker' program from AstraSoft called *Stormtracker*. I mention this because in my monthly trawl around the Internet, I found the AstraSoft web page. *Stormtracker* hasn't had any great developments since Vic looked at it, but it is now shareware, rather than a commercial program, with a registration fee of just £10. Trackers, for those of you who are wondering what I'm going on about, are pieces of software that let you create finished performances by layering and sequencing samples of audio. The finished product — both sounds and performance — is saved as a MOD file, which is the standard file format for trackers.

GOING DOWN A STORM

StormTracker is one of the best trackers on the ST platform, with an easy-to-navigate front end that emulates the feel of a pattern-based MIDI sequencer. Essentially, it offers four audio channels, variable-playback sample rate (to weigh sample quality against available memory), and the ability to load samples in a variety of formats (including AVR, SAM and SPL). The intuitive on-screen staff display lets you easily choose a playback pitch for your samples, and if your raw material needs tweaking, an integrated sample editor lets you do basic loop and pitch manipulation.

David Oakley, who wrote *StormTracker*, is also behind *DeskTracker* (shareware registration



Left: The MIDI sequencer-like front end gives StormTracker an immediately familiar feel.

Below: DeskTracker has a simple but elegant interface.

£5), a simple but elegant MOD-player desk accessory. Graphically, it's straightforward: you get just the controls you need, although there is an option for a gimmicky spectrum analyser and oscilloscope. Of course, both *StormTracker* and *DeskTracker* can be downloaded from AstraSoft's web site (www.astrasoft.ml.org/index.html), but for the net-less amongst you, check out the Goodman International public domain library (16 Conrad Close, Meir Hay, Longton, Stoke-on-Trent, Staffs ST3 1SW. Tel 01782 336222).

Trackers can be quite rewarding to use, especially if you have a good sampling package. Just don't expect completely pro results, especially on common-or-garden-variety STs. If you're running a Falcon, however, *StormTracker* can take advantage of that computer's vastly improved audio hardware and sound quality.

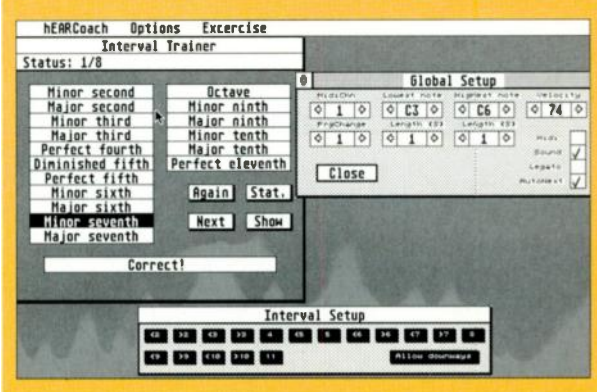
CHIPS WITH THAT?

Programs for creating music solely with the ST's built-in 3-channel sound chip often have a similar feel to trackers. Rather than chaining samples together, you're telling the sound chip what sound to make, and then defining a pattern of notes for the chip to play; such software is pretty much designed to produce music which can then be embedded in another application, typically a game or stand-alone graphics-plus-music 'demo'. *XLR8 — Chip Composer*, from Sentry NL, has been on the shareware scene for a while now (registration is US$10). I found a link for this software lurking in the MIDI/audio list of the Ultimate TOS Software Index (ping4.ping.be/dipching-drulkhor/PRG-IND2.HTM), during the same trawl that re-introduced me to *StormTracker*. It seems to be a superior example of its type, with an accessible and graphically interesting interface, plus the option to output your performance over MIDI (when you register, that is!). The pattern-based sequencer is joined by a complete instrument editor with tone controls, and volume control over every pattern or individual note. Accept that the sounds produced by your Atari's sound chip will pretty much always sound like they belong in a mid-'80s computer game, and you can have quite a bit of fun. Have a listen to some of the example files to hear some interesting examples of what can be achieved. Cheesy, yes, but more complicated, musically, than you'd think a 3-channel chip would be capable of.

EARING AID

There are several examples of ear training tools available for the ST, and I've just discovered a new one: *Hearcoach* v0.93 is the first program from Swede Joakim Hgberg, and creditable it is too. For now, all the software will manage is interval drills, but Joakim hopes to add rhythm, scale and chord exercises in the future. Using *Hearcoach* is a doddle. First of all, you select which intervals will be played to you, via the ST's speaker or as a MIDI note; intervals from a minor second up to a perfect eleventh are supplied. You can then choose a MIDI playback channel, along with program change and velocity, the lowest and highest note values that can be played, and note length. There's also an option to automatically play the next interval immediately after you've correctly guessed. For the completely baffled, the software will show you the correct interval, and if you want to keep track of your progress, a chart shows you which intervals you did and didn't get right.

***HearCoach* is actually shareware, but the registration is just US$2! Find it at: http://hem1.passagen.se/gokmase/atari/**



At present, HearCoach simply offers interval training, but it does this very well.

MIDI merge boxes

You can't combine MIDI signals just by joining the wires together. Merging MIDI datastreams is a job for a microprocessor. There is one at the heart of each model in our famous range of MIDI merge units.

The new mighty ***Little 2M*** handles all types of MIDI data including *MIDI Time Code* and *System Exclusive*.

The compact low-cost ***Little 2M*** is powered via one of its MIDI IN lines. Thus, it needs neither batteries nor an external adaptor.

Our larger merge boxes employ more conventional power supply schemes. This means that they can support extra input and output ports.

The classic ***2M*** merges two sources, the ***3M*** merges three, the ***5M*** merges five, while the ***9M*** impressively merges nine! These devices can also handle all types of MIDI data, including *MIDI Time Code* and *System Exclusive*. Many automatic features enhance performance and convenience.

The ***2M*** and ***3M*** units have built-in mains power supplies. The ***5M*** and ***9M*** units are now supplied with external mains adaptors.

Little 2M **MIDI Merge Unit.... £39.95**
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 CV converter

Little MCV will let your MIDI system control your analogue synths. It 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.

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**

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.

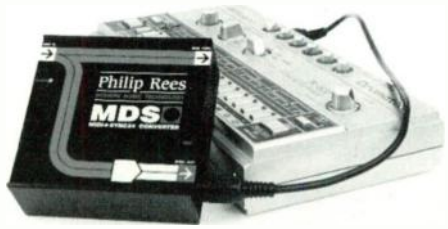
The ***TS1*** merges MIDI data received with its own sync data. You won't need to swap around the MIDI wiring, as ***TS1*** has four MIDI ports and automatic signal routing.

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

TS1 **MIDI Tape Sync Unit..... £99.00**

MIDI to DIN Sync box

Classic drum machines and sequencers, such as the *TB-303* and *TR-808* are equipped with Sync24 ("DIN Sync") inputs. When connected up via ***MDS***, they should start, play in time, and stop automatically by remote control from MIDI master equipment.



The unit is easy-to-use, compact and contains an integral mains power supply.

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

Long distance MIDI

These line driver systems 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 have built-in mains power supplies.

MLD **MIDI Line Driver £89.95**
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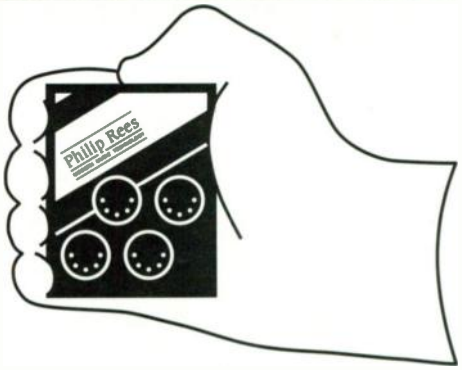


Functional simplicity

Simple MIDI switchers

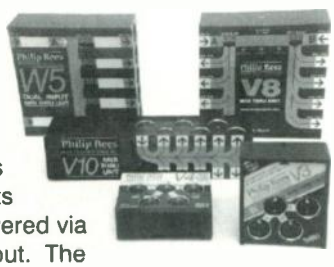
These MIDI selectors could solve your MIDI routing problems and save you the inconvenience of swapping cables about.

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

2S **MIDI Selector £12.95**
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 2 inputs and 8 outputs, is now supplied with an external ac adaptor. 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 £12.95**
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V8 **MIDI Thru Unit £35.95**
V10 **MIDI Thru Unit £39.95**
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demo DOCTOR

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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.

THE NEXUS EFFECT

Recording Venue: Home.

Recording Equipment: PC running *Cakewalk Home Studio* sequencer, Digitech Studio Quad V2 effects, SPL Stereo Vitalizer enhancer, Behringer Composer compressor, Tascam DA20 DAT, Samson Mixpad mixer.

I've reviewed the work of Peter Michael Rosenberg, the face behind the Nexus effect, in the quickies section before, and he seems to be going from strength to strength. His style has changed a bit, possibly because he's been listening to the Chemical Brothers and Massive Attack, to mention just two listed influences. Like many readers who send in instrumental demos, he seems to do it all himself — writing and recording the music, and even designing his own cassette covers.

This tape stands out from the bunch because it doesn't have any lengthy, overblown intros but cuts straight into a wicked groove, using carefully considered sounds that sit well together in the mix. It's immediately intriguing, and from the first ten seconds I can tell that it's going to be a good demo. A little120Hz wide-band EQ brings out the really low bass in the mix, but it's not what I'd call an essential improvement.

Peter Rosenberg's musical strengths could, paradoxically, also be his weaknesses. The second composition, for example, with its jazz leanings and jolly tune, takes the piece into test-card territory. This is fine if that's what you're trying to sell, but I can't help feeling that it's too much of a contrast to the first track, which definitely heads towards club. Modernising the sound of this second and subsequent compositions would require stripping them down, looking for the killer phrases and grooves, and using them to create something else.

'Cairo' is the title of the third and final composition, and it's a track that any modern jazz combo could take and cover successfully. I especially like the use of the burbling synth, strong in the lower-mid frequencies and with a modulated filter which has the effect of lifting the piece as the higher frequencies are introduced into the sound. This gives the mix a more modern edge. ❑

SCRT

Recording Venue: Home.

Recording Equipment: Steinberg *Cubase* sequencer running on Apple Mac LCII, Fostex M80 8-track, Roland 48-channel line mixer, Seck 12:8:2 mixer, Yamaha SPX90 effects, Alesis Midiverb III effects, Audio Technica AT4033 and Shure SM58 microphones.

SCRT are primarily a film and TV music band who have had some success getting their music broadcast over the past four years on the BBC and independent TV. It's not hard to see why when you listen to their first non-film/TV-related EP release, because of the quality of the ideas.

Strangely, however, the recording, although clean and well balanced, lacks the hand of a producer to add that extra something to the compositions. There are times, for example, where the piano cries out for a tasteful reverb to at least give it some sustain ('Blackwater'), and the obvious penchant for backwards sounds starts to become tedious eventually. The reversed sounds, whether sampled or taped, are nevertheless effective, especially on the opening song, a cover of the Stranglers' 'Golden Brown'. High, reversed guitar notes play the melody line, and the strange vibrato lends them a compelling, plaintive quality.

Nicki Leighton-Thomas' contribution on vocals is excellent, but she's left pretty exposed on some of the songs, and nowhere more so than on the chorus of 'World Within a World', where the arrangement fails to achieve the necessary dynamic lift into the chorus. It's simply that the backing vocals the piece cries out for arrive late and are mixed far too low. On a more positive note, the vocals have been very professionally recorded and sound great on all the songs, especially within the warm-sounding mix of 'Belle De Nuit'.

The use of guest instruments, sampled or played, gives the EP an interesting quality. I particularly liked the Middle Eastern-style violin on the aforementioned 'World Within a World'. The natural sound of the instrument is retained, with a beautiful woody tone, and the phrase it plays is tastefully used within the song arrangement. John Phillips' trumpet on a remix of 'Blackwater' is well recorded, with a crisp upper-mid tone and fine choice of large-room reverb, giving it a place in the mix where it doesn't interfere with the vocal.

In short, this demo shows plenty of good ideas and fine musicianship but occasional lapses in arrangement, which a producer of the calibre of Rupert Hine could sort out effectively should the band get a deal. ❑

ROYCE

Recording Venue: Home/Sam's Studio, Newcastle.
Recording Equipment: Tascam 488 8-track, Digitech GSP 2101 effects, LA Audio 4c, SPL Vitalizer enhancer, Alesis RA100 amp and Monitor 1 speakers, Roland R5 drum machine, AKG C3000 microphone, Aphex 107 mic preamp, Alesis Quadraverb effects, Sony DTC A6 DAT, Tandy PZM microphone.

The first three songs on this demo were recorded in the home studio of bassist Neil Cooke in Seaham, County Durham. A drum machine was used for these tracks but the band were able to use real drums at the session in Sam's Studio, Newcastle, for the final two songs.

Listening to the mix of the first song, 'Easy Now', it seems that the band have made tasteful use of the Vitalizer to add presence to the top end of the master. This gives a touch of class to the vocal sound and lends the guitars (recorded via the speaker-simulator output of the GSP 2101) a contemporary brightness when overdriven.

The mix balance on this first track is fine, and I can only suggest a couple of changes. Firstly, the snare could have been made more interesting by using a different sound on the alternate second and fourth beats. This is easily achieved with drum machines or sequencers triggering sound modules. The best way to retain continuity while introducing variety would be to trigger two snare samples for the fourth-beat hit and mix the two sounds to taste. Slight changes in pitch for the same sample might also work. The result would be a more realistic drum track.

Secondly, the sound of the guitar is a touch too close in frequency range to the vocal. Both have a gravelly tone, and I would suggest finding out where the vocal grit is (my guess is around 900Hz) and making sure that the overdriven guitar leaves a little hole for the vocal by not being too active in this range. As it happens, the presence and warmth of the sound when vocalist Ian sings a less angst-ridden song helps to alleviate a potential problem, especially on some of the other mixes. However, he's got such a good rock voice that it should be the guitar that's EQ'd to make way for it.

It was interesting for me to hear the difference that real drums made on these recordings. Energy is the most obvious change, but the vocals and guitars are also benefiting from the greater separation afforded by recording in a commercial studio. Undoubtedly this is one of the improvements offered by using a good microphone, but I notice that the guitars are less distorted, and this also creates more space for Ian's gravelly vocal to work. Some of the vocal compression is over the top and has caused sibilance, but in general both the songs and production work is improved. ❑

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UNIVERSE

Recording Venue: Home.
Recording Equipment: Tascam 238S cassette 8-track, Alesis ADAT digital 8-track, Spirit Folio Rac Pac mixer, Allen and Heath GS1 mixer, Shure SM58 microphone, Tandy PZM microphone, AKG C1000 microphone, Yamaha FX500 effects, Zoom 1202 effects, Aphex Type C2 Aural Exciter, Alesis Nanoverb effects, ART DXR Elite effects, Phonic compressor, Marshall DRP1 guitar preamp, Philips DCC730 DCC machine, Aiwa cassette deck, Rotel RA930AX amp with Tannoy 631 monitors, Arcam Delta 290 with B&W 610 monitors, *Cakewalk* sequencing software running on a PC, *Music X* software running on an Amiga.

This band have such a large equipment list because two setups were used to record the tracks! Sequenced and backing instruments were recorded to the Tascam and then bounced to the ADAT, where vocals and final overdubs were added at a different home venue. This seems a very odd way to do things when the sequenced sounds could have been run live on the mix from timecode, to free up tracks on the recorder and preserve sound quality. Apparently it just 'happened' that way. Regardless of method, the demo doesn't seem to have suffered and is a pleasant enough slice of guitar-based pop, with piano and synth-generated strings providing the main additional instrumental interest.

'Time on my hands', the first song, is well arranged, with choruses lifting where they should, courtesy of a nice counter-melody on the strings and an organ chordal pad. The addition of congas is welcome here too, but they're mixed too low and the level could have been improved by simply nudging the fader up a bit or, better still, using some EQ. I mention EQ because the strings could also have been lifted in level, but their lower-mid frequencies would then have started to obscure the congas. A little more warmth for the strings in the lower mids, at around 500Hz, and an expansive reverb with some presence, such as a chamber or plate with a filter setting of 15kHz, would really bring out the part. This would allow some upper-mid frequencies to be added to the congas at around 3 or 4kHz, which would bring out the slap of the conga sound itself, allowing it to cut through the mix without being turned up. As you can probably gather from the above, it's almost impossible to alter one element of a mix without considering how it will affect other sounds, so they must be made to work together.

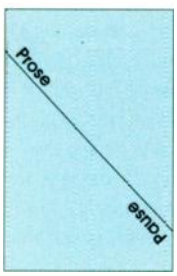
The second song on this demo is an improvement, both in terms of the mix and of the music. Some of this improvement is attributable to the better vocal performance — the vocalist is happier singing this type of upbeat song, in this key, and it shows in the pitching and confident style. The electric guitars add more body to the sound too, and are more effective than the wispy strummed acoustic on the first song, having weight in the crucial lower-mids but also retaining the bite of the upper frequencies. I'm less impressed by the lead guitar sound, though, which has the buzz of a chainsaw due to the DI style of recording.

One of the good things about the guitar sound is the complete absence of any digital modulated effect, such as chorus, flange or phase, which would have been out of context with the retro feel of the songs. The third song is especially good in this respect, and is probably the best contender for a single, with a strong chorus and use of strings and brass to lift sections of the arrangement. The more keyboard-oriented dance feel of the final song is probably worth exploring, and I think it would be a move in the right direction for the band, providing that their guitar energy is not lost. ❑

demo DOCTOR

QUICKIES

FABRICE RETKOWSKY has a pretty minimal setup, consisting of Roland JV1080 and D10 synths triggered from the Amiga *Bars & Pipes* sequencer. The instrumentals he composes are loosely classical or ambient in theme, and the mixes (recorded to Sony MiniDisc) are crystal clear but sonically small. A visit to a post-production suite could improve them if he ever felt close to releasing a CD. Certainly, wide-band EQ, with some boost at 120Hz and 12kHz and cut at 1kHz, takes the hard edge off the sound and introduces a touch of class. So don't despair if you're short of recording equipment!



The compositions feature well-chosen sounds, but the arrangements could do with tightening up — it's not enough to have one or two looped riffs for a five-minute composition of this nature.

SQUAREWAVE is the keyboard project of Nick Toone, a "reformed guitarist" who decided to dabble with synthesizers after hearing Ozric Tentacles and Hawkwind. How ironic that the Ozrics, who I saw at this year's Glastonbury, played a set that comprised of many lengthy guitar solos and prog rock 'chops'! Still, Nick's demo has some fine trippy grooves that wouldn't have been out of place at the festival itself. The sound is full, with good use of stereo panning,

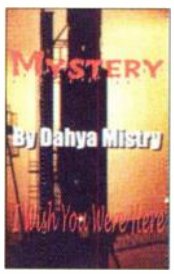
complementary sounds and decent breaks. I especially like the pitch-drop drum break in the first mix, which could have been an Akai sample or clever use of his Alesis SR16. Most impressive of all is the fact that the mix was achieved using a Spirit Notepad console aided by a PC running *Cubasis*. Excellent stuff!

