

SOUND ON SOUND

TM

EUROPE'S NO. 1 HI-TECH MUSIC RECORDING MAGAZINE

Yamaha 01V

Digital Power without the Price!

SOUND ON SOUND



PLUS

How to Choose a Recording Setup

Clive Langer & Alan Winstanley

Focusrite Platinum VoiceMaster

& much, much more...

Lexicon Studio System Recording, Tori Amos

Preview: Moog Music UK Minimoog

WIN YAMAHA 01V DIGITAL MIXER

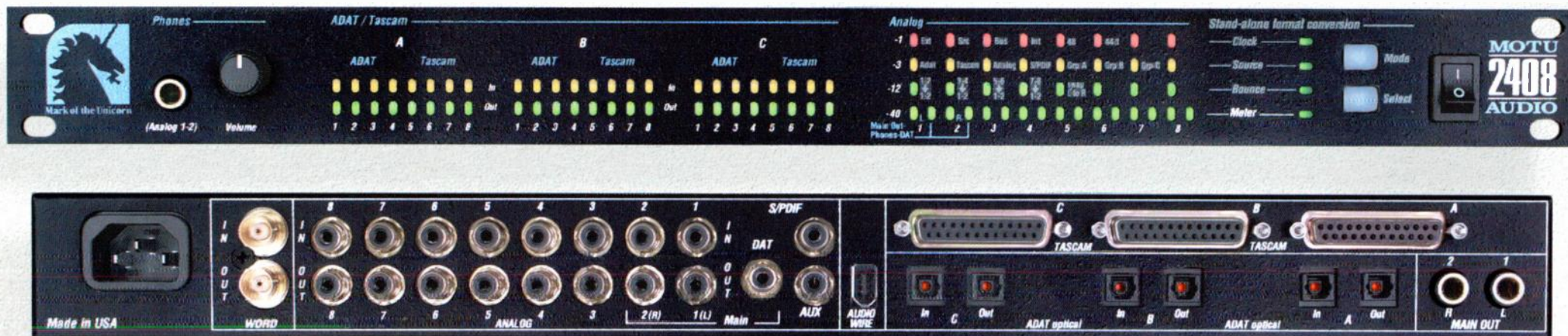
VOLUME 13
ISSUE 8
JULY 1998
£3.60

DRAWMER MX50 DE-ESSER • IMPROVING STUDIO ACOUSTICS
ALL ABOUT SUPER AUDIO COMPACT DISC • CRAIG ARMSTRONG
KORG i30 WORKSTATION • MODELLING ANALOGUE SYNTHS
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 - Korg 1212 Digital Audio PCI card
 - MOTU Fast Lane MIDI interface
 - Extended Keyboard & Mouse

ALL 3

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 - MOTU Fastlane MIDI interface
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 - Mouse

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Audiowerk8

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Logic

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One of the most sophisticated MIDI/Audio sequencing engines.

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l.a.2 audio solution

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- ATLANTIC 804/2xGB - 6.4GB Drive, 2x write CD-R, Toast Diskworks, label Kit, 10x CD's **£549**
- ATLANTIC 4xGB - 4x write Teac CD-R drive, Includes Toast, label kit, 10x CD's **£369**
- PACIFIC T04 Twin 8.4GB SCSI hard Drives + Diskworks RAID software **£699**
- PACIFIC 804 6.4GB SCSI hard Drive + Diskworks software **£299**

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I've just returned from the AES pro audio show in Amsterdam and it seems the latest industry buzzwords are in fact numbers — 24, 96 and 5.1 to be specific. Earlier this year we were told that 16-bit audio wasn't up to the job, so we'd have to upgrade to 20-bit or even 24-bit to qualify as being in any way professional. You may also recall that in the context of pop music (where all the money is), I felt going 24-bit did little more than allow you to record low-level hum and noise far more accurately than ever before, but then 24-bit converters are cheap now, and you only need 50% more drive space to store 24-bit data than you do to store 16-bit data, so what the hell!

Now, because of all the fuss and hype about Digital Versatile Disc (DVD), the much-vaunted replacement format for CD, it seems that future pro audio systems should work at a 96kHz sampling rate, twice that of the current 48kHz 'professional' format. The higher frequency is not simply to annoy bats, but rather to reduce the side-effects of the very steep anti-aliasing filters that in present digital systems lurk just beyond the reach of human hearing. I've attended one of these high-resolution audio listening tests, and under controlled conditions with discerning material (usually classical), you can just about tell the difference (but then the original analogue source material still tends to sound better to me!).

For better or worse, 96kHz audio is being adopted as a new standard, so not only do we need to double the amount of storage space, but also double the rate at which every piece of electronics processes the audio signals. Personally, I'm not sure the difference is worth it, or even musically relevant, but it's only a matter of time before more sophisticated project studio equipment starts to tout 24/96 as a reason to buy.

The other number to thank DVD for is 5.1 — the most common format for 5-speaker (plus sub-bass) surround sound. With DVD, not only can films be mixed in surround sound, but also music. If the techno-optimists are to be believed, everyone in the future will have a multifunction home entertainment system providing surround theatre sound for TV, music, games, Internet shopping and who knows what else. Nobody is quite sure about the best way to use surround for music without being gimmicky, but that doesn't matter — it's here, so studios are hedging their bets and tooling up for 5.1 mixing. This opens up several new cans of worms, because few studios are acoustically suitable for surround mixing, and nobody to my knowledge actually produces a

digital effects unit with discrete multi-channel algorithms. But give it time...

So when do we get to buy all this DVD surround stuff? The hardware will be available soon, though initially restricted to playback-only — the recordable version is due later. Say whatever you like about the DVD technology, but until it can



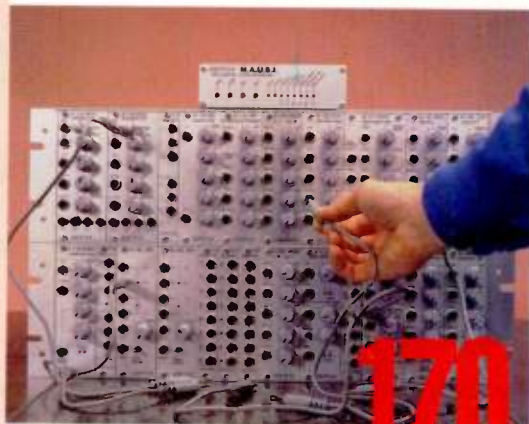
function as a high-definition video recorder with instant rewind, it won't be on my shopping list.

Ironically, while half the exhibitors were mumbling "24/96/5.1" to each other, the rest were either touting compression software to allow audio to be squeezed down the Internet or for making 5.1 surround fit on a DVD along with the picture! Audio quality is being given with one hand and taken away with the other. But back in the real world of Amsterdam's cafes and bars, most of the dance music we heard was tortured by distortion, undersampling, bit rate reduction or simulated vinyl noise. I don't imagine it'll sound much different at 24/96, though the surround element might be fun. Dave Lockwood and I even thought we heard flanged SMPTE code being used as a sound effect on more than one track! You can imagine the debates in a couple of years' time: "I think timecode values between 02:35:00:00 and 02:47:30:00 sound much warmer than those above 03:00:00:00. What do you think?"

And finally... don't pass up the chance to tell us how we can make SOS even more to your liking; fill in the Reader Survey form in this issue or, better still, visit our website and complete the form online (www.sospubs.co.uk/survey).

I look forward to your feedback.

Paul White Editor



170
Doepfer A100

REVIEWS

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- 162** Korg i30 Workstation
- 170** Doepfer A100 CV Modular Synth
- 178** Lexicon Studio Recording System
- 194** Yamaha 01V Digital Mixer
- 214** Waveit Soundfonts & Wien Editor
- 222** Art Quadra/FX 4-Channel Multi-effects
- 230** Yamaha WX5 Wind Controller
- 234** Miditemp MP88W MIDI File Player/Matrix

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SOUND ON SOUND

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Mail Order Kerry Millar

Photography Ewing-Reeson

Colour Scanning Goodfellow & Egan Ltd

Colour Origination Spectrum Print Ltd

Colour Planning WYSIWIG

Printing Warners Midlands plc

Newstrade Distribution Warners Group

Distribution Ltd. The Maltings, Manor Lane,

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sos.subs@sospubs.co.uk

UK £36 Europe £60 World £75

Payments in sterling through UK bank

ISSN 0951-6816



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SOUND ON SOUND

1998 Reader Survey & Prize Draw

To ensure we keep on delivering the best possible articles each month, we'd welcome your help. By returning this simple questionnaire you will provide us with valuable data on which to base the future content of your favourite hi-tech music recording monthly. In return, you will be automatically entered into our **Special Prize Draw** to win a superb Marantz CDR630 CD Recorder!

CDR630

LEVEL

Marantz Professional CDR630 Recorder

Marantz Professional's new CDR630 delivers the latest CD-R technology to both the professional and home recording markets for just £749 including VAT, making rewritable CD-R a serious alternative to DAT mastering for the first time.

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The transparent Serial Copy Management System enables free editing and compiling from original source material, and the Sampling Rate Converter Bypass function permits fully transparent bit to bit cloning of 44.1kHz source audio. This is further facilitated by the CD Sync feature for auto-start recording from digital sources.

The CDR630 comes as a standard 19" rackmount unit complete with the RC5 infrared remote control.

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Reader Survey Online!

To help us compile the results much more quickly, we have created an electronic version of this Survey on the *Sound On Sound* website. It is located at:

<http://www.sospubs.co.uk/survey>

Ideally, we would prefer all readers with Internet access to complete the website Survey, otherwise this paper version will do just fine.

All Surveys (electronic or paper) must be received by Monday 31st August 1998 to be entered in the Prize Draw

ALL SECTIONS MUST BE COMPLETED TO BE ELIGIBLE FOR ENTRY

Please CIRCLE the numbers on this form and reply where indicated or complete the Electronic Survey on our website:

<http://www.sospubs.co.uk/survey>

Only forms received by Monday 31st August 1998 with ALL sections completed will be eligible for entry to the Prize Draw.

ABOUT YOU...

What Age are you?

001 29

What Sex are you?

002 Male 003 Female

What is your main Occupation?

004 MUSICIAN

What is your Annual Income?

005 up to £9,999
006 £10,000—£14,999
007 £15,000—£19,999
008 £20,000—£29,999
009 £30,000—£39,999
010 £40,000 or more

Is your main Income derived from music/recording?

011 Yes 012 No

What is your MAIN Instrument?

013 Keyboards
014 Guitar
015 Bass
016 Vocals
017 Drums
018 Other
019 None

Do you play in a Band?

020 Yes 021 No

Have you ever had your music commercially released?

022 Yes 023 No

Do you currently have Internet access?

024 Yes at Work/College
025 Yes at Home
026 No, but intend to
027 No

Which Email/Bulletin Board services do you use?

028 None
029 CompuServe
030 AOL
031 CIX
032 Internet
033 Other

Have you visited the SOS website?

034 Yes 035 No

What services would you most like to see on the SOS website? 036

DON'T KNOW 'CAUSE I
AM NOT ON THE NET

Have you ever bought from the SOS Mail Order shop?

037 Yes 038 No

Have you ever attended a Music Technology or Recording course

039 Yes: Music Technology
040 Yes: Recording
041 No, not interested
042 Not yet, but considering it

How often do you use commercial MIDI Files?

043 Regularly
044 Occasionally
045 Never use them

Which of these subjects interest you?

046 Desktop Video
047 Internet Audio
048 Multimedia
049 None of them

Where/how do you buy most gear?

050 Local Music Shop
051 Non-Local Music Shop
052 UK Mail Order
053 non-UK Mail Order
054 via Internet
055 Secondhand

Do SOS Reviews influence your decision to buy equipment?

056 Yes 057 No

Do you own a Guitar?

058 Yes, Acoustic
059 Yes, Electric
060 No

How often do you play Gigs?

061 Regularly
062 Few times a year
063 Never gig

Did you visit any major public Music Exhibition/Show in 1997-98?

064 Yes 065 No

Did you visit the 'Mad About Music 98' show at Docklands Arena this June?

066 Yes 067 No

MAGAZINE CONTENT...

Would you like to see more Product Reviews in SOS?

068 More reviews
069 Less reviews
070 Keep the same

How do you rate SOS Product Reviews?

071 Highly informative
072 Not critical enough
073 OK as they are
074 Not as good as other mags'

Do you feel SOS reviews need to contain a rating system?

075 Yes 076 No

Would you like to see more Practical/Technique articles in SOS?

077 More
078 Less
079 Keep the same
080 On what subject?
..... MIXING

Would you like to see more Musician Interviews in SOS?

081 More
082 Less
083 Keep the same
084 Who? BILLY JOEL
TRACES OF RED

Would you like to see more Producer/Engineer Interviews in SOS?

085 More
086 Less
087 Keep the same
088 Who? GEORGE MARTIN

Would you like to see more Retrospective Reviews in SOS?

089 More
090 Less
091 Keep the same

Would you like to see more interviews with Equipment Designers/Manufacturers?

092 More
093 Less
094 Keep the same

Would you like to see Buyer's Guides in SOS?

095 Yes 096 No

Do you feel Head to Head reviews are useful?

097 Yes 098 No

Would you like to see more News?

099 More
100 Less
101 Keep same amount
102 Do not read News

Would you like to see features on Readers' home studios in SOS?

103 Yes 104 No

Which Computer columns do you read?

105 PC Notes
106 Apple Notes
107 Atari Notes
108 None

How do you rate our 'Demo Doctor' pages?

109 Essential reading
110 OK
111 Read it occasionally
112 Never read

How do you rate our 'Sample Shop' pages?

113 Essential reading
114 OK
115 Read it occasionally
116 Never read

YOUR EQUIPMENT...

How much have you spent on equipment/software in the past 12 months?

- 234 nothing
 235 £1—£499
 236 £500—£999
 237 £1000—£1999
 238 £2000—£2999
 239 £3000—£3999
 240 £4000—£4999
 241 £5000—£9999
 242 £10,000—£19,999
 243 £20,000—£29,999
 244 £30,000 or more

How much do you intend spending on equipment/software in the next 12 months?

- 245 nothing
 246 £1—£499
 247 £500—£999
 248 £1000—£1999
 249 £2000—£2999
 250 £3000—£3999
 251 £4000—£4999
 252 £5000—£9999
 253 £10,000—£19,999
 254 £20,000—£29,999
 255 £30,000 or more

Which of these do you intend buying in the next 12 months?

