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It seems hard to believe but, apart from cassette multitrackers and a few professional stereo machines, analogue tape is officially dead. If you search hard enough, you may find a few stocks of open-reel multitracks kicking around, but the bottom line is that they're old technology and they aren't made any more. The manufacturers would like us to believe that digital machines are better, more flexible and more convenient, so we don't need analogue tape anymore, but the real truth of the matter is that digital recorders are much cheaper for them to build, especially in a mass market.

But digital machines are still in their infancy, while analogue tape is a mechanically simple, well-proven medium that generally works with no fuss — and it sounds great! Okay, you can't sync or edit as easily as you can with digital recorders, but when was the last time you had to consult a manual before you could use an analogue tape machine — and when was the last time all your

analogue data inexplicably disappeared, or the tracks somehow got out of step with each other? The future, and indeed the present, is undoubtedly digital, but I can't help feel that



traditional analogue recorders have been abandoned before their replacements were quite ready to take over.

You only miss analogue when you don't have it anymore — like most good things — but if the machines aren't made any more, what can you do? The answer is to buy a used machine, and the plummeting cost of top-end pro 24-track recorders means that there are bargains to be had if you know what to look for — a subject broached in this very issue. It's also not unknown for respected digital mastering engineers to take DAT masters, record them onto analogue tape, then copy them back to DAT, just to inject some of that analogue magic. And don't ask me what the analogue magic is, because I can't give you a definitive answer. It could be the subtle saturation effect, it could be the second harmonic distortion that increases with signal level, or it could even be the reassuring low-level background hiss — whatever it is, most engineers seem to agree that it's real, and not just a case of wishful thinking run riot.

Paul White Editor

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# Crosstalk

## K is for Additive



Some years ago I remember reading an article by Martin Russ regarding Kawai's K5 additive synth [August 1990]. In the article, Martin mentioned that he'd written a K5 utility for the Atari ST. I've tried, in vain, to locate this program. Can you help? Andrew Lawrence London

**Derek Johnson replies:** *When reminded of this software, Martin commented, about the K5: "A pig of a SysEx implementation, littered with magic numbers instead of sensible*

*checksums, and time-outs which force you to reply within set times, and big variations between ROM OS versions!" Martin's software should be available from a large PD library. Try Goodman's PDL, on 01782 335650. Incidentally, given that you're interested in additive synthesis, you might want to try and win yourself the amazing Kawai K5000 workstation, up for grabs in this month's competition (see page 271).* ▽

## Manual Labour

I have recently purchased a Yamaha QY700 music sequencer [reviewed in SOS November 1996]. I would be interested to know if there is, or will be, a video manual for this instrument. I have spotted



a QY300 video manual being sold by SOS mail order, but fear it will not fully cover the spec of the QY700.

C Goldby Carlisle

**Derek Johnson replies:** *A quick email to Yamaha product specialist*

*Peter Peck reveals that there is in fact a free 'overview' video available, and it can be obtained from any Yamaha Hi-Tech Main Dealer or by calling Yamaha's Brochure Line (01908 369269). It lasts around 27 minutes and shows the viewer the different modes of the QY and also how it integrates with the MD4 MiniDisc 4-track recorder. Peter notes that because the QY700 is so powerful, it's impossible to demonstrate every single feature, so to help the user further Yamaha have also produced a Quick Guide which explains how to use the sequencer in more depth than the owner's manual.*

*This guide contains a tutorial disk and is also available from the Brochure Line or any Yamaha Hi-Tech dealer. And that's not all: the same outlets can provide registered users with some extra free software: QY700 Pattern Disk 1 and QY700 Pattern Disk 2 containing, not surprisingly, new patterns and phrases.* ▽

## Noise Annoys

In the March 1997 SOS a reader asked for advice about alternatives to the Sony ECM909A. I have a TCD-D7 DAT recorder, used mainly for live choral recordings, for which low self-noise is vital. Originally I also purchased an ECM909A — which Sony actually recommended at the time — with much the same disappointing results as your reader, so it was quickly returned to the dealer. Since then I have bought a Sony ECM959 MS mic which, at 25dB unweighted self-noise, is around 10dB quieter than the ECM909A. This improvement highlighted the noisiness of the TCD-D7's built-in preamp, and whenever possible I use the preamps in my Mackie 1202, with excellent results. Although the ECM959 is supplied unbalanced, it is quite simple to modify it for true balanced operation.

More generally, many microphone manufacturers seem reticent to publish noise figures for their mics, and this is complicated still further by the fact that some quote unweighted figures and some A-weighted (which can appear 10dB lower!). Perhaps SOS could encourage them by requesting and summarising, in reviews, a mic's technical facts and figures, especially

sensitivity, self-noise and maximum SPL.

Nic Holt via email

**Paul White replies:** *Most studio mics have published noise figures as well as other important specifications, though I agree that some form of standardisation should be adopted to make comparisons easier. Where data is supplied, we tend to publish it, though some manufacturer's specifications are more thorough than others. The problem arises when you buy consumer stereo mics, most of which are designed for Camcorder applications and similar jobs. Many of these have little or no technical spec attached, and many produce disappointing results when used in a serious audio environment. A decent stereo mic probably costs as much as the portable DAT machine you want to plug it into, and for best results, a separate pre-amp with inbuilt phantom power is usually the only satisfactory solution. Unfortunately, the worse the preamp on your DAT recorder, the more you need to spend on a quiet, very sensitive microphone to get passable results out of it. A portable DAT machine with pro quality on-board mic preamps can cost £1500 or more, so the simple answer is that there is no obvious cheap solution capable of truly professional results.* ▽

Send your letters, queries, tips and comments to: Crosstalk, Sound On Sound, Media House, Tratalgar Way, Bar Hill, Cambridge CB3 8SQ.

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# Crosstalk

## Down in the Dumps

Recently I purchased a Yamaha SY85 and, although I'm generally in love with it, I have come across a major stumbling block. I own an Akai S950 sampler with which I intended to dump samples to the SY85 in the manner described in Yamaha's manual (over MIDI). However, this, as yet, has proved impossible to do.

Initially I spoke with technical staff at Yamaha, who suggested that perhaps the S950 couldn't read the request for sample message sent by the SY85 and therefore I should just send the samples 'manually' from the 950. I then spoke with Akai, who very kindly explained how to initiate this unusual procedure.

Having tried this, and having made many more phone calls between the two above-named agencies, I am now at a loss and frustrated, as both advise that such a data transfer should be possible, but I cannot get it to work. I would be very grateful for a reply on this matter.

Bob Townley  
Lancaster

**Derek Johnson replies:** *It's hard to know what the problem might be, Bob, without being there. Although I don't own an S950, and can't comment on any settings that might need to be made at that end, I'm regularly beaming samples between my SY85 and various other devices. I don't really have to think about what format the samples are in, and send 8-, 12- and 16-bit samples recorded at various frequencies, with no apparent problems.*



*Simply following the manual's instructions — Wave Edit Mode starts on page 237 — allows me to initiate a sample dump from the SY85 or the external device (usually a computer in my case). Make sure that there's a two-way MIDI connection (handshaking is preferred all round when it comes to dumping samples over MIDI). I think you'll find that as each sample is received by the SY85, it will simply fill the next available empty space. But in order to access the sample, you need to tell the SY85 that it's there. This is done by going into Wave Edit (press Shift + Utility), and using the Wave Assign parameter to decide how many samples will make up a waveform. Then go to the Sample Edit page to assign the sample or samples to a specific range of the keyboard. You may need to do some retuning of samples before you save your work to disk. Samples can be saved separately, or as part of an overall SY85 file; note that really large collections of samples (if you have any memory expansions installed) will need more than one disk for a successful save. □*

## It's a Fair Cop(y)

I'd like to contribute to the tape-copying conundrums discussed in December and January's *Sound On Sound*. There is, perhaps, an alternative explanation to the problem of getting an adequate cassette copy. I have a modest digital 8-track studio and have experienced similar problems with producing decent copies on cassette. I've found it advantageous to go via an analogue stereo open-reel recorder and some additional EQ in order to make acceptable copies. As to the reason behind the problem, my cassette machine is a Tandberg TCD3014, which has exceptional specifications, but fails to adequately meter the signal below about 50Hz. Therefore, with full-bandwidth material, deep bass fundamentals cause the record heads to over-saturate without the overload showing up on the VU meters. In addition, the bass overload appears to cause the treble to distort before the sound breaks up, so bad treble response can be caused by too much bass. I tend to make use of a low-frequency filter (12dB/octave at 40Hz) and record with the meters showing 3dB below the recommended level, and this gives me a good-sounding cassette without patching in the open-reel — although I often use the open-reel anyway, since it warms up the sound of the cassette copy. I hope this information is of some value.

Ian Hearn  
South Africa

**Paul White replies:** *Thanks for the tip. It seems that a lot of people have trouble getting decent results out of cassette machines, and I've a feeling we haven't heard the last of this one. □*

## It's a Kind of Magic

Thanks very much for your prompt reply to my query concerning the transfer of MIDI files from ST to Mac [see *Crosstalk April 1997*]. All these years of being an Atari owner and I never knew they could read PC disks! Unfortunately the solution turned out to be a dead end too, but I did eventually find a way, and I thought you might be interested in printing it. I imagine there will be a lot more readers who find themselves in a similar situation to me as more Macs find their way into music studios.

Normally speaking, a Mac is more than happy to read a PC-formatted disk using *PC Exchange*. However, as soon as I wrote anything on a PC disk from the ST (ie. my precious MIDI files) the disk became unreadable by the Mac and I was given the somewhat useless choice of ejecting or re-formatting the disk. However, running

*MagicMac*, the Mac will read the ST disk. If you then transfer the files to *Magic's* 'C drive', you will find them in the *MagicMac* folder when you quit *Magic* and go back into MacOS, and it's then simply a matter of dragging and dropping them to wherever you want them.

There are several sites featuring *MagicMac* on the web, including <http://www.ataricentral.com/magic> or <http://www.toad.com>, where you can download a demo version which is perfectly adequate for the job mentioned above.

*SOS* is still the best music tech magazine; the others that have opted for the cover CD format (and price increase to match) have done so at the expense of content. I recently did a web page on Multimedia and the Music Business for a college project (I'm a Media Technology student at the University

of Glamorgan) and in it I mentioned this. Fancy graphics and CD-ROMs are all very well, but you can't beat a good read, and that's why I'll continue to subscribe to *SOS*.  
Roger Carruthers  
Gwent

**Derek Johnson replies:** *Sorry to hear that the usual trick of formatting a disk to PC format in a Mac and then being able to write to it in the Atari and transfer the disk contents back to the Mac doesn't work for you, Roger. I do it all the time in my home studio, between my Atari 1040STFM and both my aged Mac LCII and rather more up to date Power Mac 7200, with no problems. And, to be honest, most of my ST-formatted disks will also read in my Macs. Still, you've now sorted out the situation by your own methods — well done, and thanks for the info, for any other readers experiencing the same problem. □*





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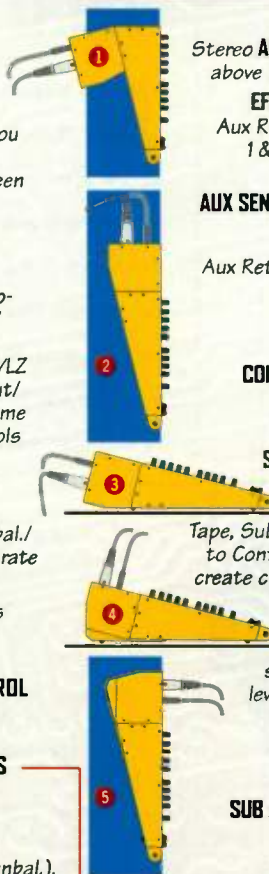
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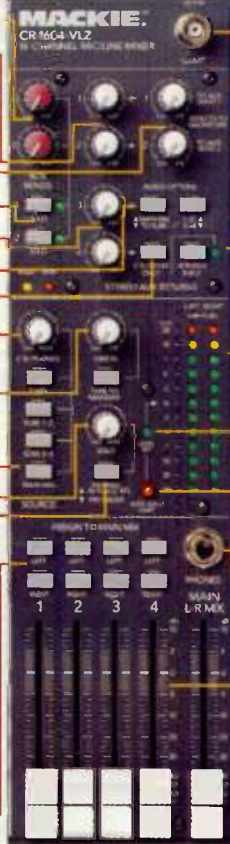
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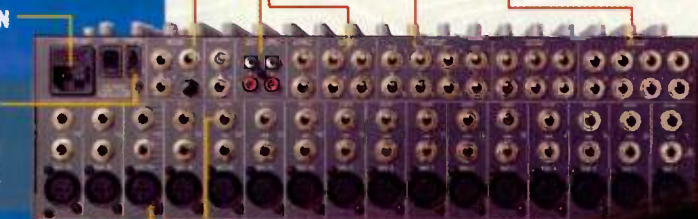
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# shape of things to come

by Derek Johnson



## Audix's Nile style

**A**udix, best known in the UK for their OM-series mics, have launched their new Nile V nearfield monitors via UK distributor SCV London.

The Nile Vs are constructed with a hand-made, seven-inch, Kevlar, long-throw woofer and a one-inch, soft-dome tweeter, each of which is matched with a custom crossover and front-ported cabinet. The

monitors are gaining praise for their "natural sound" and "silky smooth mid-range", and are set to retail for £1286.

**A** SCV London,  
6-24 Southgate Road,  
London N1 3JJ.  
**T** 0171 923 1892.  
**F** 0171 241 3644.  
**E** info@scvlondon.co.uk  
**W** http://www.scvlondon.co.uk



## ADAT WOWS Pino

**A**ce session bassist Pino Palladino has taken delivery of two Alesis ADAT XTs and a Behringer Eurodesk from Twickenham's Way Out West. The machines join Pino's expanding home recording setup. He notes: "I have often used ADATs, and many of the people I work with use them. They

sound good, so it made perfect sense to stick with a tried format. The units are also simple to use and sync effortlessly."

Incidentally, last month's item about WOW and the sale of a Soundcraft Ghost LE desk to Heaven 17's Martin Ware contained a pair of wrong numbers (those printed belong to Soundcraft!); WOW's phone and fax are actually as follows. Sorry for any confusion.

**A** Way Out West Music  
Company, 47 London Road,  
Twickenham, TW1 3SA.  
**T** 0181 744 1050.  
**F** 0181 744 1095.  
**E** wowpr@aol.com



## Syco's Human touch

**S**yco would like to invite you to the UK launch of the long-awaited Mackie HUI (Human User Interface), to be held at London's prestigious Metropolis Studio (70 Chiswick High Street, London, W4 1SU), on May 15. The Mackie HUI is a hardware controller for Digidesign's Pro Tools 4 that eliminates mice and pull-down menus and operates instead with knobs, just like a real

mixer. Ring Syco to book a space; there are demos at 11am, 1pm, 3pm, 5pm and 7pm.

In addition, Syco are hosting their first open house at their London HQ — under the banner of The Syco Experience — on May 7 and 8. The event will be an opportunity to get a close look at the latest in hard disk recording, sampling and sequencing. Product specialists will be on hand to answer visitors' questions, and exhibitors include Akai, Digidesign, Emu, Emagic, Ensoniq, Fostex, Kurzweil, Mark of the Unicorn, Opcode, Otari, Roland, Steinberg and Yamaha. The Syco Experience is free and, once again, ring Syco to reserve a space.

**A** Syco, Kimberley Road, London NW6 7SF.  
**T** 0171 625 6070.  
**F** 0171 372 7660.  
**E** sales@syco.com  
**W** http://www.syco.com

SOS can be reached on CompuServe; our email address is 100517,1113.

Our full Internet address is 100517.1113 @compuserve.com.



## Right as Rane

**R**ane's new BB44X Balance Buddy provides a simple way to convert between up to four -10dBV consumer-level RCA outputs to balanced +4dBu pro XLR inputs, or vice versa. It can also convert two stereo pairs simultaneously — one pair in either direction. Signal-to-noise performance is unaffected by the BB44X: pro-quality, nickel-core passive transformers convert the signal levels independently of active electronics, with no need for power. An optional expander unit (the Option 88) converts the BB44X into an 8-channel unit, within the same 19-inch package. The BB44X retails for £347 including VAT, while the Option 88 comes in at £205.

**A** Shutesound, 4 The Willows Centre, Willow Lane, Mitcham, Surrey CR4 4NX.  
**T** 0181 640 9600.  
**F** 0181 640 0106.



## Fatar hit the right note

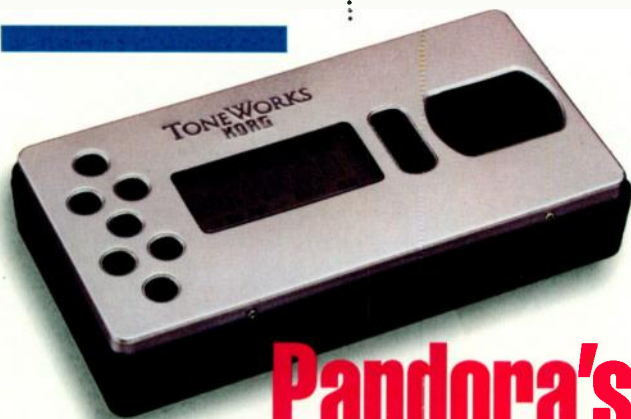
**A**rbiter have announced the availability of Fatar's new Studiologic range of controller keyboards. The range consists of the 61-key SL161 (£229.95), the 76-key SL760 (£449.95), and the SL880 (£599.95), SL1100 (£799.95) and SL2001 (£1049.95), which all come with 88 keys and Fatar's new weighted hammer action. This new action features a redesigned hammer which replicates the mass distribution of an acoustic piano hammer, the hammer travels in a wider arc, resulting in improved dynamics and "a more responsive feel".

The entire Studiologic range features velocity sensitivity and aftertouch. The synth-action SL161 offers three zones for programmable splits and/or layers, and the SL760 offers the same, with a piano-action keyboard. The SL880 has four zones, as does the SL110, although the latter also offers 32 preset memory locations. The whole range features pitch bend and modulation wheels, sustain and volume pedal inputs, and two parallel MIDI Outs. The top-of-the-range SL2001, however, also offers two programmable wheels, eight zones, 64 presets (plus room for

another 64 on an optional RAM card), a 48-character LCD and four independent MIDI Outs.

On a different tack entirely, Arbiter have just been appointed UK distributors for SKB's range of musical equipment cases: the range includes cases for guitars, keyboards, drums, strings, brass and woodwind, and the Music Technology range includes rackmount equipment and mixer cases.

**A** Arbiter Group plc, Wilberforce Road, London NW9 6AX.  
**T** 0181 202 1199.  
**F** 0181 202 7076.  
**E** arbiter@cix.compulink.co.uk  
**W** <http://www.demon.co.uk/arbiter>



## Pandora's new box

**K**org's compact guitar processor, the Pandora, is now available in a new enhanced version. Reviewed back in June 1996's issue of SOS, the original machine impressed with its ease of use and wide range of useful treatments. For just £10 more, the £199 Pandora 2 adds 32 drum tracks to the multi-effects programs, and a stereo auxiliary input facilitates jamming with ready-recorded music. A new 'key transpose' function lets you adjust the pitch of the song you're

jamming with by a range of an octave up or down, and a Centre Cancel function aims to remove the sound from the centre of a stereo mix — ie. removing vocals or lead guitar. Pandora 2 provides 56 effects types (distortion, overdrive, wah and compression, for example), plus 38 new multi-effects programs.

**A** Korg UK Ltd, 9 Newmarket Court, Kingston, Milton Keynes MK10 0AU.  
**T** 01908 857150.  
**F** 01908 857199.

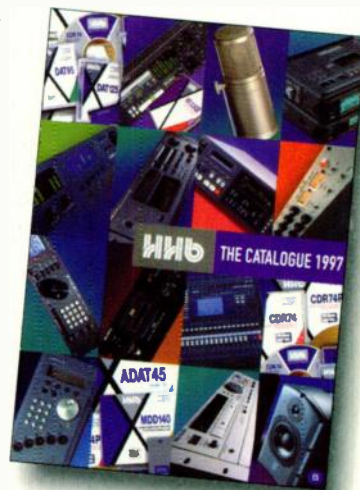
## HNB's hardy annual

**H**HB Communications have just launched the 1997 edition of their annual catalogue. The new volume is divided into 19 full-colour chapters with indexing, concise descriptions of products, and pricing. If you're on HNB's mailing list, you'll get a copy of the new catalogue automatically; if you're *not* on the mailing list, contact HNB.

New from HNB's own 'label' is the CDR800 which, at £1529, is claimed to be the lowest-cost fully professional audio CD recorder on the market. HNB's new machine is rackmounting and "solidly engineered" for studio use, and comes with pro facilities such as balanced XLR analogue inputs, unbalanced phono ins and outs, AES/EBU digital in, and optical and co-axial digital ins and outs. An on-board sample rate converter makes for painless digital-to-digital copying; sample rates between 32kHz and 48kHz, with up to +/-3% variance, are detected

automatically, and converted to the 44.1kHz CD standard. High-quality converters are used, and vibration of the disc itself is minimised during recording, courtesy of a "stable platter mechanism".

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





shape of things to come

## Fostex's SCSI Logic



expansion card offers fast back-up and restore of recorded data to external SCSI devices such as removable cartridge systems (magneto-optical, iomega, Jaz, Zip, Syquest, etc), and external

**F**ostex's DMT8VL 8-track digital recorder can now be enhanced with the addition of the new Model 8339 SCSI card. Available fitted with new machines, or as a retrofit to existing users (providing it is through SCV London's service department or an authorised Fostex Service Centre), this

hard drives. The Model 8339 retails at £199 including VAT, and is available now.

**A** SCV London, 6-24 Southgate Road, London N1 3JJ.  
**T** 0171 923 1892.  
**F** 0171 241 3644.  
**E** info@scvlondon.co.uk  
**W** http://www.scvlondon.co.uk

## Sounds like Heaven

**H**eavenly Music's latest releases include a new range of WAV-format sample disks suitable for use with the Creative Labs AWE32 and many other PC soundcards.

In response to many customer requests, the first two sets are *Kicks and Snares Volume 1* and 2, featuring a wide palette of bass and snare drum samples.

Heavenly have also released a CD collection of SoundBlaster AWE32 Sound Fonts. Over 170 sound banks include basses, keyboards, pianos, strings, brass, guitars, vocal effects, choirs, reeds, woodwind, vintage synths, sound effects, and lots more. In addition, this set contains a collection of WAV sound files and drum/percussion loops suitable for use with Steinberg, Emagic,

Evolution and Cakewalk audio sequencers, with some sample GM, GS and XG MIDI files thrown in. Virtually all of the Sound Fonts will load into a standard 512K AWE32, though 2Mb is still recommended. As a bonus, the CD will also

include Volumes 1 to 6 of Heavenly's popular *Dr Beat* percussion MIDI file building block set, worth almost £90 on their own. The CD will cost £49.99, but is currently available for the introductory price of £42.99 plus postage.

*Cu-Bytes* offers a selection of bite-sized musical parts for use with Steinberg's *Cubase*, presented as ARR, PRT and SNG files. These files take full advantage of *Cubase's* Group facility: the user simply clicks and drags the required parts to the pre-set, pre-named Group tracks, so that musical ideas can be realised in the shortest possible time.

Last, but not least, Heavenly have just released a new range of MIDI file collections: *The Beatles Volumes 1-4*; *Stevie Wonder Volumes 1 & 2*; *Diana Ross & The Supremes Volume 1*; and *Marvin Gaye Volume 1*. The collections are priced at £14.99 each, plus postage.

**A** Heavenly Music, PO Box 3175, Clacton, Essex CO15 2RP.  
**T** 01255 821039.  
**F** 01255 821039.  
**E** heavenly@ortiz.demon.co.uk  
**W** http://www.ortiz.demon.co.uk

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BARNSTAPLE	Soundpad 01271-23686
BELFAST	Marcus Music 01232-222871
BINGLEY	Spectre Sound 01274-568843
BIRMINGHAM	Musical Exchanges 0121-236 7544
BIRMINGHAM	Q Music 0121-643 4655
BIRMINGHAM	London Microphone Centre (LMC) 0121-359 4535
BLACKPOOL	Tower Music 01253-27399
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CARLISLE	AVI 01228-45599
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COLCHESTER	Axe Music 01206-765 652
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DUNFERMLINE	Sound Control 01383-732273
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- 3 Auxes allowing 2 Pre-Fader + 1 Post-Fader or 2 Post-Fader + 1 Pre-Fader
- 100mm Faders throughout
- 4 Stereo Inputs
- Rackmount Option

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Address: .....

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I read the following magazines: .....

Please send me a FREE copy of the Spirit Guide to Mixing on how to get the best from my mixer



# shape of things to come

## Kenton konversion



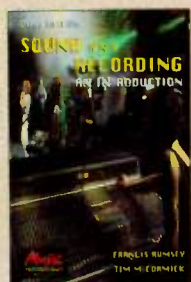
After a run of nearly five years, Kenton Electronics are discontinuing their Pro 2 MIDI-to-CV converter. However, if you are convinced that a 2-channel MIDI-to-CV converter is what you need, worry not: Kenton are replacing the popular Pro 2 with the Pro2000. The new unit offers many new features, including MIDI-syncable LFOs, built-in portamento, Hz/Volt and Volt/octave CV systems

on both channels, plus an optional KADI (Kenton Auxiliary Digital Interface), Wasp or Roland DCB port. The Pro2000 is due to retail for £229.95 including VAT.

**A** Kenton Electronics, 12 Tolworth Rise South, Surbiton, Surrey KT5 9NN.  
**T** 0181 337 0333.  
**F** 0181 3301060.  
**E** sales@kenton.co.uk  
**W** http://www.kenton.co.uk/

## book corner

Last month, we brought you news of three titles in Focal Press' Music Technology series, and we've just received another entry. *Sound and Recording: An Introduction* by Francis Rumsey and Tim McCormick is now in its third edition — it first saw print in 1994 — and features completely up-to-date standards and system information, sections on digital mixers and automation, the latest on MIDI and a revised digital audio chapter. The press material claims that the book has been "designed as an easy-to-read reference for those at an early stage in their career". While this is true to a point,



there are many entries that would benefit from even more explanation, but the intrepid amongst you should be able to figure out what's going on in context. This is more of a text book, and would prove invaluable as the core material of an audio course: backed up with lectures, the slightly techy 'Fact Files' would be invaluable reference material. These Fact Files are periodic charts that appear throughout the book, and are each dedicated to a single point or topic — for example, the principles of various mics, the decibel, Ohm's law, and more. The book costs £19.99, and is available from *SOS* Mail Order; the order code to use is B344, and postage costs £2.50 UK, £5.50 Europe, £8.80 ROW.

Also in a new edition — and not before time — is occasional *SOS*

contributor Craig Anderton's *Home Recording for Musicians*. This book first appeared in the late '70s, before *Sound On Sound* and before the '80s boom in home recording; it became the bible for hordes of spare room home recordists. The new edition is essentially a new book,

although it has much of the feeling of the original. Craig starts at the very beginning and introduces topics such as analogue recording, digital recording and MIDI gently, and in a way that makes a lot of sense. Highly recommended, and potentially useful to a wide range of recording musicians, whether complete novices or a little further down the path. The order code is B345, the price is £16.95 (postage £4.50 UK, £7.50 Europe, £14.50 ROW).



This is definitely a month for recaps: *MIDI for the Professional* by Paul D Lehrman (another *SOS* contributor!) and Tim Tully has also been revised and updated — perhaps the most important addition to this vast (255 pages) and comprehensive book is the index, which makes the book much more accessible. Otherwise, it's still as exhaustive a reference on all things MIDI as you could reasonably expect. Order code B227, price £12.95 (postage £4.50 UK,

£7.50 Europe, £14.50 ROW).

And still we're not finished: *The Musician's Guide to Home Recording* by Peter McIan and Larry Wichman (neither of whom have ever written for *SOS*) was first published nearly 10 years ago, and has just been revised and updated. Whether you're demo-ing with a cassette multitracker or a digital recorder, this book aims to help you make the most effective demo you can. All aspects of recording — including mic position, using reverb, mixing and



recreating the sounds you hear on hit records — are included. One thing, though: I know Real World is probably technically Peter Gabriel's 'home studio', but it's hardly typical of what the majority of us have to put up with. So why is it on the front cover? The order code you need for this book is B314, and the price is £16.95 (postage £4.50 UK, £7.50 Europe, £14.50 ROW).

Peter McIan's solo effort, *Using Your Portable Studio*, is a totally new book aimed at helping you extract the most from your cassette-based multitracker. While this might seem like an idea after its time, with the market seeming to be



moving inexorably to a digital future, there are still quite a few cassette-based multitracks on the market (see our roundup starting on

All sample CDs distributed by Sounds OK are now reduced by £10 each. This means that all CDs — single or double — are now £44.95 and triple CDs (Mind Control) are £89.95. Of course, all *SOS* readers ordering at the old price will automatically get the new, lower price, and the new prices have also been offered to all retailers with a Sounds OK CD jukebox.  
**T** 01276 682313.  
**E** sounds.ok@cableol.co.uk

Newtronic are distributing Satori Music's *The Classic Breaks* drum 'n' bass sampling CD. Over 1200 stylistically apt samples are included on the £29.95 (plus postage) CD.  
**T** Newtronic 0181 691 1087.  
**E** sales@newtronic.com  
**W** http://www.newtronic.com

Beyerdynamic's MCD100 digital studio condenser mic has seen some recent developments as a result of discussions with end-users and digital product manufacturers. The system still uses an MC834 cardioid mic, an impedance converter, a low-noise op-amp and an internal 22-bit A/D converter, but a new output format is used that features conventional XLR connectors for AES/EBU digital output.  
**T** 01444 258258.

The World Control range of Kurzweil K-series sound sets now includes *MC303 Kits*. The set includes most of the Roland MC303's individual drum samples, with pitch and data control. The set costs £35, or £40 outside the UK; customers in the USA pay \$60. Pay by cheque, Eurocheque, Euro giro, money order or cash.  
**T** 0113 246 9254.  
**W** http://www.u-net.com/~wcontrol

Last Unicorn's *WaveCraft*, the PC-based software synth reviewed in the October 1996 issue of *SOS*, has had a tremendous price cut: it formerly listed at £101.95, and now costs an entirely reasonable £29.99. *WaveCraft* is available from Time & Space.  
**T** Lost Unicorn 01256 701470.  
**T** Time & Space 01442 870681.

page 134 of this issue). With many people still making demos in this format, the tips and techniques illustrated in this book should have validity for some time to come. And of course, many of the tips will be useful in any multitrack environment, including the new MiniDisc multitracks and the audio software you might have installed in your computer. The order code is B346, price £17.95 (postage £4.50 UK, £7.50 Europe, £14.50 ROW).

**A** SOS Publications Ltd, Media House, Trafalgar Way, Bar Hill, Cambridge CB3 8SQ.  
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**F** 01954 789895.



# We made the console,



## ...you wrote the ad.

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

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

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

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

● "Intuitive handling, flexible routing, great Soundcraft sound."  
- Melvin Fernandes, Recording Engineer, C&M Studios, India.

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

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

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

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

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

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

# Ghost

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



In the *Cakewalk* section of the 'MIDI + Audio on the PC' article published in our February issue, it was noted that direct links to external audio editors (for example, to *Sound Forge*) were not yet implemented. We're happy to report that these links are now available.

**T** Et Cetera 01706 228039.

Due to an oversight, the eye-catching photo of West Productions' HQ (they're the company behind the audio post production of *The X-Files*) that appeared back in our February issue went uncredited: the photographer was Andrea Cimini.

Following a month-long evaluation, NBC Europe have purchased an ElectroVoice RE20 mic, mainly to be used to record voice-overs onto DAT. The RE20 is designed for broadcast and studio applications, and offers a built-in "bass tilt down" switch to provide bass attenuation.

**T** ShuttleSound 0181 646 7114.

Autopia Vanqup, professional custom flightcase specialists, have recently moved house, to a new 250,000 sq ft factory in Cwmbran, Gwent. The company also have a new direct sales number:

**T** 01633 866630.

GOSHI is a new Bath-based company specialising in professional audio software and hardware for the PC platform. Their flagship product is *Red Roaster* (reviewed in February's *SOS*), which enables 24-bit audio processing and mastering direct to CD.

**T** 01225 313219.

Leeds radio station LSR, 107.8 FM, is back on the air for the third year running. Tune in on April 21 for the first of month-long mix of local DJs, progressive music, underground sounds and spoken word. Expect to hear anything from drums & bass to jazz, indie to electro, hip-hop to latin. And watch out for the club shows: there's something happening nearly every night. The station is actually making plans to bid for a full FM license, but for now you can sample their broadcasts for a month — and they'll be back on air for another four weeks in November.

**A** LSR, LUU, PO Box 157, Leeds LS1 1UH.

**T** 0113 231 4249.

**F** 0113 244 8786.

**E** lsr@motive.demon.co.uk

*SOS* can be reached on CompuServe; our email address is 100517,1113.

Our full internet address is 100517.1113@compuserve.com.

## Absolutely fabulous!



Mark Lusardi, owner of and engineer at London's Mark Angelo Studios, recently took delivery of a pair of Spirit Absolute Zero monitors, which will take care of nearfield duties next to the studio's custom-built Quested 4-way monitor system. Lusardi notes: "I really enjoy working with the Absolute Zeros — they're punchy without being tiring on the ears. Not only do they provide nice, flat monitoring, but they look sexy as well." A pair of Absolute Zeros have also gone to up-and-coming Manchester dance label Rainy City. "What you're getting with the Zeros," says the label's Cyrille, "is a true picture of the music you're making."

There's activity elsewhere in

the Spirit range as well — downward activity, price-wise. Production expansion and decreased component costs mean that certain mixers have had their retail prices chopped by 25%: from May, the Folio Notepad costs £149, the Folio F1 14:2 £299, the Folio F1 16:2 £349 and the Folio SX £479, all including VAT. Even at the old prices, Spirit have shifted more than 300,000 mixers in the last five years.

**A** Spirit by Soundcraft, Cranborne House, Cranborne Industrial Estate, Cranborne Road, Potters Bar, Herts EN6 3JN.

**T** 01707 665000.

**F** 01707 665251.

**E** spirit@dial.pipex.com

**W** <http://www.spirit-by-soundcraft.co.uk>

## By 'eck, it's Music Connections!

MIDI and recording chain Music Connections has opened a new branch in Otley, near Leeds. The new store will offer the same range of keyboards, digital recording, samplers, effects, music software, mixers, monitors and MIDI accessories as the other branches.

**A** Music Connections, Wharfebank House, Ilkley Road, Otley, W Yorks LS21 3JP.

**T** 01943 850533.

**F** 01943 850522.

## Bonny wee preamp



Scottish studio CLM has entered the pro sound equipment manufacturing market with the launch of the DB400S 4-channel mic preamp. The device utilises SSM and dbx chips and offers metering and limiting on each channel. It's been specifically designed to handle Middle & Side (M&S) stereo recording, and two such pairs can be accommodated by using all four channels. CLM have also provided the DB400S with a proprietary stereo width management system, dubbed

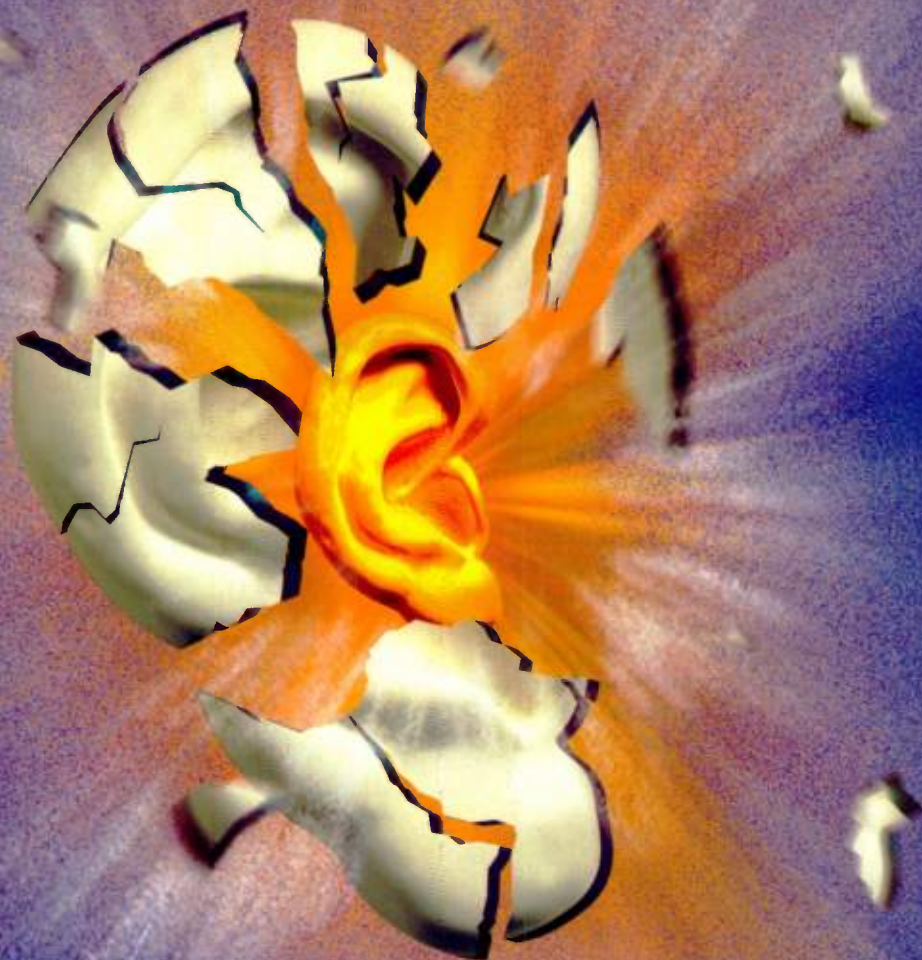
WHIP (Wide Horizontal Image Plane) — this treatment works without any phasing problems or "hole in the middle" effect, according to the manufacturers. Connections are on balanced XLRs throughout, with an input and an output on each channel (an insert point and 14dB pad are also provided). Expect a retail price in the vicinity of £1380 including VAT.

**A** CLM Dynamics, 26 Tay Street, Monifieth, Dundee DD5 4BG.

**T** 01382 534868.

**F** 01382 534868.





# We've broken the sound barrier

## again

### Introducing Sound Blaster AWE64 Gold

**The ultimate, affordable sound card for the audio enthusiast or semi-professional musician**

In 1989, Creative Labs Sound Blaster set the industry standard for PC audio. And the Sound Blaster series has been at the cutting edge of technology ever since.

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You'll experience incredibly realistic instrument reproductions as well as stunning sound effects, thanks to EMU 8000 WavEffects and Creative WaveSynth/WG.

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Either way, with AWE64 Gold priced at £199 inc. VAT and AWE64 priced at £159 inc. VAT, you've got golden opportunities which you can't afford to miss.

EMU8000 Synthesiser  
Creative WaveSynth/WG  
SP/DIF digital output  
Gold plated RCA output  
Onboard RAM

**AWE64 Gold**  
Yes  
Yes  
Yes (-120 db signal/noise ratio)  
Yes (-90 db signal/noise ratio)  
4MB (upgradeable to 12MB)



To find out more, visit our World Wide Web site 'Creative Zone': [www.creativelabs.com/64uk](http://www.creativelabs.com/64uk)  
Or contact the Creative Labs Presales Department on 01245-265265

**AWE64 Gold**

**CREATIVE**



## Vig & Saber go Pop



'Staring at the Sun', which has just been released at the time of writing. The pair are joined by "mixer extraordinaire" John X for the job, and have

**B**utch Vig and Danny Saber, both recently featured in *Sound On Sound*, are to team up for the remix of the second single from U2's *Pop*,

adopted the name of The Sonic Morticians. Flanking the trio in the picture are second engineers Jonathan Burtner and Wes Johnson.

**T**he Music Industries Association, in conjunction with Mammoth Events, are staging the first annual MIA Show, to be held at the London Docklands Arena. The event runs from June 18 to June 22; the first three days are trade only, with the Friday (June 20) being touted as Education Day. The last two days, Saturday and Sunday, go under the banner of Mad About Music, and are fully open to the public — they're being co-sponsored by the Capital Radio Group and satellite music channel VH1. Tickets for the public days are £6 for each day, or £4 in advance. Contact the London

## MIA showing out

Arena box office on 0171 538 1212.

All the major players in the UK music industry will be exhibiting — look out for stands manned by Yamaha, Korg, Arbiier Group, Akai and Washburn UK, for a start — and *Sound On Sound* will also be there, on stand D180A. A program of seminars, clinics, masterclasses and new band showcases is also scheduled.

## caught in the net



Indie-Culture home page.

### INDIE-CULTURE.COM

If you're into indie and you're into shopping, tune into indie-culture.com, an "e-zine for alternative shoppers". The site has been designed to sell and promote indie-style music as well as travel, fashion and lifestyle over the Internet. On offer is everything from techno CDs to whale-watching trips in the Azores. An electronic database ensures goods in stock will be sent within 24 hours of an order being placed (secure sales are promised), and registered browsers will be given a personal

file and incentives in the shape of points towards future purchases.

**W** <http://www.indie-culture.com>

### SOUND SOLUTIONS

Computer music supply shop Sound Solutions have recently completed their 'virtual shop'. Music is playing on every page of the new site, and browsers can take advantage of an interactive environment while looking at the stock — secure ordering is available on-line.

**W** <http://www.soundsol.com>

### AKG

German mic specialists AKG now have an Internet presence. The

new web site gives you a company profile and details of established and hot new products.

**W** <http://www.akg-acoustics.com>

### JBL PROFESSIONAL

Loudspeaker specialist JBL Professional have launched a web site that aims to provide a comprehensive guide to all their current products. Visitors to the site will also find plentiful technical information relating to all products.

**W** <http://jblpro.com>

### SOUNDSCAPE

As if to coincide with the v2 update of their PC-based digital recording and editing system, Soundscape have launched their new web site. This is definitely the one-stop shop if you're looking for info on the Soundscape

system. The site's full of tech support (with software downloads for registered users), plus news and links to Soundscape's partners.

**W** <http://www.soundscape-digital.com>

### SCV LONDON

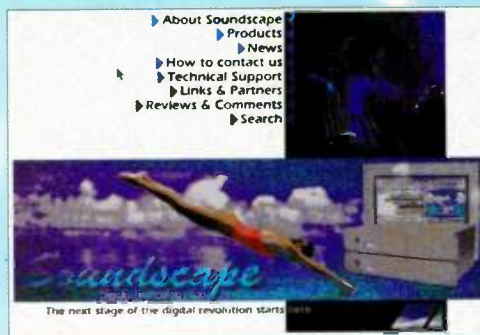
SCV London, UK distributors of Fostex, Audix and Maxell, and manufacturers and distributors of LA Audio and SCV Electronics, are now on the world wide web. SCV London's site will provide browsers with a "graphically impressive and technically abundant" experience.

**W** <http://www.scvlondon.co.uk>

### THE BLACK MATERIAL

The Black Material are launching what may be the first independent — ie. with no record-company backing — release of an Enhanced Music CD in Australia, entitled

*Clearing The Water*. To celebrate, they have constructed a special web site where their debut single, *First Kiss*, plus a preview of the multimedia version of the single, called *Interactive First*



Soundscape home page.



# Points mean prizes!



**A**udio Points is a new hi-tech music marketing scheme launched by KGM Studio Specialists. Centred around a fully-packed mail order catalogue, the idea is that every purchase you make will qualify for Audio Points vouchers, which can be used for full or part payment of a future order — rather like various supermarket loyalty ventures. Details of how

points are awarded are thin, but an example is given whereby a £200 purchase could qualify the purchaser for £30 off their next order. All 'live' accounts are also entered into a monthly prize draw, with the opportunity to win over £2000-worth of audio

equipment. And to get you going, for a limited period only all customers will get free Audio Points with a catalogue.

- A** Audio Points, 18-42 Charlotte Street, Wakefield WF1 1UH.
- T** 0345 573285 (local call charge anywhere in the UK).
- F** 01924 201618.
- E** [audiopoints@kgm.co.uk](mailto:audiopoints@kgm.co.uk)

*Kiss*, will be released. Using the latest Shockwave technology, the web browser can download a non-linear interactive version of the song or have an audio signal streamed live across the net. This will give net surfers a taste of the Enhanced Music CD title, which consists of seven audio tracks and a 130Mb Mac-compatible interactive multimedia presentation; a Windows version is in the making.

**W** <http://www1.tpgi.com.au/users/cydonian/tbm.html>

## YAMAHA

Macromedia recently chose Yamaha's SushiSpace game section of their web site as *Shocked Site of the Day* (featured

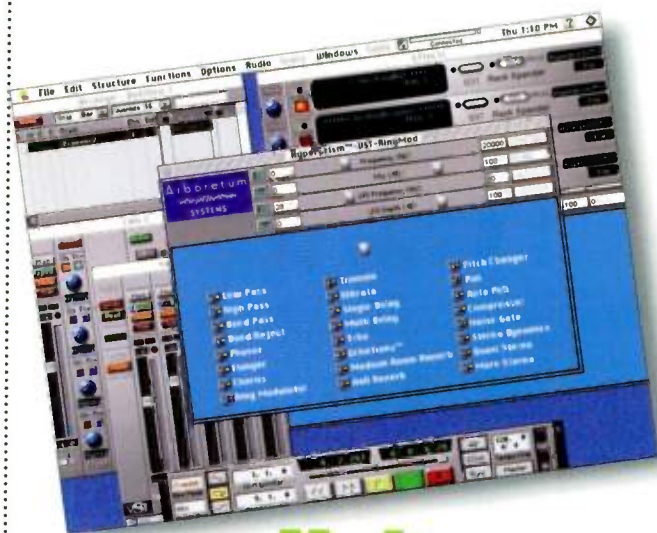


on March 5th). This games area utilises 10 different Shockwave animations, Yamaha's own *MidPlug* XG MIDI sound technology for the music, and a sprinkling of Java for good measure. The challenge is to work

your way through each game in search of XG Heaven, where prizes await you. However, if you make a wrong move you get thrown out of SushiSpace back to one of the other pages of the Yamaha site. The site was built by UK developer Co-Activ. Managing Director Paul Gilby said "We've been working on the Yamaha site since May '96. Its primary aim is to inform musicians about the XG MIDI format and synthesizers. It's also the place to download Yamaha's free *MidPlug* and *SoftSynth* for *Netscape Navigator* and *Internet Explorer*. Yamaha asked Co-Activ to build an area which utilised the *MidPlug* MIDI sound technology in conjunction with Shockwave. We developed

SushiSpace as a place that not only demonstrates the technology but is also entertaining and a real challenge to play."

- W** <http://www.yamaha.co.uk>
- W** Co-Activ <http://www.co-activ.co.uk>



## Unity plug into VST

**U**nity Audio are UK distributors for several interesting Mac-based audio software packages, including AnTares' *AutoTune*, available as a plug-in for either TDM-based or *Cubase VST* systems.

The *AutoTune* plug-in for TDM is more than a pitch-shifter. Used on vocals and other solo performances, an Automatic mode detects the current pitch of the input, identifies the closest pitch in the current scale and corrects the input pitch to match the identified pitch. You define the speed at which the pitch is corrected, and you can also introduce vibrato. All aspects of the scale can be controlled, including scale detuning. Major, minor, chromatic and 26 historical and microtonal scales are available, with the microtonal scales on offer including Just Intonation, 19-, 21-, 34- and 53-note scales, Indian, Arabic, Chinese and ancient Greek tonalities. *AutoTune* TDM retails for £499 including VAT for PCI and Nubus systems. The *Cubase VST* version of *AutoTune* is brand new and offers exactly the same features and interface as the TDM version, without needing any external hardware.

Also now available as a *Cubase VST* plug-in is Arboretum's *Hyperprism* suite of audio tools. *Hyperprism VST* v1.01 offers 24 effects, including reverbs, pitch-shifting, sweepable resonant filters, modulation, stereo enhancers, dynamic compression, delays and more. All effects algorithms operate in real time as

the user is previewing AIFF or *Sound Designer II* mono or stereo sounds, with 32-bit precision. The program supports 11kHz, 22kHz, 44kHz and 48kHz sample rates and 8- or 16-bit sample resolution. The provisional retail price for v1.01 is around £276 including VAT.

Totally new from Arboretum is *Hyperprism Ionizer*, a 512-band "real-time dynamic spectral reshaping tool for noise reduction, expansion, compression, and equalisation". In simpler terms, *Ionizer* is a tool for sound design, sculpting and restoration. For example, the software will allow the removal of broad-band noise without affecting the source material, provide simultaneous multi-band compression, expansion and EQ during mastering, and gives the sound designer many creative options courtesy of 512 bands of gated EQ and flexible filtering options. *Ionizer* is a Power Mac-native application, and is currently available as a plug-in for *Premiere*, *Deck*, *Peak*, *TurboMorph* and *Studiovision* v3.5, with a stand-alone version to come soon.

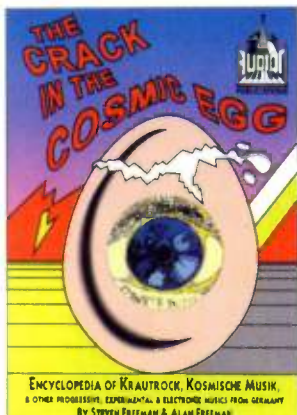
- A** Unity Audio, Upper Wheeler House, Herts SG11 1ET.
- T** 01920 822890.
- F** 01920 822892.
- E** [unityaudio@channel.co.uk](mailto:unityaudio@channel.co.uk)



shape of things  
to come

## Krautrock

## über Alles!



Fans of 'krautrock', that blossoming of German music in the late '60s and early '70s, now have a textbook to guide them: *The Crack in the Cosmic Egg*, the work of Steven and Alan Freeman, is as complete a guide as one could hope for to an amazing variety of bands playing cosmic, progressive, experimental and electronic music in Germany during the last 30 or so years. Names you'll recognise include Kraftwerk, Amon Duul, Can, Ash Ra, and Tangerine Dream, but this just scratches the surface. Even Karlheinz Stockhausen gets a respectful entry, as a strong influence on the more experimental German

groups to come. The main body of the book is an alphabetic listing of all the bands, complete with pocket biography, personnel, and discography. The book has 288 large-format pages, including two large sections of album covers, one in colour. It also features background to regional scenes, a label list and useful index, plus a further reading list.

The feel of *Cosmic Egg* is very much of a fanzine on steroids, but there's no denying the enthusiasm of the authors, who have unearthed much valuable information, often from original sources or the artists themselves. It's a true labour of love. And hurry: this edition (£20 a copy) appears to be limited to 2000 copies. Postage and packing is £5 in the UK, £8 Europe air or worldwide surface, £17 North America air, or £20 rest of the world air.

**A** Ultima Thule, 1 Conduit Street,  
Leicester LE2 0JN.

**T** 0116 285 4545.

**F** 0116 285 4555.

## Expanding Time & Space...

Sample CD specialists Time & Space have announced a little product diversification, and are now distributors to the UK MI (Musical Instrument) market for the Terratec range of soundcards and accessories. Of particular interest is the long-awaited EWS64 (£449), which consists of a 16-bit ISA card connected to a 5.25-inch module that plugs into the front of your PC (if you've got a free slot), and provides easy access to two sets of MIDI Ins and Outs, a stereo digital input (optical or co-axial) and two

stereo digital outputs (co-axial/S/PDIF). The ISA card features a 64-voice synth as standard, and sample RAM which can be expanded to 64Mb, along with a powerful DSP chip for real-time effects, and many other digital audio features. The Terratec range also features the MIDI Master Pro Keyboard and the Maestro 32 soundcard.

**A** Time & Space, PO Box 306,  
Berkhamsted, Herts HP4 2AU.

**T** 01442 870681.

**F** 01442 877266.

**E** sales@timespace.com

# turnkey

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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.

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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.

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One side of the switcher-equipped recording room.



Compare 6 mics by recording simultaneously to ADAT.



Pro-Tools III and Soundcraft DC2020 in Studio 1.



Huge range across Mac, PC and Acorn platforms.

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- 12** Keyboards & Microphones
- 13** Guitars, 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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Fax: 0171 379 0093 114 Charing Cross Road London WC2N 0



# KORG

# ALL DIGITAL EIGHT BUSS MIXER

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Over the last few years, Korg's SoundLink digital recording and editing system has gained wide respect in the post production and broadcast areas, with it's combination of flexibility and excellent sound quality. Using the experience they have gained with this product, they have now produced the SoundLink 168RC digital mixing console, which offers unprecedented facilities in an amazingly compact format.

There are 16 digital inputs and outputs in the ADAT optical format, allowing connection not only to ADAT's themselves, but also to the vast range of other equipment now supporting the format, as well as eight analogue mic / line inputs, two of which have phantom power. The master outputs are also available as coaxial SPDIF. For those of you who prefer more analogue connections, Korg are also producing high quality external 8 channel A/D and D/A convertors, again using the ADAT format. And if all this isn't enough, you can cascade multiple 168RC's together for as many channels as you like, also leaving plenty of room for future expansion.

- 24 Input 8 Buss Digital Mixer
- Snapshot & Full Dynamic Automation
- 2 Built In Effects Processors
- 16 Channels of Digital Ins & Outs
- Optional Outboard A/D & D/A Convertors

**NEW PRODUCT**  
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**NEW ProTools IV Package**

- 8200/120 32/1.2/CD w/ keyboard
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To add to the collection of burgeoning TDM plug-ins is the new Waves Truverb reverb processor, Syncro Arts Tool Belt processor & Q-Sounds QX/TDM 3D spacial enhancer using the Qsound patented expansion algorithm.

**Truverb Q-sound ToolBelt**

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- Performa 6400/180 32/1.6/CD with 28.8 modem & Keyboard
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 TEL 0171 240 4036

**AMEK**

**BIG by Langley**

As Amek dealers we now have on demonstration a fortyfour input Big by Langley console. The Big's SuperTrue Version 3.1 VCA automation compatible with all other Amek desks up to the flagship Neve 9098 series console. With the Virtual Dynamics on-screen processing plus Rupert

Neve voice recall, this is a console that is packed with facilities, over and above what it offers as a fully featured inline console: 4 band EQ, 8 auxiliaries, 12 bus, 24 outputs available in frame sizes from 28 to 44 with or without bantam patchbay. Call for an appointment.

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

**INCREDIBLE VALUE**  
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\*We will beat any genuine quote from a UK or European dealer. We must be able to translate the quote and the goods must be available and in stock. Prices include 17.5% VAT E & O.E. UK mainland carriage from £9.99



# EUROPE'S LOWEST

## YAMAHA

Whilst not as prolific a manufacturer of four tracks as some others, Yamaha have a history of taking a good look at the market place before coming up with machines which are exceptionally good value for money. The deals we have now negotiated make them unbeatable!

### MT50 MULTI-TRACKER



The MT50 can record on all four tracks simultaneously, and works at double the normal speed for improved frequency response and reduced wow and flutter. Each channel has its own two band EQ, an auxiliary send for use with effects units, and DBX noise reduction is incorporated to keep background noise to a minimum. A special 'sync' output bypasses this so as not to interfere with timecode.

RRP £389  
**£299**  
NEW BOXED

- Typical Yamaha Build Quality
- DBX Noise Reduction Built In
- Excellent Value for Money
- Includes Free Turnkey 4 Track Pack



### MT4X MULTI-TRACKER

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 £559  
**£399**  
NEW BOXED

### TURNKEY 4 TRACK PACK

This might seem like great value for money already, but don't forget that all four tracks from Turnkey come with our famous FourTrack Pack free of charge! The pack includes Maxell enclosed headphones, XLIIS chrome tape, dynamic microphone, stereo phono cables, head cleaning kit, and a book to show you all the ins and outs of home recording. Only available at Turnkey!

### XR SERIES ALL INC 4 TRACK PACK FOSTEX MULTITRACK RECORDERS

**XR3** High speed machine at £249. New auto-bounce facility and built in mic level for 4 track recording on the move.

**XR5** Stereo auto double speed transport, with individual EQ, up to 3 tracks and 2 stereo mixes, 2 inserts & 4 separate tape outs allowing use with an external mixer.

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

RRP £249  
**£249**

RRP £420  
**£335**

RRP £499  
**£449**

### PORTASTUDIOS TASCAM

**PORTA 03 MkII** New version of a classic portastudio. Improved styling and metering.

**PORTA 414** All new Portastudio from Tascam. Records to all 4 tracks at once using DBX noise reduction. Double speed recording for better bandwidth. 2 band EQ, 4 mic inputs and 1/8 LED metering make it great value for money. Includes free four track pack!

**PORTA 242 MkII** A brand new version of the best selling 424 from Tascam, inherits all the portastudio. Features include 3 band EQ with a mid sweep, records to all 4 tracks at once, 2 independent auxiliary sends (1 switchable pre/post fade). Logic controlled 2 speed transport with built in memory location. DBX noise reduction, initial supplies.

RRP £229  
**£199**

RRP £349  
**£349**

RRP £469  
**£469**

### MULTITRACKS NEW, USED & EX DEMO

Fostex 380	£499	Roland VS880	£1499	Tascam Portastudio MK2	£199
Fostex 380S	£799	Roland VS8F1	£340	Tascam PORTA27	£289
Fostex DMT8	£1199	Tascam 424	£379	Yamaha MT4X	£399
Fostex XR3	£199	Tascam 424MK2	£499	Yamaha MT50	£279
Fostex XRS	£319	Tascam 484	£599	Yamaha MTBX	£699
Fostex XRT	£419	Tascam 488MK3	£965		

### 2 TRACK NEW, USED & EX DEMO

Arbiter Laserdisk	£49	Marantz PMD502	£499	Sony DTC790	£499
Denon DCD315	£149	Marantz PMD510	£703	Sony DTC68	£649
Denon DCD625	£199	Panasonic SV3700	£1843	Sony DTC68	£849
Denon DCD715	£234	Sony SV4100	£2579	Sony MTR302	£479
Denon DM770R	£529	Philips DCC170	£249	Sony MTR3	£399
Denon RMK	£146	Philips DCC951	£169	Sony TCD110 PRO	£379
Fostex D10	£296	Revox B77	£2499	Sony TCD07	£450
Fostex D5	£999	Sony DTC100ES	£549	Sony MMD5C	£349
Marantz PMD320	£433	Sony DTC60 ES	£799	Tascam 102MKII	£249
Marantz PMD32	£511	Sony DTC690	£827	Tascam 112MK2	£599

### TASCAM DA20 DAT MACHINE

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

RRP £799  
**£639**

### DA30 MkII DAT RECORDER

Professional machines start here! Tascam's DA30 and it's current Mark II equivalent are probably the most commonly found machines in professional studios, and with good reason: they combine a range of pro features such as 44.1kHz recording, AES/EBU digital I/O, balanced analogue connections, and now a jog/shuttle wheel, with sturdy build quality and excellent reliability. Incredible new low price makes pro quality affordable!

RRP £1299  
**£975**

### 102MKII & 202MKII TAPE DECKS

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 is a double deck, which records on both decks. Limited stocks only at these prices, ideal for mastering and duplication.

RRP £249  
**£199**

RRP £349  
**£269**

### SONY DTC-ZE700 DAT RECORDER

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

RRP £729  
**£499**

### MDS-JE500 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-JE500, with digital input, jog dial and full function remote control as standard.

RRP £299  
**£299**

MDR30 PORTABLE VERSION ALSO AVAILABLE only £399

### SV3800 INDUSTRY STANDARD DAT RECORDER

The Panasonic SV3700 has been the industry standard mastering DAT recorder and is now superseded by the SV3800. Using 1 bit, 64x oversampling (equivalent to 20 bit), you can be sure of the highest possible sound quality. Records and plays back at all 3 sample rates via analog and digital inputs. Highly useable jog/shuttle wheel. AES/EBU and SPDIF digital connections. Error counting and many other software features. In stock now!

RRP £1291  
**£POA**

### FOSTEX D5 DAT RECORDER

Exclusive scoop purchase on a genuine professional machine brings quality within reach of the rest of us. Now that Sony's domestic machines are discontinued, this is one of the cheapest DATs around, but just look at the spec: detection indicators, balanced ins and outs on XLRs, AES/EBU professional digital connections as well as all the usual DAT features from the makers of the industry standard D208 timecode machine. Huge reduction.

RRP £1299  
**£769**

©2001 Turnkey. All rights reserved. We must be able to substantiate the price and the goods must be available and in stock. Prices include 17.5% VAT. UK mainland only. £99. £40. £



# PRICES GUARANTEED



## THE TAHITI IS DEAD - LONG LIVE THE PINNACLE!

**U.S. company Turtle Beach have long led the way in the Soundcard business, and their current range caters for the needs of everyone from the beginner to the serious PC music producer.**

The Turtle Beach Multisound series has long been considered the "Rolls Royce" of sound cards, from the very first Multisound in 1993, through to the highly respected Tahiti card, and now - the Multisound Pinnacle.

At £479.00 (including VAT), the Pinnacle may not seem like good value at first, but consider that a Tahiti with a synth daughter board would have been over £400, and that the Pinnacle offers SampleStore, the technology which lets you treat your own recorded samples as MIDI instruments - the advantage is clear.

Digital Orchestrator is fast becoming the sequencer of choice around the £100 mark, since it isn't a cut-down sequencer. A CD-ROM version is included free!

Windows Plug 'n' Play means that installation problems could be a thing of the past, and the optional S/PDIF board (£99) makes digital connection to your CD or DAT possible at an unheard-of price.

- 20 BIT DAC / ADC
- Enhanced or Std Duplex
- Sample Store (up to 48 Meg)
- Kurzweil Wavetable synth
- WaveBlaster™ connector (for DB50)
- Optional S/PDIF daughterboard



**PINNACLE**  
**£479**  
INC. FREE  
**DIGITAL ORCHESTRATOR PLUS**

**FIJI**  
**£369**  
A PINNACLE BUT WITHOUT SYNTH & SAMPLESTORE

**AVE**  
**£249**  
WHEN PURCHASED WITH A PINNACLE

**Logic**  
**£349**  
WHEN PURCHASED WITH A PINNACLE

**CUBASE**  
**£249**  
WHEN PURCHASED WITH A PINNACLE



**VS880**  
**DIGITAL WORKSTATION**

It's an 8 track recorder (each with an additional 8 virtual tracks) and a 14bit digital mixer complete with autocompression. Our heritage includes the VS801 for mixing using RSS and SE70 type drums, and an internal 840 meg IDE drive. New version 2 software (available as an upgrade) gives loads of new FX algorithms, mic simulation, and allows mix data to be recorded to the hard drive.

**RRP £2344**  
**£1649**

**DA38**  
**DIGITAL MTR**

The DA38 is the ultimate industry standard digital MTR in professional film and audio recording. The new DA-38 looks set to build on this with features that include 18bit x 64 oversampling A/D's, 20bit x 8 D/A's plus via T-61 24bit digital recording at 48 or 44.1 kHz. An internal electronic patchbay allows any input to be routed to any track and output. Plus up to 16 DA-38 units can be connected together and with the optional MMC-18 slave for sequencer and timecode control. Incredible price reduction only at Turnkey.

**RRP £2999**  
**£2199**

**MULTITRACKS NEW, USED & EX DEMO**

Akai DR16	£2999	Alesis A12	£1999	Akai DR8	£2299
Akai DR40	£3999	Alesis BRC	£1650	Akai IB1100	£199
Akai DR8	£2799	EMU DAWWIN	£2375	Akai IB1115	£159
Akai IB1190	£199	Fostex R8	£599	Akai IB112TV3.0	£49
Akai IB1115	£159	Fostex RD8	£999	Akai IB113MV2.0	£160
Akai IB112TV3.0	£169	JLC DATAMASTER	£699	Alesis ADAT	£1799
Akai IB113MV2.0	£169	JLC DATASYN	£349	Alesis ADATKIT	£199
Alesis ADAT	£1799	Sony PCM800	£369	Alesis A11	£399
Alesis ADATKIT	£199	Akai DR16	£2999	Alesis A2	£599
Alesis A11	£399	Akai DR40	£3999	Alesis BRC	£1299

**DD8**  
**HD MULTITRACK RECORDER**

Akai's new DD8. Records and/or plays back 8 tracks at a time directly onto hard drive, or crucially, 2.6 gig magnetoo optical carts. There is finally no lengthy backup at the end of a session, or reload at the beginning (of course you can still make a safety copy if you wish to). Sync multiple machines together, use it with the DL1500 remote for DD1500 style SuperView operation and editing, choose from a myriad of expansion options TDIF, ADAT, AES/EBU and analog I/O, digital EQ, Ethernet, SMPTE, MIDI, 9 PIN and Biphase synchronisation - the list is endless! Call Turnkey Pro on 0171 240 4036 for full details and a demo.

**PRICES FROM**  
**£3199**

**DR-16**  
**HD MULTITRACK RECORDER**

First there was the DR4, then the DR8, and now Akai bring you 16 tracks of non-nonsense hard disk recording in a single box! 8 inputs and 16 individual outputs are provided making it perfectly suited for full blown multitrack recording. Amongst the options available is a video output board to give a full colour display of all the tracks, which makes editing a breeze. Buy now from Turnkey and we will include a free 2 gig hard drive!

**NEW**  
**£3699**

CALL TURNKEY PROFESSIONAL ON 0171 240 4036 FOR DETAILS

**YAMAHA**  
**O3D**  
**Digital Console**

Like the O2R, the O3D 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. Call now for full details or a demo.

**NEW PRODUCT**  
**£2999**

**O2R**  
**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**  
**£POA**

**PROMIX 01**  
**Digital Mixer**

**STOP PRESS! NEW LOW PRICE ONLY AT TURNKEY**

**RRP £1999**  
**£1499**

CALL TURNKEY PROFESSIONAL ON 0171 240 4036 FOR DETAILS

**DIGITAL PROBLEM SOLVERS**

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) 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) is also available for greater AES/EBU reliability. The Audio Time Base (£499) 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-COM: optical to co-axial and vice versa £69
- PRD-COM: SPDIF to AES/EBU and vice versa with SCMS stripping £129
- D-4-2 COPY COM: switcher with 1 optical & 3 co-ax ins; 2 co-ax out and SCMS stripping £99
- SR44-1: converts almost any incoming sample rate to 44.1kHz (ideal for ProTools) and non-44.1 DATs £149
- SR44-2: sample rate conversion to 32, 44.1, 48kHz, with lock to internal word clock £249
- Super Clock Driver: converts DigiDesign SuperClock to word clock and into three 3.5" diaphragms £129
- Silent Audio Clock: converts Super Clock to word clock and into three synchronous SPDIF outputs £129
- ADAT Audio Clock: ADAT 9 Pin to word clock, Super Clock and SPDIF clock conversion £129
- ADAT Word Clock Synchroniser: ADAT 9 Pin to word clock and Super Clock conversion £199
- ADAT SPDIF Synchroniser: ADAT above bus with converters only to SPDIF £199
- ADAT MIDI Machine Control: MIDI to ADAT 9 Pin connector with MIDI thru (add to either of the above for \$18 remote ADAT control from your sequencer) £69
- Rack Kit: installs up to three 'black boxes' £49

**FROM**  
**£69**

**D80**  
**HD RECORDER**

The D80 is a 3U rackmount unit, with 8 individual inputs and outputs a removable front panel divided as a remote and masterbays, a removable 800 meg hard drive. Saves to MMC as well as being able to act as a master or slave to any other D80's. Has SPDIF digital ins and outs to allow back up to a standard DA3 machine and direct digital recording. Easy to use and offers excellent copy and remote patching across multiple tracks.

**2 FREE LOOMS**

**NEW**  
**£1299**

**NEW D80 only £1199 WITH ADAT I/O, SCSI & BALANCED OPTIONS**

**DMT-8 VL**  
**DIGITAL MULTITRACKER**

The personal digital multitracker is here at last, and at a price you will be amazed at. 8 impressive tracks of CD quality audio recorded to high speed 120min 120mm Record 2 (trial) or 120min 120mm Record 2 (trial) with 8 tracks. The 8 channel mixer accepts 2 ins, with a 2 band EQ and 2 aut send. Separate outputs and SPDIF optical outputs. Fully fully 4 tracks when you can have 8!

**RRP £1499**  
**£999**

INCLUDES FREE SMS5 mic. ONLY AT TURNKEY

\*We will send you a genuine quote from a UK or European dealer. We must be able to deliver in the area, and the goods must be available and in stock. Prices include 17.5% VAT. E & O. Unmatched. Delivery from 099.



# EUROPE'S LOWEST

## ZOOM A JOURNEY TO THE MOON!

Zoom is a Japanese company that was set up a few years ago by disgruntled staff from some of the major Japanese manufacturers. Their sole aim was to produce innovative new effects processors, that represent the best value for money on the market. Have they achieved that aim? We certainly think so!



**1202 TRUE STEREO FX PROCESSOR** The 1202 is a full 19" rack unit, featuring true stereo 16 bit processing at 44.1kHz. The quality of the reverb alone would make it worth the price, but there's lots more: two simultaneous effects are offered, including delay, chorus, flanging, tremolo and pitch shifting, as well as various reverb types including reverse. If one of the 512 presets doesn't suit exactly then using the two parameter knobs will allow you to tweak the program until it does, and the addition of 2 band EQ will further tailor the sound to your mix.

RRP **£149**

**INC FREE 10U DESKTOP RACK & 4x 3m JACK LEADS**

- 16 Bit 44.1kHz True Stereo FX Units
- Great Quality Reverb & Multi FX
- Vocoder Effect and Mic Input on 1204
- Over 500 Different Presets
- Free Rack Unit & Cables Only at Turnkey!



**1204 TRUE STEREO FX PROCESSOR** The 1204 builds on the success of the 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.

RRP **£199**

**INC FREE 10U DESKTOP RACK & 4x 3m JACK LEADS**

Nothing else touches these units at the price - check one out today!

**TL Audio EQ1 Parametric EQ**

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

RRP £921  
**£499**

CALL TURNKEY PROFESSIONAL ON 0171 240 4036 FOR DETAILS

**1066 dbx**

DBX build on the success of their highly acclaimed dynamics processing range with the flexible new 1066. In addition to all the professional features expected from this respected brand, the 1066 offers switching between their patented "Overeasy" soft-knee and hard-knee modes, sidechain switching, ultra-low distortion "Peak Stop Plus" limiting and meticulous US hand-built quality.

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

NEW BOXED  
**£479**

CALL TURNKEY PROFESSIONAL ON 0171 240 4036 FOR DETAILS

**MPX 1 Lexicon**

For those of us who need top quality reverb & multi FX but cannot stretch to the expense of the PCM80 & PCM90, Lexicon have released the MPX-1. Featuring the famous 'Lax' chip for reverb and separate DSP processor for multi FX, the MPX-1 brings you all that is good in signal processing for under £1200 inc VAT! 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. All new operating system includes on-line help & database for sorting presets. Achieving quality results is as stress free as possible.

RRP £1199  
**£POA**

CALL TURNKEY PROFESSIONAL ON 0171 240 4036 FOR DETAILS

**VTP-1 DIGITAL MIC PRE**

The all new 2 channel VTP1 sub mic amp / EQ looks set to take the market by storm. It combines four bands of semi parametric EQ with a high definition mic amp based around a proprietary valve design. Phase reverse, high pass filter, 20dB pad (fine adjust also available) and 48v phantom power are provided, together with high quality balanced analog outputs, and AES/EBU and SPDIF outputs at 44.1 or 48 kHz. Ideal front end for any digital system.

**VCS1 COMPRESSOR**

The VCS1 is brimming with innovation and quality, and brings you a stability priced dual channel valve dynamics processor with plenty of useful features. The compressor has the usual envelope, threshold and ratio controls, but is also switchable between hard and soft knee compression, and has an auto mode for ease of use. There are also separate gain and limiter sections, to give highly detailed signal control. Values gain is variable to give a range of boosted from subtle colouring through to controlled distortion. Call for more info.

NEW BOXED  
**£999**

NEW PRODUCT  
**£999**

CALL TURNKEY PROFESSIONAL ON 0171 240 4036 FOR DETAILS

**STUDIO QUAD 4 CH. STUDIO FX PROCESSOR**

At least - Multi effects as they should be! The new Digitech Studio Quad features not only three custom designed and ultra-powerful 3-DRC chips, but also 4 independent inputs and outputs, which using the built-in auto-mixer, can be configured as 4-mono in, building 4 effects processors, leading 4 stereo outputs. High known and new sensitive processing system with a variable 20 bit conversion rate greater than 90 dB signal to noise ratio. Effects include reverb, delay, detuning, chorus, flanging etc. Hundreds of other features too numerous to mention.

RRP £529  
**£POA**

**266 DUAL COMPRESSOR GATE**

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

RRP £229  
**£199**

**VORTEX MULTI EFFECTS PROCESSOR**

The Lexicon Vortex blends the effects result in flowing effects that can be morphed between in real time, and in the process, creating new and previously unheard of effects. (This actually changes the effect algorithm continuously - it's not a simple cross-fade between effects.) Ideal for dance music, and its real time nature makes it an excellent choice for live performers. Input synchronicity can control effect parameters, tap tempo to control delay times etc. Typical Lexicon quality can of course be taken for granted. First come first served!

RRP £429  
**£199**

**STEREO VITALIZER ENHANCER/EXCITER PROCESSOR**

The Vitalizer is the Rolls Royce of enhancer / exciter processors. Using a significantly different process to other such products, the effect deals with the full frequency range and is substantially non-linear. Also included is a "surround effect" which varies the width of the stereo field. Multiple built-in purchases allow for considerable price - check one out at a show - we guarantee you'll be impressed!

RRP £569  
**£329**

**MIDIVERB 4 PRO QUALITY FX UNIT**

The MidVerb 4's excellent Alexsis effects algorithms produce dense, natural Reverb, rich Chorus and Flange. Delay and Pitch effects that are designed for professional use. There are thirty-two effects algorithms, and 128 Preset and 128 User Programs to choose from. Large backlit LCD, online help, MIDI controller routing and programmable footswitch give you complete creative control. Over £50 worth of cables absolutely free - only at Turnkey!

RRP £329  
**£289**

INC £50 WORTH OF CABLES FREE

**PCP330 VOCODER**

Freeform Analog Technologies FreeBass is already one of the most successful sound modules of the year, and now following hot on its heels comes the 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 subliminal (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. Order now and own an instant classic!

NEW PRODUCT  
**£299**

**ALEX EFFECTS PROCESSOR**

If you're looking for a bright, warm, and subtle touch to your sound, Alexsis has the answer. Alexsis have a mission that's hard to beat! Through the strength of units to offer the famous Lex sound - The Reflex has the bulk, the benefit of cassette PLL, a really real time control of multiple effects, and a... (see featured solo @ Turnkey)

RRP £399  
**£249**

REFLEX ALSO AVAILABLE WITH MIDI CONTROL only £299

**COMPOSER WORKHORSE COMPRESSOR**

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

RRP £349  
**£225**



# PRICES GUARANTEED\*



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

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



## PREMIUM QUALITY VALVE OUTBOARD EQUIPMENT

reasonable prices though, and our factory direct exclusive cuts out a profit margin, and makes the range unbelievable value for money!

The **RP583 Studio Tube Compressor / Limiter** is bound to be one of the best sellers of the range, offering as it does two channels (stereo linkable) of some of the finest sounding

compression money can buy, with a smooth and natural compression characteristic. Ratio is continuously variable from 2:1 to infinity (not switched like some models), and there are separate controls for attack, release, threshold and make up gain. Dual VU metering is provided, as well as jack and balanced XLR ins and outs, and sidechain access is fully catered for. Ideal for a variety of instruments, vocals and complete mixes.

NEW PRODUCT  
**£499**  
FACTORY DIRECT

### RP533 Studio Tube Multi-Processor

Whilst mixers these days are of a better quality than they used to be, to get the best possible signal to tape or disk, you can't beat a dedicated unit - and for value for money, you can't beat the Bellari RP533 Studio Tube



Multi-Processor. The all tube 2u box, features a premium quality transformer balanced mic pre amp with switchable 30dB pad, phase reverse and true 48V phantom power. The compressor has all the features of the RP583, and the exciter section adds a wonderful sheen to virtually any sound, as well as beefing up the bottom end. Each stage has it's own bypass switch, sidechain access is provided, and the large VU meter can monitor input, output, or gain reduction. No serious recordist should be without one!

NEW PRODUCT  
**£499**  
FACTORY DIRECT

### Other processors in the Bellari range

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

### GX2 & MX2 GATE & MIC PRE

More incredible bargains from Turnkey! LA have recently had a slight revamp of their range, which means we can offer you the remnants of the old range at incredible discounts. The GX2 gate offers two independent frequency conscious noise gates. The channels can be stereo linked, connections are fully balanced and attack time can be as quick as five microseconds. Sidechain inputs and outputs allow external triggering for gate effects, and even use of the filters as EQ.



RRP £299  
**£99**  
GX2

The two channel MX2 mic pre amp, has been hailed as an excellent quality no-nonsense device, with transformer balanced inputs, and electronically balanced outputs. As well as gain, controls are provided for 48v phantom power, phase reverse, and a 20dB pad. Limited stocks only on both units, order now to avoid disappointment.

RRP £299  
**£129**  
MX2

### PME8 PARAMETRIC EQ

Unbelievable electronic doll on the new quality parametric EQ from Palway. Built to their usual high standards, the PME8 is a 2U rackmount featuring two channels of fully parametric (cut / boost, frequency and Q) 4 band EQ. Clearly laid out, and each channel with its own level. A second input is also provided with a 60kHz high pass filter for removing unwanted rumble etc. Very limited stocks only - first come, first served!



RRP £399  
**£149**

### 4 POLE FILTER

The 4 Pole is the legendary M.1 creative / Wave 24 dB low-pass filter. You are free to apply this filter to any audio signal that you wish into the filter. So if your favourite sampler or sample player lacks this special quality, you can give it a sonic boost via the 4 Pole Filter. It is the most powerful (and quite possibly the only) analog filter available today!



NEW BOXED  
**£269**

### X POLE FILTER

What do you get if you take two of Waldorf's 4 pole filters, put them in a rack and splice 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. Fasten up your waist today - your legs need never be the same again!



NEW PRODUCT  
**£439**

### XR300 SYNCHRONISER

Long the synchroniser of choice for professional studios, the XR300 is now being used by the industry standard unit at an unheard of price. Features include true SMPTE 12 bit standard digital, 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 £299  
**£159**

## GREEN RANGE



RRP  
**£819**  
DUAL MIC PRE

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

The **Focus 4** band parametric EQ with filters.

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

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

The **Compressor** - highly versatile compressor with hard & soft knee types, separate limiter and gate - and built-in sidechain filters.

All 4 are on permanent demo at Turnkey.

CALL TURNKEY PROFESSIONAL ON 0171 240 4036 FOR DETAILS

RRP  
**£939**  
FOCUS EQ

RRP  
**£989**  
VOICE-BOX

RRP  
**£1049**  
COM-PRESSOR

### 362 Sonic Maximizer

The 362 series delivers the sound-improving benefits of "Sonic Maximizer" technology with the convenience of ganged-stereo operation.

#### 362NR Sonic Maximizer + Noise Reduction

The 362NR combines a full-featured sonic maximizer with an independent, single-ended noise reduction system in a single rack-space unit.

#### 362SW Sonic Maximizer + Sub Woofer Control

The 362SW combines a full-featured sonic maximizer and an independent subwoofer control with a variable low-pass filter and output level control.

RRP £199

**£169**

RRP £269

**£199**

RRP £269

**£169**

## OUTBOARD

### NEW, USED & EX DEMO

Alesis 3630	£169	Drummer DL211	£558	Passive Antology Filter	£359
Alesis MEQ230	£225	Drummer DL441	£816	PHONIC PCL3200	£179
Alesis MICROVERB3	£165	Drummer DS2018	£405	Roland DP5	£99
Alesis MICROVERB4	£199	Drummer DS301	£816	Roland RSS10	£219
Alesis MIDIVERB4	£299	Drummer DS404	£816	Roland SDE330	£856
Alesis NanoVerb	£119	Drummer LA12	£287	Roland SD330	£789
Alesis QUADZ	£181	Drummer LR20	£298	Roland SRP320	£856
Aphex 720	£1818	Drummer H800	£310	Sansam E30	£218
APHEX-104	£239	Ensoniq DP4k	£1299	Sansam E82	£299
APHEX-105	£249	Ensoniq DP7	£799	Sony DPSV77	£1399
APHEX-106	£249	Eventide DSF4000	£4984	Sony NRP95	£499
APHEX-107	£249	Eventide H3000B	£3401	Sony NRP100	£499
APHEX-108	£259	Eventide H3000FS	£2999	SPEK EQ318	£699
APHEX-320A	£1818	Eventide H3000FSX	£1961	SPL CVFLR	£832
APHEX-720	£1818	Eventide H3000FX	£3781	SPL OMAQ12	£1175
APHEX Compressor	£489	Focusrite BLUE 230	£2932	SPL OPTIMIZER	£468
APHEX Express 651	£299	Focusrite BLUE215	£2932	SPL SVL4LR	£845
Audio Logic AL111 comp	£199	Focusrite BLUE245	£2879	SPL Stereo Stereo	£299
BEHRINGER BX200	£199	Focusrite BLUE330	£5676	SPL SXL	£2500
Behringer EX3100	£199	Focusrite RED0	£117	Summi DCC2000	£3113
Behringer EX3100	£199	Focusrite RED1	£2282	Summi EQP100	£2526
Behringer MDX2100	£199	Focusrite RED2	£2364	Summi EQP200	£2345
Behringer MDX2400	£249	Focusrite RED3	£2379	Summi TLA100A	£1610
Behringer MX800	£2199	Focusrite RED4	£2379	Summi TLA200	£2229
Behringer RX2400	£199	Focusrite RED5	£2386	Symmetria 402	£599
BOSS GX700	£399	Focusrite RED6	£1675	Symmetria 420	£386
BOSS MV70	£229	Focusrite RED7	£1757	Symmetria 421	£499
BOSS SX700	£359	Focusrite RED8	£1440	Symmetria 422	£599
BOSS VT1	£399	Frontline DGS 20	£80	Symmetria 425	£499
BSS CP402	£380	Furman LC1	£349	Symmetria 438	£599
BSS EPR001	£349	Furman PL8 PLUS	£169	Symmetria 451	£629
DBX 150X	£195	Furman PL8	£175	Symmetria 501/01	£379
DBX 160A	£204	Furman DM4	£399	Symmetria 528	£649
DBX 165A	£149	Joe Meek Voice Chan.	£589	Symmetria 564E	£995
DBX 165A	£149	Klark Teknik DN300	£399	Symmetria 571	£799
DBX 165A	£149	Klark Teknik DN301	£399	Symmetria 572	£699
DBX 274	£538	Klark Teknik DN320	£811	Symmetria 581	£939
DBX 290	£199	Klark Teknik DN330	£846	Symmetria 602	£939
DBX 298	£417	Klark Teknik DN332	£991	Symmetria 620	£1095
DBX 760X	£383	Klark Teknik DN360	£1479	Symmetria 621	£20
Denon DR1550	£190	LA 4C2	£399	Symmetria 622	£30
Denon DR1550	£209	LA 4C2	£399	Symmetria 6201	£259
Denon DR1550	£209	LA 4X4	£349	Symmetria 6202	£258
Denon DR1580	£199	LA C4	£699	Symmetria 6204	£258
Denon DR1760	£259	LA C42	£249	Symmetria 6208	£258
Digitalis Audio Matrix	£269	LA GX2	£249	TC 2290 22024	£2080
Digitech DHP31	£899	LA MX2	£249	TC 2290 SADF	£3498
Digitech DHP32	£899	LA V6	£249	TLA PA2	£149
Digitech DHP33	£899	Lescon 200L	£379	TLA PA1	£189
Digitech MP1Vocalist	£449	Lescon 400L	£1661	TLA E01	£182
Digitech RPM1	£549	Lescon 480L	£1056	TLA E02	£999
Digitech StudioVocalist	£999	Lescon ALEX	£229	TLA M1	£3819
Digitech TSR12	£249	Lescon DUALFX	£249	TLA M2	£899
Digitech TSR245	£799	Lescon JAMMAM	£359	TLA PA1	£1052
Digitech VOCALIST II	£549	Lescon LARP	£1472	TLA PA2	£405
DOO 231	£449	Lescon LXP18R	£379	TLA PA3	£189
DOO 830	£299	Lescon PCMB0	£1799	Vincent EPX10	£179
DOO 834	£249	Lescon PCMB9	£2585	Waldorf 4 Pole Filter	£299
DOO 835	£190	Lescon REFLEX	£339	Waldorf EQ27	£249
DOO 856	£249	Lescon VORTEX	£180	XIN 300	£139
Dreamer 181	£1180	Massey NE Pulse EQ	£499	Yamaha D5000	£1979
Dreamer 2P30	£409	Massey GLM200	£3318	Yamaha PRD310	£1058
Dreamer DL231	£558	Neve 3360DC	£2192	Yamaha O2031A	£589
Dreamer DL241	£440	PAR D-1 DI	£29	Yamaha REY100	£619

\*PPs will beat any genuine quote from a UK or European dealer. We must be able to substantiate the quote and @@@@ must be



# EUROPE'S LOWEST

## QUASIMIDI

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

### Rave-O-Lution 309 Dance Workstation



**NEW PRODUCT**  
**£649**  
NEW BOXED

## DANCE PRODUCTION REV-O-LUTION!

If you're into dance music, then Quasimidi has to be the first manufacturer to look to for your equipment - everything they make is dedicated to dance music production!

The Rave-O-Lution 309 is undoubtedly their best and most innovative product to date. Imagine the raw powerful sound quality of Roland's TR909 and TB303, give them 50 times as many sounds, add resonant filters to the drums, and you've still only got half the instrument that is the Quasimidi 309!

Knobs for all functions all send out MIDI controllers, built in real-time and step-time sequencer, 3 on board effects processors, optional rack ears, typical German build quality - far too many features to mention here! The ultimate dance production workstation - must be heard to be believed. Turnkey exclusive! Free demo CD available, please call to receive one.



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.

**NEW PRODUCT**  
**£769**



If you need to get your hands on some top quality dance sounds on a budget, look no further than Quasimidi's Technox. All sounds can be edited via the LCD display and two front panel dials, which are also used for sound selection - sounds are divided into groups to make it easy to find the one you want. 16 part multitimbral and always 24 note polyphonic with built in effects, it makes a perfect addition to an existing MIDI setup, but is comprehensive enough to use on its own, and the superb arpeggiator means you'll never get bored! Free demo CD available, please call to receive one.

**NEW PRODUCT**  
**£569**

### QUASAR SOUND MODULE



Quasimidi's first groundbreaking product, and still a stormer! The simultaneous use of multiple types of synthesis including Analog Emulation and FM, give this module a huge range of sounds from standard General MIDI tones through their famous dance sounds (including 909 etc) to incredible special effects. Huge LCD and dual digit LED displays in conjunction with a plethora of front panel knobs and buttons make use of the comprehensive editing facilities child's play. 2 MIDI inputs, 6 audio outputs, always 28 note polyphonic, and superb onboard effects and arpeggiators. Two sound expansions are also available to turn it into the ultimate dancefloor machine - Hardcore and Techno, both only £169. Sorry, no demo CD available of this one, but take our word for it, it sounds the business!

**NEW PRODUCT**  
**£869**

### THE RAVEN KEYBOARD DANCE WORKSTATION



Dance experts Quasimidi have done it again with this incredible new product. Stacked full of hundreds of the finest dance sounds, from fat analog synths through retro drums and special effects. On board sequencer with special loop motif mode makes it a cinch to create instant hits! Typically superb sound quality from this top German manufacturer. Also available, Raven Max expansion board giving over a thousand new sounds. Call in for a demo, we guarantee you'll be impressed. Free demo CD available, please call to receive one.

**NEW PRODUCT**  
**£999**

**EMU Orbit**

Emu have taken their wealth of experience in making modules such as the Proteus, Mirage Keys and Morphous, combined it with the vision from the incredible Emu2000 4, and with their usual innovation, come up with the Orbit - especially built for dance music. The Orbit is stacked full of classic drum sounds, pulsating basses, evolving pads, as well as a huge variety of hits and effects. The inclusion of the Eto 16 different types of 6 pole filters mean that this module has more powerful filtering than any other synth. Finally the BEATS MODE includes a wide selection of loops and grooves, which can have their pitch changed without tempo change and vice versa, and each their accents too! V2 software now gives improved beats inside and other enhancements, upgrade available for only £49.

**RRP £869**  
**£799**

**EMU Planet Phatt Synth Module**

The success of Emu's Orbit is already legendary, bringing incredible features like 6 pole morphing filters from the top of the range E4 synthesizer, and a range of fat and scolding drums sounds to the mass market. Planet Phatt now does the same with some of the funk and hip hop and swing sounds and grooves available. Improved beats mode means whole songs can be strung together instantly, and fantastic 'crash' effects in conjunction with the Launch Pad.

**RRP £869**  
**£799**

**HAMMOND XM1 & XMc1 Organ Modules**

Assuming assuming all over a organ module with remote drawbar controller. Based on the guts of the £8000 XB3, there is nothing as realistic as this on the market. Built in bassline arpeggiator and overdrive, up to 3 registrations simultaneously, variable reverb, swellings, percussion and two many more features to list here. Exclusively supplied by Turnkey.

**RRP £1089**  
**£999**

**KURZWEIL Micro Piano Piano Module**

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

**RRP £599**  
**£369**

**Obertone Matrix 1000 Synth Module**

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

**RRP £599**  
**£399**

**ROLAND MSE1 & MVE1 Sound Modules**

Spectacular and of the classic dial on them superb Roland specialty sound modules - buy a standalone module for less than the price of a J1080 expansion card! Both are 8 part multitimbral, 28 note polyphonic, and have dual 20 bit FX processors. The MVE1 has all the classic analog sounds from Juniors to ARP's Moogs, and the MSE1 has the famous string pads and classic solo sounds you're likely to hear anywhere, and RSS. Stocks will not last long - get your order in now!

**RRP £469**  
**RRP £469**  
**£199** **£239**  
**MSE1** **MVE1**

**ROLAND MC-303 Groovebox**

The enduring popularity of the TB303, MC200 and TR909 has just refused to go away, but increasing rarity has meant that second-hand prices have been driven up to ridiculous levels. Roland, the creators of these machines, now bring you the MC303 Groovebox which combines all their classic drum machine sounds, a step time / real time sequencer, 303 'acid' bass sounds complete with front panel filter controls and a whole host of other useable sounds (it's 16 part multi-timbral!). This box is an all in one dance music solution, and believe us, it sounds the business! Initial supplies will be very limited, order now to avoid disappointment!