TIM WILSON's demo develops sound textures triggered using the *KCS Omega* software picked up as a freebie disk some time back. The music is a series of probabilities defined by a non-standard modal scale, note lengths and the note presently sounding within the piece (I think!). Having established a conceptual framework, Tim writes out what is essentially computer code, feeds it into the computer and "lets it run free". No two performances are the same, and the human element is retained as Tim tweaks and tailors the sounds. This is electronic ambient music free of crass New Age-style sounds and it works very well. The recording itself is a bit noisy, due to a low recorded level on cassette and some noisy digital sound sources, but in general the relaxing nature of the triggered sounds comes across to the listener. Tim hopes to move into working with sound and light installations, so if there's anyone out there who's interested in his musical approach perhaps we could put you in touch!

RM2: John Senior and co-conspirator Paul Burns go chiefly for the underground sound on their demo of breakbeats and electro. The 303 sounds cut through the fatter bass lines provided by the Novation Bass Station, but in truth they could mould themselves to the mix more effectively in places with extra mid around 500Hz.

The mixes are minimal, with concentration on the breaks and some nice use of sub-bass. My favourite is the frantic 'Katy The Dog', complete with phased drum loop and synthesized whistle — very droll. On this track some of the breaks are constructed in such a way that they could almost be DJ mixes between two decks, and yet there's still plenty of scope here for live performance mixing.

DAHYA MISTRY is influenced by Asian Hindi film music, and consequently he's going for the big movie production sound, with plenty of strings, yet retaining a strong dance beat. A walking synth bass line and '70s funk drum-machine groove provide the necessary rhythm, while piano and strings take the melody lines. Here the piano could do with a longer, more expansive reverb than the slightly pre-delayed room reverb that the preset piano patch is supplied with. This is also the case for the second composition, an anthemic ballad requiring the 'big' reverb sound of a plate or hall algorithm. The rhythm section and bass end of the mix is very tight and compressed sounding, but the mid-range piano and strings have been mixed too low. This reduces the impact of the melody and also the dynamic effect of swelling strings. I'd give them a bit more level.



PERFECT CIRCLE: This Conwy four-piece launch into the world of Celtic romanticism with their opening song, 'Dutiful Sea', recorded at Rockcliffe studios in North Wales. It's a melodic rock workout that sounds a bit boxy, but a slight cut at 1kHz sorts that out, and some 12KHz boost adds more presence. I also tried a valve compressor across the mix, which tightened up the sound and added punch, so that wouldn't be a bad post-production idea for this song. The second mix doesn't need the same treatment but is awash with reverb. The vocal is also mixed too low, so I'd go for a remix on this one. The vocal line, which shows some REM influence, needs compressing to help the dynamic, but otherwise this is a fine, powerful song. 'Always you' was the final mix I listened to. This is a bit scratchy in the upper-mid frequencies, and I think it's been over-equalised across the board, suggesting either that the monitors may be lacking in upper-mid (hardly likely with JBLs), or that the engineer had to mix the band on the same day he recorded them and consequently suffered a temporary loss of treble.

AVERAGE RADICAL: There are plenty of questions in the letter that accompanies this demo, from composer Trevor Scarrow. He thinks his vocals are over-compressed, but they sound just about right to me. He also asks what's the point of de-essing a vocal and then enhancing it. My answer would be that just because a vocal processor has a de-esser and an enhancer, that doesn't mean you have to use both of them unless there's a problem with the vocal sound. An enhancer might help an SM58 mic to sound more classy, but you shouldn't need a lot of it. Trevor has used chorus on his vocal, and finds the effect uneven. This is because chorus actually modulates the signal sharp and flat in pitch compared to the original, and it could be that there's too much chorus and not enough dry signal in the mix. The chorus effect should be coming back on separate channels into the desk and then should be mixed against the dry signal, which is also kept on a separate channel. If you still don't like the sound I'd suggest using a pitch-shift effect instead, which keeps the effected vocal at a constant pitch above or below (or both in stereo) the original. After all this I don't seem to have much space left to review the songs, but my favourite was 'The Scene in the Court'.

PAUL KLEIN seems to have sent us in two tapes under different band names, but as both are solo projects it's easier to use his name. The first mix is a dance version of the old Minnie Ripperton song 'Loving You', in which he's gone for a rather ploddy octave-bouncing bass line and pedestrian drum beat. The emphasis on the bass end of the mix tends to show this up too, and it's only during the middle eight section and snare build-ups of the chorus that the rhythmic groove comes to life. More syncopated snare fills and a bit more adventure on the hi-hat would do the trick. Finally, on this track, the vocal is mixed far too low. It's been well manipulated on the sampler, so let's hear it! For the second mix Paul has taken an old Foxx/Shears/Currie track 'Young Savage'. This is a much better interpretation and he's obviously more at home with this material, although it would have been better to interpret the vocal line in a more modern way, by choosing phrases rather than keeping the whole thing.

HOT NEW LOOPS & SAMPLES FOR SUMMER

The big news in sampling this summer – tons of HOT new releases from East-West, USB and Zero-G – check them out in one of our 75 jukeboxes at a store near YOU!!

East West (USA)

BLACK BUTTA

(9/10 REVIEW)
Produced by Madjef Taylor for East☆West.
MadJef Taylor's album credits include artists like Janet Jackson, Michael Jackson, Boyz II Men, New Edition, Karyn White and many of the albums produced by Jimmy Jam and Terry Lewis.
This has to be one of the phattest collections of dope beatz and hip-hop grooves available anywhere. Madjef has compiled a fresh variety of beats, loops, scratches, bass and lead lines, live drums and fills, kicks, snares, and guitar samples in construction kits with MIDI-files. An absolute must for any Hip-Hop or R&B producer. His unique drum programming will put a groove in your tracks that will give you the edge you need to make great records. AUDIO CD plus MIDI-files: £59.95

DRUM N' BASS CONSTRUCTION KITS

Produced by James Bernard for East☆West. This BEST SELLING 2 CD SET has the most amazing collection of Drum 'n' Bass grooves and breakdowns all in construction kit format. It contains over two hours of the latest drum and bass grooves by NYC producer and sound designer James Bernard. First you get the complete loop, followed by the drum part, sub-bass part, synth pads and individual drum hits – everything is broken down so you can use as much, or as little of each loop as you want. This collection is huge value for money – you get two CDs for the price of one! 8/10 Review – KEYBOARD, USA. 2 CD-AUDIO Set: £59.95

HYPNOTICA

Produced by Perry Geyer and Greg Hawkes for East☆West.
"Fat phase-shifted and ring-modulated filter sweeps, eerie vibrato tones bouncing through a delay line, Theremin glissandi, chuffing machine clanks, crispy white-noise explosions, distant klaxons buzzing, whippy burbles, carvernous whispers – it's all here. The production values on Hypnotica are almost too high. Many of the samples consist of two or three layers of sound, almost like mini-production pieces of the trance/ambient variety. Reverb and chorusing add richness and space to a mix that glistens with high end. Truth be told Dr.Who never sounded this good. 8/10" (Keyboard USA)
New from the creators of "Technophobia!" and "Tekno/Industrial" – HYPNOTICA is loaded with fresh sounding cutting edge textures, trance and ambient loops, FX. Mind blowing Sweeps, Galactic Noises, Hypnotic sequences and magical sounds for your next rave. HYPNOTICA features complete soundscapes, ambient atmospheres, electronic samples and hold, reverse FX, noise loops, underwater textures, electronic ethnic voices, ring modulation, liquid audio, lazer sweeps, takeoffs, pans, white noise FX, low frequency sequences, oscillators, android heartbeats, drones, screams, synth bleeps, intergalactic textures etc. Orb meets Future Sound Of London – a magical mystery tour! CD-AUDIO: £59.95

SMOOV GROOVES

Produced by Michael Bland & Sonny Thompson for East☆West
"This 62-track CD doesn't bother with any demos or clumsy spoken introductions: it just kicks off with the first of the loops–and what a great way to start. Slow and meaningfully funky vibes seem to pour out of every note and, despite being more laidback than an arthritic tortoise on Mogadon, the timings, as you might expect, are absolutely spot-on.
The loops range from 60 to 108bpm, and vary from sort of camp '70s cop show feel right up to the familiar spaced-out jamroquai- esque MTV style of the '90s. The recording quality is as good as the excellent playing. With these guys as his rhythm section Prince can justifiably sing "My name is Prince, and I am Fon-Keh", and with this CD in your collection you can now say the same thing. FIVE STARS out of five ☆☆☆☆☆". (Sound on Sound, UK)
From the rhythm section of PRINCE and the 'New Power Generation' – Michael Bland & Sonny Thompson. SMOOV GROOVES is the sequel to the critically acclaimed Funky Ass Loops CD and contains all the loops you need to lay down everything from slow grooves to 70's funk (the tempos range from 60 –108 BPM). First you get a full mix of each loop, followed by the drums, bass, guitar, percussion, keys etc. SMOOV GROOVES is without doubt the finest collection of smooth laidback grooves & 70's funk available anywhere for any price!!! – and it comes to you from one of the world's funkiest rhythm sections – Sonny T. & Michael B. Audio CD: £59.95. CD-ROM (Akai or Roland): £99.00

THE ULTIMATE PIANO COLLECTION

(East☆West). REVIEWS: *"The Ultimate Piano Collection is, in my experience, as close to the real thing as technology will currently allow"* Sound On Sound (UK). KEYBOARD agreed, awarding the collection 5 out of 5. This collection contains four of the best Pianos ever built: Steinway D, Steinway C, Fazioli F228, and Bösendorfer 225. Every key has been sampled in various attacks, with and without sustain pedal. There are 13 different kinds of piano sounds each with its own characteristics. These pianos start sounding really good with 24 Mb or more of RAM (16Mb miniumum is required). Banks up to 64Mb are provided – the current industry standard. CD-ROM (Akai or Roland): £199.95

East West (USA)

ELECTRONICA

Produced by Perry Geyer and Greg Hawkes for East☆West.
"With a range of tempos from 68bpm to a pounding 214 bpm, the spectrum of applications for these samples is reassuringly broad, and as a mixed mode CD, Electronica not only gives you audio samples – both as loops and individual hits – but also all the loops as MIDI files, allowing you to load the data into your sequencer and adapt or adjust the loops for yourself. The loops are generally excellent, and varied enough, both rythmically and in terms of effects and production, to indicate that some serious time and effort has gone into this disc. Verdict – There's a broad range of applications for these well produced samples. The MIDI files are a big bonus as well. 9/10" – Future Music (UK). In this collection you'll find electro industrial loops & samples, many with MIDI-files (enabling you to recreate & customize these loops). There are two types of loops on ELECTRONICA, complete loops without MIDI-files that were generated 'live' in the studio using a combination of sequencing, synthesis & FX generation, and those with MIDI-files. The first group are complete, without any components: the MIDI-files loops start with the complete loop followed by each individual loop component. There are also many individual sounds at the end. Why do you need the MIDI-files and individual samples? Suppose you're working on a track, and want to combine a few different loops at a particular tempo. You can now do it using the loop sequence data from the MIDI-files to adjust the tempo of each loop in the sequencer – without altering the pitch of the individual samples! Or, you can replace individual samples or parts of the sequences to create new 'custom' loops featuring your own samples. We know some of this is possible with programs such as ReCycle , but you have much more control with the sequence data & loop components. If you don't need this feature you simply use the main loop. The musical content of ELECTRONICA is cutting edge electro industrial for the 90's and beyond. CD-AUDIO & MIDIFILES: £59.95

THE ULTIMATE STRING COLLECTION

(East☆West). The Ultimate String Collection is the new standard for string libraries. The collection is perfectly recorded and includes many unique features that put it in a class of its own. Apart from its superior sound quality, The collection features up to 34 violins (for a rich warm sound), 8 violas, 8 celli, and 6 basses. Most of the sections were recorded with double bow action – up and down strokes. This feature provides unparrelled realism for fast sequences. Every section has been recorded with up to 3 tempos. Two different layers per tone are provided for every section, pizzicato, marcato, plus the very best tremolo. The Strings have been recorded completely dry to enable users to choose their own ambience. Akai CD-ROM: £199.95, Roland CD-ROM: £199.95

SCORING TOOLS

(East☆West). Immaculately recorded with a sixty piece world class symphony orchestra, SCORING TOOLS provides you with ORIGINAL orchestral phrases, beginnings and endings, in 3 different keys, 2 different tempos and 7 different styles of music including, Adventure, Fanfare, Romantic, Magical, Mysterious, Suspense and Western. All you have to do to create finished tracks is add your own melodies. There is nothing else available, other than hiring a symphony orchestra and writing and recording the arrangements yourself that enables you to achieve such realsic results – this is the most powerful and inexpensive tool available to create ORIGINAL orchestral soundtracks. 9/10 REVIEW – KEYBOARD (USA). Akai CD-ROM: £199.95, Roland CD-ROM: £199.95

Zero-G (England)

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Imagine producing your own tough Drum & Bass tunes on your PC by letting your PC create it's own music from the elements you give it! Imagine creating aural landscapes that play for as long as you want without ever sounding the same! Imagine being able to change a bass or break while your track is running: imagine being able to change the tempo or key mid mix... Imagine no more... In collaboration with Sseyo we bring you the Koan Essentials Morphing Drum & Bass, the world's first GENERATIVE sample CD. Based upon the Koan software platform, we've bought the toughest, roughest drum & bass samples to your PC with 100 generative Koan X templates for the Koan software range. A special version of "Koan X Silver" software is included to get you going. The samples are presented in Soundfont™ format for Creative Lab cards as well as WAV. Plug and play automatic self-generating music has never been this easy! Have fun, go mad... Morphing Drum & Bass is innovation, you will simply want to play and play. CD-ROM for PC computers £19.95

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(Zero-G)
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The Solution: With the Beat Generator System™ you can have the best of both worlds: Imagine fitting 350 unique Stereo killer drum grooves into 16Mb of sampler memory. Hold down just two keys on a standard 5 octave keyboard to hear any combination. Think about being able to separately drop out the bass or snare drum on the fly, without missing a beat, or substituting a different sound to play the same rhythm. Consider the possibilities of adding individual bass and snare drums, changing the feel by offsetting or re-triggering the separate loops which make up the groove, quickly and intuitively. Now imagine all of this power multiplied by over twenty and you start to see the depth of the system.
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A wild collection of strange loops, crazed voices, twisted noise and just plain madness, Asylum is the most comprehensive of them all! In 'Ward A' you will find BPM grouped loops that will have the same effect on you as a month of electric shock therapy – in other wards you will discover large selections of noises that make programming your own grooves and atmospheres in a Cuckooland style a piece of cake. Asylum is un-nerving where Unhinged was strange and Ghost In The Machine was scary. Why not visit the Cuckooland Asylum... your music will never be the same again. Audio CD: £59.95. (Available Now)

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Zero-G (England)

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KITCH 70's

Kitch 70's is the biggest collection of 70's Drumloops and Samples recorded with the best vintage equipement. Thanks to digital surgery, these loops and samples ooze authenticity.
Kitch 70's is available in Akai CD-ROM format with MIDIfiles as well as audio CD. Each loop has a specific tempo and is precisely organized : a huge task to create a unique CD faithful to the sound of the seventies. The emphasis has been put on the extreme audio quality of this CD, using top of the range equipment and record players. A real jewel for Groove, House & jungle. This is for all of you dance producers! Audio CD: £59.95, Akai CD-ROM: £119.00

BASICUSSIONS

The Ultimate Percussion Tools! Percussion CDs & CD-ROMs available today are great but often of limited use. USB realized this and created a percussion CD with an angle : basic loops and tons of individual samples, all handily grouped by instrument : shaker, tamborine, triangle, congas, bongos, djembe. As the name implies, the loops are very basic but eminently usable, and are all available at several tempi. Likewise, the instrument selection concentrates on all the basic percussions that are present in virtually all music styles. Basicussions is a double CD, in mixed-mode AKAI/Audio. The first disc contains the percussion loops. The second contains the individual percussion hits. Each section is devoted to one instrument (e.g. in the shaker category, there are three different instruments over nine tempi). A generous bonus drum sounds section is located at the end of CD2. A must! Audio/Akai Mixed Mode CD-Rom: £59.95.

Ilio (USA)

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WRH

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Best Service (Germany)

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NEW from Germany's No.1 Sample CD developer, BEST SERVICE. A monster production offering over 2500 samples on 2 CDs of over 150 different voices!! Included are atmospheric intros & break lines for dance, house & Drum'N'Bass, Psychadelic vocals, Ambient hooks. A comprehensive selection of vocals for film and commercial production, plus harmonic choir multisamples for Dance & Pop, male & female shouts, lines, hooks, scratches, laughter, bubbles, screams, computer voices, backing vocals and adlibs plus computer generated voices transformed by Axel Resynth. 2 CD set (Audio CD & Audio/Akai CD): £59.95

REAL MEGA RHYTHM

NEW from Germany's No.1 Sample CD developer, BEST SERVICE. One of the highest quality and most useful sample CD-ROM sets on the market - it gives you 1500 Drum & Percussion samples, 400 loops & fills. You get 1 audio CD with demos and all loops & fills (note that most of these loops are electronic & FX loops). Also you get 2 CD-ROMs, one containing all samples, the other with all loops & fills, ready-mapped for your sampler. Brought to you by the producer of the highly succesful "Real Mega Drums".
3 CD-ROM-Set (Audio/Akai/Akai): £59.95 (Also available in Audio/Emu/Emu and Audio/Yamaha/Yamaha!)