- 256 None
 257 Keyboard
 258 Guitar
 259 Sampler
 260 Computer
 261 Signal Processor
 262 Analogue Mixer
 263 Digital Mixer
 264 Multitrack Recorder
 265 DAT Recorder
 266 CD Recorder
 267 Microphone
 268 Monitor Speakers
 269 Other (specify)

Do you own a Sampler?

- 270 Yes
 271 No

How often do you buy Sample CDs?

- 272 Regularly
 273 Occasionally
 274 Never

Which of the following items have you bought NEW or SECONDHAND in the past year? (Please circle number and kindly specify make/model of device)

New	SI/Hand	
302	303	Synthesizer keyboard
304	305	Sound module
306	307	Sampler (hardware)
308	309	Sampler (software)
310	311	Computer
312	313	Computer Soundcard
314	315	Sequencer (software)
316	317	Sequencer (hardware)
318	319	Mixer (analogue)
320	321	Mixer (digital)
322	323	Multitrack reel-to-reel
324	325	Multitrack cassette
326	327	Multitrack Digital
328	329	Hard Disk recorder
330	331	DAT recorder
332	333	Drum machine
334	335	Home keyboard/E.Piano
336	337	Microphone
338	339	Monitor speakers
340	341	Multi-effects unit
342	343	Guitar
344	345	Guitar effects pedal
346	347	Mic preamp unit
348	349	EQ unit
350	351	Dynamics unit
352	353	Voice Channel unit
354	355	External Storage device
356	357	Power amplifier
358	359	Instrument Amp
360	361	PA system

NONE

Which Computer(s) do you own?

- 275 PC Pentium II
 276 PC Pentium I
 277 PC 486/386/286
 278 Apple Power Mac
 279 Apple Mac 68020/030/040
 280 Atari ST series
 281 Atari Falcon
 282 Amiga
 283 Other NONE

Which computer platform are you most likely to adopt next?

- 284 PC
 285 Apple Power Mac
 286 Silicon Graphics
 287 Other DON'T KNOW

Do you own a CD player?

- 288 Yes
 289 No

Do you own a CD-ROM drive?

- 290 Yes
 291 No
 292 Intend to buy

Do you own a CD Recorder?

- 293 Yes
 294 No
 295 Intend to buy

Do you own a Video Camera?

- 296 Yes
 297 No

Which of these MIDI Controllers do you own?

- 298 Wind Synth
 299 MIDI Guitar
 300 MIDI Drum Pads
 301 None

Remember:
 to enter the Prize Draw
 you must complete
 all the questions

How do you rate our Readers Ads' service?

- 117 Essential reading
 118 Read occasionally
 119 Never read

Would you like to see Live Sound coverage in SOS?

- 120 Yes
 121 No

Would you like to see more guitar-related coverage in SOS?

- 122 More
 123 Less
 124 Keep the same
 125 No

How do you rate SOS's look and page designs?

- 126 Great!
 127 OK as they are
 128 Boring
 129 Stop me reading articles

How do you rate SOS's technical level/content?

- 130 Hard to understand
 131 Just right
 132 Too easy

What is your MAIN reason for buying SOS? (circle ONE answer only)

- 133 for Reviews
 134 for Features
 135 for Workshops
 136 for News
 137 for Free Ads
 138 for Manufacturer Ads
 139 for Retailer Ads

More questions overleaf...

► Is there something you would like us to change in SOS?

140 No
 (141) Yes (please specify)

TAKE US THROUGH THE RECORDING PROCESS OF SOME CLASSIC SONGS FROM THE PRODUCERS POINT OF VIEW, FROM START TO FINISH.

What topic(s) would you like to see covered more in SOS? 142

LIVE GIGS

What do you need most help with in your recording/music? 143

MIXING

READING HABITS...

How often do you read SOS?

144 1 to 6 issues a year
 145 7 to 11 issues a year
 (146) 12 (via newsagent)
 147 12 (subscribe)

What do you do with your copy of SOS after reading it?

(148) Keep it
 149 Pass it to a friend/colleague
 150 Throw it away

How many other people regularly read your copy of SOS?

(151) Only me
 152 1 other
 153 2 others
 154 3 others
 155 4 others
 156 5 or more

How do you rate cover-mount CDs on music mags?

157 Main reason I buy that mag
 158 Generally useful
 (159) Not really useful
 160 Don't buy mags with CDs
 161 Wish SOS had one

How often do you read the following magazines?

Electronic Musician
 162 1 to 6 issues a year
 163 7 to 11 issues a year
 164 12 - newsagent
 165 12 - subscriber
 (166) Never read
EQ
 167 1 to 6 issues a year
 168 7 to 11 issues a year
 169 12 - newsagent
 170 12 - subscriber
 (171) Never read

Future Music

(172) 1 to 6 issues a year
 173 7 to 11 issues a year
 174 12 - newsagent
 175 12 - subscriber
 176 Never read

Guitarist

177 1 to 6 issues a year
 178 7 to 11 issues a year
 179 12 - newsagent
 180 12 - subscriber
 (181) Never read

Guitar Techniques

182 1 to 6 issues a year
 183 7 to 11 issues a year
 184 12 - newsagent
 185 12 - subscriber
 (186) Never read

Keyboard

187 1 to 6 issues a year
 188 7 to 11 issues a year
 189 12 - newsagent
 190 12 - subscriber
 (191) Never read

Keyboard Player

192 1 to 6 issues a year
 193 7 to 11 issues a year

194 12 - newsagent
 195 12 - subscriber
 (196) Never read

Making Music

(197) 1 to 6 issues a year
 198 7 to 11 issues a year
 199 12 - newsagent
 200 12 - subscriber
 201 Never read

Music Mart

202 1 to 6 issues a year
 203 7 to 11 issues a year
 204 12 - newsagent
 205 12 - subscriber
 (206) Never read

Rhythm

207 1 to 6 issues a year
 208 7 to 11 issues a year
 209 12 - newsagent
 210 12 - subscriber
 (211) Never read

The Guitar Magazine

212 1 to 6 issues a year
 213 7 to 11 issues a year
 214 12 - newsagent
 215 12 - subscriber
 (216) Never read

The Mix

217 1 to 6 issues a year
 218 7 to 11 issues a year
 219 12 - newsagent
 220 12 - subscriber
 (221) Never read

Total Guitar

222 1 to 6 issues a year
 223 7 to 11 issues a year
 224 12 - newsagent
 225 12 - subscriber
 (226) Never read

Which of these magazines do you also receive?

227 Audio Media Europe
 228 Audio Media USA
 229 Mix USA
 230 Pro Sound News Europe
 231 Pro Sound News USA
 232 Studio Sound
 233 Technologica

NONE

Thank you for completing this Survey. Your valuable comments will help to shape the future direction of the magazine.

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 Telephone _____ Email _____
 Signature M. Alker Date 15/7/98

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 SOS Reader Survey, Media House, Trafalgar Way, Bar Hill, Cambridge, CB3 8SQ, England.

PRIZE DRAW RULES

1. Only fully completed Reader Survey forms received by the closing date of Monday 31st August 1998 will be eligible for entry to the Prize Draw.
2. Only ONE entry per person is allowed, either on this paper form or electronically via our website. Duplicate entrants will be excluded.
3. The winner will be selected randomly from all eligible entries.
4. Employees of SOS Publications Group and Marantz are excluded from entry.
5. No cash alternative is available in lieu of the prize.
6. The judge's decision is final and legally binding.

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Crosstalk

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

Our email address is sos.feedback@sospubs.co.uk

The SOS web site can be located at www.sospubs.co.uk

Pedalling Furiously

I have a problem that I think you may be able to help me with. Years ago, circumstances forced me to part with my acoustic drumkit, but the lady in my life sought to console me by purchasing a Yamaha DD11 drum pad/machine as a substitute [ah, the power of love — Assistant Ed]. Little did she realise where it would all end...

Having added a few bits like a Korg 05R/W, a Roland JV1080, a Novation Drumstation and Bassstation to my setup, I still like to play the drums rather than program them in my sequencer; so my DD11 gets used quite a bit. This is where the problem arises. The DD11 has no hi-hat pedal, and the bass drum is accessed via a switch with a fixed velocity, although the eight pads on the DD11 are velocity-sensitive. Is there a MIDI hi-hat and/or bass drum pedal that I could use that will just produce the right MIDI notes (with programmable velocity if possible)?

for dedicated drum kit modules (such as Roland's TD7/TD9 or the Yamaha TMX) or with some kind of trigger-to-MIDI converter. There aren't any pedals I know of that have a built-in ability to send MIDI notes.

The cheap way round your problem would be to get a second-hand trigger-to-MIDI interface — Simmons did a fairly basic one called the TMI — and then use it to trigger the sounds of the DD11, provided the DD11's bass and hi-hat are available as an assignable MIDI note number.

Your second option would be to get something like the Alesis D4 or DM5. These have inputs for pedals and pads (though of course they also have lots of sounds which would boost your available drum armoury). What you could then do is MIDI the D4 up to the DD11, plug some footpedals into the D4 and then either trigger bass drum and hi-hat from the D4 directly, or do the same thing via



A more modern drum unit like the Alesis DM5 could help expand the MIDI potential of an older unit like the Yamaha DD11 no end... without the need to throw away the DD11 itself!

I don't really want to go to the expense of a drum brain; just nice simple pedals that I can run through my MIDI merger so I can get a bit more feel on the hat and bass drum.

Please help; I just hate going back and trying to add feel in the piano roll editor in Cakewalk...

PS: nice mag; keep up the good work. I have just resubscribed for another year...

John Hazel
via email

Nicholas Rowland, author of the recent SOS series on rhythm programming, replies: *This is a tricky problem. The hi-hat and bass drum pedals I know of that are currently on the market are made by KAT, Roland and Yamaha, but they are all designed to be used as triggers*

MIDI. Assuming the DD11 also sends out MIDI information, you could also use the DD11 to trigger the D4 via MIDI. This way, your D11 would still be useful in the studio (thus causing no offence to your partner), you'd have lots of extra sounds to play with, and you could also hook up the D4 to your Novation Drumstation, or other MIDI gear. The reason I mention the D4 is that it's been deleted, and some stores are still selling it off cheap (I'm assuming you're on a budget). Mind you, Yamaha TMXs were also going cheap recently.

You might also want to get more pads and develop a complete electronic kit. If it is interesting sounds you want (cheaply), you could consider something ancient like an Simmons SDS9 brain plus a few pads. □

Stop the Presses... Oh, it's too late

Just before this month's SOS went to the printers, we received a phone call from Unity Audio, UK distributors of Earthworks microphones, to say that the

prices of the mics and mic preamp reviewed in this issue (see page 146) had all been cut slightly — and in the case of the Z30X cardioid, cut significantly. We tried to get the info on to the review itself, but those pages were already at the printers. So then we tried to get it onto this month's News pages — only to find they'd just gone too! In fact, the only place we could get the info in was here. On the Letters page. Yes, we know it's not ideal, but you can't say we don't try to bring you the latest information...

So, here, finally, are the new prices; please disregard the ones given on page 152 and in the text of the review there. Obviously, the significant price cut makes the Z30X

even more attractive than it appeared to Hugh Robjohns! □

Earthworks Z30 cardioid £675.63;
OTC1 omni £945.88; LAB102 preamp £1410.

ASSISTANT EDITOR

Sound On Sound, Europe's leading hi-tech music recording magazine, requires a highly motivated individual for this important post within our expanding editorial team.

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Please forward detailed CV and covering letter to: Ian Gilby,
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ALESIS

► Preaching to the Converted

I wonder if you can help me; I recently converted a wave track with a sample rate of 32kHz from my PC version of Cubase to 44.1kHz using Wavelab (as the only formats supported by my CD-R are 11, 22, or 44.1kHz). To my horror, some of the data had either gone or was suddenly outputting very little sound when I got back into Cubase. Do you have any idea why this might be, or how I could solve this? Thanks for your time.
Benjamin Piot
via email

Martin Walker replies:

Sorry to hear about your problem. Most people use the 44.1kHz sample rate in Cubase, since this is the most universal setting, and, as you have found, it makes it easier to use with a CD-R (whether you are saving data or burning an Audio CD). The 32kHz setting will certainly give better sound quality than the 22kHz multimedia one, but many applications regard it as non-standard, and some soundcards won't play back at 32kHz at all! In general, unless your PC is struggling to work with Cubase at 44.1kHz, I would stick with this sample rate.

However, Wavelab does support 32kHz, and even if you converted the sample rate up to 44.1kHz, it wouldn't remove any data — it would simply increase the length of the sound file. If something is missing when you returned to Cubase, it might be because you have mixed 32 and 44.1kHz files. The solution would be to load the file in question into Wavelab directly, change the sample rate back to 32kHz there, and save it. Then, when you next launch Cubase, you should be back to exactly where you started. Hope this helps! □

Mac Vs PC (Part 473)

"There's no such thing as bad publicity". This little epithet has been well proven in the pages of SOS over the last year or more. My letter is prompted by the interesting parallel drawn by two articles in the June '98 issue; namely Sounding Off (which dealt with the apparent lack of interest in the Mac platform), and yet another lengthy article on how to sort out your malfunctioning PC and software. This time there were six pages describing all the enjoyable steps you can undertake in order to persuade your PC to play MIDI and audio in sync (what a novel idea...).

Looking back over the last year (I keep all my back issues; they form one of the best sources of reference for the A-level Music Technology course I teach), I see that there have been many articles on all the problems the PC musician could encounter, such as optimising soundcards, discovering whether the chipset and drivers work, whether all the bits are in the case, and the aforementioned sync issue. And for the Mac? ...nothing. I wonder why?

I recall back in '95 you ran a series of articles showing what was involved in using either system. The Mac piece (just the one) explained how it worked, what software was available, and how you would use it. The PC equivalent took two articles in successive months to deal with all the problems and possible solutions. Whilst this is a source of pleasure to me (not the PC problems, that's up to the PC owners; the pleasure that I get is to just carry on using my system to make music) it does highlight a problem: your readers are continually bombarded with PC this and PC that until they begin to perceive that the Mac doesn't exist any more, and then of course the rot sets in. Manufacturers believe that they will make more money selling cards and software to PC owners, because people lose awareness of the existence of the Mac alternative and don't consider buying it. And of course, there aren't so many good Mac games for the kids to play on...