**NEW**  
**£POA**  
**NEW PRODUCT**  
**£629**  
INC MK149 MIDI KEYBOARD

**SOUND MODULES NEW, USED & EX DEMO**

Yamaha RY8	£159	Emu Proteus	£345	Obertone Matrix 1000	£499
Access MATRIX Prog	£280	Emu Proteus 2	£359	Obertone H1000	£249
Access MATRIX Prog	£280	Emu Proteus FX	£380	Obertone OB1002	£1799
Alai SGO1P	£299	Emu UltraProteus	£1139	Peavey Spectrum Org	£359
Alai SGO1V	£299	Emu Vintage Keys	£799	Peavey Spectrum Syn	£359
Alesis DM5	£299	Emu Vintage Keys	£799	Peavey SpectrumBASS	£299
Alesis SR16	£189	Kawai Omega LX	£129	Roland D110	£189
Boss DR60	£249	Korg OS4V	£299	Roland MC200	£299
Boss DR60	£249	Korg X300	£449	Roland MOC1	£299
Control Deepbass	£299	Korg X300	£449	Roland MG564	£549
Dream GMX 1	£59	Kurzweil K2000R	£1899	Roland MK570	£499
Emu CLASSIC KEYS	£549	Kurzweil KMP1	£299	Roland MOC1	£499
Emu MORPHEUS	£799	Marion PRO SYRTH	£399	Roland MS1	£399
Emu Orbit	£599	Novation BassStation	£349	Roland MS1	£199
		Novation DrumStation	£399	Roland MVS1	£229

We will best try... from a UK or overseas dealer. We must be able to fulfil the quote and the goods must be available and in stock. Prices include 17.5% VAT. E & O E. UK mainland delivery. from £6.99



# PRICES GUARANTEED



## MIDI TIMEPIECE AV

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



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

RRP  
**£645**  
turnkey  
Tel 0171 240 4036

## MIDI EXPRESS XT

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



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

RRP  
**£399**  
NEW BOXED

## MPC 2000

SAMPLING DRUM MACHINE

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



NEW PRODUCT  
**£1199**  
INC FREE 8MB RAM

## BASS STATION

BUDGET MONO SYNTH

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



RRP £349  
**£219** KEYS  
RRP £389  
**£359** RACK

## PULSE

MONO SYNTH

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



RRP  
**£499**

## DR-660

Dr. RHYTHM DRUM MACHINE

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



RRP £469  
**£299**

## DRUM STATION

DRUM MODULE

Someone had to build this eventually! Despite being discontinued for at least 10 years, Roland's TR-808 and TR-909 drum machines have remained indispensable popular classics ever since. Now, Novation bring you those classic sounds with the original editing parameters, and in the convenience of a 1U rack, with MIDI, and 8 outputs. If you want the classic sounds without the hassle, check out the drumstation now, great value for money!



RRP £449  
**£419**

## PULSE PLUS

MONO SYNTH

The Pulse Plus has all the features of the Pulse but with audio input, CV and gate control. You can even play your guitar through it! The fattest sounding monosynth around - just get better - check one out today!



NEW  
**£699**

## SR-16

DRUM MACHINE

The SR-16™ Stereo Drum Machine is an excellent tool for songwriting and performance. It features a great selection of 233 sounds, offered both in dry form and with reverb. Akai's exclusive Dynamic Articulation™ feature enables a drum sound to change its tonal content as it's played, harder for truly realistic performances. The SR-16 features 200 preset patterns that were actually played in by top studio drummers - not just programmed and quantised. Of course, the SR-16 also provides complete MIDI implementation, a footswitch input, flexible programming and editing features and velocity-sensitive pad buttons.



RRP £269  
**£199**

## DM5

DRUM MODULE

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 2 trigger inputs, 4 audio outputs and a backlit LCD display. The drum sound for life you're waiting right here! Another Turnkey magnum!



RRP £429  
**£269**

## PROGRAMMER

FOR MATRIX 1000 OR MICROWAVE

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



EXCLUSIVE  
**£329**

# YOUR INTERFACE WITH THE OUTSIDE WORLD!

## 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 FB303's powerful synthesis. The ultimate analog bass machine - this incredible price means these will fly out of the door! Another Turnkey exclusive.

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

NEW PRODUCT  
**£199**  
FACTORY DIRECT

## JV2080 Synth Module

The Roland JV1080 has been become the industry standard sound source for home studios and professionals alike. It's superb sound quality, 64 note polyphony and expandability were a winning combination. Now the new JV2080 builds on that success by offering a giant editing screen, three independent effects processors as well as reverb / delay and chorus, and room for 8 of Roland's renowned expansion boards - the potential is virtually limitless! Judging by the success of the JV1080, these will be in strong demand - call us now! Turnkey price includes free 'Experience' sound expansion board.



JV1080 STILL AVAILABLE only £899

NEW PRODUCT  
**£1399**  
INC FREE EXPERIENCE BOARD

## Microwave II Wavetable Synthesiser

The Microwave II combines all the famous features of the original Microwave together with today's requirements for user interface, signal to noise ratio and sonic purity. It's simplicity of use is obvious with the use of just 5 rotary dials and a 2x40 character back lit LCD. On the back the Microwave II has 2 fully modulatable stereo outputs (configurable as 4 monos with panning). Tone generation comes from a powerful DSP generating wavetables, the 10 voices each feature two oscillators, 2 wave generators, a mixer, two filters in series, a stereo amplifier, four envelopes, 2 LFOs, a modulation matrix with 16 slots and several 'modifiers', more than enough to keep even the most demanding programmer satisfied!



NEW PRODUCT  
**£999**



# EUROPE'S LOWEST

## XP50 Workstation Keyboard



RRP £1499

**EPOA NEW BOXED**

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

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## XP80 Workstation Keyboard



RRP £1799

**EPOA NEW BOXED**

## CASIO CTK-650 GENERAL MIDI KEYBOARD



RRP £299

**£149**

SAVE OVER 50% ON PRICE

A 61 key, touch sensitive, General MIDI keyboard at an unbelievable price. This is an ideal instrument for professionals and beginners alike as it is extremely easy to use, but don't think that means it's not powerful. The sound quality is excellent and the auto-accompaniments, which can be transmitted via MIDI, are superb. Add to all this 10 digital effects, four sound/control pads, layered or split keyboard modes, recording and four registration memories and you've got the best value for money keyboard on the market. And we've got it at an unbelievable price. Another Turnkey exclusive! Runs from batteries or optional PSU.

## Wave Synthesiser



Red

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

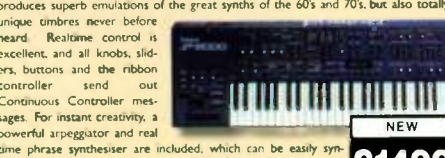
We now offer a new custom range of Wave synthesisers with 76-note keyboards in four colour options - standard blue, red (as shown), Sahara and black Totally unique sound.

- The World's Most Powerful and Unkne Synthesiser
- Unrivalled Programmability and Realtime Control
- Variety of Options for Colour, Keyboard Size and Polyphony

PRICES FROM **£6299**

CALL TURNKEY PROFESSIONAL ON 0171 240 4036 FOR DETAILS

## JP8000 ANALOG MODELLING SYNTH




NEW

**£1499**

So far, modelling technology has been used to recreate acoustic timbres, but Roland are the first to specifically model true analog synthesis with their new Analog Modelling technology, and believe us, the results are spectacular! Analog Modelling not only produces superb emulations of the great synths of the 60's and 70's, but also totally unique timbres never before heard. Realtime control is excellent, and all knobs, sliders, buttons and the ribbon controller send out Continuous Controller messages. For instant creativity, a powerful arpeggiator and real time phrase synthesiser are included, which can be easily synchronised to an external MIDI clock. This is very likely to be the hottest synth of '97 - order now!

## YAMAHA AN1x VIRTUAL ANALOGUE SYNTH



NEW PRODUCT

**£999**

The analogue emulation market is hotting with this exciting new release from Yamaha. Building on the incredible success of the CS1X, the AN1X is built on the same design principles, but uses technology from the groundbreaking VL range to produce stunning virtual analogue sounds. With a 5 octave aftertouch sensitive keyboard, 10 note polyphony, 8 knobs and a ribbon controller, and built in effects, the AN1X is sure to be an instant hit. Demand will far outstrip supply - get your order in early!

### KEYBOARDS NEW, USED & EX DEMO

Alesis OS6	£549	Houston Bass Str R	£399	Roland XP50	£1249
Ensoniq SC1PLUS32	£399	Roland A33	£299	Roland XP80	£1448
Fatar CMS61	£159	Roland AX1	£249	Yamaha CBX K3	£139
Hammond X82	£1390	Roland D70	£299	Yamaha CBXK1	£129
Hammond X83	£8630	Roland EP 5	£239	Yamaha KX5	£199
Kawai K11	£399	Roland EP3	£149	YAMAHA PF150	£1199
Korg Poly800	£149	Roland JP8000	£1199	Yamaha PRS	£799
Korg PROPHECY	£799	JWXP Exp Bdr	£199	Yamaha OS300	£935
horg X3	£1299	Roland PC200GS	£145	Yamaha SY35	£299
Korg X5D	£549	Roland RD500	£1299	Yamaha V17	£599
Kurzweil PC88	£1899	Roland XP10	£429	Yamaha W7	£899

## ROLAND DJ-70 MKII Sampling Workstation



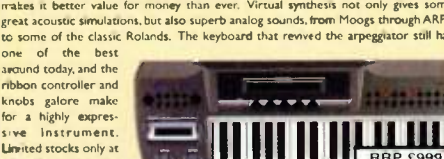
UNDER HALF PRICE

RRP £1699

**£799**

With the introduction of the DJ-70MKII, Roland have finally made sampling DJ friendly. A complete sampling workstation, the DJ-70MKII features top quality sampling as in their professional studio models, powerful processing, including excellent resonant filters for great analog style sounds, 8 track sequencer, 3 octave music keyboard, play pads for drums and loops, and a scratch dial. The basic memory of 2 meg is expandable up to 32 meg and up to 24 samples can be played simultaneously. Any DJ-70MKII bought from Turnkey comes with free access to our extensive Roland sound libraries. Call in for a demo today!

## KORG PROPHECY VIRTUAL MONOSYNTH



RRP £999

**£769**

The Prophecy is already a legend in its own lifetime, and this incredible new low price makes it better value for money than ever. Virtual synthesis not only gives some great acoustic simulations, but also superb analog sounds, from Moogs through ARP's to some of the classic Rolands. The keyboard that revived the arpeggiator still has one of the best around today, and the ribbon controller and knobs galore make for a highly expressive instrument. Limited stocks only at this price - buy now or forever hold your peace!

## AKG C3000 LARGE DIAPHRAGM MIC



INC FREE BOOM STAND

RRP £399

**£269**

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 sounding great on a variety of other instruments.

## RODE NT2 LARGE DIAPHRAGM MIC



NEW BOXED

**£499**

It's not often that a new name comes to light in the microphone market, but Rode have certainly made a name for themselves with the NT2. The gold plated large diaphragm capsule gives a superb full frequency response, great for all round use and particularly good on vocals. Cardioid and omni patterns are available, as well as a 10dB pad. Price includes flight case, windshield and shockmount!

## ROLAND PC200-II MIDI CONTROLLER KEYBOARD



RRP £199

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Compact touch sensitive master keyboard offering full control over pitch bend and mod, data slider assignable to reverb, pan or any controller, sustain pedal input, transpose over 2 octave range, send patch & bank change messages. Check out our unique package prices with these modules:

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RRP £2345

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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!

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Shure's SM58 has been the industry standard microphone for so many years as we can remember, and even today it's still a great buy. Robust enough to withstand countless heavy metal gigs, versatile enough for a wide range of studio uses, the yardstick by which all other mics are judged, now at an unrepeatable price.

## ROLAND AX-1 STRAP-ON STAGE KEYBOARD




RRP £399

**£249**

Pureurs, look no further! For remote MIDI keyboard controllers, there's nothing better than Roland's AX1, and now with this amazing deal, there's nothing cheaper either.

The 4 octave keyboard features 61 velocity sensitive keys, pitchbend ribbon and expression bar. An array of program change buttons means quick and easy patch changes, and the bright red panel glows in the dark! Very limited stocks - order now to avoid a lifetime of female rejection!

## YAMAHA CS1x SYNTHESISER



NEW

**£595**

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

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AKG C3000	£250	AKG WMS100PTP	£338	Neumann KM184	£529
AKG C401B	£76.36	AKG WMS50	£299	Neumann TLM170	£2029
AKG C401PP	£111	AKG WMS50	£398	Neumann TLM170R	£2029
AKG C402B	£59	AKG WMS58	£487	Neumann TLM183	£1687
AKG C402PP	£116	AKG WMS58	£433	Neumann U87	£2028
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AKG C407PP	£117	Audio Tech AT4011	£79	REALIST P2M	£49
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AKG C408PP	£158	Audio Tech ProHBEB	£112	Sennheiser M31	£149
AKG C409B	£135	AUDIX D1	£29	Sennheiser MK4B	£188
AKG C409PP	£158	AUDIX CD7H	£19	Sennheiser MD421	£287
AKG C410B	£175	AUDIX OM2	£99	Sennheiser MD441	£160
AKG C410PP	£233	AUDIX SCX 1	£129	Sennheiser MD504	£192
AKG C414BULS	£699	AUDIX SY 2	£89	Sennheiser ME64	£135
AKG C747	£445	AUDIX UD350	£39	Sennheiser ME66	£69
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AKG D130	£133	Beyer M88TG	£351	Shure BETA58	£195
AKG D370C	£123	Beyer M740	£1173	Shure BG1.0	£39
AKG D70S	£57	Beyer MC834	£821	Shure SM57	£99
AKG SE300B	£175	Beyer S150H	£410	Shure SM58	£99
AKG WMS100PTD	£880	DB tech HPF receiver	£169	Sony ECM909A	£69
AKG WMS100HTD	£880	Groove MD1	£599	Sony ECM999	£299

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\*In line layout means 40, 56 and 72 inputs respectively for the 16, 24 and 32 channel desks. 4 band EQ with 2 mid sweeps, 8 aux sends, 8 true subgroups, direct outs on every channel, LED metering, fader reverse - the list is endless!

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Samson's Servo 150 is specifically designed for use with nearfield monitors, and does an excellent and cost-effective job, making it close as possible to the "air we breathe" ideal for an amplifier. It offers a power rating of 70 Watts per channel (RMS), making it an ideal partner for most of today's virtual studio monitors. The essential 20 design features fit neatly into your rack system, independent left and right volume controls are given, and drive the built-in signal and clip indicators. Together with protection circuitry to help prevent blowing your speakers. All this price makes our list long - another Turnkey exclusive!

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**POWERSTATION PA MIXER BY SPIRIT**

Another winner from Soundcraft, their first entry into the powered mixer market is sure to be a success. Based around the well-known Folio 12, and also featuring a 2x300w amplifier, dual 7-band graphic and a built-in Leucos Ales' Check out these amazing package deals.

**RRP £1295**  
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Ameron Powerbase 1 ..... £249	EY S200X ..... £999	Fender SPL165 ..... £289
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# Elation KM201

## Capacitor Microphone

*In recent years, Russia has become known as a source of quality inexpensive microphones. PAUL WHITE investigates the latest crème de la Kremlin.*

There may be a biblical quotation concerning the forging of swords into ploughshares, but when it came to disbanding the Soviet Union, somebody obviously figured out that forging their weapons into studio microphones would make the metal go further. This latest Russian microphone discovery is the work of Elation's founder and chief designer, Dr Alexander Shreibmann — a suitably impressive name for a mic guru — who spent many years working at the Moscow Research Institute. I had occasion to visit one such Moscow R&D establishment some 15 or more years ago, to service a piece of measuring equipment, and was amazed to find that they had to raid another room for a light bulb so I could see what I was doing. When I asked for solder, a few precious blobs of reclaimed solder were produced from a tobacco tin! Considering the total scarcity of almost everything in the old USSR, it's a tribute to the ingenuity of Russian engineers

that they continue to make so many serious contributions to the sciences.

Supplied in a velvet-lined oak box with spaces for two further capsules, the KM201 is a fairly small microphone (120 x 23.5mm), with a choice of four different heads: cardioid, supercardioid, hypercardioid or omni. The terms supercardioid and hypercardioid are usually considered interchangeable, but here the supercardioid has a tighter polar pattern than the hypercardioid. Unfortunately, the hypercardioid capsule wasn't available at the time of this review.

Changing a capsule is simply a matter of unscrewing the end of the mic and screwing on another capsule — electrical contact is made via the screw threads and a single sprung contact point in the centre of the body which mates with a pin on the capsule. Some Asian countries have a belief that nothing man-made should ever be perfect, because perfection belongs only to the gods. The Russians have obviously taken this on board, because both examples of this otherwise very neatly built microphone that I tried had quite noticeable (and strangely identical) dents in their cardioid capsule grilles. Both the supercardioid and omni capsules, supplied a few days later, were fine, so perhaps this was a minor pre-production flaw.

The microphone body section terminates in a conventional XLR balanced output connector, and the basic package includes one

### pros & cons

#### ELATION KM201 £282

##### pros

- Smooth, open sound.
- Very versatile.
- Interchangeable capsules.
- Comes with wooden box and stand clip.

##### cons

- Available by direct order only — you can't try it out in the shops.

##### summary

Though good-value capacitor mics are by no means unique, this one offers a good combination of price and performance.

**SOUND ON SOUND**

capsule and a stand adaptor clip. Additional capsules are all £76.38 inc VAT. Unfortunately, no frequency response plot was provided with the mic, only paper specifications, so I'll reel out the most important ones of these before moving on to how I thought the mic sounded.

From its physical size, this is obviously a

“There are many good capacitor mics that have an open, natural quality, but given its price and performance, the KM201 offers good value...”

small-diaphragm model, and the cardioid capsule has a quoted frequency response of 20Hz-20kHz. No limits were given, so I assume that these are the -3dB points. The sensitivity is a reasonable, but not exceptional, 15mV/Pa at 1kHz, and the self-noise is a very acceptable 16dB (A-weighted). Phantom power at 48V is required. Maximum SPL is quoted at 140dB, and the literature provided suggests that the microphone would be as happy in front of a drum kit as a string quartet. No spec sheets accompanied the additional supercardioid and omni capsules, but the subjective performance seemed comparable.





## IN USE

Prior to these mics being available in the UK, they were supplied to a number of TV, film and sound studios throughout Russia, which implies that the KM201 is a competent all-rounder rather than being a mic designed for any specific application. Unfortunately, the microphone is only available direct from the importers, Mytex UK, so you may not be able to try before you buy. Given its size and specifications, I would suggest that its uses would include drum overheads, stereo recording of acoustic ensembles, choral ensembles (when used in pairs), and solo acoustic guitars. It would also be worthwhile trying them on acoustic piano, though I didn't have one handy during the review period.

Used with vocals, the cardioid version delivers a pleasantly full sound which combines mid-range strength and projection with high-end detail. It isn't as assertive as some mics with deliberate presence peaks, but it still manages to sound both natural and confident. Background noise is reassuringly low, and the overall sensitivity is roughly comparable with other studio capacitor mics,

including its unrelated Russian counterpart, the Oktava MK219. The hypercardioid capsule sounds very similar to the cardioid, but the omni has the distinctive, open, all-involving

“Used with vocals, the cardioid version delivers a pleasantly full sound...”

sound that characterises non-directional capsules. (Every time I check out an omni mic, I tell myself that I should use them more often.) The high-end response of the omni mic falls off slightly, but noticeably, when it's used at angles greater than 90° off-axis, but this shouldn't be a problem in the majority of

real-life situations.

Tests with acoustic guitar also inspire confidence, and the overall sound of the instrument is captured fairly accurately by this mic, with plenty of articulation and depth. Transient detail is resolved with accuracy, yet without the undue emphasis that can sometimes result in harshness, and the overall impression is one of smooth competence. To keep things in perspective, there are a great many good capacitor microphones that have an open, natural quality about them but, given its price and standard of performance, I feel that the Elation KM201 offers good value and is well worth considering.

SOS

£ With box, clip and cardioid capsule, £282 inc VAT.

Capsules £76.38 inc VAT.

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# Xpression! DPM1

## Monitor System

**JANET HARNIMAN-COOK**  
*checks out the new kid on the monitoring block and discovers a history of serious loudspeaker design.*

**T**he Xpression! DPM1 two-way passive monitor is the first studio monitor from Harbeth, a long-established British company associated with loudspeaker manufacturing for broadcast and audiophile hi-fi. Designed by MD Alan Shaw, the Xpression! DPM1, and the optional MS1 sub-bass enclosure, are aimed primarily at the private studio and post-pro market, though a Pro version is available, featuring auto-sensing electronic speaker protection with LED peak power monitoring. Active versions are available to order, and the regular DPM1 may easily be converted for bi-amping.

The quoted frequency response of the DPM1 used alone is 48Hz-20kHz ( $\pm 3\text{dB}$ ), with a sensitivity of 87dB 1W/1M and a nominal impedance of 8 $\Omega$ . The optional MS1 sub-bass enclosure extends the system response down to 40Hz, and passive filtering inside the sub-cabinet removes LF being fed to the DPM1s below around 140Hz. For this review, I used a Mass 500 which delivers 175W into 8 $\Omega$ , though the recommended amplifier power is from 20-200W with a complete system rating of 175W programme material.

### LOOKS

Weighing around 10kg and measuring 420 x 225 x 285mm, the DPM1 cabinet is made

from 15mm MDF with a textured grey finish. The 200mm woofer is made in-house and features an alarmingly mauve injection-moulded polymer cone and a high-compliance, long-throw rubber surround; it's driven by a 25mm aluminium voice coil. Handling the HF is a Morel ferro-cooled 28mm soft-dome tweeter, also driven by an aluminium voice coil; to minimise standing

*“As a stand-alone nearfield system, the DPM1s are outstanding performers.”*

waves, the internal cabinet surfaces are covered with 16mm absorbent fibre blanket. The 15-element critically damped crossover operates at 2.6kHz, and both the DPM1 and the MS1 are fed via Neutrik Speakon connectors.

Similar in size and weight to the DPM1, the Xpression! MS1 sub-woofer is connected between the amplifier and the DPM1. It is built from 20mm MDF with a matching grey finish. Unusually, rather than the single central sub approach employed by some designers, each DPM1 has its own MS1 sub-woofer, the idea being to minimise standing waves in the listening room. The MS1 driver uses the same transducer as the DPM1 and its cross-over comprises both electronic and band-pass acoustic chamber elements. There is no direct radiating element to the sub-woofer — all the energy leaves the box via the circular port.

The DPM1s should be sited away from

room corners, not too close to side or rear walls. I set them up around 1.3m apart, with the tweeters at ear level; after experimenting with the subs' positioning, I ended up placing them asymmetrically alongside the DPM1s.

### PERFORMANCE

My first test track was Richard Thompson's 'Sam Jones' from his album *You? Me? Us?*, and I was immediately impressed by the superb clarity and definition revealed by the system. The acoustic guitar came over with crisp and rich harmonic detail, while the vocals seemed natural and open. A deep string bass on this track held an even tone across the recorded range.

Listening to a recording of the Beethoven *String Trio in G Op 9/1*, I was encouraged to hear the character of the instruments portrayed so accurately, with the string tone displaying a

### pros & cons

**XPRESSION! DPM1 £379  
& MS1 £349**

#### pros

- Accurate, neutral sound with good imaging.
- Attractive price.
- Magnetically screened.

#### cons

- Dual sub-woofers may be awkward to site in small studios.

#### summary

Given its price, the Xpression! DPM1/MS1 is a versatile studio-monitoring system characterised by particularly good mid-range detail. As a stand-alone nearfield system, the DPM1s are outstanding performers, especially given their very modest cost. The subs provide significant bass extension for those mixing dance music or other material requiring the reproduction of very low frequencies.

**SOUND ON SOUND**

### SECOND OPINION

With Harbeth being a new name in the private studio monitoring market, I was keen to hear how the DPM1s compared with other monitors I've tried. Initial impressions were good — the speakers seemed to be the result of serious engineering design rather than fashion, and they're just about the right physical size to use as main monitors in a private studio setup.

After connecting the system up to a Studiomaster 600B power amplifier, I wheeled out the usual suspects from my test CD collection. The first tests were done with the sub-woofer connected, and this delivers plenty of

bass extension though, to be quite honest, the mid-range is difficult to evaluate properly when there's a lot of bass energy flying around. For dance-music mixing, the sub-bass units would be fine, but for regular work, I actually preferred the sound of the DPM1s on their own. They still deliver a realistic level of low bass, and the detail within the mix becomes much easier to hear.

Tonally, the speakers are creditably neutral and are especially natural on vocals and spoken-word recordings. The high end is nicely detailed without being splashy and the bass end is pretty even and quite solid. If anything, the low-end transient definition is a little way behind the very best monitors I've heard, but in this price range it would

be churlish to nit-pick. For close monitoring, both the level and bass extension are perfectly adequate and the stereo imaging is good.

On balance, I'd say these monitors are among the best I've heard in the mid-price range, and I've witnessed far less impressive results from speakers costing well over twice the price. They make a good stab at telling it how it is, they aren't at all fatiguing to listen to, and they're sufficiently revealing of recording flaws to be relied on in serious monitoring applications. Best of all, they have no significant vices. I'd feel happy using these and I'd have no hesitation in recommending them, though I feel the sub-bass unit is unnecessary for most private studio installations. *Paul White*



# & MS1



smooth yet refreshing natural brightness. The spoken word was also well balanced and free of coloration. Overall, the speakers worked well on all kinds of material, from pop and dance to large-scale orchestral and choral recordings. The mid-range definition in particular is outstanding for a speaker in this price range, and the low-end response is impressive. The clean mid-range translates into excellent stereo imaging, and even when you move off-axis, the frequency response remains reasonably consistent.

## SUMMARY

Whereas hi-fi speakers are often designed to flatter the programme material, the requirements of audio production call for an uncoloured reference that doesn't induce fatigue during periods of extended listening. The Xpression! DPM1/MS1 monitor system fulfils these needs impeccably — poor recordings exhibit their flaws, but well-engineered material shines.

Harbeth Acoustics have made an impressive debut in the small-studio market, with a sensibly priced and visually distinctive monitor capable of being used in serious monitoring situations. The creditable full-range fidelity combines with particularly good mid-range presence and stereo imaging to produce a compact reference monitor system that's effortless to listen to and inspiring to work with (and has been a joy to review).

Used without the MS1 sub-bass units, the DPM1s are still very capable performers, and have a wealth of detail and presence that, in my opinion, places them well up the league within their price range. If you haven't heard these speakers yet, you should!

SOS

**E** Xpression! DPM1 monitors £379 a pair; MS1 sub-bass units £345 a pair; Pro version £439 a pair. Prices inc VAT.

**A** Harbeth Acoustics, Unit 1, Bridge Road, Haywards Heath, West Sussex RH16 1UA.

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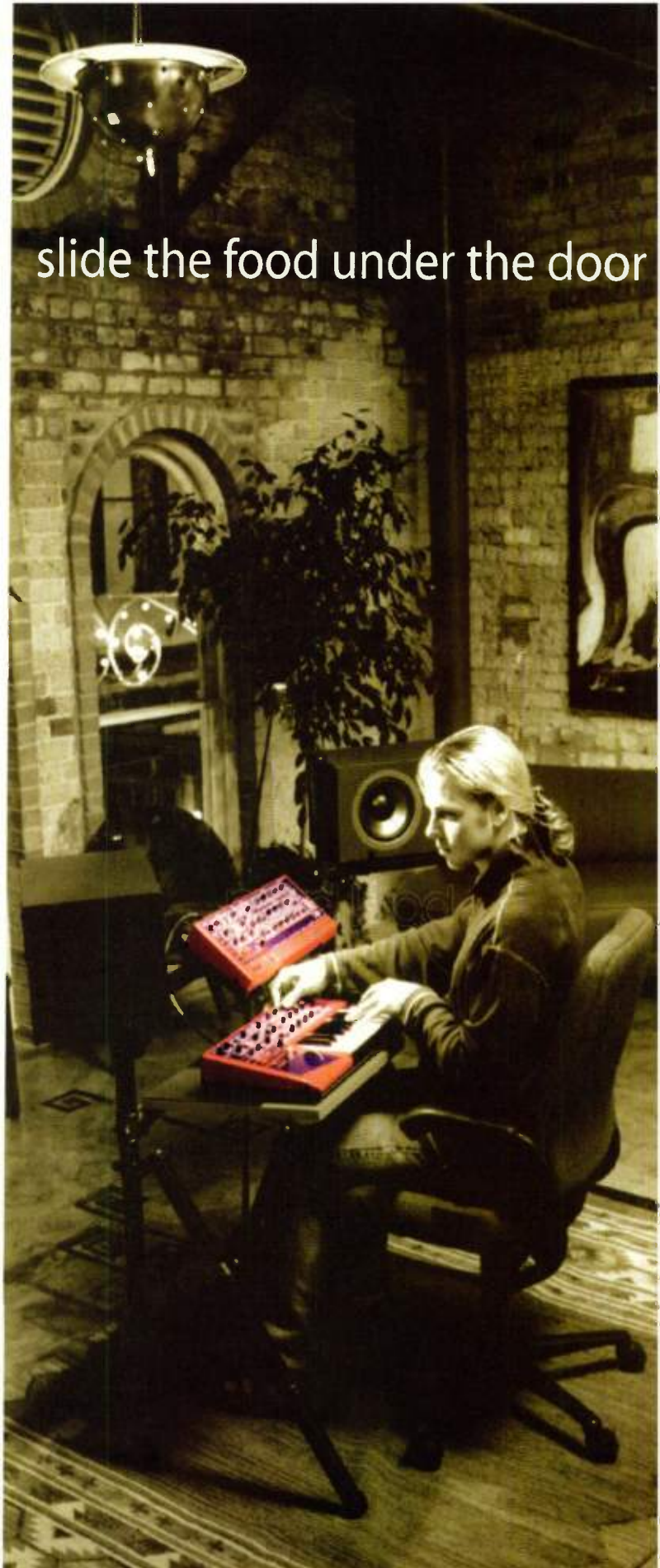
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# Waves Audio

## TDM Plug-in

**PAUL WHITE** checks over Waves' multi-process plug-in for Digidesign TDM systems, Macromedia Deck II and Adobe Premiere.

Software audio processing plug-ins are immensely useful but, unless you have a powerful Digidesign TDM system, you're very restricted as to how many you can run at any one time. To help overcome this limitation, *AudioTrack* combines the functionality of two plug-ins in one, but it only counts as a single plug-in, which helps a lot when you're in a tight spot.

To use *AudioTrack* within a Digidesign system, you'll need a dongle in the form of a Wavekey, and a single Wavekey can be updated by entering new codes to validate it for use with any Waves plug-ins you have purchased. Adobe *Premiere* users, apparently, have a disk-only install system.

Essentially, *AudioTrack* combines simplified sections derived from existing Waves plug-ins — namely the *Q10* parametric equaliser, the *C1* compressor and the gate section of the *C1* compressor. To make all this work at once, the equaliser section has been reduced to just four bands rather than the 10 offered by the *Q10*, and there's no independent control over the left- and right-channel EQ, but in most circumstances a 4-band parametric is about as much as most people can make sense of

anyway. The compressor has basic threshold, ratio attack and release settings; the gate provides control over threshold, floor (attenuation when closed), attack and release. An overall input level fader enables the user to compensate for any gain increases caused by EQ boost, and the output fader allows the output signal level to be optimised.

I tested an original version 1.1 of *AudioTrack* with *Sound Designer II* but, sadly, Waves have seen fit to discontinue the *SDII* version and concentrate on the TDM market, which I think is a bit of an oversight. *SDII* is still very much a mainstream product in the UK for album editing, and Pro Tools is not yet a satisfactory substitute for CD compiling. The version of *AudioTrack* tested here is 2.2.

In Pro Tools under TDM, settings can be adjusted in real time, which is rather more satisfactory than the Preview mode of earlier *Sound Designer* plug-ins; as in all TDM applications, you can process external audio without first having to store it to disk as an audio file. Procedures may differ if the host program is not Pro Tools TDM — I've yet to meet Adobe's *Premiere* on a social basis!

### FEATURES

Installation is straightforward, though the actual installation process is slightly different depending on what platform *AudioTrack* is to be run. Like all Waves plug-ins, it has a user interface that's both intuitive and consistent, with each function occupying its own distinct area of the screen. The usual TDM buttons run along the top and include a bypass function. The plug-in is available as either a mono or a stereo module, and TDM users have the ability to deploy several *AudioTrack* modules depending on their DSP capability.

### pros & cons

#### WAVES AUDIOTRACK £229

##### pros

- Three processes at once.
- Same quality sound as the major Waves plug-ins.

##### cons

- No individual EQ, Compressor and Gate bypass buttons.

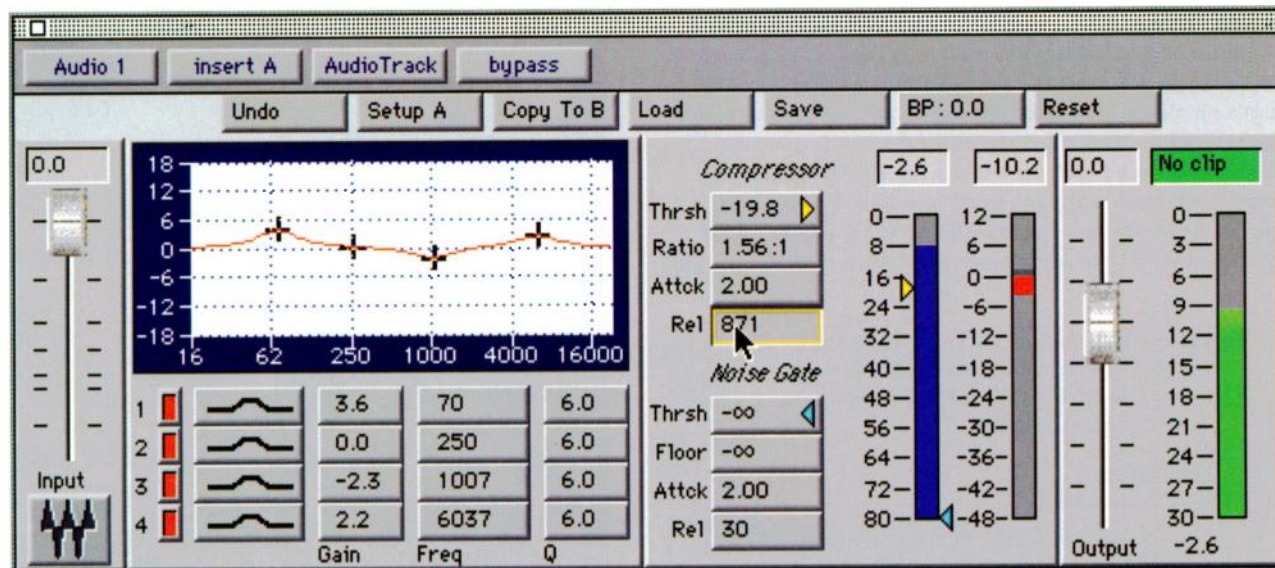
##### summary

A useful three-in-one processing package that makes full use of available processing power.

**SOUND ON SOUND**

The EQ has a graphic display, below which are the frequency, bandwidth and gain parameters relating to the four bands. Data can be changed by using the mouse to scroll values; you can type new numbers directly into the relevant boxes, or simply drag the EQ points shown on the graph and listen to the changes as you do so. Bypass switches are available for each of the four bands and the maximum cut/boost range is a generous 18dB — but there's no overall EQ bypass other than the main plug-in bypass, which is a little frustrating. In addition to their parametric modes, the individual filters may be switched to low-shelf, high-shelf, low-pass and high-pass modes.

The compressor operates with a soft-knee characteristic, and can function either as a compressor or as an expander (with a maximum expansion ratio of 0.5:1). Two meters show the signal level and the amount of gain reduction taking place, while small arrows on the leftmost meter show the compressor and





# Track

gate thresholds relative to the incoming signal. You can move these by dragging as an alternative to changing parameter values directly. Gain-reduction and peak-hold indicators are located above the two compressor meters and the main output fader. A level meter accompanies the main output level fader as well as a clip monitor, but the rather nice gain-reduction graph available in the *CI* plug-in has had to go for space reasons.

## IN USE

I've used many Waves plug-ins at one time or another and they tend to be pretty straightforward. They also work consistently well. *AudioTrack* is a very useful general-purpose package of tools, because it enables you to apply a little EQ and a degree of compression at the same time. The gate may also be useful to ensure complete silence at the starts and ends of individual sections or between sung phrases, and, of course, the overall signal level can be changed at the same time.

The 4-band EQ has all the finesse of the *Q10*, but with fewer bands, though it's rare that I've ever needed more than three or four bands of EQ at once anyway. I've always been surprised at how positive and well-behaved the Waves equaliser algorithm is — for audio sweetening, this may be as much processing as you need. However, the compressor is also controllable enough to allow you to add a little density to a complete mix without spoiling the sound. On the other hand, if you want to take an individual vocal or instrumental sound and then use heavy compression as an effect, there's plenty of range to do that too. The gate behaves in much the same way as its analogue counterpart, with no obvious vices.

## IMPRESSION

I like this plug-in, not because it does anything the other Waves plug-ins can't do, but because it can effectively take on three jobs at the same time. The sound quality hasn't been compromised and, though the facility count has

been reduced compared with that of the individual plug-ins, there's still plenty of functionality for all routine jobs.

For my own editing jobs, I find the *Q10* equaliser and the *LI* limiter among the most useful tools, and I can't help but wonder whether Waves could produce a similar hybrid combining those two functions, presumably omitting their IDR dithering system to make it all fit into a single plug-in. If Waves are reading and think this would be a good idea — please provide a *SDII* version as well! The combination of compressor and EQ is still a useful one, though, and to my mind *AudioTrack* is a very sensible and flexible way of deploying limited plug-in power. This is a very practical plug-in with lots of applications, but why the *SDII* version was discontinued remains a complete mystery to me.

SOS

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# ART Dual Levelar

Dual-channel Vactrol compressor

**RICHARD WAGHORN** takes ART's new electro-optical compressor into the studio and is genuinely surprised at the results.

**O**f all dynamic control devices, compressors tend to invoke the most emotion amongst users, due to their ability to impart certain tonal characteristics as well as controlling dynamic range. In today's studio the compressor is as much a creative device as

easy-to-use, straightforward, dual-channel compressor using an optical-type gain-control element, plus valve circuitry, with the aim of delivering a classic retro sound.

One cannot deny the popularity of early optical-type compressors: the UREI LA2 springs to mind — and, of course, there are also the newer Joe Meek designs. ART have used a similar electro-optical design philosophy to recreate the sound of those classic tube limiters, by using a Vactrol-based levelling amplifier, plus valves in each channel, instead of the more common VCAs and transistors.

The Dual Levelar comes in a 1U, all-steel rackmount package with an internal power

supply. In stereo linked mode, both channels are operated from the left-hand controls, except for the output gain.

Each channel features a four-LED gain reduction meter to provide a visual indication of how much compression is taking place. The first LED flashes when the input level reaches the set threshold. The remaining three illuminate at -3dB, -6dB and -12dB respectively.

## IN USE

I found the Dual Levelar very easy to set up; after all, there's not much to play with! When the power is switched on, all the LEDs light up and stay on until the valves have warmed up;



a corrective one. There's a wide range of units to choose from, with various models using both solid-state and valve technology to process individual tracks of vocals and instruments, or apply dynamic stereo control to an entire mix. Some manufacturers add other dynamic control tools, such as expander gates, limiters and side-chain filters, to extend the flexibility of their products, but with the Dual Levelar ART have taken a more simplistic approach. This is a very

supply, switched from the front panel. All signal input and output connections are made on the rear panel using either balanced quarter-inch jack sockets (TRS configuration, tip hot) or XLRs (pin 2 hot). The inputs are designed for line levels ranging from -30dBm to +15dBm and will happily accept unbalanced quarter-inch jacks. Although, obviously, you cannot use both inputs simultaneously, both outputs can be used at the same time to split the output, should this be desirable.

## CONTROLS

Each channel has just two control knobs and three buttons. Threshold sets the point at which the gain control circuit starts to operate — turning the threshold down increases the amount of compression; turning it fully clockwise allows the signal to pass unrestricted. Next come three switches, the first of which is a bypass, followed by what ART call a Limit/Comp button, which switches between mild and heavy compression ratios. Finally, the Auto/Fast switch controls release characteristics. The remaining control knob provides make-up gain to bring the compressed signal back up to line level. The Dual Levelar is also fitted with a stereo link switch which forces both channels to track together when the compressor is being used on stereo material. In

“I enjoyed using the unit so much that I might just have to buy one — I was that impressed!”

the unit is ready for use once the LEDs have switched themselves off. ART recommend that two to three minutes should be allowed before a consistent result can be obtained.

The compression ratio can be switched between (Comp) 2.3:1 and (Limit) 6:1. This means, for instance, that in the Comp position, with every 2.3dB input signal rise over the threshold, the output will be reduced by 1dB. The manual doesn't make it clear whether this is a soft- or hard-knee compressor, but to my ears it has the smoothness of a soft-knee model.

The release time can be set to Fast (200ms) or Auto, the latter allowing the Dual Levelar to

## pros & cons

### ART DUAL LEVELAR £299

#### pros

- Effective compression.
- Simple to use.
- Good value.

#### cons

- No side-chain insert.
- Output adjusted separately on each channel in stereo-link mode.

#### summary

A no-nonsense budget compressor with a pedigree sound at a mongrel price.

**SOUND ON SOUND**



adjust itself depending on the dynamics of the signal being processed (program dependent). As a rule of thumb I would start by trying the Fast setting on signals such as drums or vocals and the Auto setting on whole mixes, although interesting effects can be achieved by experimenting with the options. In fact this compressor was surprisingly effective with every type of input I tried, giving drums a particularly solid, fat sound without noticeably affecting attack or dynamic power. When I used the

“I've always liked the sound of optical-type compressors — there's something about this kind of circuit design that makes the compression sound more musical.”

Dual Levelar on a lead vocal it gave the sound presence and definition without any glitches or noticeable spikes on 's' and 't' sounds. Without changing the overall character of the sound, it enabled the vocal to sit more evenly in the mix. I wouldn't normally expect this kind of smoothness and warmth from a compressor in this price bracket. When pressed into action with a whole mix it also performed well, with no unacceptable pumping or squashing of the music. It was also fairly well disposed towards transient material, though heavy compression eventually results in some suppression of detail.

Overall, the sonic quality of this unit is transparent, yet undeniably flattering. I found the sound of the compressed signal very pleasing, particularly the integrity at the top end; what I *didn't* like was the fact that in stereo-linked mode the output was still separately adjusted on each channel. Some might also miss the inclusion of a side-chain insert point to allow the use of an external equaliser for de-essing and frequency-conscious operations.

## CONCLUSION

The Dual Levelar is definitely not an all-singing, all-dancing dynamics processor, but what it does do it does extremely effectively, with a claimed dynamic range greater than 105dBm. It's simple to set up and the ratios are well chosen for most applications, as are the release times. In fact, I enjoyed using the unit so much that I might just have to buy one — I was that impressed!

I've always liked the sound of the UREI LA2 and optical-type compressors — there's something about this kind of circuit design that makes the compression sound more musical. I'm not claiming that the ART Dual Levelar competes with the likes of Tube-Tech or Summit, but for £299 this is a good-quality, very nice-sounding, no-nonsense compressor. If you're in the market for a new dynamics processor, record some drums and vocals onto a DAT or cassette tape and try out the Dual Levelar at your local dealer.

SOS

**E** £299 including VAT.  
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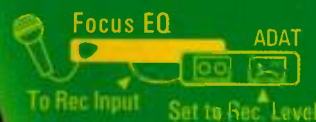
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# Record

## RELEASING YOUR OWN ALBUM

**BIG GEORGE WEBLEY** looks at how you can add to the worldwide success of the British music industry.

Releasing your own record without the emotionally crippling intervention of a chemically confused and condescending record company A&R executive has never been easier. Simply turn to the classified ads in this magazine, look under the 'Duplication' section, ring one of the companies up, and within a week you can have as many copies of your record as you can afford. After you've sold one to your auntie, one to your best mate and less than a dozen at gigs, you can store the rest under your bed where they will be safe from the dangers of heat, light and public awareness.

Are you prepared to approach releasing your own record with some thought and understanding of what you're getting into? What format best suits your music: CD, 12-inch vinyl, 7-inch vinyl, cassette, interactive CD-ROM, 8-track stereo cartridge? How do you propose to get the potentially massive global market to buy it? Are you going to sell it through a distribution company to major record retail outlets, or will you be taking it personally to independent record shops specialising in your type of music? Maybe you feel that placing mail order adverts in magazines and fanzines and plastering it across the Internet would be your best option? But if you thought that setting up a stall at local gigs and forcing family and friends to buy it was all you needed to do, think again.

What about promotion? Is it worth paying a record-plugger hundreds, if not thousands, of pounds to send every copy you get pressed to radio and club DJs? There's an old saying in the record business, which is sadly very true: "If you want to get your record into the shops just send it to radio DJs; it will be on sale in a secondhand record shop by the afternoon".

Now ask yourself: in a world full of consumer choice, will your record really be worth the bother? Obviously the answer is yes, but being objective about your own music is a tough job — that's why record companies never allow new acts that privilege. Unfortunately, most record companies, both small and major, employ frustrated wannabe artists to guide the careers of new bands. These people do occasionally get it right, but mostly

they will end up destroying the very heart and soul of a band. And of the bands that do have a hit, most never get another and within a year will find themselves without a deal. Whereas if a band have a measure of success with their own independently released record before signing with a major label, the interference from some (but not all) departments is reduced considerably, and the deal is usually far more secure.

The reason records are released (apart from spreading art across the planet in a type of global music love thang) is to make money: as much of it as possible. In the case of record company releases, not only are all aspects covered by them, but they often also own the source of where the money comes from.

### INCOME

A basic breakdown shows that the two main sources of income generated by a record are: money from the sale of the record and money for the use of what is on the record. Of course there'll be plenty of money coming in from radio plays, videos, *Top Of The Pops* appearances, and suchlike; but from a record the two places you look to for money are the distributor and an organisation called the Mechanical Copyright Protection Society (MCPS). The distributor takes an amount of your records, gets them into shops across the country, and pays you approximately 70% of the price they fetch from the dealer, after they're sold. If the record starts selling in healthy numbers they will ask for more product. They might even suggest that they take over the production of new stock to save you the bother. If they do want to take over the reins, that's a very good sign, but do make sure you know what you're getting into and with whom. Most distributors are established, honest and still in business — the dishonest ones go out of business. But, as in many industries, when bad businesses go bust they often start up again under another name using the money they owe. Don't let that be your money.

The MCPS are more than established, they are The Establishment. They are the people who deal with what is actually on a record: the music and lyrics, and who wrote them. They do not base their figures on records sold, but on records manufactured, and regularly audit all pressing plants to find out what they've pressed, who for and how many. This may seem like Big Brother watching over your art, but it's ultimately for your protection. In China alone, it's estimated that over 200 million CDs are pressed every year that are not accounted for — in other words, pirated. That means £2 billion that isn't going to record companies, artists,



# Success

songwriters and producers. Although this isn't a problem that affects you — yet — it is nonetheless a major problem for the record industry. Sadly, it seems that the money that the industry at large loses through this doesn't affect the wages and personal expense accounts of the non-productive executives, but it does stop them developing new artists and investing in young talent.

It's a similar situation to what happens when the Rolling Stones' latest album under-achieves the projected sales expectation. The record company still have to pay royalties on vast amounts of unsold stock, while the lifestyles of Messrs Jagger and Richard continue on in enviable decadence. Strangely, when these situations arise, companies don't sign as many new acts and a few of those who already have a deal get dropped. Funny, that...

When a record becomes available for sale in the shops, the MCPS will charge the record company a percentage of the dealer price for every copy of the record pressed, as opposed to every record sold. The rate can vary (between 4.75% and 12.5%) depending on which scheme the release comes under.

## ROYALTIES

On records that contain only original compositions, the artist or company representing the artist can apply for a 'notification of no claims'. Which means that, rather than the MCPS charging to collect money which they in turn will pay back, the artist keeps it and saves paying commission. It doesn't cost anything to be a member of the MCPS — they make their money from charging a small percentage. So if you release your own records containing all original material, you can bypass their system altogether, but you will still, in theory, need a licence to release your record.

If you have a record out featuring 19 band compositions and one cover of, let's say for argument's sake, Middle Of The Road's classic Number One hit 'Chirpy Chirpy Cheep Cheep', you will definitely owe money. The figure paid is 8.5% of the dealer price for a record, not the price the general public pay. So for 20 tracks the percentage cost would spread equally across all the tracks. A quick bit of maths shows that 8.5%

divided by 20 equals 0.425%. Therefore if the dealer price was £7 you would give the MCPS just under 3p per record, which they in turn would pass on to the company that publishes the writer of the song (not the band or the singer). If the record went silver (60,000 units) the fee paid to



*This label, for Area 51 Records, highlights what a little thought and expenditure with a graphic artist can do to brighten up the middle of a 12-inch.*

the MCPS would be £1,785; the remaining 19 songs would generate £33,915.

This means (in the interest of science) that if one person writes all the songs on a million-selling album with a dealer price of £8.49, their royalty for song writing alone would be £721,650. Or, to put it in Poptastic terms, not including royalties on actual sales, or radio play, or videos, on songwriting royalties alone, Michael Jackson's *Thriller* generated over £35 million.



## RELEASING YOUR OWN ALBUM

### COVER ARTWORK

Apart from your music, which speaks for itself, there's the not-so-small matter of the record sleeve. Most towns have 'imaging bureaux' (they used to be called typesetters) which provide a design service costing between £50 and £80 per hour. Bands can take their ideas and photographs in, go through the process, and have finished artwork ready for the manufacturers in a single visit. But be warned: a lot of time can be wasted looking at the amazing graphic trickery computers can do these days; you can end up with an over-complicated piece of cover art that's taken three expensive hours to produce and is definitely not what you'd intended when you walked into the shop.

Another approach is to use a freelance graphic artist. They cost less (they have smaller overheads), are more flexible, and give valid creative input. On the downside, it can take them up to a working week to get the artwork ready for the manufacturers. A rough estimate of their costing: photo scan £25; origination of logo £50; typesetting £20; designer £70 (two hours at £35 per hour); colour proof £30; total £195.

If you're paying for a designer's time, it's important not to waste it. Before you go to them, have examples of graphics and the sort of lettering you want on your sleeve. Look at magazines, flyers, other record covers, even washing-powder boxes for ideas. If you already have a logo, take a few different versions along; if you don't have a logo, be sure you have a clear idea of how you want your name written on the sleeve. Short-run CD deals often offer a complete artwork service included in the price. Just remember that, especially in the field of graphic art, you only get what you pay for.

Once the art is completed and you're happy, it has to go to the printer. There are many different formats in which artwork can be presented to a manufacturer, but don't worry about it: the graphic artist will liaise with them, not you — although after everything is pressed and printed you may wish to purchase the source of your artwork, if only to license it to a major record company to use when they pay a fortune for the rights to release your record worldwide.

### BARCODING

If you want your product to be available in all leading record retail outlets, it must have a barcode. For this you have to become a member of the Article Number Association (ANA). The yearly subscription is £70.50 for a new company (like all the prices in this article, this includes VAT), but be warned that this annual fee can go up to as much as £300 per year, though to pay this you must have an annual turnover of £250 million.

As a member, you're allotted a series of numbers, one of which will be exclusively for your record. To actually get the unattractive bold black lines of the barcode printed on your record sleeve, you'll need to contact a specialist company — there are hundreds around the country. You tell them the number and in return they send you, or your graphic artist, the barcode artwork on disk ready for inclusion on your record sleeve. This service costs around £15.

Barcodes are not just used to scan the price of the record into the cash register; they also relay sales information into the chart-return system. This supposedly fail-safe procedure is open to all sorts of skulduggery, but the ability to hype a record into the charts costs so much money that only massive record companies can afford to do it (not that they ever allow themselves to be caught).

### CD MASTERING

You would think that the most straightforward and idiot-proof thing to do in the entire process is to get a CD cut from your DAT. Be warned, the following story is true... Flushed with pride and confidence after having their first album licensed by an American prog-rock label, British band Solstice decided to allow them to administer the manufacture of their second album onto CD. The master DAT was sent to the Americans, who in turn sent it to Canada, where CD manufacture is

"The reason records are released is to make money, as much of it as possible."



Solstice are, left to right — back row: Robin Philips, bass; Steve McDaniel, keyboards; Clive Bunker, drums; Andy Glass, guitar and vocals. Front row: Emma Brown, vocals; Jenny Newman, fiddle and vocals.

cheaper. Part of the deal the band had with the label was they were given stock which they could sell through mail order across Europe and Asia, thanks to the comprehensive fanzine network geared towards serious rock fans.

The albums arrived in the country and a trip to Heathrow airport customs was hastily arranged to pick up 500 copies of the finished product, with "£250 import duty to pay, sir". (It's worth mentioning that whatever a customs officer wants is what is going to happen; that's a lesson in life best remembered.)

On getting back home the band ripped open







## RELEASING YOUR OWN ALBUM

- ▶ one of the perfectly shrink-wrapped CDs (with typeset information beautifully embossed along the spine of the wrapping for the American market), slammed it into the CD player, and cranked it up. Aaargh!! It was playing slow, and so was every other disc they tried.

After a lot of drinking and shouting obscenities down the transatlantic phone lines it transpired that the CD-processing lab in cost-effective Canada hadn't noticed that the DAT was mastered at 48kHz. But so what? Most non-professional (or to put it another way, affordable) DAT machines only record analogue at 48kHz. But all CDs are processed at 44.1kHz. So due to sloppy workmanship at the plant, the information



Popular beat trio the Hamsters.

calibrated was wrong and the music was transferred onto the CD around 9% slower than it should have been.

If you didn't understand the above technical mumbo-jumbo, it doesn't matter; the fact was that every track on every single shrink-wrapped CD was playing slow because a basic operation had been overlooked. This highlights the importance of being aware of every aspect of the process. If you're unaware of anything to do with the technical side of record manufacture, get professional help. It's amazing how expert you can become by simply watching someone who knows what they're doing avoid problems.

So, what happened next? The cheap-processing idiots only took a month and a half to get the CDs re-manufactured at the correct speed. This time the records were Federal Expressed direct from Canada to the band's door, with no duty to pay (but there was no chance of getting a refund from HM Customs on the batch collected from the airport). On arrival, instead of nicely shrink-wrapped finished product the package contained just the discs, without cases. So all that remained was for the band to un-shrinkwrap every single one of the beautifully

packaged CDs, remove the disc, and replace it with a correct but identical disc. Solstice have recently released their third CD, *Circles*, without any help from the American contingent and without a barcode.

### ANOTHER WAY

One of the most successful and hard-working bands around is the Hamsters. Formed in the late '80s, they play an average of 240 gigs a year and logged up their 2,000th gig last November. To date they've released five CDs (one of which is a double) and two live videos. Apart from selling their product via gigs and mail order, they are distributed throughout Great Britain by Pinnacle and by a Dutch-based company, Provogue, in the rest of Europe. The whole operation is managed entirely by the band themselves.

Snail Pace Slim, the band's spokesman, guitarist and singer, explains when and why they started putting out records. "The Hamsters had been together for a couple of years, doing shows across Europe and back home, before we put anything out on record. Apart from our own songs, we found that the Jimi Hendrix songs we played on stage always went down a storm with audiences. So on the 25th anniversary of his death we planned a Hendrix tribute tour, and decided to record an album of his songs to sell at gigs. Both the tour and the album were a great success. That was some time ago and, looking back on it, things could have been done a lot better — which they are now. We do a mailshot to 17,000 of our fans and give away almost as many press releases at gigs. When we're on the road we keep a record of what songs we played the last time we were in a town and change the set round for the next time we play there. We've had our own web site since September 1996, which has had 2000 enquiries from across the world so far.

"We usually start by pressing up between three and five thousand CDs, depending on what the distributor wants. We became members of the ANA in 1993 in order to get the record stocked in all major record retailers. The downside of having a barcode on your record is it means there's an ugly corner on the back of the sleeve.

"If you put out your own records, you make a lot more money per album than if it goes out through a record company. Record companies take ages to account for royalties and then you've got to hope that they're telling you the truth about how many copies they've sold and how much it cost for them to put it together. When you put your own record out, you know exactly how many it has sold and how much it has cost you to put it out."

### VINYL

On the other side of the musical fence, I spoke to Steve Melville and top techno DJ Clarke about their operation Dance Paradox Limited. They put their first tune out in 1991 and are now fast approaching their 50th 12-inch vinyl release. "The first mistake we made was that rather than get the

### HAMSTER MANIA

If you want to be placed on the Hamster mailing list and receive quarterly newsletters with information about records, merchandise and forthcoming gigs write to:

- A** The Hamsters, PO Box 835, Westcliff-On-Sea, Essex SSO 0SQ.
- E** hamsters@charkim.demon.co.uk
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## RELEASING YOUR OWN ALBUM

### WHO'S WHO

Information on publishing companies is listed in various directories, and these are available in libraries and on sale in the Mail Order section of this magazine. Or you can contact Steve Melville at Dance Paradox Limited, on 01908 370078, who is actively building a roster of writers this year.

Solstice product is available at £11 including p&p from The Glasshouse, 7 Augustus Road, Stony Stratford, Milton Keynes MK11 1HJ.

### BAR NONE

The ANA run regular seminars (£117.50 to members, £141 to non-members, which includes VAT, lunch and refreshments) where the complexities of the barcoding system are explained in full. Barcoding has been around for over 20 years and looks like being the stock control medium for the foreseeable future. They have a comprehensive information pack available.

**A** Article Number Association UK Limited, 11 Kingsway, London WC2 6AR.

**T** 0171 836 3398.

**F** 0171 240 8149.

**E** [info@ana.org.uk](mailto:info@ana.org.uk)

**W** <http://www.ana.org.uk>

▶ labels stuck on at the factory we decided to save money and do it ourselves. Which was not a good idea. What you don't realise when you stick labels on yourself is you need to wet the label and stick it on exactly in the middle, on both sides. It took us four days and saved us about £10."

Apart from their secretary Carole, it's a two-man operation: Clarkee takes care of the creative side of things and deals with the other artists on the label, while Steve deals with all the logistics. "We have four labels: Dance Paradox Records, which puts out the more commercial happy hardcore tunes; Area 51 Recordings, which deals with hard techno; S4 Records, for the more experimental techno; and 37 Gods, which is for the acid trance type of thing. We know pretty much what we're doing now and who we need to deal with."

I asked them how a band or producer goes about getting a 12-inch single cut and played in the clubs. "Once you're happy with the track and you've got the money to put it out, you get it 'cut'. What happens is you take the DAT, or whatever audio medium you've mastered onto, to the cutting room. They will listen through to all the tracks from start to finish, getting levels, adjusting EQs and making notes before actually cutting it onto a 'lacquer'. For a 12-inch, the lacquer will be a 14-inch completely smooth disc. The music is then fed through a lathe, which literally digs the grooves into the lacquer. The cost has just gone up to about £300. At the same time as getting the lacquer cut, you can get a Dub Plate cut — this is a one-off record which will be good for between 20 and 40 plays. The reason you get the cut is to check what's

**"If you want to get your record into the shops just send it to radio DJs; it will be on sale in a secondhand record shop by the afternoon."**

actually going onto the disc: EQs, levels and order of the tracks. If it's not the same when it comes back on the test pressing, you have to get the process done again, but that's down to the plant. You can also write a spiral scratch message on the run-out of the vinyl, if you want."

The lacquer goes to be processed at the manufacturing plant, where a metal copy of the lacquer is made in (you hope) dust-free conditions, from which the actual records will be pressed. After the lacquer has been processed you can get the whole batch of your records pressed up, if you want to. You're better off getting a few test pressings made. "Test pressings take a week or so to come back; you listen to make sure there's no

### WHAT TO DO

If you are about to embark on putting out a record of your own, here's a handy check-list, in order:

- Write, record and mix tracks.
- Master onto DAT or similar industry-standard medium.
- Design artwork, including credits (if any).
- Apply for an MCPS licence.
- Register songs with PRS (if member).
- Send a copy of the recording to yourself in a registered envelope and keep it unopened and safe.
- Book any advertising.
- Cut lacquer (if vinyl) and await test pressings.
- Send artwork and cut to the manufacturers.
- Mail out white labels to DJs (if vinyl).
- Receive finished product.
- Mail it out to radio stations and press.
- Finished product is sent to distributors.
- Record is released.

Good luck!

glitches or other nasty things that can occur between the cut and the pressing plant. Technically, you should only have a couple of test pressings done: one for the label, one for the artist and maybe one for the distributor. There's no difference between the test pressing and a white label; they're identical to look at, blank discs with white inner labels. In practice, both test pressings and white labels are used as promotional stock and are not declared to the MCPS. Before a track is actually released, white labels are mailed out to all the major live event DJs who will, you hope, play it, and it will end up on a multi-cassette mix tape.

"Different plants have different methods, but the average price for setting the machine up is £30 and then 50p per copy for the vinyl. So 20 test pressings will cost around £40, and these will be sent or given to all the relevant DJs working around the country."

What about getting them into shops for people to buy? "The distributor will order from us the amount of units that they think they'll sell. Then we have to second-guess that order to decide what they really will sell. It's a certainty that if the distributor orders 1,000 copies of

your track they will probably only sell around 700 units. A distributor must have stock on hand to make their money because if they receive an order and they don't have stock then that's a lost sale, whereas if they order 1000 and only sell 700, they only pay for 700 and you get 300 back. So distributors will always order more than they need. When we first started we made the mistake of pressing up more units than the distributor asked for, thinking we'd have a couple of hundred copies for when they sold out to tide them over while more were being pressed up. Nowadays we always give less than they ask for and if they want more, we'll make more.

"As for barcoding underground dance records,



there's no point. Barcodes are only for chart-return shops so they can scan records into the system. There are a couple of distributors dealing with small labels who are members of the ANA, and they will get stickers made of the numbered sequence which they dedicate to your product. But generally record outlets that insist on barcoded products don't want to sell hardcore dance vinyl. We don't sell through the major high-street record shops; our type of records sells through independents and mail order.

"Self-distribution isn't really financially viable, as you have to go to all the shops, who'll take, let's say, four units on a sale or return basis. Then you'll have to chase up every shop to get your money. If they've only sold two copies you've got to get the other two back, as well as the £4 you've grossed on the sale of two units. It's just not worth it — although that's not to say people don't do it."

The cost of finished product can vary considerably, from 48p per unit for a piece of vinyl, 65p with a label, in a disco bag as much as 80p, to around £1.20, if it's in a custom-printed bag. These prices are subject to the amount of units pressed, how many colours are used, what the finish is and how many you have pressed up. If you have an initial pressing of a million copies, the unit cost will be drastically reduced, and good luck selling them!

## BACK TO THE MONEY

The best way to get a distributor for your record is to send them a tape. The easiest way of sorting out the right distributor is to go into a specialist record shop and find a record in a similar style to your music. Then just ask the people in the shop, nicely, who distributed it, and what their phone number is.

Having a publisher isn't essential, but it can give you a lot of clout. Your first record could be the one that takes off, and if you don't have it protected you could lose a lot of money. Publishers also capitalise on the growing use of music in TV adverts, TV sport features such as 'goal of the month', computer games, and even fruit machines; in the dance music field they will also help you get money from the vast amount of multi-pack mix tapes on sale.

These days, record companies have little idea about the development of exciting new musical talent (as if they ever did!), so putting out your own product can be the only way of getting your material to the public at large. You never know, one of them might just work in a massive media conglomerate and sign you up to be the next worldwide smash. It wouldn't be the first time! Now turn to the classified section, ring up a duplication company, and order the manufacture of your forthcoming earth-shattering release. **SOS**

## LICENCE LAWS

Before releasing a record, you need to apply to the MCPS for a licence.

**A** Audio licence department,  
MCPS Limited, Elgar House,  
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# Steinberg Cubase

**NIELS LARSEN,**  
*Steinberg's Sales and Marketing manager, lets you in on some crafty ways of using Cubase.*

I have to admit that even though I drive my car every day, I still haven't read the user manual. This doesn't stop me from using the car, though! In the same way, many *Cubase* users find that they're able to start programming without even opening the manual, and the following hints and tips will be especially useful for them. But even

accurate copying of parts will help you to do this.

- Choose the pencil from the toolbox and hold down the Alt key while drawing over the part you want to copy. Keep drawing until you reach the position in the song to which you want the part copied, and release. Multiple copies will be created automatically. You can create ghost parts in the same way by pressing the Ctrl key instead of the Alt key.
- Now select the glue tool from the toolbox, press the Alt key and click on the parts you have created. This operation will glue all the parts on a track. If you wish, you can now resize parts by selecting the scissors, pressing the Alt key and clicking on a part. The length of the resized part depends on

the distance between the start of the part and the point at which you are positioning the scissors.

## QUANTISE AND SNAP VALUES

Quantise and snap values can be selected by pressing the numerical keys above your QWERTY keyboard (keys 1-7). These will select quantise and snap values regardless of which editor you are working in. If you need triplets, simply press 'T'. Your computer's numerical keypad, by the way, will not activate this function because it is used for location points instead.

## MARKER TRACK

I often create a marker track when I'm recording, to help me to identify musical sections. Simply create parts representing the start and end points of musical sections. Name and/or colour-code these parts for easy identification. Select a part, use the short-cut command Alt Gr+[P] (the Mac shortcut is Option+[P]) and the left and right locator will jump automatically to the start and end point of the part. Press '1' on the numerical keyboard and you're ready to play the section.

For long, complex arrangements it can be easier to create groups for the musical sections. Select the part representing the first musical section and choose 'Build Group' from the Structure menu. You can also use the short cut Ctrl+[U]. Repeat this process until you have created groups for the whole arrangement (see Figure 1). Now simply select the group representing the musical section you want to hear, use the above-mentioned Alt Gr+[P] short cut again, and press 1 on the numerical keyboard. This will automatically place the Song Position Pointer at the beginning of the musical section in question, ready for playback.



Figure 1.

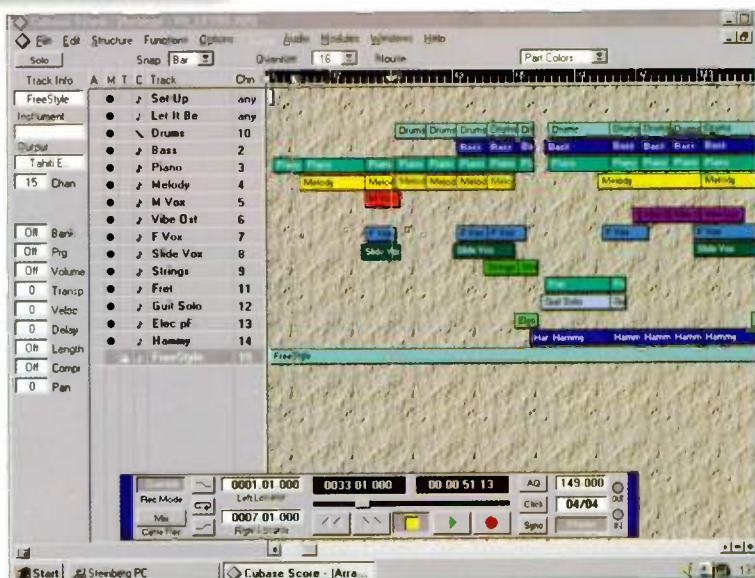


Figure 2 (below).

if you *have* read the manual I hope you won't disregard this article. You might well find a tip or two that you've overlooked.

Some of the features I'll be referring to in this article will only be applicable to the PC and Mac versions of *Cubase*. However, many articles have been written in the past about the Atari version, so I hope Atari users will forgive me! I'll be using short names for key commands: 'Ctrl' for the Control key (Command/Apple on the Mac) and 'Alt' for the Alternate key (Option on the Mac).

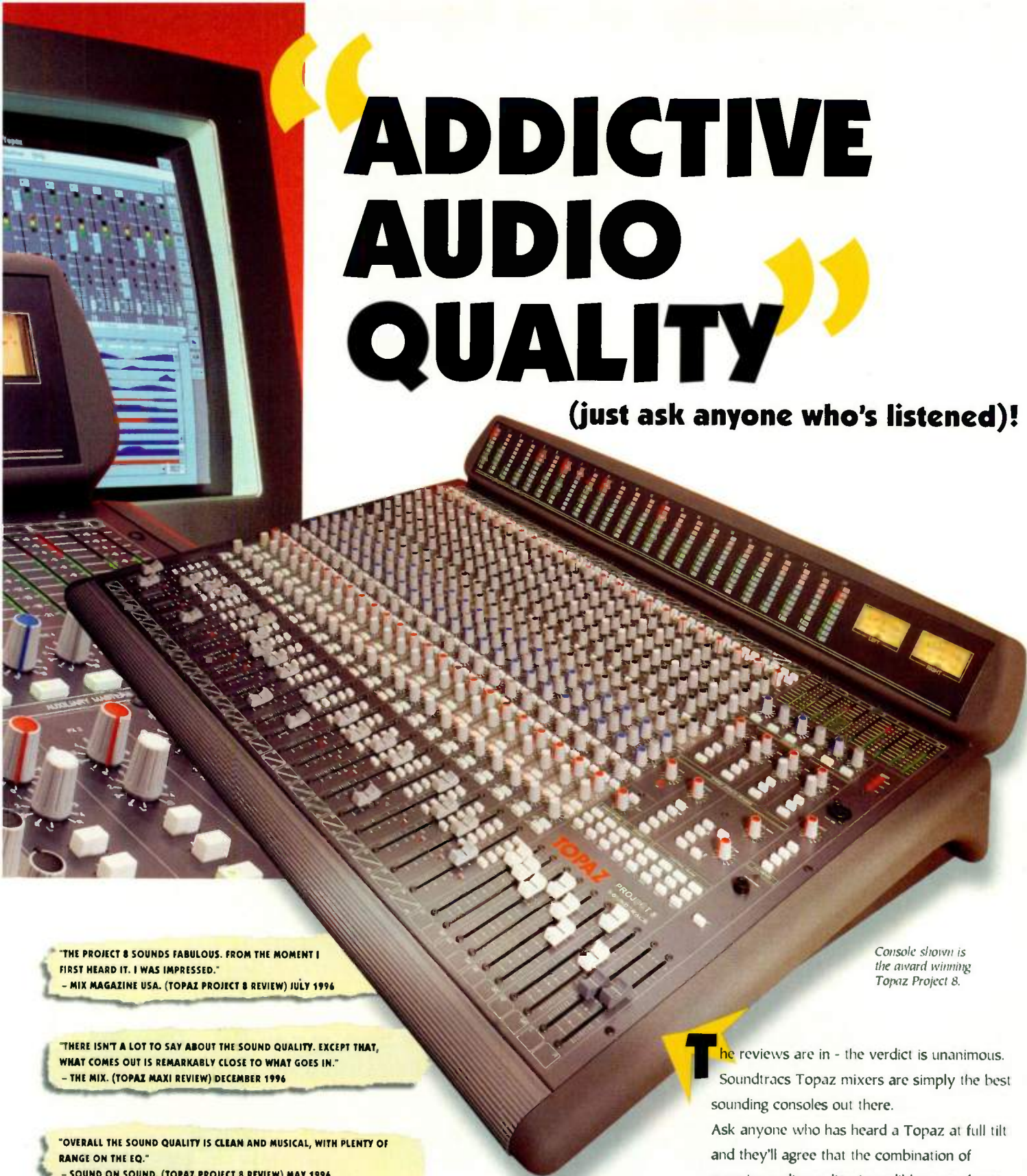
## FAST COPYING

The key to efficient programming is mastering the arrangement page. Fast and



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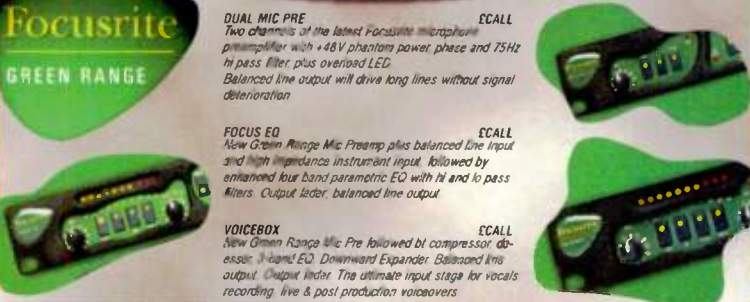
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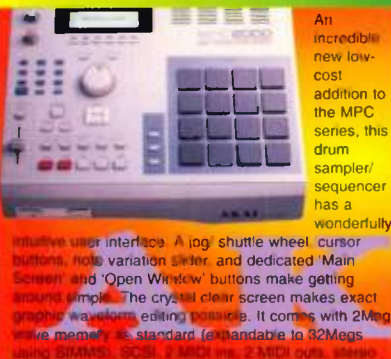


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(Birmingham)



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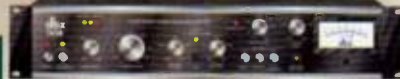
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# RETAIL CHAIN IN THE UK TODAY



**Yamaha have scooped the insides out of their well-specified MU80 half-rack GM/XG sound module and transplanted them into a full rack case, with a few extra features aimed at making the resulting MU90R stand out from the GM crowd. CHRISTOPHER HOLDER is generally impressed...**

I'd hazard a guess that there are very few people who are composing and playing back *nothing* but GM, GS or XG files. So for most people these days there's got to be more to a sound module than General MIDI and its variants — an angle, something that will make even the severest GM critic say "yeah, it's a GM module — but take a look what else it can do". Roland's Sound Canvas dynasty persists, with the new Sound Canvas Pro offering more than before; Korg weighed in with the NSSR, offering GM, GS and XG compatibility, as well as heaps of other sounds and an idiot-proof user interface; now Yamaha have decided that their GM line might benefit from some tinkering under the bonnet. What they've come up with is an MU80 in a 19-inch rack unit, with more of all the things that made the original module outstanding two years ago.

#### EXTRA, EXTRA!

If you don't already own a MU80 and are unfamiliar with it, before going further with the review in hand I should direct you towards our April 1995 issue for a full review. If you haven't got that copy, or you're simply bone idle, read on nevertheless. In short, the MU80 gave you everything you'd expect from a GM module and a bit more — more sounds (via Yamaha's XG protocol), 32-part multitimbrality, 64-note

polyphony, a performance section with lots of big, impressive sounds, a powerful effects section and, notably, an A/D input which can be routed through the effects and mixed out of the stereo outputs.

But, to coin a completely throwaway line, that was then and this is now. What's most obvious at first glance is that the MU90R has been built into a full 19-inch rackmount chassis rather than the half-rack box that the earlier MU80 (and its lower spec'd little brother, the MU50) inhabited. I think this is more of a physical necessity to accommodate the extra bells and whistles on the front panel than it is a shift in market emphasis by Yamaha — although it's true to say that GM multimedia music makers are far less likely to be packing a rack unit. The LCD remains the same in its dimensions and default multi-mode information content. All the buttons for editing and navigating around the machine remain the same, as do the volume knob and phones socket. What's new about the MU90R, bringing it to full-rack-width status, is a data dial, an extra A/D input, and a chunkier, more industrially specified power switch. A glance around the back sees the welcome inclusion of two extra individual outputs on top of the existing stereo outputs.

The improvements don't stop there. Inside there's more of everything — more sounds (779 voices, 200 performance programs), more effect types and more drum kits (30 in all). The MU90R

# Raising the Tone

YAMAHA MU90R GM/XG TONE GENERATOR





operates in four modes: XG, TG300, C/M (GM) compatible, and the unit's own Performance mode. Digging through the various banks and voices, with a little work, you can unearth some classy sounds. The strings are generally tip-top (including the 'synth' strings and pizzicato varieties), there are some big analogue synth leads which are great for instant '80s killer riffs, some of the synth basses span the subsonic to the brash (often within the same patch), and I have to reluctantly admit that even a few of the wind instruments are quite pleasing to my ears — but, of course, the nature of General MIDI-based synths dictates that you're bound to be wading through chamber orchestras of bassoons and French horns when all you want is to hear is more of those great swirling pads and brash polysynth samples. Happily there aren't any true shockers in the Yamaha palette of sounds, although the pianos wouldn't be my first choice (nothing about the sound quality seems velocity sensitive other than the volume) and the bagpipes still curdle my Famous Grouse.

In Performance mode the MU90R boasts 200 programs (100 each in ROM and RAM), each combining up to four normal voices at a time. This is not a multitimbral mode and is intended for solo performance. The calibre of sound here takes a quantum leap and is redolent of a box considerably more pricey than the MU90R's £599 asking price. Washy, evolving pads, thick analogue leads and chunky organs are in bountiful supply, as are some hilarious dance/rave effects. There's something about the Yamaha sound that miraculously combines both the thick and the transparent, which is great when you're trying to shoehorn one of these patches into an already-busy mix. If you're out of the studio and taking the MU90R on stage, many of the sounds are quite responsive to velocity, while assigning the filter to your mod wheel produces some beautifully smooth sweeps. There's a good level of editing and sound-creating potential here, with individual control over each of the four composite voices, including individual

effects levels. You only wish this mode could be made multitimbral — after all, the Korg NS5R managed this with its Combination mode.

### PROOF OF THE PUDDING

To see how the MU90R performed in a real-life situation, I set off on a one-hour voyage of compositional discovery. Strings, synth bass, piano, drums, polysynth stabs and lots of incidental bits of wibbly flotsam and jetsam took shape before my better half even realised where I'd disappeared to. Control over main levels, reverb and chorus levels and panning is all there before your eyes for instant tweaking, and I was pleased to hear how quickly each component in the mix found its own space. There's plenty of variety in the drums and percussion too. After appreciating all the various bass drum options, I had to settle on a 'Techno Kick' (combines all the best elements of the 808 and 909 kick) and a Caribbean boatload of sizzling percussive effects. I couldn't resist routing a 909 hi-hat pattern from my Roland R8 MkII drum machine into the A/D input and then grunging it with a distortion insert effect, and a bit of phaser from the Variation system effect. The result, although not high art or a cutting-edge floor filler, was something that encouraged me enough to work on the track further with my other sound sources.

### FEATURE PRESENTATION

The MU90R's downsides are hardly critical, but are worth mentioning. I think the buttons on the front panel could be a little more finger-friendly and a little less fiddly, and I wish there were least a couple of memory locations to store multi mode setups (as it is, you're forced to use SysEx to dump your setups, via a SysEx dump page that sports a dump truck icon to add further spice to the hilarity that is system exclusive). Another change to make life easier would be an additional multi mode occupied by the complete sounds set in bog-standard, sound module banks of 128 programs. This would give the GM/XG option to those who want it and an alternative sound

**pros & cons**

**YAMAHA MU90R £599**

**pros**

- Classy and versatile effects section.
- Two additional outputs.
- Good manual with glossary.
- Two A/D inputs.

**cons**

- Normal voices sometimes drab or shrill.
- Interface a bit fiddly.

**summary**

With these features, and at this price, the MU90R deserves consideration from multimedia musicians, project studio owners and live musicians alike.

**SOUND ON SOUND**





## JUST FOR EFFECT

Along with the two A/D inputs, the MU90R's effects section is the outstanding feature of this machine and is significantly more sophisticated and flexible than anything else in its class. What's on offer is an impressive three system effects, supplemented by two assignable insert effects, and a digital EQ across the mix buss for good measure.

The system effects include Reverb, Chorus, and Variation. Twelve reverb types are on offer, ranging from the Basement simulation, with a reverb time of 0.6 seconds, to the unlikely ambience of a canyon, with a reverb time of 12 seconds. The general idea for the operator is to select one of the 12 reverb programs and enjoy the fruits without any twiddling required. Although impressive, the presets are tad bright for my taste, which is generally easily remedied with a flick of the LPF setting, while bringing down the default Diffusion setting gives the reverbs the density I prefer. A notable omission is a Spring Reverb program.

Next up is the Chorus section, where you'll find 15 spatially expanding and tone-thickening effects. All the default settings are rather demure for my liking and need some tweaking. The phaser is nicely dynamic, the flangers (described in the manual as 'reminiscent of a jet airplane') are useful but not gee-whiz enough, or appreciably different enough to warrant the three on offer. The section has a Chorus into Reverb send control which adds further flexibility.

The Variation effect control on the 'home page' is a switch, with a wet/dry mix setting on the Effect Edit page. As well as all the chorusing and reverb options you have the full palette of distortions, speaker simulations, EQs and non-

linear reverbs. The guitar effects deserve a special mention. Amp simulations, wah-wah effects and overdrive all work rather nicely on the guitar patches, but can also be pressed into service for various other tasks, working on analogue synth patches, drum parts, or vocals from the A/D input — great for creating White Town vocals and Chemical Brothers grunge.

There are two Insert effects that can be assigned to any two of the 34 parts (including the A/D parts); any of the effects are available for this. If you want more flexibility, how about being able to change the Variation effect into a third Insert effect, which is done from within the Variation effect edit pages? The applications for Insert effects are as obvious as they are useful — distortion for your guitar (a synthesized one or a real one plumbed into the A/D input), a rotary speaker for your organ sound, a compressor for your vocals — the list goes on.

As mentioned, the effects are designed to swing into action without any editing, and the number of parameters on offer don't give you supreme control — but you wouldn't expect it from a unit such as this. I can remember many times when I've tinkered with effects patches and come up with something so mind-blowing, so bizarre and dynamic that it kept me amused for hours, but then had to sacrifice the extraordinary for the mundane necessity of the Small Hall patch. The number of options available on the MU90R should help to do away with that sort of frustrating situation. I've always considered effects programming to be a synthesis technique in itself, especially in the realms of Techno, where a wisely tweaked effect on a sound might just give it the freshness it needs to stand out from the preset crowd.

► module operation for the remainder. I can't believe this would significantly add to the MU90R's cost.

There are other GM modules out there with more sounds, more sophisticated editing, and more sound-creating power, but these aren't the MU90R's selling points. What makes the MU90R special are the two A/D inputs, which add loads of possibilities to your songwriting and your on-stage performance, and the effects section, which is very impressive. The data wheel speeds up operations tremendously, while the two extra outputs are most welcome. Like the previous models, the MU90R can also act as a MIDI interface, and can be plugged directly into your Mac or PC's serial port.

In short, this is a very reasonably priced, reasonably friendly songwriting tool that offers another interesting slant on the General MIDI module format. Working with the MU90R is dead easy and if you're looking for one unit that you can rely on for trying out your ideas, it's perfect.

**SOS**

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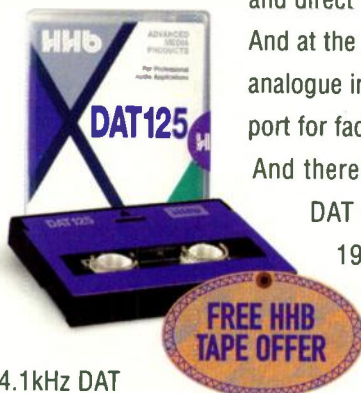
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# DOUBLE WHAMMY

*The VCS1 goes for the best of both worlds, featuring a valve for warmth and character, and solid-state technology for level control. HUGH ROBJOHNS finds out what the combination has to offer.*

## DIGITECH VCS1 DUAL-CHANNEL DYNAMICS PROCESSOR

The VCS1 is a dual-channel (but stereo-capable) multi-function dynamics processor from the American company Digitech. It's a well-specified, well-equipped unit, incorporating a dual-triode valve in the output circuitry to give that classic warm tube sound, and the latest in solid-state VCA technology for accurate and clean level control. The VCS1 is aimed at both the recording studio and the live sound rig, and has been designed to be easy to use and to provide the operator with very clear information about the state of its dynamic control activities.

A full complement of dynamics processors is provided for each channel, including a compressor, peak limiter, noise gate and de-esser. These all operate through a single VCA in each channel, whose control signal is derived from the sum of the control voltages produced by each of the individual dynamics processes, all working in parallel. This topology avoids the inherent problems of serial processing, such as whether to compress before the noise gate or after, and where to place the de-esser. The parallel processing arrangement employed by the VCS1 means that each section is working directly on the raw input signal, which makes it considerably easier to set up, and offers a much more reliable and predictable sound quality.

### THE BOX

The VCS1 is a 2U-high, 19-inch rackmounting box, measuring a fraction under six inches deep. The unit is supplied with suitable bolts and washers for mounting in a rack (why do so few manufacturers supply such essential fittings?) and a decent IEC mains lead with approved moulded plug.

The rear panel is festooned with connectors — four A-type sockets and two XLRs for each channel. The input is equipped with an XLR and A-type jack, both electronically balanced, although the jack socket is happy to accept unbalanced signals too. A push button determines the nominal

operating level for the input (+4dBu or -10dBV) and the output level can be adjusted over a very wide range, by a front-panel control. The output signal is presented on an XLR and A-type socket — again, both electronically balanced. Side-chain access is provided through a pair of normalised jack sockets, operating at +4dBu, but unbalanced this time. On the extreme left-hand side of the rear panel is the IEC mains socket with integral fuse holder.

Front-panel layout is simple and logical, visually dominated by two large, circular, backlit VU meters. The panel graphics are clear and restrained, with white and green text on a black background, and the operational controls are sensibly grouped for the two channels, the extreme right-hand end of the panel hosting the common facilities of a stereo channel link and the mains power switch.

### CONTROLS

Each VCS1 channel features 10 rotary controls and four chromed toggle switches. To the left of the VU meter are a pair of output level controls, clearly identifiable by their oversized knobs. The upper control of the pair sets the final output level from the channel, with up to 20dB of make-up gain available, and the ability to reduce the signal all the way down to silence, if required. A centre detent identifies the unity gain position, and a red LED just above the knob illuminates when any point in the signal path (pre-VCA, post-VCA but pre-valve, and post-valve) is at 3dB below clipping. The lower knob of the pair determines the drive level into the parallel-triode valve stage, and is calibrated from -20 to +20dB with a detent at the unity gain point. The valve in question is the 12AX7A (better known in the UK as an ECC83), manufactured in Russia. Digitech emphasise that the valves are all hand-tested and -graded, and the circuit design employs a fully regulated 235V anode supply for good signal-to-noise performance and transient response. As might be expected, boosting the Tube





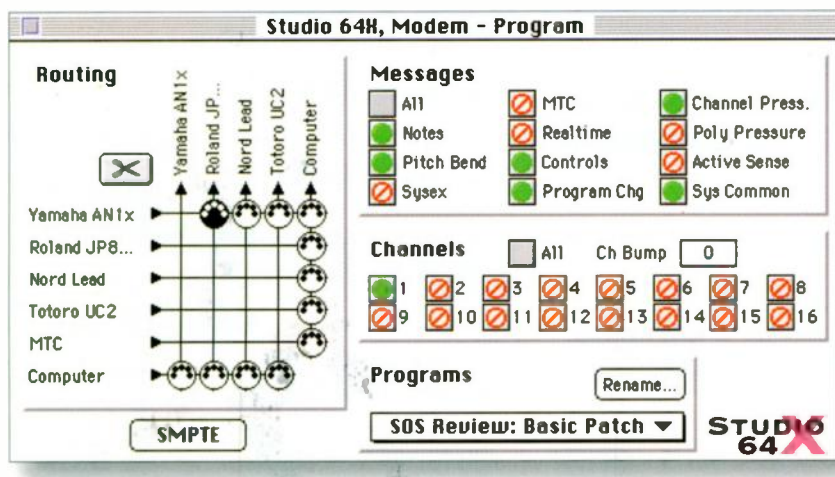


# OPCODE STUDIO 64X

- ▶ before communication could be established with the MIDI interface.

## ROUTING & FILTERING

The Studio 64X enables you to route any MIDI input port to any of the MIDI output ports (although usually you don't connect something back to itself). It provides comprehensive control over exactly which messages can be sent out of each port, so it's possible to specify that only particular types of messages can pass, to choose which MIDI channel can pass through, or even to change the MIDI channel to a different one. All of the settings in the four available user routing programs are stored in non-volatile (battery-backed) memory inside the Studio 64X. Editing the patching, filtering and other settings can only be done via software on a computer — but the routing programs are still useable without the computer.



Editing the routing and filtering settings in one of the Studio 64X's four user patches.

## USER INTERFACE

The Studio 64X front panel has a minimalist user interface. The input and output monitor LEDs allow you to visually check that your MIDI signals are arriving at the patchbay, and that they are being routed correctly. Dim LEDs usually indicate MIDI Clock messages, while bright flashes are ordinary MIDI messages, and long bright LED flashes mean SysEx or over-use of pitch bend, mod wheel or aftertouch/key pressure.

Pressing the Program button advances through the four user programs first, then through the four factory preset programs. In each case the relevant LED flashes to show that the program is active.

## INSIDE

The Studio 64X's case is quite small, so it comes as no surprise that the PCB fills much of the space inside. Unlike most of the very hi-tech synthesizers and expanders, Opcode have chosen to use conventional low packing-density, through-hole technology, rather than the higher packing density offered by surface-mount techniques.

The processor is an 80C32 micro-controller running at 12MHz. The serial lines to and from the

computer are interfaced with the industry-standard 26LS31/32s and Max 232 chips. There are four custom dual-in-line (DIL) chips marked OPCODE, which may well be used for the routing and filtering operations. Memory is a Sharp 5116 RAM and an EPROM for the Operating System — marked 'V01 1996'. Most of the chips are HC/HCT series 74 logic, all in DIL packages. The MIDI/Thru switch is a 30-pin monster which can be used to switch the Mac and PC serial lines onto the rear-panel Thru sockets when the Studio 64X is not being used.

## MIDI INTERFACING?

When you buy your second piece of MIDI equipment, and connect it to your first, you probably aren't thinking about the future. But when you buy a third, and decide to press your computer into action as a MIDI sequencer and digital audio workstation, then you need a multi-port MIDI patchbay and computer interface — it's the 'enabler' for running a computer-sequenced MIDI studio. A MIDI patchbay is very similar to an audio patchbay: it allows you to make connections without needing to move plugs and cables.

If you have just one or two items of MIDI equipment, one of the simple (around £50) 1-port MIDI interfaces will suffice. Above this, the cost increases with the number of ports, up to the 15- or 16-port 'professional' interfaces which can cost around £1000. Beyond these, there are custom MIDI patchbays and interfaces made by specialist companies. You need to match your equipment to the number of ports: ideally, in these multitimbral days, you need one port per piece of equipment, with perhaps a spare port or two if you are considering buying some more MIDI equipment. Because an individual MIDI port is capable of supporting 16 channels of information, the Studio 64X's four separate MIDI ports support up to 64 individual channels of MIDI. This enables you to devote a port to each piece of equipment — although, unless you intend to use the full 16-part multitimbrality that

The first factory program is a 'panic' mode, which sends Note Off messages for each note on each channel to each port, and is used when you get a stuck note. The MIDI/Thru push button selects whether the computer is connected to the Studio 64X, or to the printer, modem or other serial device. It is not easy to figure out which mode the button is in without actually pressing it to find out whether it is in or not! A better indication would have been useful, and would not have increased the cost hugely — for example, it's possible to get buttons which reveal a brightly coloured band when they are in the 'out' position.