IndepenDANCE

NEW from Germany's No.1 Sample CD developer, BEST SERVICE.
If you have enough of those Techno and House sampling CDs which contain sounds that you feel you could easily create on your own, and you want to open your mind for ELECTRO, 70's DISCO, BRASIL, BHANGRA, and AFRO, and you need a variety of exactly tuned Drumloops, Singleshots, Multisamples and Groovelines in really different musical styles - then you can't miss this Dance construction kit and Remixer tool for bigger beats & grooves. Audio CD: £59.95

DANCE MEGA SYNTH

NEW from Germany's No.1 Sample CD developer, BEST SERVICE.
More than 1500 stunning stereo synth sounds: Typical dance chords, dance organs, voices, choirs, pianos, pads, basses, atmospheres, strings, pizzicato, house sounds, analog & processed synths, single sounds and multisamples. Available in mixed-mode: audio CD & free 500MB Akai ROM (ROM has over 1300 programs, hundreds of sounds - perfectly looped, envelope filters already set, program numbers given, etc., mapped to the keyboard. 2CD package (includes Audio CD and audio/AKAI CD-ROM): £59.95

ADVANCED MEDIA TRAX

NEW from Germany's No.1 Sample CD developer, BEST SERVICE.
It was time to take sampling to a whole new level!!! Advanced Media Trax is an unmissable collection of FIVE CDs - the new standard for film and multimedia productions and sound tracks, featuring synth pads, stacks, orchestra hits and lines, atmospheric backgrounds, single pads and multisamples, cutting edge textures and hyper-SFX. And all licence free. Includes over 1 GIGABYTE of Akai CD-ROM data!! (also compatible for Emu and Roland users). Five-CD-Set (Mixed Mode Audio/AKAI): £149.95

Spectrasonics (USA)

SYMPHONY OF VOICES

From acclaimed developer SPECTRASONICS comes an epic production - the most extensive collection of voices ever assembled on CD-ROM. This massive FOUR CD-ROM SET produced by Eric Persing includes a breathtaking variety of multisamples, phrases & FX from some of the world's most prestigious singers. An invaluable tool for the serious composer and producer, & designed to be inspiring for years to come. Disc 1 is devoted to richly-detailed samples of the 80-voice London Chorale, recorded in a large cathedral in England - the first sampled choirs ever presented without heavy vibrato (more playable and useful in any musical contexts). Performance variations include multiple dynamics of multisampled oohs, ohs, aahs, ees, humming, intense staccato stabs, Major, Minor and Suspended Chords with high & low chord voicings, thick clusters, 12-Tone & Ligeti FX, natural Crescendo/de-crescendos, whispering, murmuring, whistling, accents, falls, Avante garde glides, Vertigo fx, octaves, moving vowels, swoops, chattering, guttural groans, shouts, ethereal phrases and more! Disc 2 brings the beauty and power of Classical Soloists - a wide variety of license-free Operatic Tenor & Soprano phrases (both with words and melismatic), & multisamples of each singer. This disc also has more of the London choir samples. Disc 3 focuses on an authentic English Boys' Choir and a Gregorian Mens Choir. Many of the sounds on this disc have never before been available to the electronic musician. The Boys' Choir features multisampled phrases (Kyrie, Alllelujah, Amen, Agnus Dei, etc.) plus the soft and loud multisampled static vowels (oos, ahs, ees, mms) and moving vowels (Oh-Eh-Ah and Ah-Eh-Ee-Oo). Also includes Solo Boy phrases and multisamples. The Gregorian Mens Choir is provided with multisampled soft and loud Ohs, Mms, Ees, Fifth Drones, Intervals (Half and Whole Step Up/Down), and ancient Gregorian Chants! Disc 4 offers an overwhelming variety of Lush Multitracked Pop Stacks, created from over 10,000 perfect vocal performances! These "Enya-esque" pads are a must-have for Pop, R&B and New Age music. This disc has the most comprehensive multisampled vowels in the collection including Oos, Ahs, Ehs, Ees, Ohs, Mms, Vvs and Zzs, Moving vowels, Washes and "Scooped" notes. Gorgeous male and female textures that will add that smooth silk to your next hit! **NOW IN STOCK!!!!**

★★★★★ FIVE STAR REVIEW (Sound on Sound)

Ten out of Ten!! (First 10/10 EVER!!!) (Keyboard, USA)

FOUR CD-ROM SET: £299.00. (Choose either Roland, Akai/Emu, Kurzweil, or SampleCell). Call to check availability - there's a rush!!!!

HEART OF ASIA

This product got a 5 star review in every magazine in UK, US & Germany! The most comprehensive collection of Asian instruments & phrases. This remarkable CD-Rom2-disc set includes over 1Gb of exotic Chinese, Malay, Nepalese, Tibetan Javanese, Hindi, Sanskrit, Mandarin, Thai & Indian samples, including instruments, phrases, opera divas, chants, speech, gamelan orchestra, monks. Perfect for your next film score, album or remix project. *"A treasure chest of lovingly sampled performances"*.(Keyboard, USA). *"The range and subtlety is faultless. You won't find a better collection of ethnic sounds anywhere else."* (Future Music, UK). Audio 2-CD set: £79.95. CD-ROM 2CD set : £249.00

BURNING GROOVES

Devoted to raw, aggressive, in-your-face energy! Blazing, all-original live drum grooves by Abe Laboriel Jr. (drummer for Seal) with extreme remixes by producer Eric Persing (who brought you Bass Legends & Distorted Reality). Unrelenting alternative, power funk, progressive soul, rock'n'roll and grungehead loops in a wide variety of tempos put this collection in a class by itself. Each groove has a unique mix (edge, ambient, distorted, lo-fi, etc) and some have Hi-fi and Lo-fi re-mixes. Grooves also played without kick/snare for flexibility in customizing loops. CD-ROM version includes the Audio CD for instant auditioning, plus the incredible SMOKIN' KITS drum library. Attitude! Audio CD: £59.95, CD-ROM (includes the audio CD): £119.00

Best Service (Germany)

XX LARGE EXTREME 2

NEW from Germany's No.1 Sample CD developer, BEST SERVICE. The sequel to one of the world's greatest drum loop collections. Features 1650 brand new drum loops from 80-170 bpm. Every style is included in this brilliant collection. All of the loops are exactly tuned and sorted into bpm groups. You also get another 150 bonus sounds: synths, chords, basses, pads, organs, etc. for all current musical styles (rap, hip-hop, dance, house, jungle, drum 'n' bass, rave). Each sound on the audio CD has an individual index number to make it easy to find any sample during a track. On the CD-Rom all of the drumloops are looped and arranged in programmes, presets, patches or instruments up to 8MB. Audio CD: £59.95, Akai, Roland, or SampleCell CD-ROM: £99.00

ADVANCED DANCE COLLECTION

NEW from Germany's No.1 Sample CD developer, BEST SERVICE. Uberschall's first CD-ROM for the new Yamaha A3000 Sampler. It contains drum & instrument loops, basses, analog synthesizers, pads, vocals, ad-libs, sound effects, and drum and percussion samples for current musical styles such as house, drum'n'bass, jungle, trip hop, and electro, etc. 460 megabytes of samples and programs which have been specially tuned for the sound capabilities of the A3000. Loops are divided into four tempos: 90bpm, 126, 150 and 160 making it very easy to combine loops. Conversion values between tempi are included in the booklet. Yamaha A3000 CD-ROM: £99.00

Zero-G (England)

DEEPEST INDIA

"The aim of Indian music is to create spiritual awakening in man" - Sangeet Karyala, India. One of the most exquisite and beautifully recorded sets of samples ever created. A 3-CD set of original samples that explores every area of musical emotion from elation to despair - from hauntingly beautiful vocals, through countless joyous orchestral ensembles to authentic instrumental phrases. It took ZERO-G's indian producers 2 years to record this collection - there's never been anything like it available before. A true masterpiece.

- Disc 1 - Vocals.
- Disc 2 - Instruments.
- Disc 3 - Orchestras & Ensembles

- Audio 3-disc set £79.95
- Akai S-Series CD-ROM: £249.00
- Other formats available soon - call for details!

REVIEW: *"The definitive article... Meticulously compiled from exclusive performances by the cream of the region's talents... The richness of the exhaustive assembly of samples on the Orchestras disc (disc 3) is almost enough to make that single disc worthy of the cost of the whole collection... Deepest India succeeds as an all-encompassing catalog of Indian musical components and combinations, and for anyone working within score and soundtrack fields it's a MUST-HAVE"* (The Mix). *"Deepest India is a brilliant sample collection: comprehensive, educating, great value and genuinely inspiring" (Technologica, UK).*

GUITAR ODYSSEY

REVIEW: *"Very cool FX... A surprisingly versatile assortment... Perfect for anything from Trip Hop to Funky House... A highly recommended disc..."* ***PLATINUM AWARD*** ★★★★★ (Future Music). To give up a promising career in Brain Surgery to pursue a musical dream in pre-glasnost U.S.S.R. says what kind of phenomena the producer of this stunning collection is. The respect he earned throughout Western Europe gave him the confidence to defect in 1992, fleeing with his family to England. Dr. Ika has played with most of the big name Dance DJs in the U.K. This CD captures the essence of what he does live. The Loops illustrate his effortless speed & accuracy. Also sustained chords and FX. For each sample the Style, F.X/Amp used, B.P.M, and Key are given. Audio CD: £59.95

MALICE IN WONDERLAND

Latest in the *'Altered States'* series from Zero-G, produced by IAN BOODY •Rhythm Loops •FX Loops •Synth Percussion Loops & Arpeggios •One-shot Percussion FX •Synth FX •Ambiences & Ethereal Textures •Bell FX •Drones •Weird Voices. Lots of great unique loops! They're weird & interesting, & the 'tighter' ones provide great backdrops to put main drum sounds around. Many loops have the 'Cuckoonland' organic quality about them but sound cleaner. Textures range from menacing low drones & Spacey FX, to really beautiful ambiences & arpeggios. All bpms & keys are provided where appropriate. **REVIEWS:** *"A very impressive source of creative loops... Clearly & logically grouped... Excellent for the off-beat samplist... Loops are generally highly usable... Well programmed patterns... Superb FX loops... The use of effects is interesting & imaginative... Plenty of mondy arpeggios... Perfect atmospheric ambient layers."* (Future Music, UK)Audio CD: £59.95 Akai CD-ROM (out now) : £119.00

FIELDS OF MOTION

Vol.4 in(Zero-G's) "Altered States" Series is a stunningly innovative CD that utilises raw and organic sources to create rhythms and soundscapes with a creative edge. Loops come with individual components allowing infinite variation, plus lots of exciting single hits and ambiences. All material is 100% original, & came from theme parks, factories and industrial sites etc etc. CD-ROM VERSIIIN COMES WITH AUDIO VERSION BUNDLED FREE!! *"A truly unique product which takes a brave & successful step towards providing a good fusion of dance and industrial styles... the selection of usable sample material will keep even the sampling die hards busy... fantastic range and depth... innovative & unusual... new and exciting sonic sculptures... a rich seam of dance floor and jungle influence... a scorching collection of "happening" dance loops... layout couldn't be more logical... will provide that elusive sparkle to your tracks... In short, Pure metallic, steam-driven wonderment.* ☆☆☆☆☆ *Five Stars* (Sound on Sound). Audio CD: £59.95, Akai S-1000 CD-ROM 2-disc set (includes audio CD): £119.00.

VOCAL XTC

EXTREMELY HOT dance vocal sample collection from ZERO-G (UK), performed by some of the hottest session singers from the UK! Totally original pro samples for all your music productions: Gospel choir, Ad-Libs, Melodies, Harmonies, and Backing Vocals. Styles featured include: Dance-R'n'B, Soul, Rock, and Indie. Both Male and Female singers. These unique vocals cover a wide spectrum of applications and are destined to appear in many a chart record in the near future. REVIEW: *"Interesting and innovative... Impressing the pants off any listener... Accurate & beautifully arranged harmonies... Truly wonderful... The attention to detail and wide range of styles make this CD pretty damn close to perfection"* (Sound on Sound, UK). Audio CD: £59.95

JUNGLE WARFARE

If you need Jungle these 3 CDs from ZERO-G are simply unmissable. Each CD features a MASSIVE set of: • Loops • Rolls & fills • Perc Kits • Pads & Chords • Bass • FX • Vocals. Volume 1 is one of our all time best selling sample CDs. Vols. 2 & 3 are even BETTER! REVIEWS of Volume1: *"Excellent fidelity, balance & punch, & variation in feel & sound... there's no serious competition. Rated 5 stars out of 5* ☆☆☆☆☆ *"*(Sound on Sound). *"Kicking grooves... a wide range of styles... highly useful... AS UP-FRONT AS YOU CAN GET."* (The Mix). *"Jungle Warfare gives you just about everything you need to survive in the remix rain forest. KEY BUY AWARD. 9/10"* (KEYBOARD, USA). CD-Audio: £59.95 each. Special offer for limited period only: Get any 2 Vols for only £99.00 - AVAILABLE NOW!

Big Fish Audio (USA)

BREAKBEAT

Breakbeats on vinyl - those absolutely authentic beats with the crispy vinyl sound used by top producers from Hip-hop to R&B to Trip-Hop have been notoriously hard to get - until now. Big Fish Audio has re-created the all time funkiest breaks - from classics to all-new - on one royalty-free audio CD, along with every hit from every loop. Breakbeat is packed with nothing but 4/4 beats - with punchy kicks, crunchy snares and sizzling hi-hats. These are the type of extended beats that work great as a complete rhythm section, but can also be augmented or edited into numerous stylistic variants. The beats to beat for 98 are all on Break:Beat. Audio CD: £69.95.

THINGS THAT GO BUMP IN THE NIGHT

Featuring ten top sound designers and electronic music artists (including Atom Heart, Robert Rich, Danny Zelonky, Low Res and control-X), Things That Go Bump in the Night is the ultimate two disc resource for the producer of film or media scores, or the electronic artist searching for absolutely amazing sounds with a dark undercurrent. Including sounds comprised of pulsar data, proprietary synth engines, incredible processed effects and much more. Things That Go Bump in the Night is the most anticipated sample release of 1998 from Big Fish Audio. Choose either two audio CDs (total 140 minutes) or two CD-ROMs for SampleCell or Akai.
2-Audio CD Set: £69.95 Akai 2-CD-ROM Set £199.95 SampleCell 2-CD-ROM Set: £199.95

THE TREASURE CHEST

- Produced by The International Beatjackers
- Hip Hop / Breakbeats
- Format: Audio CD (74 Minutes)

What happens when two of Hip Hop's top names decide to make a sample CD? The answer is International Beatjackers' Treasure Chest - packed with drum, guitar, bass, keyboard and FX breaks that set a new standard for authenticity and variety. Aimed at the Hip Hop producer, this CD is a gold mine for Trip Hop and Modern Rock producers as well. AUDIO CD: £59.95

LOOPZILLA 3

Another huge 2-disc audio CD Set from BIG FISH AUDIO busts out of the cage with 140 minutes of brand new drums, guitar, bass, rhodes, vocals, horns, turntable wizadry and much much more. From mad hard Hip Hop Funk to silky Hip Hop Soul - it's the quality that makes all the difference. Featuring the veterans of Loopzilla 1 & 2 plus new talent from Boo Ya Tribe and The Dazz Band. REVIEW: *"Volumes 1 & 2 are legendary... Volume 3 is in finer style than ever and has some seriously funky rhythms... A damn good source of breaks... many are also perfect for Drum'n'Bass... Quality is first class... Very very cool indeed."* (DJ Magazine, UK). 2CD-Set, only £69.95

FREAKY JAZZY FUNKY

From Rich Mendelson, the five-star producer of Phat & Phunky and Dance Industrial, comes the new standard in construction kits. Rich assembled the East Coast's premiere session talent and contributed his own amazing production and programming skills to make this set his best yet. With the included midi-file disk, it's a breeze for the producer to customize the loops and swap sample elements. Exploring the funky side of dance music, Freaky Jazzy Funky is the set to beat for 1997 and with three CDs and a Midi file floppy disk, this collection has to be one of the industry's best value products! The best ears at T+S rate it a total winner. Triple-CD-Set (Audio): Only £79.95

ilio Ents. (USA)

FINGERSTYLES

NEW from ILIO ENTERTAINMENTS. This approach to creating Acoustic Guitar sample libraries is so inventive, so useful, that you'll wonder why no one had thought of it before. Produced by Dan Portis-Cathers (Spectrasonics "Heart of Africa") Fingerstyles consists of Guitar Patterns, Melodies, Cadences and Endings arranged in construction kits which can be assembled and overlain to create complete, seamless tracks. Music styles include New Age, Blues, Folk, Country, Pop, Ballad, Rock, and others - nearly 40 compositions in all, each with as many as a dozen strums, riffs, patterns and melodies. Plus you get a variety of additional strummed chords, including extensions for more flexibility. The speed with which you can create full-length ultra-realistic guitar parts is startling. It's the perfect solution for soundtrack composers on a tight schedule, or anyone looking to add rich sounding fingerstyles to their mix. The six string acoustic steel is expertly played and recorded, and each performance is tempo-tuned so you can sequence the patterns with complete confidence. Whether soloed or mixed, you won't believe the realism. A class library designed to inspire and get results. Audio CD: £59.95 (Akai CD-ROM: £149.00)

FRETWORKS

NEW from ILIO ENTERTAINMENTS. A landmark library featuring legends of the fretboard. Fretworks boasts an impressive roster of musicians playing an intriguing variety of stringed instruments, including 6-string, 12-string, and slide guitar, vintage 6-string Gibson, National Steel, mandolin, custom baritone guitar etc. This collection is a journey "off the beaten path" capturing the soulful essence of Delta blues, Appalachian Folk, and the roots of rock, bluegrass, swing and shuffle. The rare performances were recorded in a musical context with all of the raw energy and "happy accidents" that make a track live and breathe. The phrases are tempo-tuned for easy sequencing, and most are provided in several tempos for flexibility. They're divided into 2 or 4 bar patterns and free-style riffs which can be strewn in countless ways to create your own unique solos. The vast musical experience represented in these fine performances will bring your tracks to that next level of quality and musicality. Audio CD: £59.95 (Call for availability/pricing of CD-ROM versions - coming soon).

WRH

WORLD'S PREMIER SOUND DEVELOPERS

TIME+SPACE - The UK's Leader in Sampled Sounds for 8 Years. Exclusive UK Distributors for: Best Service, Big Fish Audio, East-West, E-Lab, Ilio, Mixman Soundiscs, Spectrasonics, USB, Zero-G, and more.

e Lab (Sweden)

VINYLISTICS 3

NEW!! Featuring Ruff-style Breaks which have crossed over in all styles, from HipHop to House to Tekno & Jungle - Vinylistics 3 is an important source of Groove inspiration. Loops (with variations) plus their component drumsamples. UtttraMonk5 - an experimental trip hop duo, together with DJ Toby, have made the loops as Funky & Rough as possible. Edited & mastered with SP1200 sample simulations & Valve EQ's - so the beats are phat & "dirty" to the bone. Often the loops have 2 variations to make them even more varied. Special Filtering gives you that Hihat/Top Loop microphone sound which makes the loops even more creatively useful as "Groove Backrounds". Use them behind a programmed beat to increase the "live" feel for Your Rhythm. This CD, like the others in the Vinylistics series, utilise the "LoopMap™" system developed by e-LAB for the X-Static Goldmine series, making the loops easier to use & "intermix" with each other. If you can only afford one 'Vinylistic' CD get this one. Audio CD (plus bonus demo CD): £59.95

STRICTLY HOUSE

NEW RELEASE!! Are you a Remixer? A House DJ? A PRODUCER? Maybe you are still looking for the Perfect Beat? STOP SEARCHING NOW!!! THIS IS "THE CLUB" SAMPLE CD!!! PUMPIN' HOUSE & GARAGE LOOPS 2 DA MAX. A COLLECTION OF TUFF & DEEP HOUSE LOOPS (120-130 BPM) plus the Loops come WITH VARIATIONS and their component drum SAMPLES. INSPIRED TO CUT SOME RUFF & GROOVY HOUSE TRAXX!! Audio CD: £59.95. *"Spot on. You can't really fault this CD"* (Future Music)

X-FILES OF JUNGLE

Coming soon - Another in the new X-Files series from E-LAB in Sweden (makers of the X-Static Goldmine series). X-FILES of JUNGLE features Drum'N'Bass & Jungle LOOPS & SAMPLES.

These Rollercoaster beats will set off your system like nothing else. Super-Fast beats for anyone looking for the underground sound of Jungle or Drum'N'Bass. Loops, Samples, FX - they're all in there. Please call to check availability - scheduled release date of this HOT new title is Sep/Oct '98 (Please call for latest news). Audio CD: £59.95

X-FILES OF TECHNO

In stock NOW: Another unmissable CD from the makers of the X-Static Goldmine series.