So here's my idea to help deal with the situation. Why don't you run a series of articles over the coming year dealing with spurious

or invented problems affecting the Mac, together with inexpensive 'solutions'? Here are a few suggestions:

- How to make sure the Mac recognises the soundcard you've just installed (solution: make sure you've slotted the card inside the Mac, and not inside the family toaster);
- How to make sure Mac-based audio and MIDI tracks play in sync (solution: keep the live players sober);
- How to minimise hum and noise from the Mac's internals, and thus avoid interference with your audio signals (solution: bypass the Mac's monitoring system — yes, that tiny little speaker; it's not a patch on ATCs — and use its built-in 16-bit D/A converters, by inserting a jack plug connected to your mixer);
- How to fix the Millennium bug (solution: er, sorry, I can't offer one — what's a Millennium bug?).

Honestly, I don't want to get involved in the Mac/PC battle which rages elsewhere; there is room enough in the world for both platforms to co-exist, and it's fine by me that others make their choice for their own reasons, but it does concern me that the very strengths of the Mac (open-ended software and hardware compatibility, reliability, professional quality, confidence-inspiring operating system and utter simplicity of upgrade path — look at the G3 processor card you can slot straight into an old 7100, for instance! — and yes, sheer value for money in the long run) lead directly to a lowering of its profile in the eyes of the general public.

"There's no such thing as bad publicity" ... so please print this letter!

John Compton
via email

Editor Paul White replies: *You don't need to convince me — I've got six aging Macs at home (including an ancient portable) that I use for writing my SOS articles, creating graphics for our technique articles, handling my email, editing and compiling commercial albums, and when time allows, even doing a bit of my own*



music. I've also got a PC that I use as an occasional stand for review gear! Sure, PCs can be made to work for music, but being realistic, you have to know quite a lot about them, and when they fall over badly, you often need familiarity with DOS to make them go again. I've tried to install and run various bits of music software and hardware on the PC (purely in the interests of science, you understand) and I'd estimate that at least 50 percent of the time, I have serious problems that require the assistance of Martin Walker to sort them out. In fact, after a hard session with the PC, I often come to the conclusion that it would make a good adventure playground for a hamster and not much more. Then again, when you do eventually get them working, they're usually fine.

A Mac support article along the lines you suggest would be fun. I nearly did a similar thing when Martin Walker wrote six pages last year on how to wipe the hard drive on a PC and reinstall the software. I was going to add a 50-word sidebar explaining how you'd do the same thing on a Mac, but I thought it a little unfair on him! In the PC's favour, it is a little cheaper, generally by about the cost of a 17-inch monitor, and you can get lots of good-value soundcards that combine MIDI with audio. On the Mac, there are few, if any, soundcards with onboard synths, and you always need an external MIDI interface, unless you have a synth with a Mac/PC host socket.

In the Mac's favour, you get built-in audio that's of better quality than most low-cost PC soundcards can manage, the operating system is easier to deal with (especially if you've moved up from an Atari), there's far less hassle with drivers (most standard MIDI interfaces don't even need one), software installation (and de-installation) is easier, and you can save a fortune in psychiatric help! I don't expect to convince the PC diehards amongst you, and if you can get your hardware to do what you want, then you've clearly made the best choice, but from where I stand, buying a Mac is more likely to help you make music, while buying a PC will almost certainly help you learn a lot about how computers work! □

CR1604-VLZ

First read the mixer ads. Then listen to the mixers. You'll discover why our original CR1604-VLZ[®] is the overwhelming choice of audio professionals.

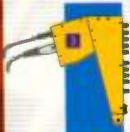
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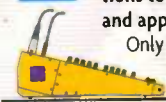
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in minutes from a table top or rack-mount mixer with input/output jacks on the top (1 & 2) to a space-conserving 8-rack space mixer with jacks to back (3) — rack rails are included. Add our optional RotoPod-VLZ bracket and rotate the input/output pod to the same plane as the mixer's controls (4 & 5) for patching-intensive applications.

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WRB

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

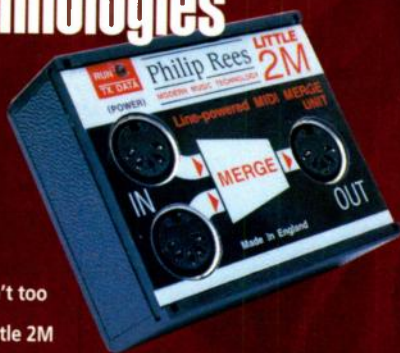


shape of things to come

by Derek Johnson

Merging Technologies

There's been a new addition to Philip Rees's family of handy MIDI gadgets. If your MIDI merging demands aren't too complex, the £39.95 Little 2M MIDI merge unit could be for you. Not only does it derive its power from the MIDI stream — no batteries are required — but it can also handle all MIDI messages, including System Exclusive and MIDI Time Code. There's even an indicator LED which lights when power is OK, dips to indicate 'transmit data flow', flashes during moments of dense data flow, and flashes



rapidly when data is just clocks or MTC. Note that this unit does not replace the mains-powered 2M, which is still available, priced at £69.95.

A Philip Rees Modern Music Technology, Unit 2, Clarendon Court, Park Street, Charlbury, Oxford OX7 3PT, UK.

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Cakewalk's Lucky 7?

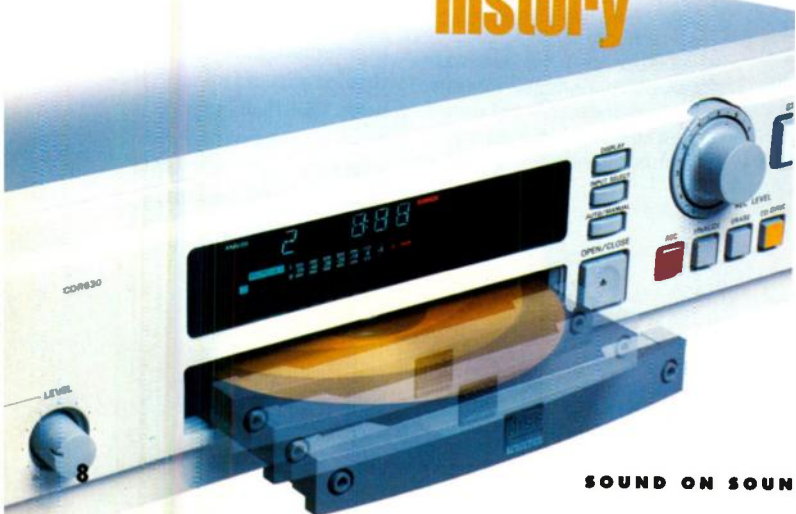
The Cakewalk range of MIDI and digital audio PC programs has reached version 7. The range includes *Cakewalk Pro Audio 7*, *Cakewalk Pro Audio Deluxe 7*, *Cakewalk Professional 7* and *Cakewalk Home Studio 7*. Real-time audio effects, using 32-bit floating-point processing, are now available in all four programs, and the new versions also include an onscreen console for recording and mixing MIDI and digital audio from a single window, plus an updated user interface with customisable tool bars. *Pro Audio 7* also works with multi-channel soundcards that provide multiple Windows wave drivers. Notation editing and printing have also been enhanced, with improved layout, spacing, and control.

As well as handling the Cakewalk range in the UK, Et Cetera are also the distributor of Turtle Beach's new £120 Montego A3D PCI card for the PC platform. The full-duplex board offers 18-bit converters with recording at up to 48kHz, 92dB signal-to-noise ratio, 64-voice wavetable synthesis, and Aureal "3D positional audio". An MPU401-compatible MIDI interface is included, and the card can be expanded with an optional S/PDIF digital audio board and a Waveblaster-compatible daughterboard for connecting an optional wavetable expansion card.

A Et Cetera Distribution, Valley House 2 Bradwood Court, St Crispin Way, Haslingden, Lancs BB4 4PW, UK.

T +44 (0)1706 228039.
F +44 (0)1706 222989.
W www.etcetera.co.uk

Marantz rewriting history



Marantz Professional's new CDR630 offers recordable CD technology to pros and home users for £749, making it competitive with many pro DAT recorders. The rackmounting CDR630 is the first machine to be capable of both playing back CD, CD-R (recordable) and CD-RW (rewritable) discs, as well as recording to professional CD-R and CD-RW discs. The spec includes both balanced XLR and unbalanced phono analogue inputs and outputs, S/PDIF co-ax and optical digital I/Os, and a 'transparent Serial Copy Management System' that enables free editing and compiling from original source material. Indexes from CD, MD, DAT and DCC sources are automatically translated to CD track numbers, and when recording from

analogue sources the CDR630 will detect a gap and change in level of a new section, and instantly increment the track number. In addition, a sampling-rate converter bypass function permits fully transparent bit-to-bit cloning of 44.1kHz source audio.

If you like what you're reading about the Marantz CDR630, fill in the SOS Reader Survey that's tucked into this issue: you'll be entered into a draw with a CDR630 as the prize.

A Marantz Professional, Kingsbridge House, Padbury Oaks, 575-583 Bath Road, Longford, Middlesex UB7 0EH, UK.

T +44 (0)1753 686080.
F +44 (0)1753 686020.
W www.marantz.com

SAE enters Disney's World

SAE Technology College has announced a "co-operative relationship" with Walt Disney Entertainment. In order to meet its worldwide needs for sound and lighting technicians, WDE has agreed to work with SAE's 26 international schools to develop a sound reinforcement training program, based on SAE's sound engineering courses, centred around the specific needs of WDE. Students completing this program will be eligible for internships at any of the many WDE sites of live productions. The School of Audio Engineering Institute of Technology opens its first United States establishments, in New York and Nashville, later in 1998.

In addition, SAE have informed us of their purchase of three SSL G+ series consoles: one of the desks will be installed at the London campus. SAE's expansion program also includes plans for a new school in Athens, Greece: details are currently being finalised.

A SAE Technology College,
United House, North Road,
London N7 9DP, UK.
T +44 (0)171 609 2653.
W www.sae.edu



Danger, new XB!

Six years after the launch of their XB2 drawbar keyboards, a digital recreation of the Hammond tonewheel sound, Hammond have introduced the XB1 keyboard, priced at £1098.

This new instrument offers an up-to-date recreation of the classic B3 sound, in a lightweight (11kg) package. All the traditional Hammond features are present: nine individual harmonic drawbars; touch-sensitive harmonic percussion; and Hammond scanner vibrato and chorus in three degrees. In addition, a totally new 'Digital Leslie'

emulates the sound of separate horn and bass rotors, along with adjustable slow and fast speeds, and rise, fall and brake times, the raspy gritty sound of the overdriven tube amp, and the ability to create different microphone positions for the ultimate in favourite Hammond/Leslie settings.

The XB1 also features a sophisticated MIDI implementation, and its ability to transmit on four MIDI channels at once, with zoning and layering, allows you to use the instrument as your master keyboard.

A Hammond UK, 19 Presley Way, Crownhill,
Milton Keynes, MK8 0ES, UK.
T +44 (0)1908 263990.
F +44 (0)1908 265955.
E hammonds@computalynx.co.uk

Digital desk breaks £1000 price barrier

Only a few years ago, digital mixers were just a twinkle in the eyes of audio equipment designers. Now, of course, they're an increasingly realistic prospect for the project studio and we're about to bring you tidings of a new one from Tascam which makes a smaller hole in the wallet than ever before: £899. The TMD1000 Digital Recording Mixer is a 16-channel, 24-bit mixer designed to directly interface with Tascam's own DA98, DA88 and DA38 8-track digital recorders. The new desk was designed with the benefit of elements from the professional-level TMD8000 (reviewed SOS May '98), and features:

- 8 analogue mic/line inputs, four with XLR mic inputs (48V phantom power).
- 3-band sweep EQ on all inputs.
- 3 assignable onboard effects processors, including dynamics processing, reverb, chorus, delay, flange, and so on.
- 8 channels of TDIF1 digital I/O (Tascam's proprietary digital interface).



- 2 XLR AES/EBU digital outputs.
- 2 S/PDIF digital outputs.
- Stereo monitor output.
- External digital input.
- Balanced and unbalanced stereo outputs.
- Up to 128 scene memories which can be recalled from the front panel or via MIDI.

MIDI I/O and MMC (MIDI Machine Control). Future firmware enhancements can be introduced via MIDI.

Tascam say that critical mixing controls, such as faders, pan, mute and tape transport controls, are

hardware-based for instant access, while functions which need to be adjusted less often are quickly accessed via an LCD display. The TMD1000 can be expanded with two optional cards — one which adds an extra eight channels of TDIF interface plus four channels of AES/EBU or S/PDIF digital, and one which doubles the desk's onboard effects. Needless to say, SOS will be there with an early review of this desk, which should be available in the Autumn.

A Tascam, 5 Marlin House,
The Croxley Centre, Watford,
Herts WD1 8YA, UK.
T +44 (0)1923 819630.
F +44 (0)1923 236290.
W www.tascam.com

Asio, Asio, it's off to work we go...

An ASIO driver is now available for Creamware's family of PC audio cards, allowing them to be used with Steinberg's *Cubase VST MIDI + Audio sequencer*. In fact, £399 gets you the entry-level dedicated MMPort for *VST* package, which features stereo analogue and S/PDIF digital ins and outs, plus MIDI In and Out. The four-channel MMPort system is upgradeable to Mport or the top-of-the-range TripleDAT at a later date.

A System Solutions, 17-19
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SE22 8RS, UK.
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F +44 (0)171 693 6936.
E sales@system-
solutions.co.uk

shape of things to come

Big Briar's new patch

Those of you who keep an eye on industry developments may know of the existence of Big Briar, the company founded and run by the legendary synth designer Bob Moog (interviewed in our May issue). One of Big Briar's main areas of expertise is the manufacture of various models of theremin, the non-contact electronic instrument invented early this century by Russian innovator Leon Theremin. We reviewed one of Big Briar's theremins, the affordable Etherwave, in our November 1996 issue, and now Turnkey tell us that they have been appointed exclusive UK agent for this and the other products in the company's range. The Etherwave retails for £349 including VAT and comes complete with an instructional video tape by leading theremin expert Lydia

Big Briar's original Etherwave, as reviewed in SOS November '96.



Kavina plus a demo CD autographed by Bob Moog himself. If you're looking for the Rolls-Royce of theremins, you might like to check out the EtherVox (£2999 including VAT), on display and available to order at Turnkey, which is "the world's first MIDI theremin." It also offers a choice of tenor, alto and soprano pitch ranges, and has rotary waveform, brightness and filter timbre controls.