## TIMING

There are two things which worry prospective purchasers of MIDI Interfaces: delays and SysEx incompatibilities. I tested the Studio 64X with my standard 'Thru' delay timing tests, and the delay from the input port to the output port was between 250 and 350 microseconds for MIDI Clock messages. This is about the same as a single byte of MIDI information, and about a third of the time it takes to transmit a single MIDI Note On message — a fine performance. For Note On and Note Off messages, the delay was longer: between 550 and 700 microseconds regardless of the filtering and channelising settings in the Studio 64X control panel, which is still pretty good. When using the more advanced filtering, splitting and processing functions in *Studio Patches*, on a MacOS computer, the delay increased to about two milliseconds (2000 microseconds). This delay is obviously longer, but even so it shouldn't present any problems at all, being undetectable for most purposes. During these tests I did notice that the Studio 64X needed to be reset sometimes when I jumped between its on-board patch programs and the OMS *Studio Patches*, but a reset is easily carried out from the front panel.

For System Exclusive, the concern is about the ability of the interface to cope with big blocks of data — if the computer or the interface can't move the data around fast enough, some of the data



this provides, it also gives you scope for adding in extra equipment on spare channels.

• CONNECTIONS

There are two ways in which a MIDI interface and patchbay are used. The basic connections are the same in both cases: typically, the MIDI Out sockets of your MIDI equipment are connected to the inputs of the patchbay, while the MIDI In sockets of the equipment are connected to the outputs of the patchbay.

When the interface is being used between a computer and MIDI equipment, the inputs might be used to record MIDI information into a sequencer, and the outputs would then be used to play back the MIDI information recorded on the tracks in the sequencer. This is when the SMPTE sync facility is useful, since it allows the sequencer to be synchronised to a tape or video recorder.

Alternatively, SysEx information from one piece of MIDI equipment might be recorded by a librarian program for editing or storage, or perhaps replayed from the librarian to restore a set of sounds. In this case, the interface is making a direct connection between the computer and the piece of MIDI equipment, which is why separate connections are needed from each MIDI In and Out socket.

But when used without the computer, a MIDI interface and patchbay becomes a way of connecting the equipment in a MIDI studio together. The patchbay can be used to route any of the inputs to any of the outputs, which means that any keyboard connected to the patchbay can be used as a 'master' keyboard to control any other sound-generating modules. In addition, one keyboard can be used to control several others, so that a stacked sound can be produced. It also allows a workstation sequencer and a drum machine to be connected, with either the workstation or the drum machine providing the MIDI clock messages, and no need to move any cables.

• SYNC

SMPTE synchronisation is a way of locking a computer sequencer to a timecode which is recorded onto a tape, thus allowing synchronised audio, video and MIDI work. All MIDI interfaces except the very simplest single-port versions tend to include synchronisation facilities. Basically there are two required functions: striping, which involves recording a timecode signal onto one track of a multitrack tape; and sync'ing, which involves receiving the timecode signal off the tape and turning it into timing information which can then drive a sequencer program on the computer.

might be corrupted. For this my usual test is to use the SysEx delay feature of my Emu Morpheus, which allows control over the delay between packets of SysEx data. The delay is normally set as 300 milliseconds, so I reduce it to zero and see if there are any problems with SysEx dumps of the complete memory of the Morpheus (about 24 kilobytes of data). The Studio 64X had no problems coping with this.

SMPTE

The Studio 64X provides SMPTE striping and synchronisation facilities. The front-panel SMPTE Stripe/Sync LED flashes slowly when the Studio 64X is generating SMPTE, flashing rapidly when receiving SMPTE. It sends an audio tone signal from the Sync Out socket even when it is not striping the tape, and this helps you to set the correct level on the tape recorder.

A special set of internal connections is also provided for the timing-critical MTC (MIDI Time Code) messages which are produced from the SMPTE sync signals. There's lots of information on SMPTE, sync'ing and striping in the on-line help.

DOCUMENTATION

The *Studio 64X Getting Started* guide is thin — just 12 A5 pages — but this is more than made up for by the excellent on-line help information. Since you need to use a computer to edit the patch programs, having help available on the computer as well makes a lot of sense. The help program will be familiar to anyone who has seen a Windows Help file or used the World Wide Web — the green underlined text links you to more information, and the button bar at the top provides useful functions like Contents, Index, Go Back, Print, Previous and Next. Clicking around the help pages is significantly faster

MACTASTIC! OTHER  
OPCODE INTERFACES

Other Opcode Mac MIDI Interfaces Include:

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1 port, 1 In, 3 Out ..... £58.
  - MIDI TRANSLATOR PRO:  
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  - STUDIO 3:  
2 ports, 2 In, 6 Out, SMPTE ..... £269.
  - STUDIO 4:  
8 ports, 8 In, 10 Out, SMPTE ..... £410.
  - STUDIO 5LX:  
15 ports, 15 In, 15 Out, SMPTE ..... £939.
- The Studio 64X sits between the Studio 3 and Studio 4 in terms of features and price.

than thumbing through a thick manual. The help pages are well designed, with plenty of pop-up 'glossary'-style boxes to explain words, and lots of links to pages offering additional explanation. In fact, I would rate them well above many of the help pages for business software from names like Microsoft.

CONCLUSION

If you have a master keyboard (or even a synthesizer that you use as your main keyboard), drum machine and one or two expander modules, the Studio 64X is designed for you. It neatly fills the gap between the 1- and 2-port basic interfaces and the pro 8-port interface/patchbay/SMPTE sync boxes.



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Soundcraft have certainly come a very long way from their early days in a cramped warehouse in North London. Today, already well established as the most prolific audio mixer manufacturer in the UK (if not the world), it's hard not to notice the company's increasing diversification. The ever-popular Spirit range of small, musician-friendly mixers has gradually been extended to encompass both ends of the recording chain. Starting with the addition of a range of microphones, the line-up conquered the opposite end of the chain with the Absolute 2 passive nearfield monitors a couple of years ago.

Visually striking, with their distinctive blue

woofers, the diminutive Absolute 2s have acquired a strong following and have clearly helped pave the way for a more up-market model: Spirit's latest offering, the active, two-way Absolute 4P nearfield monitor.

#### MECHANICS

The 4P is another example of the good industrial design which we have come to expect from Spirit. It's an extremely attractive-looking loudspeaker, with metallic green surrounds on each drive unit, and a brilliant blue LED below the woofer showing that the unit is powered up.

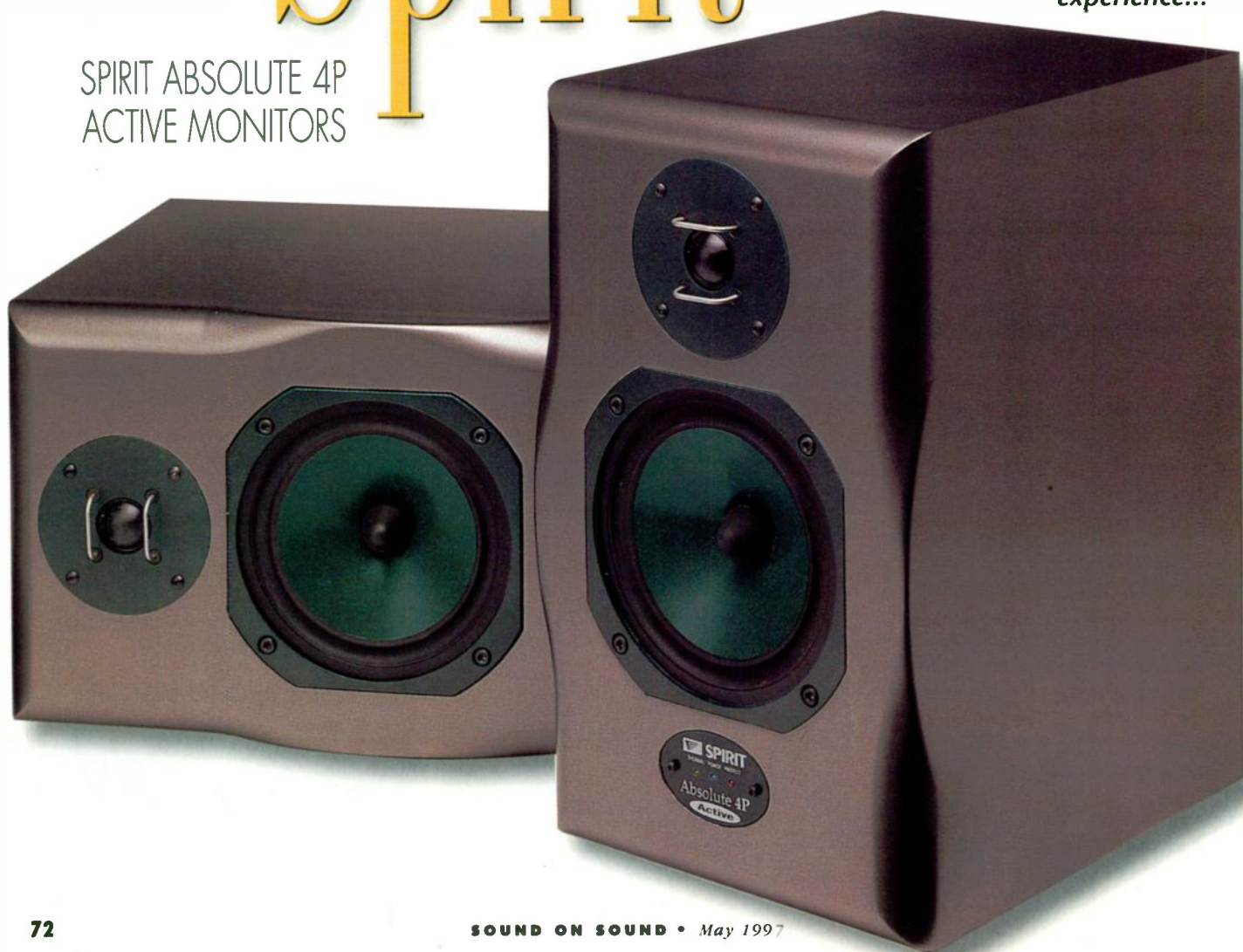
The cabinet construction appears to be pretty conventional, using MDF panels finished in a durable, hard-wearing grey textured paint. The inch-thick front baffle incorporates radiused corners to prevent unwanted diffraction effects, and is affixed to a sleeve forming the bulk of the cabinet.

The rear panel is well recessed to protect the

*Active monitoring used to be the preserve of those with quite a lot of money to spend on their studio speakers. Recently, though, it's become a lot more affordable. HUGH ROBJOHNS powers up the 4Ps and undergoes a spiritual experience...*

# Wholly Spirit

SPIRIT ABSOLUTE 4P  
ACTIVE MONITORS





controls and socketry and carries a large-diameter reflex port at the top, which looks directly onto the back of the tweeter. A large heat-sink occupies the centre of the panel, with the amplifier controls and sockets towards the bottom. The box is a decent size for a nearfield monitor, at 400 x 250 x 305mm (H x W x D) and weighs in at around 13kg — heavy enough to risk damaging the more flimsy meter bridge housings!

The drive units are built in France and consist of a 25mm soft fabric dome tweeter and a 170mm Aerogel bass unit. The flush-mounted tweeter uses ferro-fluid cooling and has a catenary profile which is claimed to extend high-frequency response. Fears over the safety and longevity of the extremely exposed soft dome tweeters can be allayed to some extent by fitting the supplied guard wires (held in place by the magnetism from the tweeter's drive assembly). However, on the review model, only one bracket actually fitted properly into the intended allen-bolt holes (the bolts actually fix the tweeter's magnet assembly to the escutcheon plate), all the others being too inaccurately shaped to fit. My disappointment with this aspect of the 4P's design was increased when I discovered that the one guard wire that did fit rattled at high monitoring levels! I think some form of tweeter dome protection is definitely necessary, and it should be much better engineered than the current offering.

The woofer has a 30mm voice coil, configured to allow the cone to operate over a long throw (to give good power-handling capabilities), and the use of the acrylic polymer gel (Aerogel) for the cone material gives it very good break-up characteristics. The bass driver also incorporates a phase plug at its centre.

The simply braced cabinet is thoroughly lined with foam sound-absorbing material, and the bass output is enhanced by the inclusion of a 50mm flared port.

### ELECTRICS

The 4P in the name of these monitors refers to the four power amplifiers used to drive the units. Each loudspeaker has a pair of 100W amplifiers directly connected to their own drive units via short lengths of cable. The crossover is performed at input signal levels by active circuitry designed to give precise fourth-order filter curves with linear phase characteristics and time-alignment between the drivers. The crossover frequency is set at 2.4kHz and

the input circuitry also includes a switchable 40Hz, 18dB/octave low-frequency filter.

The entire amplifier chassis can be removed and rotated through 90°, allowing the monitors to be used on their sides whilst maintaining optimum air flow through the amplifier heat-sink fins. Most of the electronics (except the mains transformer) are mounted on a double-sided circuit board, the input socketry and associated buffers being mounted on a small daughterboard. Extensive use has been made of surfacemount components and build quality looks to be commendably high. The amplifiers are based around two bridged pairs of integrated circuit units bolted directly to the heat-sink.

The amplifier circuits are constantly monitored by a built-in protection circuit for thermal excess and signal overload. Activation of the protection circuit, or an over-temperature condition, are indicated on the front panel of each monitor through a pair of LEDs. When the monitors are first powered the soft-start circuitry engages the protection system, with the result that the red LED is illuminated for a few seconds, as well as the distinctive blue power LED.

“... active monitoring is the only way to achieve high-quality results in mastering or mixing situations.”

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# Spirit Absolute 4P ▶

The input signal is accepted on either an electronically balanced XLR socket, at a nominal +4dBu level and 10kΩ impedance, or an unbalanced gold-plated phono socket at -10dBV. Both connections are permanently live but independently buffered. A rotary level control switch (with the familiar Spirit knob design) is provided on the rear panel, calibrated off, -20, -12 and then up to +8dB in 4dB increments.

Adjacent to the level control is a small oval push-button which introduces a 40Hz rumble filter. The brief installation notes supplied with the Absolute 4Ps recommend that this be left in circuit to provide more useable power and to prevent the protection circuit from becoming over-exercised! Although I could clearly hear the difference in bass performance with the filter switched in and out — the bass unit makes astonishing efforts to replay tones all the way down to 20Hz — I found that it did not take much in the way of high-level LF signals to trigger the protection circuits if it was left out.

Consequently, the majority of my listening tests were performed with the low-frequency filter in circuit.

Mains power is supplied through an IEC socket with the furnished lead. The socket incorporates a mains fuse (the correct rating is marked on the panel) and, although I could find no reference to its existence in the installation notes or on the monitor itself, there is a second fuse inside the amplifier (again, clearly marked with its value). The power is switched via an illuminated rocker on the rear panel.

## ABSOLUTELY FABULOUS?

The technology is all well and good, but what do these speakers sound like? Well, the first thing that hit me is that they can be loud — very loud, in fact! The Spirit notes claim 115dB SPL at 1 metre, and I have no reason to doubt that — it serves me right for not checking my monitoring level before patching in the Spirits... The rear-panel level controls tailor the 4P's sensitivity over a useful range which should meet the needs of every installation.

The second thing I noticed was that one of the monitors (serial number 000001) was emitting an astonishing amount of electronic noise from its woofer. Clearly something was amiss with its amplifier, but it seemed happy to perform completely normally in all other respects. Certainly, the other monitor in the pair proved to be acceptably noise free, so I'm quite content to put this fault down to the kind of gremlins that afflict review products when the copy deadline is as short as on this occasion.

Serious listening revealed that the Absolute 4Ps share a strong sonic signature with the earlier Absolute 2s. They have the same recessed mid-range and emphasised treble compass that many associate with a 'monitor' loudspeaker. This tonal balance could be described as 'revealing' if you're

that way inclined, or you might prefer to simply label it 'bright'. I personally favour the latter description, but don't get me wrong here: I'm not saying that the Absolute 4Ps have an unacceptable balance at all, just that the balance would be hard to describe as mellow — but then I have spent a lifetime listening to BBC-designed loudspeakers!

Bass output is commendable for a box of this size, and can be usefully extended by switching out the 40Hz filters — albeit at the expense of sustained high listening levels. Placing the monitors

“Imaging is clearly a strength of the 4Ps, with rock-solid soundstages that demonstrated good width and depth.”

close (but not hard against) a rear wall also has a strong reinforcing effect on the lower registers, as you would expect. I wouldn't expect a nearfield monitor to be able to reproduce the resonance and weight of a bass drum properly, but what the 4Ps lacked in bass extension and sheer oomph, they certainly made up in attack and speed. Transients were razor-sharp and totally realistic, bestowing a feeling of energy, rhythm and pace to just about every CD track I auditioned.

Imaging is clearly a strength of the 4Ps, with rock-solid soundstages that demonstrated good width and depth, the latter extending well back from the frontal plane of the speakers.

## CONCLUSION

The Absolute 4Ps are a welcome addition to the increasing range of active mini-monitors currently available. There is no doubt in my mind that active monitoring is the only way to achieve the high-quality results so essential in a mastering or mixing situation, and the 4Ps give a very good account of themselves, particularly when it comes to stereo imaging and dynamics. The tonal balance is definitely on the bright side of neutral, but many will appreciate the extra clarity and detail compared to more relaxed designs. I was less convinced about the appropriateness of the recessed mid-range which, in itself, probably focuses undue attention on the strong upper register, but overall, this is a fine monitor and well worth auditioning against its competition.

SOS

**pros & cons**

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**4P £799**

**pros**

- High build quality.
- Individual and distinctive styling.
- Good stereo imaging.
- Powerful dynamic range.

**cons**

- Bright tonal balance.
- Tweeter quite exposed to physical damage — from fitting the horrible guard wires, if nothing else!

**summary**

A strong newcomer to the increasingly crowded world of active mini-monitors.

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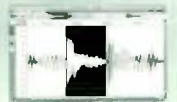
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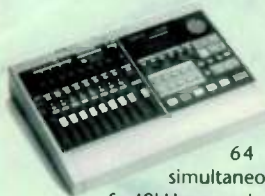


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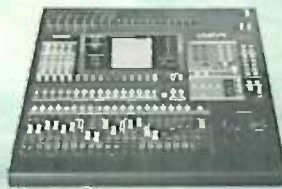


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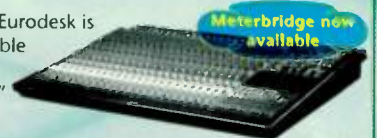
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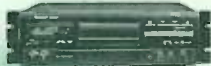
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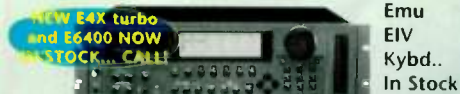


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# A Crashing Bore

## A GUIDE TO PC CRASH RECOVERY

**Even the best-regulated computer can suddenly turn nasty. MARTIN WALKER guides you through the ways to recover when you're faced with a blank screen and a frozen mouse.**

**W**indows 95 is far more robust than Windows 3.1, but crashes still happen, however careful you are. Following Janet Harniman-Cook's recent guide to the causes of PC crashes (in December 1996's *SOS*), you should at least know how to avoid the kind of crash caused by trying to run too many applications at once, and even recover from some of them without losing any data using one of the many background protection utilities available, such as those provided with *WinProbe 95*, *Norton Utilities*, or *First Aid 97* (see the 'First Aid 97 Review' box here, and also my roundup of PC utility programs in last month's issue).

Strictly speaking, there are two sorts of crash. A head crash is a rare occurrence: the hard disk read/write head takes a nose-dive, and crashes into the surface of the disk, causing irreparable damage. A system crash is when the computer 'freezes', but no permanent damage occurs. But if you find your PC in this condition, how do you work out what happened? Sometimes you don't find out that something is amiss until you boot up one morning, even if the problem occurred the

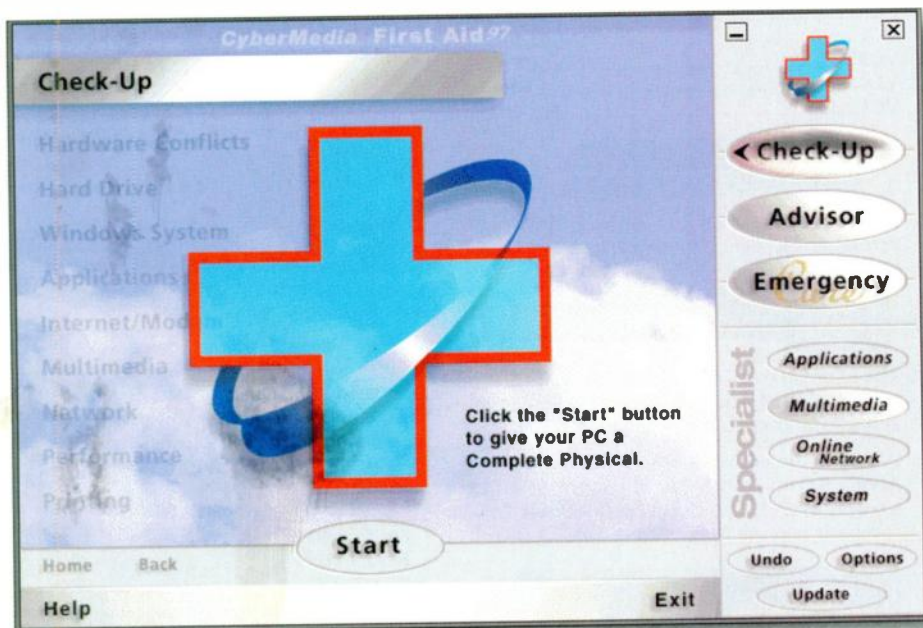
day before, since the boot process only occurs when you first switch on, or after a reset. If you can't even get as far as the main Windows 95 desktop, it's time for more radical steps — but before we discuss those, let's look at ways to prepare for this scenario, so that you emerge with the minimum of downtime, and the maximum of remaining hair.

### GETTING BACKING FOR YOUR PC VENTURE

Once you have suffered a crash that leaves you with corrupted data, you'll almost certainly take backups in future, but the sad fact remains that most of us don't bother until the inevitable happens. However, you already have a backup program that comes free with Windows 95, *Microsoft Backup*, and this is pretty self-explanatory to use. Once you've chosen which files to back up, by clicking on any combination of files and complete folders, this 'set' is saved as a single compressed file to your chosen destination (preferably on a different disk, such as a removable drive). Whenever you want to restore data, anything from a single file to the full set can be extracted and restored to its original position.

A full backup of your entire hard disk is not normally needed — as long as you have your original application disks, these can always be re-installed — but all data files and any INI files that incorporate your preferences should be backed up. If you re-install an application, the program may create a new INI file without checking for an existing one, but when you've evolved your default preferred settings in a complex program such as *Cubase* over months of use, it can be very annoying to have to do it all over again. Just in case you have a badly behaved install routine that does this (see the 'Badly Behaved Install Routines' box for more details), copy the appropriate INI file to a temporary folder — then at least you still have a spare to refer to.

How often you back up depends on how much work you're doing. If you've



**Figure 1:** Does your PC have that ring of confidence? *First Aid 97* is a new, more comprehensive version than its predecessor (*First Aid 95*), and provides significantly more hardware and software diagnostics. A regular check-up may be just what you need to spot problem areas, and if you do get a crash, the *Emergency Disk and Back Track* system could well get you up and running again. See the 'First Aid 97 Review' box.



"I used the 20/20 bas system while remixing "Slow Jams," the second single from the new Quincey Jones album. Q's Jook Joint."

"Event called to see if I would give the 20/20's a listen. The initial listening was very impressive, the sweet high end and the massive tight bottom made me think I was listening to a much larger cabinet. The smooth mids and accurate imaging make the speakers easy to listen to"

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Francis Buckley EQ Magazine July 1996

"The Event 20/20's turned out to be damn fine monitors, well up to the task of serious mixing, editing or post-pro work."

"The 20/20's bass end is sufficiently extended to make them useful as the sole pair of monitors in a small studio."

"There's plenty of top end clarity without any tendency to fatigue, and the stereo imaging is excellent."

Paul White SOS July 1996

"Detail in the program material was maintained regardless of volume...high, tinkling synth lines seemed unaffected by ponderous bass drums and remained well-profiled against a thick, swirling, mid-range - exactly as they were intended to be in the mix"

Nigal Lord The MIX January 1997

EVENT

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# PC Crash Recovery

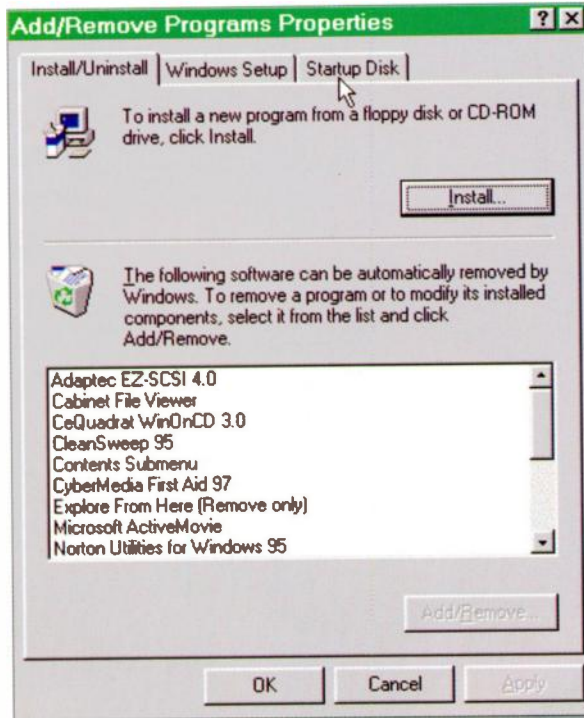


Figure 2: If your hard disk throws a wobbly, how do you manage to boot up at all? The answer is easy once you click on this tab — create a Startup floppy disk (BEFORE you get a problem!)

▶ just spent 10 hours working on a music track, then an extra two minutes to save an extra copy of the file to a floppy or removable drive before you switch off should give you peace of mind, but 'once a week' backups are sufficient for many people — just ask yourself how much work you would be prepared to redo, and back up as often as that. Sometimes even an hour of intensive sequencing is irreplaceable — so back up every hour! Many applications (including *Cubase*) allow you to Auto Backup, saving a file automatically every few minutes, and this is often the best solution, since you can then concentrate on the

work in hand. If you do have a crash, always run Microsoft *Scandisk* or an equivalent disk-checking utility after you've rebooted — any open files at the time of the crash may well have ended up corrupted. *Scandisk* will enable you to convert them to text files, so that you can inspect them for any useful data (they can be safely deleted if they contain nothing of interest).

## START AS YOU MEAN TO GO ON

If something untoward happens to your hard disk (and I don't necessarily mean a hardware fault — it may be a corrupted or missing driver file), you may find that it's impossible to get a single file to load. In this case, it's time to get your floppy Startup disk out of its hiding place. You did make one, didn't you? If not, do it now. Go into the 'Add/Remove Program' applet of Control Panel (see Figure 2, left), and click on the Tab shown. Have a blank floppy ready, and away you go. Once this disk is written, you can boot up your PC from it (put it into the floppy drive before you switch on) and it will start the machine in MS-DOS mode, giving you all of the standard DOS commands, as well as copies of *Scandisk*, *Regedit*, and *Format*, plus *Fdisk* in case all else fails and you have to reformat your hard disk and start again (this is very rarely necessary, so don't panic). Utilities such as Norton *Rescue* (part of the *Utilities* package) do much the same with their Rescue Disk, but also write extra proprietary utility programs onto the floppy, as well as copies of your registry data and startup data in the CMOS chip. Do try the floppy to verify that it works before you really need it. A particularly good time for backing up files and updating the startup disk is after you've installed new devices and applications, when you have a good working configuration. ▶

## FIRST AID 97 REVIEW

Such is the speed of software development that, less than two weeks after I finished my roundup of PC utility programs, one of them has already been upgraded! *First Aid 97* supersedes *First Aid 95*, which largely concentrated on solving software problems. This new version now also checks hardware, and so is more relevant in a crash situation — hence its inclusion here. The first thing that strikes you is the much slicker interface (see Figure 1 on page 80) and the new automated hardware check-up. This tests for hardware problems such as resource conflicts, missing drivers, hard-disk errors and fragmentation levels, printer drivers and ports, and modem setup, and there's also a more comprehensive software checkup than before for file associations, shared DLLs, shortcuts, all file references in the registry, files referenced by each application, and much more. With this level of detail, *First Aid 97* is more comprehensive than hardware-oriented packages such as *WinProbe 95*, but it's kept its easy-to-use one-keypress approach. If and when problems are found, you can either click on the Autofix button to sort things out (which generally works well, and the program explains what it's about to do), or use

Manual to run the standard Windows 95 hardware troubleshooter in tandem and resolve the problems yourself.

The second new feature is the Advisor, and this shows a graphic of a complete multimedia PC, allowing you to click on any part, such as floppy drive, CD-ROM, printer and so on, to lead you to a selection of possible problem areas. Answer multiple choice questions about your problem, and a possible solution is eventually given. The First Aid Advisor can be rather patronising, but it's more thorough than *First Aid 95*, and has 20Mb of total advice, which you can either copy to your hard disk during installation, or run directly from the CD-ROM. Multimedia problems are better supported, although there's still room for improvement. You can also click on the 'software package' graphic to bring up the Tech Support Directory, which will connect you with manufacturers' web sites; a click on the Globe takes you to the Web Searcher, which looks for the latest tips and advice on the Internet. The third main area of the package is Emergency, and this lets you create an emergency startup disk, then takes you to Windows 95 Backup for more extensive work; meanwhile Back Track keeps copies of critical system files just in case a new application messes

something up. Additional components include Windows Guardian, which adds a range of background monitors including Crash Protector (similar to that in other packages); and, to round things off nicely, Dr Solomon's well respected anti-virus software is also on the CD-ROM.

This new version of the First Aid package provides a significantly more complete service, adding a wide range of hardware checks to the software-based analysis of its predecessor. It is also one of the new breed of 'dynamic' products, which can receive updates via the Internet to cure even more problems. Unless you want to spend hours with your head under the bonnet, this one-button software and hardware approach is now comprehensive enough to be the only piece of software you need to give you peace of mind. At £34.95 for the basic version, it's also excellent value for money. A worthy successor indeed!

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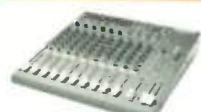
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# PC Crash Recovery

## ▶ PUTTING THE BOOT IN

If the worst happens, and Windows 95 refuses to boot up, what normally happens is that it gets so far, and then the system 'hangs' — all disk activity will stop, and the mouse cursor will be frozen on the spot. In many cases, you can cause

it's far more likely that electronic devices will fail during the switch-on surge than at any other time.

Unless the problem is caused by a hardware failure — and these are, thankfully, not too common — you now need a way to get to Windows so that you can repair the cause of the crash... a catch-22 situation. The solution is to press the F8 key as soon as you see the 'Starting Windows 95' prompt on your screen. This will bring up the Windows 95 Startup menu, which provides troubleshooting options (as shown in Figure 3, left). You may have an extra entry at number 4 if you're running a network, but for most people the options will be as shown. Option 1 ('Normal') is the default, and starts the full Windows operating system and GUI (Graphical User Interface). The second option, 'Logged', does the same, but in addition creates a file called BOOTLOG.TXT in your root directory, which writes in sequence every file and driver loaded and initialised during the boot process — not only will it show any missing files or failed initialisations (search through for the word 'fail' with a text editor) but its final entry may show the particular file that caused the crash, enabling you to narrow down the problem considerably.

Although 'Logged' mode can be used as an analytical tool, the normal first procedure is to try the third option, 'Safe mode' (also available by just pressing F5 during a normal boot). This boots a minimal Windows 95 operating system which excludes the majority of drivers, as well as bypassing the AUTOEXEC.BAT and CONFIG.SYS startup files, and the Registry (useful if you think it has been corrupted). Only essentials such as disk

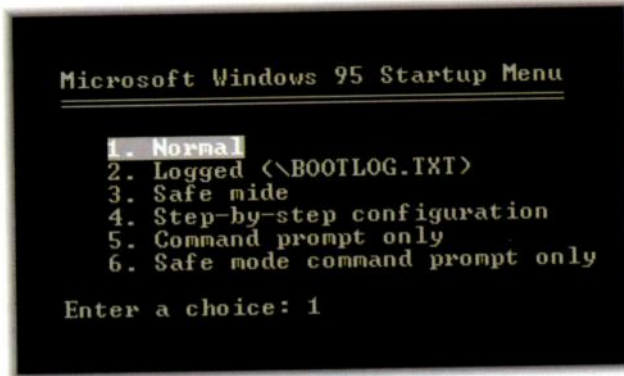


Figure 3: If you press the F8 key when 'Starting Windows 95' appears on your screen, the Boot

Options screen as shown here will appear. Details of when to use each one of these options are found in the main text.

a 'warm' boot by pressing Ctrl, Alt and Delete simultaneously (known as the three-fingered salute). This will make the machine start again at its test routine. If this fails, the reset button found on the front of most PCs will always force a hardware reset, however locked up your system is. This is far better than the alternative, which is to switch the machine off, wait at least 30 seconds (to give all of the capacitors in the power supply time to fully discharge) and then switch on again. This causes extra wear and tear on your system —

“A particularly good time for backing up files and updating the startup disk is after you install new devices and applications, when you have a good working configuration.”

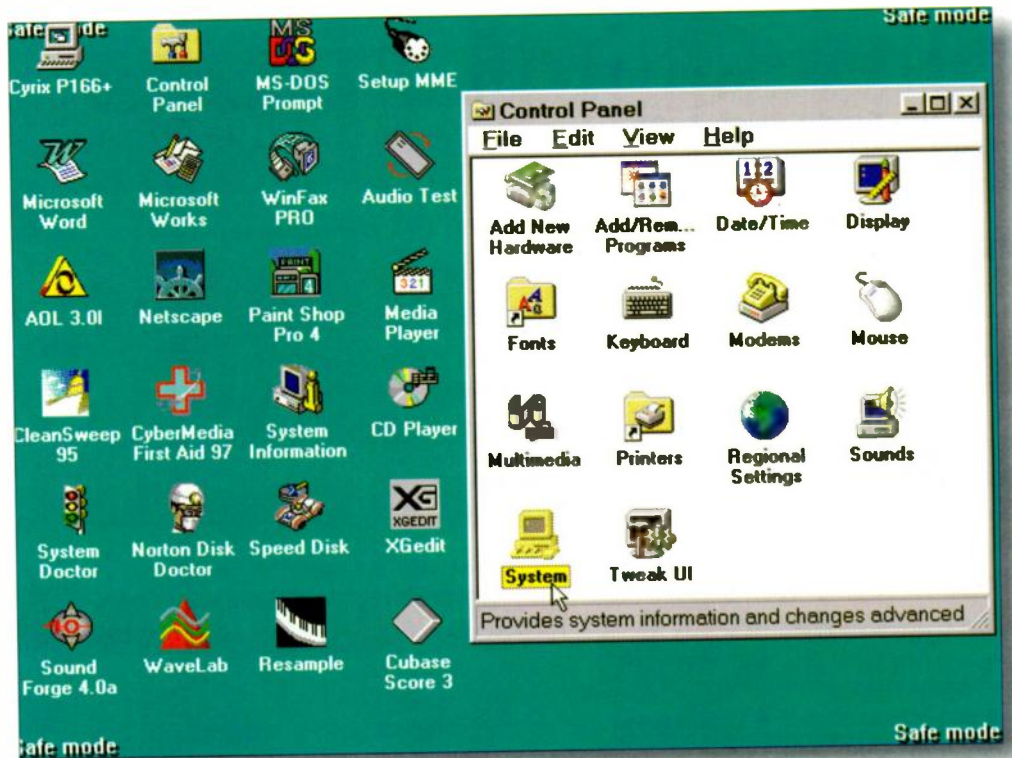


Figure 4: It's pretty obvious when you are in Safe mode, due to the chunky screen display and fetching corner warnings, and this is often the only way to adjust settings or remove faulty drivers to get the normal Windows 95 mode up and running again.



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# PC Crash Recovery



Figure 5: If your machine crashes during the installation of Windows 95 itself, you need to run Windows 95 Setup again, and it should detect that you had a previous problem, bringing up this screen. Use Safe Recovery as shown here, and everything should complete with no further mishaps. If not, try the same procedure again.

- ▶ drivers and the Microsoft Standard VGA (640 x 480 x 16-colour) video driver are used. Figure 4 (see page 84) shows you what to expect: you won't have access to CD-ROM drives, printers and other devices. This removes problems caused by their drivers, as well as letting you recover from a case of the 'wobbles' — if you have video drivers that allow various refresh rates (how often the screen image is updated) then it is possible to select one that is too high for your monitor to support. The result is a screen display that rolls all over the place, just as when your TV suffers from

a vertical hold problem. As you can't see properly to return the refresh to a more suitable value, boot into Safe mode with its plain vanilla VGA driver, and your screen will be perfectly readable. You can then enter the Display section of Control Panel (or wherever your video card utility is normally found), return the refresh rate to a lower value, and reboot normally. Because Safe mode removes so many potential sources of problems, you can often discover the cause of the crash, remove the offending driver or other file, and then reboot normally with no further problems.

“No manufacturer can check that their program will work with drivers that will be released in the future (science-fiction addicts would probably call this a time paradox).”

## BADLY BEHAVED INSTALL ROUTINES

One of the most annoying causes of seemingly unconnected problems is installing a new application that neglects to check for newer versions of shared system files, before copying an older version across. Sometimes, a vital new revision of a file in the Windows\System folder ends up being replaced by one dated 1992! The application just installed works perfectly happily, but later on another application may throw up its hands in horror, sending you little error messages or refusing to run at all. This is another job for an Uninstall program such as CleanSweep (from Quarterdeck), which will alert you when something like this happens, although you can manually check the version number of system files through the 'Properties' option in

Explorer (see Figure 7 on page 88). If all else fails, then re-installing the program that's now throwing a wobbly will probably cure the problem, as it will reinstate the offending file, without (you hope) altering yet more shared system files!

However, there is another side to this problem of different versions of identically named files — it's never safe to assume that getting an updated driver or system file (via the net, for example) will automatically improve the performance of your machine. Occasionally, changing to a newer version may cause odd bugs in one particular program, due to incompatibilities — no manufacturer can check that their program will work with drivers that will be released in the future (science-fiction addicts would probably call this a time paradox). This problem is

quite rare, but if you ever get it, the solution is often to re-install the older driver or file — if the problem goes away, you've cracked it! One other word of caution when you're trawling for updated hardware drivers via the net (or supplied on magazine covermounted CD-ROMs) — read any text file supplied with the files and find out why the new version was released. Quite often, revisions are designed to cure bugs that only occur when the program's used with specific hardware — not only may the new driver prove no faster than your existing version, but extra code will have been added (most newer drivers tend to be larger) and so its performance may be marginally worse. If the manufacturer announces an improved version, go ahead and install it, but if it solely adds a bug fix for something you don't possess, then there's absolutely no point!

'Step-by-step confirmation' is not a religious ceremony, but a way to isolate problems caused by applications (or you) putting extra lines in the AUTOEXEC.BAT or CONFIG.SYS files. These 'extras' normally run DOS hardware drivers (used by DOS programs only, and not normally required for most things running Windows 95), or they're extra statements to initialise things like SoundBlaster compatibility, or set paths so that other applications know where to look for initialisation files and the like. By using step-by-step 'Yes/No' responses, you can select which processes are carried out and which ignored, which can be very useful if you think that the problem occurs when a particular DOS driver is loaded. Use this mode if the startup process fails during loading of the startup files, or if you ever see an error message flash by during the normal boot process — you can then see exactly what problem is being reported, as well as being able to temporarily disable a specific driver if you think it is the cause of the problem.

An alternative approach is to use option five — 'Command prompt only'. This effectively leaves you in the DOS environment, which anyone who has used PCs for a few years will recognise. Only DOS commands work, and unless you've ▶



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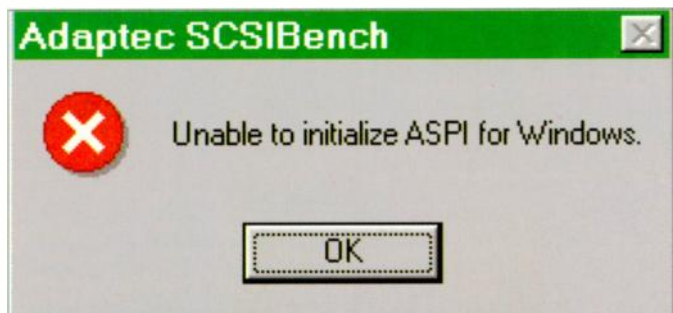
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# PC Crash Recovery

Figure 6 (below): This seemingly innocent little dialogue box popped up one day when I tried to benchmark test my Syquest SCSI drive to see if the new drivers I had downloaded from the net had improved its performance (see the 'Badly Behaved Install Routines' box). Re-installing Adaptec EZ-SCSI and SCSI Bench made no difference, and only completely re-installing Windows 95 made the problem go away. I never did discover what caused it!



- ▶ configured specific DOS drivers for your CD-ROM drive (Windows 95 doesn't use them), you won't be able to load any files from CD-ROM. The Command prompt allows you to load and run DOS programs and carry out file maintenance — a basic text editor kept on your hard disk will allow you to edit configuration files, for instance, and some people prefer the speed of putting a REM (remark) in front of suspect lines and then rebooting, rather than single stepping through as in the previous option. However, the biggest advantage of reaching the Command prompt is access to utilities — not only *Scandisk* to check your hard drive for problems; if you own *Norton Utilities* (see the April '97 issue for my review) then you can start a wealth of 'bail out' recovery programs which can pinpoint problem areas, or even repair your hard disk if they find problems. The final option on the Startup screen is 'Safe mode command prompt only' and you should use this if Windows 95 fails to start even in Safe mode. In addition to loading only the absolute minimum set of drivers, this causes the Command prompt to appear once more, so that you can rummage around your files and utilities to sort out the problem.

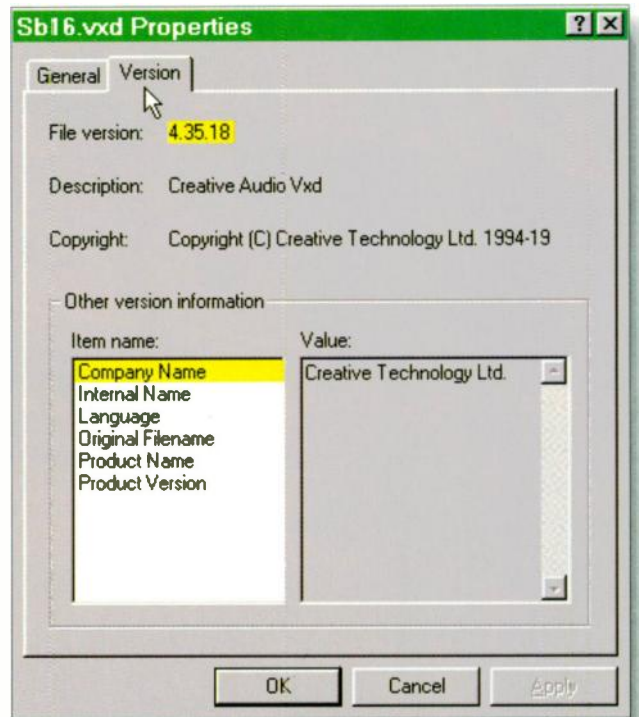


Figure 7: You can find the version number of system files via the 'Properties' option in Explorer — this can help when you're trying to narrow down problems caused by badly behaved installations (see box), but often the old datestamp of the file will give the game away first.

## WHEN THINGS ARE FLAKY

If you notice anything unusual while you're using your PC, such as an error message that hasn't come up before, don't ignore it because something else seems more important — when you finally return to it the chances are that so many other things will have since changed that the cause of the problem will be far more difficult to track down. The first thing to do is not to frantically re-install everything you can, but to try to narrow down the possible causes. What have you changed or installed recently? If the error is confined to a particular application, either giving an error message about a missing file, or simply ignoring you, it's most likely due to an accidentally deleted or corrupted file, or even another new application (see the 'Badly Behaved Install Routines' box). You can normally resolve the problem either by manually copying the offending file from the original application disk, or by

## HOT STUFF

There's been a lot of discussion about whether leaving your computer on 24 hours a day will give it a longer or shorter lifespan. Since leaving it on avoids switch-on surges, this would seem to indicate less stress on the system. In fact, it's temperature that causes more problems than anything else — or rather changes in temperature. When you switch on your machine, it starts at room temperature, but within the next 30 minutes or so some components may end up at 80° Centigrade (even more if your

cheap CPU cooling fan breaks down and gives you a quick-fried Pentium!). Every component will thermally expand by a slightly different amount, and then, when you switch off, everything cools down again at different rates. Over long periods of time this continual expansion and contraction can cause stress cracks in components and circuit boards, and chips have been even known to slowly walk out of their sockets. Intermittent hardware problems can sometimes be cured by gently applying downward pressure to suspect chips to re-seat them in their sockets.

Because of these thermal problems, some people prefer to leave their machines on continuously, but of course this increases running costs by a small amount, and if a fault does develop during the hours of darkness then you could be in trouble, with no-one there to notice the smell of burning. In the long term, the best operational solution is to switch on at the beginning of the working day, and only switch off when you finish at night. Don't bother to power down during coffee or lunch breaks, and you should give your cossetted machine the best chance of a long and happy life!



## HARDWARE DETECTION PROBLEMS

completely re-installing the problem application, to ensure that all files are reinstated.

Re-installing can extend as far as Windows 95 itself. It is quite easy to run the SETUP.EXE file on the Windows 95 CD-ROM or floppy without disturbing the rest of your applications, and this is often the only way to recover from strange problems. If Setup detects an existing Windows 95 installation, it provides an option to verify installed components, and if any verify fails during Setup then individual files are re-installed. I recently found that the System applet in Control Panel didn't run at all (I'm not sure when it stopped working, and I never did find out why it happened), so I just re-installed Windows 95 over the top of itself, and this cured the problem. If you have installed any applications that have newer shared Windows 95 components, such as DLL files, Setup will detect them during the re-install, and pop up a prompt asking whether you wish to keep the newer versions. In nearly all cases you should answer 'Yes', to save your having to update them later — the only exception is when you think that the file may itself be causing the problem.

If the fault relates to a specific piece of hardware, then it may be due to a driver problem, or conflicting hardware resources. This will exhibit itself either by an Error dialogue box popping up when you try to use the device (if you're lucky), or

When you're installing new hardware in a mixed Legacy (pre-Plug and Play) and Plug and Play system, selecting 'Yes' when Windows 95 asks 'Do you want Windows to search for your new hardware?' can, in my experience, sometimes result in a crashed machine. If it does, when you switch off and then reboot as suggested, the machine may end up with an incomplete picture of what hardware is actually connected. On one occasion I did this while I still had a review model TEAC CD-R50S plugged in, and after rebooting the Device Manager claimed that there were three of

the things connected! Until anomalies like this are resolved, the PC may also continue to crash before reaching the Windows 95 desktop. You can normally just 'Remove' the duplicates via Device Manager in Safe mode and reboot to solve the problem, but if this happens to you during the installation of Windows 95 itself, the correct procedure to follow is to run Windows 95 Setup again. The previous crash should be detected on rebooting, and the Safe Recovery dialogue box will appear (see Figure 3 on page 84). Select the Use Safe Recovery option, and then Windows 95 Setup can use built-in methods to avoid the problem that previously occurred, and thereby finish the installation without causing the same crash.

a crash when Windows 95 is booting up. If you get a crash, try rebooting into Safe mode. If this works (and it nearly always does), you can get into Control Panel and either change or remove the offending driver, and then try booting normally. In my experience, the most common cause of PC crashes are either Legacy/Plug and Play hardware clashes after you've plugged in a new expansion card, or wrongly installed drivers. For more information on these, see my 'Hardware Made Easy?' feature in the March '97 issue. And if you can't remember the name of your soundcard, then look on the packaging; don't expect to get very far by trying to install the soundcard driver that has the most familiar name — don't laugh, I know someone who did just that!

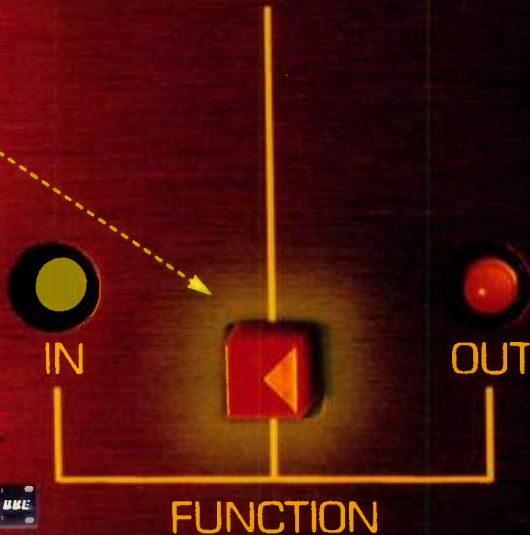
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# MAKING

## SOUND SYNTHESIS ON A COMPUTER

# WAVES

**PART 2: DENNIS MILLER concludes his short series on computer-based synthesizers by looking at some hybrid software/hardware synthesis systems, and introducing the powerful software synth language Csound.**

### HARDWARE-AIDED SOUND SYNTHESIS

In the first part of this short series, in last month's *SOS*, I looked at a number of programs that create sound directly on the desktop without requiring any additional hardware. This month, I'll finish off by examining several systems that combine sound-design software with hardware that accelerates the sound-creation process. These are Symbolic

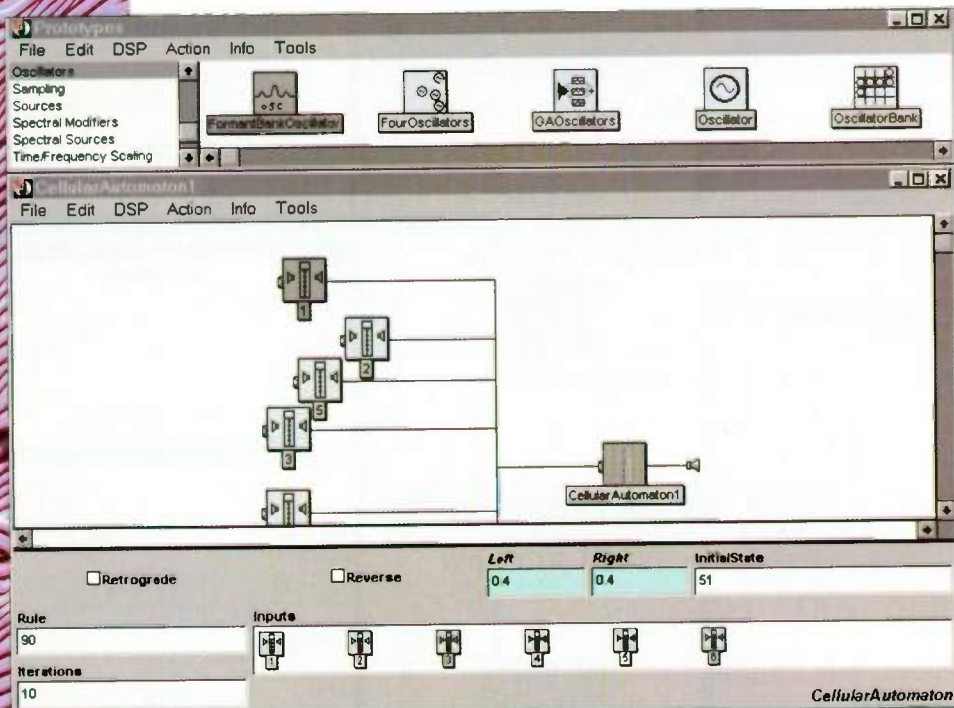
No matter how fast and powerful our desktop computers become, there will always be a strong case for using dedicated sound hardware. Not only will musicians continue to have an insatiable appetite for power ("My mate can do 100 voices of FM on his box and I'm topped out at 75!"), but the non-musical demands for CPU cycles will continue to increase as well. By combining the signal processing chips found in most synths with a highly flexible, graphic front-end, some developers have taken a hybrid approach to desktop synthesis, combining the best of both worlds. The following two systems make use of additional PC hardware to help generate the sounds you design (a third, the as-yet-unreleased MARS System, is covered in the 'MARS Exploration' box elsewhere in this article). Of special note in this category is the Kyma System from Symbolic Sound.

Though there have been other attempts to create systems of this type, mostly relegated to research labs at major academic institutions, none have managed to endure for as long as Kyma, nor develop into such powerful, all-encompassing systems.

#### • KYMA

The Kyma System from Symbolic Sound Corporation is a synthesis workstation that combines user-friendly, graphic sound design software with a black box called the Capybara. Inside the Capybara are from two to eight Motorola 56002 DSP cards running at 66MHz, which provide the horsepower needed to synthesize the sounds you design. Like the sound design programs covered in the first part of this article, Kyma provides an extensive set of sound generating and processing modules that are linked together on-screen, but your designs are then turned into audio in real-time by the Capybara. What sets Kyma so far apart from any other system is the amazing number of options that exist for controlling sound. Any type of data,

whether MIDI, real-time analogue input, scripts, or even ASCII characters extracted from a text file on your drive, can become control information for Kyma's sounds. Kyma also includes basic modules for virtually every type of synthesis and signal processing you can imagine. These modules, which Kyma calls Sounds, appear in the Prototype strip along the top of the main screen and are organised by categories (see Figure 1). You'll find many of the tools needed to create analogue



**Figure 1:** Kyma's Prototype strip organises all the sound producing and processing modules by category.

Sound's Kyma System; Native Instruments' Generator; and the MARS workstation from IRIS, which will appear later this year. I'll also take a close look at the software synthesis program Csound and some of the developments that are under way to make this powerful application friendlier and faster. Of the four programs, Csound and Kyma are available for the Mac as well as the PC, while MARS and Generator are for PC use only.



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no need for remote supplies	✓	
for desk, flightcase or rack mount	✓	
for external signal processing	✓	
no fussy external pack	✓	
no fiddly concentrics	✓	
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Extra AB output	✓	
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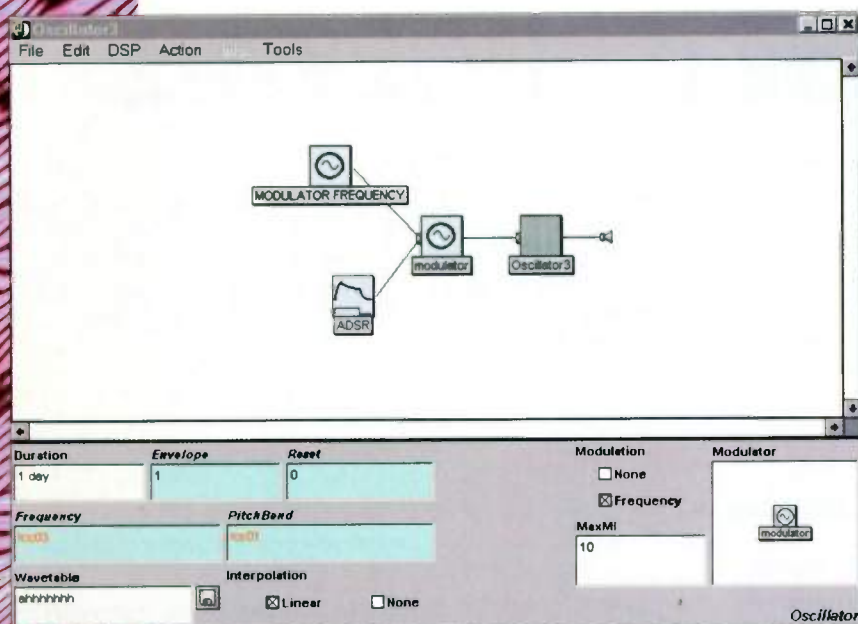
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# SOUND SYNTHESIS ON A COMPUTER



**Figure 2:** Kyma's sound editor displays the individual modules in each sound and the different parameters that control them.

► sounds (as well as dozens of excellent examples that come with the system), plus a huge variety of options for other types of sound synthesis and manipulation. Every Sound in the Prototype strip is ready to play — ie. it contains appropriate values for the various parameters it requires. When you want to change some aspect of the prototype sound, you open a sound editor window and drag a copy of the module into it. Though you can think of these prototypes as presets in your synth, the ability to alter every aspect of their structure, and chain numerous modules together, goes well beyond the basic concept of a synth preset.

Among the other categories you'll find in the Prototype strip are familiar synthesis tools such as oscillators, filters, delays, reverbs, and pitch-

“No matter how fast and powerful our desktop computers become, there will always be a strong case for using dedicated sound hardware.”

shifters. There are functions for playing sounds off your hard drive, sampling into the included sample memory on each installed DSP card (minimally 3Mb, and expandable to 12Mb per card), and playing multiple soundfiles from disk, each with independent processing. Other modules can be used for granular synthesis, spectral morphing and waveshaping. But it's the wide range of control options that's most impressive. For example, you can use a MIDI controller to alter the pitch of a soundfile as it plays back off your drive, or use an envelope to speed up and slow

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Project 1



# SOUND SYNTHESIS ON A COMPUTER

► down the playback rate automatically. Even more unusual is the ability to attach a microphone to Kyma's analogue input, and have the pitch or amplitude of your voice change the file's playback speed in real-time, so that as you sing louder or higher, the file speeds up or slows down! This trick is accomplished by using a pitch or amplitude tracker to detect fluctuations in your voice, then having that data modulate the playback rate of the soundfile player module.

A more conventional work session might go as follows: drag an oscillator from the Prototype strip into a new sound edit window and double-click on its icon to bring up a view of the parameters that make up the sound (Figure 2). There are fields for controlling the sound's frequency, duration, wavetable, and envelope, and you can also convert the oscillator into an FM carrier by simply clicking on the Frequency tab under Modulation source. A setting to control the oscillator's response to pitch bend is also adjustable from this window.

To vary the sound of this oscillator, other

“But it's the wide range of control options that's most impressive.”

sounds can be used to control its editable parameters. For example, dragging another oscillator into the frequency field gives you an LFO with dozens of waveshapes to choose from, while assigning a MIDI controller to the envelope field allows you to vary that parameter as the sound plays.

Things get really interesting when you connect the oscillator to other modules to make a complex sound. For example, you can take the output of the oscillator and connect it to the input of a granulator whose frequency and duration parameters are under the control of your own, ►

## MARS EXPLORATION

The Musical Audio Research Station (MARS) from the Italian Bontempi-Farfisa Research Institute Group (IRIS) is a hardware/software combo that has extensive real-time sound design capabilities. Although it is still at the early beta-testing stage (and currently lacks any English documentation!), I have spent several months with the system, and have been impressed with the direction it's taking.

MARS consists of an internal sound generation board that contains the system's proprietary DSP hardware, plus a configurable external audio unit that provides up to eight analogue ins and outs, and eight AES-EBU digital I/O connections. The unit also has ports for MIDI, volume controls and a headphone jack. Each board can be expanded with up to 64Mb of sample RAM, and you can build a system with up to eight separate sound boards, for a total of 64 discrete audio channels.

The MARS hardware is controlled by graphic software called the *Audio Resource Editing System (ARES)* that runs under Windows 3.X or Windows 95. There's also an integrated *WaveTable Manager* utility that is used to transfer wavefiles between the sample RAM and your hard drive, and a catalogue browser that stores the various sound resources that are associated with a project. Like the Kyma system, software upgrades and patches can be downloaded from the company's web site.

ARES's basic design layer is called an algorithm, which represents a combination of signal processing functions that are 'patched' together by the user (see screen below). There are nearly 200 individual modules that can be used to design algorithms, including numerous oscillators, filters, pitch and amplitude transformers, and modulators. You'll also find traditional effects, such as reverb and chorus, plus very convincing operators for creating physical models. Other functions are also available to assist in

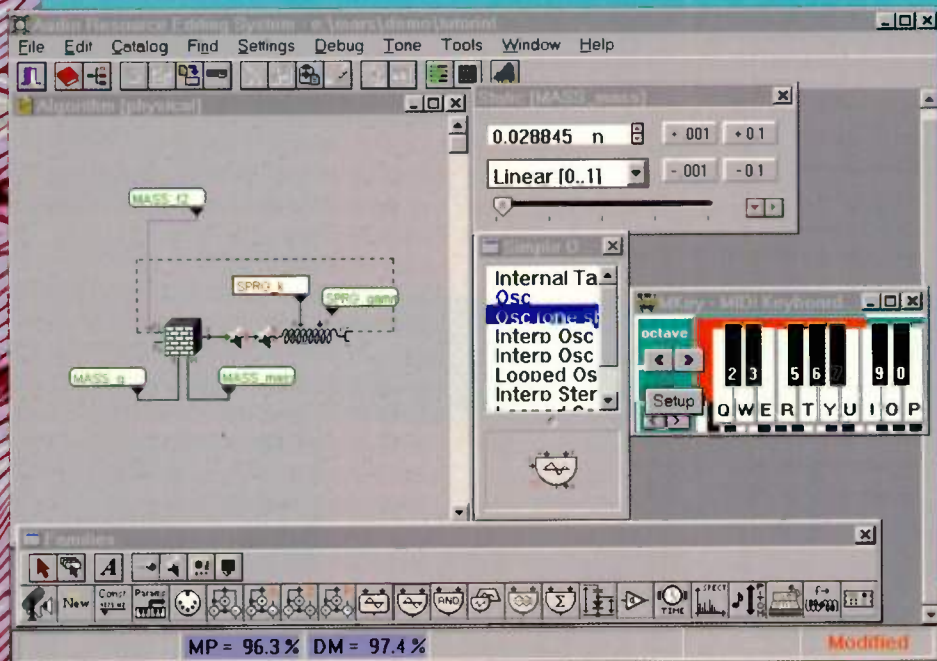
the design process, like an oscilloscope that can 'tap' into your design and display the signal at any point, and a graphic MIDI keyboard for sending Note On and other messages directly to your sound.

Once you've designed an algorithm, you next work with a Tone, which assigns various performance parameters to the algorithm. Parameters can be static (which means they will have a set value); or dynamic (they can be altered in real time via a MIDI controller), and you can build multiple tones with different settings for any algorithm. Next comes the Orchestra, where you define all audio routings for the system, and set up multitimbral MIDI environments, which the system calls Tonemaps. A Tonemap links Program Changes to Tones, and routes the tones to specific MIDI channels.

Overall, the system's architecture is very intuitive, and no more complex than that of an average professional synth or sampler. Even without documentation, I found it easy to design a sound containing several dynamic parameters, which I could then control from a sequencer running on the same computer. Another appealing aspect of working with MARS is that while you're editing, everything is updated in real time. If you're designing an FM sound, for example, you can draw the envelope that controls the carrier's frequency directly on the screen, and hear any changes you make to its shape instantly. Or you can add effects and filters to a sound by dragging them into the signal design, and the system will immediately update your sound. Numerous shortcut keys, plus access to all the program's basic functions via tool bar buttons, also make sound designing an easy and intuitive task.

The MARS System, complete with documentation and extensive tutorials, should be shipping by the time you read this. It won't come cheap, though — basic systems with professional-quality audio will start at approximately \$5000 US.

*MARS uses a modular approach to sound design, and allows you to view numerous work areas simultaneously.*





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# SOUND SYNTHESIS ON A COMPUTER

► custom-built envelopes. Then you could send that sound to a resonator whose frequency is controlled by incoming MIDI note events, and whose decay time is a function of yet another LFO with its own custom shape. Finally, the sound may be routed to a delay line and then to a panner, whose position may be modulated by the same controller data used in the original oscillator. This entire example takes only a few minutes to create, and uses just a small amount of the

system's available resources. It's also worth remembering that the size of the file representing the design of any sound, no matter how complex, is trivial when compared to the actual audio the design produces. As a result, you can store hundreds of designs in your library.

Kyma has always had interesting spectral processing, but the most recent version (4.5) easily offers the most advanced real-time capabilities around for manipulating spectral data. The morphing modules, for example, let you analyse the spectrum of a time-varying sound, and apply that spectrum to another signal in real time. You can use the included examples to automate the morphing of two sounds, or design a sound that responds to a slider you move on screen, or to MIDI control data from a file on disk. A graphical spectral editor allows you to view and hear each individual partial of a sound (analysis of up to 512 partials per sound is possible, with around 300-400 total sine wave oscillators available for resynthesis), and you can turn partials on and off as easily as solo'ing tracks in your sequencer (see Figure 3, on page 102). Quite a fun tool!

The Kyma System has been around for a number of years and continues to develop with each new software revision. This is one system that you'll just have to see (and hear!) to believe.

“Kyma has always had interesting spectral processing, but the most recent version easily offers the most advanced real-time capabilities around for manipulating spectral data.”

## Roland

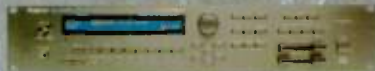
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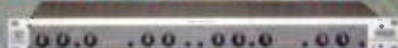
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## KYMA ANTICS

It's one thing to read about a new sound technology, but sometimes it can be even more interesting to hear stories about how people are really using it. Here are a couple of real-life applications of the Kyma System. For more stories like these, visit Symbolic Sound's website ([www.symbolicsound.com](http://www.symbolicsound.com)).

### • SUMMONING SPIRITS FOR SMIRNOFF

Pete Johnston, resident audio alchemist for London's Tape Gallery, turns men into women, women into cats, and Londoners into New Yorkers using Kyma's 'sound-sculpting' facilities — by breaking sounds up into hundreds of constituent sine waves, and then resculpting them in various ways, while still retaining

some of the complexity and liveliness of the original recordings. The resculpting, which is done in real time, can be anything from a spectral morphing of one sound object into another, to modifying the apparent size of an object, or even making it sound more stressed or aggressive.

Tape Gallery's radio spot for Smirnoff vodka evokes startling mental images of people morphing into animals or changing gender in mid-sentence as a bartender walks by with a transformative bottle of Smirnoff on his tray. You can hear this 90-second bit of audio theatre at their web site ([www.tape-gallery.co.uk](http://www.tape-gallery.co.uk)) via streaming audio.

### • RESISTANCE IS FUTILE

If you saw *Star Trek: First Contact* then you'll have

heard the work of Hollywood sound designer Francois Blagnan, who used Kyma to process the voice of the Borg (heard most prominently during the opening and recurring dream sequences, and in the obligatory sci-fi alien threat, "Lower your shields and surrender your ship... Resistance is futile"). Francois has now started his own company, Sound Rules, which specialises in cross-synthesis (the application of characteristics of one sound onto another). For example, to create the sound of a sleeping statue on a recent *Muppets Dr. Seuss* TV show, Francois used Kyma's RE (Resonator-Exciter) modules to impose the formants of a man snoring onto a sample of a rock slide; the result sounds like snoring rocks (hear it at [www.symbolicsound.com/demo-crossynth.html](http://www.symbolicsound.com/demo-crossynth.html)).

### • GENERATOR

One of the newest systems to appear on the PC is the Generator from German company Native Instruments. Generator is a sound design system that combines a single-slot ISA card with a modular software interface. Unlike the MARS and Kyma systems, which use their hardware to accelerate the computation of sound, Generator relies completely on the host CPU, so a fast processor is a necessity. The included hardware minimises the latency time between control events, such as MIDI Note On/Off messages that

are sent from external sources, and the audio output. The card also functions as a D/A converter, providing two-channels of high-quality analogue output at variable sampling rates. The system comes with dozens of modules that are used to build sounds, plus numerous complete examples that are ready to play.

Generator has a very intuitive interface that allows you to design sounds quickly and easily. All its basic modules can be accessed by clicking in the work area with the right mouse button (see Figure 4 on page 106). Here you'll find a pull-down menu

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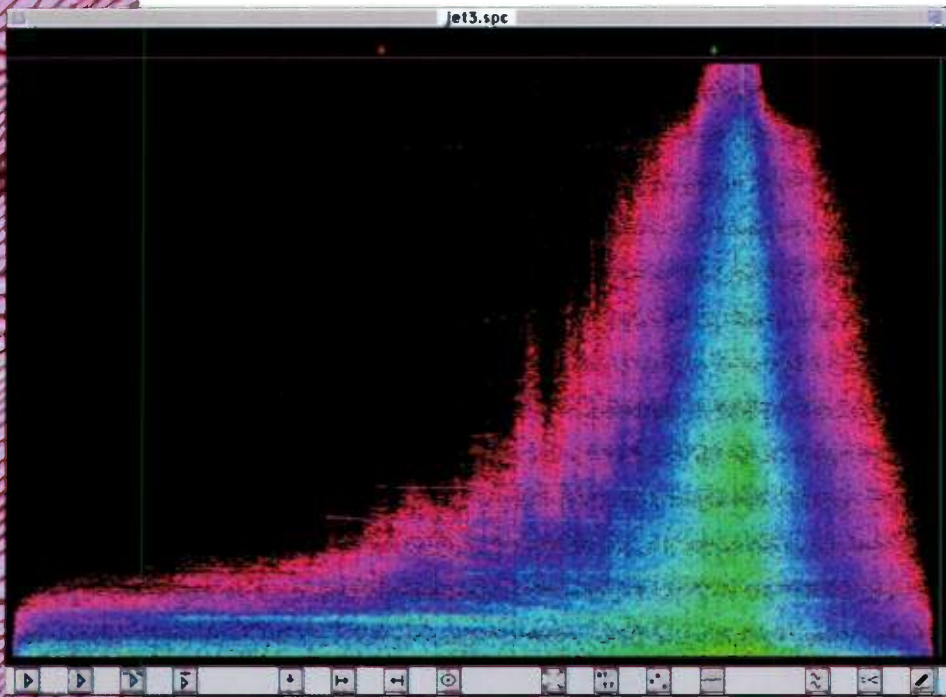
# SOUND SYNTHESIS ON A COMPUTER

- ▶ containing the different categories of modules the system provides. These include 'elementary modules' such as oscillators, filters, envelopes, and various effects, plus functions to control audio routings, MIDI mappings and more. Select any module from the list and it appears on the workspace, where it can be connected to any

parameters in the entire design (Figure 5). As you move the faders, changes take effect immediately, and you can capture the panel's current settings at any point in a 'snapshot' file, and recall the snapshots at any time.

Generator also provides multitimbral capabilities, by allowing you to create so-called Ensembles that contain numerous independent synthesis structures. Each structure can have its own MIDI channel and keyboard zone, and you can also specify the voice allocation for any sound in your ensemble.

By coupling a soundcard that offers extremely fast response time with a CPU-based, sophisticated sound design engine, Native Instruments has



*Figure 3: The spectral editing capabilities in Kyma are extensive and include the ability to turn partials on and off as easily as muting tracks in a sequencer. You can also scrub the spectral display using your mouse.*

other appropriate element. You can then play your design immediately, though you may have to adjust the output sample rate if the sound is very complex, or if you are requesting a large number of voices.

Generator calls its basic designs Structures, and any structure, no matter how complex, can be stored as a so-called Macro and re-used in another structure. Like the individual modules in a structure, the macro is represented as a single icon, which makes moving or manipulating very complex designs a breeze. Every structure has an associated Panel window, which is a single screen full of faders that represent all the adjustable

“Generator is an exciting product that should continue to grow with the ever-increasing CPU power of the future.”

accomplished quite a feat; Generator is an exciting product that should continue to grow with the ever-increasing CPU power of the future.

## CSOUND

When Max Matthews developed the first programming language for sound in the 1950s (see last month's SOS), he probably didn't imagine

## A FASTER CSOUND

Csound has been enhanced numerous times throughout its life, but one of the biggest changes is taking place as you read this. Barry Vercoe, the program's creator, has written a new version of the software that can produce sound in real time using new hardware from Analogue Devices Inc. (ADI). ADI's Sharc DSP chip is a very fast, floating-point processor that has been adopted by Generalmusic and Denon Nippon for music products due to appear later this year. Though the chip has not

yet found its way onto a 'virtual synthesizer' product, such as those described in this article, that development seems inevitable.

According to Richard Boulanger, Professor of Music Synthesis at the Berklee College of Music in Boston, and a key architect of the new Csound, desktop musicians will be in for a treat as new products that incorporate the Sharc chip and Csound appear. "Back in the old days, we used to wait while our processors crunched Csound code. It

could take hours for a sound lasting only a few minutes to compile. With new Pentium chips, those hours have become minutes, but with Csound running on the Sharc, there's no wait at all. As soon as you've finished designing your sound, you hear it played back instantly."

This development will have a major impact on the large and growing community of current Csound users, and should provide an incentive to musicians who have yet to explore Csound's potential. Keep your eye on Csound's web site for further information!



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# SOUND SYNTHESIS ON A COMPUTER

► that what he created would survive and grow for dozens of years to come. *Csound*, written by Barry Vercoe at the MIT Media Lab, is a direct descendant of Matthews' *Music N* programs, and is easily the most powerful and widely used sound-synthesis language around. There's an extensive community of *Csound* users all over the world, and numerous utilities have been written to make working with the language easier and more intuitive. There are also some important hardware developments that will have a big impact on harnessing *Csound*'s power. These are covered elsewhere in this article (see the 'Faster *Csound*' and '*Csound* Support' boxes), but first, here's an overview of this public domain software.

*Csound* retains much of the structure of the original *Music N* programs: there are dozens of modules available that can be 'wired' together (all in software, of course!) to create an unlimited number of sound combinations. *Csound* calls these modules unit generators, and understanding them is the key to getting the sounds that you want. Many of these unit generators, such as the reverbs, filters and delays, are familiar to anyone who has ever edited a patch on their synthesizer. A number of the others, though, are far more esoteric and require a good knowledge of sound design to use effectively.

To give you an idea of how *Csound* works, take a look at the basic example below. This is an ►

## CSOUND SUPPORT

Because *Csound* has been around for so long, a large number of support programs exist that make score and instrument creation much easier. One program, *MIDI2CS* by Rudgerr Boerman, for example, takes a standard MIDI file and turns it into a *Csound* score. That allows you to send MIDI data out to your synth at the same time as an audio version of your music plays back. It's also a convenient way to build *Csound* scores using a composing environment that you might be more familiar with.

W [www.inx.de/%7Erubo/songlab/midi2cs/download.html](http://www.inx.de/%7Erubo/songlab/midi2cs/download.html)

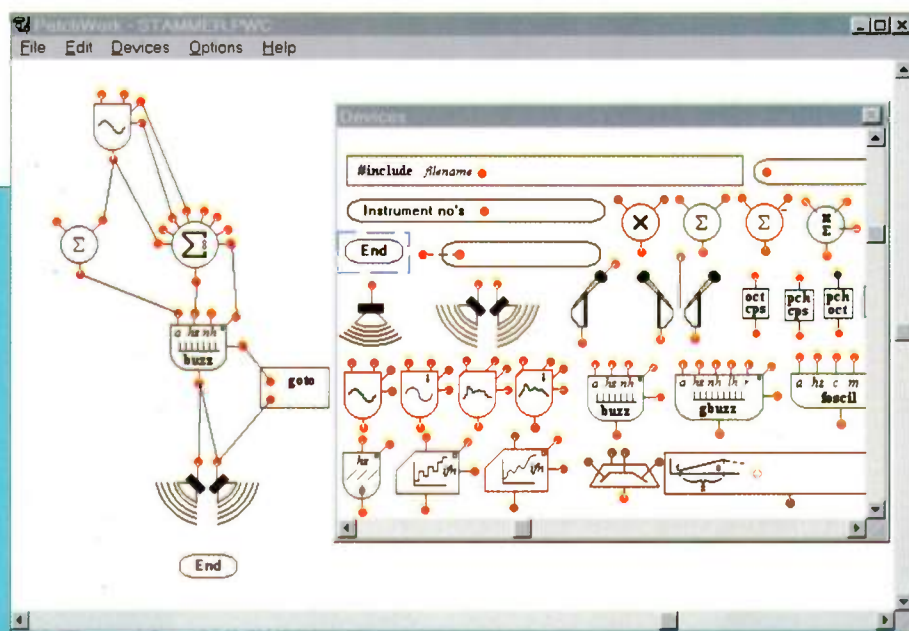
Michael Cugins has developed an entire interface for working with *Csound*. Using Cugin's program *Silence*, you create 'libraries' of orchestra files, each of which can contain dozens of individual instruments. You then specify which instruments are to play which scores. Cugins has also made some important physical models compatible with *Csound*. These models, developed by Perry Cook of Princeton University, accurately reproduce a number of acoustic instruments in software.

W [www.pipeline.com/~gogins/Silence.htm](http://www.pipeline.com/~gogins/Silence.htm)

Another approach to creating soundfiles comes from *Csounder*, a program that serves as a graphic front-end to *Csound*. This program, which is more of a 'launcher' than a design tool, shows you all the available score and orchestra files in your designated directory, and lets you pair one of each for compiling by *Csound*. In addition to setting the name of the output soundfile you want *Csound* to create, there are also a number of other helpful utilities included in the program.

W [www.omnids.com/software/index.html](http://www.omnids.com/software/index.html)

If you're interested in algorithmic score generation, where your computer picks the notes based on the selection criteria you specify, you'll find Eduardo Miranda's *Chaosynth* very useful. This program is currently only available for the SGI, but the score



Russell Pinkston's *Patchwork* is a graphic instrument builder for *Csound*, and includes icons representing all the basic functions of the program.

examples available on the web site below work with the PC and Mac versions of *Csound*, and can be edited easily. Watch for some exciting PC developments later this summer.

W [www.music.gla.ac.uk/HTMLFolder/Staff/edulect/intro.htm](http://www.music.gla.ac.uk/HTMLFolder/Staff/edulect/intro.htm)

For building *Csound* instruments, Russell Pinkston's *Patchwork* is a good choice. Like many of the sound design programs mentioned in the first part of this survey, *Patchwork* lets you link together icons that represent all the functions *Csound* provides, then turns them into a complete orchestra file, ready to run with the score of your choice (see screen above). Because this program displays *Csound*'s unit generators graphically, building sounds is very intuitive.

E [ftp.maths.bath.ac.uk/pub/dream/Csound\\_FOR\\_PC/utills/pw/](http://ftp.maths.bath.ac.uk/pub/dream/Csound_FOR_PC/utills/pw/)

There are thousands of demo *Csound* files available on the Internet, but one collection bears special mention. The Amsterdam Catalog of *Csound* Computer Instruments (ACCCI) is the most thorough

group of files I've come across. The files are organised by the different synthesis methods *Csound* provides, which makes them very easy to grasp. Though the actual instrument designs are fairly basic, the volume is so comprehensive that you'll definitely want to check it out. The collection is available at the address below.

W [mars.let.uva.nl/gather/accci/download.html](http://mars.let.uva.nl/gather/accci/download.html)

And, of course, no survey would be complete without mention of the mother of all *Csound* sites, maintained by John Fitch at the University of Bath. The first address below takes you directly to the PC version of *Csound*, where you'll also find numerous related programs. To explore the huge number of utilities that support *Csound*, plus all the different versions that are available, simply back out one directory at a time. You could also start your explorations at the second address given below, which includes links to *Csound* sites around the world.

W [ftp.maths.bath.ac.uk/pub/dream/Csound\\_FOR\\_PC/bin/](http://ftp.maths.bath.ac.uk/pub/dream/Csound_FOR_PC/bin/)

W [www.leeds.ac.uk/music/Man/c\\_front.html](http://www.leeds.ac.uk/music/Man/c_front.html)



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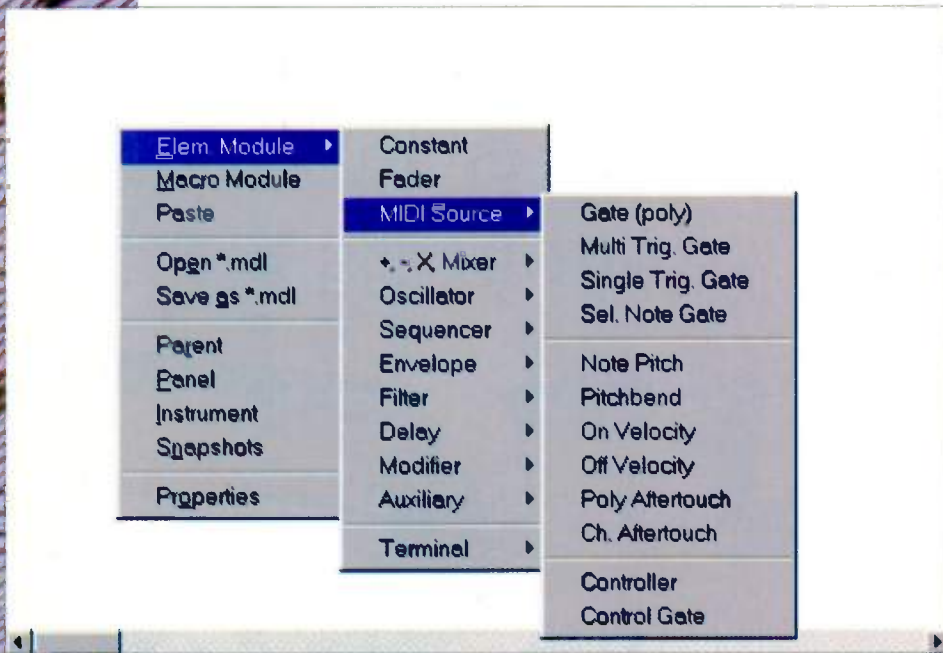


Figure 4: Native Instruments' Generator uses a hierarchical menu structure to provide access to its numerous sound modules.

► actual file that *Csound* will use to create a sine wave with a frequency of 440Hz. It's a very dull sound, but a good starting example.

```
sr=44100
kr=4410
ksmps=10

instr 1
a1 oscil 5000, 440, 1
out a1
endin
```

This is part of the information *Csound* uses to create a soundfile on your hard drive. In *Csound* terms, these lines represent one 'Instrument' in an 'Orchestra' file, and the only thing missing is a score for this instrument to play. Notice that there are three lines at the top of this example starting with 'sr=44100'. This command sets the sample rate for the soundfile. On the second line, 'kr' represents the 'control rate', which is a secondary rate used for elements of the design that don't need to be updated with the accuracy of the oscillator itself. The third line simply does some division that the program requires to kick things off.

The real fun begins with the second half of the example, where the sound is actually designed. This *Csound* instrument is labeled 'instr 1' because it is the first (and here, the only) instrument in the Orchestra. The 'a1' on line five is the label or tag that represents the result or output of the process *Csound* will perform. That process is the 'oscil', which is a function *Csound* provides for looking repeatedly into a wavetable. When the 'oscil' frequency and amplitude are specified, it will output the values it finds in the table. You can then take that output and use it however you

want; you can listen to it, by telling the program to write a soundfile with that data in it, as in this example, or the output could be used to control some other oscillator, which would be the software equivalent of an LFO.

The amplitude in the above example appears to the right of the word 'oscil' and is set at 5000. This is an arbitrary number used to scale the values in this wavetable, since internally, they're normalised from -1 to 1. That range of numbers wouldn't be strong enough to produce any sound (keep in mind that this whole process is generating samples, which are the changing amplitude values of the sound being designed). The frequency is given as 440, calculated in cycles per second, which will produce the note A. The final value on line five, the number 1, is a reference to the wavetable the oscil should use, which must be built or generated before you can hear anything. That's done with a line in the score.

One of the most important functions of a *Csound* score is to build the various wavetables instruments will read from. *Csound* provides numerous wave-generating (or GEN) functions specifically for this task. You can build absolutely any arbitrary waveform using these functions and for our sine wave, GEN function 10 will do nicely. Like all the functions in *Csound*, GEN 10 requires certain parameters, or 'arguments', to do its work.

“There's an extensive community of *Csound* users all over the world...”

Specifically, this wavetable generator requires that you specify the strengths of each harmonic partial relative to the fundamental. To generate a sine wave, you would need only a single number, 1, because a sine wave has only one partial. The exact syntax needed to build a sine wavetable is shown below:

```
f1 0 8192 10 1
```

Notice the numbers 10 and 1 at the end of this line. The 10 indicates GEN 10, and the 1 specifies a single partial — so the result is a sine wave. The 'f1' at the beginning identifies this line as f (for 'function') table 1, which refers back to the number '1' used at the end of the oscil; the '0' indicates that this table needs to be built right at the beginning of the sound, ie. '0' delay; and



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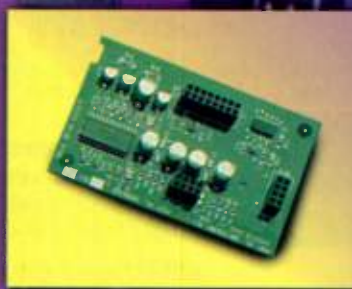
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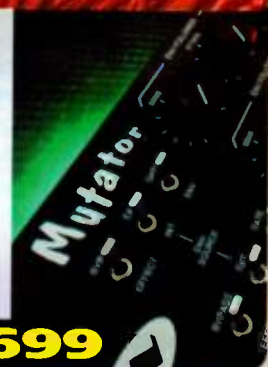
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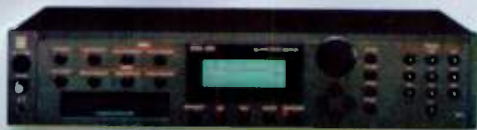


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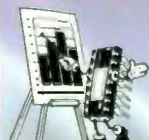
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As *Sound On Sound* Editor Paul White remarked in his Leader column a few months ago, it seems to be human nature that as soon as we've found a solution to a problem, we crave a new problem to solve. Analogue magnetic recording has been with us since the turn of the century (which is longer than even Paul and I can remember) and has been of sufficient quality to record music since the 1940s. A further period of 40 years of development brought analogue magnetic recording to the peak of its capability, with a noise floor lower than 16-bit digital audio (courtesy of

process. Distortion is measured as a percentage, and a 16-bit digital recording can offer distortion figures of around 0.01% or less, which not even Superman can hear. With an analogue recorder the figure increases according to how much level you put on the tape, so you have some control over how much distortion you want. It is usual to record at levels which will produce around 1% distortion on peaks, or up to around 3% if you are really pushing it. Listen to one of my old favourite albums, *Who's Next?*, by The Who, if you want to hear the obvious, yet creative, use of tape distortion. It is possible to use more distortion on multitrack tape than on stereo tape, where you have to be a little bit careful.

Harmonic distortion is the addition of whole-number multiple frequencies to the original frequencies on the tape. This happens naturally in musical instruments, so we tend to think of harmonic distortion as 'musical' distortion.

## ALL ABOUT ANALOGUE MULTITRACK

# Reel world

*Just as analogue synths fell temporarily from grace in the face of digital synthesis technology, so analogue tape seems to be succumbing to the digital recording revolution. But DAVID MELLOR argues that a wise musician is one who learns the lessons of fickle fashion...*

Dolby SR noise reduction), a frequency response way beyond the limit that 48kHz sampling imposes, wow and flutter figures below audibility on the most demanding material and last, but not least, a gloriously musical sound quality that makes digital recording seem like forensic science in comparison. Yet in recent years we have been moving over to digital recording with a headlong rush of such vigour that even lemmings would pause to wonder at our folly!

Having been an audio lemming myself, who discarded an analogue multitrack for a digital version, I have in some respects come to see the error of my ways, and on cold, lonely nights in the chill digital air-conditioning of my studio I dream of basking in the glow of a warm analog fire. Let's take a look at some of the advantages analogue multitrack had (and has) to offer, and consider some of the trivial problems that led us to think that digital was a more attractive option.

### WARMTH AND SPLENDOUR

Perhaps the greatest advantage of analogue recording is its wonderfully 'warm' sound quality. Warmth is the word commonly used to describe the distortion inherent in the magnetic recording

Unfortunately, harmonic distortion also leads to intermodulation distortion, where sum and difference frequencies are added which are not musically related to the original signal. Intermodulation distortion isn't too noticeable on single notes, but can sound absolutely horrible on combinations of notes. On a multitrack recording, each track is distorted separately, so intermodulation distortion is kept to a minimum. Before the days of digital recording we actually used to think that the less distortion there was on a recording, the better that recording would be. Now we know that this is not always true, that distortion is a useful musical tool, and that the analogue multitrack recorder is the optimum environment in which to use it.

I mentioned frequency response earlier, but I

“To dispose of analogue recording would be like asking artists not to use oil paints any more because modern acrylic paints are now available.”



don't think I need to say too much about it. A digital recorder will have a frequency response going up to around 20kHz. An analogue recorder can exceed 25kHz. Although few people can hear frequencies as high as this when tested with sine wave signals, it is widely believed that these frequencies do make a useful contribution to a recording of music. Which is why you'll find sampling rates of 96kHz at the leading edge of digital technology; this rate should be able to offer a frequency response of better than 40kHz in theory.

### PROBLEMS? WHAT PROBLEMS?

Analogue recorders do have their problems. But some characteristics that seem problematic on the surface turn out to be to our advantage. One such 'problem' is flutter. Normally we speak of wow and flutter as though they always go together like Pinky and Perky (old timers will remember the two puppet pigs who sing in high-pitched voices courtesy of a slowed-down tape recorder — try doing that with your ADAT!). Wow, being a variation in pitch which takes place over around a tenth of a second or more, is usually undesirable. Flutter is the same thing but it occurs over a shorter timescale. If you looked at the spectrum of a sine wave tone recorded on a digital multitrack you would — or at least should — see just one line, the original tone. With an analogue recorder, you'd see a whole host of lines, which represent the original tone plus the sidebands produced by the frequency modulation caused by flutter. Is this undesirable?

To a technical engineer, yes. But to anyone with musical ears, this effect is perceived as a 'thickening' of the texture, and applied individually to each separate track of the multitrack tape it can sound great.

Analogue tape suffers from drop-outs, too, where its magnetic coating is imperfect. Drop-outs which last half a second or more are bad news, but analogue tape also has what could be called micro drop-outs, where the signal 'dims' for a fraction of a second. These micro drop-outs can occur many times in each second and are most obvious if you record a sine wave tone on one of the edge tracks of an analogue multitrack. This will sound horrible, but, once again, on a real music signal it seems to be beneficial, and can make an analogue recording actually sound better than the original input signal. No-one has ever claimed that a digital recorder could do that.

### WHERE ARE THEY NOW?

Now that I've whetted your appetite for analogue multitrack — and I've held back some more tasty morsels to serve up later — you might be wondering where you can get your hands on one. The answer is: you can't — not new, anyway. Fostex and Tascam were the two major manufacturers of affordable analogue multitrack. Fostex have ceased production and Tascam are winding down. If you've just won the lottery you might consider a Studer A820 24-track, which will cost around the same as the luxury sports car

you'll probably also buy. Otari also still make analogue recorders, of which the MTR100 is the top model. The cost of this is comparable to the Studer. If you had to share the jackpot, both Studer and Otari make 'junior' models in the £30k price range! There are, of course, two other options. You might, for instance, already have an analogue multitrack which you haven't got round to disposing of yet. You thought it was old-fashioned and not worth using. Well, think again. Listen to some of your old recordings and you'll be surprised. If you aren't lucky enough to have an analogue multitrack sitting in the attic you'll be looking at the second-hand market. There are bargains to be had (or at least there were before this article was published!). There could even be some new stock lingering in warehouses, so scan the small print of the dealer ads in *Sound On Sound* and you might find one of the last machines off the production line. Let me run down a few of the likely options...

### THE TAPE GALLERY

#### • FOSTEX B16

Going back into the mists of time, there's the machine that started the boom in professional home studios, or project studios, as we might call them now. This was the Fostex B16, which dates from the mid-1980s. When it first came out, pro engineers didn't believe it was possible to squeeze 16 tracks onto half-inch tape. But, with precise



The Fostex B16.

engineering, clever production design and Dolby C noise reduction, it certainly was. I have to say that examples of the B16 are likely to be getting a little old and wrinkly by now, but if you can find one in good condition at the right price (and I don't think I would want to pay more than £1000 even if it was still shrink-wrapped) you could be onto a winner.