X-Files of Techno features ACID/ HARDCORE/ TEKNO LOOPS & SAMPLES - the styles which have been dominating Europe's underground scene for Years.

The TR909, TR808, TR303 are all in there - Distorting like crazy. These are the hard beats of the The Underground Charts that set the Trends which others need to follow. Created by a succesful Producer of this underground rave phenomenon. Audio CD: £59.95

X-FILES OF HOUSE

This one's a Goldmine of Deep & Progressive House loops & samples. To give you an idea, the loops and samples are in the style and mood of Armand van Helden, Tod Terry, or Deep Dish. These loops & samples will make your Hair Stand Out - pure joy! You won't be able to stop moving your feet when you hear this one. All samples provided with variations so you can create your own deep house tune instantly - perfect for injecting The new York club sound into your music - the sound of people like "Masters at Work". OVER 1000 PHAT LOOPS AND SAMPLES. Audio CD: £59.95

STRICTLY 12-INCH

This classic from E-Lab features Dance/Remix/House LOOPS & DRUMS. WHAT VINYLISTICS IS FOR HIPHOP, THIS CD IS FOR DANCE. The idea is similar: Loops, with variations, together with separate hits. This is a Remix CD for anyone in the need for good STOMPING House & Garage Loops. Very much 'DJ sounding', & produced by a Remix/Dj team. If You want the sound of the dancefloor - get this one. All Loops have been tested for reaction on the floor! Audio CD: £59.95

VINYLISTICS 1

From DJ/Producer PHAT FABE (Neneh Cherry, Shaba Ranks, Cherno, Titiyo etc) HOT Loops & samples from Jungle, breakbeat/techno to R&B and hiphop. Extended variations of many loops make this CD great for club DJs, and provide the opportunity to create smaller custom loops. The loops have a vinyl quality about them. An optional floppy disk is also available featuring the MIDI-files of the loops (specify Atari/PC or Mac). REVIEW. *"A real bargain... a CD that any r&b/ hiphop/ soul producer will be pleased to own."* (The Mix', UK). Audio CD: £59.95. Akai CD-ROM: £59.95

X-STATIC GOLDMINE 1

The original dance production mega-collection, re-released by popular demand & completely reworked by creator Erik Svahn. FEATURES OVER 4000 SAMPLES & LOOPS! - an unbelievable resource. One of the most raved about & largest collections of dance samples & loops ever released. And the AKAI S1000 CD-ROM version is the same price! REVIEW: *"One of the most astonishing value-for-money purchases in recent years... This is a great purchase for the first-time sample CD buyer... In the 'pound per sample' challenge, nothing else comes close."* (Sound on Sound, UK). Audio CD: £59.95. Akai CD-ROM: £59.95

X-STATIC GOLDMINE 3

A journey into the clubs of the world. House, Tekno, Rave, Garage & Jungle. Over 500 stereo & mono loops - all made to fit with LoopMaps™. Plus over 1000 samples cut from extensive programming & vinyl manipulation •Sub/Synth Basses •Acid tones/loops •Tekno riffs/stabs •Vintage analog seq hooks •Strings •Tekno FX •Perc. & drums. •Optional MIDI-file floppy disk (specify Atari/PC or Mac). REVIEW: "Well chosen, in-your-face dance material which you would be well advised not to be without... a collection with plenty of attitude which will not disappoint." (Soemd on Sound). Audio CD: £59.95. Akai CD-ROM (Over 3000 samples): £59.95

e Lab (Sweden)

X-STATIC GOLDMINE Vol. 5

Another winner from the 5-star producers at e-Lab. Electro, Techno, Trance, Ambient, House - whatever Your angle is, this CD is an unbelievable resource. 1500 Loops & Samples with incredible crossover potential. e-Lab Used & Abused all kinds of Electronic gear to create the widest possible variety of Synthetic Loops, Patterns & Samples. Tons of Computer Generated Trancey Synth & Acid-like Tones, Loops & voices. Plus a Massive Dose of Vintage Old Modulars - producing Zapping Blips & Twangy Bleeps, Sweepy Synthetic FX and Artificial Electronic Drum & Percussive Samples - all made to fit with the LoopMaps™, developed by e-LAB to enhance the intermixing of Loops with different BPM's. The clear links between 70's bands (like Kraftwerk) & todays techno/electro innovators (like Aphex Twin, LFO & Carl Craig) shows that electronically produced music is vital to keep the "innovative" Dance styles up-2-Date with the next Millenium. So get this CD if You want the Ultimate in Artifical, Analogue & Xperimental Loops & Synth samples, "Pure Artificial Intelligence" - or as Kraftwerk put it - "It's more fun to compute". Audio CD (plus bonus demo CD): £59.95

SYNTHASIA 3 - LOOPLAND

LOOKING FOR SYNTHLOOPS? ACID TONES? EXTENDED FILTER SWEEPS? SLIDING SLURS? ACCENTED POPS? Here's 1800+ BARS OF ACIDSQUEAKS & FILTERPEAKS !! Roland TB 303 + CLONES & MODULARS. This CD captures the No.1 AcidHouse/Tekno & Trance Machine - The Roland TB 303 & some of all the Clones of this Machine! The producers also Used & Abused old Modular Synths to Create a wide variety of TeeBee-like Loops & FitterSweeps, plus many hot Trance-like Patterns. The classic silver box was recorded clean & also forced thru a variety of Exclusive & Cheap FX, from Expensive Valve Eq's to LoFi Fuzz boxes. e-Lab achieved the Best Variety of Loops & Sweeps possible! Audio CD: £59.95

XTORTION 1

Warning! Only for the HeadStrong! Are You ready for an Adrenalin Rush ? Are You ready to be kicked by the hardest Loops & samples ever ? Pounding, Fast, Hard Techno/ Gabber/ Jungle /Industrial Loops that Bang the hell out of Your Braincells like nothing ever did before. Rough Pounding Kicks, Hysterical Transformed Vocals, SuperDistorted Heavy Synth Loops & Tones/Pads, Metallic Crunching Guitar Loops - the list is endless. Only buy it if You have the Guts to create harder stuff than Prodigy or NineInchNails. Otherwise stay away !!!! Xtorbion is a Killer's Nightmare. Audio CD: £59.95

SYNTHASIA 1

Welcome to FUNALOG and SYNTHASIA ONE: Analog dance / Remix sounds & samples (no drum loops, only samples). The perfect complement to all E-Lab's dance loop CD's. Analog dance samples made for Dance Producers by Dance Producers. Many dancehop CDs lack good clean, solid & deep synth sounds, This CD will solve your problem of finding the right fun & inspiring analogue synth sample. •Tones •FX •Basslines •Arpeggios •Chords & lots more, from new (like the Nordlead) to vintage (the phat Prophet 5). Also TB 303, TR 909, JUNO 106, JUPITER 8, KORG POLY 6, OBERHEIM M6, & many more. Over 1100 CLUB samples! Audio CD: £59.95

SYNTHASIA 2: Back2Bass

"Back2Bass" is the FOUNDATION for all kinds of Club Music: House, Techno, Dub, Soul, HipHop - You name them. You're bound to find a Bass that fits Your Track. Many Sample CD's miss this important part of ClubMusic but now this CD is here to help. Stop fiddling with inferior bass samples - instead get the real thing. Includes all kinds of Phat Bass tones & Loops - both single sampled & multi-sampled. To mention a few, equipment used includes SH101, Prophet 5, Matrix 12, CS70, Oscar, K2000, MKS 50, Jupiter 8 and many many more. Audio CD: £59.95

STRICTLY R'n'B

Prepare yourself 4 NU Classic Soulbreaks: 000+ X-Clusive Swing & Soul loops & samples (no instruments - only loops & hits). Black traxx from the sons of Soul. Swingbeat & Hiphop loops all with variations plus the component drum samples. A very black-sounding CD, perfect for anyone in need of phat/slow Rumpshaker beats. Like 'Vinylistics', but with a more slick R'n'B touch. Styles range from Hiphop's rougher side to the slicker sound of 90's soul. From the same DJ who produced "Strictly 12-inch", this loop CD must be on top of your list! A great mixture of slo & groovy loops (60-100 BPM). Are you ready 2 make some slick blakk traxx?! Audio CD: £59.95

VINYLISTICS 2

The best-selling sequel from DJ/Producer PHAT FABE (Neneh Cherry, Shaba Ranks, Cherno, Titiyo etc). Incredible loops and samples in styles ranging from Jungle, breakbeat/techno to R & B and hiphop. Once again, the extended variations of many of the loops make this CD superb for club DJs as they provide the opportunity to create custom loops by cutting out small portions of the main loop. Phat Fabe has put together another stunning collection. REVIEW. *"A real bargain... the range in kit sounds can't be faulted... everything from squeaky clean to rough and raw."* (The Mix'). Audio CD: £59.95

X-STATIC GOLDMINE 2

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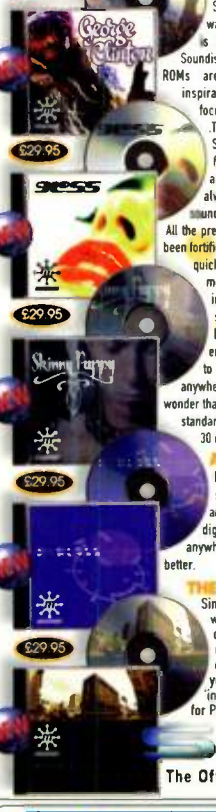

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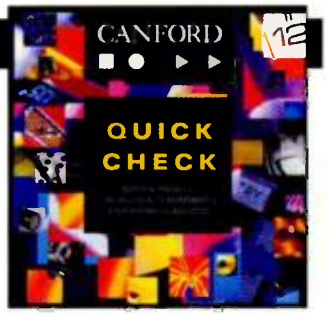

One of the most useful things any audio engineer can carry around is a test disc to check the alignment of equipment, and to evaluate unfamiliar monitoring loudspeakers. There are many such discs around already of course, but a new one from Canford Audio is a little different to the rest.

The twelve-track *Quick Check Test Disc* has been specifically intended for line-up and subjective quality assessment of audio equipment and is available in three formats — CD, MiniDisc, and DAT. In common with most test discs, there is a full set of test signals; all are at practical levels, and with usable durations. The sleeve notes are very comprehensive, not only stating what the tones should read on a variety of common meter types, but also what an AC Voltmeter should read when connected to 0dBu, 0dBV, or -10dBV outputs!

The test tones include a 440Hz Concert A tone which can also be used to check replay speed, and a swept frequency track which usefully starts with a reference level 1kHz tone and then switches directly to 20Hz, sweeping up to 20kHz before switching straight back to 1kHz. If you hear any gaps then either the replay system cannot reproduce, or your ears cannot hear, the signal!

In contrast to most test discs, however, *Quick Check* does not contain impressive music tracks — just superbly recorded spoken (male) voice. This might be unusual, but it is what makes the *Quick Check* disc so useful. If you think about it, virtually everyone spends much of the day listening to the spoken voice, and our hearing is very highly tuned to spotting deficiencies or problems with its reproduction. Try it and you will quickly discover that, compared to music, the spoken voice is far more revealing of all manner of subtle flaws in loudspeakers, room acoustics, processing equipment and recording faults. The speech tracks include a channel and phase check, followed by five minutes of a prose passage by Washington Irving, followed by a further five minutes of a hypothetical shipping forecast. The recorded prose has not been limited or compressed at all, whereas the shipping forecast has been gently limited.

All in all, *Quick Check* is a very useful reference and test tool, and certainly a disc which I shall be using a lot from now on. The attention to detail is superb, the sleeve notes provide good advice and useful information, and the quality and accuracy of the test tones and voice recordings are excellent. In my opinion, the provision of voice tracks rather than superficially impressive music makes this disc worth every penny of its asking price!

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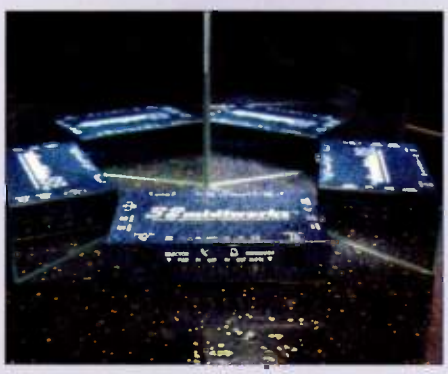
32MIDIWORKS DUAL PORT MACINTOSH MIDI INTERFACE

If you need to add a MIDI interface to a Mac it has to be external — there is no Mac equivalent of a Soundblaster 16 with on-board MIDI port. MIDI interfaces invariably connect to Macs via either the printer or modem ports. The 32midiworks model under review is a 'standard' Mac MIDI interface, which means it can be used with most music software (running on System 7 or above) without the need to install any drivers. It includes both modem and printer connectors, so that two 16 channel MIDI ports (32 MIDI channels) are available, and switched thru connectors are used so that the Mac may also be used to drive a modem or printer without the need to unplug cables. When the switches are set to their Printer or Modem positions, the MIDI inputs are passed directly to the outputs, which provides a simple means to play live MIDI parts when the sequencer is switched off. Each port has one MIDI In and two MIDI Outs. Power, SMPTE Stripe and MIDI In/Out activity LEDs for both ports provide visual feedback to show what the unit is doing.



The 32midiworks has no power supply of its own, instead drawing its power directly from the Mac's ADB buss. This works by connecting the 32midiworks in series with the Mac keyboard via two ADB sockets on the box, for which the necessary cables are provided including those needed to hook up to the modem and printer sockets. In addition to its basic MIDI interface function, the 32midiworks can generate SMPTE in 30-, 30 drop frame, 25- and 24-frame formats. Code can only be generated from time zero, but another useful trick is the box's ability to covert incoming SMPTE into MTC, enabling it to double as a tape sync unit.

Physically, the 32midiworks is a simple steel box painted in a glossy grey spatter finish with sockets on all four edges. The SMPTE In and Out connections are on jacks, there are conventional MIDI In and Out DIN connectors, and there are further sockets for connection to the computer and to a modem and printer if you have them.

I'd spent most of the day struggling with some rather intransigent software that seemed determined to thwart all my efforts to review it, so it came as a welcome relief when I unpacked the 32midiworks, plugged it in, booted up *Logic* and it worked. The SMPTE striping starts and stops at the push of a button, and if SMPTE is fed back into the unit, the computer is fed with MTC. And that's it. It says midiworks on the tin and it's true, MIDI works! *Paul White*

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MIT RIPCORD GUITAR LEAD

If you've ever read a hi-fi magazine, you'll have seen advertisements for cables that cost more than the gear they are connected to, which make extravagant claims about performance improvement. The Ripcord guitar cable doesn't (quite) cost as much as most guitars, but its makers certainly make extravagant claims for it. Those who've researched the subject, however, know that guitar cables do make a difference, as the cable

capacitance forms a tuned circuit with the inductance of the pickups, adding a coloration to the sound. If you put a DI box at the guitar end of the cable, you lose this effect and the tone changes, usually for the worse. MIT, however, have done a lot more than produce a cable with the right capacitance to match the guitar; they've made a cable with a passive filter network at each end which, they claim, produces a richer tone, lower noise and greater clarity.

The passive networks are contained in small plastic 'lumps' at either end of the cable. Because each is different, the cable has to be used the right way around, so the ends are obligingly marked Amp and Guitar. Obviously the company don't tell you what's in the boxes, but there exist a number of passive, reactive components that could make a difference, including capacitors, coils and ferrite bead RF filters. Ultimately, I don't suppose it matters what's in the boxes as long as it works — so does it?

Oddly enough, the Ripcord makes more than a subtle difference, most apparent when using my Strat Plus guitar with a valve Fender Champ amplifier. With a moderately overdriven blues sound, the Ripcord seemed to reduce the gritty components of the sound in such a way that the pleasurable parts of the distortion remained while the intermodulation products and general high frequency grot were significantly reduced. The guitar also 'felt' smoother to play, a well known phenomenon when using different sounding guitar setups. The sound was audibly smoother and more even, almost like adding the mildest tube compression, with more of a ringing, singing quality to the tone.

Other tests with my Line 6 amplifier also showed a noticeable improvement, but perhaps not as great as with the Champ. Similarly, my Yamaha Pacifica guitar didn't improve as much as the Strat Plus through either amp, so it's down to trying the lead with your own gear and making up your own mind. At over £60 for the lead, the Ripcord must be considered more as a passive signal processor than as a simple connector, but the improvement it made was great enough to make me feel I have to have one. Suspend disbelief for a while and try one yourself — the difference is quite evident and very worthwhile in the studio.

Paul White

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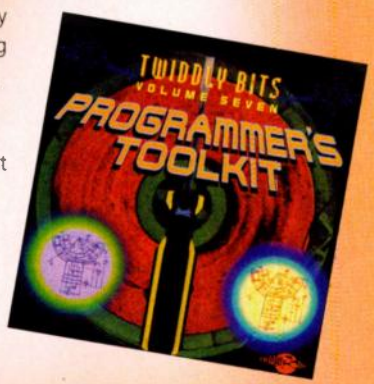
KEYFAX SOFTWARE TWIDDLY BITS VOLUME SEVEN — *PROGRAMMER'S TOOLKIT*



Volume Seven in the Twiddly Bits series is a real mixed bag of performance data, loops, grooves and riffs that come under the natty title of a *Programmer's Toolkit*. Whilst more up to date drum & bass and jungle styles are briefly touched upon, the main focus of the programming seems to be firmly on a retro-seventies dance floor feel. There are a number of keyboard arpeggios, riffs and licks that all fit neatly into the dance genre and are expertly programmed, with interesting use of pitch bend and rhythm. There are 15 or so four-bar bass riffs, and the drum patterns and fills also work well.

Moving on to the other main part of the release, we find a host of complex control templates to impose over your existing keyboard parts. These come in the form of large numbers of Pan, Pitch, Portamento and Gate effects. Again, these are mostly four bars long and are designed to be simply dropped over a pre-programmed keyboard part in your sequencer. On the whole they work well and should encourage us all to think more about the host of effective control features available to even the humblest of sound modules!

The last part of the release has a large number of resonant filter sweeps designed to 'analogue-up' a MIDI performance and make it whizz and swoop with a strong retro analogue dance feel. These have largely been programmed using Non Registered Parameter Numbers (NRPNs) and are specifically created for use with Roland's GS (Sound Canvas) family and Yamaha XG format instruments (MU series and beyond). NRPNs are generally control messages that different manufacturers often like to assign to different control functions (such as LFO, envelope or filter frequency cut-off points), and this means that other, perhaps older synth modules could well run into problems triggering these effects via MIDI.

In addition to these there are a few other oddments including some useful synth control panels in the form of *Cubase* Mixer Maps, and some wonderful wah-wah template effects.

All in all this is an interesting, and if you have the appropriate compatible sound modules, rewarding collection of programming oddments. I felt that the actual recorded MIDI parts (drum patterns, synth riffs, and bass lines) were perhaps not as exciting or devastatingly original as I would have liked, and with so much disk space taken up with the filter and control templates you aren't exactly spoilt for choice either. Having said that, as a collection of tools to integrate into your sequenced song data, or as an indication of the clever things you can do with even the most basic sound modules, *Programmer's Toolkit* works well, and like the other Twiddly Bits offerings, is too inexpensive to consider not buying!