A Turnkey, 114-116 Charing Cross Road, London WC2H 0DT, UK.
T +44 (0)171 379 5148.
F +44 (0)171 379 0093.
E sales@turnkey.demon.co.uk
W www.turnkey.uk.com



Soundscape gets Excited

Aphex Systems, best known for their Aural Exciter and other signal processors, have announced an agreement to develop Aural Exciter Type III and Big Bottom Pro DSP plug-ins for the Soundscape SSHDR1+ PC-based digital audio workstation and the new Soundscape Mixtreme 16-channel PCI audio card. The plug-ins will be modelled on the top-of-the-line Aphex Model 104 Aural Exciter Type III and Big Bottom

patented circuitry, with the new Big Bottom Pro plug-in being an enhanced 'Pro' version of the circuitry. The plug-ins are scheduled to ship in September.

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BINGLEY	Spectre Sound	01274-668843
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BIRMINGHAM	London Microphone Centre (LMC)	0121-359 4535
BLACKPOOL	Tower Music	01253-27359
BOLTON	H W Audio	01204-385199
BOURNEMOUTH	Eddie Moor's Music Ltd	01202-655135
BRIGHTON	Guitar and Amp	01273-676835
BRISTOL	Sound Control	0800-625260
BURNLEY	Dawsons Music	01282-425829
CAMBRIDGE	Music Village	01223-316091
CARDIFF	Gambins Music Centre	01222-220628
CARDIFF	Musicaland	01222-621715
CARLISLE	AVI	01228-455599
CHESTER	Dawsons Music	01244-348606
COLCHESTER	Aze Music	01206-765652
COVENTRY	Musical Exchanges	01203-635766
CROYDON	Digital Village	0181-407 8444
DERBY	Play It Again Sam	01332-348156
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DUBLIN	Control Techniques Ireland (CTI)	003531-454 5400
DUBLIN	Sound Communications & Electrical	003531-450 7324
DUNDEE	Sound Control	01382-225619
DUNFERMLINE	Sound Control	01383-732273
EASTBOURNE	Bonnors Ltd.	01323-638335
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FAREHAM	The Audio Connection	01329-235566
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GLASGOW	Sound Control	0141-204 0322
GRIMSBY	PSS Music	01472-343211
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LEICESTER	Carlshro Academy of Sound	0116-262 4183
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LONDON	London Microphone Centre (LMC)	0181-743 4680
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RINGWOOD	AJS Theatre & Lighting Supplies	01425-480698
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SHEPPERTON	Marquee Audio	01932-566777
SOUTHEND-ON-SEA	PMT	01702-436501
ST HELENS	Dawsons Music	01744-730424
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STOCKPORT	Axis Audio Systems	0161-474 7626
STOCKPORT	Dawsons Music	0161-477 1210
STOKE-ON-TRENT	Carlshro Academy of Sound	01782-205100
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Check out the Spirit Website:
<http://www.spirit-by-soundcraft.co.uk>



Protape's drive time

Tape and media specialists Protape are now exclusive UK distributors for the AD SG (Advanced Digital Systems Group — a sub-division of Sony Pictures) range of professional drives and media. The range was developed to be reliable and robust, with audio and video professionals in mind. After much research, the first result is an enhanced, pro-spec removable-cartridge drive based on Iomega's new 2Mb Jaz drive. The developers note that Jaz was originally built as a consumer format, and to bring the error rate down they developed special software and proprietary firmware to make the drive run consistently for very long periods of time. During the development period, modified Jaz drives were run non-stop for several weeks at a time, with no problems. The certified AD SG Professional 2Gb Jaz drive is available as an external, portable unit (with a battery pack soon to be released), priced at £527.58, and an internal unit (£433.58). The drives are backwards-compatible with existing 1Gb Jaz cartridges, and certified 2Gb cartridges are available for £129.24 each (or as a three-pack, cutting the unit price to £117.49 per cartridge).

A Protape UK, 15 Percy Street, London W1P 0EE, UK.
T +44 (0)171 323 0277.
F +44 (0)171 580 6852.

Needn't strings!

The latest entry in PC Publishing's growing catalogue of books for the active musician is Richard Riley's *Electric Guitar Handbook*. Its 176 pages provide a wide range of information, from how the electric guitar works, maintenance and setting up, to customising and refinishing your instrument, using effects, and playing live. There's even a pocket history of Fender and Gibson guitars, plus a list of worldwide manufacturers. The book is priced at £11.95, and is available from SOS Mail Order, order code B369. Postage and packing costs an extra £2.50 within the UK, £5.50 for Europe, and £8.50 for the rest of the world.

A SOS Publications Ltd, Media House, Trafalgar Way, Bar Hill, Cambridge CB3 8SQ, UK.
T +44 (0)1954 789888.
F +44 (0)1954 789895.
W www.sospubs.co.uk/shop/

IMAX Space Ltd, internationally-known producers of documentary films (the kind that are projected on huge screens in special IMAX cinemas) have chosen an HHB PortaDAT PDR1000 to be aboard the International Space Station. The PortaDAT has gone through a series of rigorous tests to meet NASA's stringent space travel specifications, and will be used to capture audio documenting NASA astronauts constructing the space station's initial stages. The audio will be used in the production of an IMAX film. John Shaw, Manager of Special Projects for IMAX, commented that: "Because the PortaDAT is a sturdy, solidly-built piece of equipment, we only had to make a few adjustments so it would meet NASA's rigorous space travel specifications."

T HHB Communications
 +44 (0)181 962 5000.
F +44 (0)181 962 5050.

In May, SOS ran a feature on Vincent Hill and his therapeutic music work, recommending as further reading *The Tao of Music: Using Music to Change Your Life*, by John M Ortiz. This is actually a new book, and offers thoughtful insights into how we use (or misuse) music in our day-to-day life. Dr Ortiz is a psychologist and clinical hypnotist who has analysed the effects of specific music, and in explaining his theories, actually puts forward "musical menus" of carefully selected songs and melodies to help with specific problems. Published by Newleaf/Gill & Macmillan, *The Tao of Music* costs £12.99; its ISBN is 0 7171 2726 5.

Manchester's Moonraker recording studio has passed into new ownership and has been extensively refurbished, emerging as Testa Rossa Recording Studios. Since opening last October the studio has been used for remixes of Roachford and Juliet Roberts singles, and is being patronised by "Manchester's finest dance music producers and remix teams." Gear on offer includes Soundtracs Quartz mixing (over 100 inputs on mixdown, with MIDI mute automation), Genelec and Yamaha NS10 monitoring, ADAT XT digital multitracks, and Apple Mac/Cubase VST sequencing, though the studio also has an ST for die-hard Atari users. There's also a live room for more traditional bands, and the studio is just a couple of minutes from the city centre.

T +44 (0)161 273 2404.
F +44 (0)161 273 2404.

Beethoven Street Studios in London has been relaunched following a major refit. Recording, mixing, mastering and duplication can all be handled under one roof. Highlights of the studio include an air-conditioned control room and 300 square-foot naturally lit live room, a dedicated mastering studio, and a high-ceiling 100 square-foot photographic studio, with full darkroom facilities.

T +44 (0)181 960 1088.

The DPM101 "reference-quality, super-resolution stereo bargraph", developed by Genesis Pro Systems (£1468.75 including VAT), aims to remove all ambiguity from the metering of digital audio. This simple-to-use product, according to the

company, is fast, accurate (with a claimed 0.1dB resolution from -60 to 0dB), and easy to read. It's also simple to integrate into your system: AES/EBU XLR or S/PDIF co-ax and optical inputs are provided, and buffered loop-through outputs allow the DPM101

to be easily patched in line with existing digital equipment. Status LEDs show sample rate, receiver lock or error, pro or consumer digital format, and emphasis.

The unit can be freestanding or rackmounted (two can fit in a single rack space), and vertical variants are available.

A Aspen Media, 222 Maylands Avenue, Hemel Hempstead, Herts HP2 7TD, UK.
T +44 (0)1442 255405.
F +44 (0)1442 399944.
E aspenmedia@compuserve.com

Meter made



Our customers' comments

"Ghost is Killer! Classic fat British EQ like you've always dreamed of. And the faders are awesome...the taper on them is as smooth as anything I've ever used. Incredible. Ghost has just about everything I look for in a quality console; great tone....great feel...looks...even the name! I'd swear you custom made this for me. I could not have picked a better console for sound, features and feel."

Geno Porfido, Boulevard Recording Co. New Milford, NJ

"Other consoles I've worked with in the past just couldn't deliver the levels of punch and clarity I felt the music deserved. I never have this problem with my Soundcraft Ghost. The Ghost gives me the flexibility I need over a wide range of frequencies and has the body and warmth to really bring my music to life."

Johnathan Moffett, Drummer with Michael Jackson and Madonna

"After the first mix I did, I realised I was in a whole new league. This thing sounds beautiful. Very silky in the high end and full in the lows. The EQ is totally cool and the board has a quality feel to it. I know of nothing that touches it in its price range and I have been recommending Ghost for months to anybody who's looking for a console."

Garth Webber, Red Rooster Studio, Berkeley CA

"I've worked on many competing 8 bus consoles and none can compare to the Ghost in features, ergonomics and, most importantly, sound. The Ghost, simply put, sounds warm and musical - you don't have to work hard to get great sounding mixes on this board. The EQ is very flexible and we compared the mic preamps (using a Neumann U-47) to the Neve 1066s in our studio. We were very surprised at how favourably they compared to these megabuck classics."

Peter Thorn, What If? Productions.



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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.co.uk

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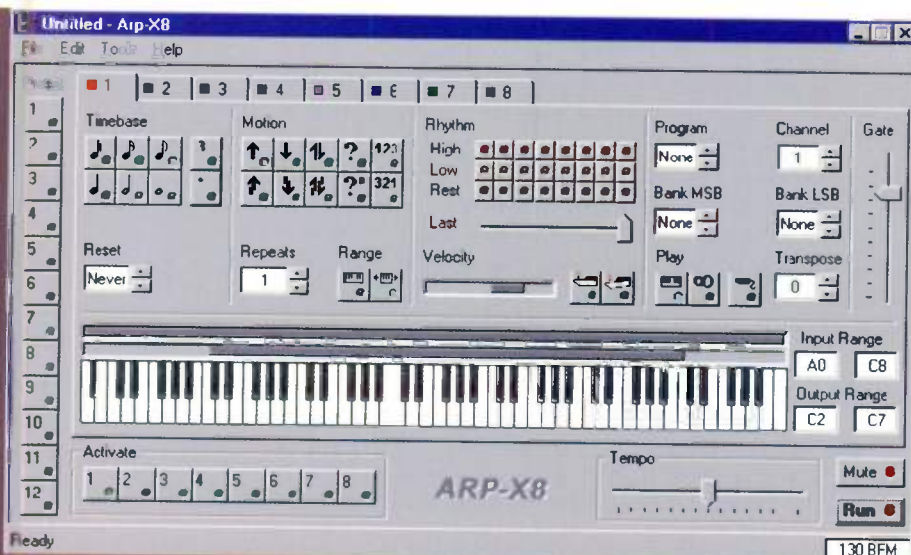
shape of things to come

Silver Anniversary for C1000S

AKG's C1000S has been a popular mic, especially in home studios, over the 11 years since it was released. Now AKG have launched a new, improved version. Foremost amongst the enhancements is the addition of the new PB1000 Presence Boost Adapter, which, in cardioid mode, provides a 5dB lift between 5 and 9kHz for "even more brilliant" high-frequency and speech reproduction. The mic's

external appearance has also been modified: the C1000S now comes in a satin-silver finish and has been re-styled to make it easier to hold, with an improved battery compartment making battery replacement a simpler task.

A Arbiter Pro Audio, Wilberforce Road,
London NW10 6AX, UK.
T +44 (0)181 202 1199.
F +44 (0)181 202 7076.
W www.akg-acoustics.com



Toys R Them

The Techno Toys *Arp X8* MIDI arpeggiator from Metaphoric Software has been launched for Windows-equipped PCs. *Arp X8* is described as an 8-layer arpeggiator; the software starts with the basic concept of the classic analogue synth arpeggiator, and multiplies it all by eight. Each of the eight

arpeggiators has independent controls for motion, timebase, and more; 10 motion algorithms (including random and Brownian motion); a rhythm and accent generator; input and output range controls; MIDI file record and export; and full integration with other Techno Toys software. The range currently includes *Seq 303* (no prizes for identifying this as another TB303 emulator) and *MIDI Thruway*, a MIDI patching and merging utility. Depending on the arpeggiator settings and the keys played, the

results can range from simple arpeggios to complex multitimbral rhythmic patterns. *Arp X8* requires Windows 95 or NT 4.0, a 486/66 or better, a MIDI keyboard, and a MIDI-equipped soundcard. Registration costs a mere US\$24.95. You can download an evaluation copy from the Techno Toys web site if you have web access.

A Metaphoric Software,
1521 NW 11th St, Corvallis,
OR 97330-4622, USA.
T +1 541 766 8051.
E info@technotoys.com.
W www.technotoys.com

DUY's spin on software synthesis

Users of Digidesign's TDM buss now have their own dedicated software synthesizer. DUY's *SynthSpider* is the first — and, so far, only — modular, programmable synthesizer for TDM, consisting of 36 separate, linkable modules. *SynthSpider* allows users to configure any number of different monophonic or polyphonic synth architectures — emulating virtually any type of synth (additive, subtractive, FM and AM synthesis, or something completely new), sound-effect generator or percussion device with just one plug-in. A large library of patches is provided as standard, and a patch manager allows programmable switching between patches via automation controls, thus allowing optimisation of DSP resources. *SynthSpider* works with Digidesign Pro Tools 4.1 and upwards, and offers full automation plus Pro Tools 24 hardware support.

DUY also produce *DSPiDer*, the first modular processing software for TDM. Choose from 40 separate modules, linkable to create custom processing plug-ins. A library of over 100 patches — including compressors, reverbs, EQs, limiters, synths, noise reduction systems, 3D effects, de-essers, sound effects generators and more — is provided as standard, and new patches will be released in future by DUY, making *DSPiDer* an open and updatable platform.

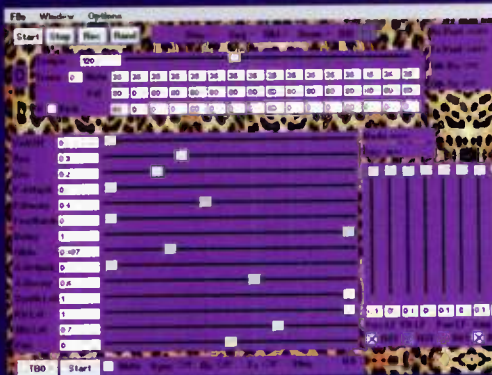
A Syco Systems, Kimberley Road,
London NW6 7SF, UK.
T +44 (0)171 625 6070.
F +44 (0)171 372 7660.
E sales@syco.com
W www.syco.com
W www.duy.es

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

Our web site address is
www.sospubs.co.uk

Picture this!