#### • TASCAM MODEL 38

Around the same time as Fostex were doing well with the B16, Tascam had their model 38, which was, as you might guess, an 8-track machine, also

### THEY ALSO SERVE...

You may have noticed that the names of Tascam and Fostex dominate in my select guide to analogue multitrack, and you might well ask what happened to all the other manufacturers in the audio industry. What became of their analogue multitracks? Well, several manufacturers, such as Soundcraft, Allen and Heath, Klark Teknik and quite a number of others, tried their hands at pro multitracks. Soundcraft did achieve some success, but I think that enough people recognised the difficulties involved and left the semi-pro market well alone. Fostex and Tascam, on the other hand, had immense experience in small-format budget multitrack, derived from their Portastudios and Multitrackers, and were able simply to scale everything up and build products which performed well and were very reliable.

“Having been an audio lemming myself, who discarded an analogue multitrack for a digital version, I have in some respects come to see the error of my ways.”



## ALL ABOUT ANALOGUE MULTITRACK

► using half-inch tape. The transport was a bit clunky and no noise reduction was provided, but it definitely has the analogue sound. Once again, judge second-hand machines very much on condition.

### • FOSTEX E16

Pivotal in the project studio market was Fostex's next analogue 16-track, the E16. This machine caught the crest of the wave and many are still in use today. The gawky adolescent that was the B16 became a confident adult able to take on the big wide world, and an E16 in good condition would be a good buy now at around £1500 to £1800.

### • TASCAM MSR16

Tascam saw the potential of the market opened up by the E16 and unleashed the MSR16, which covered very much the same ground. It was a little chunkier but its dbx noise reduction, to my mind, emphasises the problems of analogue recording a little too much. Look to pay around the same as an E16 for this worthy machine.

### • FOSTEX R8

In a lower price bracket came the Fostex R8, which was a great little machine, even though it looked



Fostex's R8 (above) and its detachable control panel (below).



## ANALOGUE TRICKS

There are some things you can do with an analogue recorder that you can't with a digital multitrack tape recorder. Here are a few:

### • BACKWARDS RECORDING

Turn the tape over so that it plays backwards. Record onto a spare track, remembering that the track numbers are now reversed. For example, something you recorded on track 3 of a 16-track recorder will now play back on track 14. Turn the tape over again and you have instant Maharishi-period Beatles.

### • REVERSE REVERB

You can't get real reverse reverb from an effects unit. Record the signal you'd like to apply reverse reverb to in the normal way. Turn the tape over so that it plays backwards. Remember that the signal will now appear on a different track. Apply reverb to the signal and record the reverb onto a spare track (remember again that the track numbers have been reversed, or you might erase something!). Turn the tape over and you have real reverse reverb.

### • WOBBULATION

I don't think this technique has an official name so I've made one up! Wow and flutter might usually be considered a bad thing, but in the past recorders have been made to produce wow for effect. For example, if you want to build up a choir of backing vocals by recording multiple takes of the same singer, you'll find that it ends up sounding more like multiple takes of the same singer than a choir! There's logic in that somewhere. A little bit of wow on each track will thicken up the sound very effectively. It works better with some recorders than others, but if you can add a weight to one of the rotating parts to unbalance it, a certain amount of wow will be produced. I'm told that in the old days chewing gum was used for this purpose. I think there might be better modern alternatives! Sticking a piece of gaffa tape to the pinch roller works too, but be careful that it doesn't come unstuck and damage your tape, and remember to clean the pinch roller afterwards. Proceed with caution!

### • DOUBLE SPEED/HALF SPEED

Some multitrack recorders have two speeds. If yours has, you can play back your backing tracks at half speed and record a new track, perhaps a vocal. When the tape is played back at normal speed, the pitch of the vocal will be raised an octave. You can use the varispeed control, which may well have a wider range than a digital recorder would, to achieve a similar effect but with less of a pitch shift.

could even put the R8 in a cupboard and hide it from your studio clients! If you do buy an R8, don't be tempted to use standard play tape because the tension is specifically set for long play, and you could wear out the heads more quickly than you might expect.

Fostex also made an 8-track version of the E16 called, not unnaturally, the E8. There wasn't anything wrong with it, but I gather that it never became a big seller for them. There are also earlier compact Fostex 8-tracks on the second-hand market. Age and condition will determine their worth.

### • TASCAM TSR8

The Tascam alternative to the R8 was the TSR8, which did take large spools and looked the business very much more than the R8, but this machine (which is actually still in production, though you'll ►



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## ALL ABOUT ANALOGUE MULTITRACK

▶ have to hurry) was more like an updated 38 than an MSR16 with fewer tracks, and I felt that the R8 was the better of the two machines.

### • FOSTEX G16S & TASCAM MSR16S

These two were the last machines off the Fostex and Tascam production lines, along with comparable 24-track versions which used 1-inch tape and, in their 'S' versions, employed the Dolby S noise reduction system, which is based on the fully pro Dolby SR. I would say that, of the affordable analogue multitracks, the Tascam MSR24S is king, and with one of these in your studio you'd have no excuse for not making great recordings.

I can't give you a guide price because I haven't been able to find any up for sale — which shows that people know when they're onto a good thing. Or perhaps I'm just keeping quiet because I want one for myself and I don't want to stir up the market!

### TIME TO SELL UP?

So is it time to sell your digital multitrack tape machine(s) and buy into the analogue heritage? Would a sensible person take this course of action? What you would lose, of course, is the stability and certainty of digital. Assuming that your digital recorders are functioning properly and that you're using the correct tape, the wonderful thing about digital is how solid everything sounds. No ifs, no buts, no doubts, no maybes. It's all just there and it sounds great. With analogue recording, there's a grey area where you have to listen and judge for yourself. You don't just get great recordings automatically. If you choose

not to use noise reduction, for example, which does change the sound quality, you have to work harder to eliminate any obvious noise when you mix your recording. But no-one can say that you can't make great recordings on analogue — too much wonderful music has been made in exactly that way.

What you gain from analogue multitrack is, of course, the analogue sound. But there are other factors involved too. When I made the move to digital, I didn't appreciate how inconvenient it would be to record eight tracks on one tape, then synchronise another machine to record the next eight tracks. When you run through the recording process in your imagination it's easy to think that

everything will go smoothly. In practice, I find the jump between the first eight tracks and the next a vast chasm, which I end up leaping back and forth across. Admittedly, I use the ADAT format and the Tascam DTRS (DA88) format is inherently much quicker to synchronise because the tapes are smaller and lighter, but it really was so much simpler just to have 16 tracks on one reel of tape. Invite the digital demon into your studio and he brings a surprising



Tascam MSR24.

number of irritating gremlins with him.

Another digital alternative is the hard disk recorder. Believe me, I've tried hard disk. I've looked at the Akai range from top to bottom and they are all great products, without a doubt — and I'm sure that the other hard disk recorders are too. But at the end of the day you have to back up your data onto tape, either DAT or ADAT. Backing up takes time and there's no verification of the data, so you're never sure that the backup is identical to your original data. Consider the amount of technology involved, the amount of time taken up, and the uncertainty factor — and this is just to perform the equivalent of putting a reel of tape on a shelf! One exclamation mark is simply not enough!! Optical disks may resolve this problem, but it's a problem that analogue never had.

### THE FUTURE OF ANALOGUE MULTITRACK

I wrote in my 'Reversing into the Future' article in last month's *Sound On Sound* that I would like to see a return to analogue recording. Not because I don't think that digital has anything to offer, but because analogue was, and still is, another very useful tool in the recording process. To dispose of it would be like asking artists not to use oil paints any more because modern acrylic paints are now available. Digital recording is not superior to analogue. It's just different. Fostex and Tascam won't shed their analogue technology, I am sure of that. One day everyone will have digital recording available, and truly creative musicians will, as they always have, seek something different. It is quite conceivable that analogue multitracks will stage a comeback after a few years. In the meantime, the second-hand market is the place to look. Smile kindly on the person you buy yours from, because they may be selling gold for the price of scrap metal. At least, for the moment.

SOS

“One day everyone will have digital recording available, and truly creative musicians will, as they always have, seek something different.”



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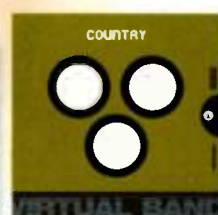


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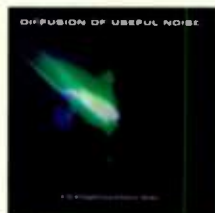
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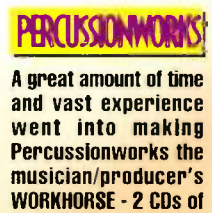
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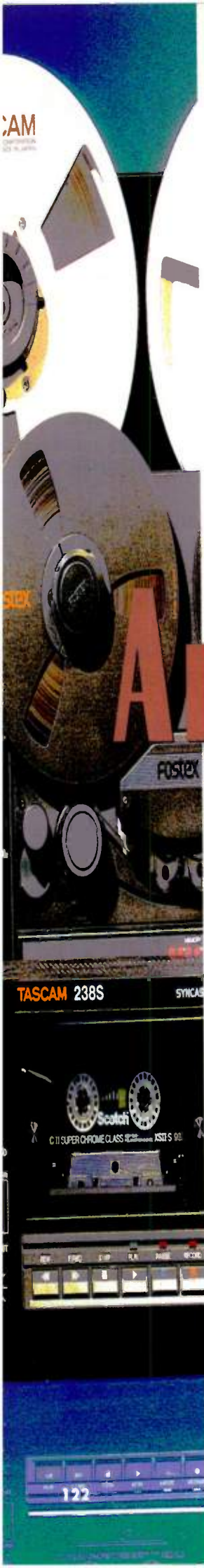
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**T**hough magnetic audio recording has been around since before the Second World War, tape recording in the form we know it today is really a post-war phenomena. The first generation of paper-backed tapes made by BASF have long since been superseded by modern polyester designs with vastly improved magnetic coatings. The mechanics and electronics of the recording apparatus have also benefited from technological developments, to the stage where, to all intents and purposes, current magnetic tape recorders represent the very pinnacle of the medium. It is hard to see any means of making further significant improvements — at least cost-effective ones — to the medium, and digital formats are already coming to the fore, as we all know.

The inherent properties of magnetic tape recording mean that it is far from 'perfect'. Harmonic and dynamic distortion are part and parcel of the medium, but these qualities are so ingrained in our audio culture that technically more accurate digital recordings often seem 'flat' by comparison. Inevitably, the great open-reel tape machine manufacturers, such as Studer, Tascam, Otari and

under normal usage. The thickness of the backing material is important: if it's too thin, the tape transport may have difficulty in handling it (the C120 cassette being the most obvious and notorious example). If it's too thick, the amount of tape which can be wound on to a given spool is limited, reducing recording and playing times.

Typical 'Standard Play' open-reel tape is about 50 microns thick, with a full 10-inch reel of tape (the standard professional size) lasting a little over 30 minutes at 15 inches per second, or ips (a common speed for a professional machine). However, other thicknesses are available, notably the 'Long Play' version, which is only 35 microns thick. This type of tape is most commonly used on machines with particularly twisty tape paths, or where the spool size is restricted, the most obvious example being the infamous Nagra tape recorders used for location sound recording. In its portable mode, the Nagra will only accept 5-inch spools, and its tape path involves a couple of very sharp 90 degree bends, so Long Play tape is the ideal choice.

Most modern tapes are 'back coated', which means that they have a slightly matt and rough-feeling surface, as opposed to a shiny, slippery one. The back coating is to improve how the tape winds (by offering improved friction between layers) and to exclude trapped air during fast winding. Neat and even winding is important in avoiding edge damage to the tape — the most common cause of drop-outs and poor head-to-tape contact. On the subject of edge damage, a correctly wound tape should not touch either

# Analysing

## INSIDE THE TAPE MACHINE

**HUGH ROBJOHNS**  
*dons his technical  
head and invites you  
on a guided tour of what makes an  
analogue tape recorder tick...*

# Analogue

the rest, will gradually phase out their production of analogue recorders in favour of digital systems, so this is probably the best time to acquire an analogue machine if you don't already have one!

### TAPE TALK

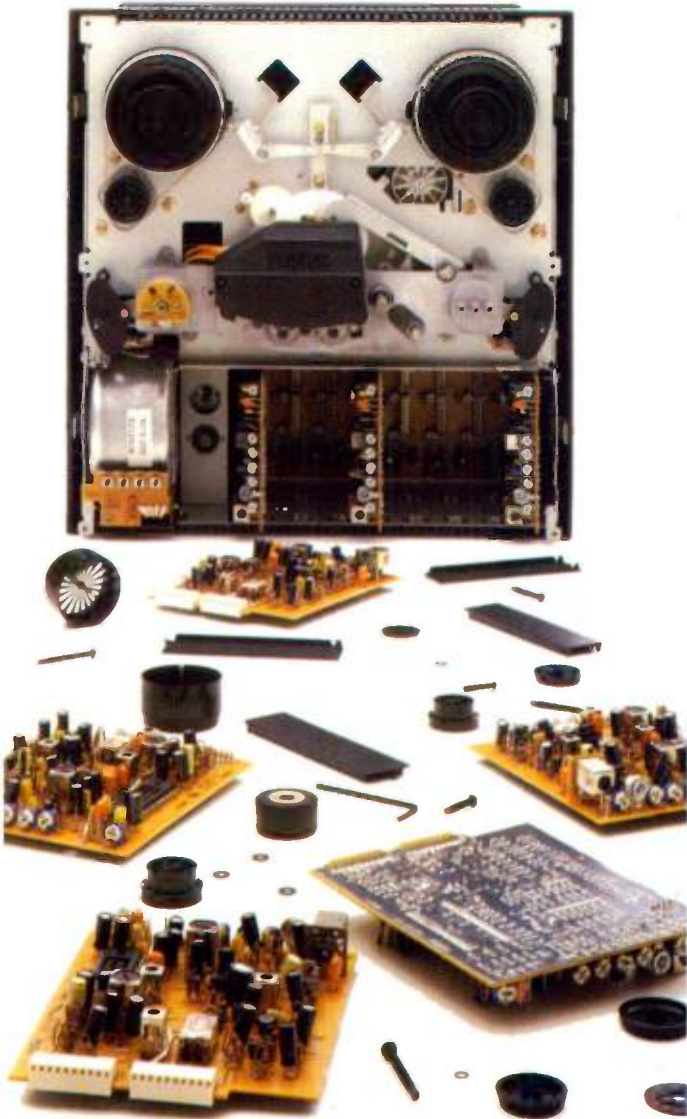
Before we look at how the tape recorder works, perhaps it's worthwhile to spend a few moments considering the actual recording medium — the tape. Recording tape is coated with a metallic compound capable of storing a pattern of magnetisation. This magnetisation is varied in strength and direction to represent the original sound waveform. In other words, the magnetisation pattern is analogous to the air pressure variations of the original sound.

Modern tape formats use polyester as the tape base, with a suitable magnetic coating. Polyester has the ideal combination of strength and flexibility, such that it will not snap or stretch

spool flange but should sit between them, and any tape spools which are bent, so that they rub against the tape during recording or playback, should be thrown away and replaced with new ones immediately!

Depending on the requirements of the tape, the detail of the magnetic material used to make up the magnetic coating may vary, but is usually either a metal oxide or metal alloy compound. The most common material is gamma-ferric oxide (gamma referring to the shape of the ferrous particles) but chromium-dioxide formulations are also used. In the early to mid-'80s, metal-particle tapes were developed, primarily for compact cassette recorders, but few machines were equipped to make best use of the formulation, as metal tapes need extremely high levels of magnetisation (they have a high 'coercivity', which is the ability of the tape to become, and remain, magnetised). The majority of domestic cassette machines simply could not achieve the required field strengths, although those that could benefited from better distortion and signal-to-





noise ratios. In fact the metal-particle tape has become far more commonly used for digital audio and video recording, where its very high recording density is ideally suited to the high-frequency requirements of digital formats. It should be noted that tapes intended for digital recorders have radically different compositions to those for analogue recorders, because the nature of the recorded information is entirely different — never use digital-formulation tapes on analogue machines!

Fundamentally, recording tape is little more than a highly sophisticated rusty ribbon, the nature, shape and depth of the 'rust' particles bestowing the combination of properties the manufacturer is seeking.

The magnetic properties of recording tape are far from linear, and, if used 'raw', would produce very quiet but heavily distorted recordings. To 'linearise' the medium, a high-frequency signal (typically about 150kHz) called bias is used. The amount of bias needed to produce optimum results depends largely on the precise construction of the magnetic layer, and will affect output level, noise, distortion and frequency response. This is a point I'll return to later.

Another characteristic of recording tape is that high-frequency signals tend to be retained by the top surface of the magnetic layer, whilst lower-frequency components tend to be recorded throughout its full depth. This has a bearing on the requirements of the recording heads and the longevity of recordings.

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# INSIDE ANALOGUE TAPE MACHINES

## THE FORMATS

There are many analogue tape recording formats available today, all broadly standardised around the world. The largest professional format uses 2-inch tape and the smallest uses eighth-inch:

- **2-inch:** originally recorded 16 tracks, but now the international standard is 24 tracks on 2-inch tape and is probably the most common multitrack format in use around the world.
- **1-inch:** an 8-track format which was also available as 16-track from some manufacturers.
- **Half-inch:** widely used for mastering (in stereo), or occasionally for 4-track work.
- **Quarter-inch:** there are a number of common versions: stereo (also known as DIN format); 2-track (also known as NAB format); 4-track; semi-pro 8-track and occasional 16-track machines (with noise reduction systems built in).

All these tape formats record across the whole width of the tape, allowing blank areas (guard bands) between the different channels or tracks, and therefore operate in one direction only. The upper edge of the tape is always track 1 (or the left channel in the case of a stereo machine) and the lower edge corresponds to the highest numbered track (right channel in a stereo machine).

There are also a couple of domestic formats, and these all use the tape as a bi-directional medium — you turn the tape over when it reaches the end of one side, and play it back the other way. The compact cassette works in this way, of

course, as does the now very rare domestic 4-track (two stereo pairs) on quarter-inch tape. The latter uses tracks 1 and 3 in the first direction (for left and right respectively) and tracks 4 and 2 (ditto) in the reverse direction.

In general, background noise and susceptibility to drop-outs (areas of tape where the recording material is absent or inefficient) is reduced as the recorded area of tape is increased. For this reason, multitrack formats used to maintain the recorded area ratio established by the 2-track quarter-inch format: two tracks on quarter-inch, four tracks on half-inch, eight tracks on 1-inch and 16 tracks on

“Fundamentally, recording tape is little more than a highly sophisticated rusty ribbon.”

2-inch. However, noise reduction systems allowed a reduction in recorded area for similar noise performance, hence the advent of the 24-track format. For the ultimate signal-to-noise ratio, though, greater recorded area is the only way to go and consequently the half-inch stereo mastering format is very popular, as is increased tape speed to 30 or 15ips as opposed to 7.5 or 3.75ips.

Where the recorded tracks are entirely related (as in stereo recorders), the guard band between tracks can be reduced, allowing larger recorded areas (decreasing noise), but increasing inter-track crosstalk. In the case of stereo material, provided the crosstalk is reasonable, stereo imaging will not be affected, so this is a reasonable compromise. However, on machines where the recorded tracks may not be related, or where absolute separation is mandatory, wider guard bands must be adopted in order to keep magnetic crosstalk to a minimum. Hence the key difference between a stereo (DIN) quarter-inch machine and a 2-track (NAB) machine is in the width of the recorded tracks and the guard band separating them.

## MECHANICS

The tape transport is critical to the performance of the entire tape recorder. An analogue tape machine must be strong enough to be able to support the heavy spool and capstan motors, and the tape guides, control panel and interconnection panels must be robust enough to withstand typical operational abuse.

The tape path involves a collection of guides, tension-sensing devices and anti-flutter rollers, as well as the capstan and pinch roller, all of which are constructed from non-ferrous (thus non-magnetic) materials. Some of the guides will be fixed pillars, accurately machined to support and control the alignment of the tape, while others are free to

“Modern machines can extract a far better frequency response from old archive tapes than was ever possible at the time of their recording.”

## QUIET LIFE: NOISE REDUCTION

Stereo or 2-track quarter-inch tapes running at high speed are capable of signal-to-noise ratios of up to about 60dB with modern tape formulations, half-inch machines achieving even better performance. However, tape formats with smaller recorded areas will be correspondingly noisier, so noise reduction (NR) systems are frequently employed to help improve the performance of such systems. Multitrack formats and cassettes are the most obvious examples which generally rely on noise reduction, and the two most familiar NR systems are Dolby and dbx.

The dbx approach is fairly simple, using a fixed-ratio compressor to reduce the dynamic range of the signal to be recorded (primarily by increasing the level of quiet signals). On replay, a matching expander pushes low-level signals even lower, with the aim of recreating the original signal dynamics and reducing the tape noise correspondingly. This simplistic approach suffers from a few problems which are outside the scope of this article.

The various Dolby systems attempt to address the shortfalls of simple companding by dividing the audio spectrum into separate bands and processing each independently. At a fundamental

level, Dolby B uses a single band restricted to the upper portion of the frequency range, whereas Dolby C uses a pair of overlapping bands. Both systems are designed for the domestic cassette medium (although Dolby C has been used on a variety of other formats, including some professional audio-video equipment). Dolby A is a good but elderly professional system using four signal bands, and Dolby SR is its successor, with a very complex arrangement of 10 bands, some fixed and some which slide over pre-determined frequency ranges. A simplified version of SR, Dolby S, is used on some recent cassette machines and some semi-professional multitrack formats.

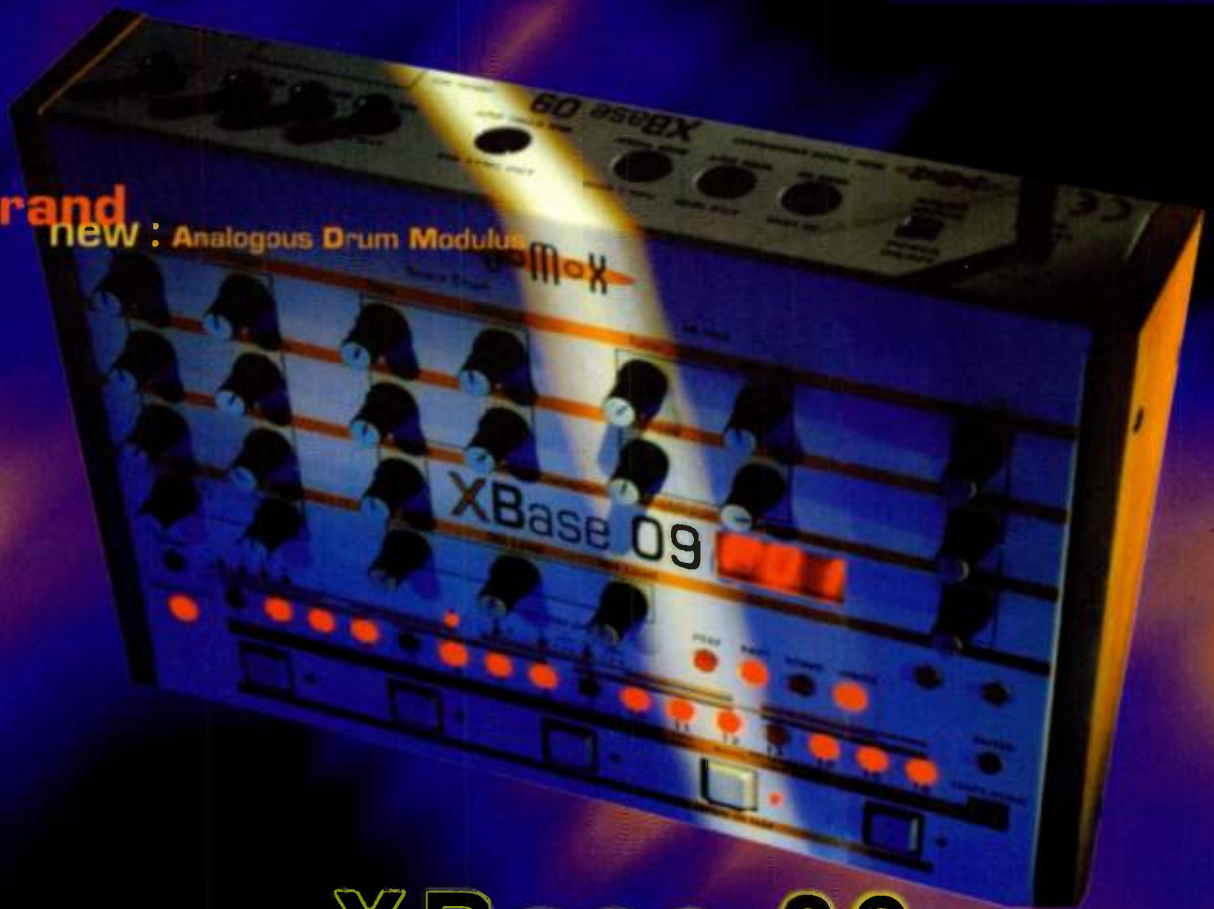
With the exception of dbx and Dolby B, accurate calibration of the record and replay characteristics of the tape machine with the noise reduction system is absolutely essential. The better systems, such as Dolby A and SR, incorporate an alignment signal from the encoding processor (a warbling tone or pink noise signal respectively) which is recorded at the start of the tape and used to calibrate the decoding process on replay. Small level and frequency-response errors in the tape machine can cause severe decoder errors if the alignment procedure is not performed accurately.



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# INSIDE ANALOGUE TAPE MACHINES

“To all intents and purposes, current magnetic tape recorders represent the very pinnacle of the medium.”

▶ rotate on high-quality bearings. A typical tape path might include a rotating guide on a movable arm (used to regulate back-tension from the feed-spool), then a large-diameter rotating guide linked to the tape counter or timing mechanism. As the tape enters the head block, there will be a precision tape guide before the heads, and then a motor-driven capstan pulls the tape through at a controlled speed. A rubber pinch-roller, mounted on a moving arm, holds the tape against the capstan when the machine is recording or replaying.

Most professional machines employ three heads — erase, record and playback. However, not all machines have three heads, as some combine the functions of the record and replay heads into a single head. This compromises the quality of both the record and replay functions but reduces cost significantly, and can simplify some other aspects of the machine. The advantage of a three-head machine is that recording quality can be checked by listening to the signal replayed from the third head. This is often called confidence monitoring: not only does it confirm the technical quality of what is going to tape, but the small replay delay due to the spacing between record and replay heads also verifies that the machine really is recording something!

The tape must be kept in constant contact with the record and replay heads to ensure good high-

frequency response and uniform levels. This task was originally performed by felt pressure pads, but fortunately this crude and unreliable technique has largely been discontinued in favour of accurately controlled tape tension determined by the feed-spool motor. However, cassette formats and some older domestic open-reel machines still rely on felt pads. Any unsupported length of tape under tension is likely to resonate or vibrate as it is pulled across the heads and this may become audible as a modulating tone, or as speed variations. Many professional machines use a roller guide between the erase and record heads to help control this 'scrape-flutter', as it's called. As the tape leaves the head block, it might pass over a second tensioning arm and, finally, on to the take-up spool.

Most modern machines employ three motors, one for each tape spool and a third for the capstan, all with sophisticated servo-electronics to regulate their speed, torque and direction. The spool motors normally govern the tape tension between feed spool and capstan, and between capstan and take-up spool. The former is critical for good head-to-tape contact, and the latter for neat tape packing, although neither is made easier by the continually varying diameter of the tape spools! Some machines employ two capstan and pinch-roller assemblies, one positioned either side of the head block, with

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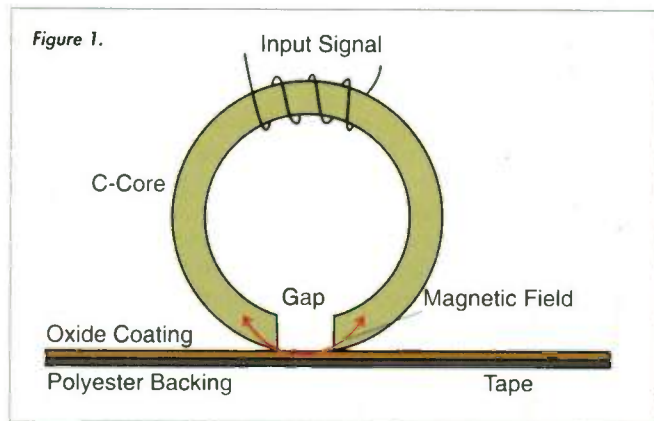
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the aim of controlling the tape tension across the heads very precisely indeed. While this approach undoubtedly works extremely well, its accurate alignment is critical, and few manufacturers have felt the need to go to such lengths!

The speed of the capstan motor is possibly one of the most important aspects of the entire transport. If the overall speed is not correct, replaying a tape on another machine will result in pitch and timing errors. If the speed is not accurately maintained, short-term pitch variations will be heard as wow (low speed variations) or flutter (high speed variations), neither being desirable on a modern machine, of course. However, there are many causes of wow and flutter, not all of which are directly attributable to the capstan motor. Eccentric pinch-rollers and badly worn rotating tape guides are actually the most common culprits.

The vast majority of open-reel tape recorders are arranged so that the tape heads face the front of the machine and the backing side of the tape faces the operator. This is very convenient for mechanical tape editing, but means that the recording oxide comes into contact with all the guides and rollers, sometimes leading to scratches and drop-outs. In contrast, many European tape recorders are arranged so that the tape is used 'oxide-out', the head block facing away from the



operator and the tape backing coming into contact with most of the guides.

### HEAD CASE

The three magnetic heads of a professional tape recorder are each optimised to perform their own particular job, but fundamentally consist of what can be thought of as an iron C-shaped core, wrapped with a coil of wire. When an electric current is passed through the winding, a magnetic field is produced across the gap in the iron core, the latter being arranged so that it is in contact with the recording tape (see Figure 1). If the current through the head varies in direct proportion to the sound signal, a varying magnetic field is produced, and as the tape is pulled past the head,



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# INSIDE ANALOGUE TAPE MACHINES

► its oxide layer becomes influenced by this magnetic field, effectively retaining its magnetic state as it departs the head. The replay head is constructed in a similar way but operates in reverse, so that the magnetic field embodied in the recorded tape sets up alternating electric currents in the head winding. These currents are then amplified and processed to recreate the original audio signal.

The erase head may cover the entire tape width (normal on a true stereo machine), or it may be split to allow independent erasure of individual tracks. During the erase process it is fed with the very high-frequency signal (typically in the region of 150kHz or so) called bias, which I mentioned earlier, and the magnetic field this creates becomes weaker with increasing distance from the centre of the head gap (in both directions). As the tape is pulled towards and past this head, the magnetic particles in the tape experience gradually increasing levels of high-frequency signal, reaching a maximum value

of the oxide particles within the tape. The solution is to add a high-frequency bias signal to the audio signal, which effectively forces the magnetisation process to become far more linear (note that the bias signal is not retained by the tape — it merely enables the recording process). The size of the gap in the recording head is not particularly critical, provided a sufficient field strength can be created, so relatively large gaps tend to be used to ensure that the magnetic field is large enough to reach the full depth of the magnetic layer in the tape. In fact, the effective recording zone is not in front of the head at all, but is actually at the point where the tape leaves the influence of its magnetic field.

The replay process relies on the generation of electric currents in a coil of wire wrapped around an iron core which gathers the varying magnetic field embodied in the tape. The inherent sensitivity of the replay head to magnetic flux means that it must be properly shielded from fields generated by the transport motors and mains transformer, so the head is usually enclosed in a protective case, often with a fold-down front piece which can be raised after the tape has been laced.

The physics of the situation are such that the voltage induced across the head windings increases in direct proportion to the rate of change of the magnetic field, thus the head produces a much greater output for a high-frequency audio signal recorded on tape than it does for a low-frequency one. This increase in output voltage with increasing frequency can be compensated for with a 6dB/octave equaliser, but at very low frequencies various magnetic anomalies result in an uneven frequency response, often referred to as 'head bumps' or 'woodles'.

The size of the gap in the replay head has a critical effect at high audio frequencies. When the recorded signal on the tape has a wavelength equal to the width of the head gap, there will be no net magnetic flux, so the electrical output from the head will be zero. This is called the extinction frequency, and the frequency response of the head falls rapidly as the extinction frequency is approached (see Figure 2). Clearly it's desirable to design the head such that the extinction frequency

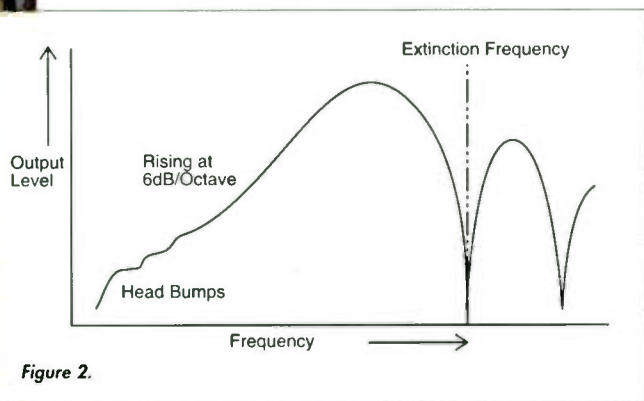


Figure 2.

and then gradually decreasing to zero. The tape is not capable of storing this high-frequency bias signal, and so leaves the head with its magnetic particles effectively randomly magnetised. Thus any previous recordings will have been erased.

The record head has to impart an audio frequency signal to the tape, but in its raw form this signal is found to be grossly distorted on replay, a phenomenon caused by the non-linear characteristics

## TAPE LEVELS: HOW LOUD CAN YOU GO?

The maximum level that can be recorded onto a tape will depend on its construction and the correct setting of bias and record drive. The maximum operating level, or MOL, of a tape is defined as the level of magnetisation (measured in nanoWebers per metre) which produces 3% third harmonic distortion of a 1kHz sine wave. This typically lies somewhere in the range 700 to 1400nWb/m and unless peak distortion is particularly desirable, it's normal to align the MOL for a given tape slightly higher than the normal peak operating level for the studio, so that the best possible signal-to-noise ratio can be achieved with little peak distortion.

The electrical signal reference level is 0dBu (PPM4 or -4VU) and during tape machine line-up, this

is equated to a magnetic reference level on a given tape (the figure for which should be quoted on the tape label). For example, a common reference level for modern tapes is 320nWb/m (the so-called IEC level), and if this was aligned to 0dBu input and output levels, a signal peak level of +8dB would produce a recording level on the tape of about 800nWb/m, resulting in perhaps 2% third harmonic distortion on a good, high MOL tape. Other common reference levels are 200nWb/m (the NAB level) and 250nWb/m (DIN level). A tape set up at the 200nWb level would be running about 4dB quieter than one set up at 320nWb/m.

Print-through is the process of a strongly magnetised portion of tape partially magnetising regions in adjacent tape layers as the tape sits on its

spool. Depending on the way in which the tape is wound (head out or tail out), this will result in pre-echos, where the start of a track may be heard faintly shortly before it actually begins, or as post-echos, where an abrupt loud ending is repeated faintly. The strength of print-through will depend in the construction of the tape (thicker backings tend to reduce the effect), the bias level (stronger bias causes deeper magnetisation of the recording layer), the record head gap (larger gaps cause the magnetic field to penetrate the tape deeper), the MOL, and the manner in which the tape is stored.

It's normal to store tapes tail out, which tends to result in more acceptable post-echos rather than pre-echos. This practice also leaves a played tape with a much neater wind on its spool than is likely to be achieved from fast rewinding, and this helps to maintain the stored tape in good condition.



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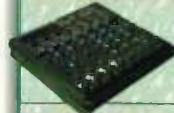
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*Despite the increasing popularity of digital recording and MIDI + Audio sequencing, the cassette multitrack is far from being dead, and many a newcomer to recording still starts his or her recording career with some form of 4-track, cassette-based studio system. PAUL WHITE & DEBBIE POYSER discuss the features a potential buyer should be looking for, and round up the models currently available.*

For this application, a machine capable of recording all four tracks at the same time is essential.

The next area of possible compromise affects sound quality. A conventional cassette deck runs at a tape speed of 1 7/8 inches per second (4.8cms per second), which is very much slower than a professional studio, open-reel recorder. The more up-market multitrack cassette systems run the tape at twice normal speed — 9.5cms per second — which provides better sound quality, usually by way of less background hiss, and a brighter top end. The only disadvantage of a high-speed machine is that the tape only lasts half as long, and, because all four tracks are recorded in the same direction, a C60 cassette used at high speed will provide just 15 minutes of recording time.

Because of the technical problems involved in making a cassette recorder play back on some tracks while simultaneously recording on others, it is not possible to get the same sound quality from a standard-speed multitrack cassette machine as from a good, conventional stereo cassette deck. Though the results produced by standard-speed multitrack machines are not actually bad, high-speed machines invariably turn in a noticeably better performance. As a rule, the standard-speed models are more suitable for producing simple music demos or for use as compositional aids, while the high-speed machines can be used to make more elaborate demos or even recordings for commercial release. Though none of the cassette multitrackers are strictly suitable for making professional-standard recordings, many independent cassette and record releases have been made on such equipment, with surprisingly good results.

## TRANSPORTS OF DELIGHT

Having established that more money usually buys better sound quality and the ability to record four tracks in one go, what other considerations are there? Some machines have what are known as soft-touch tape transport controls, while some of the cheaper models have mechanical transport buttons that are rather clunky to use. You'll also find the type and quality of metering varies across the range, as does the type of tape counter, which can be anything from a mechanical digit counter to an electronic display which reads out in true elapsed time. A further refinement on some machines is the

## BUYING A CASSETTE MULTITRACKER

**T**he home recording novice looking for their first cassette multitracker is presented with around a dozen models from which to choose. All offer the common facilities of recording and replaying up to four separate tracks of audio (or eight, in the case of the two 8-track machines currently available), and all have some means of mixing the separately-recorded tracks into stereo, after which they may be re-recorded onto a stereo tape recorder. Why, then, are there so many models offering different facilities and spanning a considerable price range?

As with so many things in life, the answer has to do with cost, and while all the machines appear to perform the same basic function, variations in features and sound quality do exist. All the really low-cost machines are limited in that they can record only two tracks (or even one track) at any one time. This represents a significant cost saving at the manufacturing stage and presents no problem to the user recording his or her music in layers, rather than all in one go. The process of building up a piece of music a few tracks at a time is known as multitracking, and is the established method for producing contemporary music, though classical music is, by-and-large, recorded as a single performance. For live recording, a multitrack machine is useful, as it allows the individual instruments (or groups of instruments) to be recorded onto separate tape tracks, allowing the musical balance to be changed at the mixing stage.



provision of some kind of autolocation — the ability to store a tape counter location, to which the machine can be made to automatically fast-wind and then stop. This can be very useful if you consistently need to return to the same point on tape, such as the beginning of a song or the start of a solo. Machines with this feature generally include a return-to-zero function, which does exactly as the name suggests and winds the tape to the zero counter location before stopping it for you. This can be zeroed at the start of each song, leaving the autolocator free for marking the start of the solo or whatever, or it may be set once at the beginning of the first song on the tape and then left alone. Some machines have the ability to play a specific section, rewind, and then play it again indefinitely until stopped, which is useful for rehearsal purposes. Some top-of-the-range models link this facility to an automatic record function, which puts the machine into and out of record at the desired locations, quite automatically. For the solo player with both hands full of guitar, this can be a distinct advantage!

### MIXING MATTERS

All cassette multitrackers have some form of mixer section, which really has two roles to play. The first is to accept signals from microphones or instruments, mix them together, and then route them to the appropriate track or tracks of the tape recorder section for recording. At the same time, the mixer has to provide the user with some means of hearing what has already been recorded while new tracks are being added or overdubbed. This process of hearing the ready-recorded material at the same time as adding new material is known as monitoring, and is often accomplished using headphones.

At the bottom end of the multitracker scale, you may be restricted to plugging in just two signals at the same time, whereas on more up-market models, there may be four or more input channels which can be routed to the tape tracks simultaneously. These channels may or may not be equipped with some form of equaliser or tone

control, and on the very low-cost machines, it may only be possible to equalise the whole, finished mix rather than separate tracks.

### ALL MOD CONS

A facility which any budding recordist will come to find indispensable is the means to plug in external effects units. Except on the cheapest machines, there should be one (or ideally two) effects sends per mixer channel, but you should also check out whether there are sufficient effects return inputs to handle the outputs from stereo effects units. The most common studio effect is digital reverb; since reverb units invariably have stereo outputs, even if only served by a mono input, a single effects return input is a limitation.

Some models are fitted with separate output sockets for all four tape tracks, which means that signals can be plugged into an external mixer, if so required. The provision of these so-called direct outputs can be an important consideration when running sequenced MIDI instruments alongside the tape machine, as most multitracker mixer sections have insufficient inputs to handle all the necessary extra sound sources; the answer to this problem is to use an external mixer to increase the number of inputs available.

If your multitracker is to be used alongside a sequencer, it will be necessary to record a synchronising code onto one track of the tape machine, in order to make the sequencer run in sync with the tape machine. These sync codes are also known as timecode and there are various types. Some machines have specific provision for recording sync codes, in that they allow the noise-reduction system and equalisation to be bypassed and the sync signal to be taken from the tape machine via a separate socket. This is very important, as some noise-reduction systems, dbx



Tascam 424 MkII.

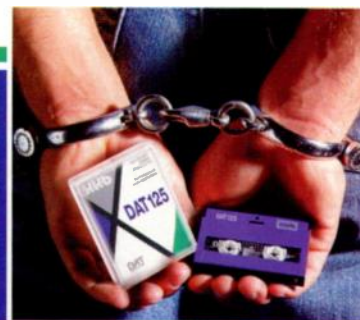


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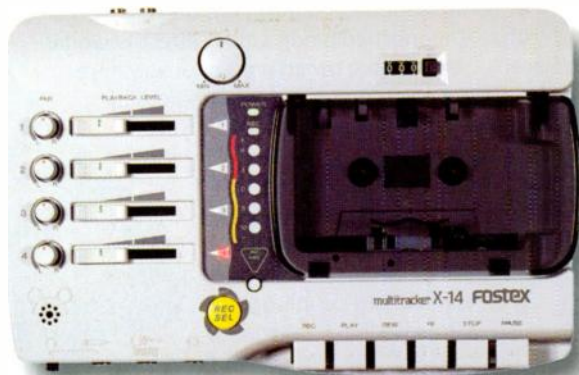


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## BUYING A CASSETTE MULTITRACKER

- ▶ in particular, can corrupt the timecode signal to such a degree that it is unusable. Dolby C, on the other hand, usually has no detrimental effect on timecode but even so, a separate output socket is still vital. The sync code is recorded onto one of the audio tracks, usually the highest-numbered one,



so it is essential to be able to access it separately — you wouldn't want to hear time code in your final stereo mix! For those of you who have never heard the sound of timecode, it's a high-frequency buzz; if you've ever dialled a fax machine by mistake, you'll know what I mean.

Insert points are a useful addition to any cassette multitracker, especially if you want to record vocals with the use of a compressor, since insert points allow external processors such as compressors, gates or equalisers to be plugged into individual mixer channels, either during recording or while mixing. On a true studio mixer, there is an insert point on every channel, but on cassette multitrackers they may either be absent altogether (on the lower-cost models) or provided in some compromised or limited form. If you only need a musical notepad, one of the low-end machines with minimal facilities will be perfectly adequate, but if you want to make serious-sounding demos, then think hard before you spend your money.

There are other little differences that will crop up between one model and another, with some of the top-end machines offering computerised signal routing and MIDI control. However, we've covered the main facilities you're likely to require, and the best advice that we can give you is to plan for your future needs, not just your present ones. For example, you may be tempted to go for a more expensive cassette multitracker with a large mixing section because you run a MIDI sequencing system or are planning to buy one soon. But before you do decide, ask yourself whether you are still going to run out of mixer inputs in six months' time or so — if the answer is yes, or even maybe, then consider a more basic cassette multitracker with direct outputs, so that you can run it with an external mixer which does have enough inputs. Given the extra flexibility provided by even a modest external mixer, I'd recommend you consider this option very seriously.

### FOSTEX X14 £149

At £149, the X14 is the lowest-cost cassette multitracker you can buy new. As you'd expect, it's a very basic, though cutely-designed, 'musical notepad', running at standard speed (4.8cms/sec) only, with no noise reduction, and recording to just one track at a time. If you're on the move or need to get an idea down in a hurry, you can make use of the X14's internal microphone, though there's also a normal jack mic input for a more conventional external mic, and an instrument input. When tracks have been recorded, they're simply balanced using the four small level faders, panned, then sent out of the stereo output (with level control) to a mastering machine or hi-fi system. Pretty much all that's left to mention is the 5-segment LED input meter and mechanical tape counter. There are no bells and whistles here, but if what you need is an easy-to-operate musical sketchpad, the X14 saves you from wasting money on features you don't need and won't use.

### FOSTEX XR3 £249

This is the next step up on the Fostex ladder from the X14, and Fostex also call the XR3 an idea sketchpad. However, it has a few extra features that raise it above the baby of the family. For a start, there's high-speed (9.5cms/sec) tape operation, switchable Dolby B noise reduction, varispeed, and simultaneous recording of two tracks



rather than one. The two inputs can handle sources ranging from line to mic level, and there's a logic-controlled 'auto-bounce' feature activated from a unique large dial control on the front panel. Fostex claim that their auto-bounce method simplifies the bouncing-down process considerably and is virtually idiot-proof. If you're feeling inspired and don't have a mic handy, the XR3 also features the built-in microphone offered by the X14, and punch in and out can be performed via an optional footswitch.

### FOSTEX X18 £339

This is an entry-level 4-track which is more than a sketchpad and should allow you to make reasonably high-quality demos. It can be battery-

“Though no cassette multitracker is strictly suitable for making professional recordings, many independent releases have been made on such equipment, with surprisingly good results.”



## NOISES OFF

All but the very cheapest cassette recorders use noise-reduction systems to reduce the level of background hiss that is a by-product of all analogue tape recording. The slower the tape speed, the greater the noise problem — which is why any cassette machine used without noise-reduction will be too hissy for serious recording work. The most famous name in noise reduction is undoubtedly Dolby, who have five different systems in production, if you include their professional studio systems.

The most common of the noise-reduction systems is Dolby B, though the newer Dolby C is to be found on many modern hi-fi cassette machines and on some cassette multitrackers. Working on the principle that hiss is only a problem when there is no sound loud

enough to cover it up, all noise-reduction systems work by recording the quieter, more vulnerable sounds onto tape at a higher level than they should normally be, so that they are relatively loud compared to the background noise. When the tape is replayed, the opposite process is applied, restoring the original level of the recorded sound but similarly reducing the level of the tape hiss during quiet passages. Because the human hearing system is more susceptible to high-frequency noise, which is perceived as hiss, Dolby noise-reduction systems take account of the frequency content of the sound being recorded when applying processing. By contrast, the alternative dbx system treats all frequencies equally — it only addresses sound levels.

The type of noise-reduction system employed depends on both the cost of the product and on the

preference of the individual manufacturer. Cheaper machines tend to use the older and slightly less effective Dolby B system, while the more sophisticated models tend to employ Dolby C or dbx. These two latter systems both work well, and after listening to many machines fitted with both systems, I have to conclude that neither system offers significant advantages over the other. However, the results do vary from model to model, so you might find one dbx machine sounds better than another Dolby C machine, or vice versa.

It should be stressed that noise reduction has to be switched on both while recording and while playing back. Failure to do this will result in the sound being either dull or over-bright and hissy, depending on whether the noise reduction was switched on during recording or playback.

powered, though it also comes with a mains adaptor, runs at standard tape speed, rather than the higher speed offered by some recorders, and features Dolby B noise reduction. A simple mechanical tape counter is fitted and there are no frills in this department, though the LED level meters are quite good for such a low-cost machine.

Recording is limited to two tracks per pass, while all four input channels may be routed to tape during recording. The input channels are basic, with just level faders, pan and monitor levels on offer, but at least it's logical, the main restriction being that only channels one and two have the three-position gain selectors which make them able to handle mic inputs.

Varispeed is fitted, as is the ability to work with sync tracks, but there's no EQ. Though there's no dedicated aux send section, you can use the monitor section for this purpose while mixing and there's a stereo effects return. Fostex obviously expect that this machine will be used for teaching, as an extra rear-panel input labelled 'Teach Buss' allows a signal to be routed exclusively to the headphone outlet, allowing remote communication in a system where several units are in use.

## FOSTEX XR5 £379

The mid-priced cassette 4-track in the Fostex range combines a high-speed tape transport with a 4-input mixer. Inputs 1 and 2 only can accept a microphone input, while 3 and 4 are for instruments, and simultaneous recording of two tracks at a time is supported. There's switchable Dolby B noise reduction, two inputs offer the luxury of insert points, and the two stereo aux sends (which, unfortunately, share a single pot) are joined by two stereo returns. All four input channels are equipped with a basic 2-band EQ. Direct tape outs increase the flexibility of the system, meaning that the XR5 can be combined with a higher-spec external mixer if desired, and direct out 4 can also be used for a sync code in a MIDI-sequenced system. There's an optional punch-in/out footswitch for hands-free operation, and varispeed is available. In all, the XR5 is nicely



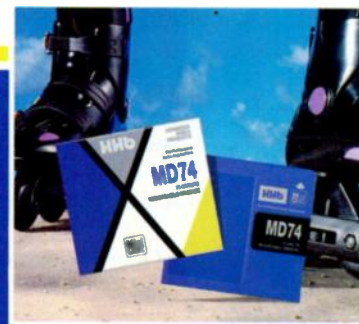
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designed, with flexible monitoring options, and the insert points and direct outs are particularly welcome at this price. The only real drawback is the restriction to 2-track simultaneous recording.

### FOSTEX XR7 £499

This is Fostex's top-of-the-range cassette 4-track, featuring a 6-input mixer with inputs 5 and 6 able to accept mics and equipped



with insert points. The first four inputs feature a basic 2-band EQ, while inputs 5 and 6 have 3-band EQ with swept mid. Two aux sends and two stereo returns are supplied, and all four tracks can be recorded to simultaneously. Two tape speeds are available (9.5cms/sec for more critical demos, and the standard 4.75cms/sec), tape speed can be varied by +/-10%, and switchable Dolby C noise reduction helps keep hiss to a minimum. A Rehearsal mode is available, as is punch-in/out, with a footswitch option, and a nice backlit LCD display keeps you informed of the XR7's status at all times. Like its smaller brother the XR5, the XR7 offers expandability through its direct tape outs, with output 4 doubling as a tape sync output. This machine should be capable of producing good quality demos with the minimum of compromises.

### TASCAM PORTA 03 MKII MINISTUDIO £199

This little machine is one of the lowest-priced cassette multitrackers around and falls into the musical notepad category. Up to two tracks (microphone or instrument) may be recorded at a time, while the recording section is based around a 4-track transport running at the standard speed and using switchable Dolby B noise reduction. Transport control is via mechanical keys, and though the sound quality isn't up to that of the more costly machines, it is quite adequate for getting your musical ideas into a coherent form. The tape counter is a

simple three-digit mechanical device.

As you might expect on a machine at this end of the price range, extra features are pretty few and far between. When you come to mix, you can adjust the relative level and left/right pan position of the four tracks but that's really about it. There's no official way of bouncing tracks, but it can be done using an external patch lead; pan the channels you wish to mix all to one side and then feed the corresponding output back into the required input.

Though the Porta 03 lacks a degree of sophistication, it still represents very good value for money, in that it is easy to use, the sound quality is reasonable and it does facilitate the organisation of your musical ideas. You can also play and multitrack over conventional stereo recordings made on your hi-fi, which could be useful. The 03's limitations are mainly in terms of expandability, so you

can't add effects or equalisation as you mix and you can't take the tape outputs into a larger mixer until you've already mixed them into stereo. As a musical notepad, the Porta 03 is close to ideal, but it isn't really suitable for use as part of a growing home-recording system.

### TASCAM 414 £349

The 414 is a mid-priced unit which allows you to record on all four tracks at once and utilises dbx noise reduction. Each input channel on the mixer section features a mic/line input, and there's a useful additional pair of stereo inputs. A basic 2-band EQ is provided on the input channels, and two aux sends, for effects processing, are available, one of which is switchable to Tape Cue for easy setting up of a monitor mix. Metering is via LED bargraphs, and the high-speed (9.5cm/sec) tape transport, with a simple 3-digit mechanical tape counter, features a return-to-zero facility. A remote punch-in/out facility is activated via an optional footswitch, for hands-free operation. Last, but not least, in these days of MIDI sync'ing, there's a sync option that bypasses the onboard noise reduction.

While the 414 isn't the



Tascam 414.



most sophisticated cassette multitracker on the market, it's far from being the most basic, and offers a good compromise between affordability and a feature set which shouldn't prove too restricting.

### TASCAM 424 MKII £499

The Tascam 424 MkII ups the ante on the price front, and, as always, as the price gets higher, the compromises get fewer. Accordingly, the 424 has the ability to record on all four tracks simultaneously using dbx noise reduction. The machine offers two tape speeds: standard and double, the latter of which can be selected for working on serious demos. The transport controls are all soft-touch types, while varispeed and the ability to cycle around a specific section of music, bounded by the zero and two locate points, are included.

The stylish, wedge-shaped package contains a four-channel mixer section set out very much like a conventional, separate mixer. All four

“Though the results produced by standard-speed multitrack machines are not actually bad, high-speed machines invariably turn in a noticeably better performance”

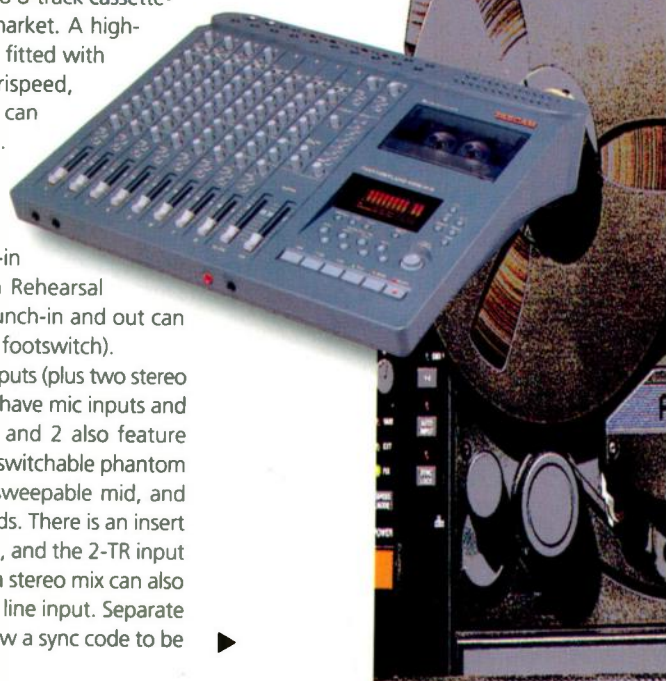
channels have mic and line inputs, and there are two additional stereo inputs. Auto punch-in and out, plus a Rehearsal feature for perfecting overdubs before performing them for real, are also provided. Three-band semi-parametric EQ on the input channels adds to the 424 MkII's flexibility.

The sound quality at the higher tape speed is really very good, but the lower tape speed is only of use when you really are desperate to save tape. However, it could be useful when recording live gigs for later analysis, where the long playing time would be a real bonus.

### TASCAM 488 MKII 8-TRACK PORTASTUDIO £1299

The 488 is one of the only two 8-track cassette-based multitrackers on the market. A high-speed tape transport is used, fitted with dbx noise reduction and varispeed, and maximum of four tracks can be recorded in a single pass. Metering is via an LCD panel, and two locator positions are accessible, as is a return-to-zero function. Auto punch-in and out is supported, and a Rehearsal facility is provided (manual punch-in and out can be performed via an optional footswitch).

The mixer has eight main inputs (plus two stereo inputs), but only the first four have mic inputs and trim controls, while inputs 1 and 2 also feature balanced XLR mic inputs with switchable phantom power. EQ is 3-band with a sweepable mid, and each channel has two aux sends. There is an insert point on both channel 1 and 2, and the 2-TR input provided for listening back to a stereo mix can also double as an additional stereo line input. Separate sync jacks are provided, to allow a sync code to be



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- ▶ recorded on channel 8.

So long as you don't need to be able to record more than four tracks in one go, the 488 is capable of making very impressive recordings.

### YAMAHA MT50 £399

This is Yamaha's budget cassette 4-track, though it still offers simultaneous recording on all four tracks, mic and line input capability on all four mixer section channels, and one aux send with



and programmable punch-in/out are available. There's a return to zero function, and the MT4X also features two additional locate points, between which it will cycle up to 16 times for rehearsal or level-setting purposes. A sync mode, for reliable recording of a synchronisation code on track 4, bypasses the onboard dbx noise reduction, which can also be globally switched off if required. The provision of direct tape outs makes the MT4X considerably more versatile, as it can be connected to an external mixer or another multitracker.

### YAMAHA MT8X MKII £999

Yamaha's MT8X 8-track runs at double the normal cassette speed and is set up to use Chrome bias (Type II) audio cassettes. Noise reduction is dbx, and is globally switchable. Up to four tracks can be recorded at one time.

The mixer section features eight main inputs and three stereo inputs. Channels 1-4 can handle either mic or line sources, while channels 5-8 have line inputs only. In addition, channels 1 and 2, which, unusually, feature balanced XLR-type mic inputs with switchable phantom power, have insert points — for easy use of compression, for example.



stereo return. EQ, provided on all four channels, is only of the basic 2-band high and low type, but, usefully, the dbx noise reduction is globally switchable or can be defeated on track 4 only for sync code purposes. There's also a Sync Out jack to allow a code recorded on track 4 to be fed directly to a MIDI system. The tape controls are of the mechanical type, with a 3-digit mechanical tape counter, but the transport runs at high speed and there's a zero stop locator function. Varispeed, as you'd expect, is provided.

### YAMAHA MT4X £559

This sophisticated machine offers a sleek design, with a fluorescent multi-function display panel featuring LED bargraph metering, the ability to record on all four tracks at once, and 3-band EQ on each channel. The mixer section has four mic/line inputs and two aux sends with stereo returns, while the tape transport offers both the higher, 9.5cm/sec speed and the standard 4.8cm/sec speed, plus varispeed. Both manual punch-in and out (via front-panel controls or an optional footswitch)

A separate Sync in and out with level control, plus a noise-reduction bypass switch on channel 8, facilitate reliable recording of timecode.

All eight mono channels feature 3-band EQ with swept mid, and each channel also has two post-fade Aux sends for use with effects. There are no dedicated returns, so you'll have to use one or two of the stereo inputs.

The fluorescent display integrates both numeric and metering functions. Tape varispeed is provided, and there are two tape locator points in addition to a return-to-zero function. The tape can be made to cycle between locator points for rehearsal, and there's also an automatic Punch-In/Punch-Out facility. As an alternative, Punch-Ins may also be executed manually from the control panel or via the Punch I/O footswitch socket.

All eight tape tracks feature direct tape output sockets, which means that recordings can be remixed via a larger, more sophisticated external mixer if required.

This machine is aimed unashamedly at the entry-level 8-track market, but has sophisticated transport locate and Auto Punch In/Out features. It's a well featured and sensibly priced system ideally suited to the production of quality demos.

SOS

### CONTACTS

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#### • TASCAM

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#### • YAMAHA

**A** Yamaha-Kemble Music (UK), Sherbourne Drive, Tilbrook, Milton Keynes MK7 8BL.

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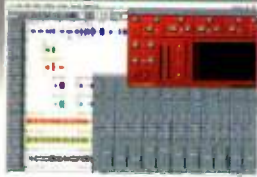


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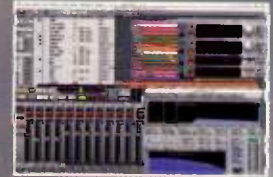
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**A**nalogue tape recorders, particularly open-reel machines, are valuable commodities in an increasingly digital world, so it's worth taking good care of them. At a basic level, routine cleaning and simple preventative maintenance will ensure that your machine remains reliable and sounds good, potential problems being identified long before they do any damage — either to the machine itself or, more importantly, to your master tapes.

The more advanced aspects of maintenance, such as re-aligning the heads, adjusting bias levels and so on, should be approached rather more cautiously, however. To perform these tasks accurately, you'll need test tapes, measuring equipment, and ideally, the technical manual for

of reasons for this, but most of them relate to the cost of the original machine. Professional machines generally give better access to the adjustment controls, and these rarely interact with each other. On the other hand, many semi-pro machines, being built to a much tighter budget, often hide controls away in operationally awkward places.

### CLEANING

The easiest maintenance routine, but one that's frequently overlooked, is cleaning and demagnetising the tape path. This should be done on a regular basis, but exactly how often will depend on how much usage your machine sees — anything from once a day to once a fortnight, perhaps. If the machine is unlikely to be used for a while, I would clean it before putting it away, and probably again before using it after storage.

The most commonly used cleaning tools are cotton buds or swabs and a little isopropyl alcohol (extremely flammable) or Colclene spray (contains CFCs). Personally, I prefer to use alcohol, but it can be difficult to acquire sometimes (try the chemists). An alternative to either of the above is Chemi-

# Head

A GUIDE TO ANALOGUE TAPE MACHINE MAINTENANCE

# Master

*Regular maintenance can not only ensure that your analogue recorder gives years of reliable service, but can also immeasurably improve the quality of the recordings you make with it. HUGH ROBJOHNS retires to the test department and meets the challenge head-on...*

the machine in question. Whilst the information in this article is intended to provide some background understanding of the various principles and techniques involved in tape machine maintenance, it does not cover the specifics of any particular machines. And before you go any further, it's advisable to read through my 'Analysing Analogue' article on how analogue tape machines work, starting on page 122 of this issue, for some of the terms and concepts involved.

If you're uncertain of your technical ability to work on a machine, don't do it! Better to get someone who knows what they're doing to re-align a slightly off-tune machine than to wreck the thing — or yourself! Always remember that there are lethal voltages and hazards within any electronic equipment. Something else to think about is that professional machines are generally a lot easier to work on than semi-pro ones. There are a number

Swabs, which are medical swabs pre-soaked in isopropyl alcohol and individually sealed into foil sachets. Although expensive, these are very easy to use, avoid any risk of solvent spillage and minimise the potential fire risk considerably compared with a bottle of alcohol thrown in the tool box! The swab is also far less likely to leave fibres in the works than the cheap and cheerful cotton bud.

The idea of cleaning the tape path is to remove the fine dust which is naturally shed from tape, plus any residue from the tape lubricants and the chinagraph marks left on the heads from editing. Only ever use the soft tip of cotton buds on the heads, guides and rollers, and use the cleaning solvent very sparingly. If the solvent drips into the







bearings on rotating guides it could cause premature bearing wear by attacking the greases, and if it encounters anything hot or any area where there are small sparks, the result could be quite dramatic! Occasionally, you may encounter stubborn deposits but refrain from attacking them with force — use patience and perhaps a little more alcohol instead.

Make sure that you clean the entire surface of rotating rollers (not always as easy as it sounds) and, as you clean each element of the tape path, examine the components for any signs of wear, such as flat spots or sloppy bearings. The latter could increase flutter and mechanical noise, and the former will lead to tape scoring or edge damage (both of which cause drop-outs).

There are two schools of thought when it comes to cleaning the pinch-roller and other rubber-faced guides. One is that isopropyl alcohol does no significant harm, and the other is that it strips the natural oils from the rubber, speeding up its ageing process and leaving it glassy and brittle. Personally, I have never had a problem with sparing applications of alcohol to release grime, but if you are concerned, try using either a little pure water, or a very dilute solution of a mild detergent.

## DEMAGNETISING

Once the tape path is clean, it can be demagnetised. The idea here is to ensure that nothing the tape comes into contact with is magnetised in any way. If it was, the recording would suffer from an increase in background noise and partial erasure of the higher frequencies. With modern machines, the increased use of non-ferrous (non-magnetic) materials reduces the likelihood of magnetised tape paths considerably; however, the heads will still benefit from an occasional demagnetisation.

There are a number of easy-to-use devices on the market these days to perform demagnetisation, but take the trouble to read the operating instructions before use — incorrect operation can leave the heads and/or guides strongly magnetised, so be careful! The aim is to gradually introduce a strong alternating magnetic field at one end of the (empty) tape path, then move it slowly and smoothly along the path close to all guides, rollers and heads, before allowing the magnetic field to fall very slowly back to zero, at which point the guides and heads will retain no magnetic flux of their own.

Some demagnetisers have electronic circuitry



# Tape Machine Maintenance

► which does the ramp-up and down automatically, but most types require the operator to physically move the device slowly towards and past the guides and heads to produce the necessary build-up and ramp-down. If the demagnetiser is turned on or off too close to the machine, the sudden creation or collapse of its magnetic field will magnetise all manner of things!

Take great care not to let the demagnetiser's probe touch the heads or guides, because the inherent vibration within the device could cause scratches in the same way as a mechanical etching



tool (most modern demagnetisers have a soft plastic cap on the probe to prevent such accidental damage). Also make sure that the demagnetiser stays well away from any kind of moving-coil meter (VUs or PPMs, for example) because it will happily demagnetise their internal magnets, causing the meters to under-read!

## MECHANICS

Mechanical maintenance of the machine is normally restricted to turning fixed guides, lubricating bearings and linkages, or adjusting mechanical spool brakes.

Often, the fixed guides in a tape path are located with a central clamping screw. If the guide is starting to show any signs of developing a flat surface, it may be possible to loosen the screw and rotate the guide so that a round surface is presented to the tape. Some engineers rotate the guide as a matter of course once every couple of months or so (depending on the machine's usage) so that the guide wears evenly around its entire circumference and flat surfaces never arise. Worn guides are the biggest culprit when it comes to excessive oxide shedding from tapes, or drop-outs caused by scoring and edge damage.

The mechanical bearings and linkages within a tape machine should be lubricated occasionally, ideally with a light machine oil but, once again, make sure you use the oil sparingly — a drop will go a very long way. While you're inside the machine, check out the condition of any rubber belts or drive wheels. Cracked or glassy surfaces and evidence of rubber powder deposits are all indications that replacements are needed.

One of the most common mechanical problems with tape machines — particularly multitrack machines — is the efficiency of the brakes. Some modern machines control the spooling motors to provide both the drive and braking actions, the mechanical brakes only being used once the reels have stopped turning. Older machines usually rely on the friction brakes for all braking effort, and if the machine is taking a long time to reach a stop after the tape has been fully rewound, or if it's throwing loops, the brakes should be adjusted. There's usually a fairly simple and obvious mechanism which sets the mechanical brake tension, but be careful not to overdo it — the spool hubs should be free to rotate when the brake solenoids are drawn in, and any drag from the brakes will only cause premature wear in the friction linings.

## TEST TAPES

Many of the electrical adjustments in this article are best performed with the assistance of a decent test tape — but the bad news is that a good test tape is going to cost the thick end of £100 (they are precision tools, after all). Some adjustments can be made reasonably well by other devious and less expensive means, but if you're seriously keen to maintain your analogue tape recorder in tip-top condition, a test tape (or two) is really an essential tool.

Make sure that the test tape is of the correct equalisation, speed and level standard for your machine. Test tapes are normally designed to be used at one speed only (so you may require two different tapes if you use both speed settings on your machine). The equalisation standards are normally referred to as IEC (also CCIR or DIN), NAB (sometimes called IEC-2), and AES. The last one only applies to high-speed (30 inches per second), 2-inch multitrack machines, but the other two standards cover the full range of tape widths. A broad generalisation would be that most European-made recorders conform to the IEC equalisation standards and most American or Japanese machines use the

NAB standard. However, it is important to use the right tape, so always check with your tape machine's manual for the correct specifications.

The recorded signal strength on the tape is defined in terms of magnetic flux, measured in Webers. There are a number of common level standards (185, 200, 250, 320 and 510nWb/m), the most common today probably being the 250 and 320nWb/m forms. Unfortunately, there are two accepted, but different, methods of defining reference flux levels, with a 10% disparity between them! One is the ANSI system, and the other is the DIN system, the latter being 10% higher than the former. The discrepancy could affect the precision of your replay level calibration, but only by about 1dB.

In practice, the reference flux level on the tape is used as a base point from which the maximum operating level can be established, in much the same way as a line-up tone is used to convey expected peak programme levels. (Note that most test tapes record calibration sections across the full width of the tape, not in defined recording tracks). The basic procedure is to adjust the replay gain so that the test

tape's reference signal aligns to a known level relative to the wanted peak operating flux level.

As an example, let's assume that I want to record tapes with a peak flux of 1000nWb/m (a fairly typical figure with modern tapes). If my test tape has a reference flux of 320nWb/m, the formula I need to use is:

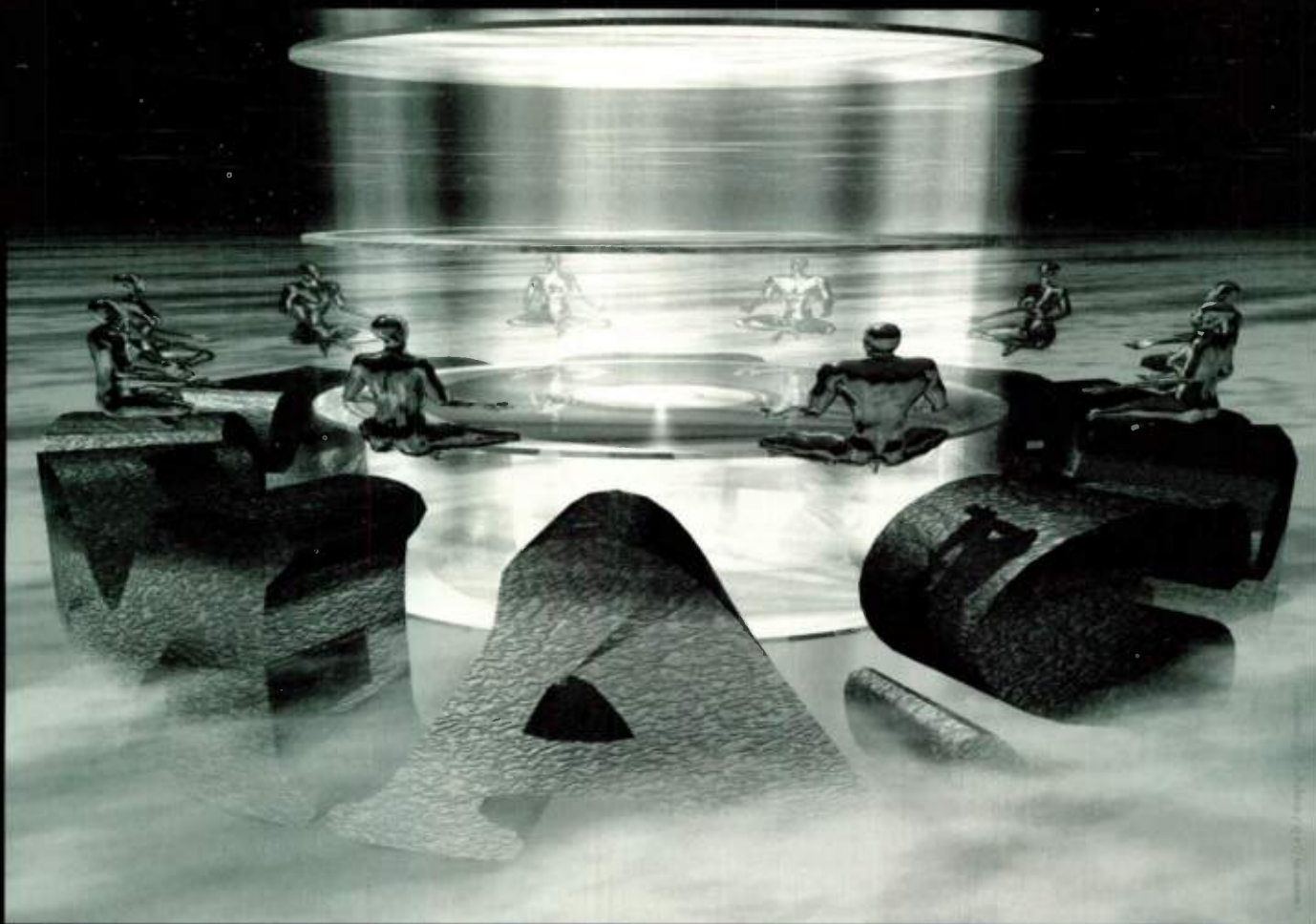
$$\text{test tape level below peak level (in dBs)} \\ = 20 \log (\text{test tape flux/wanted peak flux})$$

In this case,  $20 \log (320/1000)$  is -9.9dB, so the replay gain would be adjusted to set the reference level tone from the test tape 9.9dB below peak operating level. Assuming that the studio's normal peak signal level is +8dBu, the test tone should end up replaying at -1.9dBu, which would be about PPM 3-half or about -6VU.

It is essential to take great care of test tapes, since they are the only true reference tool you have. Try to avoid stopping the transport in the middle of recorded test signals, and never wind the tape against the heads. When storing the tape, make sure it has been wound neatly, with no blocking (raised sections within the spool) and keep it away from sunlight and heaters or radiators.



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# Tape Machine Maintenance

## ▶ REPLAY ALIGNMENT

It is essential to set up the replay side of the machine before attempting to adjust the record side, as the replay alignment is referenced to a test tape (see the 'Test Tapes' box elsewhere in this article), while the record side is set against the newly aligned replay conditions. If the machine uses any form of noise reduction, make sure it is switched out before attempting any of the line-up processes described below.

The first thing to do is to set the operating level for the machine by using the full-width calibration level portion of the test tape. This establishes the mid-frequency gain of the system accurately, regardless of minor head positioning or equalisation errors, and acts as the reference base for pretty much everything else. Note that all settings must be repeated individually for each channel and at each operational speed, which can take a considerable time.

Setting the replay gain is largely a matter of personal choice, but will also depend on the capabilities of the machine and the level of compatibility you want with other machines. Most modern tapes can accommodate flux levels well up into the 1200 or 1400nWb/m region, but the heads of older machines will probably saturate before this. In general, the higher the peak level, the better the signal-to-noise ratio, but the greater the harmonic distortion. You may prefer to set a lower peak operating level on a high-output tape, to take advantage of better transient distortion performance, for example. If you want to match the operating level of another studio, find out what peak flux they record to and make the appropriate calculations to refer it back to your own test tape reference level.

The next thing is to align the replay head — its azimuth, height, wrap and zenith (see the 'Analysing Analogue' feature starting on page 122 of this issue for a diagram illustrating these). It's rare to have to adjust anything other than the azimuth, but it's as well to check the others anyway. Before you tweak anything, examine the mechanics of the head mounting and make absolutely sure you know what screws adjust which aspects. The azimuth adjuster is usually fairly obvious, and may appear to be the only adjuster available. If the head has a pronounced worn or flat area, it may need replacement or re-lapping (re-profiling), and in this case realigning the machine is pointless until the head has been replaced.

Head height can be adjusted by sight, but is best adjusted using a special portion of the test tape. If you do not have access to a test tape, do not attempt to adjust the head height.

Azimuth is adjusted by comparing the replayed phase of a test tone from top and bottom tape tracks simultaneously, normally with the aid of an oscilloscope. Start with a 1kHz tone and make sure

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# Tape Machine Maintenance

▶ that the two oscilloscope traces (one from each track output) are vertically aligned, adjusting the azimuth set screw on the side of the head block as necessary. Next, use a 10kHz test tone and fine-tune the alignment. If you do not have an oscilloscope, the alignment can be done (albeit rather more crudely) by mixing the two outputs together at uniform gains, but in opposite polarities. Any phase shifts between the channels will prevent their complete cancellation, so adjust the azimuth for minimum output level. Again, start with 1kHz and then use 10kHz for fine tuning.

Wrap and Zenith can be checked by marking the head with a special non-permanent dye and running a blank tape over the head. The dye will be removed from the contact area and the shape of this will indicate if the head is mis-aligned. If the wrap is wrong, the gap will not lie in the centre of the cleaned area, and if the zenith is incorrect, the clean area will be trapezoid in shape rather than rectangular. It's extremely rare to have to make these adjustments, by the way, unless the head has been replaced.

If the tape machine has the ability to replay from its record head (Sync, Sel-rep or overdub mode), you can check the mechanical alignment of the record head in the same way as described for the replay head.

Once the head has been aligned correctly, the replay equalisation can be set. The test tape will have a number of spot-frequency tones — normally about 20dB below the reference level to avoid tape saturation effects. The aim is to establish the flattest possible replay frequency response and there will normally be adjustments for the HF and LF ends of the spectrum. Only adjust the HF end at this stage; the LF end will be done after the record side of the machine has been set up. The LF equalisation cannot be done using the test tape because head bumps (inherent frequency-response

variations) and fringe effects from the full-width test recordings (ie. crosstalk from the nominal guard-band areas) can give very misleading results. Ideally, all signal levels should be measured with a proper audio test set, but the tape machine's own VU meters or a mixer's PPMs can be used instead.

At this stage, the complete replay-line up has



been completed (bar the replay bass equalisation) and it is usually a good idea to quickly check the reference levels and sweep frequency responses once more before moving on to the record side of the machine. If you plan to use the machine at different speeds, you'll need to repeat the electrical alignments for the other speeds — there should be separate adjusters for each speed. Take care not to accidentally re-adjust a control for a speed which has already been set up.

## RECORD & BIAS ALIGNMENT

Bias affects record equalisation and level to some degree, so it is usually the first thing to be adjusted, although it may be a good idea to set the record drive for roughly unity gain through the machine at 1kHz first, just to make life easier. Make sure you load the machine up with a brand new reel of the tape type you plan to use, as bias is very specific to tape types and speeds.

If you are working on a three-head machine, record adjustments can be made in 'real-time' as their effects can be monitored directly from the replay head as the tape runs past. However, on a two-head machine it's a very tedious case of making an adjustment, winding the tape back, measuring the change, making another adjustment, and so on. Rather you than me — especially as you need to repeat the electrical alignment for each speed on the machine too.

The easiest way to adjust bias is to monitor the output level of a 1kHz tone (input to the machine roughly 10dB below the expected peak operating level), as the bias is slowly increased from its lowest setting. The level of the 1kHz tone should rise steadily at the output until a slight plateau is reached, after which it will start to fall: set the bias initially to the position which gives maximum

“The satisfaction of knowing you've set your machine up to perform superbly well is hard to beat!”

## CALIBRATION TONES

Tape machine alignment is a complex and time-consuming business, and there are very few points of reference. Consequently, it's vital that before every new recording, a sequence of calibration signals is recorded on the tape so that when it is replayed on a different machine, or on your own machine in the years to come, the correct levels and frequency response can be obtained.

As an absolute minimum, you should record your reference level (0dBu) tone at 1kHz for about 30 seconds, followed by a 10kHz tone (usually at -8dBu). The 10kHz tone can be used to align the replay head azimuth as well as the replay equalisation, and if you're really keen, you could also put down a low-frequency tone (say 63Hz at -8dBu) to align the LF replay equalisation.

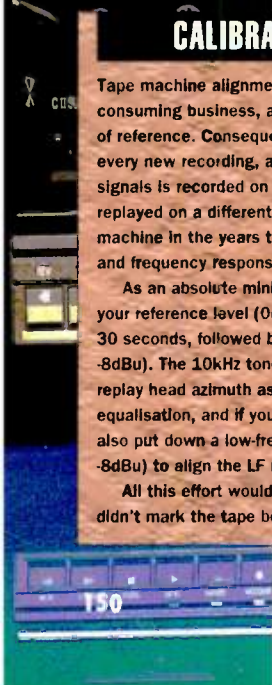
All this effort would be completely wasted if you didn't mark the tape box accurately with which

tones have been provided, and at what levels. The latter point is complicated by the need to refer to both your studio operating levels, and the flux level laid down on the tape but, assuming we'd aligned the machine based on a peak recording level of 1000nWb/m, as described earlier, the tape label might read something like this:

### Tones:

1kHz @ zero level 398nWb/m for 30 seconds  
Peak recorded level = 8dB above reference (= 1000nWb/m)  
10kHz @ -8dB for 30 seconds  
63 Hz @ -8dB for 30 seconds

With this little lot, an engineer has everything needed to align the replay head, set replay equalisation, and match the tape levels to the studio operating levels, so that peaks on tape are within the rest of the system's capabilities.





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# Tape Machine Maintenance



▶ output. Next, input a 10kHz tone and fine-tune the bias for a maximum output level again, noting what this level is. Then *increase* the bias slightly more, so that the level at 10kHz falls by either 1.5, 3 or 6dB relative to the noted peak level, the amount depending on tape speed (for 30, 15 and 7.5ips respectively). You may find you can get better results with slight variations of my suggested over-bias values: the exact numbers are dependent on the specific tape, and the tape's manufacturer will be able to provide ideal specifications.

Once bias has been set, the record head alignment can be adjusted (if necessary). The recording is not actually made in the head gap, but by the edge of the magnetic field, and this will change in size as the bias is adjusted. Consequently, record head azimuth can only be set once the bias level is fixed. Record a 10kHz tone (at about 10dB below peak level) and adjust the record head's mechanical azimuth for accurate phasing between edge tracks when viewed on the replayed outputs. Record head

height can also be adjusted now, by maximising and matching the output level from the two outside edge tracks.

Next, the record level and equalisation can be set. The record level was roughly set at the start, but it can now be accurately aligned so that the machine has unity gain between input and output when recording (ie. the input level is the same as the output level). Adjusting the record equalisation is a case of trying to achieve the flattest record-replay frequency response, and normally only a high-frequency equaliser control is provided. Record a 1kHz tone about 15dB below peak level and note its level on the output as a reference. Next, increase the record frequency to 5kHz, 10kHz, and 15kHz, adjusting the HF equaliser to get the flattest possible response between the three spot frequencies. A final check of the top-end quality of the machine can be made by sweeping the oscillator over the range 1kHz to 20kHz and noting the delightfully flat and extended frequency response!

Next, re-tune the oscillator to the low-frequency region (say between 30 and 200Hz) and adjust the Replay low-frequency equaliser to get the smoothest low-frequency response. This is very unlikely to be really flat because of the inherent problems of head bumps, or woodles, but you should be able to achieve a reasonably flat response, and certainly within the tolerances given by the manufacturer.

## ODDS AND ENDS

The erase head and signal level rarely needs adjustment because its settings are not particularly

critical. However, since you're now knee-deep in the machine, you might as well check it out. The azimuth and head height should be checked visually, and the erasure performance checked by trying to erase a peak level recording. If the level of erasure is not as good as expected, try adjusting the erase level before altering the head height.

Finally, the tape speed should be checked, and if necessary (and possible), adjusted. Ideally, a frequency counter would be used to measure the pitch of a calibrated tone recorded on the test tape, but good results can also be achieved by timing a long recording made on a known good machine (and whose time is accurately logged), or a strobe leader tape could be used. If the machine uses a synchronous capstan motor, there is probably little that can be adjusted, but if a servo system is employed, there will be a speed adjuster somewhere in the works.

## CONCLUSION

The maintenance and alignment of an analogue recorder is reasonably logical and straightforward, but demands meticulous attention, a little thought, a lot of time, and a few specific items of test gear to really do the job properly. If the whole thing fazes you, don't worry about it — just enjoy using the machine and call in an expert when you think it needs re-alignment or other maintenance (many of the reputable service centres advertise in *Sound On Sound's* Classified section, towards the back of the magazine). If you feel comfortable with the ideas and concepts, and have access to the necessary hardware and (ideally) test tapes, have a go. The satisfaction of knowing you've set your machine up to perform superbly well is hard to beat! But please remember that there are very serious hazards involved when working on any electrical equipment and, particularly with semi-pro machines, it is often necessary to remove the machine's covers to gain access to the appropriate adjusters. Always make sure someone is nearby while you are working (to identify the charred remains, if nothing else...) and arrange for the mains switch or plug to be within easy and obvious reach.

The basic procedures described above apply equally well to multitracks, 2-tracks and even cassette machines, and I have often been amazed at the improvements made possible by a little judicious re-alignment now and again. It is all too easy to ignore falling performance levels until they become desperately bad, but a decent analogue open-reel recorder should be able to give even the sexiest digital toy a decent run for its money when properly set up.

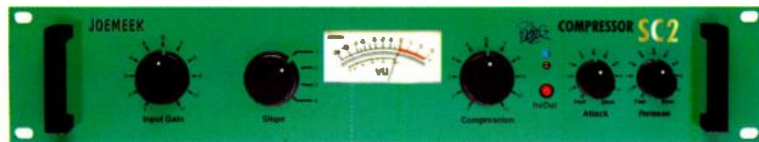
**SOS**

**SOS covered tape recorder line-up in step-by-step form way back in September and October 1986, and the novice to this particular form of recreation might find those articles worth a look. The issues in question are now out of print, but photocopies can be obtained for £2 per article from SOS Mail Order, Media House, Trafalgar Way, Bar Hill, Cambridge CB3 8SQ.**

“... a decent analogue open-reel recorder should be able to give even the sexiest digital toy a decent run for its money when properly set up.”



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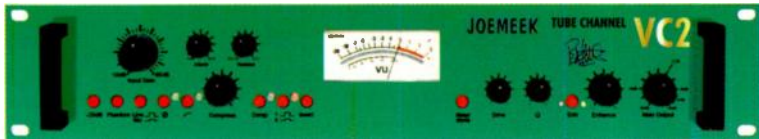


☞ Unless you have permanent access to a rack of vintage compressors, a unit such as the SC2 would be a particularly worthwhile addition to your effects resources ... (Studio Sound - 1995)

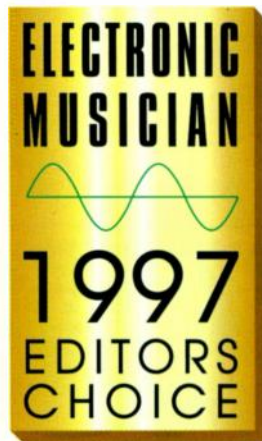
☞ This unit is pretty damn good ... the SC2 is stunningly quiet. It's also extremely distinctive sounding ... It's spectacular ... (EQ - December 1995)



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# John Leckie



*In his first interview since winning the coveted 'Best Producer' award at this year's Brits, John Leckie joins MARK CUNNINGHAM in Abbey Road Studio 2 to discuss his 27-year career and the making of Cast's new album, Mother Nature Calls.*

**H**alf an hour before the Brit Awards kicked off at Earl's Court in February, I homed in on John Leckie, seemingly lost in a reception full of anonymous record company execs, and wished him luck as a 'Best Producer' nominee. "You're bound to get it," I said, reminding myself of the year in which he was responsible for Kula Shaker's chart-topping *K*, Cast's uplifting million-selling debut album, and the first release by ex-Take Thatter Mark Owen. "I doubt it," he replied. "There's a lot of competition." It was a sign of the current popularity of the British guitar band that he wiped the floor with this perceived competition and rose to the lectern to collect the UK's ultimate producer accolade. A broad grin appeared across my lips. It was as if Music had come home.

Leckie's award came almost 27 years to the day that he walked through the doors of Abbey Road Studios for the first time as an EMI employee on February 15, 1970. Initially hired as a tape op, he quickly progressed to the position of balance engineer. But for all his early success in music recording, his original ambitions lay in the movie world. After completing a two-year course in film and television at Ravensbourne College of Art, Leckie turned down opportunities with the BBC and the newly-launched London Weekend Television to make obscure 16mm films at a small Wardour Street film company. Although the job lasted for just five months it was a useful outlet for Leckie's vivid imagination.

He says: "I was heavily inspired by the weird underground avant-garde films that were happening around 1968 and 1969, but there was a major obstacle preventing me from becoming a film director: I couldn't get into the ACTT [Association of Cinema and Television Technicians]." Survival tactics took over and his other great interest, music, provided the means for a new direction. Whilst at college, Leckie had written a thesis on electronic music, based on information gleaned from liner notes of albums by Stockhausen and the few other serious electronic composers of the late '60s. "I tied it all in with Hendrix and Floyd and the whole underground psychedelic movement, which was what I was into. I was always into experimental media, whether it was film or music, because it was stretching boundaries beyond their perceived limits."

Already familiar with the basics of putting sound on tape through his experience with film, Leckie decided to blanket the London recording industry with applications for non-existent jobs. He struck gold when EMI was the only company to reply. "I was offered an interview and got shown around Abbey Road, then three months later I received a letter asking me to start as a tape op the following Monday. Like every other new starter, I spent the

**TRUE BRIT** first couple of weeks sitting around watching what the engineers did on a session and suddenly the guy wasn't there any more, so I was asked to take over. It was 100% practical experience and exactly what I wanted. The last thing I was interested in was training for two years with the BBC and sitting exams before I did any actual work."

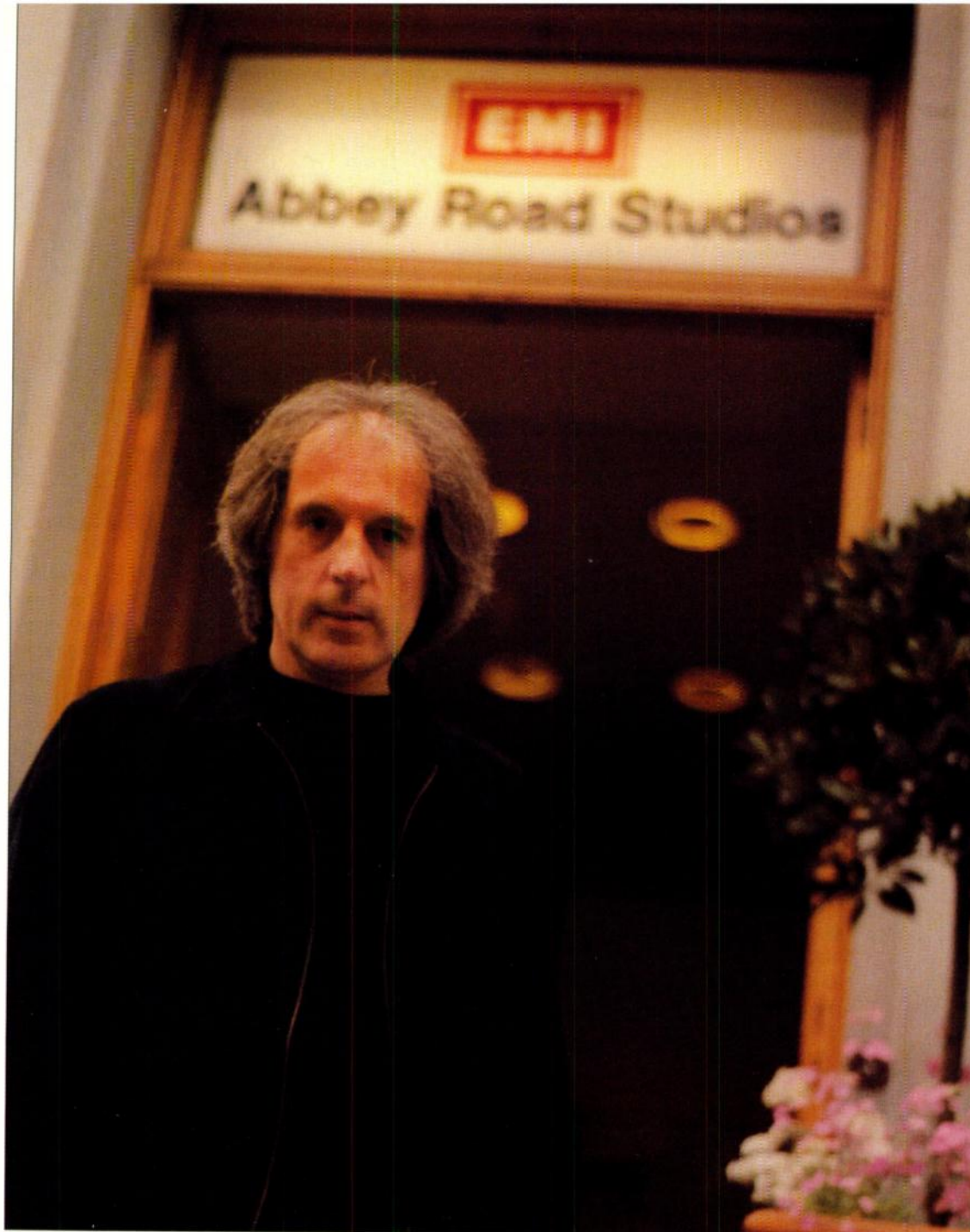
At the time of Leckie's arrival, around 90% of Abbey Road's workload was EMI recording artists, and it was from the studio's Progress Office that the whole process of a record release was managed — from the A&R department's booking of a session to the final mastering. Leckie saw it all, and when he was not directly involved in a session, he would find various essential tasks to fill his hours. "White label test pressings were always approved here, and checking their quality was often a good way of generating overtime money," he recalls. "You'd have a pile waiting for you which were identified by a catalogue number, not by an artist's name, and you would listen out for excessive noise, pops, clicks or jumps, and reject them if necessary."