Paul Farrer

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FOCAL PRESS DIGITAL AUDIO CD

Over the last fifteen years or so, we have probably all gathered some awareness of the workings of digital audio systems through books and articles — indeed, *SOS* has carried numerous features on the subject in its time. The problem with the written word on audio-related subjects, however, is that you can not *hear* the effects being described and, just as a picture says a thousand words, a good audible example can easily be worth as much.

With this in mind, Focal Press have recently published a new CD on the topic of digital audio, as the latest addition to their Music Technology Series (see box). The new release is available in two versions: you can either get a straight demonstration CD complete with comprehensive sleeve notes, or a 'Resource Pack' which combines around 40 pages of notes and overhead transparency masters with a copy of the CD.

The lecturers' notes are unlikely to be appropriate to the more casual reader, as a fairly high degree of prior knowledge is required to make sense of them. The stand-alone CD, however, is far more affordable, and the comprehensive sleeve notes act as a more than adequate guide to the demonstration tracks. The CD carries no fewer than 93 listening examples, which reveal the effects of different bit resolutions, truncation, dithering and noise-shaping; sampling clock jitter; word clock synchronisation errors; error correction and interpolation; pitch-shifting; and zipper noise from operational controls. The final nine tracks are configured as a "critical listening test" for the user to evaluate their ability to detect typical digital artefacts — something which is far harder than might at first appear!

Many of the demonstrations on the disc are quite subtle and a good monitoring system (speakers or headphones) is sometimes required to hear the characteristic effects. The sleeve notes do not provide any advice on what to listen out for, but the choice of demonstration material is well suited to the relevant artefacts and the compilation has been produced to a very high standard by Markus Erne, chairman of the Swiss branch of the Audio Engineering Society.

If you are interested in developing your understanding of digital audio, want to be better able to recognise some of its quirks, or just like listening to the hi-fi in your anorak, this very reasonably priced CD would certainly be a worthwhile purchase. *Hugh Robjohns*

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SERIOUS SERIES

The Focal Press Music Technology Series also includes books on the subjects of: MIDI Systems And Control, Sound and Recording (3rd edition), Sound Synthesis and Sampling, Acoustics and Psychoacoustics, and the Audio Workstation Handbook.

BBE DI-10 DI BOX WITH SPEAKER SIMULATOR

DI boxes are essential pieces of studio kit, but they don't all do the same job. For DI'ing an electric guitar or bass that doesn't have active circuitry, you'll need a DI box with a high input impedance, whereas for a line level signal (such as is produced by a guitar preamp), an impedance of around 47kΩ is more common. What's more, if you're DI'ing a guitar amplifier, it's useful to be able to take a feed from the speaker output so as to retain the coloration of the amp's output stage, but because DI'ing bypasses the speaker, some form of speaker simulation filtering will be necessary to restore a natural amp tone. Valve amplifiers don't like running without a speaker, so you either have to provide a dummy load or fit a thru socket so that the original speaker can be left connected (BBE have taken the latter approach).

The BBE DI-10 is designed specifically for use with line or loudspeaker level signals, which suggests that it was designed with instrument amplifiers in mind — there is no high impedance instrument input. Being an active DI box it needs a power source, and can run from either batteries, phantom power or an external mains adapter. A switchable speaker simulation filter is included, based on a 24dB/octave low-pass network with a 4kHz cutoff frequency. This may seem rather severe, but in practice most guitar speakers roll off quite steeply above 3kHz. If they didn't, the overdrive harmonics would sound raspy and unpleasant.

Packaged in a neat but tough steel box, the DI-10 has an unbalanced line input jack, speaker in and thru jacks and a balanced XLR output as well as an unbalanced jack output. A DC inlet accepts a 9V DC power supply and a slide switch brings in the speaker simulator.

USABILITY

The DI-10 works fine in both straight and filtered modes, and the speaker simulation provides a lively basic tone with a decent amount of bite and no nasty high end rasp. I did an A/B comparison with my passive Palmer Junction box using a Boogie V Twin preamp as the source, and though there was a notable difference in tone, I wouldn't say that either one was more or less authentic than the other — it was more like the effect of using a different mic on the same amp. The Palmer had more low end punch, but I felt the BBE was better at putting over the top end ring and bite while at the same time keeping the tone smooth and natural.

In all, the DI-10 is a good instrument amp or preamp DI box, with a speaker simulator that sounds better than some dedicated units I've tried — a very pleasant surprise! *Paul White*

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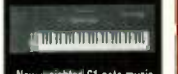

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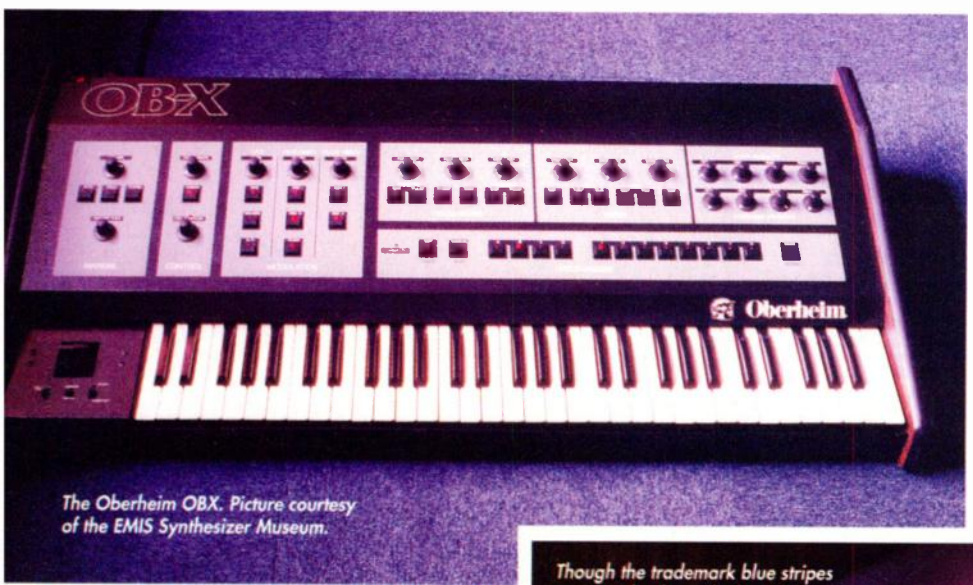
Meet the Family

OBERHEIM OB SERIES ANALOGUE SYNTHESIZERS

SIMON LOWTHER introduces the clan of classic American analogue synths.

Tom Oberheim entered the synthesiser business with his SEM and 4-Voice models in the mid 1970s, and achieved considerable success. Oberheim synths quickly became known for a fat warm sound, raunchy brass and full strings, not to mention great bell and Hammond sounds. In 1978, however, their place at the cutting edge was threatened by the arrival of the milestone Prophet 5, the first of the microprocessor-programmable and homogeneous-sounding polyphonic synths we take for granted today. The OBX, unveiled in July the following year, was Oberheim's response.



The Oberheim OBX. Picture courtesy of the EMIS Synthesizer Museum.

OBX

The OBX had similar audio paths to the earlier SEM; on the OBX, however, they came under microprocessor control for full programmability. There were 32 programs storable in four banks of eight, named A, B, C and D. Continuing a tradition which had begun with the SEM, you could choose a four, six, or eight-voice instrument and buy additional voice cards later, bank manager or album advances permitting. It was also quite easy to open up the OBX's hood to get inside, either to make quick repairs, defeat a wobbly voice, or get at the memory-protect switch. If you ever do see an OBX opened up, you'll notice that there is an awful lot in there, which makes them big, heavy, and unfortunately of questionable reliability. The whole voice chain uses analogue components, with Curtis chips employed only for the envelopes. Perhaps as a consequence of this, every individual OBX can sound slightly different.

VOICE ARCHITECTURE — OBERHEIM'S VIEW

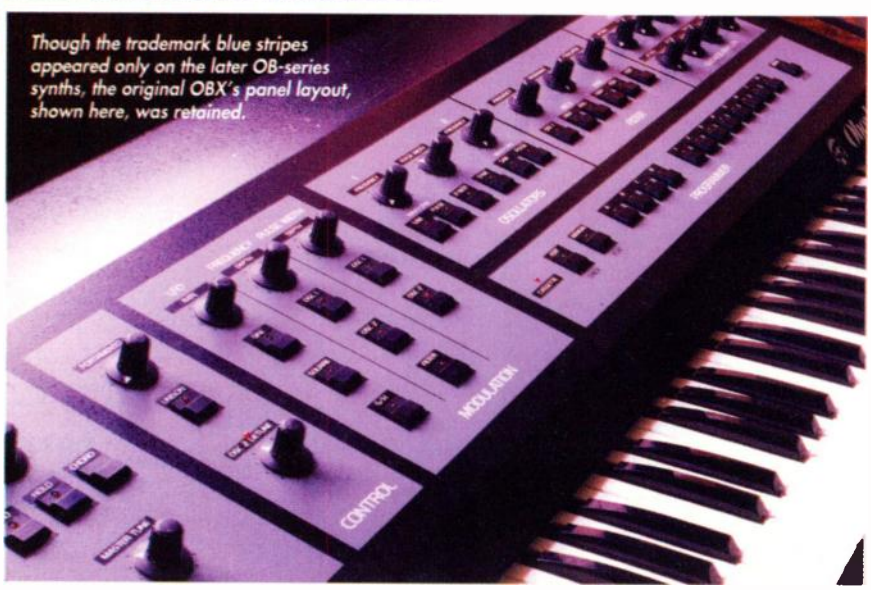
Although the OB series evolved over the years, and substantial improvements were made to the control system, the layout of the front panel remained remarkably consistent, and most of the OBX's panel features survived into the OBXa and OB8.

First of all, you got two VCOs delivering sawtooth or variable pulse waveforms. These were supplemented on the OBX by cross modulation and sync switches. Then came the mixer — not the OBX's most exciting feature, consisting as it did of just four switches. You could turn OSC 1, OSC 2 and white noise on or off, or use OSC 2 at half volume. Although this mixer attracted a fair amount of criticism over the years, Oberheim decided not to change it (for whatever reason) and kept the design for the subsequent OBXa and OB8.

The filter on the OBX was a resonant 12dB/octave lowpass, with cut-off controllable from the dedicated filter ADSR. LFO modulation was also possible, and the filter's keyboard tracking was either on 100 percent or off. Although the VCF on the OBX was apparently related to the filter on the SEM, it lacked the latter's multimode settings, which I always thought was a bit of a shame. No doubt cost came into it, especially as the OBX was not cheap. The VCA had its own dedicated ADSR, and the single LFO offers triangle, square, and sample and hold waveforms for the usual duties, which included a big, swirly and effective PWM.

PERFORMANCE TIME

A major innovation on the OBX were the performance controllers, which took the form of two sprung paddles to the left of the keyboard. Though there was some doubt about these paddles at first, as Moog style pitch and mod wheels were very much the accepted standard, they proved to give such a balanced resistance, making control expressive and intuitive, that most players just loved them. There was also polyphonic portamento, which excited magazine reviewers at the time, unison for monster mono lines, and a nifty chord memory for huge one-finger stab sounds. The later effect is great, especially for dance music.



Though the trademark blue stripes appeared only on the later OB-series synths, the original OBX's panel layout, shown here, was retained.

On the back panel were sockets for vibrato, filter, hold and program advance. Interestingly, the OB series was stereo from the outset, with Left, Right and Mono outputs, but Oberheim never got round to putting a headphone socket on.

Though the OBX may seem pretty light on features by today's standards, it still possesses one overwhelming plus point — it sounds huge.

UPDATE TIME

It's generally true that a new product has to have some strong features to succeed against an established market leader, and Oberheim clearly knew that the OBX was not enough to take the crown from the Prophet 5. Early in 1981, therefore, the OBXa was introduced. Its appearance, like its name, did not suggest radical alterations — but Oberheim's improvements made all the difference. For one thing, it looked smarter, sporting the now-famous black body with blue strips. For another, you could now split or layer two sounds on the keyboard, and 8 of each were storable, which was big news at that time on this sort of synth. It was, if not a first, a pretty close thing.

Beyond that, the synth engine had also been upgraded. The filter now had selectable 12dB or 24dB (2- or 4-pole) rolloff, giving a nice choice of tone colours (apparently JL Cooper had already been doing this as a third party modification for OBX owners who wanted a 4-pole Moog type sound). The cross-modulation switch on the OBX was reassigned, and now connected the filter envelope to sweep the pitch of Oscillator 2, for those screaming sync sounds. Though the loss of cross-modulation was a shame, I think this made up for it.

Inside, there had been a major overhaul, with Curtis chips employed throughout (buyers still got to choose a six- or eight-voice instrument). Such a radical change of components meant that there was inevitably a change of tone, but it was a subtler one than might have been expected, and the OBXa had a wonderfully fat, powerful sound. An unequivocally positive consequence of the component change was that it made the OBXa lighter and a bit more reliable than its predecessor (though only a bit, as the availability of an optional road repair kit might suggest).

EXTRA PERFORMANCE

The OBXa also benefited from significant improvements to the performance panel. The paddles could now modulate each VCO and split or layered part independently. There were also now three LFOs, one on the performance panel, and a programmable one for each of the two voice boards. Though there was only one set of controls on the main panel, each half of a split or layer could have its own modulation settings.

MAJOR PLAYERS

The OB series boasted lots of high profile users, and was a major contributor to the Minneapolis and Los Angeles sound of the 1980s.

OBX — Tangerine Dream, Youth, Japan.

OBXa — New Order, Stranglers, Thompson Twins (basses), Prince, Queen ('Flash Gordon'), Cliff Richard, Gary Numan, Van Halen (The infamous 'Jump' is preset A1), Jam and Lewis.

OB8 — Soul to Soul, KLF, Pet Shop Boys, lots of Italian dance stuff, Art of Noise.

The OBXa's designers had also come up with some clever ideas to get more out of the available hardware. If you pulled the performance panel LFO knobs, they clicked upwards, whereupon the LFO depth knob now set the LFO depth directly, bypassing the paddle for continuous two-LFO sounds. Raising the speed knob changed the waveform to sawtooth, and transpose and pitch bend were implemented on the second VCO. This was surprisingly effective, whether you used it when the VCOs were sync'ed or for expressively bending VCOs against each other. All of these were nice touches typical of a maturing system.

EDITING TIME

On the original OBX, you had to enter edit mode by pressing a special button. The OBXa's controls, on the other hand, were always active. If you liked your edit, you could just write it in. Edits were very smooth, since moving a knob added or subtracted from the value stored in memory rather than jumping to the physical setting of the knob like a Jupiter or Prophet. If you wanted to clear the value and show the true setting, you turned the control fully left then right. For hard core programmers, there was a manual switch which disconnected the programmer so you could start from scratch.

The OBXa's auto-tune feature is worth mentioning. Not only is it faster than that of the Prophet, but it is also more user-friendly. When the tune button is pressed, the synth strolls through the voices displayed by the programmer LEDs so you can see its progress. Failed voices continue to flash when the autotuning is over, and if any are getting wobbly the tuner spends more time working on them, hovering on that voice while passing through. I much prefer this system to that of Memorymoogs and Prophets, which just shut down while tuning and can take quite a few seconds, leaving you to wonder if it will work out OK or not.

On the back panel, a 37-pin computer interface appeared, designed specifically to link the OBXa to another OBXa/OB8 or to other Oberheim products like the DMX drum machine and DSX sequencer in what was termed the Oberheim System. While

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The OB8 offered even more features, and greater reliability, than the earlier OBX and OBXa; some, however, would argue that it lacked their sonic punch.

this was cutting edge technology at the time (remember,we are talking well over a year before the introduction of MIDI), it's unlikely to get used much today. Various updates increased patch memory from 32 to 120 programs, and improved the general running of the autotune and cassette interface. The extra sounds were selected by holding down multiple bank switches and then choosing 1 to 8. While the extra capacity was useful, patch names could get long winded (ACD5, for example), and sometimes you just couldn't remember where you'd put that sound!

With the OBXa Oberheim were back on the map, and customers flocked in.

OB8

There is something of a difference of opinion about the OB8 amongst OBie afficionados. It was, undoubtedly, much more sophisticated, and the operating system give it more features than the OBX/Xa and a more modern feel. Some say it was the best of the series, being a lot lighter (it had same box as the OBXa, but put less in it), more flexible, and more stable (one of Oberheim's goals in increasing the degree of software control). The fall in component prices that had occurred throughout the '80s meant that the OB8 was cheaper to make than its predecessors, and so was bound to sell well.

There is, however, a body of opinion which says that the OB8 lacks power in the sound department compared to the OBXa and its forefathers, and it is possible that some of the very clever software calibration routines that give reliability do also contribute to a less vibrant sound.

THE SOUND

Before we consider the features which were new to the OB8, let's look at the argument about sounds. For annihilating heavy metal guitarists in a live mix, the OBXa or OBX is the one. Think Van Halen. The OBXa does seem to have shorter attack times than the OB8 and a fuller, gutsier sound. However, I have found that the OB8 can sit better in a mix when working with more recent synths, though I don't really know why. I've always found the OB8 strings smoother, and the extra modulation options lend themselves to a more polished and interesting sound. Tom Oberheim himself allegedly had some retrospective misgivings about the OB8 sound, claiming that the OBXa sound is fatter because its tuning is less perfect. The only answer, really, is to play both of them and see what you think. There is a difference and, though both are great, each has its own strengths and weaknesses.

In appearance, the OB8 is remarkably similar to the OBXa. There are more features to list on the front panel, and an end cheek is cutaway to reveal pan knobs for each of the eight voices. Apart from the early units, OB8s were factory fitted with MIDI. Mine has sockets on the other end cheek, while on later units MIDI moved to the back panel.

The idea of adding voice cards had been dropped, and the OB8 was, as the name suggests, an eight-voice synth. In terms of programmability, it was considerably more versatile than the OBXa, offering seven LFO waveforms which could also be routed to the VCA for tremolo. Its VCOs could mix sawtooth and pulse waveforms for a fatter sound, and you also got a triangle wave. It's also worth noting that the OB8's memory-protect switch was externally mounted on the rear of the unit.

Once again the performance panel had been upgraded, giving its LFO more waveforms (including white noise), and a rather fab Arpeggiator. Externally clockable, though unfortunately not by MIDI, it could control either or both parts of a split or layer, and memorise up to five preset transpositions as well as note order. This was way beyond usual Arpeggiator expectations, though sadly it only remembered its current setting.

Each new model in the series added new features to the performance panel (this is the OB8's), but retained the OBX's innovative paddle controllers.

A SECOND PAGE

Another feature of the OB8, which was very remarkable at the time, was that pressing the chord button twice in quick succession assigned most of the controls completely new functions — a halfway house towards parameter access. It was clear when the jump had been made because all the LEDS immediately switched to show new settings. The eight programmer LED's also came on, showing that voices were active. You could turn voices on or off with these, which was very comforting for live performers. If you're buying an OB8, it's worth checking here to see if any dodgy voices have been deactivated. On earlier OB8s none of these Page Two features were labelled, while on some later units they were detailed in faint blue writing, though I'm not sure how common these were. Apparently you could pay, in the States at least, to have the writing put on as a retrofit.