Martin Russ gave space in his Apple Notes column recently (January and February 1998) to a discussion of the zippy, multitasking alternative operating system for Power Macs, BeOS (manufactured by Be, Inc). Martin also discussed a modular software synth for BeOS — Adamation's *Audio Elements* — but this isn't all that's available for music and MIDI users of BeOS. The BeWare section of Be, Inc's web site (www.be.com/be/ware/) lists a lot of compatible software, and there's a healthy selection of MIDI and audio tools. One particularly intriguing package is Tebo Software's *Grabbo*, a "video-to-MIDI converter". *Grabbo* processes any incoming video (from a BeOS-supported video capture card) using a real-time vision algorithm, with the results of the analysis output to the internal synth or via MIDI. The size of the frames grabbed for analysis will be user-configurable in the commercial release, allowing any BeOS machine to achieve video-rate image analysis. Future versions of *Grabbo* will be able to send messages to any BeOS program, using BeOS inter-application messaging. *Grabbo* analyses images based on the orientation of objects, rather than position. Two algorithms are currently provided: one outputs an index based on the closest matching image in a set of stored video frames. The other is a 3D interpolation scheme, which associates stored frames with points in 3D space, and computes a



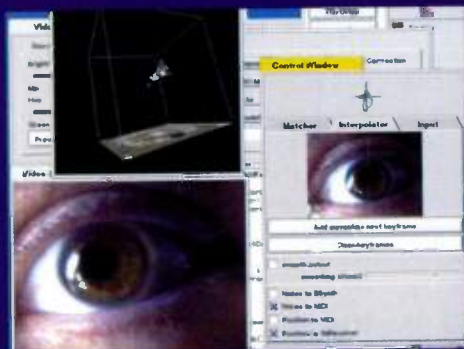
Rack747.

position between the points based on the similarity of the current video image to the key frames. Although the demo version controls a single 3D point, the full commercial release will support the interpolation of multiple 3D points, simultaneously: each co-ordinate of the interpolated positions will be assignable to a separate MIDI parameter. The limited free beta version (it expires on August 1) of *Grabbo* v0.9 is available from Tebo Software's web site, with the full commercial release due later this year; a price has yet to be fixed.

Another BeOS-compatible package is David Karla's *Rack747* v5.03, a Roland TB303 Bassline emulator that incorporates a "vaguely 808-ish drum module". The TB303 model comes with a basic 16-note sequencer, which can send and receive MIDI note and control data; multiple copies can be run at one time, and they can be locked to each other, synced to MIDI clock, or left to freewheel. A song mode allows control and note data to be chained into longer patterns. Other features include a "grunty, resonant filter for high-acid squelch", a direct graphic interface, for easy live manipulation (by mouse, keyboard, or external MIDI controller), full MIDI spec, step- and real-time recording, built-in feedback/delay for each synth, stereo output and more. *Rack747* is shareware at the moment, and costs just US\$30.30.

W *Grabbo*
www.idiom.com/~tebo/

W *Rack747* www.zog.net.au/dak/rack/index.html



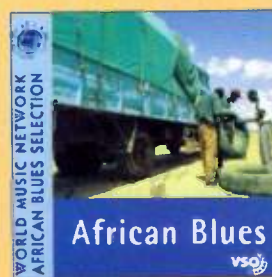
Grabbo.

BCK's MIDI Chart Busters are sold by the company to be "the fastest-moving MIDI file albums in the UK." A new MIDI Chart Buster is released at the start of each month, featuring the most requested current pop songs. This ensures that MIDI Chart Busters are right up to date, and they also feature MIDI karaoke lyric data and MIDI harmony data (for use with MIDI harmony processors) where applicable to the song. Each album costs £10.99 for seven or eight songs, and they are available from music shops throughout the UK, but if you have trouble finding them, you can contact BCK on the number below.

T +44 (0)1992 624442.

F +44 (0)1992 524004.

E BCKproducts@compuserve.com



Picking up a copy of the *African Blues* CD (also available on cassette) gets you 15 songs by leading artists from all over Africa and also benefits development aid charity VSO (Voluntary Services Overseas). VSO, which sends skilled people from the UK to work with communities overseas, has teamed up with the World Music Network to launch the CD and help raise funds for projects in some of the world's poorest countries. The mid-priced CD's catalogue number is RGNET1019CD, and you can get more info about it, and VSO's Routes In Rhythm campaign, at www.oneworld.org/vso/music/routes.htm.

Stop Press: Opcode go to Gibson?

Just as *SOS* was going to press, news broke of the acquisition of American audio software house Opcode by guitar giant Gibson.

The company has held Opcode shares for a few years now, and is looking to expand further into the music technology market. Opcode is currently developing a range of cross-platform products that will "dramatically simplify and lower the customer's cost of entry into both computer music software and multitrack recording applications". Apparently, these moves caught the attention of Gibson Musical Instruments (GMI) CEO Henry Juszkiewicz, who sees the potential of marrying computer technology with more traditional instruments: "Opcode has succeeded in simplifying music production by offering tools that don't get in the way of the creative process. These tools continue to make more and more traditional

instrumentalists comfortable with technology, which will inevitably help us reach a customer base far beyond the electronic keyboard-centred niche that music software currently occupies." Opcode President Chris Halaby comments: "When you go into many music stores today, stringed instruments are usually located in one part of the store and music software is over by the keyboards. But as we work both sides of the customer equation, we can succeed in breaking down the barriers, and build business with an entirely new and growing customer base."

Opcode will be run as an independent subsidiary of GMI: no information on any implications for UK distribution and support has been issued at the time of going to press.

This latest Opcode news comes shortly after the company sold their interest in their notation package, *Overture*, back to the

software's original developers, only to see it snapped up fairly quickly by Cakewalk. This provides the PC specialists, who are distributed in the UK by Et Cetera, with another Mac product for their growing portfolio.

Cakewalk will begin supporting *Overture* immediately and plan long-term enhancements: it should be re-released later this year. Opcode aren't leaving scoring behind, however: there are plans to integrate professional notation features into Opcode's core product — the *Studio Vision Pro* MIDI + Audio sequencer — and to release stand-alone notation software for both Mac and Windows computers.

Opcode aren't off the front page yet: also breaking at the time of the Gibson buyout surprise was the news that Opcode have been granted a US patent for their Audio-to-MIDI and MIDI-to-Audio conversion technology. This technology is featured in the

Studio Vision Pro MIDI + Audio sequencing software for the Mac, and allows users to transform any single-line digital audio file (voice, guitar solo, wind instrument, etc) into a MIDI track containing the pitch, timing, dynamics and spectral data of the original file. The resulting MIDI track can be edited like any other MIDI track and then converted back into digital audio which reflects all MIDI editing changes.

A SCV, 6-24 Southgate Road, London N1 3JJ, UK.

T +44 (0)171 923 1892.

F +44 (0)171 241 3644.

W www.scvlondon.co.uk

A Et Cetera Distribution, Valley House 2 Bradwood Court, St Crispin Way, Haslingden, Lancs BB4 4PW, UK.

T +44 (0)1706 228039.

F +44 (0)1706 222989.

W www.etcetera.co.uk

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

Northbrook College in West Sussex has just completed a new web site. Check it out for information on their music technology courses, plus a selection of drum loops, MIDI files, samples, music demos, studio tips, a recording and music technology message board and lots of music links.

W members.aol.com/musicNBC/

B Box is a new 'sampling groove machine' for users of the PC version of Steinberg's *Cubase VST* package. It not only lets you program rhythm parts as if you were using a drum machine, but gives you access to a collection of sounds modelled on classic beat boxes such as Emu's SP12, the Linn 9000, Roland's CR78, TR707, TR808 and TR909, and many more. Grooves can take up as many bars as you like and the stream-to-disk function renders the finished result on to your hard drive as a 44.1kHz WAV file. The tempo settings match those of *Cubase* down to the individual tick.

T Arbitr Pro Audio
 +44 (0)181 202 1199.

W www.steinberg.net

Power On — The *Roland Magazine* is a new free magazine launched by Roland UK for its registered customers. The 32-page mag will appear twice a year, and will provide product news, interviews with professional Roland users, and advice from the company's product support team.

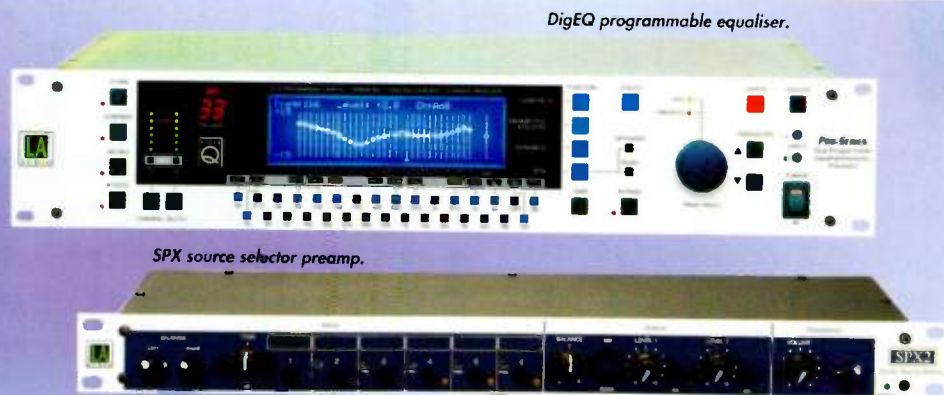
T +44 (0)1792 515020.

Red Tape Studios in Sheffield has completed the first phase of a major equipment upgrade to support its new range of vocational music industry courses. New facilities include four Emagic Logic-based studios, each with a Yamaha Premix 01 desk, Roland JV1080 synth, Akai S3000XL sampler, Emagic Uno-6 MIDI interface, Audlowerk8 card and Logic Audio v3. The studio has also installed a new Digidesign Pro Tools suite, with another (their third) coming on line later this summer. Equipment was supplied by Academy of Sound.

T +44 (0)114 276 1151.

W www.redtape.org.uk

T Academy of Sound Sheffield
 +44 (0)114 264 0000.



Escape with LA

There's a number of new products on the way from LA Audio, starting with the new DigEQ programmable EQ. The DigEQ features simultaneous graphic and parametric equalisation, sweepable high- and low-pass filters, shelving EQ, compressor/limiter, and noise gate. Options include dual-channel slave units, a choice of wired or wireless remotes, digital delay and digital I/O.

There are also new products for the Millennium series of studio processors:

- The ADX2 is a 24-bit A-D converter with selectable sample rates and AES/EBU or SPDIF formats on XLR, optical or co-ax connections.
- The PSI is a professional single-channel recording strip featuring an ultra low-noise mic/line preamp, noise reduction, expander, sweepable de-esser, compressor, and parametric EQ. The unit features both analogue and 24-bit digital output as standard and is targeted at broadcast and post-production applications.

- The SPX Stereo Source Selector/Preamp is designed to improve the efficiency of studio monitoring, as well as functioning as an installation source selector for clubs and restaurants. The unit provides inputs for six sources with a variety of cable standards, routed to two individual zone outputs and a headphone monitor.
- The TCX2 Tubesonic Dual Compressor is a valve-based compressor which is the first in a new series of "affordable" 1U valve processors.

Finally, the Classic series gets a face lift with the launch of the new Classic 1, a dual vintage compressor featuring LA Audio's tribute to the FET-based compressors of yesteryear, coupled with a 24-bit digital output. The Classic 1 is the first of a new series targeted at high-end recording studios and post-production facilities.

A SCV, 6-24 Southgate Road,
 London N1 3JJ, UK.

T +44 (0)171 923 1892.

F +44 (0)171 241 3644.

W www.scvlonon.co.uk

Mac gets the Works

The TC Works range of signal processing plug-ins, which are based on TC Electronic hardware, can now be accessed by Macintosh users. First up is *TC Native Reverb* (£329), for Steinberg's *Cubase VST* running on a Power Mac — and remember that the *VST* format is also being supported by Emagic's *Logic Audio* family. The package includes two plug-ins: a mono-to-stereo version for use in an auxiliary send/return loop, and a stereo-in/stereo-out version for use in the master



section of *Cubase VST*. *TC Native Reverb's* "highly graphical" user interface recreates a hardware look, and provides control over all aspects of the reverb. A collection of 'ROM' presets offers a basic collection of reverbs, which can be edited and saved as custom presets. You need a PCI PowerMac with PPC 604/166 processor or better,

32Mb of RAM, MacOS 7.6 or higher (8.x recommended) and software compatible with *Cubase VST's* plug-in architecture.

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The list of new features is endless...



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- DSP processing available from arrangement page

So why not get ahead of the game and book a course with one of the approved training centres.

The approved Steinberg training centres have all passed the demanding criteria set by Steinberg in Germany. The facilities for teaching are excellent and the quality of course material is very high. Courses generally start in September so book now to secure a space.

The Academy Of Contemporary Music	Guildford	01483 456 888	
Jewel & Esk Valley College	Edinburgh	0131 657 7235	gweir@jovc.ac.uk
Manchester MIDI School	Manchester	0161 953 4072	mms@mcrl.poptel.org.uk
Metro New Media	London	0171 729 9992	info@mmn.co.uk
Newcastle College - Digital Solutions	Newcastle	0191 200 4727	sss.ncl-col.ac.uk
SAE Technology College	Glasgow	0141 221 3441	enquiries@sacl.demon.co.uk

The 6 centres listed here all teach on the Mac platform. Please call us for a list of PC centres.

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Steinberg
CUBASE
MUSIC RECORDING AND EDITING SYSTEM
4.0

shape of things
to come

Eventide put all their eggs in one basket

Processing wizards Eventide have just announced their latest and greatest Ultra Harmonizer — an Ultra Ultra Harmonizer, you might say. The new processor, called the DSP4500, combines all the features and software of Eventide's three 4000-series models (the original TEC award-winning DSP4000 studio model, the GTR4000 guitar version, and the radio, TV and post-production DSP4000B).

The DSP4500 also features the Alchemy 101 library, a new collection of 255 program presets, bringing the total of presets on board to over 1000. There's a versatile 87-second internal sampler, too, and sounds

captured with the sampler can be used within many DSP4500 presets. Advanced stereo looping and multiple looping capabilities are also provided. Other features include:

- Digital and analogue I/O
- Newly upgraded 24-bit A-D and D-A converters
- A total of 147 effects 'modules' from which to construct your own patches
- Free full-screen graphic editing software for PC.

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W www.hbb.co.uk



Screen Gems?