"Another little job we had to do was the banding of 15ips quarter-inch tape copies which came to us from Capitol, or overseas subsidiaries like the Russian label Melodia or ABC Dunhill [once famed for Steely Dan]. They would arrive without white leader tape between tracks, so in breaks from sessions, I would spend an hour or two putting leader tape in the right places, and then top and tail it with white leader at the front of the tape and red at the end. If you were quick and did it in half an hour you could knock off early and go down the pub!"

Times may have changed but there are some aspects of working at Abbey Road which remain the same, such as the wide range of musical disciplines faced by the staff engineers. "Because of the huge range of music recorded here, engineers have always had the opportunity to work with different styles and become acquainted with the various demands of each type of session. When I was on the staff in the early '70s, it was expected that even though you might have stayed up half the night with Pink Floyd, you had to be in the next day to prepare the studio for a German opera singer. Even now, a young assistant engineer might find himself working on a four-week Oasis project and then go straight into recording a solo piano concerto. Abbey Road is one of the few studios in the world where you can gain that breadth of experience."

One of the first hard lessons learned by Leckie was that he and all of his young colleagues were dispensable. A session would always continue in his absence and should things go critically wrong, there would always be another wide-eyed, aspiring engineer ready to fill his shoes. He also discovered that accidentally erasing an in-progress tape could be dangerous to one's health! "When it's no one's





“What I hope I can do above everything else is capture the spirit of a band

on stage, so that when you see them play live after liking their record it's not a big disappointment.”

fault but yours, because you pressed the red button, you just want to die. It only takes once and you don't wipe anything for six months or so because you double-check everything.”

The tape operator's role was well defined in the era which pre-dated the use of the multitrack remote controller, and much responsibility was placed on the shoulders of the young Leckie as he nervously activated the controls of the tape machine. He says: “It was always someone's very specific job to start, stop, rewind and fast-forward the tape. That was the tape op's first priority because at any time the producer said ‘Run the tape’ or ‘Go back to the second verse’, the whole focus had to be on being able to act on his instruction as quickly as possible. It was down to you to record the tracks, do all the drop-ins and take care of the headphone sync mix, while the engineer positioned the microphones and made the balance on the desk. Invariably you had to be one step ahead of what everyone else on the session was thinking, but also be ready to go one

step back. If you were working with a nutty producer like Phil Spector, you would never assume anything, and when he said ‘Run the tape’ you would need to know what song he was talking about. He'd say ‘Play that song again!’, and you'd rewind to the beginning of the track you'd just been working on and hit the play button, only to hear him yell ‘Not that song, the other one!’. It was hard to know what was going through his mind most of the time.”

Leckie is referring to the unique experience he gained within less than a year of joining Abbey Road when he ‘tape opped’ on the Phil Spector-produced sessions for George Harrison's *All Things Must Pass* triple set and the John Lennon/Yoko Ono Plastic Ono Band albums, their first collections following the break-up of The Beatles. Along the route to excellence, however, a control-room nightmare resulted in Harrison's track ‘Awaiting On You All’ appearing in a shorter form on *All Things Must Pass*. “We were working with 3M 8-track



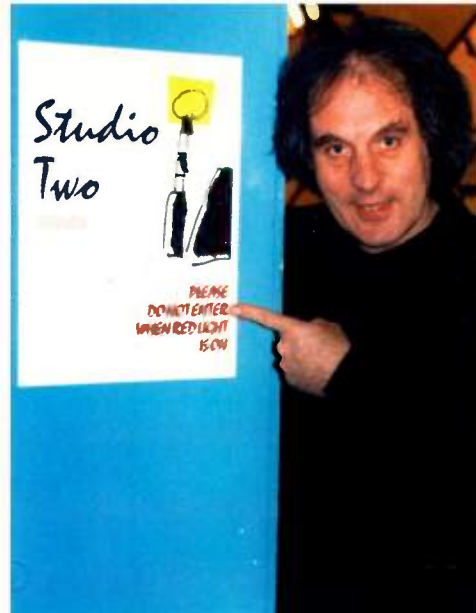
# John Leckie

► machines on which the tape would pass the record head, around a roller and past the playback head in a kind of elongated 'S' shape. Running at 15ips, you had a good half a second between playback and record which, obviously, was a consideration when dropping in. You really had to drive these machines and slow them down before you slammed them into fast-forward.

"I was having a few problems controlling one of these machines and kept complaining to the famous maintenance guy Eddie Klein (now the manager of Paul McCartney's private studio in East Sussex). He said 'Oh, don't worry about it, I can't fix it now.' Five minutes later, during George's vocal overdub on top of the finished track, complete with strings and horns, I pressed fast-forward and stop, and the tape went flying across the room. My heart was in my mouth. I panicked and said in a quivering voice, 'It wasn't my fault, Eddie said it would be alright!' Fortunately the tape was retrieved, but I suspect part of the recording may have been damaged amidst the chaos."

## TURNING FREELANCE

Leckie survived the Spector sessions, credibility intact, and went on to work on a vast array of fascinating projects as an Abbey Road staffer during the 1970s, including Pink Floyd's *Meddle*, Be Bop Deluxe's *Sunburst Finish* and the early albums of Magazine and Simple Minds. By July 1978, however, he was faced with the choice of either remaining loyal to EMI or taking the huge leap into the world of the unknown as an independent



producer/engineer. He explains: "I had produced XTC's first album [*White Music*] at The Manor during my holiday in late 1977 and purposely didn't tell anyone at Abbey Road about it. Although I had been working with Be Bop Deluxe in other studios, they were an EMI band so it was OK, and I could have recorded XTC at Abbey Road but not at a non-EMI studio. There had to be an EMI element and I was threatened with the sack if I stepped out of line. By the summer of '78, XTC had become quite successful and were ready to do their next album [*Go 2*] at The Townhouse, so I felt compelled to explain my predicament to my studio manager. But he once again told me that I'd be fired if I worked with them at The Townhouse. EMI wouldn't hire my services out to Virgin, so I had to leave."

Interestingly, Leckie's success has been totally built on a foundation of British artists, even though he has been offered the chance to produce

## WORKING WITH PHIL SPECTOR

Just a few months after joining the Abbey Road team, John Leckie received a major injection of experience as the tape operator on the sessions for George Harrison's classic *All Things Must Pass* album, co-produced by Phil 'Wall Of Sound' Spector, whose employment of a white chauffeur-driven Rolls-Royce and an armed bodyguard were viewed by several staff as being sinister and threatening. Leckie recalls: "I worked on nearly all of that album, which was recorded mostly in Studio 3 from April right through the summer of 1970. My experience of the Phil Spector sound was that it had less to do with the studio itself than the large amount of musicians playing together simultaneously in the same room. There were two drummers (Ringo Starr and Jim Gordon), two bassists (Klaus Voormann and Carl Radle), two pianists (Gary Brooker and Gary Wright), two organists (Billy Preston and Bobby Whitlock), four acoustic guitarists (Badfinger), two electricians (George and Dave Mason), Bobby Keys on sax and Jim Price on trumpet, and a lot of it went down live."

"There were also a lot of overdubs with strings, guitar solos, vocals and backing vocals, and some of this work was done at Trident, which was the only studio in 1970 with 16-track facilities, and that was important for things like the massed 'Hare Krishna' vocals on 'My Sweet Lord'."

"Phil Spector was used to the 'what you hear is what you get' idea of recording and would expect the reverb and delay effects normally only heard through

the monitors during recording to be put on tape. At his request we would have two or three machines running for tape echo delays, and a lot of time was spent working delay times out via the monitor. The next day, we would come in and Phil McDonald would pull up the faders and put all the reverbs and delays back into place because they weren't on tape. Of course, it never sounded exactly the same as the previous day, and Spector would know that and so he insisted that the effects and music were as one on the multitrack. So on things like 'My Sweet Lord' and 'Wah Wah' a lot of the reverbs were recorded. It was, of course, the album which defined George's double-tracked slide guitar style and also the one which enabled him to record all the songs that he was never free to do with The Beatles."

Immediately after the Harrison sessions, Leckie worked with Spector yet again on the Plastic Ono Band albums by John Lennon and Yoko Ono. "John's album was a much more stripped-down affair with just piano, bass, guitar and drums, recorded live and often in one or two takes. Yoko's album took much longer than John's, and both were recorded simultaneously with the same band. Yoko would essentially scream over the top of blues jams, and we'd spend about three weeks editing them. I suppose what we did was the forerunner of sampling because we would copy a vocal line from the multitrack on to quarter-inch and splice it into place at John and Yoko's instruction. It was a way of forming a composite article from half an hour's worth of improvised music. John was very spontaneous as an artist but I remember him being incredibly disciplined in

the studio, as was George, and both of them were good at taking instructions and respecting Spector's wishes."

The guitar amps used for both projects were Fender Champs with American 110 volt tubes. Leckie remembers that because they were being run at 240 volts they inevitably blew up by the end of each session! "Every night, Mal Evans (The Beatles' roadie) would leave with two or three of these amps to have them fixed overnight and would return with them in the morning."



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# John Leckie



John Leckie tickles the ivories at Abbey Road.

▶ American bands. Whilst with EMI, he turned down a job with Capitol Records in Hollywood, preferring to stay in Britain where, he says, the harder-edged music had more appeal. This decision, made exactly 20 years ago, ultimately steered him towards his landmark achievements in the '90s. "Britain in 1977 was a really exciting place for music but what was going on in America was the Eagles and a lot of what I'd call unadventurous, old-fashioned crap. I decided it was more happening in the UK and returned home.

"There are some great things in America; it's a land of extremes. You can always tell an American band from their attitude and the way they've learned to play, which is very different from the British method. An American band in rehearsal will jam for three hours, whereas an English band's idea will be to sit around and talk about it! I think there's more craziness and eccentricity here, which leads to greater invention. American music tends to be a little too conventional for me. The contrast between the UK and US dance scenes is a good example. In the UK it is a thriving market with some incredible, creative music that is more than just music to dance to; it's constantly breaking down the boundaries, and is everything I aspired to when I was at college in the late 1960s. What's happening in dance music today is not too dissimilar from what the Floyd were thinking about in 1968, but they didn't have the simple technology that people now have at their disposal to create the sound. If they or Hendrix had used it then, the results would have been phenomenal."

So is the dance market something that interests him as a producer? "Yes: it's all about fantastic sounds and there is immense control, but it seems that the best things happen when it goes out of control. That's when I get a buzz from dance music. I'm not inspired when I hear it thumping away in a predictable manner. It's the same with humans playing guitars and drums in bands. American musicians probably find it more difficult to get out of control than their British counterparts."

## CASTING A SPELL

Since producing tracks such as the seminal 'Fools Gold' by The Stone Roses, Leckie has gone on to help define the sound of today's British guitar pop music with Radiohead, Cast, Kula Shaker, Ride and others, although he is the first to concede that finding an identity for each of these bands has been the result of a two-way partnership. "I feel that my input as a producer can only work if the band's music is already of a high standard before I step in. The bands I choose to work with are those who are halfway towards the sound that will happen on record because of their live work, and I think I contribute the other half in terms of communicating ideas for them to act upon or guiding them in that direction."

This 'other half' may include flavouring music with Leslie speakers, Mellotrons and other exotic hardware. "Both Cast and Kula Shaker are known for their use of Leslies and Mellotrons, and that comes from me. I just turned on the Leslie one day and they loved it. I might choose to set the Symphonic effect on an SPX90 and speed it up, but when you make the effort to use a real Leslie and you can find one that doesn't rattle or hum, it is a very special sound because it's the Doppler effect and it has a life of its own. Knowing when to use it is part of the secret. [Cast frontman] John Power instantly fell in love with the sound and, of course, there were all kinds of observations like 'It sounds just like [The Beatles'] 'Blue Jay Way''. The way I record drums and get a certain sound also appeals to them. What I hope I can do above everything else is capture the spirit of a band on stage so that when you see them play live after liking their record, it's not a big disappointment."

Cast's 1995 first album, *All Change*, was briefly the biggest-selling debut in the history of Polydor Records, and legend has it that immediately upon hearing their demos, an impressed Leckie headed straight for Liverpool, urging the band to hire him as their producer. What was it that attracted him? "The first thing I noticed was the quality of the songs and John's voice, which I knew anyway, having produced The La's. I could tell where John's head was at. When I heard 'Walkaway' it was a very scratchy acoustic guitar demo but I could tell it had the potential to be a classic record."

Nearly two years on, Cast are back with their second album, *Mother Nature Calls*, an incredibly



## MOTHER NATURE'S DESKS

*Mother Nature Calls* was recorded at three studios and on three quite different consoles. Says Leckie: "At RAK we used their old API made by Boeing around 1975 — I don't think it has been turned off since! That's a straight-through desk with no form of automation, and it has fairly basic EQ in 2dB steps. Sawmills has a Trident Series 80 which has been modified, while at Abbey Road the desk in Studio 3 is an SSL G Series 8000. That's my favourite mixing desk because you can do anything with it, but my favourite desk for recording is probably the API, although I manage to get what I want from most permutations of equipment."





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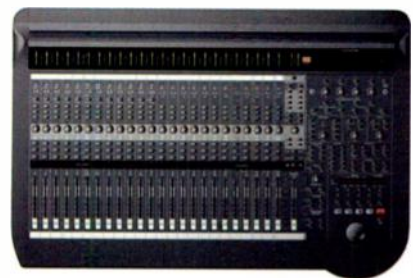
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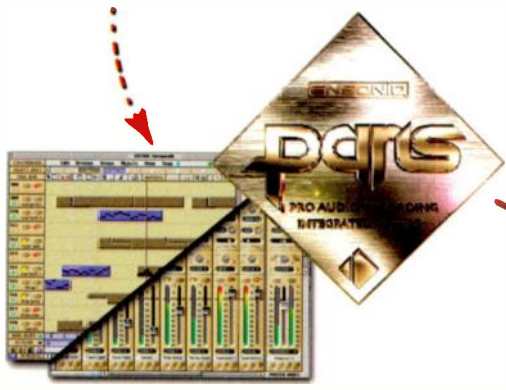
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# John Leckie

“An American band in rehearsal will jam for three hours, whereas an English band’s idea will be to sit around and talk about it!”

mature and diverse collection of songs and styles, with Leckie once again at the production helm. The major difference between the albums (apart from the fact that Mark ‘Spike’ Stent mixed the new release) was in the approach to the sessions. Whereas *All Change* consisted of material routinized on the road before recording, *Mother Nature Calls* relied almost totally on new, previously unperformed songs which were arranged with Leckie’s input during a two-week stretch of rehearsals. There was also a glimmer-of complacency to overcome. Says Leckie: “We made the first album for ourselves and there was a lot more excitement. This time there was the comfort factor which came from knowing that whatever we did was ultimately going to sell a substantial number of records. But I still wanted to make a great album and they needed a bit of a kick from me to get going!”

Backing tracks for *Mother Nature Calls* were recorded over four weeks at RAK Studio 1, in the room which Leckie eagerly describes as “the best in the country”. After the Christmas break, Cast relocated to the Sawmills in Cornwall where they re-worked the backing for ‘Free Me’, ‘I’m So Lonely’, ‘She Sun Shines’ and ‘Mirror Me’, and recorded guitar overdubs. It was at this point that the clock seemed to be ticking too fast for comfort.

“Our original plan was to do all the backing tracks at RAK, the vocal and guitar overdubs at Sawmills and then mix in Studio 3 at Abbey Road, but somewhere down the line we ran out of time and ended up doing more recording when we got to

Abbey Road. That included B-sides, for Christ’s sake! Right at the end of the project, when ‘Free Me’ was about to be mastered for the single, the label were saying ‘Give us as many B-sides as you’ve got, a minimum of four and a maximum of six. We need them now, finished and mixed, for the dual-format CD singles.’ So I suggested to Cast that every night after dinner we should go back into the studio at 9pm and bang out a B-side by midnight, and by the end of the week we’d have five of them. I had the same problem with Radiohead, where a single was brought out before the album was finished, so you have to abandon the album for a while until you’ve delivered these bonus tracks. This is a major distraction to your focus on the main event. So my advice to any band is to get the B-sides recorded and out of the way before you concentrate on the album, otherwise your judgment can be damaged.”

Much acclaim has been accorded to the guitar sounds Leckie captures in the studio. His miking technique usually involves the mixture of either a Shure SM58 or 57 dynamic mic with a Neumann 87 or 67 condenser. “There’s obviously an amazing difference in the sound and coloration you get from adjusting the balance of each of those mics, and you can get radically different textures depending on your mix of the two. I always have the mics positioned right up close to the guitar cabinet, literally touching the speaker cloth, and never two feet back, no matter how loud the cabinet’s being driven. Whether you have the mics in the centre of the speaker or to the side, off-axis, is a matter of experimentation. I tend to prefer a 58 because I’m not overly keen about the top lift of a 57. A lot of it is down to perfect tuning and the tone you get on the amp in the first place, because if you have a shitty sounding amp, it’ll still sound bad no matter what you do in the control room. If the guitar sounds great in the room, that’s most of your battle won. Very rarely do I use any ambient miking away from the cabinet. I might do on the odd solo or for a special effect, but it certainly is not the rule.”

To my surprise, Leckie informed me that many of the guitar tracks on *Mother Nature Calls* (including the main riff of ‘Free Me’) were recorded with a £30 battery-powered miniature Fender Twin replica. “It wasn’t out of laziness but because it sounded so great! I placed a 58 on the speaker and just added a touch of low-end EQ on the desk because you don’t get too much bass out of those toys! One of the things about recording guitars is that although there are no rules, you have to be careful with EQ.”

Maybe as a throwback to the era in which Leckie began his career, he is an enormous fan of the psychedelic-hued backwards guitar. This is mirrored in the new Cast track ‘She Sun Shines’. He says: “I normally turn the multitrack tape over and get the guitarist to play completely spontaneously, do a few passes, then use the most interesting sections. The most difficult aspect of recording in this way is to know where you are in the song, and the result

## KULA’S ‘TATVA’

Crispan Mills: “We recorded *Tattva* at first in a Kilburn 8-track studio with the riff going round and round. That’s when we were learning about recording. We did some full-on psychedelic rock epics on 8-track, I’ll tell you.”

John Leckie: “There were two demos. The very first one had no verses and it was more of a jam with tabla and a drum loop, and it was pretty wild-sounding. Then they did a demo which had verses and still had all of the ingredients, but with a much lengthier structure, lasting about 10 minutes.”

Mills: “The ‘St. George’s Day’ version was recorded at a place called Eastcote and it was the first time we’d used a Mellotron. It wasn’t ‘90s enough or where we’re at now, but the charm and magic of it was wonderful. It was the first time that song really started to happen as a possible single.”

Leckie: “I knew it was a brilliant single but it sounded a bit tame to me at this stage, so we went back into rehearsals with it and formed a new arrangement before going into Townhouse 2 to record the single. Crispan had the idea for the slide solo even though no one definite solo existed; he plays it differently every time they play live and it was a question of picking the right



one for the mix. What makes *Kula Shaker* great is that they work really hard at their music and there is always room for spontaneity and improvisation. Crispan has a classic musician’s soul ethic and nothing scares him. He’ll happily make mistakes in pursuit of something outstanding and he’ll instinctively know when it’s right.

“Unlike a lot of today’s keyboard players, Jay Darlington is not ruled by synths and MIDI. He keeps to his Hammond and provides keyboard colours for the rest of the band to fall back upon. And he’s bloody good! Despite how it might appear, we didn’t use any esoteric valve gear to record *K*, but instead did it more or less totally on SSLs at different modern studios like Eden, Livingstone and Townhouse 2.”



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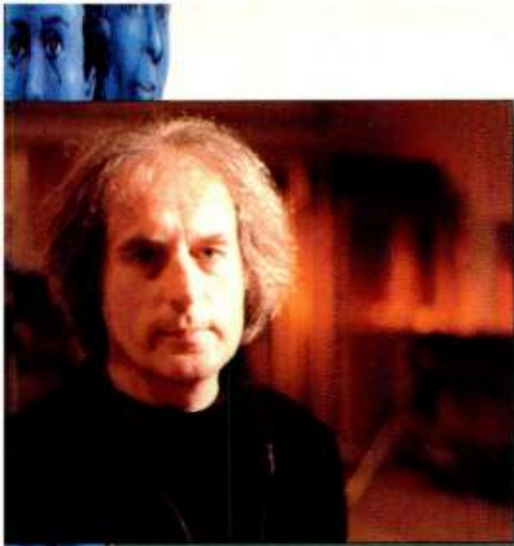
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# John Leckie

► essentially depends on where the guitarist's head is at on the day. That's the beauty of the whole backwards guitar thing — you never know what you're going to get until you turn the tape back over and play it. It's full of surprises and often if you are lost for an idea, the backwards thing might just produce a magical phrase that sends a track in a new direction.

"You can, of course, sample some guitar licks and reverse them via the sampler, and if it sounds good, then

great. But if the whole point is to have a random feel, the old manual method of turning the tape is the best. One of the features of 'She Sun Shines' is Skin's backwards guitar riff which we spent a lot of time on and is actually a sample loop that was used by Brendan Lynch on the original demo of the song. However, if Skin had played to the reversed multitrack I'm sure a lot more strange ideas would have evolved."

Obviously, working with guitars has its limitations and there are few ideas and sounds left for Leckie to discover. It is not surprising, therefore, that he is constantly on the lookout for unique touches to add to his clients' tracks. His subtle contribution to 'Live The Dream', a wispy, swampy sound which appears in gaps between the vocal lines, is a typical example. He explains: "It was a sound I found on a Roland Sound Canvas (the actual setting of which shall remain a trade secret!) and I just pushed it up to the highest possible octave so that it no longer sounded musical, but instead produced an effect. I just love taking things to the edge and I've often stayed up all night listening to some of the craziest noises to see if they'll fit. Suddenly you'll hear something that totally captivates you and you then try to see how you can incorporate it without it sounding false. It's great to work with people who'll allow you to do that."

"I feel that my input as a producer can only work if the band's music is already of a high standard before I step in."

## LECKIE ON THE POLITICS OF MIXING

"When you're laying tracks you're going with the vibe of the energy that is around you and the band, and your aim is to get the best from the musicians. With mixing, you are trying to please everyone but it really isn't possible because everyone has a different opinion. There are so many different ways of mixing. I mixed some tracks for *Elastica* which I part-recorded, and I was aware that they wanted an upfront, hard punky sound. I noticed that the bass drum sounded particularly awful and it amazed me how easy it was to turn *Elastica* into *Shampoo* when I notched the bass drum's EQ! You really

can make huge changes to anyone and anything at the mixing stage.

"If you are working on a single, the priority is for radio and the mix will be vocal heavy to ram the song home because that's where the melody is. Most of the time it seems unnecessary to me when it's a great record, but that seems to be the way for radio. Given the choice, I prefer to make records that sound good at home on the hi-fi. A mix can sometimes take four days, but it might just as easily take half an hour, and what's the best one? You can play people a string of mixes of the same song and they will all have

different ideas about which is best, none of which are related to how much work you put into it. There might be some sort of magic that leaps out at the listener, but that magic was first recognised by the producer who, at the end of a take, put his finger on the talkback button and said to the band, 'Great guys, that's the one.' But that same producer may not be allowed to say 'Hey, that's a great mix', because it's a decision that is made by the A&R guy or the band's manager. So it's ironic that at the end of the day, despite all the time and effort spent on a project by the producer, he is powerless when it comes to the very end result."

## WORLD MUSIC

With so much attention given to Leckie's guitar-orientated achievements, it is easy to forget that ethnic music has played a significant part in his career. In 1981, he spent three months in Nigeria at EMI's studio in Lagos (the venue for *Wings' Band On The Run*) to assist with its transition to 24-track, and it was there that he recorded native artists such as Fela Ransome Kuti. He even rates his involvement in the Real World Recording Week (both in 1992 and 1995) as his most enjoyable studio experiences to date.

He says: "The whole studio complex is completely taken over by little World music projects. In '95 there were 16 separate recording areas, with everything from 48-track digital in the Big Room to ADATs on the lawn. It was held on the same weekend as the WOMAD festival, so we'd have all kinds of musicians walking in and contributing something to various recordings. It's like a mini commune, with everyone recording and the most unlikely groups of people collaborating, and totally unlike a normal studio environment where egos are at stake. Because there is no commercial goal the ideas flow differently and musical risks are constantly taken. It's just for the music — you'd be sitting there with African drummers, Billy Cobham, Iggy Pop and Joe Strummer, and there'd be people calling each other saying, 'Hey you, can you play violin?' And you'd suddenly find yourself embroiled in a bizarre session."

## PROS AND CONS OF ACCLAIM

Being awarded the 'Best Producer' prize at the Brits is something of which Leckie is naturally proud, but more than anything he sees it as a reflection of the healthy British music scene. "I think it's a really good sign that I got it rather than Trevor Horn!" he laughs. "I always tend to pick new bands and do their first couple of albums, by which time they have got an established sound of their own. That's the period in a band's career when they tend to be at their inventive peak and have the most energy. It is also when you are essentially recording them as they really are."

He is quick to point out that the award could have a negative effect. "Some bands who might have wanted to work with me before might take the view that I'm now in a different league and would not be on their level any more, which is probably very far from the truth. So that sort of acclaim can work against you. It's for a slightly similar reason that I'm debating whether or not I should produce the next *Page & Plant* album. I was approached by them because they liked *Radiohead's The Bends*. Peter Jenner, Billy Bragg's manager, recently told me that if I did it I wouldn't be hip any more. But I suppose that would depend on how the record turned out! It would worry me if people believed that just because I've won the Brit award, I've turned into Mr Big Time with a Rolls-Royce, because it will always be the fresh young bands who excite and inspire me."

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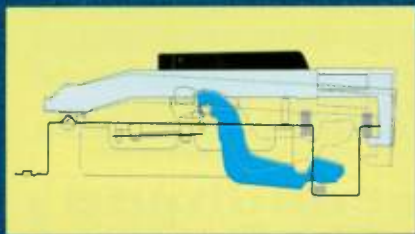
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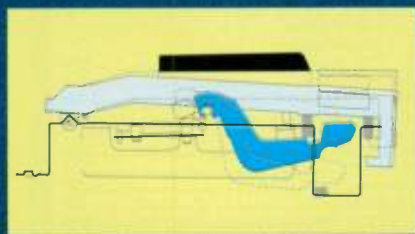
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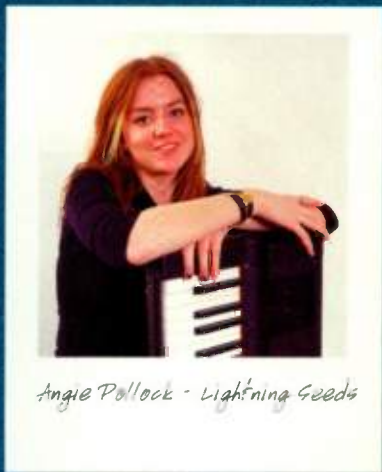
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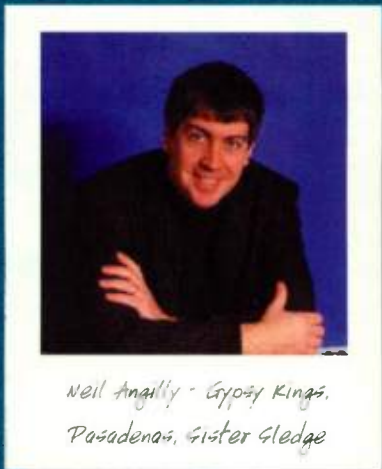
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## EMU E4X TURBO 128-VOICE STEREO SAMPLER

**T**he April issue of *SOS* has come around again, so it must be E4 review time once more. Yes, when I looked back at my original EIV sampler review, it was in the April '95 issue, and my E4K keyboard piece was exactly one year later, in April '96. So what do we have to look at in the way of new E4s this year? Fortunately, Emu have recently introduced a best-ever model, the E4X Turbo, as well as an increased upgradeability across the E4/e64 sampler range, so there's plenty to talk about.

When I reviewed the Emulator e64 in July '95's *SOS*, I was absolutely delighted to find that it shared the EOS operating system and many of the hardware features of the EIV, which I'd looked at some three months previously. Indeed, as I said, it was more than half an EIV for about half the price. The only drawback was that if, on budget grounds, you made the decision to go for the e64, you couldn't decide later to expand it to the full EIV specification. If you'd thought, for example, that 64 voices or a maximum of 64Mb of RAM would be enough, when you inevitably discovered that it wasn't (Wiffen's first rule of sampling: "You never have enough voices or memory"), there was nothing you could do about it.

Now all that has changed. Realising that their customers often cannot afford the sampler they want all in one go, Emu have introduced a new modularity into their professional sampler range, which means that you can now buy the sampler that fits your budget and expand it later to the one that fits your needs. The base model of this range is the e6400 at two and a half grand, with the same price and specification (64 voices, 4Mb RAM) as the now discontinued e64. At the other end of the scale is the E4X Turbo, the unit supplied for

*A new expandability has come to Emu's professional range of samplers. PAUL WIFFEN lifts the bonnet of the top-of-the-range model and finds an e6400 lurking inside.*

this review. But anybody who buys an e6400 can upgrade it to the full spec described here, except that the digital interface on the e6400 will be S/PDIF rather than AES/EBU.

This is possible because of the shared Emulator Operating System, currently at version 2.50F (but shortly due to be upgraded to 3.0 — see sidebar), which simply looks to see what hardware is present at boot-up. Hardware expansion is achieved using plug-in cards and a hard drive mounting kit, allowing another 64 voices, DSP effects, an internal drive and other options to be added individually at any time. So clear is the division between the different hardware configurations and the software common to the whole range that Emu supply two manuals: a small specific hardware manual describing the physical components of the particular model you have, plus a much thicker EOS manual with all the software's operational procedures covered.

### A LOOK UNDER THE HOOD

So what does the E4X Turbo spec comprise? In short, the original EIV's 128 voices and potential 128Mb of RAM (although it comes with 16Mb as standard), plus an integrated 18-bit effects board

### pros & cons

#### EMU E4X TURBO £4409

#### pros

- 1Gb of excellent sounds on board.
- New sample ROM and Flash ROM expansion capability.
- New 3.0 Emulator Operating System included in the price.
- Even more exciting morphing filters.
- Better CD-ROM compatibility than ever before.
- Exceptional operation in conjunction with the Macintosh.

#### cons

- RAM expansion much more convoluted than on original EIV.
- No optical-format digital interface (S/PDIF or ADAT).

#### summary

With a huge collection of excellent sounds on board, options for an additional MIDI interface, eight extra outputs, a second effects board and slots for the E-synth ROM sound boards and Flash ROM, the E4X Turbo leaves very few professional needs not catered for (except, perhaps, a multi-channel digital interface). Add to this the expandability of the entire current Emulator range, and not only has the best just got better, but now you can upgrade the lesser models to the status of the best as well!

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# Emu E4XT

“You can now buy the sampler that fits your budget and expand it later to the one that fits your needs.”

▶ and a 1Gb hard drive loaded with sounds. The standard E4X — X presumably standing for eXpandable — comes with 64 voices, so that the entry price point can be lower, but the board that will expand the e6400 to 128 voices will do the same job for the E4X. This board is fitted as standard in the E4X Turbo.

The motherboard of the E4X is updated from that of the original EIV to accommodate this 64-voice expansion board, plus the new sound ROM and Flash ROM expansion boards. As a result, the eight SIMM slots for RAM in the original EIV have been replaced by just two 72-pin SIMM slots on the E4X motherboard, placed directly behind the two 72-pin ROM slots for the forthcoming Sound and Flash ROM expansion options. These two RAM slots still allow for expansion up to 128Mb using two 64Mb SIMMs, but do make gradual expansion less easy, as you can't just add a 16Mb SIMM every time you have a few spare quid! Things are further complicated by the E4X's exclusive taste for 4Mb, 16Mb or 64Mb SIMMs (it can't recognise 8Mb or 32Mb SIMMs, something that I found out the hard way when attempting to expand the first E4X I had my hands on — one of the first in Europe, belonging to Gavin Rossdale of Bush), and the fact that if two SIMMs of different size are used the machine can only see half the memory on the smaller one. As a result, the possible memory combinations and the resulting amounts of available memory are so convoluted that the E4X hardware manual has to use a diagram (reproduced here) to illustrate the possible combinations of SIMMs and the amount of memory they give.

## DIGITAL I/O

The E4X family still features digital in and out on the XLR-based AES/EBU interface that's supposedly the domain of professionals (the ES132 supports the 'consumer' S/PDIF interface, as does the e6400 with an optional board). Fortunately, for those of us who can't afford DAT players or other devices with this interface (no DAT player under a grand has AES/EBU), there's a software switch which allows you to set the output signal to S/PDIF or AES format. This means that you just need a couple of XLR-to-co-ax cables to make the physical connection with your S/PDIF device (so much better than my usual bodge of putting a resistor in the cable to bring the level down) and there's even a diagram in the manual showing how to wire this. However, I can't help feeling that connectors in both formats (co-ax or optical for S/PDIF, as well as the XLRs) would make life a bit easier, especially as the opticals prevent any electrical problems between the chassis of the machines.

One of the other expansion card possibilities hinted at by Emu two years ago was a solution for those who want to send the separate outputs that the EIV, and now the E4X, offer to a digital desk such as the Yamaha 02R or Korg 168RC, without passing through unnecessary digital/analogue/digital

conversions. This was the implementation of the ADAT optical interface, which allows eight channels of digital audio to be transferred on one optical cable. It would have made the EIV the first sampler on the market to support multi-channel digital interfacing. Unfortunately, this expansion board has never been shipped, despite the fact that a similar option has been available for Emu's Darwin hard disk recorder for some time. In the meantime, both Korg and Kurzweil have joined Alesis in supporting their multi-channel digital I/O on optical upgrades. But it's samplers that are often in most need of treatment on separate mixer channels, and, sadly, there's still no true sampler on the market that offers a multi-channel digital I/O.

I asked about this on the Emu stand at NAMM this year, particularly in view of the fact that the ADAT interface is available for the Darwin, and was told that some of the necessary hardware to support this was included in the Darwin, so it was a much smaller job to design and build this interface. The ADAT interface for the E4 family is still very much on the cards, but it would take more time and money to implement. In other words, like so many things in our industry, it's just a question of resources and what will sell best. So if you think a multi-channel digital interface is a good idea, you'd better let Emu know before they put that design engineer onto something else.

## EVEN MORE FILTERS AND EFFECTS

When I looked at the e64 back in July '95, the filter count in EOS had just gone up from three different types to 17. Well, in 2.50F there are now 21, four

“I was struck by the amazing combination of crystal-clear transparency from the sampling and the warmth and character provided by the filtering.”

more Z-plane filters having been added, and these are even more complex and unusual than the six morphing-style filters that I looked at back then. They are Dual EQ Morph, 2EQ+Lowpass Morph, 2EQ Morph+Expression and Peak/Shelf Morph, and their names are fairly revealing of what they do, combining the precision of EQ curves with the movement and vocal quality of formant filtering. Words to describe the precise effects

## EOS VERSION 3.0 FEATURES

This imminent upgrade to the Emulator Operating System will be supplied free of charge to everyone who's purchased an Emulator E4 or e6400 this year. EIV or e64 owners can add the majority of this functionality (everything that their hardware will support) for just £175.

- 48-track, full-function workstation/sequencer.
- Advanced MIDI controller functions.
- Support for computer-based preset editing and librarian functions.
- Sound ROM support (where necessary slots are available).
- Sample Flash memory support (where necessary slots are available).

The first Sound ROM board to be released is the 16Mb E-Synth, loaded with more than 700 new samples, turning any of the current Emulator series into a ROM synthesizer. The Flash ROM boards, available in 8Mb or 16Mb versions, will allow the user's own choice of samples to be stored permanently in memory.



## E6400 EXPANDABILITY

The replacement for the e64 offers the same basic spec as the machine I reviewed back in July 1995, but there's one invaluable new feature: complete expandability to almost the same spec as the E4X Turbo under review here. The new e6400 motherboard gives the same double pair of SIMM and ROM expansion slots, plus the ability to add the extra 64-voice board, the 18-bit effects

board and the second MIDI input board. This will help keep the resale value of the e6400 higher than its predecessor, as new owners can always expand it to suit their needs. The E4X comes with a hard drive as standard (which is an option on the e6400), and also has AES/EBU digital interface and an ASCII connection for a keyboard. You can acquire the ASCII connection for the e6400 on an optional board which also features an S/PDIF digital interface.

these filters generate would tend to make the author sound like a hippy, so I just recommend that, if you get near any Emulator from e64(00) all the way up to E4X Turbo, you check all the filter types, because they give you a breadth of tonal control that's not available on anything else.

The same is true of the overall sound quality of the machine. I have waxed lyrical about this before, but working through the 1Gb of sounds that the E4X Turbo is supplied with, I was struck once again by the amazing combination of crystal-clear transparency from the sampling and the warmth and character provided by the filtering.

I checked the list of effects against what was on the E4K in April 1996 and discovered that, while Preset Effects A haven't changed, there are five new distortion effects hiding down at the tail-end of bank B. These are all ideal for turning almost any sample into an Eddie Van Halen sound-alike and I had great fun reverting to my heavy metal roots with these. As well as two straight distortions, there are Distorted Flange, Distorted Chorus and Distorted Double, which really let you make some filthy rackets. Great!

## SCSI MIRACLES

The ability to load other manufacturers' libraries from SCSI has now been increased to include both Roland S700 and Akai S1000/S1100 formats. I tried a fair few banks of both Roland and Akai sounds, and in general they worked very well, with different icons in the display instantly alerting you to the format the sounds were saved in. The E4X's sound quality is a tad harsher than the original Akai's (although this is quite effective on some sounds, making them cut through better) and sometimes the unit doesn't cope very well with stereo sounds — it doesn't pan them, so you get a phased mono result — but overall this is such a wonderful facility that it would be churlish to gripe about its not producing an absolutely identical sound on every sound bank.

I was halfway through checking this stuff out when I realised that I wasn't suffering from the CD-ROM compatibility problems

that I'd had with the EIV and ES132. Previously I'd only managed to get Apple CD-ROM drives to work, but here I was loading Akai and Roland sounds from the MediaVision ReNo that had refused to work with any of the previous Emulator review units.

I was so struck by this degree of SCSI excellence that I decided to go for the big one and try the E4X connected directly to the Mac, mainly to see whether sound CD-ROMs could be read directly from the Mac's CD-ROM drive. Blow me if this didn't work faultlessly first time, as did my new 1.6 version of *Recycle*. The reason that the Emulators work so well with Macs is the 'Mac on SCSI Buss' parameter. With this switched on, the Emulator goes into a mode of Uriah Heep-like subservience, where it demurs to the Mac's desire to be the big boss. Using other samplers on the same SCSI buss as a Mac can lead to all sorts of problems, as the Mac hates to share the SCSI buss with another intelligent device, so Emu have achieved a minor miracle in getting the Mac's CD-ROM readable from the Emulator without putting the Mac's nose out of joint. Never again will I suggest that SCSI stands for Sometimes Can't Share Information!

## CONCLUSION

Overall, reviewing the E4X Turbo was another stage in the ongoing voyage of discovery of the new delights Emu have added in the past year, and I really don't mind if this becomes an annual event. If this year it's hardware expandability, new filter types, better operation with Mac and CD-ROMs plus distortion effects, who knows what they'll come up with next year — SOS ADAT optical interface, perhaps?

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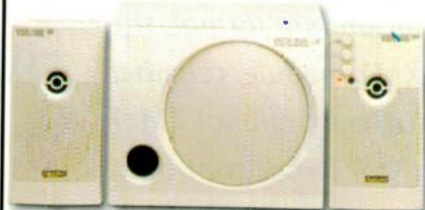
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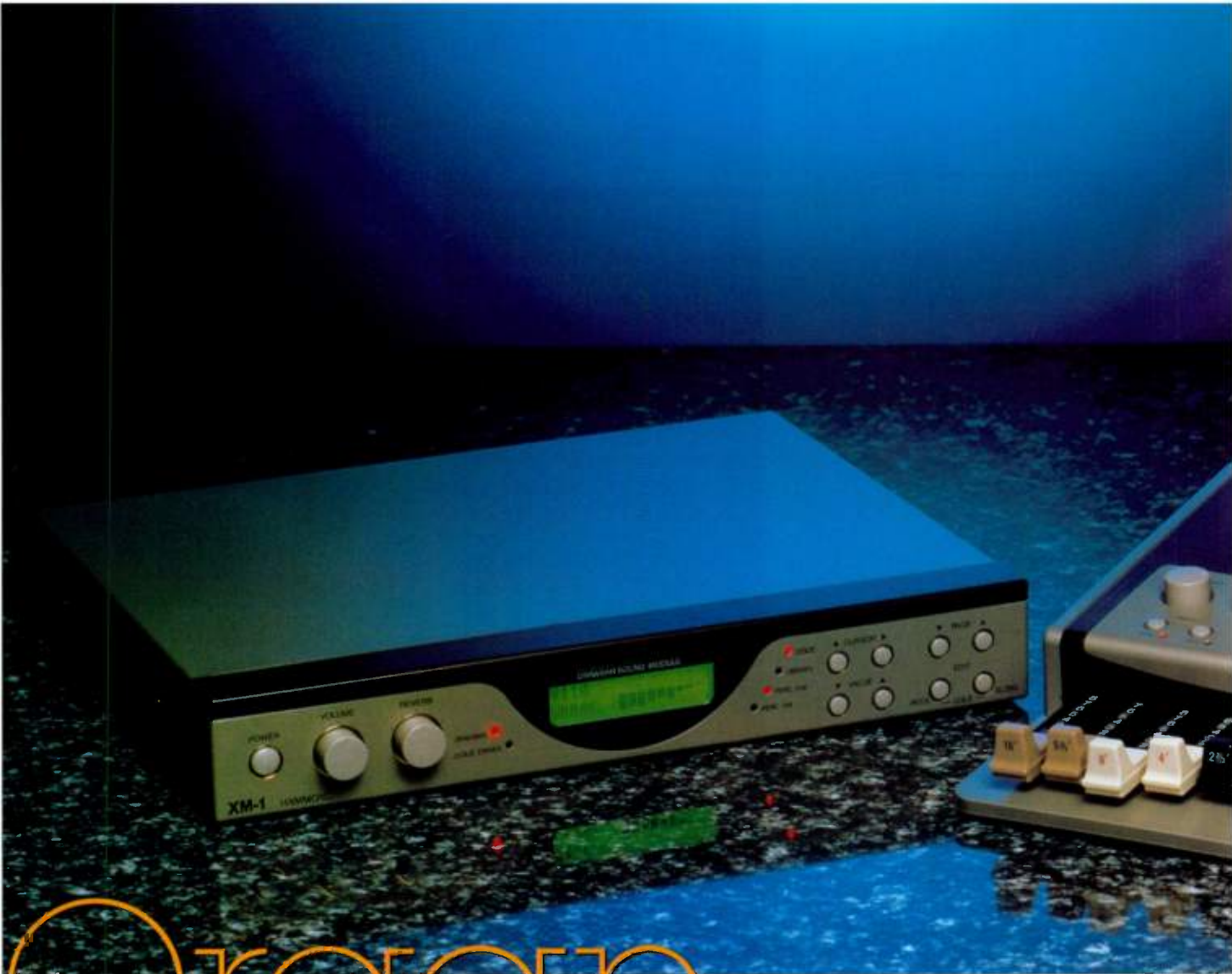
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# Organ Bank

*Offering classic Hammond sounds in a rackmount format, the XM1 module, together with the optional XMc1 drawbar controller, seems the ideal space-saving solution for those unwilling to rely on sample CDs for their organ sounds. Hammond XB2 owner NICK MAGNUS considers the pros and cons of a transplant...*

## HAMMOND XM1 ORGAN MODULE & XMc1 DRAWBAR CONTROLLER

**T**he music industry is well known for its fleeting fashions — certain sounds are all the rage one minute, then, before you know it, nobody would be found dead (or at best maimed) with that sample infesting their creations. Just think of FM (rather unjustly vilified)... you couldn't so much as get a session on a Nolan Sisters album in the mid to late '80s without a DX7, and now people are virtually paying you to take them off their hands.

Despite this fickle fact, there are sounds (or, more specifically, instruments) that remain timeless. The Hammond tonewheel organ is one such beast, having suffered only minor, transitory run-ins with the Fashion Police, and demand for its versatile tones has, if anything, increased of late — witness the deluge of Hammond samples on CD-ROMs,

sample libraries, and S+S synth expansion boards. This is all super, smashing and lovely, and many of these samples are indeed excellent under the right conditions. But, being pre-sampled drawbar registrations, they preclude the immediate fine tonal adjustments offered by a fistful of drawbars (darn it, I promised myself I wouldn't use that phrase!)

In these times of MIDI master keyboards and home studios in a matchbox, another physical keyboard is likely to be the last thing you need. Several manufacturers have addressed this problem in the past by releasing MIDI organ tone modules (see the 'Organ Donors' box), among them Peavey, Voce, Fuji and Oberheim. But for those in the know, a question has been hanging in the air since the release of Hammond's XB2 single manual organ: can we have that one in a box, please? So intense





can take quite a while. The only real-time controls are two rotary pots for volume and reverb amount, and this is where the XM1 comes in — more of which later. There is a yellow backlit display to guide you in your travels, and a power switch — that's it for the front. The rear has connections for the usual things: a 10V DC input from the external power supply, stereo outs, MIDI In, Out, and Thru, and a footswitch input which can be assigned several functions — the Leslie speed, for example. Like the XB2, the XM1 also has a multi-pin connector for output to a real Leslie cabinet.

Part of the 'organic' quality of a real Hammond is the immediate access to the drawbars, as well as the controls for percussion, vibrato and Leslie speed. The XM1 provides all this, plus overdrive level and secondary volume control to boot. Also present are three preset buttons (as on the Korg CX3), and another button with three associated LED indicators to select whether you're changing the drawbar settings for the upper manual, lower manual or pedals. Features such as percussion level are only accessible from the menu system on the main module, but at least the principal performance controls are all here. Curiously, you can't change patches from the remote — you have to do that from the module or via MIDI Program Change messages! A shame, as I'd have thought that there was room for two more buttons and a knob for percussion level on the XM1. In a non-pre-programmed performance situation you would still have to keep the module close to hand.

### LET'S GET PICKY

Having been an XB2 owner since they first appeared, I was keen to do a critical comparison between it and the XM1. Was the XM1 going to tempt me to trade up and regain some valuable space? Well, it was a swings and roundabouts verdict! The first test was to compare the basic sounds of the two without the benefit of any effects — just naked and cruel... The results were interesting: when you listen closely, there's a distinct difference in tone. The XM1 wins this round, having a subtly rounder, firmer sound than the XB2, with improved definition in the lower registers; the XB2 sounds reedier, as if there's a small amount of leakage from the upper drawbars even when they are fully off. Sticklers (you mean someone's more anally retentive than me?) might point out that the real thing is less than perfect and some leakage should be expected, but subjectively I prefer the sound of the XM1.

My next point of comparison was the percussion — and it's here that the two units vary quite markedly. The XM1 has far more flexible editing options for the percussion, such as keyboard scaling and single/multiple triggering, but despite this, it's one area of the XM1 that disappoints. The amplitude envelope is very steep in the initial decay phase (regardless of the decay time), giving it a pronounced 'clicky' quality

was this need that Wix Wickens (of the Paul McCartney band) reputedly took a chainsaw to his XB2, removing the drawbar end so it could sit on top of his master keyboard while the remaining sound-generating gubbins was kept on the floor out of the way. Well, Hammond have finally decided to save you the bother of donning a lumberjack shirt and brushing up your DIY skills; they've put what is effectively an XB5 in a two-thirds of rack-width module (the XM1), with a remote drawbar controller (the XM1c) available as an optional unit. In the same way that lager is only notionally optional with curry, most interested parties are unlikely to want one unit without the other.

### DESIGN AND CONTROLS

If you can imagine a Morris 1000 Traveller re-designed for the turn of the millennium, complete with fake walnut, environmentally friendly dashboard, that's pretty much the appearance of the XM1 and XM1c. Naff? On the contrary. Camp chic meets hi-tech in one of the most eye-catching module designs I've yet seen. It urges you to plug in and play even though the pasta is nearly done and *The X-Files* is on in five minutes.

Everything you need to make a noise is accessible from the module itself via a group of small cursor, menu and value buttons. There's a lot of stuff to edit here, more than on the Hammond XB2, and setting up a custom sound from scratch

### pros & cons

**HAMMOND XM1 £799**  
**XM1c £299**

#### pros

- Very compact and stylish.
- Subjectively, the best basic sound of any module available.
- Much-improved MIDI spec over XB2.
- Instant sound sculpture.

#### cons

- Fairly expensive.
- Disappointing percussion.
- Disappointing overdrive.

#### summary

For me, this is the most authentic-sounding dedicated tonewheel organ substitute currently available. High marks for real-time sound creation and the ability to record this over MIDI. It's a damned handsome filly, too.

**SOUND ON SOUND**

“Camp chic meets hi-tech in one of the most eye-catching module designs I've yet seen.”



# Hammond XM1 & XMc1

## ORGAN DONORS

Tonewheel organ impersonations are nothing new, as a glance back over the years reveals. The Crumar Organiser in 1974 and the Roland VK09 in 1981 were just two such keyboards to take a stab at the task, only to be usurped by the Korg CX3 and BX3 models in 1980 — deservedly a great success in their day, these last produced a sound that was closer to a Hammond than any other ersatz offering had managed. Indeed, to this day, CX3s can be seen lurking in the shadows at the back of the *Top Of The Pops* stage (where all us wretched ivory-tinklers belong). Latterly, Roland's VK1000 from 1990 got very close, sporting a highly respectable internal rotary speaker simulation, but was pipped to the post for authentic basic sounds by Suzuki/Hammond's XB2 single-manual and XB3 and XB5 double-manual organs.

► (different to key click, which is a separate sound in itself), so that little of the pitched body of the percussion is perceivable unless its level is set high, whereupon the click becomes painfully intrusive. An additional parameter to soften the attack would not have gone amiss. The XB2 fares much better in this department, having a smooth, marimba-like envelope much more akin to the real thing.

The percussion implementation was guilty of one more *faux pas* — it's not instantly obvious, but when the Leslie effect is switched in, something is not quite right. After I'd pushed in all the drawbars, the problem became clear: the percussion is not routed through the Leslie. Oops.... There must have been a good reason for this design slip-up, but I doubt that it holds water. Possibly Hammond felt that it would help the sound cut better — but if any of you have ever encountered an actual Hammond organ with the percussion output separately to avoid the Leslie cabinet, I would be intrigued to hear about it.

## SPIN DOCTOR

This leads us neatly, if not gracefully, to the Leslie simulation itself. The weakest aspect of the original XB2 was its own Leslie effect. Barely a token gesture, it could only appeal to emetic fans who relished a good bout of *mal de mer* in the comfort of their own studio. Hammond have certainly made an effort to improve this feature, which now has a full range of editing parameters. There are 10 locations in which to store your cabinet simulations, and these are occupied by some variations previously set up at the factory. Rise and fall times of the bass and treble speakers can be set individually, as can bass/horn balance, min/max speeds, microphone angle and even microphone distance. The factory settings tend to accelerate and decelerate rather lazily, but a quick tweak sorts things out. Overall, a vast and welcome improvement on the XB2's version. However, some users may prefer to output to an external device, such as one of the Dynacord units or the excellent Roland SDX330. Or even a real Leslie if you have one knocking around. This also overcomes the percussion's non-internal Leslie effect problem.

## ROOM WITH A VU?

Like the XB2, the XM1 includes an integral reverb, which is in fact a chip licensed by Hammond from Alesis. There are four choices of algorithm: Room, Live, Hall and Church. In common with the XB, this didn't make nearly enough gain available from the reverb (nor is any editing possible), which makes drifts ambient effects unavailable without recourse to an outboard reverb unit, and you'd probably want to use that in a controlled environment such as the studio.

The final patient in the doctor's surgery is the overdrive effect. Higher marks have to go to the XB2 here; its overdrive is much the warmer and growlier. The XM1's overdrive, I feel, is rather too much like radio static added to the signal — not so much a case of effecting a sound, more adding

an effect on top of a sound. If you play only fifths and octaves, the crackly artefacts are not too offensive, but add a third, and... Hello Houston, are you receiving me?

## MIDI AND OTHER MATTERS

The XM1 (or rather the XMc1) boasts one significant improvement over the XB2 — it sends all drawbar movements as a stream of MIDI controller information (Continuous Controller number 80) from its MIDI Out port, enabling you to record the drawbar changes you make during a performance. This was something offered by Roland's VK1000, but was, sadly, omitted from the XB2. Leslie fast/slow is also supported (CC92) and the three preset buttons on the XMc1 send the appropriate Program Change and CC80 commands to be recorded in your sequencer too. Quite why the percussion and vibrato controls are excluded from this luxury is not clear, but at least the most important needs are addressed. These features can presumably be accessed via NRPNs (there was no manual to confirm this), but it's a pity that those sound changes can't also be recorded on the fly from the remote controller. The other big improvement is a similar spec to the XB5 — that is, the upper manual, lower manual and pedal board are all represented, and capable of receiving on separate MIDI channels.

## CONCLUSION

The XM1/XMc1 combination offers significant improvements over the XB2 in some areas (size, basic tone, 3-part multitimbrality, Leslie, recordable drawbars), but takes a backward step in others (percussion, overdrive). To answer the original question — is it worth trading up from the XB to the XM? — I would say that it's all down to how fussy you are about the negative points raised here, and whether space is really at a premium for you. If you're intending to use external Leslie and overdrive effects, you might find those on offer in the XM1 to be redundant. I would personally find the change in the nature of the percussion to be a problem, but if I were buying from scratch, never having owned an XB2, I'd generally be more than happy, despite my hyper-critical comments, to have the XM1 as part of my musical arsenal. The only remaining bugbear is the price for the XM1 and XMc1 bundle (£1098), which is not cheap by any means. But when you consider that the 1994 XB3 dual-manual machine (whose facilities the XM1 emulates) cost £8,630, it doesn't look quite so bad.

505

**E** XM1 £799; XMc1 £299. Prices include VAT.

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*Quasimidi have distilled the experience gained from their successful dance-orientated keyboards into a one-box solution of concentrated rave power. DEREK JOHNSON gets on the ravy train...*

**B**ack in 1993 it would have taken the Delphic oracle (plus, no doubt, the sacrifice of your first-born) to predict the future plans of German company Quasimidi. At the time, their main product was a slightly expensive hardware auto-accompaniment sequencer (the Styledrive), yet by August 1994 SOS was reviewing their Quasar synth module. Since then the company has hardly looked back, releasing a family of imaginatively named synth modules and keyboards aimed not-so-squarely at the analogue-obsessed '90s dance musician.

Quasimidi's latest release is the 309 Rave-O-Lution, and if that name doesn't give you an instant idea of its target market, it's time to take up knitting. On the face of it, the 309 appears to be direct competition for Roland's MC303 Groovebox; that is to say, a combination of drum machine, pattern-based sequencer and analogue-style synth, with 100 appropriately programmed preset Patterns to get you started. As befits the current

# RAVE NEW WORLD

## QUASIMIDI RAVE-O-LUTION 309

trend for all things analogue, the Rave-O-Lution offers real-time control in a big way — just check out the knobbage on the front panel! — and the sound/sequence engine takes its lead from classic instruments such as Roland's TB303 Bassline and TR909 drum machine — 309, geddit?!?

### THE PACKAGE

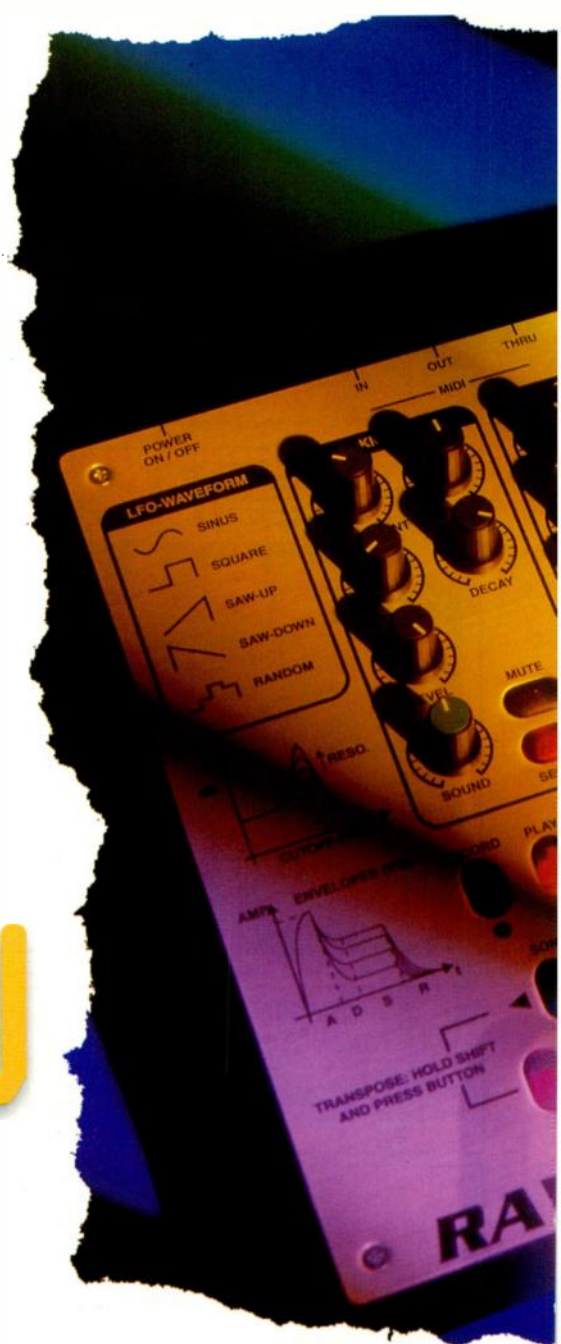
Like Roland's MC303, the 309 is a table-top box, and about the same size as that machine, although a little extra height makes the 309 seem more substantial. The finish is brushed aluminium, and thus shinier than the MC303, with a lot more knobs (36 altogether) and some nifty blue buttons. Although they appear solid, the buttons are actually translucent, flashing red (courtesy of an integral LED) when activated.

Generally speaking, the front panel is divided into two areas, with the main synth and drum sound controls at the top and the sequencer and other controls at the bottom, arranged around the 2-line

by 14-character liquid crystal display and large alpha dial. Apart from controlling the sequencer, certain of these bottom-half buttons allow you to edit sounds and system functions (such as global MIDI channel and sync status) using a '90s-style parameter-access interface. Clearly-labelled buttons — the sequencer transport functions, Edit, Exit, Page Left and Right, and Write, for example — make navigating the 309 pretty simple from power up.

We'll discuss the allocation of knobs and buttons in a moment; let's just tie up the broad description with a note that the back panel offers MIDI In, Out and Thru sockets, a pair of audio outs, an assignable footswitch socket, and a power input: the PSU itself is external (with none-too-long leads), unfortunately. There's also a further quartet of holes, labelled but blanked off by a panel: an optional upgrade which adds a pair of audio ins and another pair of audio outs fits in here.

The exact details of the 309's sound generation technology, which Quasimidi has dubbed AES (Analog Emulation Synthesis), are vague. It utilises a combination of samples — most of the basic







drum sounds — and DSP-based modelled synth waveforms, although certain sustained bass drums and cymbals are also modelled; further modelling, of the subtractive synthesis variety (with 24dB/oct resonant filter), is available to treat any sound. As one might expect from a hi-tech instrument of the '90s, there are also effects on board — two simultaneous treatments, plus EQ.

### THE SOUND SOURCE

The layout of the 309's 'sound module' is logical: a clearly labelled section is provided for each of its five sounds — Kick, Snare, Hi-hat, Percussion Set (which provides a further 12 percussion sounds) and monophonic Bass/Lead Synthesizer. All instruments are monophonic, apart from the Percussion Set which can, if you wish, sound all of its 12 drum voices at once. Each section has its own collection of real-time control knobs, the alterations of which can be recorded by the on-board sequencer, or transmitted over MIDI, for reliable replay later. The basic knob-controllable parameters are as follows:

- Kick: Instrument, Tune, Attack, Decay, Level, Sound
- Snare: Instrument, Tune, Tone, Decay, Level, Sound
- Hi-hat: Instrument, Tune, Decay, Level, Sound
- Percussion Set: Perc Set, Tone, Decay, Level, Sound
- Bass/Lead Synthesizer: Wave, Attack, Decay, Sustain, Accent, Glide, Resonance, Envelope Mod, Level, Cutoff, Sound

Pretty self-explanatory, although I'll point out that Instrument and Wave select between different raw waveforms, Perc Set changes to a different percussion set (there are 10), and Sound selects an actual patch.

Each section has its own collection of patches — 64 each for the drum sounds and 128 for the bass/lead synth. The sonic raw material is a collection of waveforms or samples: 26 kick drums; 25 snares; seven hi-hats and 28 synth waveforms. The Percussion set has the option of 10 editable sets of 12 drum sounds each, which

### pros & cons

#### QUASIMIDI 309 £649

##### pros

- An all-in-one dance machine, which, however, can work perfectly well in other musical idioms.
- Loads of knobs for loads of real-time control.
- Expandable.
- Great sound matched by great looks.

##### cons

- No naming of sounds, Patterns or Motifs.
- Changing between some modes causes sequencer to jump.
- External PSU, with not very long leads.

##### summary

One of the hottest products to come out of Germany, and one of the hottest products, full stop, for this year so far. Ignore at your peril if you're anywhere near interested in bloopy, dubby rave, and have a go if you're in any way electronically biased.

**SOUND ON SOUND**



# QUASIMIDI RAVE-O-LUTION 309



Set, with tweaks being recordable by the sequencer or sent out over MIDI.

The synth section has one further button, labelled VCA/Gate; this overrides the envelope settings (which are normally shared by the filter and the VCA), letting a note sound for the length of its gate time.

Each section is routed through a virtual mixer, with level, pan and two effects send controls. The two effects units offer, broadly speaking, reverb (Room 1, 2, 3; Hall 1, 2; Plate; Delay; Pan Delay) and modulation effects (Chorus 1, 2, 3, 4; Feedback Chorus; Flanger; Short Delay; Feedback Delay). The whole stereo mix is then passed through a global 2-band parametric EQ and an 'Overblast' control. The latter provides a "linear addition to the bass

► can be chosen from a pool of 128 raw waveforms.

All the 309's sounds have even more parameters that aren't accessible via the main knobs, but can be changed using the parameter access editing — for example, the envelope generator does have a release parameter, but this doesn't have a dedicated knob. Each section is, in itself, a complete synth, albeit a percussion synth in the case of each of the drums. The complete list of editing parameters available (including the ones without dedicated knobs) is as follows:

- Level
- VCF drive (a pre-filter distortion parameter)
- Cutoff frequency
- Resonance
- Filter envelope modulation
- Filter dynamic modulation
- Accent
- EG attack, EG decay, EG sustain, EG release
- VCA gate
- Tune

In addition, the bass/lead synth has parameters for glide; LFO waveform, rate, depth, VCO modulation, VCF modulation, VCA modulation; and Hold pedal.

Note that when you're editing a Percussion Set, the general 'synth' parameters treat all 12 sounds within the set. The control over each *individual* sound consists solely of tuning, effects sends, pan and level.

Quite apart from the knobs, all five sections have a pair of buttons labelled Mute and Select; the first mutes a section, while the second activates it for editing. Looking at the front-panel picture, you'll notice that the synth section has more knobs than the drum and percussion sections. This doesn't mean that the percussion sounds are any less editable or controllable in real time: pressing and holding the select button allows the section you're working on to be processed by all the knobs provided for the synth section — the knobs basically become assignable to whichever section you want — without your having to go into the parameter-access Edit mode. So the filter can be used to treat, in real time, the Kick, Snare, Hi-hat and Percussion

tone range". Think of it as a bass boost, similar to that found on the MC303; I suspect most users will leave this full on, but they should watch their speakers!

Let's talk about MIDI for a moment: hands up those of you expecting all the drum sounds to be on MIDI channel 10, as per the standard established by General MIDI? In fact, each of the five sections has its own MIDI channel, set consecutively (if, for example, the main System MIDI channel is 1, the Kick drum is on channel 1, the Snare on 2, the hi-hat on 3, and so on). These channel assignments hold whether you're playing the sounds from an external source or transmitting knob movements over MIDI. Note that while knob movements can be sent over MIDI at any time, you have to make the decision to transmit notes: a special page in the mixer menu sets the 'track' mode to internal (which plays the on-board sound) or external; you can't have both at the same time.

## THE SEQUENCER

The 309's sequencer is essentially a 5-track, pattern-based device, with recording available in real or step time. The latter utilises a TR909-like grid edit (with the row of 16 buttons, or pads, that run across the bottom of the front panel providing the grid) for percussion, and an MC202-like event list for the bass/lead synth. A set of buttons on the left of the front panel take the form of one octave of a piano keyboard: this can be used to enter notes or events, and can be transposed if necessary. It is *not* velocity sensitive: velocity and gate values (four each) can be entered from the front panel with dedicated buttons. The actual velocity and gate values imposed by these buttons are user-definable. If you write sequences using an external MIDI keyboard, however, you get access to a full velocity range (plus pitch bend and modulation).

There are 100 unerasable preset and 100 user Patterns on board, and these can be chained together to make Songs — up to 16. As simple as this may sound, Quasimidi have added one further layer of sophistication: Motifs. When you record a

## FEATURES

- **Synthesis system:** Analog Emulation Synthesis, a combination of samples and modelled subtractive synthesis.
- **Polyphony:** 17 voices.
- **Sound Storage:** 128 synth sound memories, 64 memories each for Kick, Snare, Hi-hat, Percussion Set.
- **Sequencer:** 5-track sequencer, plus Master Track.
- **Song & Pattern capacity:** 16 Songs (up to 99 steps of up to 64 bars each), 100 User Patterns (up to eight bars per Pattern), 100 ROM Patterns.
- **Effects:** Reverb, Modulation/Delay, 2-band parametric EQ, Overblast.
- **Display:** 2-line x 16-character backlit LCD.
- **Connections:** 2 quarter-inch jacks for L/R stereo out, MIDI In, Out & Thru, quarter-inch footswitch jack.



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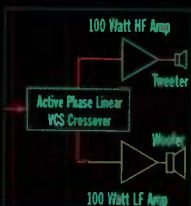
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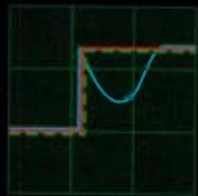
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# QUASIMIDI RAVE-O-LUTION 309

## IT'S A MODEL AND IT'S SOUNDING GOOD...

While I'd like to say something about the quality of the 309's factory sounds, I can't really give you the usual obligatory guided tour of favourite presets, since they're not named, being designated simply by numbers. The 128 factory synth sounds are made up from 28 waveform models (not samples), including Sawtooth, Sine, Square, and Triangle waves, Moog waves and distortion Sine and Triangle waves. Detuned, double-oscillator versions of some waveforms are also provided. The factory set is uniformly authentic, and mostly concentrated in the bass end of the spectrum (though the synth section is called a bass/lead synth, I suspect most will be using it for low-frequency duties). While perfectly capable of emulating a TB303, the 309's synth section goes way beyond this type of sound.

Each of the drum sections feels like a little synth too; while most of the raw material is sampled (from the TR909, TR808 and TR606 drum machines), some are actually models. For example, modelled white noise can be used to create snares from scratch — and we all know the irritation of trying to use sampled white noise. It changes pitch as you tune a patch based on it.

When editing a sound, either with the real-time control knobs or via parameter access, you feel very much as if you're editing a real analogue synth rather than a digital approximation. And if what you're looking for in the sound department is Analogue with a capital 'A', I'm sure you won't be disappointed.

► Pattern, you're actually recording five Motifs, one for each of the sound sections on the front panel; there's room for 100 user Motifs, and there are already 99 preset Motifs on board. A Randomise function, as found on Quasimidi's Raven, will randomly play back Motifs for you, which could be fun. The manual is a little confusing on the subject of Motifs, but you can pretty well ignore them initially and simply think in terms of Patterns, though Motifs come in handy when you want to create Patterns based on existing material, since new Patterns can be easily created from any Motifs that are already on board. The sequencer also offers a 'Special Loop Tracks' function, which allows Motifs to be assigned to pads for live triggering during a performance — rather like a fill-in on an auto-accompaniment keyboard, except more fun.

If 16 steps per 4-beat bar isn't a high enough resolution for you, as with Roland drum machines it's possible to change this: you can also select 8th note, 12th (8th triplet), 24th (16th triplet) and 32nd note resolution. Sixteen pads won't be enough to enter or edit 32 32nd notes, so use the Page buttons to scroll through the various sections of a Pattern. The same is true of Patterns that are more than one bar long. You can freely change resolution, with an 8th-note kick drum Motif playing alongside a 16th-note triplet hi-hat and a very busy 32nd-note bass synth; you can even record events using one resolution, then add more events to the same Motif using a different resolution. The only problem here is that not only can you not easily switch voices during grid or step record, but the sequencer also judders somewhat as you do so.

It's probably worth elaborating here on how many tracks the sequencer offers: as I said earlier, it's basically a 5-track job, but when you're working with the Percussion Set part in drum grid mode, it feels as though you've got an extra 12 tracks — you're building up a Percussion part one instrument at a time, to a total of 12 instruments, in a similar manner to the TR808 and TR909.

In addition to the above, the sequencer has a sixth track, the Master Track, available only for use on a completed Song. This Master Track is used to record all front-panel tweaks and is one of the truly fun aspects of the 309, but be warned that there is a 'working' time lag when you've finished recording the Master Track as the new data is merged with the original song material. A particularly violent tweaking session on a long Song might take a while to compute. Let's just make sure this is quite clear: you don't record knob-tweaks while you're laying down the Patterns

that make up a Song; you add them all at the end when the Patterns have been chained into a Song.

Unfortunately, the 309 doesn't offer any variety when it comes to time signatures: its sequencer is permanently in 4/4. On the positive side, however, the 309 will easily synchronise to other MIDI equipment, although when using the 309 as a slave, you need to hit its Play button before starting a sequence on the master machine. Sadly, the 309 doesn't respond to Song Position Pointers, which means that you'll always have to start your sequences from the top.

## THE EDITING

The Edit button opens up a world of minute control over sounds and sequences. Use the Page buttons to scroll through the options and you find the following main headings: Sound, Mix, Pattern, Song, FX1, FX2, EQ, Pads and System. The small display is a little inadequate here, but a logical hierarchy takes you fairly painlessly through the various levels of the operating system. When it comes to drum and synth sounds, you can pretty well customise them with the control knobs, and save the results, but using the parameter-access option gives you more control.

What you don't get is the option to name all of your work; raw sound waveforms are provided with names, and you can name the 16 Songs, but Motifs, Patterns and sounds remain numbers forever. And with 64 memory locations for each drum sound, 128 for the synth sounds, and the large number of Patterns and Motifs, that's a lot of numbers. If this isn't fixed in a future software upgrade, you'll have to get out the pen and paper to keep track of your work. To be honest, this is also the case with the MC303, which lacks even an LCD. At least the 309 lets you see the name of the parameter you're editing or tweaking at any time.

Saving your work is accomplished courtesy of the Write button, which also hides a menu for the initialisation of Patterns and Motifs, plus some commands for sending the 309's memory contents as a MIDI System Exclusive Dump. You can send sounds or sequences, and also have the option to send a Temporary Dump — a dump of only the active parameters for current Patterns and sounds.

## THE EXPERIENCE

Take it out of the box, and the Rave-O-Lution is one of the most immediately useable products on the market. Plug it in, start the sequencer, and tweak away. It sounds great, it's easy and it's fun. As I said earlier, the front panel is clearly and logically labelled, so it's quite simple to figure out what you need to do to edit a sound or a Pattern and so on. When it comes to the minutiae, however, it's time to dig out the manual. It's clear and nicely laid out, but not, regrettably, totally coherent. The contents seem to jump around a bit, and there is no index to get you to specific topics quickly. Luckily, the important points that you wouldn't necessarily discover on your own — such as pressing and holding the Select buttons to give drum parts access to the synth section's

## RAVE O LUTION EVOLUTION: EXPANDABILITY

Quasimidi have had a refreshing policy of building upgradability into their instruments from the start, whether for memory, sound expansion or extra audio outputs. The 309 continues this healthy trend: underneath the

unit is a small, removable panel which provides access for a forthcoming sound and oscillator waveform expansion option (which we don't have much info about at the moment), and at the back there's a blank panel

offering space for an extra four audio sockets. These provide two more audio outputs and a pair of audio ins, the latter of which would be used for treating external sources with the 309's entire sound-shaping armoury.



knobs — come up quite easily in the manual, but trying to figure out all the fiddly little moves needed to edit sequences can take a little time.

Since the 309 is aimed at the dance market, the ability to use it live could be seen as essential. And Quasimidi haven't let us down. It's possible to assign Patterns to the pads at the bottom of the panel, and the Loop Tracks mentioned earlier help to add a bit of variety. The real essence of live performance with the 309 comes from the drum and synth knobs, and a positive feel and general lack of zipper noise makes for a very satisfying experience.

Used in a MIDI studio, you'll find the 309 pretty flexible. As perverse as it may sound, I wrote sequences using just external sounds (remembering that individual drum sounds are on different MIDI channels), and produced some pleasing results — like using an analogue sequencer or a TR909 with modern digital synths. Playing the internal sounds from an external sequencer also works well, and is a valid option; another thing you might want to do is record a finished 309 performance into an external sequencer for high-level manipulation. Synchronisation is tight in both directions (which is not necessarily the case with the MC303) — the 309 locks quickly to an external sync source and also provides prompt and reliable leadership when used as the master in a MIDI system. Full control over all parameters is available via MIDI: the MIDI controller listing and MIDI implementation chart in the manual will aid the intrepid when it comes to defining software mixer maps.

### THE VERDICT

For me, the Rave-O-Lution 309 feels rather like the machine Roland's MC303 should have been. The MC303 is still good, mind you, but the 309 has more of a gritty, raw, analogue feel about it. The user interface (and sequencer) is fairly similar on both units (though, I feel, rather more accessible on the 309) but, sonically, Quasimidi's modelling-plus-samples approach beats a box full of samples any time. The filter models on the 309 are superb — really fat and squelchy.

The preset Patterns are good, make no mistake: there are extremely fine replications of typical rave and dance styles here (including a wry nod in Kraftwerk's direction). However, I would have preferred to be able to write over the presets, and perhaps be given the option to restore them later. All the sound memories, which are full of factory sounds when you get the 309, can be overwritten with your own creations.

If you're not a rave or techno enthusiast, don't be put off by the name: just because Quasimidi are aiming the Rave-O-Lution at the dance market, this doesn't mean that non-dance musicians should avoid it. Remember that the TR909 and TB303 were simply drum machine and bass sequencer respectively when they were first released — only later did fashion cause them to evolve into hyper-trendy dance boxes. Look at what the Rave-O-Lution offers for musicians of almost any kind: a superb bass synth with great filters, a collection of excellent drum sounds, and a pretty accessible sequencer. Then there are the effects and the all-important real-time control. If you're at all nostalgic about the way synths, drum machines and sequencers used to operate, the very modern but very traditional 309 has plenty to offer you.

SOS

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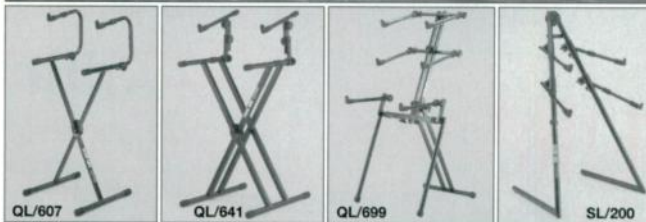


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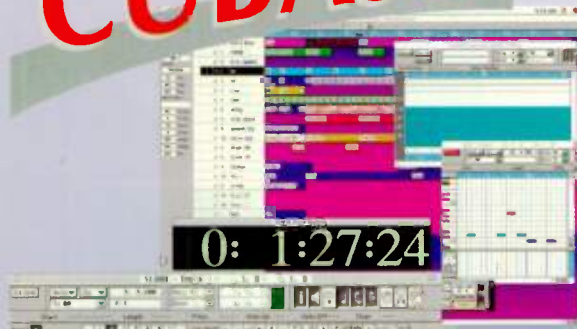
Rick Wakeman says YES to QUIK LOK



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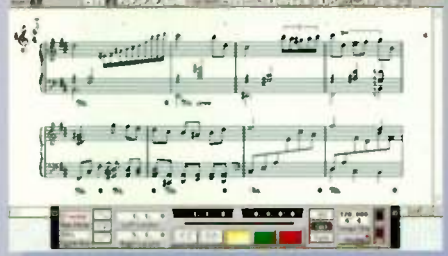
...Midi sequencing,  
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## CUBASE



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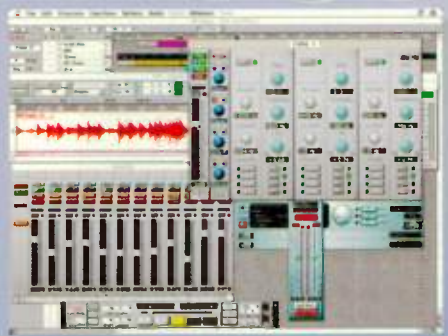
More records have been composed and recorded with Cubase than with any other sequencer. With no less than 6 editing windows and unequalled levels of sophistication, including unlimited tracks, mixer maps, many quantize options, score printing, QuickTime movie support and much, much more, Cubase is now an industry standard.



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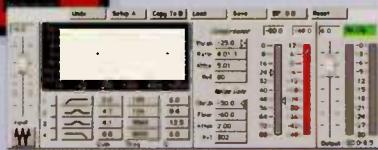
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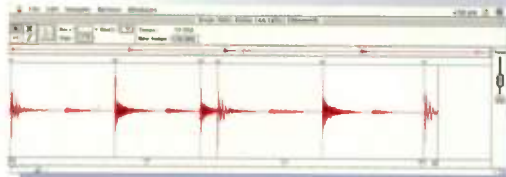
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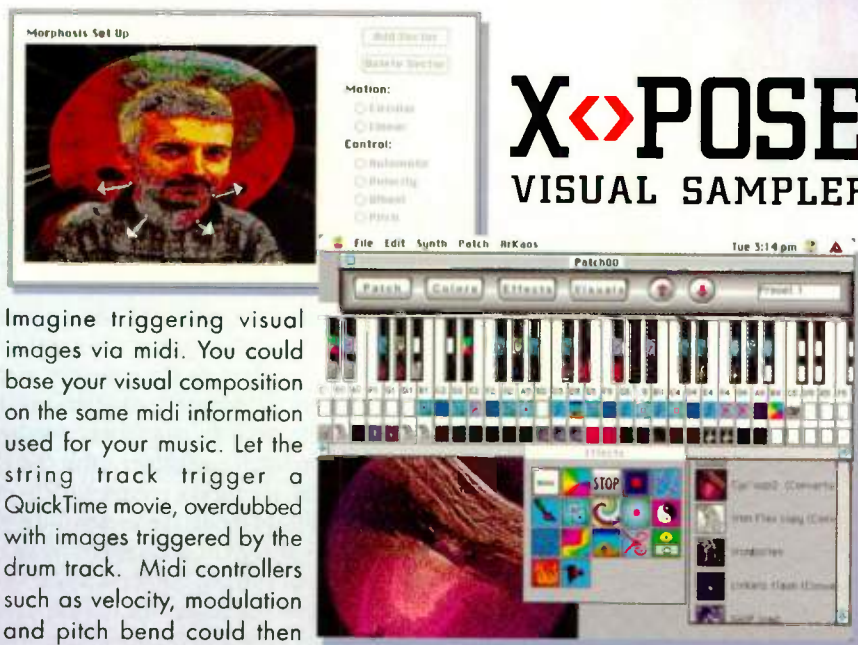


This program makes the task of matching the tempo of one audio file with that of another EASY. Recycle isolates an audio file's rhythmic components, allocates the samples to different keys on your

sampler and saves them as notes in a midi-file. When the midi-file is played, the audio-file will sync perfectly, whatever the tempo. Once you have tried it, you won't be able to live without it. Recycle 1.6 is compatible with Akai, Kurzweil, Emu, Ensoniq, Roland and Digidesign samplers, and is now also compatible with Cubase VST 3.02, enabling it to play back recycled files.

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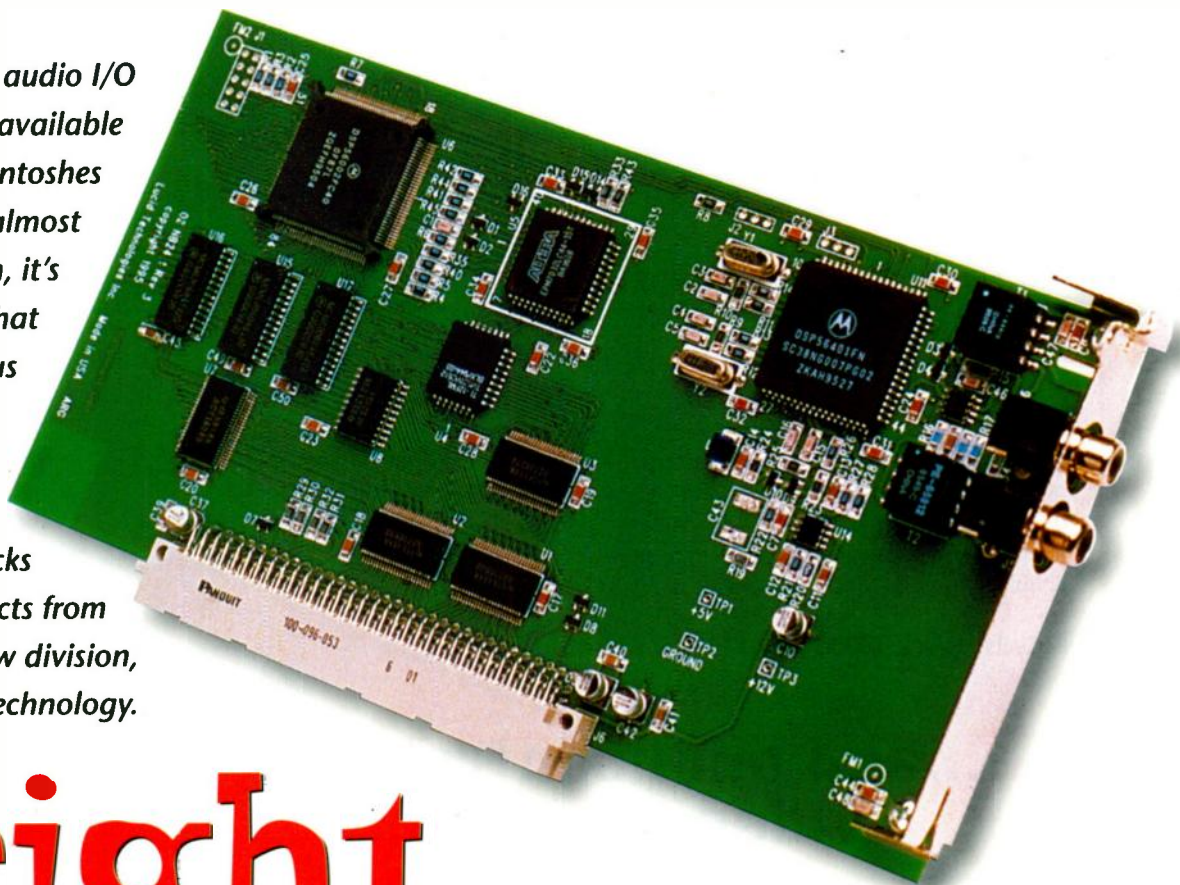
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With new PCI audio I/O cards becoming available for PCI Macintoshes and newer PCs almost every month, it's good to know that those with NuBus Macintoshes aren't being totally forgotten. MIKE COLLINS checks out the first products from Symetrix's new division, Lucid Technology.



# Bright Ideas

LUCID TECHNOLOGY NB24 NUBUS DIGITAL I/O CARD & ADA1000 20-BIT A/D & D/A CONVERTERS

use 24-bit converters and any applications that support 24 bits with the Lucid board when Sound Manager is upgraded.

## GETTING IT ALL WORKING

The NB24 fits easily into a vacant Macintosh NuBus slot — and no further hardware configuration is necessary. You simply connect the card's input to the digital output of a DAT machine, A/D converter or CD player and connect the card's output to a DAT machine or D/A converter. Once the hardware is in place, you start up the computer, place the supplied NB24 software driver in your Mac's Extensions folder, and restart your computer. The only thing to watch out for here is that *Cubase VST* users should use Lucid's version 1.01CB drivers, while *Deck* users should use version 1.02DK.

The way that most applications make use of the NB24 is by selecting the Apple Sound Manager as the audio I/O hardware. You can then select the NB24 as the Input and Output Device from your Mac's Sound Control Panel. Sound Manager will then redirect the audio through the NB24 rather than through the computer's built-in audio hardware. So, once your computer has rebooted, you open the Apple Sound Control Panel, select Inputs from the menu, and check that you can see the Lucid NB24 icon, as shown in Figure 1. Then you open the Outputs panel and select the 44.1kHz/16-bit stereo options (see Figure 2) — and that's it!

The NB24's input will lock to whatever sample rate the digital input signal is running at — normally 48kHz, 44.1kHz or 32kHz — while you select the output rate using your Mac's Sound Control Panel. The supported output rates are 48kHz, 44.1kHz and 22.05kHz, and the NB24 can also lock to an external clock running from between 32kHz to 48kHz.

**S**o, it's finally happened! The very thing I've been suggesting in various articles on the subject of Macintosh MIDI + Audio software over the previous couple of years: an affordable NuBus board has finally been developed for the Mac, to provide the S/PDIF input and output that's sadly missing from older Macs.

Lucid Technology, a new division of Symetrix (see the interview with Dane Butcher of Lucid in *SOS* January 1997), have developed two new digital hardware products for the Macintosh, the NB24 digital I/O card for NuBus Macs and the ADA1000 20-bit analogue-to-digital and digital-to-analogue converters — which are packaged together in a 19-inch, 1U, rackmount unit at a budget price.

The NB24 allows S/PDIF digital audio equipment, such as DAT machines and CD players, to be used as an audio source for hard disk recording on the Mac, or the Mac to be used as a source of S/PDIF digital audio for DAT players. The NB24 is ready to handle 24-bit audio, although Apple's Sound Manager, through which the NB24 operates, currently supports a maximum of 16-bit audio. Future versions of Sound Manager will probably support 24 bits, so you'll be able to

### pros & cons

**LUCID TECHNOLOGY  
NB24 £299/ADA1000 £449**

#### pros

- At last — a digital audio input and output NuBus card for the Macintosh.
- Extremely simple to install and configure.
- The ADA1000 interface complements the board perfectly and offers excellent quality for the price.

#### cons

- Some work still needs to be done before the NB24 will work with all the major audio recording packages.

#### summary

These products deliver the goods — digital audio input and output, and support for 16-bit audio at a range of sample rates, even on Macs that only have 8-bit audio built-in.

**SOUND ON SOUND**



## COMPATIBILITY

In theory, any piece of software that can use the Apple Sound Manager will work with the NB24, although in practice some software will not work properly without special drivers — such as *Cubase VST* and *Deck*, as mentioned above. The Lucid documentation also warns that you can only work with a restricted number of audio tracks using *Logic Audio*. Other applications that have been tested successfully by Lucid include *BIAS Peak v1.x*, *Macromedia*

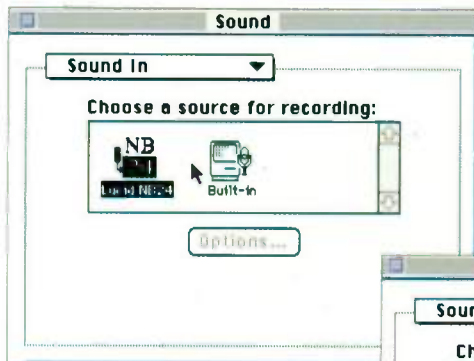


Figure 1.

*SoundEdit16 v2* and *Deck v2.2*, *Infinity Looping Tools*, *Digidesign Session v2.0* and *Pro Tools Power Mix*, *Opcode Audioshop* and *Adobe Premiere v4.0*.

There are a couple of other points worth mentioning here. The NB24 will not work with software that does not allow use of, or bypasses, the Apple Sound Manager — so it won't work with *Digidesign's Sound Designer II*, for instance.

Also, Apple have changed the way the Sound Manager works — it is now built into Mac OS 7.6 — so the Lucid board is unlikely to work with the new version of Mac OS until new drivers have been tweaked for use with the NB24. This may also be the case with any audio software that uses the Sound Manager, so don't

forget to check with your dealer before you buy if you want to work with System 7.6.