The OB8's second page adds a lot of control and modulation extras. You could detune the VCOs in unison mode for a mega sound, quantise the LFO modulation into semitones,

VARIATIONS ON THE THEME

A number of variations on these three basic models were produced at one point or another. The OB-Sx was a preset four-octave OBXa. The OBXpander, not to be confused with the Xpander, was shown at trade shows, and seemed to be a four-voice multitimbral OB8 with the keyboard removed — I suspect it never saw proper production. Studio Electronics of Minimoog rackmount fame also offered a racked OB8, though they probably produced only a handful. For those of a brave disposition, there are a number of OB8 modifications posted on the web. You can beef up the outputs, and even add multimode filters if you don't mind losing white noise on the way.

BUYING AN OB TODAY

"Reliable" isn't the first word that comes to mind when I think about the OB series. Neither is "compact". If you're looking at one as a prospective purchase, remember to check the polyphony if it's an earlier one. Some have been on heavy world tours and may show it. I bought an OBXa again last year having sold one some years ago, and I am left thinking that you really do get rather a lot for your money. Which one to go for depends on what is important to you. If reliability is the key, buy as late an example as possible. If, on the other hand, you want the powerful Oberheim sound then although they all sound like Obies, the earlier ones sound more so. Gigging? Come on, be sensible. My personal opinion is that the OBX is perhaps best left to collectors.

What Price?
At Launch: OBX £2608 (1979-81) OBXa £3499 (1981-83) OB8 £2995 (1983-85)
Today: OBX £350-600 OBXa £550-750 OB8 (assuming MIDI) £575-875. Add a bit more if MIDI is retrofitted on an OBX or OBXa.

even put the LFOs out of phase with each other and set them to track the keyboard, so that the higher you played, the faster the LFO went — in a musical fashion too. There was a pair of software generated delay and attack envelopes for controlling LFO depth and frequency for anything from subtle expression to wild VCS3 impressions. These envelopes could be inverted for attack, hold and decay.

You could also mess with the portamento, choosing whether you wanted notes to arrive at the same time or not, pre-programming slurs, and quantising to create glissando. Blind twiddling (my favourite form of editing) produced a stream of sounds that just seemed to spark the musical imagination.

The MIDI settings are also accessed from Page Two. You can select any MIDI channel from 1 to 8 as the basic channel, or opt for Omni mode if you prefer. When the synth is in split or layer mode you get true bi-timbral operation, with MIDI data being sent and received on adjacent channels for each half of a split or layer. I must say that having each part of a layer responding to different MIDI channels can be plain confusing when used with a sequencer! A pleasant surprise, however, is SysEx, which allows patch dumping of the current patch via MIDI.

What is great about Page Two is that if you want to get on and play you can completely ignore it, but programmers can really dive in and have fun. Oberheim continually improved the software on the OB8, adding some features and debugging others. You can check the revision of any OB8 by pressing the Page Two button twice, holding it the second time, then pressing the sync button. The Programmer LEDs then show the version — B5 was the last.

The OB8 is the most modern-feeling of the OB series, with features today's users expect, like programmable program volume, balancing of parts in a split or layer, and remembering many settings you had even after powering down. Like its predecessors, however, the OB8 lacked a touch-sensitive keyboard. It still had a distinctive Oberheim sound, but one which I would describe as lighter than those of its predecessors.

CONCLUSIONS

The OB series are undoubtedly some of the great analogue synths, refined through their heyday from 1979 to 1985, and are probably the foundation of Oberheim's reputation today. The sound is big, bold, fat, and full. No doubt you have seen OB this or that in patch names on synths over the years, in the same way people talk of Moog bass, and although not as punchy as a Moog, for sheer power an OBXa or OBX is a valid alternative to a Memorymoog. As the series progressed, design and production improvements brought costs down, and improved reliability by using fewer actual parts inside, while increasing features and control with the clever use of software. The OBX, OBXa, and OB8 shared a similar voice architecture, which represented a frustrating mix of rash simplification and genius. Today this charms you and your creativity down interesting sonic avenues. If you are looking for an analogue synth, they are class acts.

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SECK 18:8:2 mixing desk with flightcase, ideal for live use and recording, £400; Yamaha RX5 drum machine, tuneable with 12 outputs, £180 ☎ 0117 972 4966 (Bristol)

SECK 18:8:2 mixer, PSU, manual, flightcase, £475, Shure SM58 radio mic, single aerial, £225, Shure SM57, £75; Audio Technica bass-drum mic, £65, everything for £800 ☎ Mark 01438 215839 (Hertfordshire)

SECK 12:8:2 mixer, £325; Emu Proformance Plus, stereo piano module, £170; Roland D110, 8 outputs, £160, all home use only and boxed ☎ Alan 0181 304 3851 (Kent)

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SONY A8 DAT, bought to meet project deadline, used twice, £675 ono ☎ Will 01775 710962 (Lincs)

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TASCAM DA30 MK2 DAT plus SKB flightcase and tapes, £600 ono ☎ Colin 01279 439346 or email colin.tack@btinternet.com (Harlow)

TASCAM M200 16-line mixer, rackmount, with MIDI patchbay, £200 ☎ 01509 233598 or email a.m.shaw@lboro.ac.uk (Loughborough)

TASCAM MSR24, Dolby S, 1-inch tape machine, includes remote, pro-mounting system, faultless reliability, digital loom to desk, £3500 ☎ 01344 455616 (Berks)

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YAMAHA 02R v2, digital mixing desk, as new, £4100 ono ☎ Vas 0802 485724 (Beds)

YAMAHA 03D, £1650, Yamaha 02R, £3500, Fostex D90, £900, Roland JV2080, £850, Boss SE70, £375, all in new condition and the 03D/02R are still boxed. Roland VS1680 new condition, £1750 ☎ 0181 340 1230

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YAMAHA QY70, for sale, very good condition, never gigged, quick sale, £300 ☎ 0181 853 0866 or email Dave_35@hotmail.com (London)

SAMPLERS

AKAI CD3000 16Mb with Akai CD ROMs, reluctant sale due to house purchase, £850 no offers ☎ 01209 831461 or email playdig@aol.com (Camborne, Cornwall)

AKAI CD3000, 16Mb, £750, Ensoniq SD1 keyboard, £450, Alesis Quadraverb GT effects unit, £160, all in excellent condition, boxed with manuals ☎ 01634 232739 (Kent)

AKAI MPC2000, £1000, Akai S3000XL, £1100, Roland JV2080, £1000, Boss SX700 effects, £250, Spirit Folio SX mixer, £350, Fatar Studiologic SL161, £100, all in very good condition ☎ Kenny 01344 778899 (Berks)

AKAI S20 full memory upgrade ☎ 01324 711267 (Falkirk)

AKAI S900 MIDI sampler with library, smart 12-bit resolution, excellent condition, ideal for drums and percussion, includes manual ☎ Joel 0161 442 8959 (Cheshire)

AKAI S950, as new, some disks, home use only, excellent first sampler, £300 ono ☎ Steve 01268 285514 (Essex)

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AKAI S1000, very good condition, 12Mb, looking for quick sale, no time wasters, or traders, £450 ☎ Dave 0181 853 0866 or email Dave_35@hotmail.com (London)

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AKAI S2800 sampler with built-in effects and 10Mb of memory, £590 ono ☎ 01483 860209

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EMU EMULATOR 4 keyboard, v3 software, 32Mb, 8 outs, arpeggiator, full spec, £1850 ono ☎ 01949 837801 (Nottingham)

EMU EK4 sampler keyboard, 128-voice, 32Mb digital I/O, 8 outs, effects, 250Mb internal hard drive, Emu samples, mint, £2800, Akai 2800, 4 outs, effects, mint, £600 ☎ 01947 603537 (Nottingham)

EMU E6400 sampler, mint condition, boxed with manuals, v3.00 software, 32Mb RAM, 1.5Gb of Emu sound library on CD-ROM, Emagic Soundiver, £1750 ☎ 01244 374900 (Cheshire)

EMU EMAX II, sampling keyboard, 2Mb, large Library, SCSI, £300, Emu Proteus 1XR, expanded module with 512 sounds, £200 ☎ 0131 622 0159 or email hlinday@sol.co.uk (Edinburgh)

EMU E-SYNTH dance rack with Orbit and Planet Phatt ROM boards, 128Mb, 64-voice polyphony, 8 outputs, effects board, AES/EBU, 32-part MIDI expansion, new and unused, sound box with receipt and warranty ☎ 0956 493001/0181 969 6982

EMU E SYNTH, 2 weeks old, 64Mb RAM, 6.4Gb hard drive, 9 CD-ROMs boxed as new, would consider swap for Kurzweil K2500X, £2700, Tascam DA20 DAT recorder in pristine condition, boxed as new with 7 Tapes but only 1 used, £450 ☎ Chris 01563 572300 (Kilmarnock, Ayrshire)

EMU ESi32, 32Mb, v2.12, SCSI, SyQuest, only a few weeks old, owner upgrading, £900 ☎ Michael 01271 862801 (Devon)

EMU ESi32, 8Mb RAM, very good condition, £600 ☎ 01872 242408 (Truro)

EMU ESi32 sampler, standard memory, 4 outs, SCSI, manual, hardly used, £480 ono, Alesis Nano Bass, boxed with manual as new, plenty of bass sounds, effects, excellent MIDI spec, £120 ☎ Simon 01274 662262 or email simon.noble@lineone.net (Bradford)

EMU ESi32 8Mb, SCSI, boxed, manual, excellent condition, home use only, £550, Roland JD800, boxed, manuals, excellent condition, home use only, £800 ☎ 01392 206411 or email mattdavid@aol.com (Exeter)

EMU ESi32, boxed, 32Mb, manual, CD-ROMs, £600 or swap for digital 8-track, Simms, 2x16Mb, £70, please leave a message ☎ Mal 01426 159525 (Suffolk)

EMU ESi4000 turbo sampler, 16Mb, too many features to list, boxed and absolutely as new, £925 ono ☎ 01706 841305 (Manchester)

EMU ESi4000, mint, boxed, £775, Neumann U87, no cradle, £500 ☎ 0121 422 9605

EMU EMAX HDSE rack sampler, great filter, grainy samples, very good condition, £350, Tesco 60F mono synthesizer, rare, CV/gate, in good condition, made by ARP, £225 ☎ 01243 830697 or email RDormon@aol.com (Bognor Regis)

ENSONIQ EPS 13-bit sampler, 8-output expansion, memory upgrade, mint condition, £230, Soundcraft Spirit Folio 12 2 mixer, mint condition, power supply, £200, GT Pro MIDI workstation keyboard-stand, 3 levels plus micro, holder, fully adjustable, £20 ☎ 01458 833483 or email Chris@peace.demon.co.uk (Somerset)

ENSONIQ EPS 16+, mint condition with manuals & sound library, £550 ☎ Mark 01223 571261 or email mark@playa.demon.co.uk (Cambridge)

ENSONIQ ASR X turbo groove sampler, includes dance board, 32Mb expansion, hardly used, manuals, cost £1500, will accept £1200 ☎ Mark 01442 264825 (Herts)

ENSONIQ EPS16+ sampling unit, 2Mb effects sequencer, £550 ono, Roland D10, 8-part LA synth drum effects, £275 ono, Atari 1040ST, offers ☎ Jack 01942 877210/0956 894462 (Manchester)

ENSONIQ ASR10R, SCSI, 10Mb, 8 outputs, superb effects, mint condition, home use only, boxed with manuals, £900 ☎ Andy 01484 472660 or email a.d.goulding@hud.ac.uk (Huddersfield)

ENSONIQ ASRX, boxed, as new, mint, under warranty, upgraded to 18Mb, £950 ono ☎ Ben 0117 970 6951 (Bristol)

ENSONIQ SD1, £550, AKG C3000, £150, TOA 280ME studio monitors, £175, Fender USA Strat, blonde, great vintage sound, £345 ☎ 01295 721696 (Oxfordshire)

ROLAND MS1, 6Mb flash RAM card, PSU, boxed, £300 or swap for Yamaha CS1X or Roland SH101 with mod grip and MIDI interface ☎ Steve 0181 567 6973

ROLAND S330 SAMPLER, complete with manuals and 50-disk sample library, £100 ☎ Malc 01827 898428 or email langer@langer.demon.co.uk (Staffs)

ROLAND S50 sampling keyboard, boxed, great condition, monitor for on-screen wave editing, loads of disks, buyer collects, £350 ☎ David 0411 259773 or email dbright232@aol.com (Wakefield)

ROLAND S50 sampling keyboard, excellent condition, over 40 disks, sequencer software, full flight case, stand, £300 ☎ 0776 205516 or email mwhite@dreepblue.softnet.co.uk (Derbyshire)

ROLAND S50 sampler and monitor, 4 outputs, sequencer software, loads of sounds on floppy disc, £300, Seck 12 8 2 mixing desk, £225, Lexicon LXP15 multi-effects, £175, Midiverb II, £80 ☎ 0114 258 6328 (Sheffield)

YAMAHA A3000 fully upgraded, 8 outputs, 128Mb, triple block built-in effects, boxed as new, quick sale, £875 ono ☎ Mark 01489 896905 (Southampton)

YAMAHA SU10 with 2 CDs, box & manual, excellent condition, MIDI, ribbon, scratch control, £130 ☎ 01243 830697 or email RDormon@aol.com (Bognor Regis)

YAMAHA TX16W sampler, stereo, 8 outs, 16 filters, Typhoon software, all disks, manual and library easy to use and great value, £230 ☎ James 01865 250373 (Oxford)

DRUM MACHINES

AKAI MPC60 MkII perfect condition, flightcased, manuals, £1050 ono ☎ 0181 4704807

ALESIS D4 DRUM MODULE for sale includes trigger outputs and 2U gigbag, sample drum sounds to make your kit versatile, or studio use, £200 ☎ Joe 01422 251010 or email joseph@review.force9.co.uk (Halifax)

ALESIS SR16, boxed as new, £120, no offers. Will post ☎ 0113 232 0537 (Leeds)

BOSS DR5 drum machine, in box, manual, £200, Gallen Krueger 100 Watt combo, £400 ☎ 0181 808 1126

BOSS DR660, £200, Yamaha MT8X, £400, Boss BX16 2, £130, Roland JX3P polysynth, £200, JL Cooper sync unit, £70, all in excellent condition ☎ Mick 01376 512700 (Essex)

BOSS DR660, mint condition, boxed with manuals, can deliver in the London area, £199 ☎ Malcolm 0467 637725 or email malcolm.mccluskey@strath.ac.uk (Glasgow)

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HAMMOND RHYTHM UNIT, vintage analogue drum machine, based on Roland TR77, excellent condition, £160 ☎ Gordon 01223 811245 or email gordon@cedaraudio.com (Cambridge)

NOVATION DRUMSTATION RACK, classic sounds of the Roland TR808 and TR909, in a 1U rack, 8 outputs, immaculate, £250 ☎ Andy 0151 708 6669 or email paraprod@btinternet.com (Liverpool)

ROLAND R8 with TR808 card, £250, Boss Me10 effects, £250, Cambro Colt 100 Watt keyboard combo, £150, Peavey 800 Watt PA, £1500 ☎ 01782 330900 (Stoke)

ROLAND R8 with manual, £270 ☎ 0161 440 8027 (Stockport)

ROLAND R8 drum machine, dance and power drum cards, boxed, immaculate, £400 ono ☎ 0181 292 0549

ROLAND R8 ROM cards, Mallet Percussion, Dry Kit and Sound Effects, £20 each or all three for £50 or swap for Boss ME6 ☎ 0141 779 3900 (Glasgow)

ROLAND R70 including 808, 909, CR78, 606, huge effects, mint, £225, Studiomaster 16 2 mixer, mint, £160, 2-tier stand wanted ☎ 0115 958 1216 (Nottingham)

ROLAND TB303 drum machine with case, collectable analogue groove box, excellent condition, £495 ☎ 0118 984 2200 (Reading)

ROLAND TB303, excellent condition with original manual, £800 ☎ 01694 723780 or email j@avalanche.demon.co.uk (Shropshire)

ROLAND TR505 rhythm composer, new condition, boxed, manuals offers ☎ Paul 01582 762968 (Herts)

ROLAND TR626 drum machine, great collection of sounds, intuitive Roland programming, 8 individual outs, MIDI, will run on batteries, with PSU and manual, good

WRH

condition, £120. ☎ 01354 695239.

ROLAND TR626, boxed, original carry case, excellent condition, £110. ☎ Craig 01703 814215 (Hants).

ROLAND TR808, £400; SH101 with modulation grip, £200. ☎ 01332 558350 (Derby).

ROLAND TR909 drum machine with manual, superb condition, £850, no offers. Sequential Prophet VS wanted in mint condition for swap with 909 plus £100. ☎ 0118 969 3371 (Reading).

SIMMONS MTX9 drum expander, 3 extra triggers, MIDI in and thru, £65 ono. Alesis SR16 drum machine, £140 ono. ☎ Stuart 01949 850329/0421 519936 (Notts).

PERSONNEL

DANCE DJ needed to collaborate with programmer/producer with studio, must have dedication and samples coming out of your ears, funky house and garage. ☎ Simon 01274 662267 or email simon.robin@lineone.net (West Yorkshire).

DANCE KEYBOARDIST needs noise-making partner to make killer tunes, must have gear and ideas. ☎ Russell 01375 403279 (Essex).

DRUMMER AND BASS player required for live industrial-tinged dance outfit, based in Cambridge, influences: NIN, Soundgarden, Future Sound Of London, Massive Attack. Label and management interest. ☎ Tim 01223 367040 (Cambridge).

FEMALE VOCAL PERFORMER, home studio owner seeks dedicated collaborator and performer for Streetdance, R&B duo, local only, lots of rehearsing. ☎ 01202 299020 or email enquiries@ac cashflow.co.uk (Bournemouth, Dorset).

FEMALE VOCALIST needed to join 'Amiden' playing gothic/industrial blend and touring Europe and USA in 1999. ☎ Martin 01203 672288 (Coventry).

FEMALE VOCALIST & lyric writer wanted for serious recording project, influences: All Saints, Mariah Carey, Madonna and Aqua. ☎ 0181 922 3318/0956 560596.

FREELANCE AUDIO ENGINEER, want to record a demo? Let me find the right studio for you, prices from £50 per day. ☎ Allan 0181 670 2977 or email creat@enterprise.net

I NEED SOMEBODY to teach me how to use *Cakewalk Express*, AWE64 Gold CS1X, I will pay. ☎ 0121 561 3651 (Birmingham).

LONDON PRODUCER seeks assistant with MIDI sampling and hard-disk recording experience, would suit bright wavy youngster into guitar bands, good break, low wage! ☎ Julian 0956 412209.

MALE VOCALIST requires professional work, cabaret type preferred, very experienced, 1500 Watt PA, lights, MIDI 1800, MIDI song files, plays drums, ex Jet Harris and Blackjacks. ☎ 01639 768240 (West Glam).