Video manuals for musical equipment have really taken off in recent years, due in no small part to specialists Labyrinth, who've just announced two new additions to their range. The Roland GR30 guitar synthesizer (reviewed SOS February 1997) now benefits from its own video manual presented by Roland UK product specialist Nick Cooper, who explains every function the GR30 has to offer, as well as as sharing hints and tips. This manual

costs just £19.99 plus postage and packing, and will be available from SOS Mail Order very shortly. Coming soon are video manuals for Roland's newest digital recorders, the VS840 (reviewed SOS May 1998) and the VS1680 (reviewed SOS June 1998), again presented by Nick Cooper and explaining "in fullest detail" the capabilities of these two digital workstations.

All Labyrinth video manuals feature the company's unique VIS Video Index System, which enables the user to locate a desired section of the video quickly and easily.

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brochures...



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

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

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

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

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

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One side of the switcher-equipped recording room.



Compare 6 mixes by recording simultaneously to ADAT



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

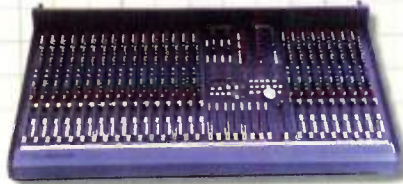
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DREAM RECORDING PACKAGES AT DREAM PRICES

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

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



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

RRP £6729

£3999⁹⁹

GHOST 24 LE + ADAT LX20

ALL PACKAGES INC FREE LOOMS

RRP £7469

£4599⁹⁹

GHOST 24 + ADAT LX20

ADD £399⁹⁹ FOR 24ch METER BRIDGE

RRP £7575

£4699⁹⁹

GHOST 32 LE + ADAT LX20

ADD £499⁹⁹ FOR 32ch METER BRIDGE

RRP £8327

£5199⁹⁹

GHOST 32 + ADAT LX20

ADD £1499⁹⁹ FOR 2nd ADAT XT



ADAT LX20 DIGITAL MULTITRACK RECORDER

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



Alesis pioneered low cost digital multitrack recording with the introduction of the ADAT, and changed the face of home and professional recording. The new LX20 version still plays tapes

from the old machines, but now records at full 20 bit resolution - 16 times more detail than previously!

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



ProTools Plug-ins

t.c. tools **£775⁹⁹**
Arguably the best reverb plug-in available. TC Tools uses algorithms developed from the 18800 mainframe reverb. Great user interface allows you to visualize the effects via the graphics, making it intuitive and easy to use.

Dolby Surround Tools

Produces Dolby Surround mixes instantly within the ProTools environment. Both Encoder & Decoder Plug-ins are available as a bundle providing logical implementation of encoding/decoding process. **£1339⁹⁹**

Focusrite D2

Based on the famed Focusrite Red 2 Dual EQ designed by Rupert Neve, the D2 plug-in matches the high-quality expected from the company's own down to the brushed aluminium front panel. **£880⁹⁹**

Antares Auto-Tune

The plug-in that many professionals have but none will admit to! AutoTune identifies the pitch of a signal and corrects it to a defined scale, retaining original quality, making intonation problems a thing of the past. Available as a TDM or VST plug-in. **£580⁹⁹**



F11 SELF POWERED MONITOR

The F11's cabinet design is another Quested first, being made from a new mineral loaded material which offers excellent acoustic properties using a considerably smaller box than would be possible using conventional materials. The design is a self powered two way bi-amplified one, with 165mm bass driver, and 28mm soft dome HF unit. Months of fine tuning have resulted in a speaker which produces a superb sound, totally belying its size. Custom colours can be specified for bulk orders. **NEW PRODUCT £1149⁹⁹**

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

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

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

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

VS2205 SELF POWERED MONITOR



One of the most popular models in the Quested range, the VS2205 is designed as a highly accurate reference monitor, and its low profile and shielding made it ideal for a wide variety of uses. The built in amplifiers separately drive two 130mm bass units and a 28mm ferrofluid damped soft dome tweeter. **NEW PRODUCT £1699⁹⁹**

Switches are provided for input sensitivity and HF and LF equalisation, to compensate for room conditions and positioning.

AMIII & G3 Pack

- G3/OS 64/4000CD & Apple Design Keyboard
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- ProTools24 Core System
- Digidesign 888/24 Interface
- Alto PCI SCSI Accelerator
- 4Gb Fast & Wide Rortas Data Barracuda Hard Drive
- Sonic Work Artist

9600 PACKAGE **£12889⁹⁹** INCLUDING V A T

New Products:

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

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

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PROMIX 01V Digital Mixer

Yamaha's fabulous new 01V replaces the ground breaking ProMix 01, and is basically a slightly cut down 03D, for a lot less money!

As well as a striking new silver paint job, the 01V also features 16 analogue inputs plus 8 digital ins and outs via optional cards in either ADAT, TDIF or AES/EBU format.

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

There is 4 band fully parametric EQ for all the main inputs, 2 stereo multi effects processors, moving faders, dynamic MIDI automation, and of course, exemplary sound quality. Initial stocks will be very limited - get your order in now!



NEW PRODUCT
£1399.99

03D Digital Console



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

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

Call now for a Turnkey Professional brochure and a free trial!

RRP £2999
£1999.99

02R Digital Console

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

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



RRP £6999
£4649.99

TASCAM

564 MINIDISC PORTASTUDIO / EDITOR

ALMOST 60% OFF!

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



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

RRP £1199
£499.99

DA20MkII DAT MACHINE

The new Mk II version of the DA20 builds on what is already 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. New features include error counting & adjustable ID encoding.



RRP £699
£599.99

102MkII & 202MkIII 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 MkIII is a double deck, which records on both decks. Limited stocks only at these prices, ideal for mastering and duplication.



RRP £249
£199.99
RRP £349
£269.99

DTC-ZE700 DAT RECORDER

We have exclusively secured a small supply of the Sony DTCZE700 to bring you by far the cheapest full size DAT machine on the market, but 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 I/O 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!

ALMOST 50% OFF!



RRP £699
£359.99

MDS-JE510 MINIDISC RECORDER

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



RRP £299
£199.99

MZ-R30 PORTABLE MINIDISC RECORDER

Now available is this compact portable version of the MDS-JE510 as featured above. This must be the nearest walkman you've ever seen!



RRP £399
£199.99

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
£269.99

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 practise dropping in and out as many times as you like, without risking erasing your precious recording! Other great features include three band EQ on each channel, two auxiliary sends, LCD metering, double or single speed operation, and individual track outputs for use with an external mixer.



RRP £569
£349.99

THE UK 4 TRACK CENTRE

Our famous 4 track pack includes everything you need to start making music: Maxell headphones, a dynamic microphone, a chroma tape, cables, head cleaning kit and the best book we've yet seen on multitrack recording, taking you through basic track laying, mixdown etc... with sections on everything from mic placement to synchronisation and MIDI. We've obtained some great 4 track pricing and for a limited period, we will give you the 4 track pack (normal price £59.99) absolutely free when you purchase any of these multitrack recorders.

ALL MULTITRACKS INC '4 TRACK PACK' ADD £10 FOR X-14

X-14 The nearest introduction to multitrack recording ever! Built in mic for instant recording and straightforward operation means almost anyone can make a track without reference to the manual. Buy with our complete four track pack for only £10 extra!

RRP £149
£129.99

X-24 The X24 is the latest in a long line of successful budget multitrackers from Fostex. It records at double speed with Dolby B noise reduction for great quality, and has two XLR mic inputs to maintain your signal's integrity. Fostex's unique 'Auto-Bounce' facility means it's easy to cram multiple tracks on, and other great features include a wide pitch control with ±50%±5% variation, allowing you to slow down a track by an octave! Stop dreaming - start recording!

RRP £249
£199.99

XR3 High speed machine at under £250! New auto-bounce facility and built in mic - ideal for 4 track recording on the move.

RRP £249
£199.99

X-55 Stunning new double speed Fostex machine with individual EQ, up to 3 aux sends and 2 stereo returns. 2 inserts & 4 separate tape outs allowing use with an external mixer. 2 XLR mic inputs.

RRP £379
£379.99

X-77 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. 2 XLR mic inputs.

RRP £499
£499.99

PORTASTUDIOS

PORTA 02

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

RRP £349
£319.99

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 full LED metering make it great value for money. Includes free four track pack!

RRP £489
£399.99

424 MkII A brand new version of the best selling 424 from Tascam, inventors of 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 fader). Logic controlled 2 speed transport with built in memory location points. DBX noise reduction, insert supplies, limited.

RRP £489
£399.99

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

Picture this!

Martin Rues gave space in his Apple Notes column recently (January and February 1998) to a discussion of the zippy, multitasking alternative operating system for Power Macs, BeOS (manufactured by Be, Inc). Martin also discussed a modular software synth for BeOS — Adamation's *Audio Elements* — but this isn't all that's available for music and MIDI users of BeOS. The BeWare section of Be, Inc's web site (www.be.com/beware/) lists a lot of compatible software, and there's a healthy selection of MIDI and audio tools. One particularly intriguing package is Tebo Software's *Grabbo*, a "video-to-MIDI converter". *Grabbo* processes any incoming video (from a BeOS-supported video capture card) using a real-time vision algorithm, with the results of the analysis output to the internal synth or via MIDI. The size of the frames grabbed for analysis will be user-configurable in the commercial release, allowing any BeOS machine to achieve video-rate image analysis. Future versions of *Grabbo* will be able to send messages to any BeOS program, using BeOS inter-application messaging. *Grabbo* analyses images based on the orientation of objects, rather than position. Two algorithms are currently provided: one outputs an index based on the closest matching image in a set of stored video frames. The other is a 3D interpolation scheme, which associates stored frames with points in 3D space, and computes a



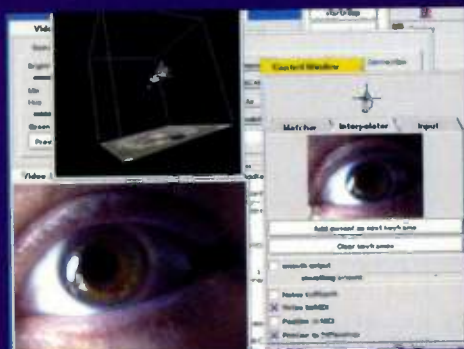
Rack747.

position between the points based on the similarity of the current video image to the key frames. Although the demo version controls a single 3D point, the full commercial release will support the interpolation of multiple 3D points, simultaneously; each co-ordinate of the interpolated positions will be assignable to a separate MIDI parameter. The limited free beta version (it expires on August 1) of *Grabbo* v0.9 is available from Tebo Software's web site, with the full commercial release due later this year; a price has yet to be fixed.

Another BeOS-compatible package is David Karla's *Rack747* v5.03, a Roland TB303 Bassline emulator that incorporates a "vaguely 808-ish drum module". The TB303 model comes with a basic 16-note sequencer, which can send and receive MIDI note and control data; multiple copies can be run at one time, and they can be locked to each other, sync'd to MIDI clock, or left to freewheel. A song mode allows control and note data to be chained into longer patterns. Other features include a "grunty, resonant filter for high-acid squelch", a direct graphic interface, for easy live manipulation (by mouse, keyboard, or external MIDI controller), full MIDI spec, step- and real-time recording, built-in feedback/delay for each synth, stereo output and more. *Rack747* is shareware at the moment, and costs just US\$30.30.

W *Grabbo*
www.idiom.com/~tebo/

W *Rack747* www.zog.net.au/dak/rack/index.html



Grabbo.

BCK's MIDI Chart Busters are sold by the company to be "the fastest-moving MIDI file albums in the UK." A new MIDI Chart Buster is released at the start of each month, featuring the most requested current pop songs. This ensures that MIDI Chart Busters are right up to date, and they also feature MIDI karaoke lyric data and MIDI harmony data (for use with MIDI harmony processors) where applicable to the song. Each album costs £10.99 for seven or eight songs, and they are available from music shops throughout the UK, but if you have trouble finding them, you can contact BCK on the number below.

T +44 (0)1992 624442.

F +44 (0)1992 524004.

E BCKproducts@compuserve.com



Picking up a copy of the *African Blues* CD (also available on cassette) gets you 15 songs by leading artists from all over Africa and also benefits development aid charity VSO (Voluntary Services Overseas). VSO, which sends skilled people from the UK to work with communities overseas, has teamed up with the World Music Network to launch the CD and help raise funds for projects in some of the world's poorest countries. The mid-priced CD's catalogue number is RGNET1019CD, and you can get more info about it, and VSO's Routes In Rhythm campaign, at www.oneworld.org/vso/music/routes.htm.

Stop Press: Opcode go to Gibson?

Just as *SOS* was going to press, news broke of the acquisition of American audio software house Opcode by guitar giant Gibson.

The company has held Opcode shares for a few years now, and is looking to expand further into the music technology market. Opcode is currently developing a range of cross-platform products that will "dramatically simplify and lower the customer's cost of entry into both computer music software and multitrack recording applications". Apparently, these moves caught the attention of Gibson Musical Instruments (GMI) CEO Henry Juskiewicz, who sees the potential of marrying computer technology with more traditional instruments: "Opcode has succeeded in simplifying music production by offering tools that don't get in the way of the creative process. These tools continue to make more and more traditional

instrumentalists comfortable with technology, which will inevitably help us reach a customer base far beyond the electronic keyboard-centred niche that music software currently occupies." Opcode President Chris Halaby comments: "When you go into many music stores today, stringed instruments are usually located in one part of the store and music software is over by the keyboards. But as we work both sides of the customer equation, we can succeed in breaking down the barriers, and build business with an entirely new and growing customer base."

Opcode will be run as an independent subsidiary of GMI; no information on any implications for UK distribution and support has been issued at the time of going to press.

This latest Opcode news comes shortly after the company sold their interest in their notation package, *Overture*, back to the

software's original developers, only to see it snapped up fairly quickly by Cakewalk. This provides the PC specialists, who are distributed in the UK by Et Cetera, with another Mac product for their growing portfolio.

Cakewalk will begin supporting *Overture* immediately and plan long-term enhancements; it should be re-released later this year. Opcode aren't leaving scoring behind, however: there are plans to integrate professional notation features into Opcode's core product — the *Studio Vision Pro* MIDI + Audio sequencer — and to release stand-alone notation software for both Mac and Windows computers.

Opcode aren't off the front page yet: also breaking at the time of the Gibson buyout surprise was the news that Opcode have been granted a US patent for their Audio-to-MIDI and MIDI-to-Audio conversion technology. This technology is featured in the

Studio Vision Pro MIDI + Audio sequencing software for the Mac, and allows users to transform any single-line digital audio file (voice, guitar solo, wind instrument, etc) into a MIDI track containing the pitch, timing, dynamics and spectral data of the original file. The resulting MIDI track can be edited like any other MIDI track and then converted back into digital audio which reflects all MIDI editing changes.