## IN ACTION

I installed the Lucid board on my Quadra 950 so that I could check it out with a range of MIDI software. I used System 7.5.1, OMS 2.3, DAE/DSI 2.95, and Sound Manager 3.2.1, with Sound Control Panel 8.0.5. I wasn't able to test the NB24 with MOTU's *Digital Performer* or Steinberg's *Cubase Audio XT*, as they only work with *Digidesign's DAE* (Digital Audio Engine) and hardware at present, not the Apple Sound Manager. The other Steinberg alternative, *Cubase VST*, only works on a Power Mac, and not with my Quadra 950. [We're also told that *Cubase VST* will only become compatible with the Lucid driver from version 3.5

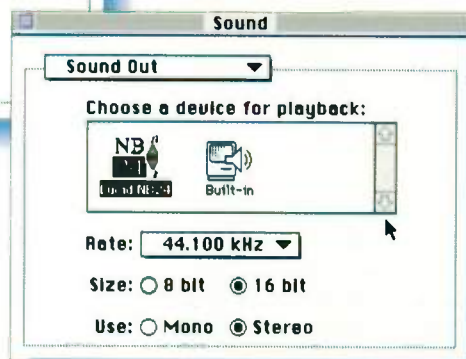


Figure 2.

onwards, which is currently set for late summer release — *Assistant Ed*].

I also had a few problems with *Opcode's Studio Vision v3.0.6* — recording kept stopping of its own accord, and various glitchy, clicky sounds were superimposed on the audio I recorded — although apparently further tweaks to both Lucid's driver and *Opcode's* software are in the pipeline to correct these. I am happy to report that *SoundEdit 16 v2* worked fine, as did *BIAS Peak v1.0*.

## LOOKING TO THE FUTURE — FROM NUBUS TO PCI

Lucid Technology have designed the NB24 board for NuBus Macs first, working on the basis that there are still plenty of these models in use around the world. As most of you will be aware, all the Macs currently being produced use PCI slots, so Lucid will be following up with their PCI24 and PCI24 DSP boards over the coming months. The PCI24 board version is almost at beta-testing stage, and this will have both S/PDIF and AES/EBU interfaces. A couple of months later, there will be a PCI24 DSP board with S/PDIF, AES/EBU and stereo analogue in and out. This will also have DSP on board, and will be bundled with a selection of *Waves* plug-ins. Featuring 6Mb of onboard RAM, this board will allow you to create effects that need

a lot of RAM — reverb, filtering, and so forth. The PCI card will also have sample-rate conversion at the input stage, so you can put 48kHz audio in and get a 44.1kHz file on disk. This will be very useful for people who have DATs recorded at 48kHz and need to get this into the Mac to burn a CD at 44.1kHz.

Any of these cards can be paired with the ADA1000 converters, making a very cost-effective package which should appeal to the many musicians now using Macs. Ultimately, though, the PCI cards are where the main interest will be. These cards will initially only be available with Macintosh driver software, but Lucid will also be developing a PC driver so they can sell their boards into the larger PC market.



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*Original 880 owner PAUL NAGLE's movin' on up...*

stickers, all at a very reasonable £49. (If you don't own a Zip drive contact your Roland dealer, who should be able to perform the upgrade for you. If all else fails you can return your unit to Roland.)

The new VS880 V-Xpanded supports six tracks of uncompressed audio. I suspect this may be pushing the system to its limit, and that eight may simply not be possible with existing hardware.

Remember that Roland (unlike some of their competitors) do not restrict you to fixed track lengths, allowing you to allocate available time to tracks as you require. Personally, I'm happy

# V: La Difference!

## ROLAND VS880 V-XPANDED DIGITAL MULTITRACK

During the last year the Roland VS880 has established itself as the cornerstone of many small or semi-professional studios, my own included. Reviewed back in March 1996's *SOS*, the original unit was a compact 8-track hard disk recorder with integral digital mixer, SCSI interface and an optional effects card (VS8F-1). With a maximum of eight virtual tracks for every real track, it offered ample scope for trying out alternate mixes or several takes of a solo. By means of Roland's own cunning compression routines, the VS880 was able to squeeze the maximum recording time from a hard disk without sacrificing quality — although if you did turn compression off, it was reduced to playing back only four simultaneous tracks.

### EXPANSION

Not content to rest on their laurels, Roland created several useful (and free) improvements in the form of system-updating MIDI files. Now, a year on, they have released the V-Xpanded version of the VS880, at the same price as the original but with some useful new additions. Existing owners needn't fear being left out in the cold, since all the V-Xpanded features are available in the form of the S1 System Expansion kit, consisting of a Zip disk, new manuals and front-panel reference

using eight tracks at MT1 compression mode (approximately 2:1 compression) and think such things should always be judged by your ears and not a meaningless spec sheet.

### EFFECTS

The expanded VS880 offers 10 new effects types, as follows: Voice Transformer, Mic Simulator, 19-band Vocoder, Hum Canceller, Lo-Fi Sound Processor, Space Chorus, Reverb 2, 4-band Parametric EQ, 10-band Graphic EQ and Vocal Canceller. Examples of these appear in a new bank of 100 presets, taking the total to 300 presets in all, with 100 of these user-programmable. For my money, the Voice Transformer alone (probably derived from the Boss/Roland VT1 self-contained Voice Transformer box, reviewed *SOS* November 1996) justifies the upgrade fee, providing, as it does, a range of real-time voice pitch and formant characteristics. Some of the gender-bending factory presets are quite uncanny, transforming tenor to soprano (or vice versa) with none of the "munchkinisation" associated with cheap vocal processors. Even my own squeaky voice could be translated into a reasonably convincing Darth Vader or a manic gerbil on helium. A Robot Voice option sets incoming vocalisations to a fixed pitch of your choice, creating some unique special effects. If

### pros & cons

#### ROLAND VS880 V-XPANDED £1499

#### pros

- Integrated 8-track hard disk recorder with virtual tracks.
- Compression allows more recording time per hard disk.
- Effects card keeps all processing in digital domain.
- Digital mixer.
- SCSI.

#### cons

- Non-backlit LCD.
- No phantom powered mic inputs.

#### summary

The VS880 was already a superb studio tool; the new V-Xpanded machine has even more going for it, with mixer automation, improvements to the already excellent effects implementation, and an extra two tracks in uncompressed mode.

**SOUND ON SOUND**



that weren't enough, real-time editing is available via the first five channel sliders, which control five parameters of the voice transformer — so you can tweak as you record. Note that, due to the processing power required, the Voice Transformer and the 19-band Vocoder use up both effects slots when in use.

My other favourites are the Space Chorus (designed to simulate Roland's classic SDD 320), the 19-band Vocoder and the Lo-Fi Processor. The last is complete with a resonant filter (low-, high- or band-pass) and can transform your clear, crisp recordings into the wheezing output of a toy radio or low-resolution sampler. It also derives some grungy, processed electronic effects from the most polite and sanitised sources.

The Mic Simulators apparently use Roland's COSM (Composite Object Sound Modelling) technology, and aim to transform the sound of your humble 'Karaoke mike' into that of a high-quality condenser microphone. I expected this to be a little gimmicky but was surprised that my initial results showed rare promise, adding 'air' to the recordings of acoustic drums, for example. Even my nastiest microphones were able to exhibit improved tonal qualities with minimal effort, although much practice will be needed to fully exploit these capabilities.

One of the most popular questions I hear about the VS880 is "how do I record with effects?" It is often desirable to add an effect during recording rather than leave it until the final mix, so Roland have taken note and added new insert options. Understanding signal flow is essential to get the most from the mixer, and the much-improved manual now includes a better explanation of the busses, despite a curious plumbing analogy based on kitchen sinks, bathtubs and toilets.

Thankfully, it is now possible to assign stereo reverbs and delays to both effects slots, not just slot 1. Effects can be added at the master output stage for a last-minute EQ or compression of the whole mix.

## AUTO MIX

Previously, VS880 owners wanting to perform an automated mixdown had to do so by sending MIDI control changes from an external sequencer. The V-Xpanded VS880 allows you to record real-time mixes along with the audio data — up to 12,000 events per song. Mixer events can be recorded statically or during song playback, or even generated automatically for smooth fades between two existing points. If you don't already use a MIDI sequencer, this facility will be an invaluable addition. Even if you do, it's sometimes handy to keep everything in one place, although EQ settings must be automated, as before, via external sequencer control. Each track has its own base level, set from -12 to +12dB. This is great for altering the relative volume of a finished track without affecting an existing automated mix.

## MIDI

I was delighted that Roland have now introduced scene and effects patch selection via MIDI. I was less than delighted that the manual advises that we

## ODDS & SODS

- A stereo signal can now be mixed in at the master output stage, taking its source from inputs 1&2, 3&4 or digital. This last option is ideal when two VS880s are operated in synchronisation.
- It is now possible to use the 3-band EQ in both the simpler track->input mode and the more flexible input->mix /track->mix mode (at least for up to eight selected channels). I should perhaps explain that track/mix mode is designed for controlling VS880 tracks alongside external sources.
- Something that surprised (and

worried) me when I first heard about it was the inclusion of SCMS (Serial Copy Management System), which allows you to infect the digital output of the VS880 with the SCMS digital protection virus. Fortunately this can easily be switched off, so we'll say no more about it.

- There are some new options for creation of sync tracks and tempo maps from mark points, etc. For example, if you can tap reliably at the start of each bar, the VS880 can convert these mark points to a tempo map.
- A small tweak to the Remaining Space display means that this value can now

be represented as time, % free, actual space (in Mb) or events free.

- Peak levels may now be held on the track level display — useful for setting input gain accurately.
- Finally, the Operating System provides basic disk diagnostics, in the form of a surface scan which is done either at drive initialisation or later.

I'm not sure what future plans Roland have for the VS880, but my first suggestion would be a backlit LCD kit (the VS880's display being the only real annoyance) and my second the ability to switch virtual tracks during playback.

refer to "the separately sold MIDI implementation" if we require information on scene selection and real-time effects manipulation via MIDI controllers. Most manuals have a MIDI section at the back, and I hope that this V-Xpanded approach is a temporary aberration and not some ominous indicator of future direction. I haven't yet seen this optional 'extra', so I can't tell you exactly how many effect parameters can be modified in this way. A nice new touch is the use of MIDI to switch track status: by sending Controller 29, with various values, you can switch tracks into play, mute, record or source modes, something I'll be adding to my *Cubase* mixer map as soon as I get a chance.

## CONCLUSION

If you're still pondering the merits of stand-alone hard disk recorders, perhaps weighing them against a wholly computer-based solution, you owe it to yourself to check out the VS880 V-Xpanded. With its automated mixdown, integral effects and virtual tracks, the whole philosophy of the VS880 is liberating, recalling the days when you just switched on a tape deck, hit record and made music.

For existing VS880 owners, the choice is simpler: if you have the effects card, you should not be without the S1 expansion kit. If you don't yet have the effects card, I can only assume it's on your shopping list, after which the upgrade should be on there too.

SOS

## ENHANCEMENTS AT A GLANCE

- 6-track playback in Master (uncompressed) mode.
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- Improved manuals.

**E** VS880 V-Xpanded (without hard drive) £1499; VS8F-1 effects board £340; HDD3 1.4Gb internal hard disk £399; VS880-S1 System Expansion kit for original VS880 £49. Prices include VAT. Version 2.04 reviewed.

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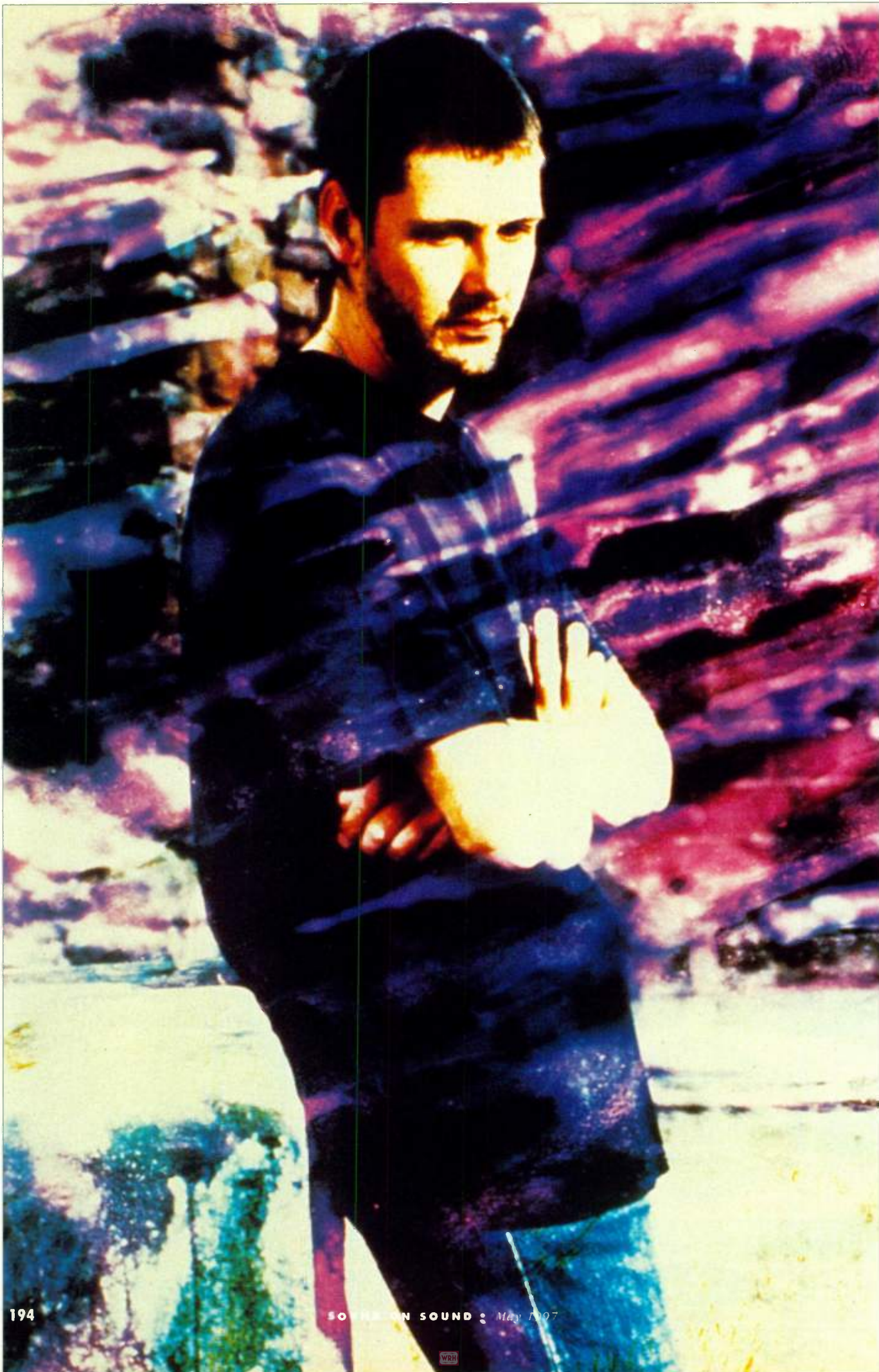
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Succeeding in today's frivolous music industry is no easy task. When *SOS* last spoke with Banco de Gaia — or Toby Marks, for they are one and the same — in February 1994, he'd just signed a deal with Planet Dog and released his 'Desert Wind' debut single, and his recorded output consisted of three home-produced cassette albums (with enchanting titles such as *Freeform Flutes And Fading Tibetans*), plus appearances on several compilation albums, including each of Beyond's acclaimed *Ambient Dub* series. But chart placings are not necessarily a true reflection of an artist's popularity, for Toby swiftly graduated with honours into the 'Grand Hall of Ambient Dance', alongside the likes of the Orb, regularly performing to ecstatic crowds both at home and abroad. In 1995, Toby's impact at the Glastonbury Festival was such that *The Guardian* was moved to comment "...there was one act — and above all, perhaps, one single moment — which somehow epitomises the reason why one feels Glastonbury could last another quarter-century yet... The packed crowd in and beyond 'A' marquee on the Avalon Field burst suddenly into a semi-devotional chant at a climatic moment during the set of the weekend: that by Banco de Gaia, classified as ambient house music."

really peaks! I thought it was so ludicrous that a top composer actually wrote this really dull opera that it seemed as good a name as any, frankly. Maybe it can work the other way around: a crap composer can be described as a genius!"

Mmm. Forgive me if I'm just a little sceptical here, for Toby's official Internet homepage confidently states that 'Banco de Gaia' was the *nom de plume* of deceased Italian fascist dictator Benito Mussolini's gay lover! However, it does also warn: "Not everything you read is true..."

"There are loads of things I'm interested in — nothing to do with music and not relevant in any way, except as an influence at some deep level," says Toby, "and I'm lucky I can put them up on my web site. The reasons why I like writing music, travelling, and why I care about Tibet are all interlinked. Ancient civilisations, other cultures and other spiritual systems are fascinating to me. That's why I find the world such an interesting place — though not the present day: of all the societies throughout history, this is one I'd almost certainly not choose to live in. Some years back this guy called James Lublock came up with the Gaia hypothesis [Gaia is a Greek earth goddess]: the Earth itself is one living organism, and unless we treat it with some respect, we'll destroy it."

**Leading ambient housemeister Banco de Gaia has just completed his eagerly awaited new studio album. JONATHAN MILLER finds him changing tracks as he steams towards greater commercial success.**

# Banco De Gaia

This musical zenith was prompted by the track 'Mafich Arabi' with its infectious Arabic mantra-like sample, as featured on *Maya*, Toby's excellent 1994 debut album. Unknown to him, this performance was captured for posterity on multiple ADATs by the Glastonbury team, later resurfacing in 1996 on the Banco de Gaia *Live At Glastonbury* album, the cover of which depicts a lone Roland SH09 analogue monosynth in the middle of a field of cows... *Maya* shifted 20,000 copies in the UK alone — not bad going for a relatively low-profile independent release; *Last Train To Lhasa*, its 1995 double follow-up, fared even better.

## PHANTOM OF THE OPERA

I met up with Toby Marks as he was putting the finishing touches to his fourth, as yet untitled, album at World Bank, his cosy private studio in Warwickshire. Before we discussed matters of a more hi-tech nature, I had to ask Toby about his unusual recording pseudonym. It's a question I suspect he's faced on many occasions, but he nevertheless obligingly answers.

"*Banco de Gaia* is the title of a short opera by Puccini about a day in the life of an accountant who works at a bank. It's considered to be the most boring opera in the history of Western music, because it's literally just about this guy getting up, having his breakfast and going to the bank, working out who owes what, and then going home. It never

## LAST TRAIN TO LEAMINGTON

University was a disappointment — "I thought studying Philosophy was going to be about questioning God's existence, and it was all about the logic side of it, so I didn't bother" — and Toby soon left Warwick to travel in Egypt and Morocco. "Travelling about has enabled me to record stuff and buy tapes, so I've built up a large supply of sounds for creating samples. I'd love to go travelling again with a DAT recorder and record hours and hours of stuff around the world. Ideally, I'd like to take a filmmaker with me — so if there's anyone interested out there...? I plan to go away for a few months to various places to meet local musicians; record and film them; then come back, chuck it all into the sampler and record an album."

Toby's travels have stood him in good stead in the creation of his rich, layered, diverse and often danceable music, as he utilises all manner of exotic samples and effortlessly weaves them into an intricate electronic web. Roland's flagship S750 sampler first formed the backbone of the recognisable Banco de Gaia sound; Toby has since invested in additional,



# Banco De Gaia

► fully-expanded Roland S770 and S760 samplers. "They're lovely to work with. You've got a proper screen and a mouse for editing, so you don't do your back in leaning over to work with a poxy little screen — although the S760 hasn't got that and so gets used more as a playback machine. I also like their sound. Akai and Roland samplers process sound in different ways and neither is entirely accurate, but whereas the Rolands warm things up, Akais tend to make things sound precise; like an engineering tool."

"The samplers do most of the work," Toby admits, but he uses conventional synthesizers too. "The Nord Rack can play four parts: I've got the Novation BassStation rack, the Oberheim Matrix 1000, and a MIDI'd Roland Jupiter 8 and Juno 6, all of which tend to get used on most tunes. A lot of the arpeggios and lead lines are created using the analogues, then percussion, basses, effects, some pad sounds, and strings, are generally sampled. Live, the samplers are doing almost everything. I don't take the Jupiter on stage anymore, so I sample its sounds instead."

"Personally, I find the possibilities of sampling fascinating — I think what I do is musically, aesthetically and artistically valid. I'm not using samples because I can't play and haven't got ideas of my own, although there's certainly music around that

does come across like that! Sampling something is just the same as taping it, except that before recording with a conventional multitrack you need to know whereabouts in a tune you want something to be. With a sampler, you can put it wherever you like. So using samplers isn't so radically different to traditional ways of working musically: it still requires someone to perform, and the better their performance, the better the end result. Having a good sampler and a crap performance doesn't make a good tune."



Toby in his Warwickshire studio.

Toby freely admits to spending less time creating his own samples from scratch these days, although this wasn't always the case: "On my early stuff, I just sampled what I felt like, and that's how I learned to work: I heard a sound that inspired me and used it. Say I was working on a tune and suddenly thought, 'Hey, this needs a banjo', I'd simply go and find something with a banjo on it, without worrying about copyright implications. Now that I'm selling records, I can't do that, so sample CDs have been great: I know I can go out and buy a copyright-free CD that's got banjo sounds on; maybe not played the way I want, but at least the sound is there. This is probably another reason why I don't bother with digital synths — why buy a Korg Trinity or Wavestation for a



A mixed rack containing both sound sources (Oberheim Matrix 1000 and Novation BassStation rack), and samplers (Roland S750, S760 and S770).



Analogues abound — Roland Juno 6, SH09, and Jupiter 8, plus SCI Pro One.

## BANCO DE GAIA'S EQUIPMENT LIST

### SYNTHESIZERS:

- Korg M1
- Clavia Nord Rack
- Novation BassStation
- Oberheim Matrix 1000
- Roland SH09
- Roland Jupiter 8
- Roland Juno 6
- Roland GR50 (guitar synth)
- Sequential Circuits Pro One

### SAMPLING:

- Roland S750 (18Mb RAM Turbo CPU)
- Roland S760 (32Mb RAM)
- Roland S770 (18Mb RAM Turbo CPU)

### COMPUTERS/SEQUENCING:

- Apple PowerMac 9500/200 running Emagic Logic Audio v2.6 and Digidesign ProTools 3
- Apple PowerBook 520C running Emagic Logic Audio v2.6
- Opcode Studio 4 MIDI Interface

### RECORDING:

- Mackle 32:8:2 desk
- Sony TCD D3 DAT
- Tascam DA30 Mk II DAT

### PROCESSING:

- Aces 2 x 15 graphic EQ
- Alesis Quadraverb effects

- Alesis Midverb II reverb
- Aphex Type C exciter
- ART Proverb 200 reverb
- BBE Sonic Maximizer 422A
- Boss MicroRack delay and reverb
- Boss SE70 effects
- Roland SRV2000 reverb
- Roland SDE330 dimensional delay
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## SAVE A PRAYER

The legalities of sample copyright have caused Toby a few problems, including the premature deletion of his early cassette albums, *Medium*, *Deep Live*, and *Freeform Flutes And Fading Tibetans*. "It's the practicalities of the situation that I'm not content with," he argues. "I totally agree with the principle that a musician should be entitled to remuneration if someone else uses a bit of their recording. Personally, I'd be flattered if someone sampled a bit of one of my albums, although I might be bothered if they sampled eight minutes from one tune! The problem, as ever, seems to come from the people in suits in offices."

"In the case of the '887' track [on the *Live At Glastonbury* album], there's a vocal taken from an old car advert and it just sat beautifully in this live version, as if it had been written for it. But, unknown to me at the time, the number got recorded and we ended up wanting to release it. So we contacted the publishers, and they wanted a 50% cut! We said, 'Look, this isn't like a song where the vocal is half the tune; it's just a five-second sample,' — so then they asked for 30%, which was still ludicrous, but worth it."

"The singer was fine about it, as were the record company, but it turned out that the original recording had been made by a production company that, as far as I understand, is one guy. He'd had a reasonable advance from the record company that never got fully recouped when the track was released as a single. If we paid the record company to use this sample, then he'd not actually get anything; it would just go towards paying off his advance. So he wanted to get something out of it as well — he bunged the price up by a couple of grand and suddenly it was no longer financially feasible to do it. If I'd been allowed to talk to him direct, then quite possibly we could have come to an agreement, but a whole series of managers and lawyers was involved. The way it all worked out was pretty unsatisfactory." Eventually, the offending section had simply to be edited out.

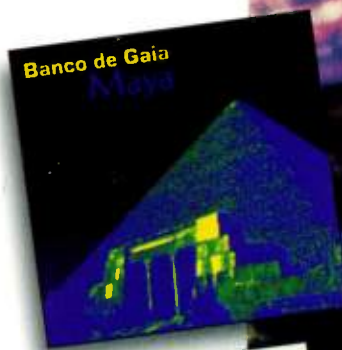
## BARGAIN BASEMENT

Currently based in a rented factory unit, Toby's World Bank studio is ergonomically laid out, with virtually everything at arm's length from a central seating position. An A-frame stand against one wall is groaning under the weight of an impressive collection of predominantly vintage pedigree Roland analogue synthesizers: a Juno 6 atop an SH09 and a recently acquired Sequential Circuits Pro One monosynth, plus the monstrous Jupiter 8. Toby bought Roland's former flagship polysynth for just £350 and the comparatively diminutive SH09 — as depicted on the *Live At Glastonbury* sleeve — for a measly £50!

"It used to belong to Matthew Corbett, of *Sooty* fame, who's actually the reason I got into electronic music in the first place! The Jupiter is wonderful. It's fat — not with a 'ph', I might add! The Juno 6 is pretty basic — no MIDI, no memories, but it's wonderful live. It's great for emphasising dynamics and putting in little fills in a way that you just couldn't do with an M1 or SY85."

Toby is no great fan of these synths' digital counterparts: "I was toying with the idea of getting a new digital synth, thinking I'll get something that sounds so wonderful and inspiring that it'll take me in a whole new direction. So I borrowed a Korg Trinity for a couple of days. And really it's the same old thing over again: good pan pipes, interesting marimba, the acoustic piano slightly better than it was on the M1 — but there wasn't really much in there that excited me. It's got this touch screen which everyone seems to think is wonderful, but it takes about five seconds to redraw if you change a patch."

"I'm not specifically slagging off that instrument, it's just that I still don't like most of the digital synths about. You *can* make them sound good, but I'm not a programmer; I don't like going through loads of bloody menus, they drive me mad. Whereas there is an immediacy and intuitiveness about an analogue synth: If you understand what ADSR and frequency means and know what the knobs do, then



## BANCO DE GAIA'S DISCOGRAPHY MUSINGS

### • *Medium* (1990).

"A bit raw and under-produced in places, this includes tracks that still get an airing live from time to time. Various samples and lines have been recycled in later tunes."

### • *Freeform Flutes & Fading Tibetans* (1992).

"This is when it all took off, really; if you're familiar with the *Ambient Dub* compilations then you'll know a few of these already. It probably would have been a proper CD release if it hadn't been for some rather incriminating sampling!

### • *Deep Live* (1993).

"Recorded live at Club Dog, London in December '92 when it was still at

the George Robey. A great early gig and one that really established me with the 'doggy' folk."

(The above albums were released on cassette only and are no longer available.)

### • 'Desert Wind' (1993).

"Hmm. Don't know quite what to say about this one; it wasn't really a dance EP, nor ambient either. Not the best versions of the tunes ever, but I still like the mix of 'Shanti!'."

### • *Maya* (1994).

"What can I say? My first 'proper' album release, which topped the indie charts in Britain and was a dream come true. Still haven't been on *Top Of The Pops*, though! Some of

my favourite tracks are on here, particularly 'Mafich Arabi', which I'm still playing live quite a lot."

### • 'Hellopolis' (1994).

"This was intended to be a 'DJ-friendly' EP. It got good feedback from DJs, but was never stocked in the dance shops. I guess I just don't do techno..."

### • *Last Train To Lhasa* (1995).

"Definitely more refined than *Maya* as my production skills improved. We released a limited edition triple CD in Britain that contained most of the best bits of seven and a half hours' worth of masters; guess it'll have to be a 10-album boxed set next time!"

### • 'Last Train To Lhasa' (1995).

"The stupid four-minute radio edit is

to be avoided, although it did get some airplay, but the ambient mix is fun. Check it out if you want to know how to make a 3/4 sample fit a 4/4 tune. It amazed me that it worked!"

### • 'Kincajou' (1995).

"A deliberately dance floor-targeted remix EP with Oliver Lieb doing the trance thing and Speedy J doing... well, Speedy J, really! Not exactly typical Banco style, but more appealing to DJs, by all accounts."

### • *Live At Glastonbury* (1996).

"A very good recording of possibly the most 'vibey' gig I did in '95 — definitely makes you feel as if you're there, and it sounds like a good gig, which it was. Many thanks to all who can be heard on it; it sounds as if you were having a good time."



# Banco De Gaia

► it makes sense: you move them, the sound changes.

"The Nord Rack, though, is wonderful — the best of both worlds. It's got knobs and they all send MIDI data, which is what I've always wanted for the Jupiter. It's got endless modulation possibilities and, because it's digital, it doesn't have the tuning problems of the Jupiter, so I can risk taking it out on tour. I wish I'd gone for the keyboard version — it's the kind of synth you want to be playing and tweaking simultaneously — but I didn't want another keyboard to hump about live, and the keyboard doesn't have aftertouch! I know version 2 responds to aftertouch over MIDI, but it still doesn't have an aftertouch keyboard. For God's sake, it's £1500! I'd quite happily pay £1600 if it had aftertouch, so that's why I bought the rack and hooked it up to the M1, which has a better keyboard anyway.

"There's potential in digital technology and digital synths, and there may be other things around now which I'd love if I heard them. I haven't played around with a Korg Prophecy yet, which is a good example of virtual synthesis."

## THE LUXURY GAP

Toby has made an impressive investment in the computer stakes, with Apple's prevailing heavyweight PowerMac 9500/200 running Emagic *Logic Audio 2.6* and Digidesign's *Pro Tools 3.0*.

"I've started working with saxophone players and getting involved with a lot more live playing," Toby explains, "so I needed to get the digital audio side of things sorted out. It was starting to get a bit bulky for the samplers."

Using the PowerMac for time-stretching applications, for example, has eased the process enormously: "Suddenly things that used to take half an hour now take five minutes. Now it's feasible to try things out just to see if they'll work, without wasting an hour if they don't. When I'm time-stretching something on the sampler, by the time it's finished I can't work out if it's better or not and I've completely lost the thread of what I'm doing."

## TOTAL RECALL

Despite now owning a state-of-the-art computer-based recording and editing system, in retaining a Mackie 38:8:2 console Toby has consciously steered clear of automated mixing. "I'm a traditionalist," he claims. "I can't get used to the idea of virtual mixers when I've got a real one sitting there — what's the point? I like knobs, as it were — well, potentiometers or variable resistors, for want of a better phrase! I've been talking to people recently about digital desks and, while it would be great to have total recall, how many knobs are there on something like the Yamaha ProMix system? I know you've got an assignable data wheel, but I couldn't work like that — especially live. Imagine if you wanted to hit the reverb on a snare; you'd be thinking, 'Okay, assign track 3 to Aux Send 2. Damn, missed it! Oh, well...'. You'd spend the whole bloody tune getting ready for one reverb shot when you could be making countless other adjustments elsewhere at the same time using a conventional mixer.

"Having total recall of every parameter would be wonderful, though. At the moment I often work on a tune, go away and do something else, and then come back and set up the board again, and it never sounds quite the same. But that random element can sometimes work in your favour: because the centre frequency of the low-mid EQ is actually at 250Hz rather than 220, that kick drum might be much better than you got it sounding last time. It's useful to know you've just got to press one button and everything's back where it was so you can carry on where you left off, but I could never live with just working with a few knobs. Maybe this is because I grew up on Portastudios, then graduated to big mixing desks — that's the way I visualise a mix. I can't imagine how I'd look at a digital desk with only one knob and work out what's going on.

"There was a very valid point in the December 1996 editorial of *Sound On Sound* which said that every technology has to start somewhere. In the early days everything is over-priced and doesn't work properly. If there was a digital, total recall version of this Mackie at a reasonable price, then I would buy it. At the moment the options are I'd lose all the flexibility and user-friendliness of the Mackie to get total recall. Even sound-wise, I don't think there'd be any significant improvement to be had by getting a ProMix over this. For the money, the Mackie sounds great."

## DARK SIDE OF SHEPHERD MOONS

My visit to World Bank ended on a musical high, with Toby premiering an excellent excerpt from the forthcoming Banco de Gaia platter. The track in question features virtuoso saxophone playing from none other than Dick Parry — famed for his exemplary work on 'Us and Them' and 'Money' from Pink Floyd's *Dark Side of The Moon*. The result? Floyd for the next millennium. Possibly. Look out for uilleann pipes recordings as well: this is one artist who's trying to avoid rigid definitions. "The music scene here is all very classified and pigeonholed," Toby complains. "In Germany, for example, I've tried very hard to make a go of it, but I don't really play techno, and I don't play some people's very narrow definition of ambient, so there's no interest, because no-one's prepared to try something they haven't tried before. Whereas in the States, this whole electronic music thing is all new, so people don't distinguish between me, the Prodigy, Higher Intelligence Agency; we're all new electronic 'dancey' acts, and it's exciting.

"People like what they like, and don't care if something's got a '909 kick drum or sounds like it's got a real drummer playing. In America, it's the gap between the scenes that people are looking for. That, to me, is so refreshing, because as time goes by I'm feeling less and less part of any scene."

SOS

## HOME AND AWAY

"I did all the writing and pre-production for the first two albums at home and then took all the gear up to Gighthouse to record it — a commercial studio near here, in a converted barn. It's a beautiful place to work; really peaceful, surrounded by fields and trees and birds.

"I've been recording the new album here at World Bank, because I've finally got some reasonable monitors in the Tannoy DTM15 MkIIIs and a workable room. At the moment World Bank is in this building — it's a conceptual construct, because I always liked the idea of calling a pile of equipment in my bedroom something!

"It's been interesting having the studio here, 20 minutes away from where I live. When I first started working here it was great not to be working at home, with people always dropping round and the phone ringing all the time; I came here to do music and when I went home I was separated from music for the first time in my life. At first this really helped me focus, but then I started getting uncomfortable being here, and I realised it was because I was so bloody lonely. For the last few months I've had some of the gear back home to do some writing — and it was great, but all the hassles about being constantly interrupted by phone calls started again and I remembered why I moved away!"

"Although I'm living in Leamington, which is quite a small, quiet town, I'd like to find an old farmhouse with a couple of barns or outbuildings that I could convert. I want to be out in the country and see sheep and trees in the morning — pandering to my hippie aspect!"

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is soon moving to a new address —  
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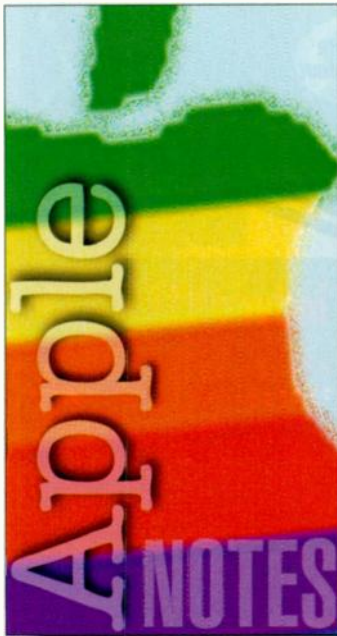
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We Buy Secondhand Gear

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**MARTIN RUSS** takes stock of price drops, takeover rumours, and in some cases, the end of the line.

The usual Spring 'model replacement' bargain season is here. With the remarkable increases in processor clock speed, there are many sub-200MHz machines at very affordable prices. This might be the time to make that final move from 68K to PowerPC — and with rumours about the imminent demise of the Performa line, I'm increasingly tempted by the 6400.

**CORRECTION**

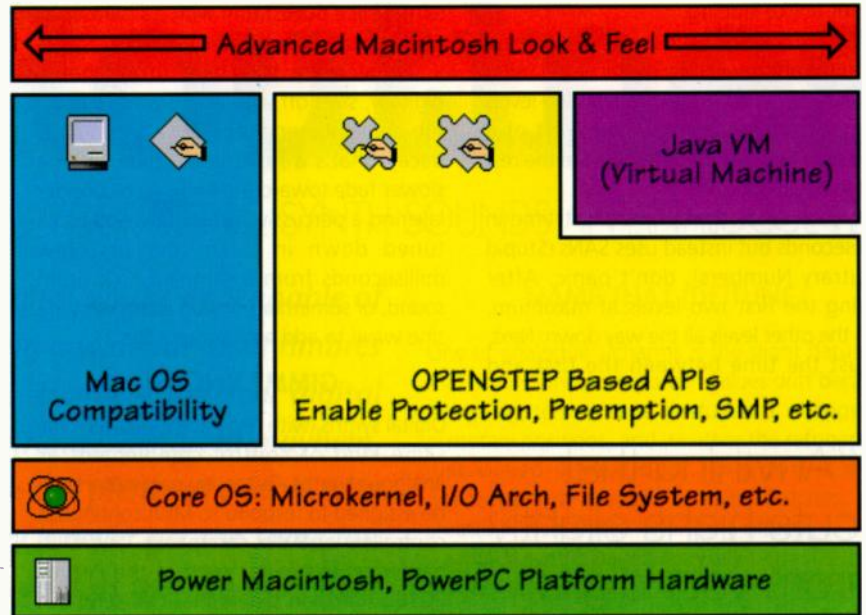
Statistics are dreadful things: too easy to misinterpret, and yet too influential to ignore. I fell into the trap in the March issue of Apple Notes, where I mentioned a well-publicised figure for the number of Internet servers that are Macs. Reader Paul Findon emailed me from Japan to point out that the actual figure is probably closer to 36%, and that the number of people producing Web content using Macs is probably where the 62% figure comes from. I'm happy to set the record straight. Thanks, Paul.

As a result of exchanging email with Paul, I'm making a few changes to Apple Notes. Feedback does work — and I welcome email from SOS readers.

**OPERATING SYSTEMS**

After several months of a rather fluid strategy for their operating system, Apple seem to be firming up their approach. Rather than repeat all the technical detail that you might find in Mac-specific magazines, I'm going to try to condense the information into the stuff that matters.

MacOS 7.6 is now here, and the long-awaited MacOS 8 (albeit in a very different



Inside Rhapsody: also see <http://www.macos.apple.com/>

form) will be here late in the year. MacOS 8 apparently promises more of the 3D/rectilinear look that has gradually been appearing — the new Extensions Manager in 7.6 may be a preview. Late in 1997 or 1998, the 'Premier' release of Rhapsody will appear. 'Rhapsody' (a code-name, not the real name) is the result of merging the Mac and NeXT operating systems, and is solely for PowerPCs; 68K Macs will continue along the MacOS path only.

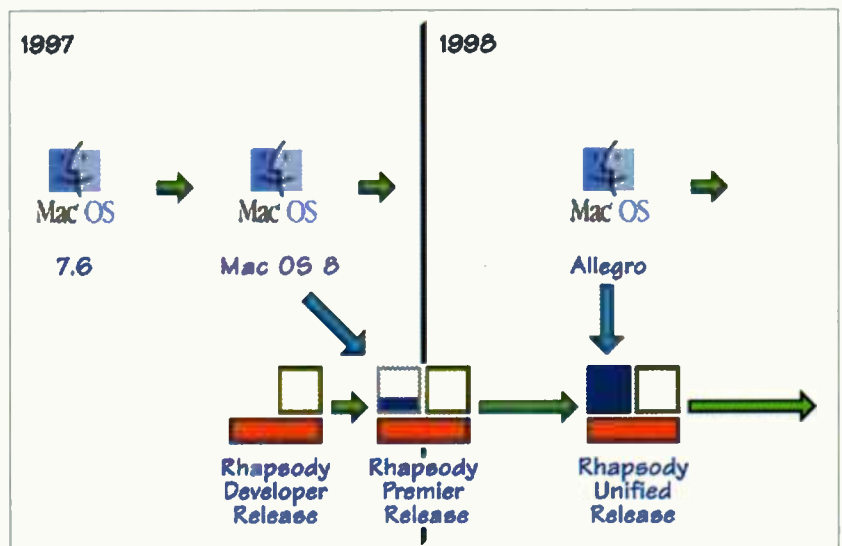
Rhapsody includes two ways of joining the 'advanced Macintosh look and feel' user interface to the underlying microkernel OS and hardware: the Yellow Box and the Blue Box. The Yellow Box is based on OpenStep, the NeXT OS;

the Blue Box is the MacOS compatibility box. The first release of Rhapsody will not have complete MacOS compatibility — this will appear in mid-1998, when Allegro and the 'Unified' Rhapsody are released. Both Rhapsody and MacOS are due to continue in parallel.

**THE END OF THE LINE**

MacOS 7.6 signals the end of the line for some Macintoshes, and some familiar bits of MacOS System software. Although I've mentioned before that MacOS 7.5 was likely to be the last operating system for some models, the details are only now emerging.

Although the latest MacOS Operating System



Apple's roadmap for future OS releases: see <http://www.macos.apple.com/>



## APPLE NEWS IN BRIEF

### • ASK THE ORACLE

It has been reported in the financial press that Oracle, champions of the Network Computer alternative to 'a PC on every desktop', have offered a billion dollars for Apple Computer. Now every other takeover rumour like this has so far come to nothing, but Oracle are one of the most powerful of the 'anti-PC' companies. Also, Oracle, Sun and Apple are already partners in several alliances, and so with a failed Sun attempt to buy Apple last year...

### • GOODBYE TO...

The videoconferencing support built into QuickTime will continue, but Apple are discontinuing their own products that take advantage of this.

Quickdraw GX will not be used for printing in the future, although many of the features available in GX will be included in the Rhapsody OS.

After many years of background existence, AIX, Apple's own UNIX implementation, is finally to be dropped. This will probably only affect specialist and high-end server users.

Apple are apparently planning to lay off about a third of their workforce, just over 4000 people. Second quarter results for 1997 are likely to reflect the costs of this, plus the purchase of NeXT, and some other contract cancellation charges and asset write-offs.

supports the ageing 68030 (some Mac IIs) and 68040 (Quadras and Centrises) processors as well as the more recent PowerPC chips, some of the older models of Macintosh will not be able to run MacOS 7.6. Because of their processor, any Mac with a 68000, 68010 or 68020 is now stuck at MacOS 7.5: the Mac XL (Lisa); Mac 128K; Mac 512Ke; Mac Plus; Mac SE; Mac Portable; Mac Classic; PowerBook 100; Mac LC; Mac SE/30. The Mac IIx and Mac IIcx won't be able to run 7.6 even though they have 68030 processors, which is a pity, because the IIcx was one of the most expandable, compatible and popular of the Mac II series.

In the System Folder, AppleTalk (aka LocalTalk) is no longer an option. MacOS 7.6 now insists on using the more modern Open Transport networking software. This may be bad news for anyone who shares a printer using AppleTalk... And until a software fix comes along, the OpenDoc and LiveObjects componentware extensions won't work on 68030 or 68040-based machines.

The final nail in the coffin is the memory requirement for MacOS 7.6 — at least 8Mb of RAM for itself, with an additional 8Mb of either RAM or virtual memory (hard disk). Since using your hard disk as virtual memory seriously degrades the performance of the computer, this effectively means that you need at least 16Mb of RAM memory, and probably more for good

performance. Another interesting example of creeping expansion is the size of hard disk required: a typical installation of MacOS 7.6 will apparently use about 70Mb of hard disk space. And I can remember when a 40Mb drive was more than enough for a system and all your working files...

## HOW IT WORKS: SHORTCUTS

This month's topic is a reminder about some useful shortcuts. The prime consideration for inclusion here is that I can't remember how to do these, and I assume that I'm not the only one!

### • OPTION KEY

Copying files from one disk to another, instead of merely moving them, requires the Option key to be held down before you click and drag.

To close all the windows on the Desktop, hold down the Option key, and then click in the 'go-away' box at the top left-hand corner of the window.

Forcing the Trash/Wastebasket to empty: hold down the Option key before going to the Special menu.

### • SHIFT KEY

To turn off all your Extensions when the Mac starts up (useful for checking if an Extension is causing crashes), hold down the Shift key when the computer boots up.

To select (or deselect) more than one file at

## ON THE NET



# Mac OS 7.6

For lots of information about MacOS 7.6 and Rhapsody, a virtual visit to Apple's own web site is an excellent idea. The only downside is the number and size of the graphics images used — users of 14.4 and 28.8K modems should surf early on Sunday mornings!

**W** <http://www.macos.apple.com/>

once, hold down the Shift key before clicking on them. Often, it is easier to drag-select lots of files and then shift-click to remove the ones that you don't want.

### • COMMAND KEY

The Command key is the one with either an Apple logo, a four-leaf clover symbol, or both on it.

To see the folder hierarchy for a window, hold down the Command key and click in the title bar of the window. A pop-up menu will show the nested folders and allow you to navigate back up through them.

To rebuild the Desktop (this can cure some minor problems): hold down the Command and the Option keys when the computer boots up.

SOS

## TIP OF THE MONTH

As a heavy mouse user, I've a piece of advice that I give often enough to count as a tip: replace your mouse and mouse mat regularly. I've seen people struggle on with a mouse that no amount of cleaning will fix, and a mouse mat that adds more fluff and dirt each time the mouse moves across it. Now is a good time to assess your essential rodent and take action!

Having used many different varieties (breeds?) of mice over the years, I've settled on the standard Apple Desktop Bus Mouse II. After a difficult time a couple of years ago when Apple ill-advisedly tried to reduce the weight of the ball itself, all has been restored and it now offers the best compromise of price, performance and ease of use. The micro-switch does need some initial playing in, rather like a guitar string, but after that it's fine. It's the mechanics of the ball movement that tend to die, not the microswitch, although with long-term frantic clicking, the action does tend to become very light.

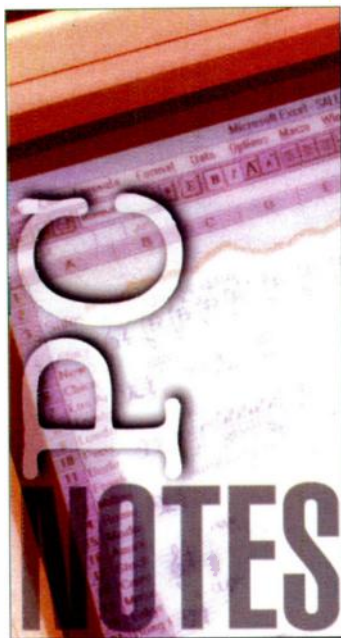
You can clean a mouse in two ways: via the rotating user access cover; or by disassembling the mouse itself. Although it's sometimes possible to remove quite a lot of the fluff and muck that accumulates on the rollers without opening the whole thing up, there's no substitute for really good access. Opening a Bus Mouse II requires you to find the small cross-head self-

tapping screw (some models have two screws) which is concealed underneath the self-adhesive plastic label near the head or front part of the mouse.

Mouse mats come basically in two varieties: with a fabric top and with a plastic top. Those with fabric tops have good grip, but they shed lint and are hard to clean; the fabric will eventually fray and unstick from the rubber, and you need to remember to throw them away when the grime becomes too bad. The plastic-topped variety are easier to clean, but the sharp edges can annoy hands and they tend to suffer from accidental damage when something gets dropped onto them — the plastic deforms and is then almost unusable.

There is a third type which isn't usually commercially available, and it's actually a variation on the underlying rubber itself. Electronics engineers use a special type of rubber sheeting which has a built-in conductive layer designed to prevent damage to chips from static electricity. The top surface of this sheeting is tough and rippled, rendering it extremely mouse-hostile, but the bottom layer is a soft, dense vinyl foam which has a smooth surface which is ideal for a mouse to live on: split apart the special anti-static sheeting and you can use just the lower foam layer upside-down. It works perfectly with most mice, and is rugged and very hard-wearing. But I've never seen a commercial mouse-mat made using it!

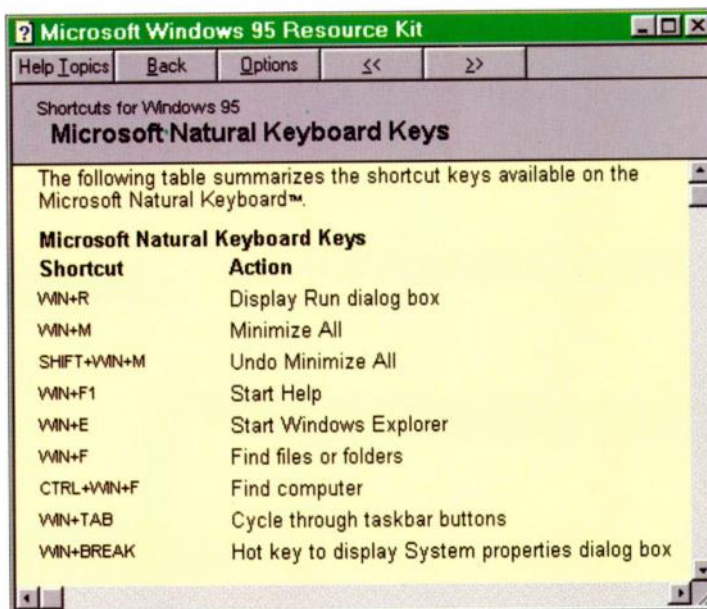




**Taking over the PC Notes hot seat, MARTIN WALKER looks at the future of PC audio, and exposes a few problem areas for soundcards.**

**D**uring April, San Francisco will be hosting the Windows Hardware Engineering Conference (WinHEC), and one item on the agenda is the way forward for a new PC sound hardware standard. All software developers are heartily sick of having to cope with the support problems caused by running the dozens of different soundcards available for PCs; without a standard, few manufacturers are prepared to go out on a limb to support the PCI buss. The biggest problem is that mainstream PC audio is still largely driven by the games market, and this means maintaining SoundBlaster compatibility, as well as supporting the ageing ISA buss. Creative Labs were the first company to combine FM synthesis (as previously used by Adlib) and sampled capability. All subsequent cards, whatever their individual strengths, stood or fell by whether you could use them with games, and this meant compatibility with (or at least emulation of) SoundBlaster.

In June 1996, a group of companies including Intel, Creative Labs and Yamaha announced support for an audio component specification. The specification of AC97 was designed to ease the transition of audio onto the PCI buss, and was expected to result in products appearing in the second half of 1997. It demands a 20Hz-20,000Hz frequency response, a minimum 75dB signal-to-noise ratio and THD (total harmonic distortion) of 0.02% maximum. Most significantly, the spec involves a two-chip design, separating the analogue and



*If you have one of the Windows 95 keyboards (with the two extra windows keys either side of the space bar), you may not have come across the extra keyboard shortcuts that make life just that little bit easier. I use 'Win E' all the time to bring up Explorer. Here's the complete list for you to try out.*

digital parts of the audio circuitry. The digital controller handles the movement of audio data across the PCI buss, and the audio codec (compression/decompression) chip converts the digital audio stream back into an analogue waveform. The two devices are connected via a 5-wire serial buss.

The beauty of the two-chip approach is that the audio chip can be kept well away from electrically noisy circuitry, giving potential signal-to-noise ratios of around 90dB, even if it's incorporated onto the motherboard. However, high-end manufacturers would like to use the Universal Serial Buss (USB) or the IEEE1394 (Firewire) buss instead of the AC97's proposed 5-wire serial solution, as these would allow the digital audio to be sent to external peripherals. Unfortunately, this pioneering attitude is not shared by mainstream manufacturers, who are



*Included with Microsoft's Power Toys (which is free, and found on nearly every 'free' CD-ROM attached to a computer magazine) is QuickRes, which can be invaluable for musicians. Once installed, it shows up as an extra icon on the right-hand end of the Taskbar, as seen here.*

only interested in smoothing the transition to the PCI buss. All we can hope is that WinHEC will thrash out the details and resolve the SoundBlaster question, so that everybody can get on with producing a range of PCI soundcards that will finally improve the tarnished image of PC audio.

**SOUNDCARDS AND UNSOUND CARDS**

You may have noticed several reports in SOS over the last few months of musicians with a PC and soundcard that refuse to work together. In

an effort to help those in trouble on the PC, I intend to cover problem areas on this page — not from individuals, I hasten to add, since manufacturers' help lines and email facilities are the best way to address these (that saved the postman from a hernia!), but known problems that have been acknowledged by the manufacturer, along with any fixes or advice that are available.

To kick off, Digidesign have had a lot of problems with their Audiomedia III card and PC motherboards that use PCI Burst mode — this isn't the burst rate of hard disk drives, nor the DRAM Burst read and writes used by EDO RAM, but the way that data is addressed via the PCI buss. In Burst mode, large amounts of data can pass between the CPU and a PCI card in one continuous... well, burst. To avoid inexplicable clicks or DAE errors, Digidesign instruct all Audiomedia III users to disable PCI Burst mode via the BIOS. I can't help thinking that, whatever the performance boost, asking users to delve into BIOS settings may be asking for trouble, as changing some settings other than this one can stop your PC booting up at all. Besides, disabling PCI Burst mode to achieve better performance with the Audiomedia III would seem to compromise all other areas of PCI hardware performance, including graphics cards and SCSI host adapters.

The problem is compounded if your PC has the Triton 430HX, 430VX, or 440VX chip sets (and these account for most bought nowadays), since it's more than likely that a setting to disable PCI Burst mode will not be available in your BIOS, and in this case the Audiomedia III card will NOT work properly with your computer. Have a look at the Audiomedia III FAQ internet page (<http://www.digidesign.com/>) to see details of likely problems caused by PCI Burst mode. Digidesign are currently finalising a chip upgrade that addresses this, and, to quote from their web site: "The PCI Burst Mode Upgrade should be available no later than 31



March 1997. The modification is FREE within the first 45 days of ownership or during the initial 45 days of availability from Digidesign. After the initial 45 days, the cost is \$59 for those customers who wish to modify their card for increased compatibility."

In essence, this means that it's up to you to contact Digidesign Technical Support and get your name on the list for a free upgrade. When this new chip arrives, they'll contact you so that you can send your Audiomedia III card back for the upgrade. The chip will not add any extra performance or features to the card: all it does is enable the card to work with those PCs that cannot disable PCI Burst mode — so if yours works anyway, please don't clog up the system for those people who have genuine problems. All credit to Digidesign for managing to resolve this issue once and for all, we hope — their product support lines will probably get rather quieter as a result!

The second subject on the problem agenda is one about which I knew little until very recently: incompatibilities

*MIDImon is a handy freeware program which monitors MIDI information, and can be very useful if you are trying to figure out just exactly what data is emerging from a keyboard or module. You can find it on the net at: <http://www.harmony-central.com/Software/Windows/>, and it's only 34k in size!*

between hardware or software and certain processors. Back in December I upgraded my PC and, among many other improvements, it now includes a Cyrix 166+ processor. You can pick one of these up from a mail-order retailer nowadays for about £120 inc VAT, whereas a straight Pentium P166 is more like £250, and

Properties for Display About QuickRes
640x480 256 color
800x600 256 color
✓ 1024x768 256 color
640x480 HiColor (16 bit)
800x600 HiColor (16 bit)
640x480 TrueColor (24 bit)

*If you right-click with the mouse on the QuickRes icon (see opposite page) this menu appears, allowing you to change the resolution of your screen display 'on the fly', rather than altering it in Control Panel and then re-booting the PC. Many musicians prefer to use 800 x 600 displays for most purposes, but for sequencing 1024 x 768 allows you to see far more data. If you use QuickRes, it only takes a couple of seconds to switch between them.*

File	Options	Filter	Stop	Clear					
TIMESTAMP	PORT	STATUS	DATA1	DATA2	CHAN	NOTE	EVENT		
000183E0	2	D0	6C	---	1	---	Channel Aft		
000183EE	2	D0	26	---	1	---	Channel Aft		
000183FC	2	D0	00	---	1	---	Channel Aft		
00018442	2	80	4D	40	1	F 5	Note Off		
00018BEA	2	B0	40	7F	1	---	Control Change		
00018ED2	2	B0	40	00	1	---	Control Change		
00019157	2	90	40	22	1	E 4	Note On		
000193FD	2	80	40	40	1	E 4	Note Off		
00019C00	2	90	3E	2E	1	D 4	Note On		
00019D5E	2	80	3E	40	1	D 4	Note Off		

the Pentium MMX 166 is currently even more, at £370. The Cyrix P166+ is generally held to out-perform the equivalent Pentium P166 (non-MMX) in the speed stakes, by up to 10% in many areas. Its only weakness is in its floating-point performance, which in normal use doesn't usually matter a great deal, but does of course have an effect on the final performance of audio number-crunching programs such as *Sound Forge* and *WaveLab*, which use a lot of floating-point maths. However, I heard a few days ago that certain

software/hardware combinations refuse point blank to work with a Cyrix processor. The new AWE64 card from Creative Labs works fine, but its WaveSynth/WG will only run with genuine Intel Pentium or AMD processors, despite the best efforts of CL to produce a software patch. Apparently Cyrix have acknowledged the problem, and say that it will be addressed in the next upgrade, but this isn't a lot of use if you've just bought a P166+ or an AWE64. I'll be reporting any other processor/software incompatibilities that I come across in my travels.

## QUIET PLEASE!

Papst Variofans have already been mentioned in *SOS*, in my roundup of PC utilities (see last issue), and fitting these as replacements for the cheap and cheerful fans inside PCs will give

you a significant reduction in noise level. If you have tried this successfully, and want to achieve an even quieter machine, the likely cause of remaining noise is the sheet metal casing itself, thrumming along to the vibration from the hard disk. Try tapping the side panels lightly — they will probably sound like drums (you could always try sampling them!). If you are the tweaky type, you could try re-attaching the drives via rubber grommets, but it's often difficult to get at them without completely dismantling the PC, and you may still find studio monitors 'setting off' your case at certain frequencies. In fact, contrary to what you might think, removing the cover often makes the computer quieter, simply because there's then less to vibrate in sympathy. A very cheap way to cure the problem once and for all is to attach a self-adhesive bitumastic sound deadening pad to each side panel (on the inside!). These have been used for years to deaden vibration in cars for a quieter ride, although it's difficult to find them in car accessory shops nowadays. I got some from Russ Andrews, who runs a company specialising in audiophile accessories (RATA Ltd, on 01539 823247). At only £2.47 each including VAT, they are well worth a try, and it's easier than building your PC into a cupboard!

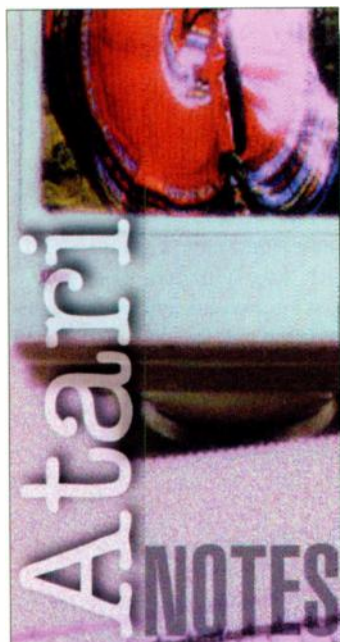
## IN THE PIPELINE

Back in the October '96 issue of *SOS* I was waiting with bated breath for the PC version of Akai's *MESA* software to appear, to enable me to save all of my samples on a PC SCSI drive. Well, I'm still waiting! Akai UK say that they now hope to release *PC Mesa* in May or June some time, but it seems likely that, as its size has increased considerably (isn't this always the case?), it will come as a full package on CD-ROM rather than being downloadable from the web site, as many people previously imagined.

Sonic Foundry are still busy working on two plug-ins for *Sound Forge*. *CD Architect* will allow you to write Red-Book audio to a recordable CD, with extensive support for PQ editing, as well as instantaneous crossfades between files. Most

popular CD recorders will be supported. Sonic Foundry hope to ship it in mid-May (no UK price has been set yet). Being able to stay within *Sound Forge* when assembling CDs could be a dream come true for a lot of people! The second plug-in is *Acoustics Modeler* (sic), and this takes a rather different approach to providing ambience or reverberation, by adding an 'acoustic signature'. After measuring the acoustics of a particular concert hall, or even the response from a vintage tube microphone, the software creates a signature file. This can then be mapped onto a sound file, effectively simulating how your file would sound in that environment. The program is claimed to have stereo imaging and realism that are uncanny. A Signature library will be included, or you can collect and save your own. I'll provide shipping dates and price details as soon as I have them.





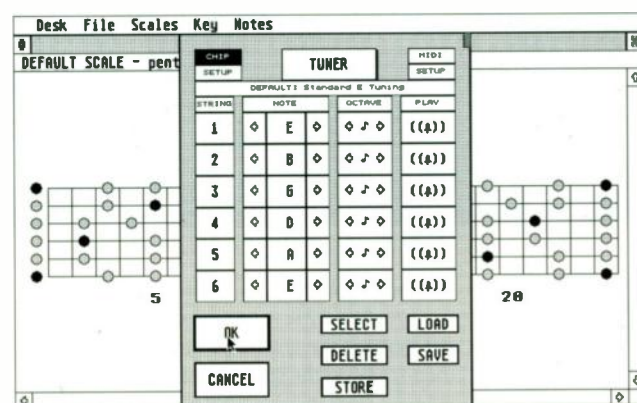
**DEREK JOHNSON keeps the Atari flag flying with tidings of some hardware add-ons for both Falcon and ST, plus a neat freeware package that turns your Atari into a guitar tuner...**

This month I'm kicking off with news of some new Falcon- and Atari-compatible hardware. Chris Krowchuk of Computer Direct (the Canadian Atari mail-order specialists) got in touch recently to let us know that their web site's URL, which we published a few months ago, has changed (to <http://www.compdirect.com>), but Chris also informed us of a couple of new Falcon products from Line Audio Designs, who are producing a range of audio add-ons for the Atari and C-Lab Falcons, all of which are compatible with various audio recording software, such as Steinberg's *Cubase Audio* and Emagic's *Logic Audio*.

First up is the Jam In 8, which lets your Falcon record eight individual analogue sources direct to disk simultaneously, while the Jam Out 8 provides

eight low-noise, low-distortion audio outs, using 18-bit convertors. Jam Out 8 also features a 'pass thru' DSP plug for expandable daisy-chaining of additional Falcon DSP peripherals. Next, there's the Jam 8 Pro, a 19-inch rack version of the Jam Out 8, designed for professional studio installations; an optional Jam In 8 card will allow for eight ins and eight outs in one convenient package. Lastly, Line Audio Designs' Jam Sample Clocks, used with the Falcon's DSP port, clocks the Falcon to standard sample frequencies; it works with programs that use external clock (44.1kHz or 48kHz versions are available), such as *Cubase Audio*. Info is available on the Computer Direct web site, where Line Audio Design have their own page ([http://www.compdirect.com/line\\_audio/](http://www.compdirect.com/line_audio/)), although System Solutions are now distributing these expanders in the UK. System Solutions' mail order location is Windsor Business Centre, Vansittart Road, Windsor, Berks SL4 1SE. Telephone 01753 832212, fax 01753 830344 (or visit their web site. at <http://www.ssolutions.com/>).

System Solutions is also the place to go for a nifty dongle expander. This was never a particularly common piece of hardware, even in the ST's heyday, but it's a useful tool if you're irritated by having to change dongles when



*The Guitar Reference.*

moving between software. The Cartmaster, priced at £99, accommodates up four dongles, and comes with configuration software.

### TITAN THROWS WEIGHT BEHIND FALCON

To return to the Falcon family for a moment, Titan Designs are specialising in supporting the platform. While their endeavours appear to favour the graphics capabilities of this machine, with hardware and manipulation software galore, I'm sure many of the hardware and software options they can supply would be of interest to any Falcon user. For example, BSS' *Debug*, "the only true Falcon debugger" has now been upgraded for full compatibility with the *MagiC* operating system and the *Afterburner040* accelerator. Titan also stock a range of SCSI hard drives and CD-ROM drives, plus monitors and CD-ROM discs. You can visit their website (<http://ourworld.compuserve.com/homepages/titanweb/>) to get a feeling for what they have to offer, or contact them more conventionally at: 6 Witherford Way, Selly Oak,

### GOING DUTCH

If you've ever felt the urge to play someone's MIDI gear long-distance, a simple piece of Dutch shareware software will do the trick: *ChatMIDI* lets you send MIDI data over a phone, using a modem. A two-way split screen also allows the connected Atari owners to type messages to each other. The software works better the faster your modem is, and the simpler your MIDI stream is (real-time messages are filtered completely). I found *ChatMIDI* at the mighty Shareware Music Machine (<http://www.hitsquad.com/smm/midi/10000154.html/>), but it can be located at a variety of other sites.

Birmingham B29 4AX. Telephone 0121 693 6669, fax 0121 414 1630, email 100345.2350@compuserve.com.

### MORE STRINGS TO YOUR ATARI

Guitar-playing Atari owners aren't exactly drowning in software, so *The Guitar Reference*, by one Alan Richardson, should be welcome. This is a highly useful and well-programmed piece of software that provides both scale and tuning references, with the tuning reference section actually able to give an audio output via the Atari's soundchip or over MIDI — basically

giving you an on-screen guitar tuner. The software has a database of 46 alternative tunings, and you can also devise (and save to disk) your own.

*The Guitar Reference* also features a database of 57 scale types, with options for the user to customise and save their own. Scales are displayed on screen, with a variety of zoom levels, and you can choose whether diamonds, circles or note names are used to

indicate note positions on the on-screen fretboard. It's a doddle to edit or create new scales, and they can just as easily be transposed into different keys, with root notes clearly indicated. There is no audio playback in the scale window, but the idea is that you play the scale on your guitar, so this isn't a problem.

The most amazing thing is that although *The Guitar Reference* started life as shareware, it's now freeware. This is a shame, because it would be nice to know that the author was getting some kind of financial payback for his work. But I'm all too aware that most users are not well known for honouring their shareware commitments. Incidentally, the software has been tested on an STFM, an STE and a Falcon. It's possible to locate *The Guitar Reference* on a number of ftp sites; you can find a full description at <http://www.wmin.ac.uk/~richara/guitarref.htm>, which provides a link to Hensa. But be warned, as usual, that since this is an educational site it's closed to non-academic visitors between 8am and 8pm UK time.

### SHOWTIME

We mentioned them last month, but don't forget the three Atari shows during April and May: Saturday 26th April at the Compton Suite in Birmingham's Motor Cycle Museum; Sunday April 27th at the Kew, Syon and Hampton Suites of London's Osterley Hotel; and Sunday 11th May at the Kintyre Suite of the Quality Central Hotel in Glasgow. All shows run from 10am to 5pm, and tickets are £5 for adults before 2pm, £3 after 2pm, and £1 for under 16s, all day. Special family deals are also available. Goodman International are running the shows (telephone 01782 335650, fax 01782 316132).



**ALESIS**

# NanoSeries

*New!*

Actual Size



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



The NanoVerb is an 18-bit digital stereo effects unit featuring 16 of Alesis' best effects including lush halls, plates, room reverb, rich true stereo chorus, flange, delay and rotary speaker simulation. The NanoVerb gives you professional quality effects in an easy-to-use, affordable package.

*What will they think of next?*

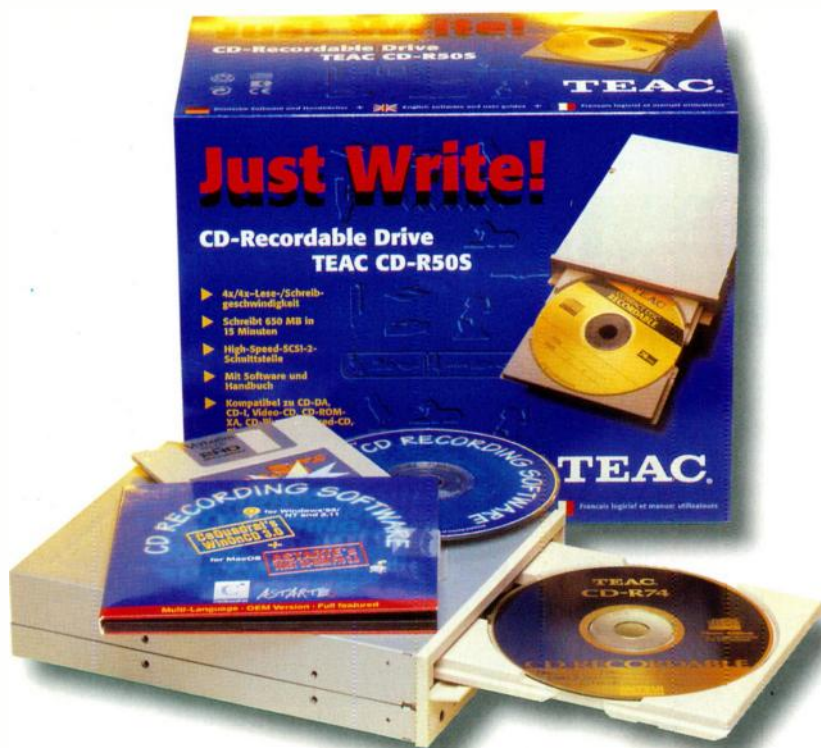
*The 64-voice polyphonic, 16-part multi-timbral NanoSynthesizer?!*

**For free colour NanoSeries brochures call  
Sound Technology on 01462 480000**



Sound Technology plc, Letchworth Point, Letchworth, Hertfordshire. SG6 1ND  
Fax: 01462 480800 More info on our Web site: <http://www.soundtech.co.uk>





*Mac CD-writing has a head start over the PC, but recent arrivals like the Teac CD-R50S come with both Mac and PC CD software as standard. MARTIN WALKER plugs one in to see if writing your own CD is as easy as people make out.*

# Write One!

**M**ost people thinking of buying a CD-R machine fall into one of two categories — those who think you just plug it in, switch it on, and start churning out loads of CDs, and those who have read so many horror stories about CDs burned on one machine which refuse to play on any other, or which refuse to reliably write with all but one make of blank discs, that they prefer to avoid the issue until the situation improves. Although CD-R technology had many teething problems, and as recently as six months ago incompatibilities caused a lot of heartache for some people, CD-Rs are now not only comparatively easy to use, but extremely reliable too. Part of the problem has been that some manufacturers have over-simplified the use of CD writers, promoting them as some sort of super floppy drive — “just plug it in and back up 650Mb of your data, make your own audio CDs...”. In reality, the expression “recording a CD” is a gross simplification of the processes involved. Unlike the glass master used in commercial CD replication, CD-Rs use a blank disc that already has a spiral track groove which guides the laser. During the write process, once the laser is moving along this groove and heating up the surface of the disc, any interruption to the flow of data will result in an error — and you only get one chance to burn a CD-R. A single error will result in an unuseable disc. Maintaining a smooth flow of data is vital, and this is why just having a fast CD-R machine is not enough: you ideally also need a fast hard drive, SCSI interface, and well

written software. In fact, the faster the CD writer, the more powerful the PC needed to maintain the data flow.

There are a wide variety of formats encompassing the many uses of CD-R (see ‘All the Colours of the Rainbow’ box). Most musicians will, of course, be mainly interested in CD Audio (also known as CD-DA). It’s easy enough to grasp that with most software you need a complete image of the CD inside your computer, and then once the PQ codes have been added, which tell audio CD players where each track starts, the software simply transfers this complete image to a blank CD — and Bob’s your uncle. However, anyone who read Mike Collins’ comprehensive feature on Mac CD Mastering (May 96 issue), and his update, ‘Disc-O-Tech’ (March 1997 issue), will already know that with some software it can be a rigmarole setting these PQ codes. Often the only way of separating two tracks is by having a default two seconds of silence inserted between them. If you ever want to do something like cross-fade between two tracks, this can often involve lots of workarounds, such as leaping in and

## TEAC CD-R50S CD-WRITER

out of different pieces of software.

Another extremely important area for CD-R technology is that of data backup. Anyone who has ever had a hard disk crash, or a floppy disk retire to that great disk box in the sky will know that there is nothing more frustrating than losing data. Many businesses (and a few musicians) employ dedicated tape backup drives, using either computer DAT tapes or other proprietary tape-cartridge media. Although these are well proven in the computer field (and, of course, the tapes can be re-used time and time again), the main advantages of CD archives are their random access (no more waiting for an hour to scan the contents of an entire backup to access a single file), and their fixed nature (no more accidental wiping by someone who thought they were using a blank tape). Keeping regular backups on CD can also be far more secure than using any form of magnetic disk or tape, which can be affected by stray magnetic fields from unshielded loudspeakers and the like. The CD-R must be top of the list for the musician archiving any form of data that’s not likely to change, such as audio samples, or one-off copies of albums.

### DRIVE TIME

The Teac CD-R50S is supplied as a bare drive, ready for fitting into a standard PC 5.25-inch drive bay (or into a Mac — see box). For about £60 more, you can get it in the CD-R50SK (kit) version, which also has software for both PC and Mac (on a single dual-



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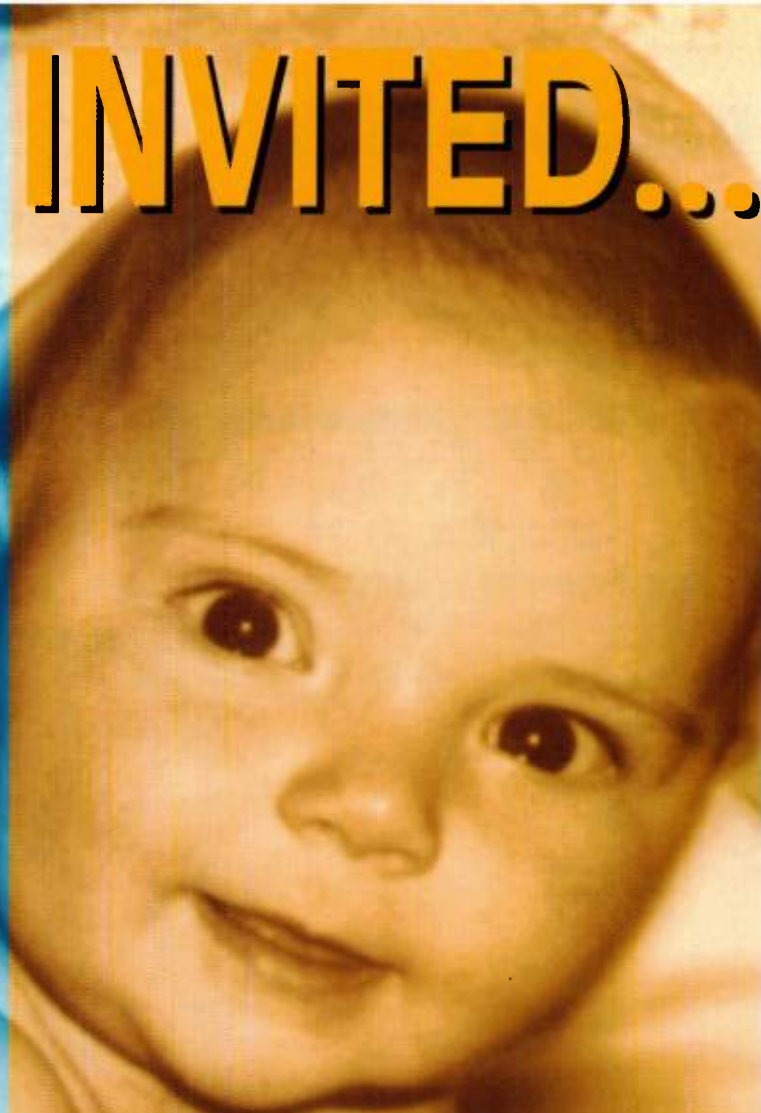
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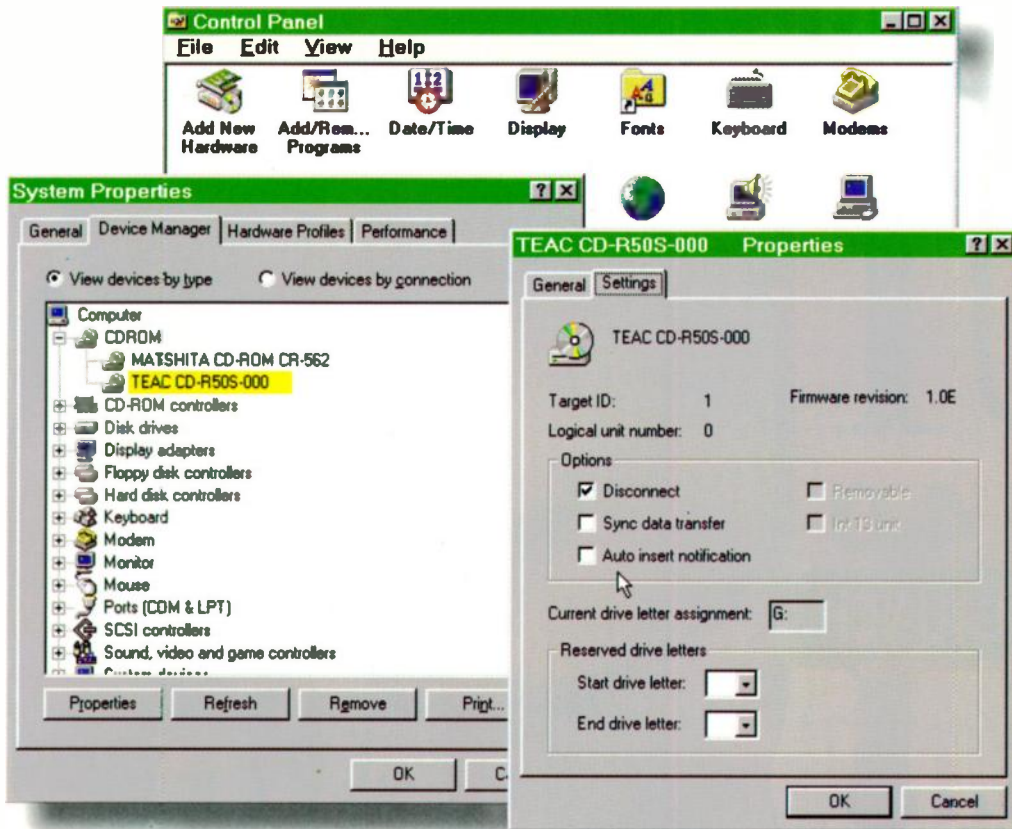
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# Teac CD-R50S

► format CD-ROM) along with a PC floppy (holding additional drivers), audio and data cables and screws. It is a SCSI device, and although this means that you need a SCSI host adapter card inside your PC, bear in mind that a SCSI drive can also be connected

Figure 1: Before trying to write a CD-R disc on your PC, check these options for the correct settings.



writing side is also 4-speed, and this means that a typical hour-long audio CD can be written in about 15 minutes — any faster and you would need a pretty expensive PC system to supply the data fast enough to ensure smooth operation. Most modern

CD writers have a memory buffer to ensure that they can cope with brief hiccups in data flow, and the Teac comes with 1Mb, which is fairly standard on a drive of this calibre. To keep a steady flow of data when writing a CD at 4x speed (600Kb/second), a 1Mb buffer will cope with an interruption of 1Mb/600Kb, or 1.7 seconds. If your computer or hard drive cannot manage this, it's better to write at double speed to give everything more time to cope (up to 3.4 seconds interruption).

The supplied software for PC is CeQuadrat's *WinOnCD v3.0* (see

“Higher powered lasers capable of writing CDs are heavier, and cannot move as speedily as

those in read-only CD players, so 4-speed playback is good going for a CD-R.”

to most samplers for accessing CD-ROM libraries. The Adaptec AVA-1505 card is often recommended for PC use, and will cost you about £45 (see my 'Drive Time' feature in the February issue for more details on choosing a SCSI card).

After connecting up the new drive, and checking that the default SCSI ID of 2 did not conflict with any other device in my system, I rebooted the PC with no problems, and the drive showed up correctly as an additional device in Windows 95. The first thing most people will do is to open and close the drive door, but I should warn you that it retracts rather smartly — make sure your fingers don't get in the way! Front-panel controls include the normal eject button, 3.5mm headphone socket and thumbwheel volume control, and two LEDs that indicate power and busy. For pristine sampling, the Teac allows you to extract the digital data from audio CDs (not all drives do), and this is a definite plus point, although I didn't have an opportunity to check out this feature personally.

The drive has 4-speed playback (600Kb/sec) when in use as a CD-ROM player, which is not 'state-of-the-art', but the higher-powered lasers capable of writing CDs are heavier, and cannot move as speedily as those in read-only CD players, so 4-speed playback is good going for a CD-R. The big plus is that the

review later), and this comes on a dual-format CD-ROM, which also contains *Toast CD-ROM Pro v3.0* for Mac use. On the PC, running the install.exe file (which will happen automatically on loading the CD if you have 'auto-insert notification' enabled) also prompts you to insert the supplied floppy disk with extra PC drivers (the Mac software is self-contained). Ironically, when you first run the *WinOnCD* software, the first thing it does is suggest that 'Auto-insert notification' be switched off, and offers to do it for you. This is because otherwise the drive will periodically check to see if you have inserted a new CD, with potentially disastrous consequences if you're in the middle of burning your 74-minute masterpiece! There are several options in the CD-ROM section of Device Manager that need to be checked. The 'Disconnect' option

## pros & cons

### TEAC CD-R50S £480

#### pros

- 4-speed CD writing is as fast as they come.
- Low processor overhead when used as 4-speed CD-ROM drive.
- Good quality audio CD player.

#### cons

- Incomplete *WinOnCD* help file.
- No fault-finding guidance in *WinOnCD* documentation.

#### summary

The CD-R50S is a good all-round drive, not just a CD writer. If you need to write more than a few CDs, its 4-speed operation will save a lot of time. The combined *WinOnCD 3.0/Toast CD-ROM Pro 3.0* software for both platforms works out at only £60 more when bought with the kit version, and so is excellent value.

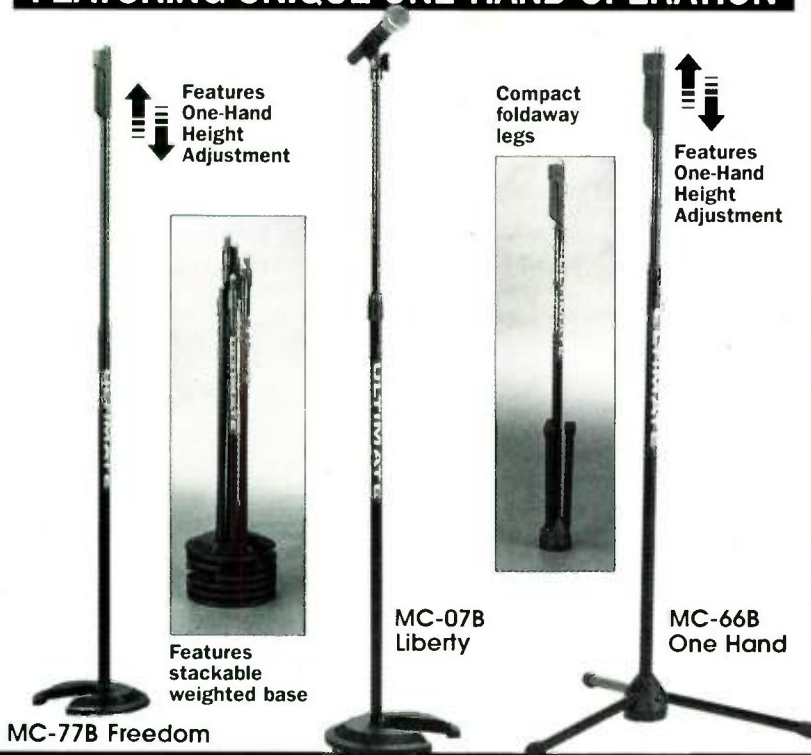
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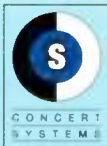
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## CD RELIABILITY

The basic measure of quality used by most commercial CD pressing plants is BLER (not the band, but BLock Error Rate). All CDs play back with some errors (and incorporate extra data and error correction to recover from these), but in the case of CD writers the number of errors gives an indication of drive quality, or bad or dirty media. Most modern drives, including the CD-R50S, now have very low BLER levels. The problems with CDs burnt on one machine not playing back on another are largely caused by another phenomenon known as 'pit jitter' — the pits burned by the laser of the CD writer vary in length from 3 to 11 channel bits, known as 3T, 4T and so on. An ideal disc should have all pits of a particular value exactly the same length. Any variation is known as jitter. CD-ROM drives differ in their ability to cope with a jittery signal, and this can cause problems with playing back CDs recorded with high levels of jitter on some other drives. Thankfully, the CD-R50S has extremely low jitter levels. The final element to examine is that of the media itself. Although some manufacturers (notably Plasmon) design drives that can self-calibrate to use any brand of media, most recommend specific types, since the laser power needed may vary from brand to brand. Teac recommend MTC (Mitsui), Kodak, TDK, TY, Mitsubishi, Ricoh, Hitachi, and Pioneer. This should be enough varieties for anyone!

▶ must be on, because this controls whether the drive can disconnect itself from the SCSI buss while it is performing a lengthy operation, allowing another device to use the buss. The Sync option must be turned off as, although Synchronous data transfer is faster for normal purposes, the alternative Asynchronous transfer waits for an acknowledgement after each packet of data has been sent before sending any more, and this is vital; in normal use it's possible to retry after an error, but when writing a CD-R it's better to be safe than sorry. Figure 1 (see page 216) shows the best settings to use.

Various other points need to be checked before you try burning your first CD. You first need to make sure that there are no programs that may kick in during the duration of the write process. Programs to disable include screen savers (likely to start up after several minutes of keyboard inactivity) and, in my case, the Power Management option that powers down my removable Syquest drive after 15 minutes with no drive activity. Even thermal calibration (periodic pauses by the disk drive to adjust for possible changes in temperature) can stop a drive for a second or more unless an AV type of drive is used. Any unintended interruption such as this may just be enough to cause the dreaded 'buffer underrun', which basically means that your CD has just turned into an attractive coaster for your coffee mug.

## PREPARING FOR THE BIG MOMENT

The supplied version of CeQuadrat's *WinOnCD* has a host of features, and is easy to use for most data applications, but for CD audio I did encounter some problems on the first run-through. In the absence of a printed manual, I had a good read through the help file, with particular attention to the CD audio section. I assembled a single 650Mb WAV file in *Sound Forge*, containing seven tracks, adjusted the positions of all the track starts, and the length of silence between each track, even crossfading between two tracks. I then noted down all the exact

“Keeping regular backups on CD can be far more secure than using any form of magnetic disk or tape, which can be affected by other stray magnetic fields.”

start points and loaded the file into *WinOnCD*. No doubt most people will assemble a set of separate tracks, so that each start point requires no further editing, but with a composite file you select a portion of the waveform display, and then right-click to bring up the Insert Track menu, so that you can point to the beginning of each track.

I expected to be able to zoom in, click on the desired start point, and insert a new track start, but the software insisted that I chose a section of any arbitrary length before it would accept the track, seemingly simply to extract the start point (this has been solved in the newer version of the software, and I'll enlarge on this later). However, despite the fact that I had perfect start points for each track noted down from *Sound Forge*, they kept adjusting themselves after I entered them into *WinOnCD*, putting the start points slightly after the beginning of the first note in the track. I finally worked out that because CDs are written in data blocks of 2532 bytes, track starts are forced to the start of the next block. Time Format can be changed from samples to milliseconds or blocks, so I switched to adjusting each start point by entering block points rather than invalid sample points, and this

stopped them jumping to new positions. Once I'd worked all this out, the whole process was quick and fairly easy, but there was a lot of head scratching at first.

When I started to write my first audio CD, the software tried to create a new set of RAW files (totalling another 650Mb) as an image file. Since I didn't have a further 650Mb of space on my hard disk, I chose to write 'on the fly' from my existing file, and immediately received an error message. The problem was swiftly sorted out by Teac, and occurred because the review unit needed updating to the current firmware version, and I was soon up and running again. However, the error message prompted me to look in the troubleshooting section of the *WinOnCD* manual. This turned out to be telephone, fax or email contacts for ▶

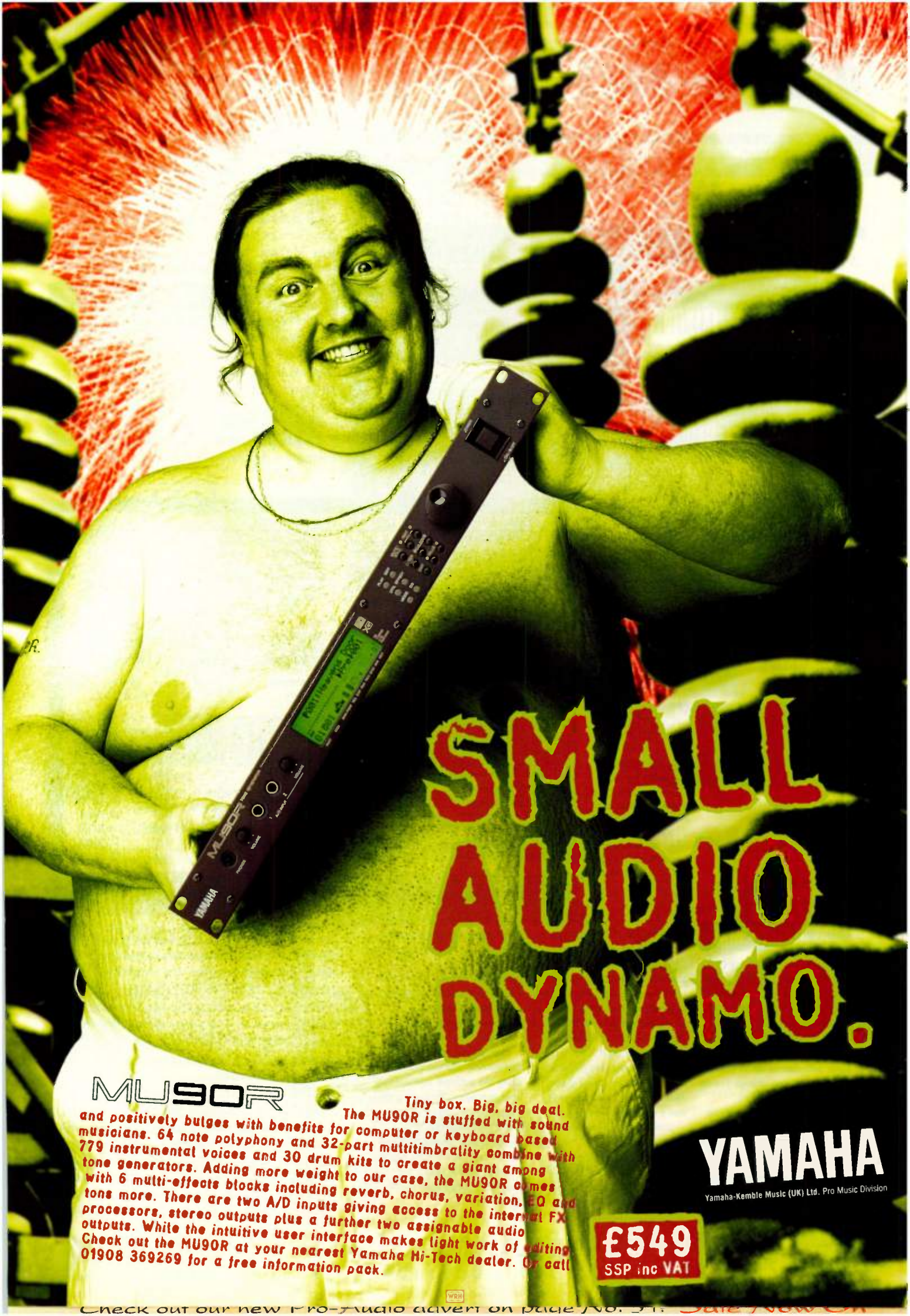
## SESSION PLAYERS

There are several ways to approach the actual CD recording process. For CD-ROMs, the easiest way is 'Track-at-once', which allows you to write each track separately, the big advantage being that you don't need a complete image of the full CD (which may be up to 650Mb) held on your hard drive. The disadvantage is that, for each track a run-in and run-out sector is written by the laser as it starts and stops writing. For data purposes this makes little difference, but if you're writing an audio CD it will play back as a slight 'click', and always produces two seconds of silence after each track, as well as causing errors at mastering houses if you try to use a disc written in this way to master audio CDs. Some earlier CD recorders permit *only* this mode, and this is why older CD-R software adopts such an approach. To avoid the above problems, the 'Disc-at-once' mode should be used if available. This, as its name suggests, writes the whole disc in one go, and since the laser never stops during the

procedure, no extra sectors are written. The result is a click-free audio CD, and much more flexibility in the gaps between audio tracks. The *WinOnCD* software supplied with the CD-R50S allows 'Disc-at-once' mode, and therefore can produce Red Book audio CDs (see 'All the Colours of the Rainbow' box for details of CD standards).