MUSICIANS interested in contemporary jazz & electronic sounds to join experienced bassist/programmer for live & recorded projects. ☎ Mike 0410 419166 or email stylon@dial.pipex.com (Monmouthshire).

PROGRAMMER, high quality work, all deadlines met. ☎ Gerard 07957 293734.

VOCALIST, is there a (preferably female) vocalist in London interested in recording or performing original space/psychedelic/rock material? ☎ Kevin 0181 840 6123 or email kevin.perry@virgin.net

COMPUTERS/SOFTWARE

APPLE POWERMAC 7200/75, 20Mb RAM, 500Mb hard disk, 3 PCI slots, 512k L2 cache, keyboard, mouse, Opcode MusicShop, £750. ☎ 0181 778 7378.

APPLE POWERMAC 8200/120, 48Mb RAM, 1.2Gb hard drive, CD-ROM, 14-inch monitor, keyboard, mouse, modem, 2 Macmim interfaces, *Cubase VST 3.5*, *Rebirth*, *Recycle*, manuals, £850, delivery possible. ☎ 01202 398097 (Dorset).

ATARI FALCON, 14Mb, IDE and zip drive, Logic 2.5, Notator, Log 3, Unitor 2, Roland A880 MIDI patchbay, SoundDriver magic multitasking hard disk driver with software, £750. ☎ Michael 01271 862801 (Devon).

ATARI FALCON, 65Mb hard drive, 4Mb memory, SVGA monitor, DTP software, £400 ono. ☎ Mark 01202 749344 (Poole).

ATARI ST with monitor and *Cubase* v3, £150; GM sound module, 156 sounds, drums, £140 ono; amp cased, £60. ☎ 01244 546393 (Chester).

ATARI ST sequencer, editor, will run *Cubase*, *Notator*, hi-res monitor, £150 ono; hard drive, £30; Yamaha SY22, £200; M1, swap for M1R. ☎ 01884 257487 (Devon).

ATARI ST, SM124 monitor with *Cubase* v3, £275 the lot, can deliver London area. ☎ 0467 637725 or email malcolm.mccluskey@strath.ac.uk (Glasgow).

ATARI ST 4Mb with oversean and high-res monitor, 270Mb hard drive, with interface and CD-ROM drive, £350 or swap for Yamaha TG500 or similar, £350. ☎ Richard 01869 24l995 or email richard@2020.demon.co.uk (Bicester).

ATARI ST S20 STFM with 1Mb upgrade, includes over 100 disks, Naksha mouse, boxed, with free mono monitor (faulty), £150 ono. ☎ Shaun 0498 785178 or email shaun@keithd force9.co.uk (Manchester, UK).

ATARI ST COMPUTERS, 1Mb, 2 for sale with *Cubase* v3, £95 each, high-res monitor, £50, medium-res monitor, colour, £45. ☎ Lou 01244 546393 (Buckley).

ATARI STE, 2Mb, second floppy drive, mono monitor, software, £150 ono. ☎ Rob 01475 631737 or email robmclree@dial.pipex.com (Renfrewshire).

ATARI 1040 STE with 14-inch high-res monitor, fully upgraded to 4Mb RAM, *Cubase* v1.24, good condition, £220. ☎ 0181 656 0291.

ATARI 1040 STE, 4Mb TOS 2.6 upgrade, SM144 monitor, 80Mb power computers hard drive, *Cubase*, *Notator* and extras, mint, £300 ono; Steinberg VST v3.5.5 for PC, un-registered, unused, still boxed, £200 or possible swaps. ☎ Alan (Evening) 01942 749868 (Cheshire).

ATARI 1040 ST computer with monitor and Unitor SMPTE synchroniser, £275. ☎ Rich 0171 287 0027 or email Music2pic@aol.com (London).

ATARI 1040 STE, 4Mb, SM124 monitor, *Notator*, *Logic 1.8*, *Log 3*, £235, M1 explorer librarian/editor, £20; *Cakewalk Professional* v5, £50; Yamaha QY10, £50. ☎ Anthony 0370 734752 (Kent).

ATARI 1040 STE with high-res monitor, *Cubase* v2, £180; Cubase CD-ROM for PC/Mac compatibles, £50. ☎ Steve 01553 674076 (Norfolk).

ATARI STFM 1040 & SM124, hi-res monitor, Emagic Notator, boxed with manuals, far less trouble than PC. MIDI sequencing and much cheaper at only £200. ☎ Andy 0114 2215692 or email ADB@freestyle.force9.net (Sheffield).

ATARI STFM, 2Mb RAM, high-resolution monitor, complete sequencing set-up, 32-channel MIDI port, adapter and software. ☎ 01375 401964 or 0411 592283 (Essex).

C LAB UNITOR AND EXPORT, MIDI and sync interfaces for Atari Computer, usable with C Lab *Notator* and *Creator* programs, £200. ☎ Chris 00 60 3 754 6727 or email clokge@tm.net (Petaling Jaya, Malaysia).

CREAMWARE TRIPLEDAT v2.518, excellent condition, guarantee, £500 ono. ☎ Maurice 0044 9132 5189 (Germany).

***CUBASE AUDIO 16*/ATARI FALCON**, a complete system ready to roll. Includes high-res monitor, removable hard disks, DAT digital backup, extras, possibly part-exchange for Atari/Steinberg, £375. ☎ John 01392 219332 or email 106053.431@Compuserve.com (Exeter).

CUBASE AUDIO SCORE VST with *Hyperprism* & *DUY* plugins, *Rebirth*, *ReCycle*, *Timebandit*, *Zap*. Will call back, £200. ☎ 0049 172 6934098 or email macaudio@hotmail.com (Berlin).

CUBASE AUDIO XT for the PC, boxed with manuals unregistered, works with Session 8, this is not a crack, £250. ☎ Joe 0151 283 4194 or email joedispoone@hotmail.com (Liverpool).

DAW SOUNDSCAPE SSHDR1+, 10 inputs, 12 out, 1.6 and 1.2Gb drives, audio tools, pitchshift, £7300; Yamaha 03D with TDIF, £1300; Lexicon MPX1, £450, all ono. ☎ 01226 751196.

DIGIDESIGN AUDIOMEDIA II NuBus card, with *Sound Designer* and *Red Book* software, £350. ☎ 0181 686 0172.

DIGIDESIGN SOUND TOOLS 2, complete system with Macintosh computer, 4 in 4 out Digidesign interface, hardly used, £950; Digitech Vocalist 2, excellent harmony generator, manuals, £125. ☎ Rick 0171 287 0027 or email Music2pic@aol.com.

EMAGIC LOGIC AUDIO v3, excellent condition with dongles manuals & MIDI interface for MAC, £400. ☎ Mark 01865 326499 or email darky6000@aol.com (Oxford).

EVENT GINA, high quality 2 in, 10 out PCI audio card, as new, boxed with full contents and latest drivers for PC, i300, Mackie 1604, not VLZ, with rotopod, £400. ☎ Darren 0181 299 2302 or email dazmyles@ukonline.co.uk

IOMEGA ZIP DRIVE for apple computer plus 20 disks, £190. ☎ Nick 0141 334 5631 or email cooltoshi@easynet.co.uk (Glasgow).

INTEL PENTIUM 2 computer based digital hard disk recording system, 266-333 MMX and Windows 98, 9 year warranty, offers. ☎ 0181 922 3318/0956 560596.

MAC POWERTOWER PRO, 225mHz 604e, 192Mb, 128 bit 8Mb graphics, Seagate 2Gb 4Gb Barracuda, extensive software bundle installed, £1500. ☎ Dave 0181 287 6224 or email dac@cjp.co.uk

PENTIUM 2, 233mHz, 128Mb 4.3 hard drive AWE64 soundcard, MIDI in and out, *Cubase Audio XT*, *Rebirth*, *Wavelab* v2, *Cakewalk Pro Audio*, £699. ☎ Mike 01785 840830 or email mike@dsn.net.uk (Staffs).

PRO TOOLS PROJECT SYSTEM, includes core NuBus card and 882I/O audio interface, 8 in/out and SPDIF, £500 Opcode Studio SQX 15 in/out MIDI interface for Macintosh, as new, £450. ☎ Andy 0151 708 6669 or email daraprod@btinternet.com (Liverpool).

PRO TOOLS III, 16-track core system, 4.1.1 software and masterlist, CD, boxed as new, £2700. Roland PMA5 portable MIDI sequencer, £250 ono. ☎ 0171 831 8135/278 0427.

SESSION 8 NUBUS hard disk recording package for Nubus Mac, includes 882 I/O interface, as new, £1000 ono. ☎ 01209 831461 or email playdig@aol.com (Cornwall).

SONIC FOUNDRY SOUND FORGE 4, *Rebirth* v1.5, *Cubase* and *Logic Audio* v3, all on PC CD-ROM, £15 each or the lot for £50. ☎ 07971 341423.

STEINBERG M1 SYNTHWORKS EDITOR for Atari with keyboard, £20; Music Quest MQX 32M, PC MIDI interface, 2 in/2 out and SMPTE in/out, £95. ☎ Jan 01225 465548 or email jan@dotrose.force9.co.uk (Bath).

STEINBERG *CUBASE VST/24* for Mac, Apple Stylewriter II printer, other music software, urgent sale, £300 ono. ☎ Steve 0181 301 0777 (Kent).

STEINBERG *CUBASE VST*, latest PC Windows version 3.5.5 on CD-ROM, complete with manual and dongle, £230. ☎ Carl 0161 248 6886 (Manchester).

TURTLE BEACH FUI soundcard complete with digital I/O option fitted, £220. ☎ Terry 01384 567727 or email Terry@tires.demon.co.uk (West Midlands).

TURTLE BEACH MONTEREY SOUNDCARD, original box and manuals. Includes add-on sample memory, £50. ☎ Keith 01438 340265 or email keith.price@mail.com (Herts).

TURTLE BEACH PINNACLE with digital I/O and 16Mb of sample RAM, £290. ☎ David 01904 337745 or email david.elwood@clara.co.uk (York).

TURTLE BEACH PINNACLE soundcard, 8Mb RAM, boxed, all manuals, drivers, 8 months old, mint condition, £195 ono. ☎ 01237 479235 (Devon).

TURTLE BEACH PINNACLE sound card, Kurzweil synth, 20 bit, 8Mb RAM installed, perfect condition, boxed with manuals and drivers. ☎ Neal 0181 803 5066.

YAMAHA CX5 bits, YRM101 music composer program, YRM105 D02I voicing program and SFG05 FM sound synthesizer unit II, will sell all for £20 or for a Boss chorus. ☎ 0141 779 3900 (Glasgow).

YAMAHA SW60XG soundcard, excellent sounds, complete with *Cakewalk Express* sequencer. Can deliver/fit if required, £95. ☎ Richard 0171 259 9935 or email adamchandnoth@hotmail.com

MISCELLANEOUS

ANTORIA ACOUSTIC GUITAR excellent buy, nice neck, good action stunning well balanced sound, I'm only selling because my house is too small, £90. ☎ 01582 502470 or email rica@dial.pipex.com (Bros).

BIT 3 EXPANSION CHASSIS, 7-slot chassis for PCI Macintosh, Pro Tools Systems, gives you more slots for your Digidesign Cards, £900. ☎ (0171) 419 0859 or email Avtog1@wright.demon.co.uk

ELECTRO VOICE SX200 speakers, £850. Five Star flightcase for M1, £75. DR660 sound effects ROM, £10. Boss effects pedal board with PSM5 power supply, £45. ☎ 0181 675 0651.

FLIGHTCASE, 10 unit, foam insert, 19-inch fan vents, wheels, Photex catches, ideal for power amps and PA, built like a tank, £175. ☎ 01254 344264 (Lancs).

FOREFRONT TECHNOLOGY Patch Commander, pedal accessory, MIDI message commander, keypad entry, patchbank select, channel mapping plus a whole lot more, £55. Alesis new PC connection cable for QS6/QS7 £8 including postage & packing. Yamaha R100 reverb user manual, £5, high quality flight case, would suit Alesis QS7 or similar, 29cm by 114cm by 9.5cm internal dimensions, cost £130 new, unmarked, £85, Marcal flight case, 4U rackmount flight case, removable front and rear access panels, side handles, £70. ☎ 01275 337957 or email drum@uk.oracle.com (Bristol).

MALCOLM HILL ASSOCIATES Pro2 PA speakers, 350 Watt, 500 Watt, 10-inch bass, 8-inch mid, 1.25 high frequency, Tannoy drivers, cost £2300, will sell for £700. ☎ John 01480 470947 (Cambs).

MARSHALL 30 WATT bass combo amp, good condition, £110. ☎ Matt 01865 725862 (Oxford).

MISSION 731L SPEAKERS boxed and recently serviced, immaculate condition. Ideal small monitors, £45. ☎ Tim 0181 974 6562 or email tim@globalnet.co.uk (Surrey).

OVER 30 GUITAR MAGAZINES, tab books, all in excellent condition, books include Nirvana, Bush, Pantera, Sound Garden, RATM and other guitar titles, £30. ☎ Jamie 01635 32191 (Berks).

PEAVEY 2.6c stereo power amp, 130 Watts per side, boxed, new, £200. Peavey 1PR monitors, moulded casing, 100 Watts per side, £175. ☎ 01933 392783 (Northants).

PEAVEY XR600E amp, speakers, one powered monitor, one unpowered, 6 months old, may take SY85 in exchange, or will sell for £350, also, drum mics wanted. ☎ 01933 651701 (Northants).

RAM MEMORY CARDS for Roland R8 drum machine, M512 E or D 256 E, cash waiting. ☎ Muzaffer 0181 842 7842 or email muzafer@ncmail.com

ROLAND COLOUR MONITOR, 14-inch RGB screen for samplers S330, S550 and S750/760/770, complete with special RGB cable, good condition, £85. Atari high-res, special edition, 14-inch screen with swivel base and sound output, suitable for *Cubase*, good condition, £85, also SM124 and SM125 monitors available, £85. ☎ 0181 763 8991 or email NOR999@aol.com (Surrey).

ROLAND JX10 memory cartridges, Mo4c, M16c, voice ROMs, VR102 Synth 1 and VR103 Sound Effects, M1 Synth 2 PCM program cards, offers. ☎ Tony 01706 378141 (Lancs).

SEAGATE BARRACUDA hard drive, 4.3Gb SCSI, 7200rpm, 9ms, audio video mode unused, £140. Hayes Accura ISDN modem, 128k external boxed, still sealed, £95. ☎ 01753 675789 or email mpomagic@cwinet.co.uk (Berks).

SHANRMA LESLIE speaker, very good condition, rare model, finished in walnut top and bottom, jack inputs, can be used with any instrument. ☎ 01827 715480 (Warwickshire).

SKB 4214 keyboard case, hardly used, foam inserts still unattached, £250 ono. Roland JX8P polyphonic synthesizer, £250 ono. ☎ 0113 243 1001 (Leeds).

30-PIN SIMM CHIPS, 2x 4Mb and 2x1Mb, £10. ☎ 01626 366434 (Devon).

35U FIVE-FOOT metal rack, grey, front, side and back access, very rare, £150. ☎ Vas 0802 485724 (Beds).

2kW SOUND SYSTEM for sale, 1kW per channel, virtually new, 9 hours use, £2900, will split. ☎ 0168 206105 (Leicestershire).

TORQUE T250SK stereo keyboard amplifier, 2x50 Watt, 3 channel, 3-band equaliser, perfect condition, hardly used, cost £375 new, will sell for £100. ☎ 01638 602492 or email jimmy@proven7000.com (Newmarket).

WATKINS COPYCAT ECHO UNIT, rare original piece of kit, collectors item, £195. ☎ Eric 0121 308 2302 (West Midlands).

YAMAHA DX7 ROM CARTRIGES, original factory set for sale. I have duplicates of both ROMs, so contact me if you just looking for one or both, £20. ☎ Bruce 0131 554 6266 or email bruce@cloudstate.demon.co.uk (Edinburgh).

YAMAHA TG33 quick operation guide, Tascam 644 Midi studio manual, any offers considered. ☎ 0181 644 7717.

YAMAHA 9000 drum kit, immaculate, 24-inch kick, 14x5.5-inch snare, 13 and 14-inch rack toms, 18-inch floor tom, wood finish, £650. Pan custom made 5-string banjo, cased, beautiful instrument, £450 ono. ☎ 01422 839631 (Halifax).

WANTED

AKAI CD-ROMS, XX Large Pads, Distorted Reality, Charged, Liquid Grooves, Ultimate Piano, Dance Megadrums, Heart Of Asia, Stackwave, Heart Of Africa, Peter Siedlaczek Orchestral. ☎ 0181 449 9698 (Herts).

ATARI HIGH-RES monitor, any size or any VGA mono PC monitor, will pay £60 for a good Atari one or £20 for a PC one. ☎ 01389 721070 (Scotland).

BOOKS OR VIDEOS on recording techniques, urgently wanted. ☎ Nick 01458 860006 (Somerset).

CLAVIA NORD LEAD 1 unexpanded model preferred, poss p/x with Korg Wavestation A/D, and/or Sony TCD D7 Dat. ☎ 01275 332957 or email drum@uk.oracle.com (Bristol).

DDA AMR24/AMEK Hendrix or similar, must have at least 28 channels, CDR machine, HHB or similar preferred. ☎ Darryl 0171 267 7777/0468 997522.

DRUMKAT wanted, or similar in good condition, up to £250. ☎ 0117 904 0957 or email lance@cymap.com (Bristol).

EMAX SE HD or Korg D1551, must be in perfect condition with disks and manuals, may consider Emax II if the price is right. ☎ Chris 01326 318180 (Cornwall).

EMU SP1200 wanted, must be in mint condition. £700. ☎ Raylex +31 65 55 33 749 or email Johnny_blazing@hotmail.com (Veldhoven, Netherlands).

ENSONIQ ME16 expansion cartridge wanted for EPS16+, £100 including SP2 interface, also, does anyone know if a zip drive works with and EPS16+, please help. ☎ Paul 0113 232 0537 (Leeds).

FENDER RHODES electric keyboard, any model considered, good condition only, cash waiting. ☎ Will 0114 231 6867 (Sheffield).

INSTRUCTION MANUAL for Roland W30 needed. ☎ Marc 0410 577708 (Halifax).

ITEMS WANTED to build a studio, Trinity, Prophecy, SP808, 1B303, 909, Orbit, CS1x, P8000, Mackie, Lexicon, DAT, NS10M, Akai S3000XL, E6400, most considered, cash waiting for bargains. ☎ 01252 677059.

JL COOPER DATASYNC 2 ADAT serial to SMPTE/MTC interface wanted. ☎ Steve 0181 993 9755 or email s.draughn@virgin.net

KORG CX3, OB3, XM1 organ module or the like required ASAP, any of the above considered, cash waiting. ☎ 0191 234 1736 or email ray.snowden@unn.ac.uk (Tyne and Wear).

KORG PE2000, polyphonic ensemble. ☎ Gordon 01223 811245 or email gordon@cedaraudio.com (Cambridge).