A SCV, 6-24 Southgate Road, London N1 3JJ, UK.

T +44 (0)171 923 1892.

F +44 (0)171 241 3644.

W www.scvlondon.co.uk

A Et Cetera Distribution, Valley House 2 Bradwood Court, St Crispin Way, Haslingden, Lancs BB4 4PW, UK.

T +44 (0)1706 228039.

F +44 (0)1706 222989.

W www.etcetera.co.uk

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

Northbrook College in West Sussex has just completed a new web site. Check it out for information on their music technology courses, plus a selection of drum loops, MIDI files, samples, music demos, studio tips, a recording and music technology message board and lots of music links.

W members.aol.com/musicNBC/

B Box is a new 'sampling groove machine' for users of the PC version of Steinberg's *Cubase VST* package. It not only lets you program rhythm parts as if you were using a drum machine, but gives you access to a collection of sounds modelled on classic beat boxes such as Emu's SP12, the Linn 9000, Roland's CR7S, TR707, TR808 and TR909, and many more. Grooves can take up as many bars as you like and the stream-to-disk function renders the finished result on to your hard drive as a 44.1kHz WAV file. The tempo settings match those of *Cubase* down to the individual tick.

T Arbitr Pro Audio
 +44 (0)181 292 1199.

W www.steinberg.net

Power On — The *Roland Magazine* is a new free magazine launched by Roland UK for its registered customers. The 32-page mag will appear twice a year, and will provide product news, interviews with professional Roland users, and advice from the company's product support team.

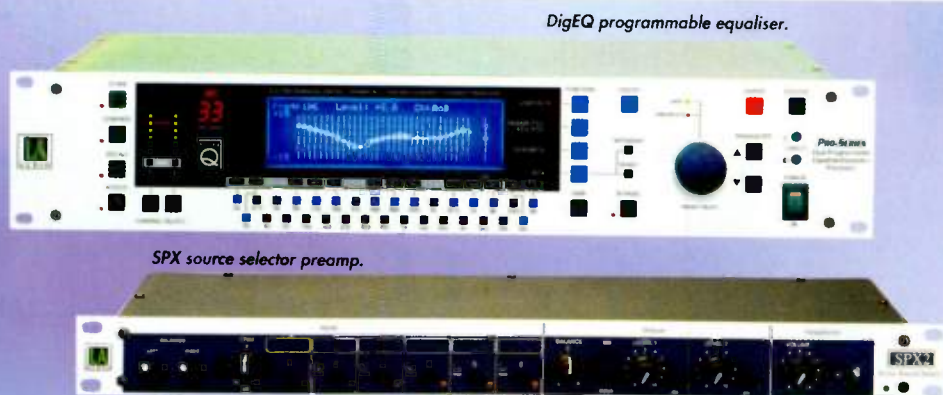
T +44 (0)1792 515020.

Red Tape Studios in Sheffield has completed the first phase of a major equipment upgrade to support its new range of vocational music industry courses. New facilities include four Emagic *Logic*-based studios, each with a Yamaha Promix 01 desk, Roland JV1080 synth, Akai S3000XL sampler, Emagic Uinito8 MIDI interface, Audlwerk8 card and *Logic Audio v3*. The studio has also installed a new Digidesign Pro Tools suite, with another (their third) coming on line later this summer. Equipment was supplied by Academy of Sound.

T +44 (0)114 276 1151.

W www.redtape.org.uk

T Academy of Sound Sheffield
 +44 (0)114 264 0000.



Escape with LA

There's a number of new products on the way from LA Audio, starting with the new DigEQ programmable EQ. The DigEQ features simultaneous graphic and parametric equalisation, sweepable high- and low-pass filters, shelving EQ, compressor/limiter, and noise gate. Options include dual-channel slave units, a choice of wired or wireless remotes, digital delay and digital I/O.

There are also new products for the Millennium series of studio processors:

- The ADX2 is a 24-bit A-D converter with selectable sample rates and AES/EBU or S/PDIF formats on XLR, optical or co-ax connections.
- The PS1 is a professional single-channel recording strip featuring an ultra low-noise mic/line preamp, noise reduction, expander, sweepable de-esser, compressor, and parametric EQ. The unit features both analogue and 24-bit digital output as standard and is targeted at broadcast and post-production applications.

- The SPX Stereo Source Selector/Preamp is designed to improve the efficiency of studio monitoring, as well as functioning as an installation source selector for clubs and restaurants. The unit provides inputs for six sources with a variety of cable standards, routed to two individual zone outputs and a headphone monitor.
- The TCX2 Tubesonic Dual Compressor is a valve-based compressor which is the first in a new series of "affordable" 1U valve processors.

Finally, the Classic series gets a face lift with the launch of the new Classic 1, a dual vintage compressor featuring LA Audio's tribute to the FET-based compressors of yesteryear, coupled with a 24-bit digital output. The Classic 1 is the first of a new series targeted at high-end recording studios and post-production facilities.

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 London N1 3JJ, UK.

T +44 (0)171 923 1892.

F +44 (0)171 241 3644.

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Mac gets the Works

The TC Works range of signal processing plug-ins, which are based on TC Electronic hardware, can now be accessed by Macintosh users. First up is *TC Native Reverb* (£329), for Steinberg's *Cubase VST* running on a Power Mac — and remember that the *VST* format is also being supported by Emagic's *Logic Audio* family. The package includes two plug-ins: a mono-to-stereo version for use in an auxiliary send/return loop, and a stereo-in/stereo-out version for use in the master



section of *Cubase VST*. *TC Native Reverb's* "highly graphical" user interface recreates a hardware look, and provides control over all aspects of the reverb. A collection of 'ROM' presets offers a basic collection of reverbs, which can be edited and saved as custom presets. You need a PCI PowerMac with PPC 604/166 processor or better,

32Mb of RAM, MacOS 7.6 or higher (8.x recommended) and software compatible with *Cubase VST's* plug-in architecture.

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The list of new features is endless...



So why not get ahead of the game and book a course with one of the approved training centres.

The approved Steinberg training centres have all passed the demanding criteria set by Steinberg in Germany. The facilities for teaching are excellent and the quality of course material is very high. Courses generally start in September so book now to secure a space.

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Manchester MIDI School	Manchester	0161 953 4072	mms@mri1.poptel.org.uk
Metro New Media	London	0171 729 9992	info@mmm.co.uk
Newcastle College - Digital Solutions	Newcastle	0191 200 4727	sss.ncl-col.ac.uk
SAE Technology College	Glasgow	0141 221 3441	enquiries@sacl.demon.co.uk

The 6 centres listed here all teach on the Mac platform. Please call us for a list of PC centres.

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- DSP processing available from arrangement page

Steinberg

CUBASE

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4.0

shape of things
to come

Eventide put all their eggs in one basket

Processing wizards Eventide have just announced their latest and greatest Ultra Harmonizer — an Ultra Ultra Harmonizer, you might say. The new processor, called the DSP4500, combines all the features and software of Eventide's three 4000-series models (the original TEC award-winning DSP4000 studio model, the GTR4000 guitar version, and the radio, TV and post-production DSP4000B).

The DSP4500 also features the Alchemy 101 library, a new collection of 255 program presets, bringing the total of presets on board to over 1000. There's a versatile 87-second internal sampler, too, and sounds

captured with the sampler can be used within many DSP4500 presets. Advanced stereo looping and multiple looping capabilities are also provided. Other features include:

- Digital and analogue I/O
- Newly upgraded 24-bit A-D and D-A converters
- A total of 147 effects 'modules' from which to construct your own patches
- Free full-screen graphic editing software for PC.

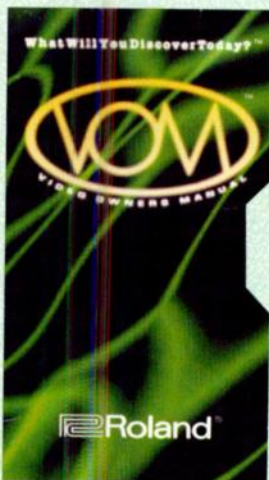
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Screen Gems?

Video manuals for musical equipment have really taken off in recent years, due in no small part to specialists Labyrinth, who've just announced two new additions to their range. The Roland GR30 guitar synthesizer (reviewed SOS February 1997) now benefits from its own video manual presented by Roland UK product specialist Nick Cooper, who explains every function the GR30 has to offer, as well as as sharing hints and tips. This manual

costs just £19.99 plus postage and packing, and will be available from SOS Mail Order very shortly. Coming soon are video manuals for Roland's newest digital recorders, the VS840 (reviewed SOS May 1998) and the VS1680 (reviewed SOS June 1998), again presented by Nick Cooper and explaining "in fullest detail" the capabilities of these two digital workstations.

All Labyrinth video manuals feature the company's unique VIS Video Index System, which enables the user to locate a desired section of the video quickly and easily.

A SOS Publications Ltd, Media House, Trafalgar Way,
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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 synthesizers.

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



One side of the switcher-equipped recording room.



Compare 6 mics, by recording simultaneously to ADAT.



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



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PRICES GUARANTEED



VS-840 DIGITAL WORKSTATION



INCLUDES 10 FREE ZIP CARTS!

Want the advantages of a hard disk based recorder, but without the price tag? Roland's new VS840 should fit the bill, recording 8 tracks (up to 64 virtual tracks) onto its built in Zip drive, you still

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

benefit from a fully digital mixer, and a built in FX processor, with 26 different algorithms and guitar level input. An all in one no-nonsense product with a no-nonsense price. Initial stocks will be very limited - get your order in

RRP
£949.99

VS-880P DIGITAL WORKSTATION

Roland's VS880 has become the de-facto standard for compact digital eight track recording. Each track has 8 virtual tracks allowing you to record multiple takes, and then compare them, even if you've already recorded on the other 7 tracks. The built in digital mixer handles up to 14 channels, has 2 band parametric EQ, 1 external and 2 internal aux sends to the supplied FX board, and is fully MIDI controllable. The SCSI port allows connection of external SCSI

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

devices for recording or backup, which can also be made to DAT or CDR via the digi i/o. MTC is standard to sync up your sequencer. New V2 software allows automation data to be recorded to the hard drive, and also gives numerous new effects algorithms, including mic emulation!



INC 2 GIG DRIVE & FX BOARD!

RRP £2236
£1499.99

VS-1680 DIGITAL WORKSTATION

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

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

built in. 3 band parametric EQ is easily edited via the huge LCD display. In stock now at Turnkey!



NEW PRODUCT
£2199.99

DMT-8 VL DIGITAL MULTITRACKER

The personal digital multi-track is here at last, and at a price you won't believe! 8 separate tracks of CD quality audio recorded to 1.6 Gb hard-disk (40 minutes). Record 2 tracks simultaneously, jog-shuttle audio and sync to MIDI without losing a track. The 8 channel mixer accepts 2 mics, with a 2 band EQ and 2 aux sends. Separate outputs and SPDIF optical output. Price includes optional SCSI interface.

Why buy 4 tracks when you can have 8?

INC SCSI INTERFACE!



RRP £1200
£849.99

D80 HD RECORDER

The D80 is a 3U rackmount unit, with 8 individual in/outs and outputs, a removable front panel doubles as a remote and meter-bridge, and a removable canister drive slot. Slaves to MMC as well as being able to act as a master, all with no track loss, and has SPDIF digital ins and outs to allow backup to a standard DAT machine and direct digital recording. Easy to use editing allows cut, copy and repeat, passing across multiple tracks.

Comes with 1.3Gb Hard Drive as standard.

INC 1.3Gb HD



RRP £1499
£1099.99

D90 HD RECORDER

The D90 has all the features of the D80, but also has ADAT digi i/o as standard, and optional kits for connecting SCSI drives & balanced analog i/o's for interlocking with pro level equipment.

Our price includes a 1.6 Gb Hard Drive fitted free!

INC 1.6 Gb HD



RRP £1798
£1299.99

D160 HD RECORDER

Latest in the family from Fostex is the superb D160, giving you a full 16 tracks of hard disk recording for well under £3000 - less than the price of a secondhand analogue machine! D/A conversion is 20 bit delta-sigma 128x oversampling, so sound quality is superb. An amazing amount of machine for your money - call us for more details. Price includes 3.6 Gb Hard Drive.

INC 3.6 Gb HD



RRP £2932
£2099.99

MDMX4 DIGITAL MULTITRACKER

The MDMX4 offers 37 minutes of high quality four track digital recording on an MD data disc.

It also features the exclusive Track Edit system and a host of other functions that will revolutionise your concept of personal recording, and Sony's second generation data compression algorithms give it a significant sound advantage over similar machines. The 10 input mixer (2 XLR's) has 4 buss, individual track outputs, 2 aux sends and 3 band EQ. Random access transport includes 11 point locator, jog-shuttle wheel as well as rehearsal and auto-pitch modes. There's no need to leave a track spare for bouncing, and whole songs can be digitally copied forward for a 'safety' version. *MTC and MTC compatibility for use with MIDI sequencers - you can even control it from your sequencer! *MIDI Clocks are also supported for use with keyboard workstations and drum machines.

Stocks are very limited on this exclusive deal - order now!



RRP £999
£439.99

CDR880 RE-RECORDABLE CD WRITER



The ultimate mastering medium! As well as offering excellent durability, CDs are the industry and consumer standard format. What's more, there's nothing like your own finished CD to impress your mate! This brand new recorder from Philips is the only machine on the market to be able to use re-recordable CDs, as well as the cheaper consumer standard blank. Now automatically recognises sampling rate for jitter free recording. Digital and analogue ins and outs, superb sound quality. Our incredible price even includes one free CD. (Further CDs: consumer £4.99, re-recordable £14.99)

RRP £499
£359.99

CR200 CD RECORDER

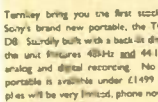


Bargain price on this fabulous new pro CD recorder from Fostex. 3U rackmount design with balanced analog and AES/EBU inputs, as well as optical and coaxial SPDIF and phono analog i/o.

Automatic sample rate conversion and works with either professional or consumer format CDs. Flawless CD recording with Fostex reliability.

RRP £1399
£999.99

TCD-D8 PORTABLE DAT MACHINE



Turnkey bring you the first stocks of Sony's brand new portable, the TCD-D8. Specially built with a backlit display, the unit features 48kHz and 44.1kHz digital and analogue recording. No other portable is available under £1499 - initial supplies will be very limited, please now to reserve yours! The ultimate Walkman!