A third type is known as 'Session-at-once', and this was first introduced for PhotoCDs, since it allows you to add further data to an existing disc, until it is full. Each session creates a new directory, in addition to the newly added data, which links to the one previously written, and then writes an updated version (some software then writes a new directory containing entries for everything now on the disc; other software just creates a link so that the fragmented directories are all available). Once again, most audio CD players will only recognise the first session, and computer operating systems have assorted responses — MS-DOS only sees the first session, Windows 95 sees only the last session.





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# Teac CD-R50S

Figure 4: Supplied with the latest version of WinOnCD 3.0, the SpeedoMeter gives your system speed a series of tests to determine how well the rest of your system will perform.



▶ also added. The software as originally supplied with the review Teac drive (version 3.00.145) is not as complete as this, so do check that you get the most up-to-date version. CeQuadrat's web site has driver updates, although you will need to download over 1Mb of zipped files.

Despite my initial troubles, and once I had the latest version of the software, *WinOnCD v3.0* proved easy enough to use, especially for simple assembling of CD-ROM discs. For audio use, it does a good basic job, and if you create your composite file in another application, such as *Sound Forge*, you can even crossfade between tracks. The *WinOnCD* help file/disk manual does need updating, but since this software retails elsewhere at £300, it's a bargain when bundled with the Teac CD-R50S.

## GOING FOR THE BURN

Once your data has been assembled ready for writing, it's simply a matter of clicking the right option, using whichever software is appropriate for your computer platform, and waiting for the

burn to be completed. Thankfully, most software (including both packages supplied with the Teac drive) allows you to emulate a write procedure, so you can check that your system can cope at the selected speed. If problems do occur, simply lower the speed (4x, 2x and single speeds are available) until you get a successful emulation, and then retry. You only really need to do this once with a particular hardware setup, and it could save wasted blanks. The latest version of *WinOnCD* includes a separate utility called *SpeedoMeter* (see screenshot) which tests your system speed and recommends suitable maximum settings, independent of the actual CD-R drive, giving you an idea of how much system power you have in hand.

## CONCLUSION

Once I had sorted my problems with *WinOnCD* and was using the latest version it was all plain sailing. For Mac owners, the supplied *Toast* seems to be the best choice for ease of use (see the 'I'm Alright Mac' box). The CD-R50S itself worked exactly as it should; the perfect CD writer is not exciting — it just gets on with the job reliably, and that's exactly what you want. I suspect that many studios may go for a 4-speed writer, simply because a full album can be burned in about a quarter of its playing time — ideal if you need to quickly produce a one-off copy for clients to take away with them — and if a 4-speed device is what you're after, this is a good one which also works well as a CD audio player and CD-ROM drive. What more can I say? **SOS**

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## ALL THE COLOURS OF THE RAINBOW

When you first start thinking about CD-R, the onslaught of specifications can be overwhelming. Each CD format has its standard technical specification, but it helps to put them into historical perspective.

- **Red Book (CD-DA):** This is the original spec agreed in 1982, and is for audio CDs (also known as CD-DA). For most musicians, Red Book is still the most important.
- **Yellow Book (CD-ROM):** In 1984, the data version of CD was introduced, but it was not ideal for the emerging

multimedia market who wanted the standard extended for audio and video.

- **Green Book (CD-I):** The extended Yellow Book version was agreed in 1987, and Compact Disc Interactive players subsequently appeared.
- **Orange Book (CD-R):** The Kodak Photo CD was the first to use 'write-once' technology, as well as allowing multiple sessions, so that more data could be added at later dates. In 1990, the definitions were laid down in the Orange Book, and are widely used for backing up data. In 1995, the new

CD-E (Erasable) discs were incorporated into version 3 of this standard.

- **White Book (VideoCD):** The White Book standard, for storing up to 70 minutes of video, was first defined in 1993, but was updated to version 2 in 1994, to make it more suitable for interactive video applications, rather than just linear video.
- **Blue Book (CD Extra, also known as CD plus):** This is a two-session CD, such as those found cover-mounted on some magazines. The first session is CD-DA, and the second is data. It was standardised in 1996, and resolved the problems caused on

some CD players when playing audio tracks. The new format is primarily an audio one, but allows any extra space on the CD to be used by interactive multimedia programs.

- **Rainbow:** Many CD-ROMs were produced with several areas, suitable for multiple platforms such as PC and Mac (and known as Hybrid CDs). The data track of such Hybrid CDs can also be packed on a CD-Extra disc. If additional CD-i data is placed on a CD-Extra, the disc can also be played back by audio CD players, PCs, Apple Macintosh computers, and CD-i players. This special kind of CD-Extra is called Rainbow CD.



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If you've been trusting the quality of your creative product to passive monitors, there's an astonishing revelation waiting for you. In our opinion, the active, biamplified HR824 is the most accurate near-field monitor available — so accurate that it essentially has no "sound" of its own. Rather, Mackie Designs' High Resolution Series™ HR824 is the first small monitor with power response so flat that it can serve as a completely neutral conductor for whatever signal you send it.



Mackie acoustic engineer David Bie uses scanning laser vibrometry to map HR824 tweeter dome vibrations.

Imaging and definition are compromised. The "sweet spot" gets very small.



Fig. C: Uneven fabric dome tweeter motion distorts high frequencies.

## SCIENCE NOT SNAKE OIL.

Internally-biamped, servo-controlled speakers aren't a new concept. But to keep the cost of such monitors reasonable, it's taken advances in measurement instrumentation, transducers, and electronics technology. In developing the HR Series, Mackie Designs sought out the most talented acoustic engineers and then made an enormous commitment to exotic technology. The HR824 is the result of painstaking research and money-is-no-object components, not to mention thousands of hours of listening tests and tens of thousands of dollars in tooling.

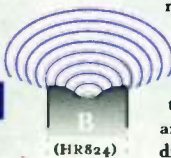
## FLAT RESPONSE. ON OR OFF-AXIS.

One of the first things you notice about the HR824 is the gigantic "sweet spot." The detailed sound field stays with you as you move back and forth across the console — and extends far enough behind you that musicians and producers can hear the same accurate playback.

The reason is our proprietary exponential high frequency wave guide. Without it, a monitor speaker tends to project critical high frequencies in a narrow beam (Fig. A) — while creating undesirable edge diffraction as sound waves interact with the edges of the speaker.

and a systems approach to make them work in near-field applications.

The HR824's wave guide (Fig. B) maximizes dispersion, time aligns the acoustic center of the HF transducer to the LF transducer's center, and avoids enclosure diffraction (notice that the monitor's face is perfectly smooth.) The exponential guide also increases low treble sensitivity, enabling the HF transducer to handle more power and produce flat response at high SPLs.



## CLEAN ARTICULATED BASS.

Seasoned recording engineers can't believe the HR824's controlled low bass extension. They hear low frequency accuracy that simply can't be achieved with passive speakers using external amplifiers. Why?

First, the HR824's FR Series 150-watt bass amplifier is directly coupled in a servo loop to the 8.75-inch mineral-filled polypropylene low frequency transducer.

It constantly monitors the LF unit's motional parameters and applies appropriate control and damping. An oversized magnet structure and extra-long voice coil lets the woofer achieve over 16 mm of cone excursion. Bass notes start and stop instantly, without "tubbiness."

Second, the HR824's low frequency driver is coupled to a pair of aluminum mass-loaded, acoustic-insulated 6.5-inch passive drivers. These ultra-rigid drivers eliminate problems like vent noise, power compression, and low frequency distortion — and couple much more effectively with the control room's air mass. They achieve the equivalent radiating area of a 12-inch woofer cone, allowing the HR824 to deliver FLAT response to 42Hz with a 38Hz, 3dB-down point.

Third, the woofer enclosure is air-displaced with high-density adiabatic foam. It damps internal midrange reflections so they can't bleed back through the LF trans-

ducer cone and reach your ears. The typical problem of small-monitor midrange "boxiness" is eliminated.

## A TRUE PISTONIC HIGH-FREQUENCY RADIATOR.

We scoured the earth for the finest high frequency transducers and then subjected them to rigorous evaluation. One test, scanning laser vibrometry, gives a true picture of surface vibration patterns. Two test results are shown in



The Mackie HR824 Active Monitor.  $\pm 1.5$ dB from 42 to 20kHz.

the upper right hand corner of this ad. Figure C is a conventional fabric dome tweeter in motion. You needn't be an acoustic engineer to see that the dome is NOT behaving as a true piston.

Figure D shows our High Resolution metal alloy dome at the same frequency. It acts as a rigid piston up to 22kHz, delivering pristine, uncolored treble output that reproduces exactly what you're recording.

## INDIVIDUALLY OPTIMIZED.

We precisely match each transducer's actual output via electronic adjustments. During final assembly, each HR824 is carefully hand-trimmed to  $\pm 1.5$ dB, 42Hz-20kHz. As proof, each monitor comes certified with its own serialized, guaranteed frequency response printout.

The HR824's front board has "radiused" edges to further eliminate diffraction; an "H" brace bisects the enclosure for extra rigidity.

Fig. D: HR824 alloy dome's uniform, accurate pistic motion.

Mackie is one of the few active monitor manufacturers that also has experience building stand-alone professional power amps. Our HR824 employs two smaller versions of our FR Series M-1200 power amplifier — 100 watts (with 150W bursts) for high frequencies, and 150 watts (200W peak output) for low frequencies. Both amps make use of high-speed, latch-proof Fast Recovery design using extremely low negative feedback.

## TAILOR THEM TO YOUR SPACE.

Because control rooms come in all shapes, sizes and cubic volumes, each HR824 has a three-position Low Frequency Acoustic Space control. It maintains flat bass response whether you place your monitors away from walls (whole space), against the wall (half space) or in corners (quarter space). A low frequency Roll-Off switch at 80Hz lets you emulate small home stereo speakers or popular small studio monitors.

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If you've never experienced active monitors before, you're going to love the unflinching accuracy of Mackie Designs' HR824s.

If you've priced other 2-way active monitors, you're going to love the HR824's price AND its accuracy.

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HR824 Active Monitors accept balanced or unbalanced 1/4" and XLR inputs. Jacks & removable IEC

power cord face downward so that the speaker can be placed close to rear wall surfaces.

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*Design guru  
Andy Munro talks  
to PAUL WHITE about  
the development of  
Dynaudio Acoustics'  
monitors and his  
own approach to  
studio design.*

**A**ndy Munro is perhaps one of the UK's best-known studio designers, but today he also heads Dynaudio Acoustics' UK operation, where new studio-monitor designs are researched and built. Small-scale production runs are built here in the UK; models destined to be built on a larger scale are manufactured in the main Dynaudio factory. Both Munro Associates and Dynaudio Acoustics UK share a riverside development close to London Bridge, where both arms of the business seem to be kept very busy. Dynaudio recently launched their first active nearfield monitor, the BM6A, so I was keen to find out the design philosophy behind this and future active projects.

handle short-duration peaks in excess of a thousand Watts, so we've always tried to have amplifiers that can match that, which means high-voltage rails and high instantaneous-current capability."

#### ACTIVE VS PASSIVE

**Could you explain the advantages of active systems over traditional passive designs? I've always understood that a good active system provides you with more control over the crossover filter characteristics, and you get better coupling between the amplifiers and the drivers.**

"You get all of that, but a well-designed passive crossover can actually better complement the impedance characteristics of a driver than an active

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system can. With an active system, the amplifier drives directly into the loudspeaker, but a driver in itself is a fairly complex load — the impedance rises rapidly with frequency; it has dynamic and mechanical impedance; it has all kinds of things going on that can't be compensated for with a voltage amplifier. You can do the job with a constant current amplifier, where the loudspeaker acts as a load — a transmission-line kind of principle — but most amplifiers don't see an ideal load from a drive unit, so it's not actually true to say that active systems load loudspeakers better. A passive system can actually take into account the characteristics of the driver, so you end up with a much flatter impedance curve.

"What partly bears that out is that the very best loudspeakers in the esoteric hi-fi world are nearly all passive. The top three hi-fi speakers in the States are all passive — and just happen to use Dynaudio drivers. You can argue it either way, and we play devil's advocate to some extent in that we now look at it from both points of view and offer the choice of an active system or a passive system. I'm not saying our active systems are better than our passive systems — I'm just saying that they're the best active systems we can make."

"The need to build an active monitor was market-driven," Andy explains. "A number of our competitors, such as Genelec, are building them already. What we've always tried to do is use the best speaker system we can put together, along with the best amplifier — then we work on the two together to get the best results. For example, if we're doing a passive crossover, we can put in impedance corrections to make the amplifier and speaker work together as well as they can, so we already have some of the advantages of an active system when we design a passive system. The reason I've been against currently produced active systems is that they've tended to use quite small amplifiers with very little headroom. They have a lot of built-in compromises, and we've shied away from that, because our drive units can take very wide dynamic signals. Any one of our drivers can

#### INTEGRATED ACTIVE MONITORS

**What improvements have you been able to make in the smaller active systems, where the crossover and power amplifiers are in the same box as the drivers?**

"A lot of it is trying to develop a better output stage to deliver the kind of sound quality we need. We did a lot of looking around to find the best-sounding MOSFET devices, and then designed backwards from that. Then we designed a power



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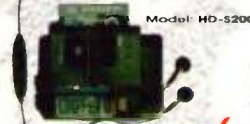
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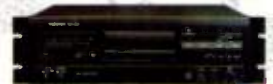


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The Dynaudio BM6As, the company's first active monitors.

► supply that could provide the kind of current and voltage characteristics we wanted, and, finally, we tried to put it all together with some active crossover and equaliser circuits that made the best use of the amplifier power. That allowed us to be a little more creative with the box tuning and the overall EQ of the drivers. We've gone for the best acoustic loading of the driver in the smallest possible box, with the best equalisation characteristic to go with it. This has allowed us to make the box slightly smaller than we would have done had it been a passive system, and this in turn results in a slight kicking up of the  $Q_{tc}$  [total resonance] of the system, which means you get a slight bump in the response. We've equalised that to be flat, which in effect gives us more headroom in that key kick-drum, low-snare area of the spectrum where a loudspeaker works hardest. It gives around 6dB more headroom in that region than the other active systems we've tried.

"We've also been able to extend the low-frequency response a bit more. Instead of using a fourth-order filter to chop the bottom end off viciously, we've allowed it to drift down a little bit lower, then used an electronic filter which is variable. This lets you work with lower power but extended bass, or you can tighten up the bass and use more power. The EQ circuit is actually quite complex."

#### TIME AND PHASE

"The phase correlation between the porting, the electronics and the drivers is as good as we can get. It's not necessarily absolutely linear all the way down to the bottom, but few loudspeakers are. Most phase responses are only measured from 100Hz upwards. Some speakers I've come across are very woolly or woofy at the low end — they look as if they've got a good response, but if you hit them with any dynamics in the real bass, you don't get a click, you get a boom. I don't like knocking other

people's products, and there are lots of things about other people's products I like, but if you take the B&W 801, which is a lovely classical listening device, put a kick drum through that and you can go and make a cup of tea while it's still coming out. That's why you don't see many 801s in rock-and-roll studios — what makes it a great classical speaker might make it entirely unsuitable for anything else.

"I'm not going to stand up and say we're right and everybody else is wrong, but we do know what we're talking about. I know what's good and bad about both our systems and our competitors'. If I had to say what was bad about ours, I'd say they weren't particularly efficient. There's a reason for that: it's because we're using certain types of technologies that aren't electro-mechanically efficient. We use well-damped, fast, lightweight components, and we still feel we have the best compromise between fidelity and efficiency. All Dynaudio drivers are matched to within half a decibel, so there's no need to match individual pairs of components.

"There are systems that are louder than ours, and there are systems that are better than ours in terms of absolute fidelity, but you can't have both. For example, look at horn loudspeakers. They're great for getting level, but in absolute fidelity terms they're diabolical. A horn is a band-pass filter, and a pretty poor band-pass filter at that, so you have to equalise them heavily to make them behave. You can't get a horn that has a constant power bandwidth, so you have to make all kinds of compromises to the horn, the driver and the equalisation. You may end up with something that sounds OK on axis with certain material, but if you put opera or piano on it, or even a flute, you can hear it. Listening to flute on horn loudspeakers is particularly revealing. A flute has very few harmonics and those that are there are very even. ►



#### GETTING IT RIGHT: ACTIVE AMPLIFICATION

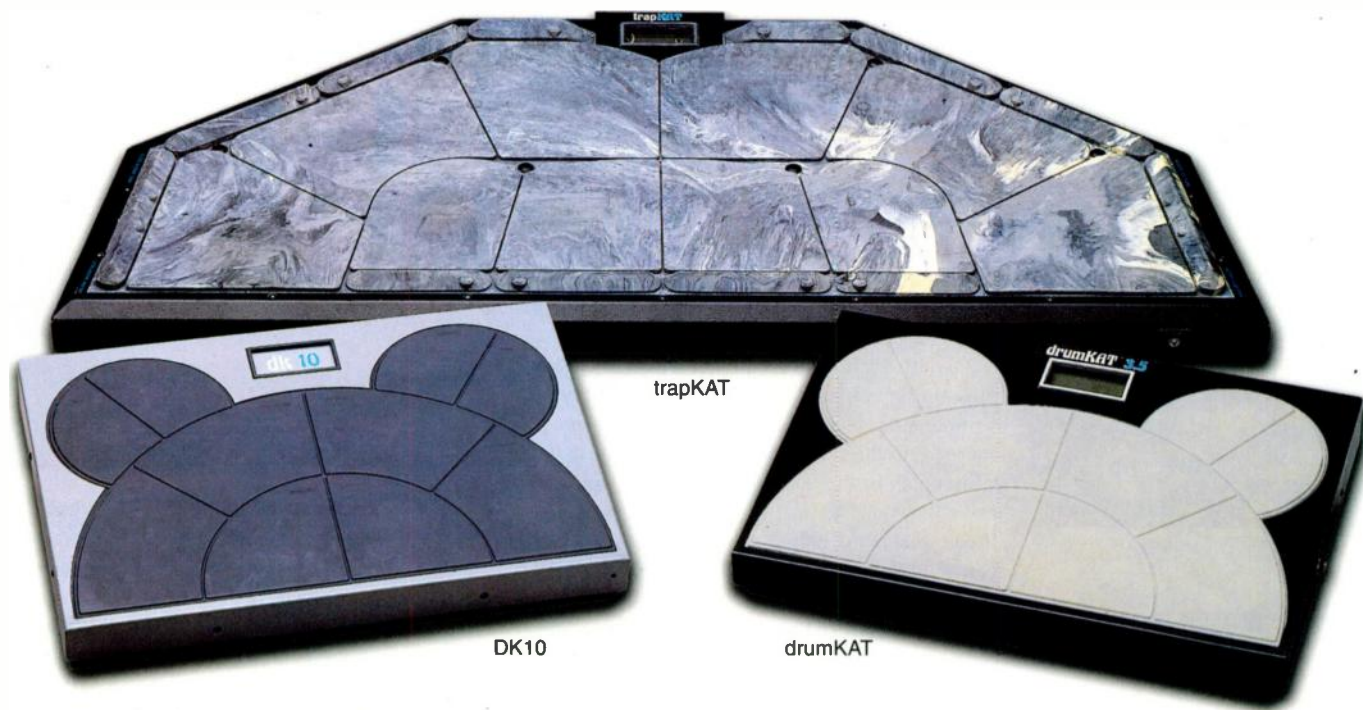
"We've used a variety of amplifiers over the years, including a version of Malcolm Hill's design that he built especially for us, and we've used the Chord amplifier. The Chord has the dynamics we need, but it also has the kind of power supply that can deliver high levels of current when required. Even with the passive systems [such as the BM5 and BM10, reviewed in SOS June '96], it's surprising how dynamic they can sound when they're driven from the right amplifier, whereas nearly all the smaller active systems I've heard just run out of steam. They use various devices, such as compression, limiting, or signal processing, but none of them can match the dynamics that you get from using a big amplifier. It's all down to money.

"I think that active systems fall into two camps. You have those designed for workstations, multimedia, home studios and so on, where they don't have a lot in the way of dynamics or headroom, then you have what I call the really well-designed professional systems that have been around for a number of years, from the likes of ATC, and Genelec, Meyer HD1s. If we were going to make an active system, we had to do something different."



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### FILTERING

**When it comes to studio control-room design, how valid is it to use EQ to try to counteract problems that are due to the acoustic properties of the room?**

"Equalising a speaker to correct its response is OK, but a good speaker shouldn't need very much EQ anyway. However, the interface between the room and the loudspeaker can create the need for equalisation. For example, if you take a speaker designed for free-field operation and you put it in a wall, in theory you get a 6dB low-end increase on axis at, say, two metres away, so you may want to correct that. That can be a good thing, because once you've put in that EQ, you have more headroom.

"You can't, however, using normal minimum-phase equaliser filters, correct for most of the effects attributable to the room, because the majority of those are caused by reflections. If, for example, you get a dip in your monitor response created by a reflection, then you put more energy into the speaker at that frequency to try to compensate — but you're also putting more energy into the reflection. Trying to equalise out a big notch in the response is probably going to make it worse, and that's where people go wrong. If you were to use a third-octave graphic equaliser, you might be able to get what looks like a flat response, but all you've really done is to use the filters either side of the hole to pull up the energy, and what they're doing is masking what's probably now an even deeper hole. The dip is probably deeper after equalisation than before, but the only way you can really see that is with an FFT analyser or some form of swept-tracking analyser. That way you can play around with your equalisation and see which peaks and dips respond correctly."

**Is it still fair to say that your ears don't respond in the same way as measuring microphones, and if you EQ the speaker too much, the direct sound will be perceived as wrong?**

"It depends on the situation, and that's where design experience counts for a lot. I think what you're saying is that the direct-to-reverberant ratio of what you're hearing is weighted in favour of the direct sound. This is true — what you hear first, you pay more attention to — but that effect diminishes as the frequency gets lower. At very low frequencies, you hear very little direct energy from the loudspeakers — usually less than one per cent. Even with a small nearfield monitor, the surface area of the radiating bass wave is 13 square metres just one metre from the cabinet. The area of your ear, on the other hand, is about five hundredths of a square metre, so the amount of energy you hear directly from a loudspeaker in a normal room at low frequencies is a fraction of one per cent. All the rest comes from the room, unless the room is completely dead, in which case you'd have a system that's hopelessly inefficient.



Andy with the Dynaudio BM15A.

"My particular argument against completely dead control rooms is not because I don't think they're accurate, but because I have an inbuilt aversion to wasting all that energy! If the room is acoustically correct, you can make use of that energy, and even in a fairly dry control room with a reverb time of about a quarter of a second, you can still get somewhere between 6dB and 8dB more out of a monitor system without actually compromising the deadness and the accuracy of the room at all. We very rarely find any need to EQ other than at the low end — most of our systems are inherently flat in a reasonably correct room.

"We try to get this balance between the direct response of the speaker and the room response, which means the off-axis response of the speaker has to be quite good. And that's where I have objections to some of these so-called time-aligned monitors where they just shove the tweeter back a few millimetres. That's only time-aligned on axis, but what's needed is proper phase alignment of the drivers such that the phase response is correct both on and off axis. Again, this is where a passive system can be an advantage, because you can play around with the phase alignment to make it work.

"All this was worked out by Richard Heiser, who also invented the TEF analyser, and he published AES papers in the late '60s and early '70s where he described how minimum-phase filters worked. He described how any system with a flat frequency response would have flat phase response, if you use minimum-phase filters. But you can make a system look flat without using minimum-phase filters, and it will be all over the place. That's where

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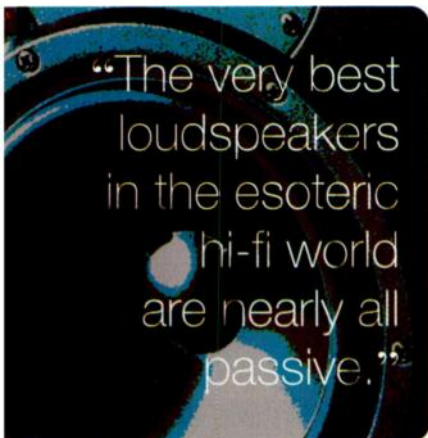
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► the time-alignment concept falls apart. I've come across a lot of systems where the frequency response looks fine, but the impulse response doesn't look at all right. That's why most loudspeaker manufacturers don't publish phase data, or distortion data, or group-delay data — it's misleading and, even in the best systems, it never looks that great."

## THE ROOM INTERFACE

"If you have too much high-frequency reverb in a room, it's not going to affect what you really measure in terms of frequency response on a particular loudspeaker system — it'll just sound harsh. We've found that we tend to let the high-frequency response tail off a bit on most systems, and it works. But the systems that have the widest dispersions at high frequencies can stand the flattest reverb characteristics. In other words, if you have a speaker that's flat to 20kHz, with a perfectly dispersive polar response at 20kHz, then you can have a room that is actually quite reverberant at 20kHz, and it will all work. If the room starts to dry up in the high frequencies, then it's better if the speaker-directivity tightens up as well. Intuitively, this sounds like a contradiction, but it's not.

"The perfect example of that is the cinema. If you've got a great big JBL system and you're measuring 20 metres away, then you have to put in the X curve or the Academy curve, which is a roll-off above 2kHz. The reason for doing this is not, as many people think, to tone down the horn, but to correct for the acoustics of the room. The room is much deadier at high frequencies than it is at low frequencies, so it's really compensating for that. You actually get a build-up at low frequencies — but the only energy you get from a horn is what comes out of that horn so, allowing for the inverse square law, you get the same amount of overall energy at 20 metres as you do at one metre. However, at low frequencies, most of the energy goes back into the room, and a very high percentage of that comes back to your listening position, which increases the bass level. To maintain the correct balance at that point, you have to allow the bass to be much higher in level than the high frequencies, to maintain the original balance. I had a lot of problems understanding that, and it wasn't until I worked it out mathematically that I understood it properly.

"If you listen to a pair of flat nearfields at one metre, and compare that with the more distant main monitors having the appropriate roll-off, they should sound the same, even though the nearfields may be flat to 20kHz, and the more distant monitors may be down 15dB at 20kHz. It's all to do with the direct-to-reverberant ratio. There's a lot of apparent contradiction in this, and if you look in some of the textbooks, they'll tell you that you should increase the reverb time at high frequencies if the speaker has a narrow HF dispersion."

## ROOM DESIGN

**What is the latest philosophy on control room design? This seems to change from year to year...**

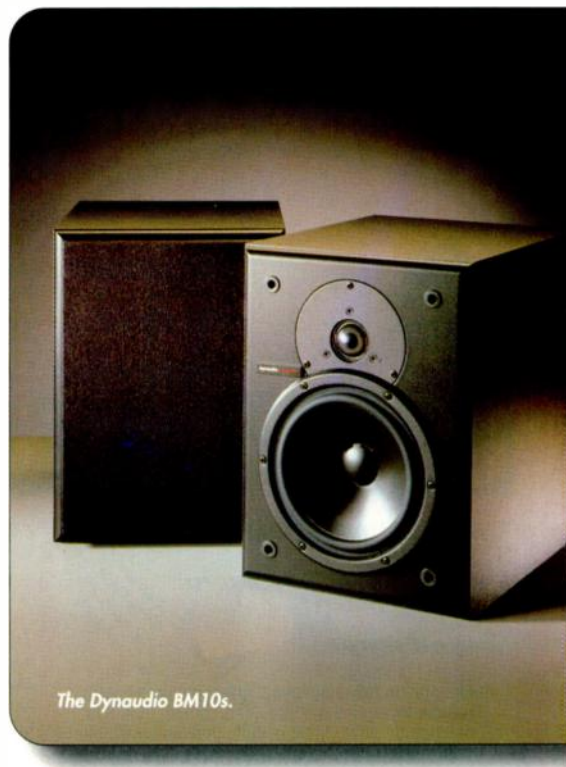
"I like a neutral room with no obvious

characteristics, but it doesn't have to be dead. Probably the biggest challenge we've had recently is doing the remix room up at Decca when they bought an AMS Logic 2 and went completely digital. They discovered that their optimum listening environment has a slightly longer reverb time than we would normally have done, about 0.35 seconds, but extending right out into the higher frequencies. Now they use the B&W monitor, which has a tiny tweeter with a very wide dispersion, so this is where we came to this conclusion that if you have a very extended high-frequency dispersion, then the high-frequency reverb should be there to match it.

"Most of the best-sounding rooms around are pretty average in terms of what I call space technology. They are well designed and have properly balanced reverb times, but they don't use anything particularly extravagant."

**Do you advocate the use of diffusers in your designs?**

"Oh yes, we use them a lot, but they're just part of the palette of available treatments. If you want to get rid of early-order reflections, and you don't want the room to be too dead, then diffusion is the best way to do it. The theory is that reflections are scattered over a hemisphere but, in practice, the



diffuser just trashes the reflection! One thing that people tend to forget, though, is that diffusers also have quite a high absorption co-efficient, so you have to take that into account when planning your overall room absorption. A lot of concert halls that were done in the '80s used diffusers, and in many cases they had to take the diffusers out, because the reverb time ended up being too short. To some extent, that can be true in a large control room."

**The traps you're using around this room, ►**





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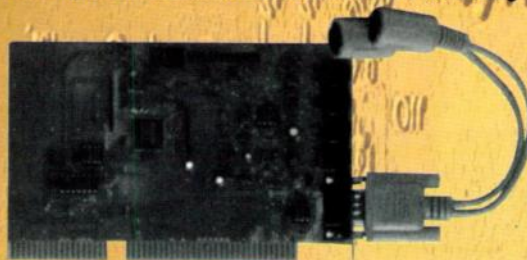
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- ▶ based on shallow boxes covered with a membrane of Revac deadsheet, seem to be a relatively recent innovation.

"Yes, but the BBC used to do it with roofing felt! Traditional bass traps are a bit crude, and a quarter-wavelength bass trap is just that — which means it has to be very deep to get down to, say, 20Hz. The trap we use now is based on the traditional panel trap, but the damping factor is different. There is another term in the formula, but basically it's still a mass on a spring. You have a certain mass of material, and a certain air stiffness in the box behind, and it creates a natural resonant frequency. The advantage of this design is that at that natural frequency, the movement is maximum, and that results in a loss of energy. The stiffer the panel, the narrower the Q; but with this very dead material, we can create a low-Q trap that works over quite a wide frequency range with a Sabine co-efficient of about 0.7. We use three types: the deepest, which is around eight inches deep, has a maximum absorption at about 40Hz. The others work at about 80Hz and 100Hz, but we tend to stagger them to try to give overall absorption over a wider range. We can also make them with a higher Q by bonding the Revac onto very thin plywood. That works quite well for tuning out room modes.

"There was a studio in Camden Town built in a dead square room, and it had the most wicked 40Hz modes of any room I've ever seen — if you looked on an analyser, the 40Hz band was around 12dB higher than the rest of the spectrum. What we did in there was design these boxes to resonate at 40Hz with the narrowest Q we could get, and we tuned that mode out altogether. The other way to do that is to use an electronic notch filter in the monitoring chain to put in a very deep notch over, say, a 3Hz or 4Hz band. You can notch out a low-frequency mode and it makes practically no difference to what you actually hear. Theoretically, that's an awful thing to do, but it's just knowing what to do in the circumstances."

**In terms of whereabouts the absorption goes in a room, do you now advocate distributing it evenly around the room, rather than going for some type of live-end, dead-end concept?**

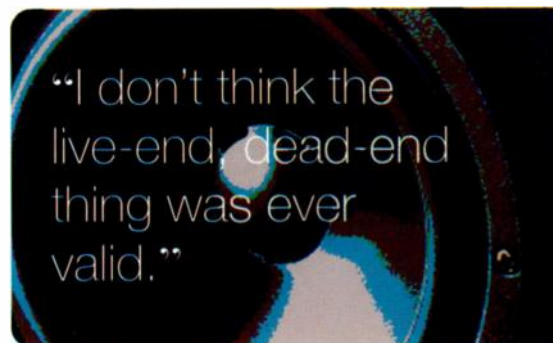
"I don't think the live-end, dead-end thing was ever valid. I think it was just a misconception to start with because, at very low frequencies, there's no such thing as live-end, dead-end. Distribution at low frequencies is modal, and therefore by definition colours the whole room. You get to a transition point, known as the critical frequency (the formula was discovered by Manfred Schroeder), which is a function of the room volume and the reverb time. For a typical small control room with a reverb time of a quarter of a second, the critical frequency is around 150Hz. Below 150Hz, the room is entirely controlled by its volume and its modes, and above that, it's more or less the specular reflections and the geometry of the room that influence its behaviour.

"With our bigger systems, we often use a sub-bass system to control the bass end, then cross over into a normal system, where we try to match

the crossover point of that system to the critical frequency of the room. In a bigger control room, that would be around 100Hz, and I think you can get terrific results by using sub-bass up to 100Hz, and then having a satellite system to do your main monitoring."

**In the small studio, what's the best way to treat the back wall? Should you use absorbers to try to make it disappear, or is it best to use scattering?**

"A bit of both, I think. It's useful energy, so if you can diffuse it and maintain a reasonable reverberation time overall, then that's a good thing. What's bad is to create a live-end, dead-end feel, so



that when you're at the back of the room, you do feel that you're in a different acoustic environment to the mix position. There are some studios where the engineer is hearing a more or less dead, direct sound, and the producer is hearing the reverberant characteristics of the back of the room.

"In the very small studio, it can still be a valid approach to put a Revac trap across most of the back wall and then cover this with foam to provide broad-band absorption. But it's not too difficult to get the energy elsewhere rather than absorbing all of it. Even if you've got a relatively shallow room, providing it's reasonably wide, you can deflect the energy onto the sides, then diffuse it, then bring it back. We tend to do more of that rather trying to make it completely dead."

**What would be the practical implementation of that? Would you build an absorbent wall and then put diffusers over the top?**

"Basically, a low-frequency absorbing section with a diffusing or reflecting surface on top of that. Or we might actually use a veneered ply as the basic absorber, but done in such a way as to deflect the high frequencies."

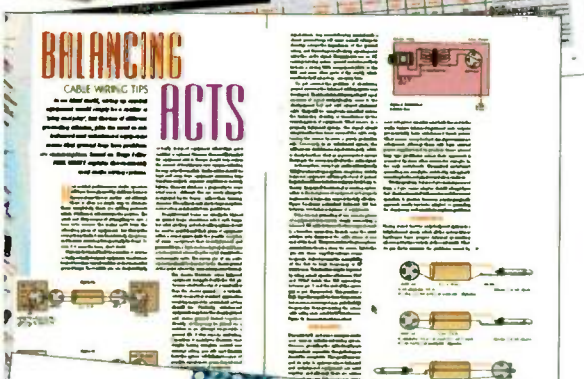
**How has the science of acoustic treatment improved over the past couple of decades?**

"Measurement is the key to everything. There's only one real aspect of acoustics that I think has improved over the last few years, and that's the measurement side of it. Trial-and-error room-tuning worked pretty well, and most people who knew what they were doing could get a room to sound OK in the end, but nowadays there's so much more that you can measure, analyse, and deal with on a computer. I don't think there's much else new in acoustics that we didn't have 30 years ago."

## COMPUTER MODELLING

"We use a couple of proprietary modelling systems — one's called CAT acoustics, which basically is a way of developing algorithms that can drive a DSP engine to create an acoustic impression of a system. It's crude, but it lets you listen to the room before you've built it. The degree to which you can model something is almost infinite, and you have to do it to an almost infinite degree to get a realistic model. The basic problem is time — time to input data in the first place, and time to process it afterwards. Most acoustic systems at the moment work on co-ordinates, so you have to put in a wire-frame drawing of the building, then you can define surfaces. It's very good for designing sound systems for large venues, but less accurate for modelling the behaviour of small rooms."





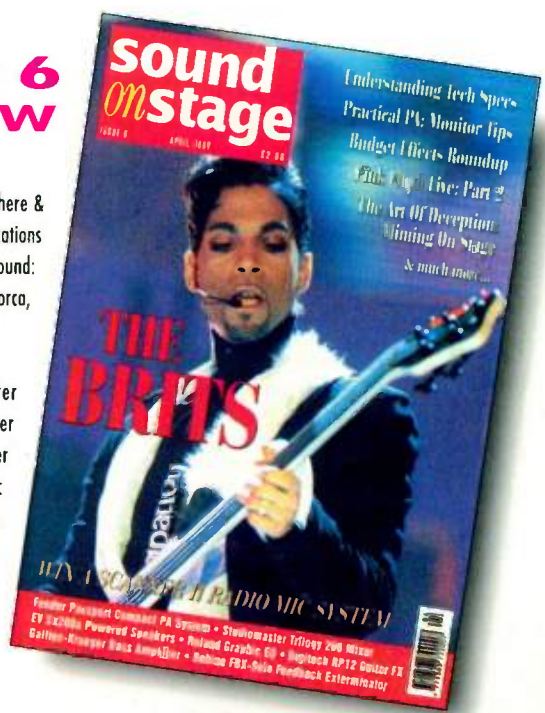
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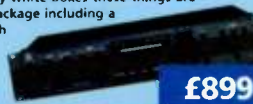


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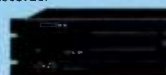
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# Sample shop

Our regular look at the hottest new sample CDs and CD-ROMs.

## PETER SIEDLACZEK'S ADVANCED ORCHESTRA

(FIVE CD-ROM SET)

There are some sample CD releases that might trigger a spark of interest in the potential user reading about what they could contain. There are some releases that you might actively look forward to hearing, and get almost excited by the thought of what they might sound like in your latest project. There are even some that are positively drool-worthy. You want them, you justify the price to yourself somehow, you get your credit card out and prepare yourself to be blown away with new sonic dimensions and exciting textures. Then there's *Peter Siedlaczek's Advanced Orchestra*.

From the renowned orchestral sample über-meisters Best Service comes this five CD-ROM set available in both Akai and Roland formats. It works something like this: Imagine a full-sized symphony orchestra meticulously recorded and arranged, providing a massive selection of multisamples, effects, runs, glissandos, swells, tremolos and so on, edited sensibly across five CD-ROMs jam-packed with useable material. With each disc constituting more sample information than your average single CD-ROM release, I could write a thousand words on each, but I won't. Instead I'll look at each disc individually, with apologies up-front for any points I have to exclude in the interests of keeping this month's Sample Shop under a million words!

### VOLUME 1: STRING ENSEMBLES •••••

Unlike the highly successful *Orchestra* CD-ROM which gave us a full and crossfaded orchestral string section, Volume 1 in this set deals with the individual elements of the string section, namely: 14 violins, 10 violas, eight celli and six basses. The violins are given the most disc space (nearly four whole partitions) and the volumes range all the way from large multisamples of the entire section playing '*ff*' and '*pp*' to complex runs, glissandos, swells, *pizzicato* effects and odd phrases. A lot of attention has been given to the number of different playing styles, and this has presented the user with a huge database of classical-sounding effects that could either be slipped effortlessly into an



existing string track, or used as the central theme idea. It goes without saying that the recording quality is superb and the programming and editing of the raw samples to blend and crossfade within a multisample programme is superb. All the sounds are presented in stereo and, as you've probably guessed, the name of the game with all of these sounds is quality and flexibility as opposed to saving on memory space. This can sometimes be a mild inconvenience to anyone working with anything less than 32Mb of sample memory, and some mono or lower-bandwidth alternatives of the most important sounds would have been a great help, but this is only a mild gripe set against a huge sonic backdrop of sheer quality and pure technical musicianship.

### VOLUME 2: SOLO STRINGS ••••

Three instruments (violin, viola and cello) are each presented first as a stereo multisample (*forte* and *piano*) of sustained notes, followed by shorter, '*detache*'-style playing. Following from that are *spiccato* and *pizzicato* multisamples and the very expressive *con sordino* styles. Interestingly, the producers have opted to have no loops with these samples; instead they offer us very long stereo recordings of each note (sometimes as long as six seconds each!) allowing us to loop them ourselves if we need to. This accounts for the fact that each of the full-range violin programmes is around the 16Mb mark. Whether or not a solo string instrument sounds

infinitely better or worse as a mono recording is a moot point, but it seems foolish of the producers to exclude at least one mono alternative for each instrument. Of course, going through your sampler and deleting all left-hand channel samples, then re-saving the programme onto a spare part of the hard disk is one way to get round this, but it seems awfully long-winded. The sounds themselves are fantastic (or at least as good as any I've yet heard) with the expressive cello programme (*cello con sordino*) stealing the show for me in the realism department. But where this volume really shines is in the amount of 'twiddly bits' thrown in for good measure. Trills, runs and glissandos are just the kind of things that are virtually impossible to programme realistically, and here is a massive selection of all sorts of 'real' playing that, when dropped into your MIDI performance, can fool even the most astute listener. This CD-ROM covers only three instruments, of course, but as an in-depth study of each it rates very highly indeed.

### VOLUME 3: WOODWINDS •••••

Just as with the solo strings, most loops on this disc have been replaced with exceptionally long recorded samples — and very good they are too. The disc covers most of the instruments of the contemporary woodwind family, namely: flutes (solo and flute trio), alto flute, piccolo flute, oboe, clarinets, bass clarinet, solo clarinet, bassoon, contra bassoon and English horn (*Cor Anglais*). Each instrument starts with long, sustained multisamples playing both loud and soft notes, followed by staccato notes, trills, mordants, swells and grace notes. The flutter tongue effects are particularly good, as are the major and minor runs for nearly all of the instruments. The solo samples are, again, nearly all in stereo, apart from a few mono and half-bandwidth versions (at last!), and these generally work better as samples than the recordings of three instruments playing together. The oboe and English horn samples are particularly fine, sounding richer and more authentic than any physical modelling synth ever could, but it's the wonderfully mellow bassoon that really steals the show for me. Perhaps because of the wide range of instruments presented on this disc, you really get the 'value for money' feeling when flicking through this volume, and as a single source of woodwind sounds I can hardly fault it at all.

### VOLUME 4: BRASS AND EFFECTS •••••

Trumpets, tubas, French horns, trombones and all manner of weirdness can be found in the effects section. The disc starts with sustained multisamples of all instruments, followed by musical oddments including swells, trills, glissandos and staccato phrasings. This disc seems to be slightly less memory-hungry than



some of the other volumes but, just like the others in the series, the accompanying literature and sleeve notes are extremely clear and help you to determine exactly the kind of sound you're looking for and how to go about getting it into your sampler. The solo trumpet is jaw-droppingly realistic, as are the French horn sections and trombone crescendos. When you want all the power and aggression of a big-sounding brass section, this disc delivers, just as it does when you want the subtle and more delicate tones of a solo French horn. The effects section is a little more erratic, and unfortunately tends to concentrate a bit too much on a contrabassoon doing a helicopter impression, or a gimmicky viola sound effect, when it really should have provided a few 'Whole Orchestra' effects such as stabs, hits, runs and short phrases. But it does offer some excellent string cluster effects, and overall there's more than enough to keep most users happy for quite some time.

#### VOLUME 5: PERCUSSION AND HARP ●●●●

This disc features cymbals (of varying sizes), timpani drums, Gran Cassa, snare rolls and hits, orchestral bells, Tam Tam/gongs, Chinese gongs, triangles, xylophone, vibraphone, marimba, tubular bells — oh, and a harp. It starts with a huge number of long, sustained cymbal crashes, rolls and crescendos, then moves onto the wonderfully rich and harmonic timpani samples (*pp*, *mf*, and *ff*). The snare drum programmes are especially useable, with up to five different levels of snare roll and hit in one patch, plus various speeds of crescendo and velocities of hit. This is just the kind of attention to detail that makes this whole set a real joy to use. The tubular bells take up a massive amount of memory (the full set needing more than 28Mb) but are well worth the wait. This is true for most sounds in this library, and if you don't have the sample space you'll quickly get very frustrated. The harp collection is packed full of every imaginable glissando and strum, but somehow fatally neglects to provide us with a full multisample of the instrument! This spoils an otherwise faultless volume and means that if you want your harp to play anything other than the (admittedly wide) selection of sounds here, you will just have to look elsewhere. Overall, though, if you want orchestral percussion samples you really should be looking at this disc.

#### CONCLUSION

The whole package is currently on sale for a penny under £600, which may put it well out of reach of smaller studios, but for anyone seriously involved with film or TV soundtrack work, this set deserves serious consideration. For those working to a real budget, audio versions of all of these discs are available (for the usual £59.95), but be warned — you'd have to stay up quite late to match Best Service's

level of programming, particularly when it comes to accurately crossfading and blending the raw material within a patch or programme. The simple truth is that you will need a lot of sample memory (certainly no less than 16Mb, and 32Mb or more is preferred), a very fast CD-ROM drive, and quite a bit of time to get to know the library inside and out before you can confidently call yourself a 'power user'.

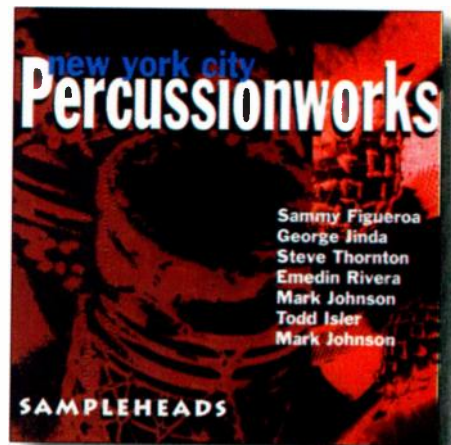
This project obviously represents a huge number of man-hours of work, and it shows at every level. As a set of intelligently recorded musical instrument samples that you will turn to again and again for inspiration, *Advanced Orchestra works* like a dream. The competition is going to have to work very hard to beat this one, because — certainly within this price range — there isn't anything that even comes close. *PS: When the man from Best Service comes round to collect his CDs, tell him I'm out... Paul Farrer*

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#### NEW YORK CITY PERCUSSIONWORKS (DOUBLE AUDIO CD)



*New York City Percussionworks* is a double audio CD bringing together the various talents of some of New York's hottest percussionists. Collectively, their performance credits read like a *Who's Who* of respected recording artists, and this double audio CD set provides a good showcase for each of the player's talents. Each player is given roughly 30 or so tracks in which to perform, and these are then sub-sectioned off into loops, fills, effects and individual instrument samples. The standard format seems to be that a player comes up with a percussive loop, then provides sometimes as many as 20 different tempo variations of the same loop. These can start around the 80bpm mark and go up, in increments of 4bpm, right



into the 140bpm area.

The playing styles obviously vary from player to player, but the overall feel here is less of a funky contemporary percussion CD and more of a dedicated study of ethnic percussion and all of its complementary formats. Although featuring some wonderfully complex South American multi rhythms, overflowing with buzz and vitality, the larger part of these CDs is given over to the slightly more intelligent and thoughtful side of percussion performance.

One of the many interesting things about this release is the inclusion of some very unusual percussive instruments that you'll almost certainly never have heard of, and it's this originality, coupled with a fantastic recording quality and a good collection of competent and imaginative players, that makes this release well worth a listen. On the down side, what is obviously intended as the 'ultimate percussion sample CD' seems to be a victim of its own success in some respects. I can't imagine many users (no matter how dedicated) sitting through track after track of shaker and tambourine loops at countless different tempos, trying to find exactly the right one, and although including every single one of the percussion sounds as an individual sample seems like a good idea, I personally just don't have the time to dedicate to such a mammoth task as sampling and editing these, and would probably skip over them in search of some instant gratification elsewhere.

Having said all of that, the sleeve notes are clear and easy to follow, and no criticism can take away from the quality of the playing or the interesting depth of sound that *New York City Percussionworks* has to offer. With its meticulous attention to detail and exciting ethnic overtones it may be something of a specialist's product, but it's a winner all the same. *Paul Farrer*

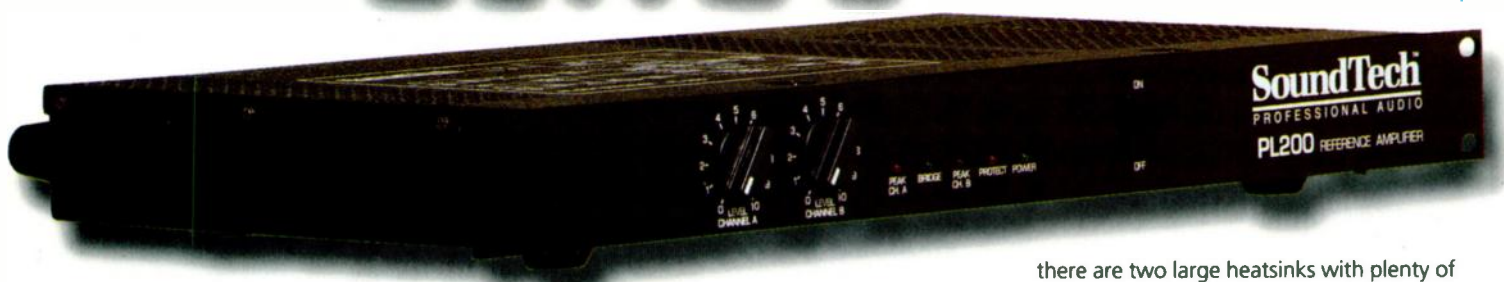
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# POWER LINES

*Power amps certainly can't be classed as particularly exciting, but they're a necessary part of the project studio, and if you've got to have one, you might as well make sure it's powerful and quiet. MARTIN WALKER checks out one of the strong silent types...*



## SOUNDTECH PL200 POWER AMPLIFIER

SoundTech will be a new name to most SOS readers — they're an American manufacturer of professional audio products, and these are distributed in the UK by a company called Smart Sound Direct, who make use of a rather unusual approach. Rather than go through normal retail outlets, with all of the associated mark-ups, Smart Sound Direct deal directly through mail order. This has the advantage of keeping prices down, but of course you don't get the opportunity to see the equipment before you purchase. However, Smart Sound Direct offer a 10-day money back guarantee, so you have that long to try the gear out with the rest of your equipment, and change your mind if necessary — a novel idea.

### MEET THE PL200

The SoundTech PL200 power amplifier under review here offers 100 Watts per stereo channel (into 4Ω speakers) or 65W (into 8Ω). It is housed in a 1U rackmounting case, and since it is convection-cooled (rather than using a fan, with all the noise that implies), it is aimed primarily at monitoring applications in small studios, where low ambient noise is important. If you need sheer power, the two stereo outputs can be bridged to provide 200W into an 8Ω load, by connecting the loudspeakers between the two positive terminals and adjusting a switch on the bottom of the case. If the amp is rackmounted, this switch is inaccessible, but fortunately, it isn't something that you're likely to want to reach on more than rare occasions. The PL200's casing is rugged, and there are plenty of convection holes top and bottom to provide a throughflow of air. Inside,

there are two large heatsinks with plenty of metal 'fingers' to further aid the cooling process (the fingers have a large surface area from which heat can escape). The circuit board is neatly laid out, and sits next to a large mains transformer.

The front panel features twin-channel level controls, each with an associated peak LED which comes on at 10dB below clip point. These should never flash more than momentarily on peaks — if they do, you need to turn the level controls down a bit. Bridge mode is indicated by another LED, and there is a further LED, labelled Protect. This (as shown on the useful block diagram printed on the top of the case) monitors any DC or overload present on either output, and shuts the amp down if any error is found. Not only should this protect your speakers in the event of amp problems, but it also prevents the amp from doing itself a mischief if you accidentally short-circuit its outputs, or attempt to run it into loads of less than 4Ω. Although hi-fi purists maintain that any extra circuitry of this sort in the signal path can affect the sound marginally, it's far better to be safe than sorry! The front panel is completed by an on/off rocker switch and a green Power LED.

Around the back, the PL200's captive mains lead may lose the support of those who like the removable IEC type, but a reliable connection is important, particularly for a power amp, and in my experience, not all IEC mains plug/socket combinations give a firm grip. Inputs are provided on both unbalanced quarter-inch jacks and electronically balanced XLRs. The outputs on the review model were on four banana sockets (two red/two black), but to comply with the latest regulations, production models will have a pair of Speakon connectors instead. Overall, build quality was good, although I did notice that the labelling of the output sockets was partly obscured by a flange from the top cover, and the level controls were a little wobbly — but these are both minor points.

**pros & cons**

**SOUNDTECH PL200 £169**

**pros**

- Excellent sound.
- Low noise levels.
- No fan!

**cons**

- Wobbly level controls on review model.
- Bridging mode switch inaccessible if rackmounted.

**summary**

At this price, and with this performance, the postman's going to be very busy!

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## ▶ LISTENING TEST

I replaced my normal power amp with the PL200, switched it on, and left it to warm up for a bit. As Paul White is fond of mentioning in *SOS*, most amps benefit from reaching their normal operating conditions, so it's better to wait a while rather than start listening from cold. It is always encouraging when you stick your head into the speaker and hear little or no noise from the power amp itself (unless you find that you've gone deaf!). When I sat back to listen, the top end seemed marginally tame at first, but this was soon cured by cleaning the pins of the mains plug with wire wool. Everyone who has tried this on my recommendation has found an improvement in low-level detail. Opinions vary as to why this works, but it will lower the impedance of the mains supply if the contacts are really clean — try it for yourself! Once the top end had opened out, the PL200 produced a very detailed soundstage, with good stereo imagery and depth — each instrument could be located accurately not only between the speakers, but also from front (near) to back (distant). The bass end was firm, and overall, the sound seemed very 'natural', which is intended as a compliment — for studio monitoring you need a natural sound, not one that is hyped to the eyeballs.

Many people think that all power amps do is create a version of the input signal at a higher output level, but in fact, with good equipment, different power amps will give slightly different sounds. One of the complicating factors is that the final sound is dependent on the connection between the amp and speaker. Yes, we're talking about cables affecting the sound. The fact is that any cable connected between amp and speaker will at the very least compromise the damping factor (the ratio of amp output impedance to that of the speaker), leaving the speakers less controlled, particularly at the bass end. Active speakers (with built-in amplifiers) remove this uncertainty, but with a separate power amplifier, you should at least use a heavy-duty speaker cable to minimise the contribution to the sound.

With my speakers (nominally 8Ω, lowering to about 6Ω minimum) the peak LEDs started to illuminate at levels approaching 100dB SPL at a listening position one metre from the speakers, but this sort of test is entirely dependent on the efficiency of your own speakers. All I can say is that it was louder than I ever monitor on a regular basis! With 8Ω speakers, the output power of the PL200 is rated at 65W per channel (EIA rating at 1.0% total harmonic distortion). With speakers of a 4Ω nominal impedance, the output power will increase to 100W per channel.

Throughout the listening tests (and I carried on listening while I wrote this review) the sound was sweet and detailed — indeed, there was such a good sense of the position of sounds in the stereo image that I ended up swapping back and forth to

my previous amp (a well respected £300 hi-fi power amp with a very similar spec to this one) to check that my ears weren't being deceived. Each time I returned to the SoundTech PL200, things sounded slightly more focused. The only strange thing occurred when I finally switched off — a loud (but not damaging) click came from the speakers and the Protect LED came on, staying on for about 10 seconds until the PSU ran down. I contacted SoundTech about this, and they answered my query within 24 hours. Apparently, the way the PL200 operates is intentional — any brownout (drop in mains voltage) or power cut (including switching the amp off!) brings protection circuitry into play to protect your speakers. After a certain time, the protection gives up waiting for the power to return, and releases the speakers. SoundTech also mentioned that they were already looking into improving the PL200's wobbly knobs. With this sort of response to user feedback, they deserve to do well.

## CONCLUSIONS

Power amps are not exciting beasts — if they work, and work well, you rarely notice their presence, unless something goes wrong. The SoundTech PL200 falls into this category. Its electronic and physical design is good, and the audio is clean, quiet and hum-free, apart from a tiny mechanical buzz from the transformer in the review model, that you wouldn't notice from more than a couple of feet away in a quiet room. Although its specifications are not state-of-the-art, many people have found to their cost that amps with superb specs don't always perform as the numbers suggest they should. The best test equipment is ultimately your ears, and subjectively, I found the PL200's audio quality excellent; I would happily leave the review model connected to my gear if it didn't have to be returned. If you have 8Ω speakers that are inefficient, and you like monitoring at high levels, you might find that you need a higher-powered amp, but this one is aimed fair and square at small studios, and most nearfield monitors should be efficient enough to give you plenty of level before amp clipping. Although the sound of a power amp in a complete system does depend on the rest of the equipment, all I can say is that in *my* system it sounded better than the aforementioned, well respected amp it replaced.

I also like the concept of direct mail sales — at £169, this amp is an absolute bargain, and if you don't like it in your own system, you can send it back! The only cheaper way to buy an amp with these specs is to look in the clearance bins for superseded hi-fi models, and I know which I'd prefer. Highly recommended.

**SOS**

BRIEF SPECIFICATIONS	
Power Output:	2 x 100W into 4Ω/2 x 65W into 8Ω
Bridged Output:	200W into 8Ω
Frequency Response:	20-20kHz +/- 1dB Input
Impedance (balanced or unbalanced):	10kΩ
Input sensitivity:	1.23V (+4dBu)
Signal to Noise Ratio:	90dB
Total Harmonic Distortion:	< 0.1%

“The best test equipment is ultimately your ears, and subjectively, I found the PL200's audio quality excellent...”

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**PAUL WHITE looks at the different ways in which the leading enhancers produce their results, and offers some practical advice on where the various types work best.**

Perhaps it's endemic to the society in which we live that nothing, no matter how good, is ever quite good enough. It seems that we have a fixation with wanting everything to be larger and more impressive than life — witness the extravagant special effects used in contemporary films and the expansion of the cosmetic surgery industry. When it comes to audio, we're also tempted to seek out silicone enhancement to give our mixes more lift and forward projection. Accepting that there's a demand for this, what can you do to a perfectly good mix to make it sound even better?

Perhaps the first real enhancer was the equaliser, a device that works by cutting or boosting a part of the audio spectrum to alter the overall spectral balance. EQ can help brighten sounds or change the relative balance of the bass and mid-range, but it can only work with what's already there — if the frequencies you want to hear never existed in the first place, no amount of EQ will bring them out. Another limitation is that when you add EQ boost, it's there all the time — you can't, for example, decide to add bass boost only to the kick-drum beats or top boost only to

## PHASE MANIPULATION

BBE's Sonic Maximizer system is based on the premise that most audio systems introduce unwanted phase shifts into the audio signal, resulting in a lack of clarity. To remedy this, the BBE processor splits the audio signal into three frequency bands, then applies different delays to each band to restore the original phase relationship of the harmonics making up the sound. On the models I've used, frequencies below 150Hz are delayed by around 2.5ms, while those between 150Hz and 1200Hz are delayed by about 0.5ms. Frequencies above 1200Hz are not delayed, but do have some form of dynamic control (compression/expansion) applied to them so as to enhance transients. A block diagram is shown in Figure 1. Unlike the Aphex process described later, the BBE principle does not add new harmonics, but rather attempts to realign the relative phase of existing harmonics, as well as using dynamic processing to emphasise transients.

Essentially, the controls comprise a low-end EQ control to help balance the bass end against the enhanced top end, and a Definition control.

# Psychotherapy

## AN INTRODUCTION TO PSYCHOACOUSTIC ENHANCEMENT



Aphex's Type C2 Aural Exciter.

the snare hits. However, this is possible using dynamic equalisation, where the amount of tonal boost varies according to the dynamics and spectral content of the signal being processed. Properly applied, dynamic equalisation effects are quite dramatic — they can actually increase the tonal contrast within the music rather than applying a blanket treatment to the overall sound or mix. Dynamic equalisation is used in several enhancement devices, described later in this article.

Several companies, the most famous of which are probably BBE, Aphex and SPL, build enhancers of one kind or another, and some combine elements of dynamic EQ with other processes, including harmonic synthesis and phase manipulation. Not all manufacturers use the same combination of techniques, the outcome of which is that each type of enhancer has its own characteristic sound.

LED metering shows the extent of the dynamic processing applied to the HF band and, on the models I've used, there has also been an Auto/Manual button. In Auto mode, the dynamic treatment of the HF band is determined by the dynamics of the mid-band signal; in Manual mode, the high band is subjected to a fixed degree of dynamic processing. The Definition control affects only the dynamic, high-band processing level — the inter-band delays are always active when the process is engaged.

Setting up a BBE Sonic Maximizer usually entails selecting Auto mode, adjusting the Definition control to bring up the high end, then using the Lo-Contour control to make up for any lost bass end. Overall subjective brightness is increased, but the sound lacks the incisive (and sometimes fatiguing) edge of the harmonic exciter. On the benefits side, the process generally sounds very smooth and natural.

The dynamic nature of the high-band processing is a real advantage when you're dealing with noisy material, as boost is only applied when the signal level is high enough to mask any noise that might be brought up by the dynamic control. On some material, the Manual setting produces a more even result than the Auto setting, which varies more noticeably as the input material dynamics change. Which setting to choose is down to personal taste.



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2. The music cannot exceed 5 minutes in length. The composition can be

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3. You must be or become a registered user of Keyfax Software or Q Up Arts. If you did not purchase directly, submit proof of purchase from authorised agent/reseller.

4. Submit your music on one of the following audio media: CD, cassette, DAT. Must be labeled with name and phone number. *Entries cannot be returned.* Please make backups!

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## DAWSONS



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The Amiga's music scene has been more than a little the worse for wear for some time, and this is hardly surprising when you consider the troubles that the platform has had over the last few years. First released in 1986, the Commodore Amiga was seen not just as a state-of-the-art games machine, but also as a computer for serious use, including music applications. It was, for example, the first home computer to have a useable multitasking operating system (something that the majority of PC users didn't get until almost ten years later, when Windows 95 arrived) and its price made it a natural successor to contemporary offerings like the Atari ST.

same drawbacks as far as general use was concerned. Being essentially coders' tools, these tracker sequencers, or trackers, as they came to be known, adopted programmer-style conventions for creating music sequences; song descriptions were built around crude lists showing the times at which various samples were to be played. Though editing facilities were far from ideal, the tracker method of composing rapidly became established in Amiga circles. So too did the term 'tracker module' for the disk files used to store the output from these tracker programs (in effect, the tracker equivalent of the files produced by conventional sequencers).

It was during this time that a Finnish programmer, Teijo Kinnunen, produced his public domain tracker, called *MED*. This allowed users to select and load sound samples of instruments and both create and edit an arrangement's track event lists with relative ease. Over the course of a few years, *MED* went from strength to strength

# RBF Software

## TRACKER/SEQUENCER SOFTWARE FOR AMIGA/IBM PC

*The release of this tracker is welcome news for Amiga users, but it's also a glimpse of things to come on the PC platform. Amiga expert PAUL OVERAA puts the package through its paces.*

# OctaMED

The Amiga truly had the potential to do great things, but in 1994, Commodore went into liquidation. A year later, Amiga Technologies, the company which arose from the Commodore bankruptcy ashes, was bought by PC manufacturer Escom. The rest is history — one year after that Escom themselves bit the bullet, leaving the Amiga pretty much back where it was during the 1994 fiasco — ie. still awaiting a buyer to secure its future. Of course, during this time there's been little in the way of new music software for the platform, but of late, the Amiga has received a fairly substantial boost. The event that has triggered things is the appearance of a music package called *OctaMED Soundstudio*. Being brutally concise, the *OctaMED Soundstudio* is a sequencer program primarily designed to record and play back short sections of digital audio; in other words, it's a package for creating songs built out of sound samples. But strictly speaking, *OctaMED Soundstudio* is not a

sequencer as most *SOS* readers will understand the term; instead, it's something called a 'tracker'. Trackers have been common since the earliest days of the Amiga, having come about originally because games programmers needed a fast and convenient way of creating music for games and demos. One of the earliest utilities to appear was called *SoundTracker*, but within a few years, other clones had appeared, although all suffered from the

and, as eight sound channel facilities were incorporated, a commercial version (*OctaMED*) was released in association with an Amiga software house called RBF Software. Eventually, the program became *OctaMED Pro*, with new MIDI facilities, and by the time version 6 of this program appeared, it simply beat its Amiga-based competition hands down. Users could employ conventional MIDI keyboards to enter riffs, and notes were then recorded in the tracker event lists in much the same way that events are added to sequences using a conventional MIDI sequencer. What's more, MIDI files could be imported and used as the basis for compositions, and song modules could be exported in either tracker or MIDI file form. Development on the program was unaffected by the Amiga's troubles; even as *OctaMED Pro v6* appeared early in 1995, work had started on the all-encompassing *OctaMED Soundstudio* package.

### INTRODUCING OCTAMED SOUNDSTUDIO

As in earlier versions of the program, *OctaMED Soundstudio* songs are made up of a series of small sections of music, called blocks, whose contents are displayed as events in a main 'Track Editor' window. *OctaMED Soundstudio* stores no default instruments in memory, so before you can start work on an arrangement, you have to first use the Load Instruments menu option to bring in some sampled sounds from disk. The program can handle 8SVX, AIFF, MAUD, WAV and raw (digitised data only) sample formats, and there are byte-swapping (see the 'Amiga Jargon Buster' box) raw sample conversion options for 16-bit samples. These options



*The new output facilities even allow the digital mix to be sent to disk.*

sequencer as most *SOS* readers will understand the term; instead, it's something called a 'tracker'.

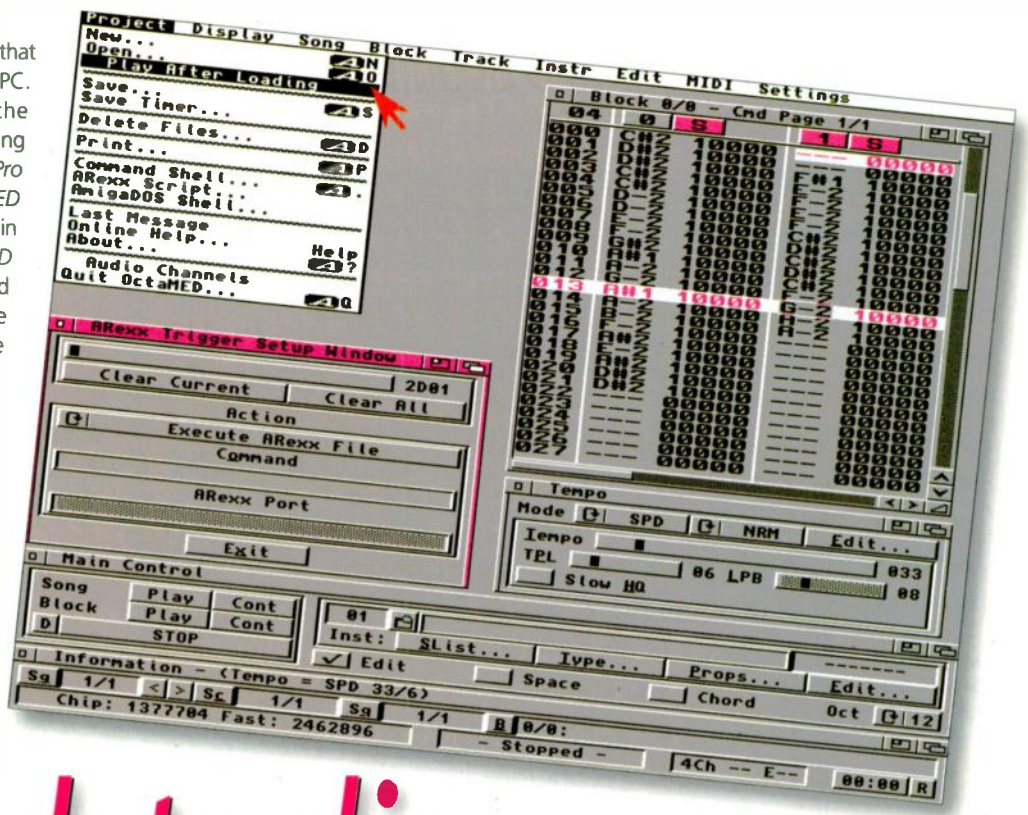
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are vital if, for instance, you use samples that have been grabbed and stored using a PC. A sample editor is also built into the program, and in terms of editing, anything which could be done with *OctaMED Pro* can be achieved more easily from *OctaMED Soundstudio*. But despite having its roots in previous *OctaMED* versions, *OctaMED Soundstudio* is not simply an enhanced version of *OctaMED* — underneath the surface, some major changes have occurred, with perhaps the most exciting feature of the new package being the digital mixing options, which allow you to use many more sounds in a composition than was possible with *OctaMED Pro*.

### MIXING BY NUMBERS?

*OctaMED Soundstudio* is able to calculate the digital data that represents the chosen sound sample mix, either storing the resulting waveform as a single sample, or using



# Soundstudio

Users of *OctaMED* will find it easy to get to grips with the new *Soundstudio*.

the data in real time. This new approach actually permits up to 64 sample source channels to be used even when tracker modules are played back using the Amiga's limited internal sounds (standard Amigas only have hardware support for four audio channels). What happens is that *Soundstudio* looks at all the sample data that needs to be played at each point in a song arrangement, and then mixes it down into a form suitable for the currently chosen output device. If, for example, you're just playing back using an Amiga's internal sounds, *Soundstudio* will create composite sample data, and feed this to each of the four internal hardware sound channels.

The exact real-time performance you can expect here depends on the kind of Amiga you're using, whether you have an Amiga accelerator card and so on, but there's no doubt that even on a standard A1200, the most popular Amiga machine, the results to be had with the *OctaMED Soundstudio* package are impressive compared to those from *OctaMED Pro*! The new mixing arrangements are of equal benefit to those Amiga users who have a third-party 16-bit soundcard fitted to their machines. Already, several menu-selectable soundcard options are available from within *OctaMED Soundstudio*, including output support for Maestix, Delfina, and Macro Systems' popular 16-bit Toccata board.

The original *OctaMED* actually used a sort of sample mixing process to enable the playback of up to eight sound samples simultaneously. However, these earlier sound manipulation routines were tightly tied to the four-channel audio hardware used by the Amiga, which was rather restrictive. Because *Soundstudio's* output

device handling is now more flexible, it has been easy to add additional output options, and it is in fact now possible to store a complete song module (or parts of it) on disk as a digitised sample, in either 8-bit or 16-bit form: you simply use the program's Settings menu to divert the program's output from your internal sounds or soundcard to disk.

This is a big plus for the package, and a real boon for hard-done-by Amiga musicians, many of whom still have to cope with just the four 8-bit internal sound channels available on their standard machines. It's now possible, for example, to create a multiple-sample drum track, store a few bars of it on disk as a combined digital sample, and then re-load that sample, using just a single channel, for use in some other song module you're creating. This helps keep the remaining channels free for more important instruments.

A special Smoothing option is available when digitally recording to disk, and this performs some mathematical magic on the digital output to filter

**pros & cons**

### OCTAMED SOUNDSTUDIO

**pros**

- Excellent value for money.
- Built-in digital mixing facilities.

**cons**

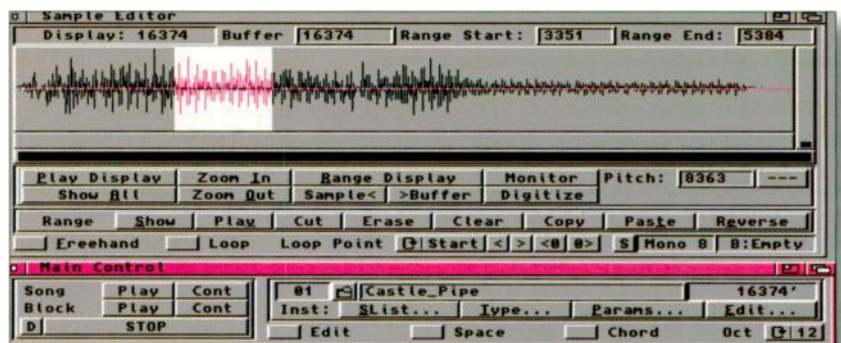
- Amiga platform still going through difficult times due to first Commodore's, and then Escom's, solvency-related problems.

**summary**

Undoubtedly the best sample editing/tracker program ever to appear for the Amiga.

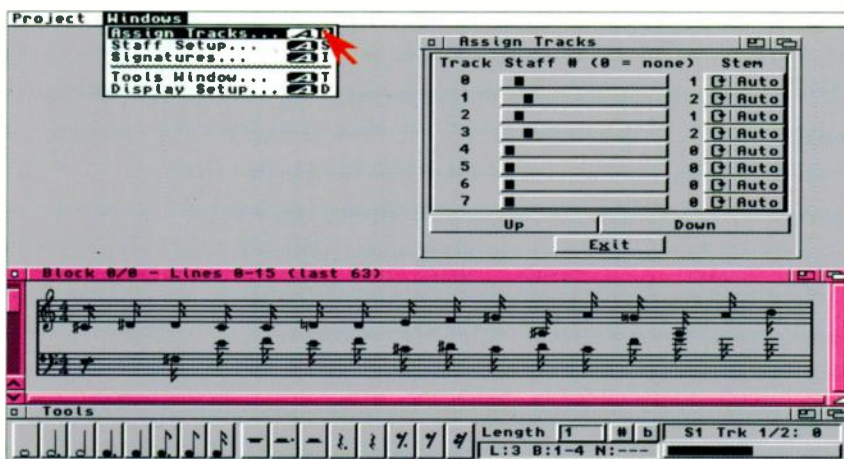
**SOUND ON SOUND**

The built-in sample editor handles 8SVX, AIFF, MAUD, WAV and RAW sample formats.





# RBF Software *OctaMED Soundstudio*



Notation facilities — in no way brilliant, but acceptable for a tracker-style sequencer.

▶ out unwanted frequencies. Although no details are given on how this function works, it seems to perform some standard filter calculations to reduce noise and eliminate excessive differences between close points in each area of the waveform. All the end user really needs to know is that, although Smoothing slows the mixing process down a little, it produces improved overall sound quality in most cases.

There have been other digital improvements too — standard effects like echo and cross echo (where an echo is panned across the stereo image)

are now available. There are also some useful built-in chord options which allow you to generate samples of particular chord inversions from any specified sample (making it easy to add string section tracks to an arrangement, for example, by creating an appropriate series of chords from a single-note string synth sample).

## OTHER IMPROVEMENTS

The notation editor that originally appeared in version 5 of *OctaMED* but which, for technical reasons, did not appear in *OctaMED v6*, is now back in enhanced form. Don't get too excited, though — the aim has not been to provide comprehensive and professional score entry, and, even with the latest enhancements, the facilities are very basic. *OctaMED Soundstudio* is very definitely still a tracker-based sequencer, and the notation editor really only exists to offer a different way of displaying and entering notes!

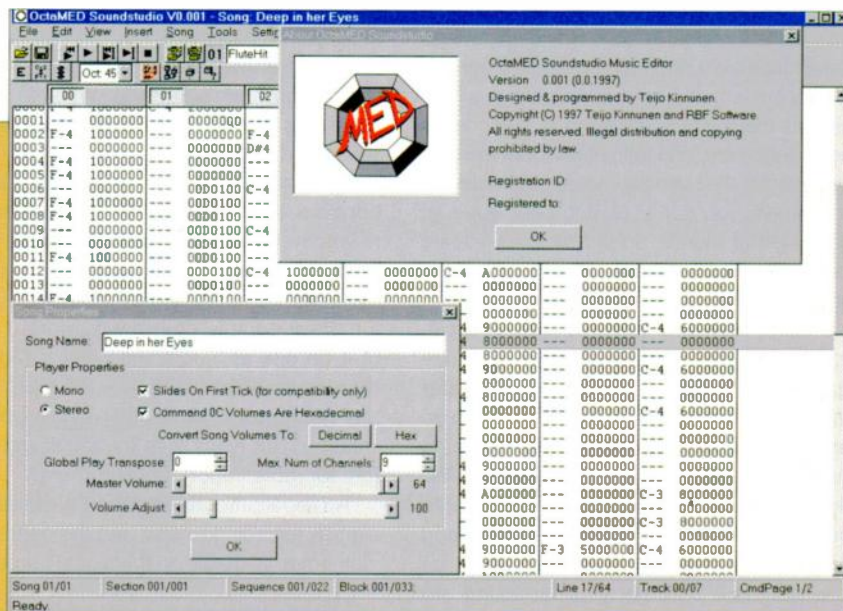
Another facility provided with *OctaMED Soundstudio* is less visible but still important. The Amiga is unusual in computer terms, in that much of the work that would normally be carried out by a main processor is actually performed by some custom-designed Commodore chips, such as handling the graphics display and retrieving sound samples from memory. The snag is that only parts of the Amiga's memory are accessible to these custom chips, and the amount of this so-called

## OCTAMED SOUNDSTUDIO — THE PC FUTURE

For 18 months, everyone has been asking the same question: why, with the Amiga having a rough time, was so much work being put into this program, such as removing the dependence on the Amiga's sound hardware arrangements, and providing more MIDI support, score style notation, and better sample editing with provisions for handling 8-bit and 16-bit samples in a variety of different machine formats? The answer is that, whilst Amiga users are clearly not being forgotten about (as this latest release shows), there is now a PC version of *OctaMED Soundstudio* under development.

Release of the full package on the Windows platform is still some time away, but during this time, the same approach will be used on the PC as was originally used on the Amiga. Already a freely distributable version of *OctaMED Soundstudio's* module player has been released, and this will be followed by preliminary versions of *OctaMED Soundstudio* itself. Chances are that the associated file formats will also be made public to encourage other software houses to use *Soundstudio*-style tracking and so on. Nothing will be released commercially until the PC version has been thoroughly tested, but when this does finally happen, chances are that PC users will get something that'll blow the socks off existing PC trackers.

Whether the forthcoming PC version will make its mark on the more general PC music front, say in the



The preliminary PC version of *OctaMED Soundstudio* which beta testers are currently using.

area of sample editing and mixing, is less certain. I've already been told that more emphasis will be placed on *OctaMED Soundstudio's* MIDI facilities with the new version, but whether this means that the PC version will eventually end up as a combined sample workstation-cum-conventional MIDI sequencer is hard to tell. One thing's for certain — music software on the PC is already at a far higher standard than has ever been available for the Amiga. Admittedly this, to some extent, is due to the fact

that the task of software development is actually easier on the PC (because far more support is provided by the Windows environment itself).

On the other hand, competition is undoubtedly stronger in the PC world and it is correspondingly more difficult for new products to gain footholds. All we can really do on this score is wait and see. If you have Internet access, you'll be able to view this progress for yourself by visiting the *OctaMED* web site (see the address details at the end of this review).



'chip' memory is limited. *OctaMED Soundstudio* can, where appropriate, load samples into the machine's non-chip memory, and then transparently copy them into chip memory as required. You'd think this might slow things down a bit but, surprisingly, the buffering process turns out to be very fast.

Other improvements? There's a window which allows you to carry out search and replace operations on notes, instrument numbers, commands and so on, and an instrument list window for easy viewing and selecting of samples representing *Soundstudio* instruments. There's also a greatly improved ARexx interface, which can be used to write macro scripts so that (for example) editing functions can be automated. *Soundstudio* can now also load modules created on two different PC sequencers: *ScreamTracker v3* and *FastTracker v1.0* (not all *ScreamTracker* effects are supported, but most modules play well enough).

There are many smaller improvements to be found in *OctaMED Soundstudio* compared to its predecessor *OctaMED Pro*. A song annotation window allows you to attach copyright notices, author name, text and so on to compositions, and default directories for loading songs, instruments and executing ARexx scripts can be set

and saved. There's also a menu item for opening AmigaDOS shells (an MSDOS-style command line window, for those non-Amiga owners out there) on the *OctaMED* screen for quick command line jobs. The list goes on and on!

### THE BOTTOM LINE

With its sample editing/mixing and chord creation facilities, *OctaMED Soundstudio* is aimed at any Amiga owner interested in music, not just those who are interested in tracker-style sequencing. The program certainly lives up to all the 'pre-release' hype — in fact, *OctaMED Soundstudio* is quite simply the best music tracker that has ever appeared, or is ever likely to appear, on the Amiga. There is no competition worth mentioning!

SOS

**E** Pricing is being revised, with the software currently set to cost less than £30: contact RBF for full details.

**A** RBF Software, 169 Dale Valley Road, Southampton SO16 6QX.

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## AMIGA JARGON BUSTER

### • ACCELERATOR

An Amiga hardware card add-on that provides increased performance by adding a faster processor.

### • AMIGADOS

The Amiga's disk operating system.

### • AREXX

This is the Amiga version of the Rexx programming/batch-control language. It also allows Amiga programs to talk to each other, and be controlled, in a standardised way.

### • BUFFER

Just an area of memory where data (for example digital audio) is kept until needed.

### • BYTE SWAPPING

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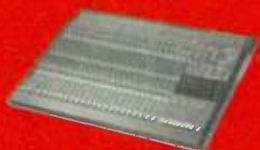
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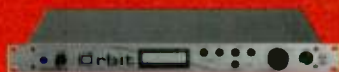
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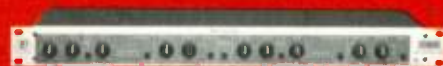
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# 808 Statement

ROLAND TR808 RHYTHM COMPOSER

*Few electronic instruments are still as desirable, 16 years after their launch, as the 808, and even fewer become famous enough to have a band named after them. CHRIS CARTER hits that perfect beat.*

Unless you've been living in a cave for the last 16 years, or you've only just come into the wonderful world of music, you *must* have heard of the TR808. In an industry where many instruments are known only by a number, there are few as distinctive and well-known as the Roland TR808 drum machine. You don't even need to say the whole thing — just say "eight-oh-eight" and almost any musician, DJ or clubber will know precisely what you're talking about. Thousands of people on both sides of the turntable can identify the sound of the 808, more than any other drum machine. There aren't many electronic instruments that have such a reputation. It's like saying piano,

trumpet, Moog, or Mellotron — instant recognition.

I first heard about the 808 a month or so before it was launched in 1981, and I was so blown away by the specification and price that I went straight down to Rod Argent's music shop in Denmark Street and put down a deposit to secure one from the first shipment, without even hearing it! When they finally arrived I rushed to pick up my new toy and was confronted by a shop full of people huddled round an 808 on demo, all trying to play it, so I didn't even get to try out my brand-new 808 before I left the shop with it under my arm. During those first weeks of 'discovery' I managed to blow two monitor wedges and a bass bin... that bass drum. I was not disappointed: the TR808 was one of the most inspiring instruments I ever bought.

## THE EMPIRE STRIKES BACK

The Roland TR808 Rhythm Composer, to give it its full title, was born (of variable parentage) in 1981 in the land of the rising sun. Previous Roland drum machines had been cheap-sounding rhythm boxes such as the CR78, aimed mainly at organists and club combos — you know the type — but the appearance of

the 808 was part of an attempt by Japanese manufacturers to take on the American-dominated pro music market. Until the 808 arrived, most musicians' first encounter with a programmable drum machine would have been the humongous (in size and price) LinnDrum or the dinky Paia Drum Set, both USA made. The 808 changed all that, almost overnight, but in an unexpected way.

## SANDPAPER AND VELVET

Whereas drum machines like the Linn were trying to sound like a real drummer playing real drums, the 808, intentionally or not, turned that idea on its head. It didn't sound like a real drummer playing real drums, or like a cheapo rhythm box churning out bossa novas — it sounded like... well, it sounded like nothing else, really, and this is what made it so distinctive. Now it was cool to have a rhythm in your song that sounded as though it could only have been produced by a machine. That long, low bass drum, that tinny (ahem! snappy) snare drum, those classic handclaps and that weird cowbell! A machine of extremes, sandpaper and velvet, and unique.





## SET THE CONTROLS

Here is a brief explanation of a few of the most often-used controls:

- **Instrument/Track Selector:** This is a 12-way rotary switch for selecting drum sounds or Rhythm Tracks.
- **Mode Selector:** Switches between pattern clear, 1st part write, 2nd part write, Manual Play, Track Play and Track Compose.
- **Step buttons:** 16 illuminated buttons for inputting beats; these double up as pattern select buttons, and the last four buttons are also used as Intro/Fill-in selectors.
- **Start/Stop button:** Also controllable through a rear-panel jack socket.
- **Tap button:** For triggering the Intro/Fill-in buttons and inputting beats in real-time, also controllable through a rear-panel jack socket.
- **Pre-Scale:** This is a four-way switch for choosing the time signature or number of steps needed for each pattern.
- **Auto Fill-in:** This selector adjusts the number of bars before a Fill-in, from Manual to 16, 12, 8, 4, or 2.
- **Clear button:** This erases either a selected pattern or Rhythm track.

### BLACK BOX

People are often surprised when they see an 808 for the first time. At 22 x 12 x 4 (inches), it's a larger-than-expected black box with a busy surface and splashes of colour. The rear is a nest of sockets, 19 in all. Each drum voice has an

original sound; the same can't always be said of sample libraries and ROM/PCM card manufacturers, though. My method is to sample the drum sounds as a pattern (a bar or two) and not as individual beats. These sampled patterns can then be triggered by a MIDI sequencer or used as loops. It's even better, if you have enough sample memory, to

producers were using 808s in all sorts of songs, from ballads to bollocks, many becoming classics. Who can forget Marvin Gaye's '(Sexual) Healing' and Paul Young's 'Wherever I Lay My Hat', Afrika Bambaata's 'Planet Rock', New Order's 'Confusion' or Paul Hardcastle's '19'? And this was just the beginning: in the subsequent 16 years the 808 went on to appear on more records (probably) than any other drum machine in recent history. It seems as if every style of music has embraced the 808 at some point, with some styles existing almost because of it. Over the years the 808 sound has gone out of fashion, come back in again, gone out again — and so on and so on. All it seems to take is one or two high-profile remixes or hits featuring an 808 and it's hip again. At the moment the 808 sound is on a slight downward curve in the popularity stakes but, mark my words, it will climb back up at some point, probably as soon as the current '70s revival is over and an '80s revival kicks in. And this brings me to the \$64,000 question: is the sound of an 808 sample as good as the real thing?

### IS IT REAL OR IS IT RAM?

I've read countless interviews where producers, users, DJs and remixers have voiced opinions on whether the 808 should be sampled or not. Most agree that, no matter how good a sample you have, nothing sounds quite like the original, particularly when it comes to the 808 bass drum. Of course, there are

“While the sound of the 808 is undoubtedly its trademark, half the fun of using one is playing it.”

sample each drum channel (through the individual outputs) as a separate pattern and not a mix of all the drum sounds.

I'm not alone in recognising that not all 808s sound the same: when two 808s are listened to side by side, subtle differences in tone and tuning can be heard. Some users (me included) have also noted that some 808s need to warm up from a cold start. When first switched on, some can sound 'flat' — particularly the bass drum and toms, which can exhibit a slight inconsistency in tone from beat to beat. After 20 minutes or so, however, they sound as good as ever. These quirks are to be expected from a 16-year old, all-analogue instrument and, if anything, they add to the character of the machine.

### COME PLAY WITH ME

While the sound of the 808 is undoubtedly its trademark, half the fun of using one is playing it. Programming the 808 is a memorable experience: to the newcomer the 808 can seem idiosyncratic and inscrutable — but if you persevere the rewards are great.

“Whereas drum machines like the Linn were trying to sound like a real drummer playing real drums, the 808, intentionally or not, turned that idea on its head.”

individual output with a level control, and some have further controls for tuning, decay, tone and voice select. There's a large tempo control, switches for A/B variation, a volume control, a Tap button, various mode selectors and, of course, the illuminated step buttons (see box). It comes across as rather bulky and heavy, which it is, but this isn't necessarily a drawback, especially at gigs, where it's not quite as inclined to slide off a stand or table as most small drum boxes and sequencers.

### LEGEND IN ITS OWN LUNCHTIME

Soon after its launch the 808 started appearing in the charts and on the dance floor. All manner of songwriters, musicians and

circumstances where sampling the 808 is entirely justified. Sampling has been the '90s saviour for thousands of musicians who just don't have access, for whatever reason, to instruments they would love to own or play. Using samples or PCM sample cards is a way for a lot of people to try sounds that would otherwise be inaccessible to them. I know this will sound like sacrilege to die-hard 808 purists but there are benefits to using an 808 sample — such as the scope it allows for further editing and manipulation. Some 808 sounds sit in a track a lot better if they can be edited or tuned, particularly the cowbell and snare drum.

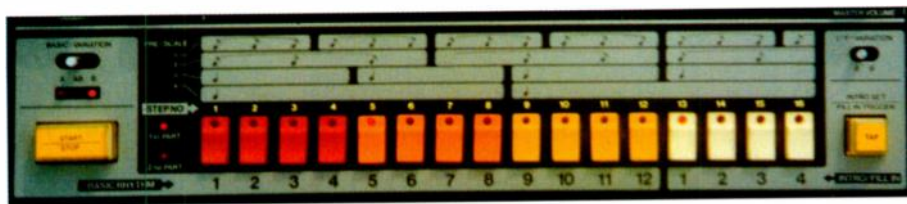
I must admit to sampling my 808 frequently, but as an owner I can take as long as I need to get the sample as close as possible to the

## THE PROP DEPARTMENT

While on tour in Germany in 1991, our 'electro/industrial' support band had a customised 808 with a gunmetal Hammerite finish. Everything was painted — buttons, knobs, lettering — everything except the LEDs. It sat on a stand in the middle of the stage like a slab of metal, plugged in to nothing at all, with the LEDs dancing up and down while the band did their stuff around it, like some sort of ritual. I have it on good authority that some newer, gigging dance bands buy an 808 just because of the reputation and kudos it carries, even if they don't actually use it!



# ROLAND TR808



▶ At the simplest level is step-time programming, which is a piece of cake. Just select a drum sound with the rotary selector and begin pressing the coloured step buttons while the pattern is running. Now move onto the next sound, building up your rhythm pattern; any mistakes are cancelled by pressing a given button a second time. An LED in each button lights up to confirm which beats are being triggered for whichever drum voice is selected — instant visual feedback and nicely reassuring. Real-time programming is just as easy: you simply hit the Tap button, having selected the drum sound you want, and the beats you've tapped in appear on the flashing LED step buttons. Build up a pattern from different sounds, and erase any mistakes by pushing the relevant step button to deselect the beat. Each pattern can be divided into two parts, with each part having a different number of steps if necessary (to a maximum of 32 steps). Each part can also have a further A or B version, and you can alternate manually or automatically between the two variations. A separate bank of four rhythm patterns, with their own A/B version switch, can be used as Intro/Fill-ins and are triggered by the Tap button. It's possible to programme a total of 64 different rhythm patterns into the 808 — not vast by today's standards, but perfectly adequate for most purposes.