KORG 770, any condition, cash waiting. ☎ Frances. ☎ 0181 533 1723.

KORG WAVESTATION SR wavestation SR urgently wanted, must have manuals, going-rate paid. ☎ George 0411 902 965 or email george.cook@obc.co.uk (London).

MARSHALL VALVESTATE amplifier wanted, approximately 100 Watts, must be in reasonable condition. ☎ Jamie 01737 842271 (Surrey).

MPC DRUM COMPUTER, wanted, must be in good working order. ☎ 01243 830697 or email RDunn@aol.com (Bognor Regis).

OBERHEIM MATRIX 1000, looking for one in good condition, preferably a Mk2 version will pay up to £300. ☎ Gary 0151 356 3865 or email gmorgan@fprints.demon.co.uk (Cheshire).

OLD SYNTHESIZERS, especially monosynths, Moog, Roland, Korg, any condition, up to £250 cash paid. ☎ Angus 0181 994 6321 or email angus@chb.co.uk

PATCH SHEETS for Maplin ETI 4600 synth keyboard for music 5000 synth and FM synth sound editing software for Commodore 64 FM sound expander. ☎ Mick 0441 195576 (Notts).

PPG 2.2 OR 2.3, must be in good cosmetic condition. ☎ Gordon 01223 811245 or email gordon@cedaraudio.com (Cambridge).

PPG PROCESSOR KB FD set up drastic repaired. ☎ Steve 0181 893 4966 or email SBaudio@aol.com (Twickenham).

ROLAND MGS1 grey set wanted, for a blue Roland SH101, must be blue. ☎ Richard 01732 465875 (Kent).

ROLAND PAD 80 Syndrum, must be in excellent condition. ☎ 01274 878626/0498 695249 (West Yorkshire).

ROLAND XP50, cash waiting. ☎ Mark 01827 898428 or email langer@langer.demon.co.uk (Tamworth, Staffs).

SAMPLE PLAYER wanted. Peavey DPM SP or similar, must have manuals, PC management software would be nice. ☎ Shaun 0498 785178 or email shaun@keithd force9.co.uk (Manchester).

SANSUI SY1 synchronisation unit, cash waiting. ☎ George 0181 771 6811 (Surrey).

SIMMONS SDE EXPANDER, manual or photocopy desperately needed, expansion cartridge would be nice as well. ☎ Milo 0171 609 0741.

SONY MZ1 portable mini disc recorder, cash waiting. ☎ 01803 882772 (Devon).

SPIRIT FOLIO 12:2, will pay £100; Alesis SR16, will pay £80; Joemeek VC3, will pay £95; Beyer DT100, £40; Behringer Composer, will pay, £95. ☎ 01909 487750 (Notts).

STUDIOLOGIC SL880/S900/KX88 or similar weighted master keyboard, will pay fair price for a tidy, boxed example, can collect from within a 150 mile radius of Neath in South Wales. ☎ Phil 01639 763103.

STEINBERG *CUBASE* v3+ wanted for Atari, also Atari hard disk, 20Mb or more. ☎ Mark 0121 247 9241 or email spacey@dial.pipex.com (Birmingham).

STUDIO EQUIPMENT WANTED, mic boom, stands, microphones, leads, compressors, DAT machine. ☎ 0961 354791 or email artlesscomb@ee.org (Croydon, Surrey).

SYMPHONY OF VOICES CD-ROM wanted in Kurzweil format, also Peter Siedlaczeks Advanced Orchestra for Emu or Kurzweil. ☎ Chris 01563 572300 (Kilmarnock, Ayrshire).

TASCAM 38 rack mount bit wanted, half-inch test tape, outboard processors in part-exchange for Fostex 280, sale value £250. ☎ 01904 470854 (Yorks).

TANTEK PARAMETRIC EQ module for rack system wanted. ☎ 01792 844634 (Swansea).

TUTORIALS/BOOKS/ARTICLES wanted on the playing of rock, pop and keyboards to performance level. ☎ Mark 01483 205032/ 600891 (Surrey).

UNITOR BY C LAB for use with *Creator* on Atari. ☎ Kez 01208 873 649 or email kez.stone@virgin.net (Cornwall).

VOYETRA SEQUENCER PLUS for PC, v3 (pref), V.4 (not SP JR), please mail me with details, will pay postage. ☎ Mike 0181 747 1350 or email mike42@technocom.com

YAMAHA CBX D5 or D3 wanted, offers. ☎ Simon 01727 868729 or email simon.burges@bigfoot.com (Herts).

YAMAHA CS80, TC 2290 delay, AMS sequencer, Lexicon PCM42. ☎ 01535 645233 (West Yorkshire).

YAMAHA QS300, will pay £450 or QY300 (£250). ☎ Paul 01229 466236 (Cumbria).

YAMAHA SY85 SAMPLE MEMORY required, good price paid. ☎ Joe 01422 251010 or email joep@freview.force9.co.uk (Halifax).

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The QS8 is top of the Alesis range of synthesizers.The fully weighted 88 note keyboard provides incredibly realistic piano action feel with velocity, release velocity and aftertouch.The 16MB internal sound ROM contains 640 programs and 500 mixes, plus the dual PCMCIA card slots allow another 16 megabytes of sound to be added, bringing the total to a massive 32MB available at once.The QS8 features an on board 4 buss multieffects unit based on the superb Alesis Q2 processor. As a midi controller the QS8 offers 4 assignable slider, sustain pedal, 2 assignable pedal controllers plus pitch bend and modulation.With the built in serial computer port the QS8 is perfect for performance& composition

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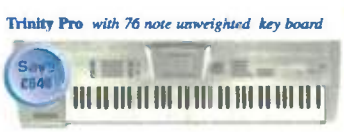

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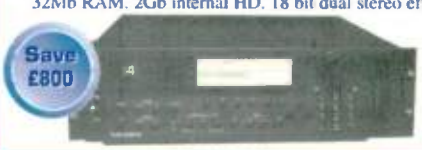

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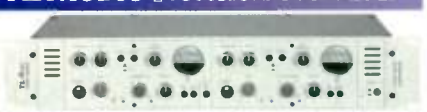

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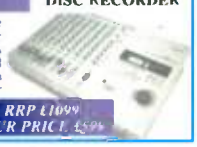

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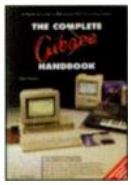

by Udo Weyers

This new edition addresses all three computer platforms (PC, Mac, Atari) and differences between versions are discussed in the appropriate sections. The new Audio and VST functions of Cubase are dealt with in separate chapters, bringing the Handbook bang up-to date. Filled with real world applications and down to earth explanations of how to use all the powerful features offered by Cubase. A not-to be-missed purchase for users of Steinberg's highly popular music software.

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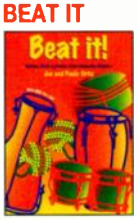

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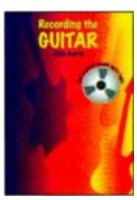

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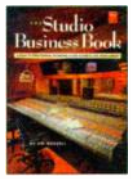

by Jim Mandell

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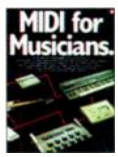

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THE EMAGIC LOGIC TUTORIAL VIDEO

Produced by Emagic themselves, this video once again sees Tim Walter in the tutor's chair. This 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
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VOCAL WORKOUT Video

by Sam West

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VIDEO CODE V067 **£22.95**

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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.

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CODE V005 **£24.95**

Running time: 1 hour 10 minutes

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CODE V006 **£24.95**

Running time: 1 hour 45 minutes

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Index to Advertisers

Artists Wanted	300	Duplication	292-296	Lineage	290	Services	291
Clubs	299	Flight Cases	298	Microphones	298	Situation Vacant	301
Courses	290/297-300	For Hire	300	Programming	291	Soft Cases & Covers	291
Digital Editing	296	For Sale	285-290	Programming/Hire	291	Studio Acoustics	296
Digital Mastering	296	Insurance	301	Recording Studios	301	Tuition/Programming	291

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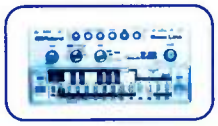

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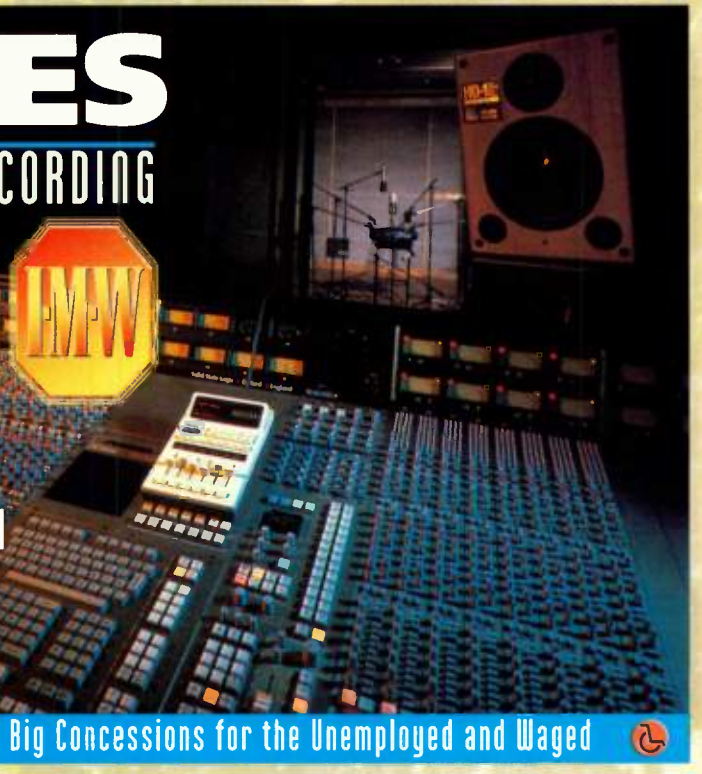

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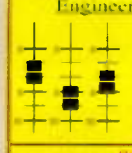

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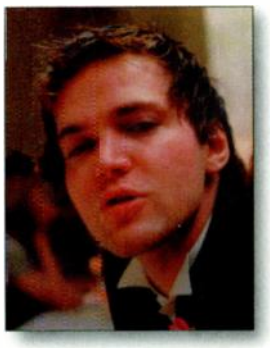
THE ADVERTISERS INDEX

A1 Music	☎ 0161 236 0340	269
Academy of Sound / Carlsbro Retail	☎ 0116 262 4183	155, 156-157, 158-159
Akai UK	☎ 0181 897 6388	13
Alchemea School of Recording	☎ 0171 359 3988	263
Andertons Music Company	☎ 01483 456777	109, 210-211
Arbiter PLC	☎ 0181 202 1199	15, 136-137
Area 51	☎ 01442 235151	43
Audio-Technica	☎ 0113 277 1441	33
BCK Products	☎ 01992 524442	267
Beyerdynamic GB	☎ 01444 258258	39, 145
Blue Systems	☎ 01799 584095	37
Brandoni Music	☎ 0181 908 2323	169
Brixton Exchange Mart (BEM)	☎ 0171 733 6821	133
Computer Audio Warehouse	☎ 0181 400 1234	1
Concert Systems	☎ 0161 927 7700	221, 261
DACS	☎ 0191 438 5585	97
Dawsons Music	☎ 01925 632591	163, 164-165
Digital Village	☎ 0181 440 3440	112-113, 114-115, 116-117
Drawmer Distribution	☎ 01924 378669	45
E-MU Systems Incorporated	☎ 001 831 438 1921	130-131, 231
Eddie Moore Music	☎ 01202 395135	276-277, 278-279
EMTEC Magnetics GmBH	☎ 00 49 621 5920 276	49
Exclusive Distribution	☎ 01462 481148	79, 87, 187
G & N Computers	☎ 01324 887007	97, 261
Gig Sounds	☎ 0181 769 6496	103
Guitar, Amp & Keyboard Centre	☎ 01273 676835	264-265
HHB Communications	☎ 0181 962 5000	40-41, 82-83
Isotrack	☎ 01202 247 000	101
Kenton Electronics	☎ 0181 337 0333	223
Key Audio Systems	☎ 01245 344001	7, 143, 167, 185, 203
Korg UK	☎ 01908 857100	OBC, 73, 182-183
M Corporation	☎ 01425 480569	88-89, 90-91
Marantz Professional UK	☎ 01753 680868	19
Midiman UK	☎ 01205 290680	207
Millennium Music Software	☎ 0115 955 2200	51, 53
Music Connections	☎ 01245 354777	55, 56-57, 58-59, 60-61, 62-63, 64-65, 66
Music Lab	☎ 0171 388 5392	Loose Insertion
Music Village	☎ 0181 598 9806	118-119, 120-121, 122-123, 124-125
Musical Exchanges	☎ 0121 248 5868	75
Musictrack	☎ 01462 812010	IFC
P & R Audio Technology	☎ 01323 849522	189
Peavey Electronics Corp UK	☎ 01536 461234	147
Phil Rees Modern Music Technology	☎ 01608 811215	249
Project Music	☎ 0181 570 4444	209
Red Sound Systems	☎ 01494 429321	95
Red Submarine	☎ 01904 624266	227
Roland UK	☎ 01792 515020	105, 218-219, 250-251
Samplezone	☎ 0800 731 2939	200-201
Sennheiser UK	☎ 01494 551551	111
SCV London	☎ 0171 923 1892	IBC, 35, 103, 129, 153, 223
Smart Sound Direct	☎ 01883 346647	191
Sound Business Studio Sales	☎ 0181 559 0373	205
Sound Control	☎ 0800 525260	232-233
Sound Division	☎ 0171 609 3939	302-303
Sound Solutions	☎ 01403 732606	169
Sound Technology plc	☎ 01462 480000	5, 171
Sound Valley Distribution	☎ 01494 434738	213
Sounds Live	☎ 0191 230 3422	215
Spirit by Soundcraft	☎ 01707 665000	8-9
SRTL	☎ 01243 379834	242 243
Stirling Audio Systems	☎ 0171 624 6000	69
Studiomaster	☎ 01582 570370	135
Studiospares	☎ 0171 482 1692	107
Sutekina/Music (World of Music)	☎ 0800 371129	149, 246-247
TEAC UK	☎ 01923 819630	172-173
Technimate UK	☎ 01206 793355	93
The Academy of Contemporary Music	☎ 01483 456788	199
The American Intercontinental University	☎ 0171 486 1772	127
The UK Office	☎ 01442 870103	77
Thomann Musikhaus	☎ 00 49 956 92230	259
Time & Space Distribution	☎ 01837 841100	255, 256-257
Tony Larking Audio	☎ 01462 490600	197
Turnkey	☎ 0171 379 5148	20-21, 22-23, 24-25, 26-27, 28-29, 30-31, 141, 229, 236-237, 277, Loose Insertion
Unity Audio	☎ 01440 785843	193
Way Out West Music Company	☎ 0181 744 1040	47, 225
Yamaha - Kemble Music	☎ 01908 366700	17, 75



sounding Off

RUPERT COOK tells the Luddites among us to stop complaining and defragment our hard drives.

Reading 'Sounding Off' recently, you tend to get the impression that music and computers just don't mix. A typical article will read either "I'd rather use a good old warm/analogue/2-inch 24-track any day than one of these new-fangled disk things, err, but I grit my teeth, struggle with the unfamiliar, and use one anyway," or "I was distressed to find my Yashimoti Wanblaster soundcard only played back two and a half tracks of audio with *Logic*, even after de-installing all my games except *Resident Auto Theft III*..."

In the first case, a seasoned 'pro' is attempting to apply the same working methods to hard disk recording that he/she would use with tape. However, this doesn't quite get explained to the supplier, and they end up installing an under-specified system. The user is left feeling that computers and music just don't mix very well, and that they simply aren't worth all the hassle. "If Sergeant Pepper didn't need one..." they can be heard to mutter into their pints.

In the second case, the complaints stem once again from woefully under-specified systems. The company selling the computer or soundcard most probably doesn't know its word clock from its *Wordperfect*, and is still living in the dark old days of 1995, when getting more than four tracks out of a computer was considered an exotic luxury, rather like having your car talk to you. Funnily enough, it's the same computer salesmen who also have David Hasselhoff haircuts, but that's another story...

Anyway, let's put all of this behind us. 1998 is Year Zero as far as computers and hard disk recording are concerned, now that Apple have finally got their butt into gear and released the brilliant G3. It's now perfectly possible to set up a computer-based hard disk recording system that behaves much like a 24-track tape machine when you want it to, and much like a sequencer when that appeals. It's just a matter of planning, setting up, and spending some cash.

Here's the secret. Buy a G3, stick in more RAM than is usual (128Mb), attach a pair of big AV drives (never put all your, er, data in one basket), add 16 channels of ADAT I/O via cards, and here's the good bit — it actually works! Use a pair of ADATs or a desk with ADAT format I/O for your ins and outs, and Bob's your uncle. Add multiple outboard valve preamps for that groovy sound we all love, and no-one can complain — compared to the cost of a well maintained 2-inch 24-track, you'll save at least five grand, enough money for the tape- and tree-huggers to pay for a lifetime's subscription to *What Classic Car* magazine, with something left over for new polo-neck sweaters. Of course, you'll still need some great mics, and don't expect to do all your effects and processing with plug-ins for at least another year, so don't sell the PCM 90 just yet.

There's just one main rule — back up your data regularly. I don't wish to get too boring, but here's my method. I just drop the folder containing all the sound and sequencer info on to my second hard drive from time to time, backing up the project as I go. When the tunes are finished, I'll make CD-ROMs. I'm finding that each song tends to take up about 500Mb, which means that I can back up the all the multitrack information for around 90 pence. For safety's sake, let's call it two pounds fifty and make a couple of copies and print labels. Now, I for one don't remotely believe the figures banded around for the life of CD-R media — one earnest salesman informed me that the blank CD-Rs he was selling would definitely hold their data for a hundred years, whereupon I expressed surprise and told him that I was unaware, up until now, that they'd made 4-speed CD recorders in 1898. Perhaps the manufacturers were just taking a good guess at archive life. I do believe, however, that they'll last long enough for me to back up all the CD-ROMs that I've made on to whatever format supersedes them in about five years and makes their capacity look miniscule. As a matter of interest, I've just backed up all my old high density floppies on to one CD-R.

Done properly, therefore, you can have all the advantages of a tape-based system (separate ins and outs, simultaneous multiple track recording, cheap media, er, that's it) with the zillion and one brilliant things that have made sequencers the tools of the modern music scene that they are. All this for a system that also plays the stress relieving *Duke Nukem* without messing up any of your settings, for when the might of your modern music software is rendered useless by the oldest force known to society, the crap drummer. Oh yes, and I'm writing this initially on paper whilst sitting in the garden. It's a gorgeous day and a laptop would melt. I'll leave my computers doing what they do best, recording expressive music and getting it onto CD with the minimum of fuss, so that others can hear it.

Rupert Cook wears eyeliner, drives an old Capri, and loves the '90s. Contact www.lostboysstudio.com for more information.

SOS

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, Cambs CB3 8SQ. Any comments on the contents of previous columns are also welcome, and should be sent to the Editor at the same address. Email: sos.feedback@sospubs.co.uk

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