There are two ways of playing back patterns: Manual Play and Rhythm Track

## DRUM MAJOR: THOSE SOUNDS

- **BASS DRUM:** The speaker killer, short and clicky or long and velvet deep, almost subsonic.
- **SNARE DRUM:** Bright, tight and 'snappy', classic 808.
- **TOMS:** Totally unrealistic, but a great sound, almost a bass drum when tuned low down.
- **CONGAS:** Pitched too high but can sound great when the tuning is swept up and down.
- **RIMSHOT:** Tick tock, sounds like a clock.
- **CLAVES:** A slow Geiger counter.
- **HANDCLAP:** Pretty convincing, and later used on the TR909.
- **MARACAS:** Like shuffling sandpaper.
- **COWBELL:** The weirdest cowbell ever and probably the most notorious 808 sound of all — totally unique.
- **CYMBAL:** Musical white noise with an outrageously long decay.
- **OPEN HI-HAT:** White noise, with a long decay that sounds backwards.
- **CLOSED HI-HAT:** Chiff, chiff, chiff, chiff.

Compose. Once you've programmed a few patterns/parts you can chain them together to make a song. In Compose mode (with the memory cleared) there's enough space to record 12 different rhythm tracks, with each track holding 64 bars. If you need to record more than 64 bars, it's possible to record continuously, to a maximum of 768 bars. Unusually, when the 808 reaches the last bar it loops back to the beginning without a breath. This 'feature' can't be disabled, so it's usual to have a couple of blank patterns after the last bar to indicate the end of a song. Patterns are recorded into a Rhythm Track in real time by pushing the coloured pattern buttons while the 808 is running in Compose mode. If a mistake is made while laying down a Rhythm Track, you either have to start again from the beginning, or play the track through and overwrite your mistakes as you go. No step editing here, I'm afraid.

## TOTAL REAL-TIME CONTROL

In my opinion, Manual Play is one of the most fun ways of playing an 808 and is perfect for trying out ideas, jamming with other musicians and improvising with other instruments or sequencers.



An ideal setup would have the 11 individual drum outputs running through separate channels on a mixing desk, with EQ, if necessary, and some effects patched in for added spice. A sequencer, synth or some sampled loops running in sync would add to the mixture nicely. Put together a bunch of groovy rhythm patterns and include a few fancy Fill-ins. Make sure you have a blank pattern for breaks and maybe some patterns using the gate outputs to trigger other gear (drum pads, noise gates, samples, and so on). It's also a good idea to have some patterns chained together in a Rhythm Track but with the

## SPECIFICATION

Original price:	£765 including VAT.
Sounds:	16 analogue drums.
Memory:	64 patterns and 768 measures.
BPM:	33 to 300.
Outputs:	11 drum, two mix/mono, three gate/trigger.
Sync:	Roland DIN sync in/out.
Footswitch:	Start/Stop, Intro/Fill-In.

### NOT INCLUDED:

- MIDI
- Realistic drum sounds
- Stereo output
- Pattern Copy or Insert
- Tape sync
- Saving and loading
- Tape or disk storage
- Headphone socket
- BPM indicator

Rhythm Track Play mode off — initially anyway.

Now the fun begins: set the required tempo, press Start and away you go, switching from pattern to pattern, inserting Fill-ins and breaks as your fancy takes you. Because the 808 always starts the next pattern on the first beat of the following bar you never have to worry about being spot-on with your timing. If you need to adjust levels, add effects or alter the drum controls (decay, tuning, tone, etc) turn on the Rhythm Track Play mode and let the 808 take over for a while, then return to Manual Play when you're ready. The whole process is very intuitive and a refreshing change from cursors, menus and mice.

This is real hands-on rhythm composition and improvisation, a bit like playing a keyboard full of perfectly-sync'ed rhythm patterns. I can't think of any current drum machines or sequencers that allow you to play back rhythm patterns in such an easy way, although I suppose you could trigger sampled rhythm loops from a MIDI keyboard to achieve a vaguely similar effect. But it wouldn't be as much fun.

## PRICES & AVAILABILITY

The popularity of the 808 started to decline about a year ago, when the rarer TR909 took



its place as *the* dance floor drum machine to use. This came about for various reasons: the 909 gives more control over the drum sounds, has better programming and includes MIDI as standard. It also currently sells for between £900 and £1100. The 808 is still quite collectable, and although maximum prices peaked at about £700 to £800, things have calmed down a little and the price has dropped to £450-£550, depending on condition and whether it has been MIDI retrofitted. There have been quite a few MIDI options available for the 808 from various sources over the years, some better than others. If you're buying an 808 with this option, try and check that the MIDI side works as it should.

“It seems as if every style of music has embraced the 808 at some point, with some styles existing almost because of it.”

Dealers I contacted said that the 808 generally has a good reputation for reliability (which I can vouch for, being a long-term user myself). However, bear in mind that this machine has been around for quite some time, so beware of the following points if you're looking at buying one:

- Try all the buttons, as these get more use and abuse than anything else, particularly the Tap button and the step keys with the built-in LEDs. Look for any dead LEDs, as these blinking lights are the only visual indication there is of what's going on with the 808, and even one non-functioning LED will cause problems when programming and playing back rhythms.
- A common fault in instruments this old is noisy or troublesome pots. These can have quite a detrimental effect, making sounds thin, weak or unpredictable.
- Examine the back-up battery compartment, underneath, and check for signs of corrosion from leaking batteries; replace with new batteries if necessary.
- Take a good look at the sockets on the rear for any that might be loose or broken and check the little sync in/out switch, as these are easily damaged or occasionally pushed inside the casing.

One last point: the instruction manual is pretty essential, unless you already know enough about the 808 to program it without one.

### INTO THE SUNSET

Being realistic for a moment, most people won't ever get their hands on an 808, because of its rarity, and many will be put off by the price — but there are other options. Using an 808 PCM card and a MIDI drum machine, such as the Roland R8 or Boss DR660 with built-in 808 sounds, is one option. However, if you really are tempted to seek out an original 808 I don't think you'll be disappointed: it's full of classic sounds, has a simple, intuitive interface, and is bursting with energy and character. Just be careful with that bass drum...

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# demo DOCTOR

If you'd like our resident specialist **JOHN HARRIS** to review your demo tape, just send it on cassette or DAT, with recording details and a photograph, to: Demo Doctor, Sound On Sound, Media House, Trafalgar Way, Bar Hill, Cambridge CB3 8SQ

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.

## UNREALITY

**Recording Venue:** Home  
**Recording Equipment:** Macintosh PowerBook 150 running Cubase Lite, Mastertracks Pro 4 sequencing software, Pioneer cassette deck.

John Clark has sent this demo in to replace another which he wasn't terribly happy with. Since the first demo he's been hard at work refining tracks and tweaking controls to get the most out of his minimalist system. He's also been writing more tracks and so has had difficulty in choosing what to send as his style moves from trance dance to techno to something that verges on acid house but is all firmly in dance territory.

The first track is a tracey, ambient, house crossover (in his words) with a monster bass end that is quite tight to the kick but could be improved with a little attack on the kick drum, as both sounds are occupying the same frequency area in the LF section of the mix — this would enhance the impression of punch in the bass end. The track is a slow developer which would benefit from some more interesting percussion, but I guess John tends to avoid this because of an inability to pan the drums on his basic system — even via MIDI.

Moving on, the second track is

described as slightly acid commercial dance and has a good uplifting groove going for it. The music sounds very movie/TV-oriented to me, in the way *The X-Files* can sometimes be, and one of the strengths in this particular mix is the feel of space. On the downside, the bass sounded a touch too loud on my system but was okay with a mere 2dB cut applied at around 40Hz to control the really low frequencies. I like the way the sounds gel in this mix, with a lower-mid wash holding the mix together while the twangy loops take the upper-mid stereo without ever becoming harsh — the synth sounds are pretty warm, if a little noisy (as John himself points out).

I was intrigued by the uplifting Detroit-inspired techno description of side 2, track 1 so I flipped the tape over. Given that John seems to go for a mellow, well-crafted kind of sound I was hoping for something a bit more aggressive. That's not how it turned out — but the track 'Astral Vacation' isn't disappointing; there are some finely programmed twists and turns, and I especially like the mixture of synth and what sounds like a synth drum, run on sixteenth notes and pitch-dropped for a couple of breaks.

Given the sounds and the arrangements, this is a tape that will appeal to fans of Jean-Michel Jarre as well as trance dancers into the more mellow vibe. □

## HEED

**Recording Venue:** Home  
**Recording Equipment:** Foxtex DMT8 digital multitrack, Aiwa AF460 analogue tape recorder, Sony DTC750 DAT recorder, Alesis RA100 power amp, JBL 4208 monitors, Alesis 3630 compressor, Lexicon Alex effects, Beyer DT250 headphones.

Not a gigging band as yet (although by the time the tape gets to my ears this information is probably out of date), Heed come from county Durham. They seem to do a lot of rehearsing and most of their material comes out of jamming in the good old-fashioned band way. The sound is far from old-fashioned, though, embracing modern technology with a line-up that's a simple two-piece of vocals or processed guitar and keyboards.

Singer David Carpenter has only just started singing and mentions problems with getting tired and husky by going over and over a vocal take. It's interesting, this vocal take business. Some producers just do three performance takes, review them, and comp the best bits.

Others will take it line by line — a tedious process that is guaranteed to irritate the singer but is necessary if the singer can't actually sing or if the producer is looking for something in the vocal which the singer can't deliver straight off. In any event, prolonged singing will make the voice sound tired, especially if you're singing from the throat and not using vocal and breathing techniques. Sometimes this tiredness can suit the song; in the case of David's unusual voice, I think that it actually works with the thoughtful material. As for the huskiness, it's obvious to me that David is singing right at the top of his range, almost falsetto, and eventually this will lead to vocal-cord damage; so the singing tuition he mentions in the letter wouldn't be a bad idea.

There are some nice ideas going on in the mix, with some decent fat low-end bass synth that sits well with the harder kick drum. Jamie Fawcus on synthesizers is perhaps a little too fond of the resonance and cut-off type of

sample — these seem to appear on nearly every song. However, there is some respite in the tastefully programmed harp-style sample and some effective rhythmic interaction on 'Coffers' between typewriter-style hi-hat, clicky synth, and drum samples.

The decision to place the vocals way down in the mix and make them almost an instrument works on some songs, but there are times when the voice needs to come to the front, and without effects. A dry vocal with lots of compression can be very effective. □





## PALMA VIOLETS

**Recording Venue:** Home

**Recording Equipment:** Spirit Folio mixer, Yamaha MT120 4-track recorder, Sony hi-fi, Atari running Cubase.

Lee Wraith of the Palma Violets is looking for a 'no punches pulled' review of this demo. He describes the music as classic synth pop in the Human League and Depeche Mode vein. Interestingly, they write the songs on guitar and then transfer them to synth, claiming that this is easier because technology gets in the way of creativity. I'm sure that some readers would disagree strongly with that viewpoint — personally, I think it only gets in the way if you let it. Learning to use technology to make music is a bit like learning to play an instrument: you're just using studio equipment and programming instead of actually hitting a set of wires with a piece of plastic. Familiarity with the equipment certainly speeds things up, and this takes time, effort and commitment, just as playing the guitar does (and God knows, I've been trying

to play it for 20 years!).

Listening to the mix on the first song, it's immediately apparent that the sound is on the hard side: some EQ cut at 800Hz seemed to smooth it out. As it happens I had a Spirit Folio at home, so I was able to try the EQ out on this desk to match the one the band were using. While we're on the subject of tone, the general mix also benefited from an upper mid cut at 3kHz of a few decibels to cut the harsh digital sound a bit.

On the second track the mix isn't really hanging together that well: the fault is in the bass line. This would have been better as straight eights, without much in the way of accenting — as it would have been in the early '80s when the League were working with Martin Rushent at the (then) forefront of technology.

I like the use of short, metallic, reverb to make the voice sound cold on some tracks —



a technique certainly employed by Depeche Mode way back when. However, the Palma Violets also know when to use that touch of echo with a short feedback tail on the voice to good effect, as I can hear on the third and best song, 'Going Away'. Singer Lee turns in his best performance on this one, and with a remix lifting the drums — particularly kick and snare — it could be a contender as a single. □

## LOVE SWING

**Recording Venue:** Home

**Recording Equipment:** Studiomaster Sessionmix 16:2 Gold mixer, Clarion 4-track recorder, Casio DA7 DAT recorder, Alesis compressor, Alesis Microverb III effects, ART LT effects, Shure SM58 mics, Peavey PVM 520M monitors.

The best photograph this month comes from the hat-and-shade-wearing Love Swing, projecting an upside-down image of the band over themselves — some deeper meaning, perhaps?

The Torrington-based band have the luxury of a separate room to record their drums in — a real kit, no less! Drums and bass are recorded live to the Casio DA7, then mixed together onto track 1 of the Clarion 4-track. When the 4-track is full they bounce to the DAT again, and so on. Considering the amount of bouncing, the tape sounds pretty good and I would say that the DA7 has

had some part to play in this. Bouncing from cassette multitracker to digital quite often seems to increase clarity, and I know for a fact that the DA7 gives a slight lift at 5-6kHz — which can be useful or annoying depending upon the music. However, that's not to disparage the band's engineering: they've managed to keep a clear separation between instruments and a good kit balance on the opening track. I'd have tried to keep the drums and bass in stereo, and keep bouncing, if I followed their method of working. The room the drums were recorded in sounds as though it might have been quite nice without the artificial reverb added (louder in the mix on the second track).

Occasionally, things jump out of the mix — the occasional emphasised kick drum and rumbling bass note. A decent compressor across the entire mix would have really pulled everything together and taken care of the dynamics too.

Good vocals on all the tracks give the band some chance of being listened to a second time, but they could have been mixed more to the front, I think, as they are on the final short offering on this tape. There's some Jim Morrison influence in the dark singing, and also an attempt for an across-the-board appeal with the added synthesizer doodlings on the third track. This is perhaps an area that could be developed in future songwriting, to prevent a slip into a purely retro style. □



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# demo DOCTOR

## ▶ QUICKIES

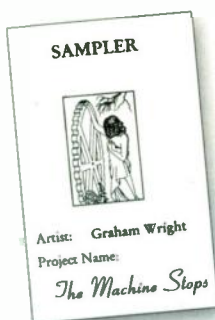
**MAR WOOD:** The demo was recorded at the Hall Studios in Bicester, and would have been given a longer review if some of the recording and equipment details had been included in the letter. My first reaction is that the bass end of the mix is a bit heavy, but it's something that can be easily rectified with a 3dB cut on a conventional low-frequency EQ. A high-pass filter at around 80Hz would also do the job. The overall mix is quite full-sounding, and that's because everything is right up front: there's little use of the sort of delay effects that could have enhanced the sound picture. A touch of room reverb on the kick, snare and bass guitar would have given the sounds a little space without actually having to be that audible. Nevertheless, there's something quite appealing about this dry-sounding mix and I think it's the fact that everything hangs together well — a testament to some decent engineering ears. The guitars could perhaps have been a little less scratchy at 3kHz and the snare would benefit from a few decibels of HF boost. Otherwise, a fine-sounding demo.

**ALLY ROBSON:** Ally's heavy groove draws in a lot of elements and attempts to knit them together. Using a basic overdriven '60s blues riff to underpin the breakbeat works well, and the slightly distorted breakbeat adds to the grittiness of the mix. Delay is used on the sampled spoken voice with the dry sample panned hard right and the delay left with some feedback, which helps it sit in the mix. Other well-chosen vocal samples are used from time to time to add interest to the mix, but my feeling is that it keeps on one level for too long. The break at the end of the mix shows that Ally can do some interesting things with modulation and it would have been good to hear something similar earlier on. The second track is

a manic workout with some good use of gate reverb on the kick drum to accent the first beat of the bar, and backwards cymbal effects to add to the rhythm of the percussion. The third track has one of the funniest samples I've heard for some time, as an American interviewer asks "Hey, you with the long hair, what's the hippie view of interplanetary travel?"

**GRAHAM WRIGHT:** Graham's songwriting shows some sensitivity; the recording has some nice sounds on it, and some not so good. The clean guitar, an Epiphone Sheraton semi-acoustic, was DI'd and sounds clear and light, but the decision to DI the overdriven guitar was a bad move, as it's very buzzy. Graham

appears to be sitting in front of a Vox amp and cab in his photo and I really think he should have made more use of it for the recording.



Track 2 starts tastefully in pseudo-medieval fashion, with some great crumhorn-style sounds on the Ensoniq which are probably modified oboe presets. The drum-machine toms that join are nicely plummy and the rhythmic pattern is emphasised by an underlying mellow drone (from the guitar, posing as a sitar, I think), which works well. There's the odd bum note which really shouldn't have been left in, but overall, not a bad piece of music. Graham's eclectic taste comes to the fore again on the third track, another instrumental; this has a distinctly Middle Eastern theme, courtesy of the hammer-dulcimer sound. There is a tendency to ramble on this one and the reverb on the kick and snare is overcooked, but the instrumental balance is otherwise good.

**DILI DALI DOYLES:** This strangely named (to us Southerners anyway) songwriting partnership hails from just outside Glasgow. The songs, with their country-rock influence, have a lot of potential but some work needs to be done on the recording. The treble end of the mix is very fizzy and the fault lies in the way the guitars have been recorded. The acoustic guitars have been over-equalised in the treble region and

the overdriven guitar DI'd. The result is too much action around the 2-8kHz region and nothing below it! I'd suggest using the AKG C 1000 to do a bit of miking up for the guitars and laying off the overdrive a bit. Even the slide guitar doesn't really need so much distortion — try and get a more natural sound. The vocals are muddy, but placed next to the guitars they would sound that way. I'd suggest sweetening them up with a little high-frequency EQ. I like the singing, though, especially the harmony vocals and the song. With a bit more work on the sound engineering, the quality of the songwriting will shine through.

**PAUL M MANGRU:** Paul's letter was sketchy but his recorded music spoke out for him. There's a collage of sound samples at the start of the first track before we launch into a fairly heavy groove with a wicked bass sound. Almost pure sine wave but with some modulation added, it provides the classic bottom end that most underground sound systems are looking for. This is mixed to the front without allowing the bass-frequency end of the mix to get out of hand, and a solid kick drum is there right alongside it. Sampled vocals are used in rhythmic fashion on stabbing eights for one break, pitched up in other places, and slowed down elsewhere for different sections of the mix. This was effective and not as random or tacky as it may sound. A good mix with some neat ideas — a shame there was only one track on the demo!

**BLOOM:** Bloom are a four-piece song-based pop band with influences from Wobble to Weller who also have a sense of humour and a nice melodic twist. The first song on their tape has a great deal of potential but the mix lacks punch and it's very much a demo, with a hard sound that



doesn't really sit together. The vocals also sound a bit muddy on this track and so does the voice on the second song, but the entire mix is improved by some cut at 600Hz and a little HF

boost; a good compressor would have really glued the mix together and tightened up the whole sound — and a valve compressor (which I'm sure the studio who recorded this must have) would have been great. The third track, I was told, had the best mix and this is absolutely spot on. The drums are drier and up front which makes the whole track more modern-sounding (the big live room on the second track got a bit out of hand in the mix). On the evidence of the third song, Bloom have a lot of potential — there are some great overdriven guitar sounds (aided by echo) in this moody production too.

**DE FACTO:** After lulling you into a false sense of security with a mellow synth opening, De Facto get down to business with some raw guitar. The guitar sound is treated to a heavy dose of modulation and distortion and delivered in a wide stereo pan; over this the vocals are howled in an anguished fashion. From a mixing

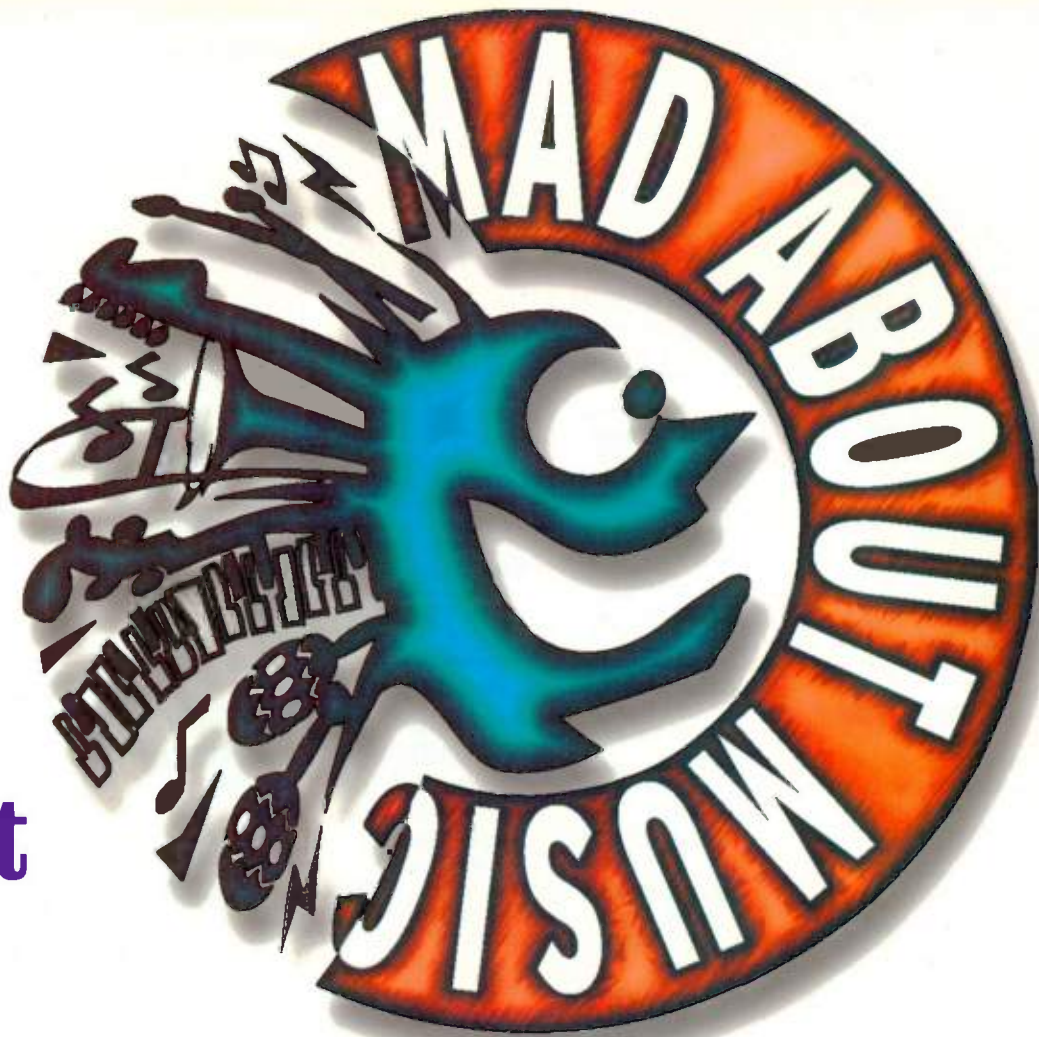


point of view, vocals for thrash really need to be placed low in the mix or the effect of the forced vocals will be lost, because they're

not struggling to be heard against anything. Have a listen to some albums in this genre and you'll see what I mean. The second track bears a passing resemblance to 'Life's What You Make It' by Talk Talk in its chord sequence and rhythm, but the treatment here is completely different: a sparse, string-led mix. The pad chords could have come up to fatten up the mix, though, and the vocal level again is too high. The bare mix develops as the overdriven power chords join in and these have been given too much reverb — but this does separate them from the sampled strings which are operating in the same upper-mid frequency arena. The multi-layered approach of guitar and strings towards the end of the track builds up nicely and there's some decent drum programming going on too. As for the choice of drum sounds — synth toms would have been better replaced with rock kit and ambient room for this type of production approach. □



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**ROLAND JX8P** £250, PG800, £300, Akai MX73, £100, Roland MC48 sequencer, £100, no offers + Rob 01403 272098

**ROLAND MC202** squelch machine, boxed, manuals PSU excellent condition, reluctant sale, £250, Korg M1 cropreset MKII with internal speaker, £100 + Nick 01372 456146 or 0117 927 6725

**ROLAND MC303** complete dance module, 448 sounds, bass, drums, synth, piano, strings, FX etc, £500 + 0121 236 6616

**ROLAND MC303** brand new, £500 + 01274 878826

**ROLAND MKS20** piano module, ace sounds, EQ, chorus, tremolo, fully editable, £200 + Richard 01782 213226

**ROLAND MKS70** bi-timbral analog rackmount, excellent MIDI spec, chorus, stereo, layer mode gives 4-osc simultaneous power, excellent condition with manual, £550 ono + Adam 01352 712937

**ROLAND MV51** vintage synth sound module, excellent analogue sounds plus 808/909 drums, reverb, chorus etc, as new, inc. psu, manual etc, £195 + 01933 67668

**ROLAND MKS20** piano module, same sounds and spec as RD1000 Stage Piano and programmable £275, Roland A30 mother keyboard, £500 for both, great digital piano setup + Rob 01480 352755

**ROLAND MKS70** Super JX module with two ROM and one RAM cartridge, £600 + 01787 476108

**ROLAND MV51** vintage module, £250 or swap for Novation Bass Station + Gordon 01625 529840 after 6pm

**ROLAND PK5 BASS PEDALS** still boxed, never used, £195 + Dave 01543 454253

**ROLAND SC33** Sound Canvas, 226 sounds plus drums, inc TR808, FX, single and multi modes, M/GIGS standard, VGC with all the bits, £150 + 01933 67898X

**ROLAND SUPER JX10** gated condition, quick sale required, £450 will part exchange C21000, DX7 + Mark 01952 273862

**ROLAND SH101** with PSU and case VGC, £250, Cision MCV20 MIDI to CV interface + Andy 01430 440238

**ROLAND SH101** grey, good condition with manual, £200 + Larry 0151 256 9724

**ROLAND SH101** excellent condition, complete with modulation grip, mains adaptor, original Roland leather strap and manual, £265 ono + Dave 0161 765 7754

**ROLAND SH101** grey, with modulation grip, £250 ono, TR707, £150 ono, TR606, £100, ono, all immaculate + 0976 225549

**ROLAND U220** module, mint condition, 2 sound cards, box, manual etc, £250 + 01305 774367

**ROLAND U20** keyboard plus stand and hard flightcase with Lynzy KD1000 keyboard amplifier, all immaculate condition, £500 ono + 0161 368 1764 after 6pm

**ROLAND U110** multitimbral module, multiple outs etc £150 ono, Roland CM64 module, all the sounds of the U110 and D110 in one box £225 ono, £350 for both, possible plex or swap mother keyboard or synth + Rob 01480 352755

**ROLAND U110** with sound card, box and manual, £175 ono, Mac MIDI interface, switcheable, £40, Roland CSQ6000 voice control sequencer, offers? + Trevor 01993 883117

**ROLAND XP10** synth 388 sounds, inc 101 and 303 plus as arpeggiator and realtime filter controls, £375 ono, Phonic 6.2 mini mixer, £60 + 01509 267926

**ROLAND XP50** workstation, Expression expansion board, pedal stand, carry case, manuals, leads, immaculate condition only, £1050 + 0171 720 7540

**ROLAND XP50** with dance card, mint condition, boxed, manuals etc, £1095 + Philip 0113 275 9000

**SEQUENTIAL PROPHET T8** £1650, Juno 2, £295, Minimoog, £950, CR78, £250, Oberheim DX, £195, CR68, model 103, mc202, multi-clone, 800dv + Tom 01372 745494

**TECHNICS WSA1** pro workstation, £750 ono, Tascam 644 MIDI Portastudio, £550 ono, Atari 1040STE, monitor, Cubase Lite software, £195. All mint, boxed, manuals, receipts + Phil 01113 230 5036

**YAMAHA CS1X** synth, 61-note keyboard, brilliant real time control, super arpeggiator, full MIDI spec, GM compatible, great effects, PC/Mac computer interface, boxed, manuals in perfect condition, £480 + 01843 587098

**YAMAHA CS1X** as new, £495, Yamaha SU10 sampler, £189, Spirit Folio Notepad mixer, £139. The lot, only £800 + Paul 01732 455790

**YAMAHA DX7** and RAMS £175, D110 £175, S700 Separate outs plus 70 quick disks £175,

ESQ1 needs sounds £175 + Pil 0181 998 8628

**YAMAHA DX75** excellent condition, cartridge and sustain pedal, home use only, £350 ono, Yamaha RM50 drum module rack, mint condition, £325 ono + 01244 301566

**YAMAHA MU80 MODULE** £350, Roland V220 with PCM cards £300, Micro B3 Hammond sample play module £200 + 01522 750846

**YAMAHA MU80** sound module, excellent condition, £300, Tascam Porta 05HS 4-track, excellent condition, £150 + 01223 312171

**YAMAHA MU80** sound module with guitar or mic input, 64-voice polyphony, 3 months old, mint, £390 + 01207 509089

**YAMAHA PFP100** digital piano, superb stereo, grand, Rhodes, DX sounds with effects and internal monitor speakers, also serve as good controller keyboard, £950 ono + Steve 01703 550913

**YAMAHA QS300** workstation only 12 months old, man features include, disk drive, 16 track sequencer, large lcd screen, over 1000 sounds and more, £750 ono + Andy 01509 813474

**YAMAHA SQ300** Keyboard, £790, Digitech Vocalist II, £320, Emu Proteus 2, £280, Peavey Addverb 3 multi-effects, £230, XRI400 MIDI Mate, £100, Spirit Absolute 2s monitors, £195 + Alan 0151 339 1167

**YAMAHA SY77** immaculate, leads, manuals and disks, £980 or swap for SY85 + Dave 0121 434 3486 or 01384 827077

**YAMAHA SY77** mint, extra sounds, £540, MT3X 4-track, six channel, £240 both ono, quick sale + Sam 01902 836203

**YAMAHA SY85** immaculate condition with RM card, 2.5Mb sample RAM, library, flightcase, X-stand, Atari editor, Replay 16 editor and cartridge, £650 the lot + Linc 0113 225 3087

**YAMAHA SY85B** excellent for dance music, mint condition, £595 ono may PAX + 0113 255898B

**YAMAHA SY85** £650, Kawai K1R with Steinberg editor, £125, Alexis SR16, £130, Roland Pad 5, £50. All boxed, mint with manuals + Andy 01484 647131

**YAMAHA SY85** keyboard, good condition, plenty of sound disks, flight case, £750, Forest R8 tape machine, vgc, 10 reels, including MTC1 38 box, £800 + Giles 0141 337 3201

**YAMAHA SY99** workstation synthesizer, 76 notes, flightcased, sample disks, sound disks, box, manual, superb condition, £899, Roland D5 keyboard, flightcased, one note doesn't work, neatly repaired + Kevin 01628 663980

**YAMAHA TG33** 32-note poly vector synth, £220 or swap for an effects unit, a mono synth + Paul 01772 626269

**YAMAHA TX816** 8 DX7's, £900 or swap for JD990, Roland S10 plus small library, £225, VGC + Mike 01942 204800

**YAMAHA TX812** classic 4-operator FM synth, MIDI, 8-part multitimbral, rack-mounting, wickid bases, manual editor and extra sounds on ST rack, £190 + 01354 695239

**YAMAHA TX812** FM Module, 8-part multitimbral, classic bass/lead sounds, boxed, manual, editor for atari ST. Immaculate condition, £125 + 01782 717009

**YAMAHA SY77** workstation Drums 1 cards, manuals, discs, £600. Quick sale hence price, can deliver if not too far away + Work 01434 60085 home, 0191 265 2170

**YAMAHA EMT10** sound module, excellent condition with manual, good piano sounds, £60. Boss DR550 drum machine, excellent condition plus manual, £60 + Grahame 0161 797 4305

**YAMAHA W7** With dance and vintage boards plus sound disks, Aless Q56 dance edition both immaculate and boxed. Wanted Roland MC303 + Ian 01207 509856

## RECORDING

**AKAI DR4D**, 500Mb hard disk, MIDI board, £700, Mackie 1202VLZ mixer, £250 both excellent condition + 01484 546242

**ALESIS ADAT VA.03** immaculate, boxed, £1100, Roland Jugiater 8, £850, Yamaha DX7's, excar cartridges, £325, Yamaha Rev 7, £400, Tascam headhone station, £185, Quadverb, £185, Roland TR626, £125 + 0131 552 4668

**AKG1000S** studio mic, boxed as new, immaculate condition, never used, not even a scratch, £120 ono + 01753 559505 days, 01753 749852 eves

**ALESIS ADAT.XT** latest model, unused, immaculate, boxed, under shop guarantee until end May 97, two free SVHS tapes, £1650 + Richie 0151 643 9996

**ALESIS 16:2:2** mixer, 16 channels, rack or flat mounted, 6 aux sends, 2 dirty faders hence, £250, stereo rack reverb, £100 ono boxed + Carl 0181 444 0582

**ALESIS MICROVERB 3** boxed, £100, Roland D110 with manual, £200, various PC components due to upgrade + Steve 01422 350281

**ALESIS MIDIVERB 3** Boxed, manual, PSU, £170, Yamaha RY30 drum machine, filters, fully editable, manual, PSU, £190. Both excellent condition, can post + Steve 0121 689 2386

**ALLEN & HEATH G53** mixer, £950, Korg Q3RAW, £450, Yamaha QY20, £250 + Andy 0121 712 4393, 0121 449 2035 after 6pm

**ALESIS QUADRAVERB** mint condition, £195 ono + Malcolm 0191 9653434

**ART MULTIVERB ALPHA** £125, Charlie Lab Digitar £175, Roland MC50 with SMF converter £300, Roland MGS-64 rackmount expander £395, all home use only + 01375 673411

**BEYERDYNAMIC M300N** mic, £50, keyboard X stand, £15 + Adam 01937 842602

**CARLSBRO PROMIX** mixing desk 24 x 2 quick sale, bargain, £290 no offers + 01992 463985

**DIGITECH GSP2112** latest guitar multi-effects, new, boxed, never used. It's the best guitar system in the world, but I can't afford to keep it, £850, with Control 7, £900 + 0171 720 3702

3702

**DRAWNER D5201** dual noise gate £195 + 01305 7742647

**EVENTIDE H3000** £999, AMS 1580S8, mint, £1300, DDA forum Composer 24 B 24 2 pro mixer, £5,800 + Nicolas +32 3 2367454 or Fax +32 3 2358766

**FOSTEX 380s** 4-track Dolby S, almost unused, boxed with manuals, as new, £425, Roland TR505 drum machine drum machine, good condition with manuals, £70 + 0191 268 9041

**FOSTEX A8** 8-track recorder, excellent condition, regularly serviced, ideal home studio recorder, boxed with manual, £310, Studiomastr Sessionmix 16.2 mixer, parametrics, channel inserts etc, excellent live or studio desk, boxed with manual as new, £275 + 01489 577050

**FOSTEX DCM100 & MIXTAB** mint, boxed, 8.2 MIDI mixer, £275 ono + 01432 342343

**FOSTEX E16** and Behringer Eurodesk, perfect condition, N510s and master tapes, all looms and cables, £2250 ono + Chris 01904 625192 or 01287 623348

**FOSTEX E16** remote and loom, £1700, Sect: 18 x 2, £600, Quadverb, £225, Drawner LX20, £150, BBE 422A, £120, isopatch 44 patchbay, £50, mixer stand and bridge, £150, Drawner DL221, £225, Soundtracs PC MIDI 24, £2200 + 01223 236108

**FOSTEX M80** professional 8-track recorder in excellent condition, comes with a tape, manual, demagnetiser and loom cable including gold-plated RCA connectors, £425 ono + 0171 720 3702

**FOSTEX M80** 8-track recorder, good condition, quick sale required, £395 + 01483 419234

**FOSTEX M80** 8-track, mint condition, recent service with six reels Ampeg, £550 ono + 01780 753900

**FOSTEX R8** Sect 12.8.2 mixing desk and Steinberg TimeLack synchroniser all in perfect working order, £900 ono the lot + 0181 3416192

**FOSTEX R8** with MTC1 and remote extension, 7 looms, one brand new, still boxed, all in excellent condition, £650 + 01386 832391

**FOSTEX R8** £650, MTR 12.8.2, £150, Sony DTC690 DAT, £250, Alessis MEQ230, £100, Roland TR626, £50. All in good condition, light home use only + Neil 01299 878135

**FOSTEX R8** MTC 1, remote, cable & tapes, no mileage, Studiomaster Mixdown Gold 16.8.16, looms, both like new manuals and hard flightcases, £1895 + Mike 0161 7409438

**FOSTEX XR5** multitrack recorder, 4 months old, hardly used, £325 + 01704 29470

**FOSTEX X28B** cassette multitracker, 4-track, 8 input machine with direct outs on all four tracks, hardly used, manual included, £250 ono + Mark 01422 320147

**MACKIE 1402 VLZ** Immaculate condition, I used once for production project. Bargain at, £395 ono + Larry 0151 2569724

**MACKIE CR1604** 16-channel mixer, boxed, mint, £595, Sony PCM701 digital audio processor, £220, Teac A3440 4-track, £225, Tannoy System 2 near field monitors, £175 + 01507 480509

**MACKIE 1604**, two with Mixer Mixer so they can be used as a 32 track desk, both in immaculate condition, £800 ono, Novation Bass Station, boxed, £225 + Simon 01902 753344 (Wolverhampton)

**MEGAMIX AUTOMATION**, 16-channels, fits any desk, Cubase control, £350 ono, 10 drums/pads on a rack frame, £275 ono, ART Multiverb LT, £115 + 01234 750730

**NEUMANN M149** valve mic, £3200, Tubetech valve EQ, £1200, Alessis Quadverb Plus, £230, Behringer compressor, £160. All as brand new with manuals + Rick 01234 269860

**PATCH BAYS** bantam type 36 way professional ex-BT, A1 condition, 95% never used + Rob 0171 353 7418, 737 6233

**PEAVEY QFX4X4** 4 independent effects processors with MIDI, 8 inputs and outputs, £300 + 0141 638 6887

**PHILIP REES TS1** SMPTE tape sync unit, 1 year old, excellent condition, £60 ono + 01827 53220

**PHILLIPS DCC300** digital recorder with manual, remote, tapes, boxed, £160, Roland S10 keyboard sampler with discs, £250, ADC 12-band stereo graphic rack mounted, £20 + Carl 01203 394737

**PHILLIPS DCC** full size unit, inc remote, vgc perfect for digital masters etc, £120 + Richard 01234 306985

**Q-LOCK SYNCHRONISER** with interfaces for Sony 5850 video and Fostex E16 and 3M 24track audio, excellent condition, £300, + Anne 0118 958 4934

**RAM 10:4:8:2** disk, two aux, three band EQ, nice sound, £175 ono + Roger 01450 870763

**ROLAND DIMENSION D** £150, Fostex graphic equaliser £100, Fostex 4050 autolocator £100, Proteus 1 module needs power supply £100, Korg M1 workstation slight case damage therefore £350 + 01753 643886

**ROLAND DM80** hard disk recorder, 4-track for use with Mac, brand new, unused, cost, £550 + Gary 0151 201 8490 eves

**ROLAND DM800** pro HD recording system, latest version software, DA400 A to D converter for extra O/Ps, two 540Mb Quantum drives, boxed with manuals, little used hence sale, £2400 ono + 0171 724 0768

**ROLAND SRV330** dimensional space reverb, uses RS5 3D algorithms, full stereo effects at 44.1kHz, boxed, manuals, mint, £475 + Dave 0115 950 7033

**ROLAND VS880** plus effects, unused, DX7s immaculate, £250 + 01926 817877

**ROLAND VS880** 8-track HD recorder/digital automated mixer, great MIDI spec 6 months old, good as new 1Gb drive and manuals, £1400 ono + 0161 295 8661

**ROLAND VS880** digital recorder plus hard drive, effects board and Zip drive, boxed,

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used cost, £2200 accepted, £1700, MC303 unused, £460, Roland JP8000 unused, £1250  
Craig 0114 248 4400

**SECK MIXER 12-channel, 4 aux, 4-band EQ, 2 master outs, external power pack, boxed as new and never gassed, £250**  $\Rightarrow$  01753 559505  
days, 01753 749852 eves

**SECK 18B.2 £500, Revov A77, £50, Yamaha RX50, £100, Gibson L65, £350, Various FX pedals, £30 each**  $\Rightarrow$  Alan 01277 218631

**SECK 18B.2 MKII mixing desk, 3-band EQ with mid sweep, 5 aux sends, 4 aux returns, sub group inserts, channel inserts loads of features, £500**  $\Rightarrow$  Steve, 01629 735442

**SONY MDS3011 Minidisc recorder, £175, Wanted Sony M21 personal Minidisc recorder, Roland JV series expansion cards and Roland RA-800 Intelligent Arranger**  $\Rightarrow$  Simon 01803 882772

**SONY DTC750 and TCD-D7 DAT recorders, VGC, boxed with manuals plus 20 tapes, £550 the lot**  $\Rightarrow$  Chrs 01273 738446

**SONY TCD PROII stereo cassette recorder, new, boxed with manual, carrying case and straps, professional quality, £550**  $\Rightarrow$  01707 326918

**SOUNDCRAFT 6000 mixing desk 40 16.2, warmly EQ, meter bridge, proper old style desk, recently serviced to original specification, £3400**  $\Rightarrow$  Jake 01273 417802

**SOUNDCRAFT TOPAZ PROJECT 8 32 B studiosck, meter bridge & PSU, as new would PFX for older Fender or Gibson, multitrack, computer or PA gear, £2300, 16x18 MABO 4 Ch reverb head and 2XPro 200 2x12 horn speakers, £295, Ibanez Ieman, 1st edition tobacco sunburst, original parts in good condition, tatty case, becoming collectable £375, pair Quad 520 rack amps, £325 each, Hofner acoustic, soft cutaway £105/1323 736017**

**SPL STEREO VITALIZER 2 months old, mint, boxed used twice, £240, Marshall 100w super lead head, £225**  $\Rightarrow$  018708 85495

**SPIRIT FOLIO S1 mixer, 18 channels, 3-band EQ with mid sweep, two aux sends etc, manual, perfect, studio use only £290**  $\Rightarrow$  01475 630181, after 6pm

**SPIRIT FOLIO 4 2 0 4 2 3-band eq, 8 aux post, pre/post pan phantom shelving mid sweep**  $\Rightarrow$  0181 252 7811

**SPIRIT FOLIO 1222 mint condition, £250, cheap loans and patch bays available, jack to jack 8 1/16 way**  $\Rightarrow$  Mark 01952 273862

**STUDIOMASTER PROLINE GOLD mixing desk 24:24:24 MIDI muting, lovely EQ, 6 aux sends, boxed with manuals, £799**  $\Rightarrow$  Steve 0181 883 6215

**STUDIOMASTER DIAMOND CLUB 16.2 mixer, brand new condition, hardly used, 3-band EQ, mid sweep, perfect for small project studio, £250**  $\Rightarrow$  Ian 01363 866843

**STUDIOMASTER SESSION MIX GOLD 12.2 desk in SKB pop up mixer flightcase, good condition, £450**  $\Rightarrow$  America 01239 615631

**TASCAM D30 20 hours, £700, Sony TCD-D10 pro, phantom powering, mains/batteries/12V, 10 hours, £900, Akai CD3000 10Mb sampler, £1400**  $\Rightarrow$  0385 310465

**TASCAM 3B with footswitch, remote, Behringer 8-channel denoiser, 16 way loom, 10 used tapes, £625, Seck 18B.2 mixer, £525, both for £1000 no offers**  $\Rightarrow$  Clive 01243 514567

**TASCAM 3B half-inch 8-track, 2 reels and loom, £650**  $\Rightarrow$  Seck 12.8.2 mixer, £350  $\Rightarrow$  Dan 01373 812674

**TASCAM 85 16-track, 1-inch recorder with tapes, Soundtracs PC MIDI mixer, 24-track with patchbay looms, stand, shelves, both well maintained with manuals, excellent bargain**  $\Rightarrow$  01268 433012

**TASCAM 244 Portastudio, little use, £195**  $\Rightarrow$  Steve 01734 753309

**TASCAM 488 £450, Soundcraft Rac-Pac, £350, Korg AX30G, £150 All VGC, boxed with manuals**  $\Rightarrow$  Mark 0113 273 8841

**TASCAM MSR16 multitrack, good condition with 16-way loom and head demagnetiser, £1800, AKG CS25 mic, £80, bass guitar combo, £600 with chorus effects, £150**  $\Rightarrow$  Gurf 01462 678885

**TASCAM PORTA 07 boxed, mint condition PSU, etc, £200, wanted urgently DAT recorder in exchange for either Porta 07, Yamaha AMB02 mixer, S1000P, needs 2Mb board, £250**  $\Rightarrow$  01472 310247

**TASCAM TSR8 half-inch E-track, dibx, home use only, perfect condition, XR130 SMPTE sync unit, £800**  $\Rightarrow$  Raoul 0171 284 4833, John 0171 624 5951

**TEAC 80 B half-inch 8-track, £450, Studiomaster Proline 16.16.2, £500, DX7, £200, Proteus 1, £250, Akai S1000, £900**  $\Rightarrow$  Ian 0181 292 6168

**TELA VP2051 valve mc pre/compressor/EQ, new, flawless, super sound but superfluous to requirements, £575 boxed**  $\Rightarrow$  Jason 0171 482 3609

**TRIDENT FLEXIMIX desk, 20.8.2 classic analogue sound, professional quality, £1200**  $\Rightarrow$  Studer B62 trolley mounted 2-rack quarter inch mastering machine, £450 including tapes, NAB reels, service manual  $\Rightarrow$  01381 621512

**VESTAX MICRORACK chrous flanger and PSU, £75, Boss Dr Pad II, £35, Kenton Pro Solo, £110**  $\Rightarrow$  Chrs 01235 534152

**YAMAHA MT120 4-track, unused, £150, Akai S900, £300, Aless D4, £180, ART SGX L1 19-inch FX unit, £120, Yamaha FX500, £150**  $\Rightarrow$  Andy 01932 402002

**YAMAHA D2R digital automated desk, £4500, Akai S3000XL, £1300, Roland JV1080, £750**  $\Rightarrow$  All as new  $\Rightarrow$  0181 800 9944 days, 0181 800 1040 eves

**YAMAHA MTBx 8-track recorder, £600, PPS2 SMPTE/smart FSK synchroniser, £60 Both as new, hardly used and boxed with manuals**  $\Rightarrow$  Dave 01483 893365

**YAMAHA PROMIX 01 6 months old, mint**

condition, sale due to upgrade to 02R, a truly superb desk for the price, £1175

$\Rightarrow$  Mark 01952 273862

**YAMAHA CBX D5 digital recording processor, £499, Philip Rees 2X MIDI merge unit, £30**  $\Rightarrow$  01243 824305 or 0410 203527

**YAMAHA MT4X analogue 4-track, VGC, few months old, quick sale, £350**  $\Rightarrow$  Chrs 01732 832037

**YAMAHA DMPT7 digital mixer, very good condition, £400**  $\Rightarrow$  Annie 0118 958 4934

**YAMAHA PROMIX II little used, Foster R8 with new heads; Alesis SR16, SM58 plus all leads offers**  $\Rightarrow$  Patnck 0171 635 9965

## COMPUTERS/SOFTWARE

**AMIGA 500 computer, extended memory, some games, £75; external 3.25 floppy drive, £20 all mint condition, £90 the lot**  $\Rightarrow$  01489 577050

**APPLE POWERMAC 7200/90, 16/700, CD, Apple monitor and extended keyboard, various software, excellent condition, £1300**  $\Rightarrow$  01922 445635

**AMIGA 500 computer, extended memory, some games, £125, external 3.25 floppy drive, £30, Phillips 14-inch computer/video monitor, £60 all mint condition, £200 the lot**  $\Rightarrow$  01489 577050

**ATARI HI-RES MONITOR mono, 14-inch studio model with sound for didd/metronome, as new condition only £90 with original carton**  $\Rightarrow$  0181 668 6077

**ATARI FALCON 14Mb RAM, 350Mb IDE, 540Mb external, FDI, £850; Amiga 1500 with 50Mb HD, £150, Word for Windows 95, Publisher 97, Works 95, £100**  $\Rightarrow$  01702 616861

**ATARI FALCON 4Mb, 128Mb internal hard drive, Audiotracker 8-track recording software, CD ROM systems, VGC, monitor, complete working system, lots of other bits, £400, Steinberg Cubase Audio 16 for Falcon, boxed with manuals and dongle, 44.1kHz clock, and Clarity sample editor, £300**  $\Rightarrow$  0113 225 3087

**ATARI ST sequencing set up complete, ST 1Mb HIRES monitor, leads, Accessories etc. was used with cubase Editors sampler etc. Excellent condition ready to use £1900**  $\Rightarrow$  01884 257487

**ATARI 520STFM computer, with memory upgrade board installed, 1Mb RAM fitted, easily upgraded to 4Mb, with mouse, still great for MIDI, £120**  $\Rightarrow$  01354 695239

**ATARI STE 4Mb, SM124 monitor, 16+ cartridge and loads of software, £250**  $\Rightarrow$  ICD 170Mb hard drive £185  $\Rightarrow$  Cubase v3.02 original, dongle and manuals etc £150  $\Rightarrow$  0550 the lot  $\Rightarrow$  Rob 01480 352755

**ATARI ST 2Mb, high res monitor, 50 disks of software, mouse, joystick, £215, Roland D110, £170; Korg DW6000, £180, Casio CZ1000, £100**  $\Rightarrow$  0115 938 2468

**ATARI 520STFM 4Mb, SM124 hi-res monitor, Replay 16 sampler, plus sequencer and leads etc, £250**  $\Rightarrow$  01484 862813

**ATARI 2.5Mb STE hi-res monitor, £300, Roland M-V1 vintage synth, £250, all items boxed as new P&P extra**  $\Rightarrow$  Steve 01553 674076

**ATARI STE 4Mb RAM, TOS 2.06, 60Mb hard drive, SM125 monitor, external disk drive, software, £320**  $\Rightarrow$  Jim 01626 852234

**ATARI STE1040 with high density drive, Atan SM146 14-inch bw monitor, £400, Cubase SC, latest version, £295, Midex Plus, £295**  $\Rightarrow$  All original package, complete with manuals, all boxed in excellent condition, the lot for, £900  $\Rightarrow$  0181 933 3248

**ATARI 1040ST5 With 1Mb RAM, SM124 monitor, Cubase, blank discs, good condition, £160**  $\Rightarrow$  Lee 0161 295 8661

**ATARI 1040 STFM SM124 monitor plus software, as new only, £200**  $\Rightarrow$  Andy 01484 647131

**ATARI ST 2MB SM124 monitor, Cubase v3.01, manuals and dongle, plus 1 in 8 out MIDI Thru box and extra software for Atan thrown in, £400**  $\Rightarrow$  01753 643886

**ATARI MIDIPORT EXPANDER Gives 32 MIDI channels, comes with cubase drivers, £20 includes postage and free MIDI tester**  $\Rightarrow$  0141 638 6687

**ATARI HI-RES MONITOR suitable for Cubase/Notator/MP software, two available, 14-inch, £85 and 12-inch, £75, excellent condition. Can dispatch in original carton**  $\Rightarrow$  0181 668 6077

**ATARI MEGA 4Mb, SM124 monitor, Emagic export, £300**  $\Rightarrow$  David 01444 239007 after 7pm

**ATARI STE 4Mb ideal for music/sequencing, all kinds of software, Hi-res monitor, £260**  $\Rightarrow$  01942 818686

**ATARI 520STFM With 4Mb RAM, SM124 hi-res monitor, mouse, etc, £250**  $\Rightarrow$  Gary 01277 630530

**ATARI 1040STE 4Mb, SM124 monitor, SVGA adapter, Protar 120Mb SCSI hard disk, Replay 16 sampler, Steinberg Midex, Xport, MIDI expanders, Cubase Editor 2.08, StyleTrax, Tango 1.0, Patching JVB80 editor, Band-in-a-box 5.0 with styles, various MIDI utilities, original software with manuals & dongles. All items boxed & vgc, lot for £550**  $\Rightarrow$  0181 346 8418

**ATARI 1040ST and SM124 monitor, both boxed with manual, £225, Korg M1 with manual, £525; Roland U110 sound module with soundcard and manual, £225**  $\Rightarrow$  Richard 01943 462722

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# Anatek Pocket Products to solve your MIDI headaches!

At SOS, we have regularly found ourselves referring readers to one or other of the Anatek Pocket range of MIDI accessories to solve their all too common MIDI interconnection and transmission problems. Trouble was, Pocket Products were previously hard to find... until now!

## POCKET MERGE

- Merges 2 MIDI signals into 1 • Handles System Exclusive • Merges on all 16 MIDI channels
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POCKET MERGE is an essential tool for sequencing or live use. Operating as a 2-In, 1-Out MIDI Merger, several Pocket Merges can be stacked to merge more than 2 inputs. Now any controller can be a "master". In live setups, POCKET MERGE allows any two controllers (keyboard, drum pads, guitar synth, etc) to share a sampler or sound module. Use one keyboard as a master, while using a favourite pitch bender from another, or combine two keyboards for a multi-tiered, organ-style controller. In the studio, POCKET MERGE is a must for sample dump editors, allowing a keyboard and a computer to be connected to the sampler at the same time. POCKET MERGE handles data very quickly, making buffer overflows a thing of the past.

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- Economical Macintosh MIDI interface • No external power supply required • 1 MIDI In, 2 MIDI Outs • LEDs indicate MIDI In/Out data • Uses serial or modem port • High speed CMOS design
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POCKET MAC opens up a whole new world of MIDI programs for the Macintosh computer user. With many Macintosh programs simultaneously supporting both the serial port and the modem port, one POCKET MAC could be connected to each allowing access to twice as many MIDI devices.

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- 'Smart' FSK Tape-to-MIDI synchroniser • Starts anywhere in song • MIDI In to Out merging • Automatic read/write switching • 'Jam Sync' protects against tape dropouts • Records tempo changes • MIDI and FSK status LEDs

POCKET SYNC is the way to expand the capabilities of any multitrack studio. No longer is it necessary to allocate more than one tape track for sequenced parts. Now, shuttling to different points in the song is quick and effortless. POCKET SYNC writes a special FSK sync tone on one track of tape that is converted to MIDI Clock and Song Position Pointer on playback. Merging of data from the MIDI input to the output allows new sequencer tracks to be added while remaining synchronised to tape. Automatic switching between write (recording FSK) and read (playback FSK) cuts downs on confusing switches and buttons. Tape oxide dropouts are no longer a problem with POCKET SYNC's variable dropout protection. The sequencer can continue playing over a dropout for a short time, even if FSK code is completely lost!

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- Sends on multiple MIDI channels • Supports 1 continuous controller • Supports 1 momentary footswitch • Sends pitch-bend, modulation, portamento time, and MIDI Volume • Sends sustain, portamento on/off, sostenuto, and start/stop • Auto pedal/footswitch calibration
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POCKET PEDAL is an indispensable controller for the performing musician. Use it with an ordinary volume pedal and footswitch to send MIDI volume, modulation, and sustain controls on all 16 MIDI channels simultaneously. For owners of multi-effects processors, POCKET PEDAL provides a convenient cost-effective way of providing dynamic control over effects parameters. It is also a handy controller for automated mixdowns, converting any resistive input into MIDI Controller messages for VCAs. Connect a photocell to POCKET PEDAL and control MIDI parameters with a light source!

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- 'Phantom' powers all Pocket Products • Functions in-line with MIDI signal • Powered by most AC adaptors • Automatic polarity switching
- Fully regulated supply • Passes all MIDI data
- Alleviates hook-up problems • Boosts MIDI signal

POWER PACK provides power to Pocket Products in instances where upstream devices from other manufacturers have neglected to meet MIDI specifications, or in any instance where power is unavailable. POWER PACK can be placed anywhere in the MIDI chain and accepts power from a standard AC adaptor (not included). It provides additional power when more than 4 Pocket Products are used in a row or allows POCKET PEDAL and POCKET FILTER to retain their channel settings when the master device is turned off. What's more, POWER PACK can be used to boost the MIDI signal and extend the maximum distance between two devices.

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- 8-Zone Keyboard Splitter • Range from 1 to 127 notes • Fixed boundaries • MIDI Channel/Zone assignment • Footswitch controllable
- Floating split point

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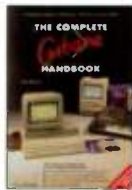
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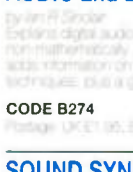
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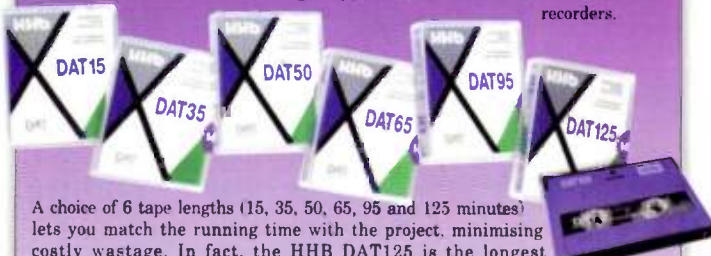


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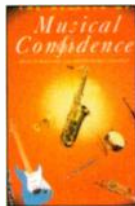


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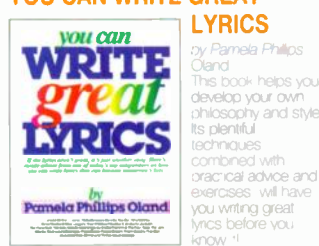
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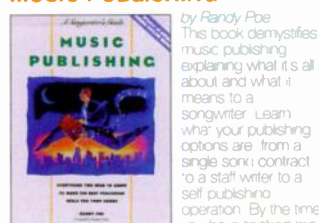
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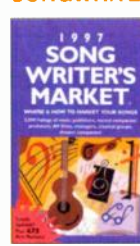
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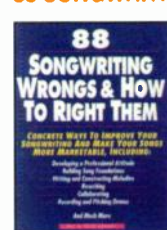
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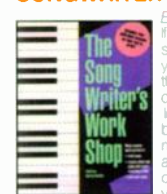
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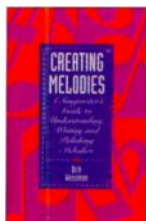


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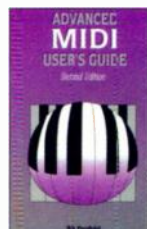
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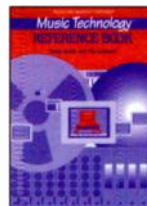


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**SYNTHESIZERS**

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by Julian Colbeck  
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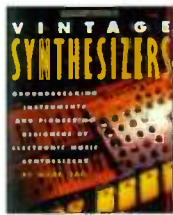
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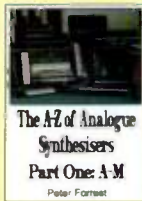
**VINTAGE SYNTHESIZERS**



By Alan Kay  
This well illustrated 300 page book covers synth history, interviews with designers and owners of important instruments. Mark Kay's book could be the most entertaining and useful synth book yet - check out the definitive history of the instrument, complete with the production techniques, switches, knobs and pots a buyer's guide, there's a comprehensive section on sourcing, valuing, upgrading and servicing classic instruments.

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**THE A-Z OF ANALOGUE SYNTHS PART ONE: A-M / PART TWO: N-Z**



By Peter Forrest  
Complete rundown of all the major analogue synths and analogues ever made. Spread across two books, such as a testament to the massive amount of research and effort put in by the author. Featuring model synths, modules and circuit boards.

Each book provides a comprehensive overview of the various instruments, circuits and basic design details. Each also includes sections on how to maintain and repair your instrument. It's a must for anyone who wants to build a great instrument. Available as well as such instruments as sound quality, connectivity and user interface. Includes colour photos of many classic instruments.

PART ONE: A-M      CODE B294      **£14.00**  
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By Alan Cobble  
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are covered in this reasonable guide. So a great buy.  
CODE B096      **ONLY £5.99**  
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**THE MUSEUM OF SYNTHESIZER TECHNOLOGY**



By Martin A. Sawford  
If you read our feature on the opening of the Museum of Synthesizer Technology in October, but haven't got the time or the cash to visit in person, then the next best thing has to be the museum's guide book. The 118 book is printed on glossy paper and contains

full colour pictures of a huge selection of exhibits from the museum, with some descriptive text and company background. The text reads a bit like a brochure, but the readable synth fanatic will want the book for the pictures. In these pages you will glimpse instruments that you are unlikely ever to experience in the flesh, or see on stage. Roland's Super 100 modular set-up, an EMS Synth 100, an ARP 2500, a large Ermo modular and what must be the comprehensive collection of Moog equipment.

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**DRUM MACHINES**

**DRUM MACHINE RHYTHM DICTIONARY**

By Sandy Ripstein  
For use with Roland drum machines or any grid-based pattern system. First 75 pages on programming huge range of rhythms in rock, funk, jazz and funk styles. Remainder analyses styles and patterns of world's top drummers - Phil Collins, Billy Cobham, Steve Gadd, Stewart Copeland etc. Highly recommended.

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By Stephen Hoffman  
Looks at how drummers compose rhythmic patterns to add emotion, swing or groove. Contains examples for you to programme into your drum machine or sequencer.

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128 boxes filled with both bass and drums, the heart of the rock group, together. Although written primarily for drummers and bass players anyone interested in understanding this much music in popular styles will find this book invaluable.

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**CLASSICS IN SEQUENCE**

By William Lloyd & Paul Terry  
Takes extracts from Music In Sequence and applies them to all the classic classical music forms. Authors show how to make them exciting reproductions of music scores, into an event and effects, inspiring scores, using synth voices. Highly creative - an ideal workbook for the music classroom. Classic Masters Renaissance dance music, Beethoven's 9th symphony, Vivaldi, Bach, Handel, Schubert, Chopin, music from Clavin Clavin, Debussy, Gabe, Steve Reich, Ravi Shankar and more. Highly recommended.

CODE B193      **£12.95**  
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**MUSIC IN SEQUENCE**

By William Lloyd & Paul Terry  
One of our best selling books. Easy to follow, practical guide to making real use of your sequencer, written by people who really understand music and how to create it using today's technology. The brilliant, unique book comes with the CD set of approvals.

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**1000 KEYBOARD TIPS**



By J. Wheeler & Q. Hare  
With each musician's guide to the basics of music, scales, chords and harmonies. 256 pages covering chord relationships, improvisation, suggested drum machine patterns, plus comprehensive and comprehensive chord table. Too good to miss.

CODE B113      **£13.95**  
Postage UK £3.50 Europe £6.95 P.O.W. £9.50

**ROCK IN SEQUENCE**



By William Lloyd & Paul Terry  
The classic book from the Europe of Music In Sequence and Classics In Sequence is now available. Rock In Sequence offers detailed scores of 17 rock and pop hits from the 60s to the present day, alongside a collection of rock sequencing tips.

Score sets included from the likes of Earthquake, Sly & The Family, Led Zeppelin, Aerosmith and others. 112 pages.  
CODE B320      **£14.95**  
Postage UK £2.50 Europe £5.95 P.O.W. £9.50

**COMPUTER & MUSIC**

**THE DESKTOP MUSCIAN** NEW



By David M. Rubin  
A comprehensive guide to MIDI and audio on PC and Macintosh computers. Includes a CD-ROM full of MIDI software demos to get them going and the text - over 300 pages of it - covers all aspects of music and computer, from MIDI concepts to advanced arrangement techniques.

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Postage UK £4.95 Europe £7.95 P.O.W. £14.50

**COMPUTERS AND MUSIC**

By P.A. Fleming  
Also author, Covers hardware and software applications. Covers gateway of sequencers and how they link up to date.

CODE B098      **£8.95**  
Postage UK £1.95 Europe £4.95 P.O.W. £7.50

**MULTIMEDIA ON THE PC**



By Ian F. Singer  
You want to know what multimedia is and what it can do for you, then this is the book for you. Much of the information is general enough for everybody, but for the geeks, the book is aimed at PC users. The book explains the installation and use of a CD-ROM drive and a sound card and covers all the concepts behind multimedia. As an added incentive, if you buy the book, you can also have for a free copy of 'Multimedia: A Multimedia Learning Package'.

CODE B272      **£11.95**  
Postage UK £2.50 Europe £4.95 P.O.W. £7.50

**PC MUSIC HANDBOOK 2nd Edition**

By Brian Hayward & Roger Egan  
This book will show you how to turn your PC into a capable music-making machine. It explains how you can create any sophisticated music on your PC by running sequencing software. How to install your PC as a sound transfer, or a sampler, or even use it as a hard disk recorder or a sound sampler. All these things are possible with today's sophisticated PC. The use of sound in multimedia applications is also covered, and there is a chapter on CD hardware with advice on which type of PC is best for your particular needs.

There's also a lot on getting connected to the internet, where you can contact other PC music aficionados world-wide.  
CODE B332      **£10.95**  
Postage UK £1.95 Europe £5.95 P.O.W. £7.50

**THE COMPLETE SOUND BLASTER**



By Howard Massey  
Explains in simple, non-technical terms, how to install the Sound Blaster hardware and software for use in both the DOS and Windows environments. The text sound processes used by the card, MIDI, the Sound Blaster's MIDI capabilities, and the many different applications for the Sound Blaster. Including the various software utilities provided with the card, and many of the third party support products available to operators.

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**SEQUENCER SECRETS**

By Ian F. Singer  
This book aims to go beyond the manual in telling you how to get the best from your sequencer. The book features 20 chapters on sequencing projects and is suitable for use with all software sequencers. The book teaches you how to create your MIDI system and use your sequencer to create all sorts of useful effects. A troubleshooting section helps you track down such things as double notes and so on.

CODE B299      **£7.95**  
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**MUSICAL APPLICATIONS OF THE ATARI ST's**

By P.A. Fleming  
Includes a general introduction to MIDI, a handy of MIDI and on projects. This book, MIDI sequencer and so on, plus a collection of programs, in fact BASIC, that allows you to use the ST's internal sound generator and create the MIDI applications.

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**LIVE SOUND**



Peter Back has produced a book written for live sound engineers and gigging musicians with practical applications and real life scenarios very much in mind. The whole ambit of live sound engineering is addressed, including the equipment used and how to get the most out of it, the problems you will confront and how to fix them, and various other related subjects such as safety, feedback, as well as automation and MIDI in the live sound field.

CODE B337      **£14.95**  
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**PUBLIC ADDRESS LOUDSPEAKER SYSTEMS**

By V. Cable  
All aspects of PA speaker systems are covered in the book, including live applications, matching 100V systems, transmission lines and how to install inductive hearing aid loops. At the heart of the book is the Live Sound Guide, a system that is aimed at improving clarity, with coverage and reduced feedback. Full step-by-step construction and installation details are given.

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**SOUND REINFORCEMENT HANDBOOK**

By Gary Gant & Rich Jones  
From recording to broadcast, live installations to touring, the ABC book reference covers live sound setups, equipment, techniques and more.

CODE B105      **£27.95**  
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**LOUDSPEAKERS FOR MUSICIANS**

CODE B284      **£3.95**  
Postage UK £1.95 Europe £5.95 P.O.W. £9.50

**INTRO TO LOUDSPEAKER & ENCLOSURE DESIGN**

By V. Cable  
The book provides both useful background to speaker and enclosure in general, but practical information on construction and full detail on constructing the so-called 'Wagemaster' design of speakers.

CODE B281      **£2.95**  
Postage UK £1.95 Europe £5.95 P.O.W. £9.50

**LIVE SOUND MIXING**



By Duncan R. Fry  
This is a hands-on, friendly introduction to all aspects of mixing live. It has from Australia, and is an SOS Readership exclusive. The author is an experienced live sound engineer and has packed the book with loads of information, diagrams and hints to take you from basic principles through to those shooting when things go wrong.

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# SOS Videos

## GUITARS

### PLAY BLUES NOW!



A complete guide to blues guitar playing that shows a variety of blues rhythm and soloing styles — for both beginners and advanced players alike. Learn the blues style of Eric Clapton, Steve Ray, Vaughan, Peter Green etc. The programme not only covers the usual blues shuffles and scales but using 4 complete songs gives you the resources and techniques to create professional blues parts and solos in a wide variety of blues styles.

**CODE V051 £12.99**  
Running time approx 50 minutes  
Postage UK £1.75 Europe £4.95 R.O.W. £6.95

### ACOUSTIC BLUES GUITAR



Presented by Mel Reeves. Whether you can already play fingerstyle guitar or are simply familiar with basic chords, this programme will show you all of the necessary techniques to play great blues guitar. All of the technical aspects are explained in the clearest possible way before getting down to the real business of learning 5 real blues that are great to listen to and terrific to play.

**CODE V058 £12.99**  
Running time approx 63 minutes  
Postage UK £1.75 Europe £4.95 R.O.W. £6.95

## SYNTHESIZERS

### KORG PROPHECY VIDEO MANUAL

Written by Phil MacDonald. Korg's new Prophecy Synthesizer now has its own video manual! The video covers all the major features over 6 sections, with lots of examples of the amazing effects that are available using the 'log' and 'mod' wheels. The video's visual interest is maintained by the extensive use of Chroma Key and multi-camera effects. This is a video that is ideal for new owners, and those who want to know more about the Prophecy before they make a purchase.

**CODE V049 £14.99**  
Running time: 35 minutes  
Postage UK £1.75 Europe £4.95 R.O.W. £6.95

### ROLAND GR-1 GUITAR SYNTH

**CODE V014 ONLY £29.99 for 2 videos**

Total Running time: 4 hours Format: VHS (PAL)  
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### ROLAND MS-1 VIDEO MANUAL

**CODE V047 £24.99**  
Running time: 43 minutes (approx) Format: VHS (PAL)  
Postage UK £1.75 Europe £4.95 R.O.W. £6.95

### KORG X3

This video offers an easy way in to this powerful workstation. It starts from absolute basics, covering audio connections and volume levels and the 'on' and 'off' buttons covers all basic functions of the X3. The video features a sophisticated use of picture-in-picture, with the X3's display, outlining the main stages to show you clearly what Phil is actually doing, and main points are recorded with on-screen text and graphics. The main section headings are:

- 3 Audio Connections
- Setting Around the X3
- Factory Preset
- Disk Drive Modes
- Sequencer Mode
- Global Modes
- Sequencer Mode
- Quick Sound Editing
- Playing MIDI Files on the X3
- Using the X3 with an external sequencer.

Note that the 'safe' headings with each section also containing information on connected subject of varying amounts of detail. A lot of ground is covered, and we can recommend the face to any X3 owner.

**CODE V018 £19.99**  
Running time: 55 minutes Format: VHS (PAL)  
Postage UK £1.75 Europe £4.95 R.O.W. £6.95

### PLAY HEAVY METAL NOW!



A concise, easy-to-follow video guide to real 'heavy' metal playing for guitarists of all levels. A guide to hard 'rock/heavy metal' techniques for guitarists of all levels. The programme covers RHYTHM, SOLOING and TECHNIQUE. All of the techniques, solos etc are clearly demonstrated. No need to read music. Free booklet contains tab.

chord and scale diagrams  
**CODE V052 £12.99**  
Running time approx 65 minutes  
Postage UK £1.75 Europe £4.95 R.O.W. £6.95

### PLAY GUITAR NOW!



An easy-to-follow video to take you, from the basics to a full rock solo. The programme covers TUNING, CHORDS, FINGERSTYLE, 12 BAR BLUES, BARRE CHORDS and ROCK SOLOING for both electric and acoustic guitars. Includes 'see chord/tab booklet'. It is not necessary to be able to read music to learn from this video.

**CODE V053 £12.99**  
Running time approx 50 minutes  
Postage UK £1.75 Europe £4.95 R.O.W. £6.95

### ROLAND G800



Presented by Roland UK's product demonstrator Sara Reybould. This video covers every essential feature and function of the Roland G800. Sara provides the user with a wealth of knowledge on this sophisticated instrument with recourse to many practical examples and close up shots of the LCD screen. The video was produced in association with Roland UK and Roland UK to ensure that the content is accurate and informative.

**CODE V060 £19.99**  
Running time 50 minutes  
Postage UK £1.75 Europe £4.95 R.O.W. £6.95

### ROLAND GR09

Presented by Roland UK product demonstrator Nick Cooper. This application based tutorial video for the Roland GR09 produced in association with Roland USA covers every function completely. Covered topics include: the GK2A S-1 'Flesher Driver' pickup sensitivity, use of the 'marker' what a patch consists of, use of the pedals 'pitch bend', '3.2', including layering and detune, chromatic function, reverb & chorus edit, 'auto', 'pitch shift', the use of external MIDI devices, saving to an external sequencer & more.

**CODE V061 £19.99**  
Running time 57 minutes  
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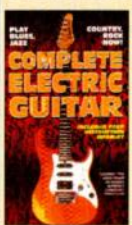
### ROLAND JV-1080 VIDEO MANUAL



Roland's amazing JV 1080 synthesizer module is covered in detail in this informative video. Presented by Tim Walter, the video the video guides you through the basics and leads you painlessly onto the advanced features. The video even shows you how to fit the expansion boards & gives demonstrations of some of the wonderful sounds they contain. Or to agree this video has been produced in association with Roland UK & USA to ensure that everything is contained is accurate and relevant to the new and more experienced users alike.

**CODE V046 £19.99**  
Running time: 80 minutes Format: VHS (PAL)  
Postage UK £1.75 Europe £4.95 R.O.W. £6.95

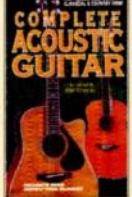
### COMPLETE ELECTRIC GUITAR



Presented by Mel Reeves. Learn how to create solos and rhythm parts in any style! The programme covers ROCK 'N' ROLL, BLUES, JAZZ, COUNTRY, ROCK and FUSION and much, much more. Plus the clearest possible guide to chord and scale construction, tonal centres and working out parts for yourself. Includes 'see construction booklet'.

**CODE V050 £12.99**  
Running time approx 65 minutes  
Postage UK £1.75 Europe £4.95 R.O.W. £6.95

### COMPLETE ACOUSTIC GUITAR



Presented by Mel Reeves. Whether you only know a few chords, or are already proficient, this easy-to-follow programme will show you all of the main guitar styles, as performed on the acoustic guitar. As well as learning tips and tricks of the trade, Mel Reeves will show you 6 great instruments, step-by-step and take your playing to new heights. Plus, open tuning, the capo, high-strung guitar, reading music and more! Styles include: Guitars in Roses, Bon Jovi, Herbie Hancock, Mississippi Blues, Django Style Jazz, Nuts in Mincow, Classical, Romance, Carter Style, Buffalo Gals and Bottleneck/Side Style.

**CODE V056 £12.99**  
Running time approx 78 minutes  
Postage UK £1.75 Europe £4.95 R.O.W. £6.95

### GETTING THE MOST OUT OF THE KORG M1



Written and presented by Julian Colbeck. This video covers every essential feature and function of the Roland G800. Sara provides the user with a wealth of knowledge on this sophisticated instrument with recourse to many practical examples and close up shots of the LCD screen. The video was produced in association with Roland UK and Roland UK to ensure that the content is accurate and informative.

**CODE V002 £24.95**  
Running time: 1 hour 10 minutes Format: VHS (PAL)  
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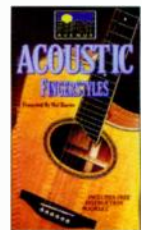
### ANALOGUE HEAVEN



Remember our feature on the opening day of the Museum of Synthesizer Technology which we ran back in October 1994? Wish you'd actually been able to attend? Well now you can have the next best thing: the museum has released a fascinating 50 minute promo video that features footage shot on the day as well as a lightning tour of the facility. The programme is hosted by SOS columnist, Julian Colbeck. The tape opens with a musical score and officially opening the museum followed by a nostalgic run through one of his old modular systems. Analogue Heaven makes a great 'revisiting' for anyone interested in vintage synth, recreates good value and offers the 'perfect companion' to the Museum's guide book also available from the SOS Bookshop.

**CODE V026 £12.95**  
Running time: 50 minutes Format: VHS (PAL)  
Postage UK £1.75 Europe £4.95 R.O.W. £6.95

### ACOUSTIC FINGERSTYLES



Presented by Mel Reeves. In this video there are 5 major instrumental studies to work through including country, classical and blues. Each style is broken down into small sections allowing you to learn more quickly and efficiently. Each piece is demanding but great fun to play. The final section looks at styles and techniques used by players such as R.E.M., The Eagles, Sheryl Crow and Paul Simon and provides an insight into 'rearing new and interesting fingerstyles of your own'.

**CODE V059 £12.99**  
Running time approx 30 minutes  
Postage UK £1.75 Europe £4.95 R.O.W. £6.95

## PC

### WINDOWS 95: WHAT WILL YOU LEARN TODAY?

**CODE V065 £19.99**  
Running time: 74 min  
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### EVERYTHING YOU WANTED TO KNOW ABOUT PCs BUT WERE AFRAID TO ASK!



**CODE V048 £19.99**  
Running time 91 minutes  
Postage UK £1.75 Europe £4.95 R.O.W. £6.95

### KORG X5 SYNTH



Korg's new X5 synthesizer, reviewed in SOS January 1995 issue, now has its own video manual. Presented by Tim Walter in an entertaining and light-hearted manner, and explains all basic aspects of Korg's highly affordable instrument in very clear terms. If you're in any way daunted by your new purchase, or want to get a feel for the exciting capabilities before laying out your cash, this is the video for you.

**CODE V027 £19.99**  
Running time 55 minutes  
Postage UK £1.75 Europe £4.95 R.O.W. £6.95

### ROLAND XP-50

XP-50 video owners manual produced by Roland Corporation, US, and covers the major features of the instrument in detail. This is an application based video that provides many examples of how your new found knowledge can be applied. A number of the separate topic areas covered are: Effects, Choosing Sounds, Loading a Song, Loop Recording, Copying a Track to Pattern, Making an RPS, Track Editing, Multitrack Recording, Patch Editing, Creating Spills, Layers, 1/4 Patch.

**CODE V063 £24.99**  
Running time: 63 minutes  
Postage UK £1.75 Europe £4.95 R.O.W. £6.95

### ROLAND JV-90 SYNTH



Roland's JV 90 synthesizer gets the treatment in 'The Home Video Library' production. Virtually every facet of the JV 90 is covered, from the basic functions to more advanced programming. Chris Allen guides you through the powerful features this instrument has to offer. Produced in association with Roland UK & USA to ensure that everything it contains is accurate and relevant to new and more experienced users alike.

**CODE V044 £19.99**  
Running time: 110 minutes  
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RECORDING

MACKIE 8-BUS VIDEO MANUAL



CODE V068 £9.95

MACKIE ULTRA MIX VIDEO GUIDE

This highly informative video for the UltraMix automation system...

CODE V066 £9.99

START HOME RECORDING NOW!



Running time: approx 55 minutes. Postage: UK £1.75, Europe £4.95, ROW £8.95

KEYBOARDS

YAMAHA PSR6000 KEYBOARD VIDEO MANUAL

Yamaha's PSR6000 is a home keyboard with a difference...

CODE V029 £19.99

PLAY KEYBOARDS NOW!

Presented by Mike Rowley. An up-to-date workbook that gets to the heart of modern keyboard playing...

CODE V054 £12.99

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Presented by Mike Rowley. This programme will not only teach you note-reading, rhythm, rests, ties and how to move up and down the keyboard with ease...

CODE V057 12.99

HOW TO GET THE MOST OUT OF HOME RECORDING

3 TOP CLASS VIDEOS

A superbly presented set of videos which no home recordist should be without. Have you got your set yet?!

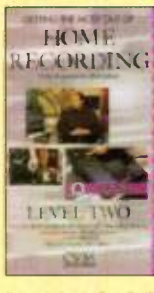
LEVEL ONE



This well presented video explains how to set up and operate a single cassette or double cassette home studio...

CODE V005 £24.95

LEVEL TWO



This is, in our opinion, the best ever guide to the equipment and skills needed to produce high quality audio from a home studio...

CODE V006 £24.95

LEVEL THREE



The video is packed with information and professional tips on advanced AEC applications in the home studio...

CODE V007 £24.95

EMAGIC

EMAGIC NOTATOR VIDEO TRAINING MANUAL



This is the video to bring you down to earth. An introduction and 216 tutorials take the user from the absolute basics...

CODE V012 £19.99

THE EMAGIC LOGIC TUTORIAL VIDEO



Produced by Emagic themselves, this video starts again with the user situated on the Macintosh screen...

- How to use the Emagic Logic software and how to use the Macintosh screen...
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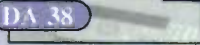
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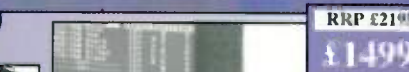
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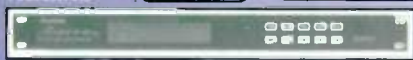
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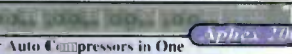
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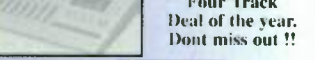


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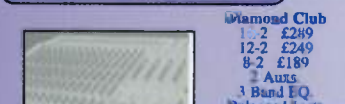
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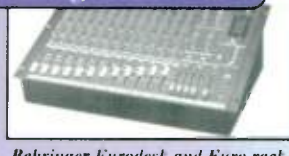
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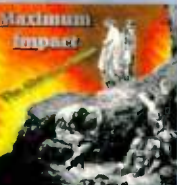
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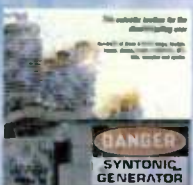
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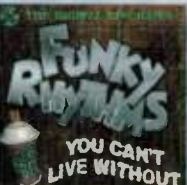
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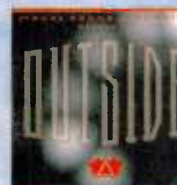
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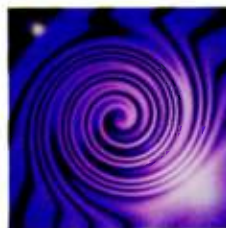
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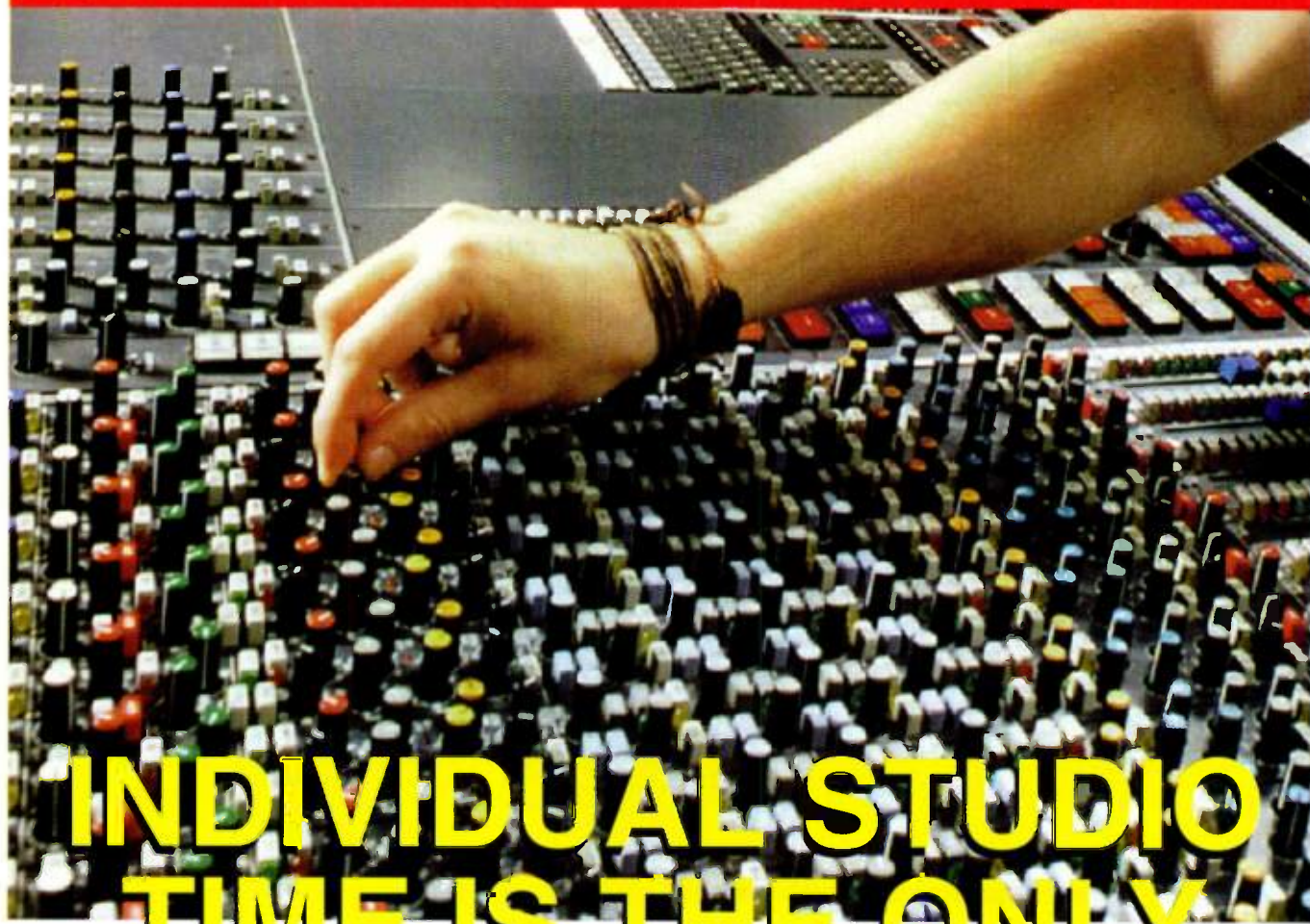


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Godric Wilkie and friends.

# sounding Off

**"Please read the manual!" runs the time-honoured advice — but what do you do when the information you need just isn't anywhere to be found? GODRIC WILKIE has a pertinent tale to tell and a plea to make...**

**M**anual labour can be hard work. When you hit a snag in your software, or find something you want to do which you know must be possible if only you could guess where they've hidden the commands, then — being a sensible person — you turn to the manual. But even supposing that you can define the exact nature of what you need to find out, if you can't find that particular topic in the Contents pages and there's no mention of it in the Index, then all you can do is read the wretched book from cover to cover — and you could still end up without any answers. You'll end up phoning the software helpline yet again, and waiting patiently in the queue for as long as it takes; eventually you'll get an answer that's probably reasonable enough. So why couldn't they tell you that in the first place? Why can't manufacturers give us the information we need?

My questions were: how do I move an audio region in a Pro Tools session to a later time in the session so that the automation I've painstakingly built up moves with it? And how do I select all regions (and automation) to the right of this point in the session so that I can move it all as one lump to later in the session? Not unreasonable queries, you might think. Aha...

Let me give you some background. I've been using Digidesign's *Sound Tools* and *MasterList* programs to edit CD masters for clients since about 1989 (I've been told that I had one of the first systems in the country).

Some years ago, I realised my SE30 was going to be left behind by Digidesign and it was time to upgrade. I decided to buy a 4-track Pro Tools system for the primary reason that the D/A to A/D conversion hardware was better quality than in the system I had, and for the secondary reason that occasionally there had been sessions (admittedly only a couple) where having an extra two tracks would have made my job a lot easier.

Then the other day a client phoned up to say that he wanted to edit a CD's worth of music — nine tracks of about six minutes each — without gaps and, in a few places, to overlay the crossfade between tracks with dialogue, and we decided to assemble the edited tracks using Pro Tools.

Once we'd positioned the tracks, we drew in automation envelopes to adjust and match the levels between tracks. While we were doing this, we had to move a region slightly and I assumed (not unreasonably, I feel) that if I moved the audio, Pro Tools would take care of moving the automation with it. Alas, I was wrong: I had to move the automation separately. On this occasion it didn't bother me too much, but I thought it a little eccentric (and my client thought it totally daft) that the automation and audio were apparently unlinked.

A few weeks later the client called again, wanting to insert a new track between the existing tracks 3 and 4. This time I knew that I really had to work out how to move both the audio and the automation at the same time (I wasn't going to redraw 40 minutes of automation!) — and it would also be nice if there was a quick way of selecting all the stuff

to the right of the third track and moving it as one.

Never mind how bad it looked to the client, then — out came the manual (luckily, I'd already admitted that I didn't know the program very well). But 10 minutes later I still hadn't discovered the answer, despite having looked up what seemed to me all the even slightly relevant items in the index. If you look up 'block mode' in the current manual's index, it refers you to page 19 — where you find no mention of it at all. Look at page 108 and the explanation for the existence of block mode is that it speeds up screen redraws — there's no mention that it also has the effect of grouping automation and audio together. Likewise, there's no explanation of the 'Select all to the right' shortcut. It doesn't seem to be mentioned in pages 175-179, which deal with selection techniques — although, randomly enough, it does appear on the keyboard shortcuts card.

So — and this was even worse than consulting a manual in front of a client — I called Digidesign's customer support (Hello Giles). I got through to an answering machine, and left my query and a request for response within 15 minutes. In the meantime, I called a few people I knew who had Pro Tools systems, including the esteemed editor of this very publication. The general response was "Yes, it's a bit of a problem with Pro Tools..." It had occurred to me that if I could select all the automation, change to the waveform displays, and then shift-click on all the audio regions and move them, the previously selected automation should move too. This worked: it was extremely laborious, but it got the job done. A few minutes later, Giles called back and told me that if the 'Region block mode' display is used, automation and audio get moved together. This also worked and was quicker than my method. Giles also told me a keyboard shortcut for 'Select everything to the right'.

Now, full marks to Giles at Digidesign for getting back to me quite quickly and telling me what I needed to know, but why could I not find out either of these two facts from the manual? I'm not even saying that they're not in there — though two of us hunting certainly couldn't find them, and nor, it seems, could the few other users I called — but if you can't actually locate information, it might just as well not be there.

By the way, I'm not really picking on Digidesign: try looking up any of the 'render' filters, or the 'hardlight/softlight' modes in any of the three *Photoshop* manuals produced by Adobe — there's diddly squat on them. No wonder there are so many third-party 'Photoshop For The Cognitively Disadvantaged' books around. (In contrast, the new *Max* manuals are really quite good.)

Much of the money that you and I pay for software is not for the R&D of the software itself, but for support — both manuals, and the techies you talk to on the phone. Since the latter represent an ongoing employment commitment, they are likely to be a considerable cost to the software company. It seems to me that if the manuals were properly written and sensibly indexed — and that means re-indexing following re-pagination as well — then most enquiries could be answered by users looking in the book. We'd all spend less time in phone queues, and the companies could save money on staff.

So software producers — write better manuals, get rid of a few tech support staff (sorry, Giles) and pass the savings on to us.

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, Cambridge CB3 8SQ. Any comments on the contents of previous columns are also welcome, and should be sent to the Editor at the same address.



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