RRP £599
£399.99

NEW MD8 DIGITAL WORKSTATION

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



RRP £399
£299.99

PCM-R300 DAT RECORDER



Turnkey have done it again! A pro, full spec DAT machine at a bargain price! Just look at the list of features: SPDIF coaxial and optical ins and outs, digital and analogue recording at 48kHz sampling rates (32 kHz, 44.1 kHz, 48 kHz), full 19" rackmount, as well as all the usual EQ facilities and a full function infra red remote control. Sony's exclusive Super DR Mapping process can also be switched in, ensuring the sound of 20 bits into 16! Stocks at this incredible price are limited - get your order in now!

RRP £799
£475.99

NEW D8 DIGITAL WORKSTATION

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



NEW PRODUCT
£849.99

MAGNETIC MEDIA

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DAT	120 min	£4.60	10	
ADAT	40 min	£10.00	6	
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ADAT	120 min	£25.00	6	
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*We will only guarantee prices from a UK or European dealer at the time of order. We must be able to deliver the goods and the goods must be available and in stock. Prices include 5% VAT. UK mainland delivery. From £9.99. Postal items 10 working days for cheque. Returns: Errors & omissions excepted.

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DBX DDP -THE DBs!

Dynamics processing has been living in the dark ages recently, whilst virtually all other areas of the studio have gone digital, humble compressors and gates seem to have been left behind. Now DBX are changing all that with the incredible new Digital Dynamics Processor. As well as compression and gating, the DDP also performs limiting, de-essing, has detailed sidechain processing facilities and DBX's patented Type IV conversion with Tape Saturation Emulation.



50 presets and 50 user programs mean at last you can recall your favourite settings at the touch of a button, so that great crunchy drum sound or smooth vocal you had two months ago can now easily be applied to this week's mix.

The DDP's superb display makes editing a breeze, with an on screen plot of dynamics curves instantly visualising your edits. Processing can be true stereo or dual mono with completely different programs on each channel, inputs from -10 to +4 dB are catered for, full MIDI support is provided, and the 24 bit A/D and D/A converters mean that pristine audio quality is ensured throughout.

So come out of the dynamics dark ages, and see what a DDP can do for you today!



- Completely Digital Processing for Superb Audio Quality
- Multiple Dynamics Processes Catered for by a Single Unit
- Instant Recall of Factory or User Programs
- Superb Display for Easy Graphic Editing

NEW PRODUCT
£599⁹⁹

XR300 SYNCHRONISER TURKEY EXCLUSIVE XRI System

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

RRP £299
£169⁹⁹

VC3 PRO CHANNEL JOEMEER

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

RRP £249
£169⁹⁹

COMPOSER WORKHORSE COMPRESSOR BEHRINGER

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

RRP £349
£169⁹⁹

STUDIO QUAD 4 CH. STUDIO FX PROCESSOR Digitech

ONCE IN A LIFE TIME OFFER!

At last - Multi effects as they should be! The new Digitech Studio Quad features not only their custom designed and ultra-powerful 'S-DISC' chip, but also 4 independent inputs and outputs, which using the built-in sub-mixer, can even be configured as 4 mono inputs feeding 4 effects processors, feeding 4 stereo outputs!

The huge screen and new intuitive operating system make editing a breeze, 20 bit converters give greater than 90 dB signal to noise ratio and the range of effects includes reverbs, delays, detuning, chorus, flanging etc... Hundreds of other features too numerous to mention.

RRP £529
£259⁹⁹

Exclusive end of line deal only at Turnkey!

104 AURAL EXCITER APHEX

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

RRP £299
£149⁹⁹

THC-00 RESINATOR FAT

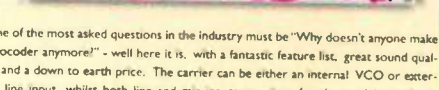
Freeform Analog Technologies FreeBass is already one of the most successful sound modules of the year, and now following hot on the heels of the Freebass and PCP330 Procoder is the new THC-00 Resinator.



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

NEW PRODUCT
£169⁹⁹

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 silblance (unvoiced) control also has an external input if required. The final output can contain any mix of modulator, carrier, vocoded signal and a special filtered version of the signal. Remember, this doesn't only create robot voices, there are thousands of creative uses, and it's also ideal for processing drum loops.

NEW PRODUCT
£299⁹⁹

DIGITAL PROBLEM SOLVERS FRIEND-CHIP



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

Also in the range:

OP-024	Optical to Analogue and vice versa with 80MHz shipping	£49.99
PRO-CON	SPDIF to AES/EBU and vice versa with 80MHz shipping	£129.99
D 4 2 COPY	CD/DVD burner with 1 channel 4.7Gb drive, 2 channel 8cm and 80MHz shipping	£119.99
SPK 1	4 channel stereo to 4 channel stereo with 44.1kHz (also to ProTools) and 48.0kHz	£149.99
SDIF-W	4 channel stereo to 4 channel stereo with 44.1kHz (also to ProTools) and 48.0kHz	£299.99
Super Clock Slave	4 channel stereo to 4 channel stereo with 44.1kHz (also to ProTools) and 48.0kHz	£129.99
Smart Audio Clock	4 channel stereo to 4 channel stereo with 44.1kHz (also to ProTools) and 48.0kHz	£129.99
ADAT Audio Clock	ADAT 8 Pin to word clock, Super Clock and SPDIF clock conversion	£129.99
ADAT Word Clock Synchroniser	ADAT 8 Pin to word clock and Super Clock conversion, also word MTC	£129.99
ADAT SPDIF Synchroniser	ADAT 8 Pin to word clock and Super Clock conversion, also word MTC	£199.99
ADAT Word Machine	Control MIDI to ADAT 8 Pin conversion with SPDIF bus sync to word clock	£89.99
Word 8K	Word clock to 8K clock	£49.99

FROM £49⁹⁹

266A DUAL COMPRESSOR GATE Digitech



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

RRP £249
£149⁹⁹

PRICES GUARANTEED



PREMIUM QUALITY VALVE OUTBOARD EQUIPMENT

If you've previously used valve equipment, you'll be well aware of the magical quality that tube circuitry produces, and if you haven't used it - try it now! Many manufacturers use the word valve as an excuse to charge exorbitant prices for their product, but not Bellari, and our factory direct exclusive makes the range unbelievable value for money!



The **RP583 Studio Tube Compressor / Limiter** has become an instant hit, offering as it does two channels (stereo linkable) of some of the finest sounding compression money can buy, with a smooth and natural compression

characteristic. Ratio is continuously variable from 2:1 to infinity, and there are separate controls for attack, release, threshold and make-up gain. Dual VU metering is provided, as well as jack and balanced XLR ins and outs, and sidechain access is fully catered for. **Ideal for a variety of instruments, vocals and complete mixes.**

NEW PRODUCT
£499.99
FACTORY DIRECT



RP533 Studio Tube Multi-Processor

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

NEW PRODUCT
£499.99
FACTORY DIRECT



RP520 Studio Mic Pre Amp

A true dual tube mic pre amp at a bargain price, with tubes used at all the crucial gain stages, not just strapped across the outputs. Features include phase reverse, input and output pads, separate XLR outputs and dual VU meters.

NEW PRODUCT
£399.99
FACTORY DIRECT

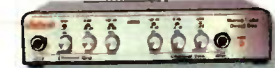


RP562 Stereo Exciter

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

NEW PRODUCT
£299.99
FACTORY DIRECT

A8B3 Stereo Direct Box



Stand alone 2 channel tube DI box.

NEW PRODUCT
£129.99

MP110 Direct Drive Mic Pre Amp



Stand alone single channel tube mic pre amp.

NEW PRODUCT
£169.99

VC4 ENHANCER

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



RRP £399
£199.99

MIKEMAN MIC PRE-AMP

The Mikeman is a dual channel, high definition mic preamp featuring up to 72dB of gain, allowing the noise free amplification of even the lowest input signals. The unique design of the phantom power supply, gives a precise 48v output, alleviating the problem of 'phantom drift' the source of so many problems, particularly when using older or tube microphones. Uniquely the Mikeman has a facility to split a single input into two outputs and features individual controls for gain, phase reverse, phantom power and a -35dB pad. We don't expect to have these long!



RRP £349
£169.99

4 POLE FILTER

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



NEW BOXED
£269.99

VITALIZER STEREO JACK ENHANCER/EXCITER PROCESSOR

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



RRP £209
£169.99

X POLE FILTER

What do you get if you take two of Waldorf's 4 pole filters, put them in a rack and rig it up? The all new X-Pole! Harnessing 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. Zu rack design makes for easy integration into your studio. Factor up your sound today - your loops need never be the same again!



NEW PRODUCT
£439.99

5021 IVORY RANGE 2 CH. VALVE COMPRESSOR

Each channel offers fully variable control of input and output gain, threshold ratio and gain make up. Attack and Release times are switchable for 'fast' and 'slow' modes. Metering is via VU meters - either output level or gain reduction can be monitored. A front panel instrument input is also included. The unit will work in dual mono or stereo linked modes, and a compressor bypass switch is provided on each channel. Inputs and outputs are duplicated on balanced XLR and unbalanced jack, and a sidechain insert point is included on each channel.



NEW PRODUCT
£469.99

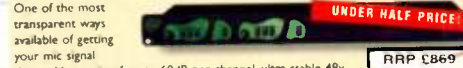
FOCUS EQ PARAMETRIC EQUALISER



Turnkey are well known for bringing you clearance deals at bargain prices, but not often does the chance come to own something as prestigious as Focusrite outboard, at a fraction of the original cost. The Focus EQ features an ultra high quality mic preamp complete with phantom power and phase reverse, as well as line and instrument level inputs, making it an excellent recording channel, or even a top quality preamp for bass or acoustic guitar. In addition to the four parametric EQ bands, there are also variable high and low pass filters, and the EQ and filters each have their own bypass switches. Typical Focusrite build quality can be taken for granted, as can some of the best sounding EQ you've ever heard. Very limited quantities available for this exclusive deal - order now or regret forever!

RRP £939
£399.99

DUAL MIC PRE DUAL CHANNEL MIC PREAMP



One of the most transparent ways available of getting your mic signal down. Huge gain of up to 60dB per channel, ultra stable 48v switchable phantom power supply, 12dB per octave high pass roll-off filter, and an amazing Equivalent Input Noise figure of -128dBu. Small quantities only at this incredible price.

RRP £869
£399.99

The Quad Compressor

The Quad Compressor this combines a multi-channel stereo compressor, de-esser and parametric EQ in a single unit - the ultimate signal path for digital recording. **£849.99**

The Voicebox

The Voicebox highly-ic scale compressor with hard & soft knee types, variable limiter and auto mix input is even provided for quick and easy setup. **£849.99**

The Channel Strip

The Channel Strip features the ultimate, full suite featuring line level inputs and built in EQ. **£999.99**

1201 TRUE STEREO FX PROCESSOR

The 1201 is a full 17" rack unit, featuring true stereo 16 bit processing at 44.1kHz, with 64x oversampling converters. The quality of the reverb alone would make it worth the price, but there's lots more: two simultaneous effects are offered, from a choice of 33 including delay, chorus, flanging, tremolo and pitch shifting, 'vocoder', karaoke, 'lo-fi' and vocal distortion effects as well as various reverb types including reverse. If one of the 363 presets doesn't suit exactly then using the two parameter knobs will allow you to tweak the program until it does, and the addition of 2 band EQ will further tailor the sound to your mix.

NEW PRODUCT
£99.99

1204 TRUE STEREO FX PROCESSOR

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

NEW PRODUCT
£199.99

REFLEX EFFECTS PROCESSOR



Once the preserve of only the world's top studios, Lexicon reverb has become more affordable in recent years, but this incredible exclusive deal means anyone can own one!

The Reflex packs stunning reverb quality together with two effects such as delay and Resonator, and some of the most comprehensive MIDI control available into a 1U rack unit. Reverse, gated and plate reverbs are included along with more traditional algorithms, and up to 10 editable parameters are available for each program. Lexicon's famous Dynamic MIDI allows for any four of these to be controlled in real time via virtually any MIDI information - imagine varying decay time via note number, or feedback from your modulation wheel - the possibilities are endless! The best sounding reverb on this side of an MPX1.

RRP £469
£169.99

Limited stocks only - first come, first served!

MPX1 MULTI EFFECTS PROCESSOR

For those of us who need top quality reverb & multi FX but cannot stretch to the expense of the PCM80, Lexicon has released the MPX-1. Featuring the famous 'Lex' chip for reverb and separate DSP processor for multi FX, the MPX-1 brings you all that is good in signal processing for an incredibly low price. Up to 5 simultaneous effects are available including pristine quality stereo pitch shifting, and effects can be "morphed" from one algorithm to another, as pioneered in the Verlex. **Megelele only at Turnkey!**

RRP £1149
£699.99

PCM80 - 2 CARDS AVAILABLE only £1399

OUTBOARD NEW, USED & EX DEMO

ALESIS 3630	£169	BEHRINGER ULTRACURVE E299	LEXICON PCM90 + CRD	£1,599
ALESIS MICROVERB 4	£149	DBX 9654	LEXICON REFLEX	£,999
ALESIS MIDIVERB 4	£199	DIGITECH STUDIO VOC	SPL VITALIZER	£,959
ALESIS HANCOMP	£80	DIGITECH VOC PEDF	TC FINALIZER	£1,499
ALESIS HANOVERB	£99	FOCUSRITE GREEN 2 EQ	YAMAHA REV500	£299
ALESIS QUADRAVERB 2	£249	JOEMEER VC3	ZOOM 1204	£,149
BBE 302	£149	LEXICON MPX1		£595
BEHRINGER COMPRESSOR	£159	LEXI PCM80 - 2 CARDS		£1,399

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

EUROPE'S LOWEST



THE TURNKEY PRO TECH PENTIUM: A TOWER OF STRENGTH

Ringing round for the cheapest Pentium?
 We sell audio equipment - not office software and games! The computer is the heart of any studio setup, and a Turnkey Pro Tech audio-ready PC, built with carefully selected components, means a quality solution at an affordable price. We deliver a tested, working, integrated system - if you have a problem, just call us!

A modern Pentium can be used for a myriad of tasks ranging from desktop publishing, multimedia, games, and office work. However, few applications are as demanding as digital audio recording. Criteria which are irrelevant to most PC shoppers (such as the level of radio frequency interference within the casing), become very important, and sound cards which are otherwise considered "best buy" in the press often lack the essential "full duplex" ability which permits monitoring of audio during recording.

By supplying a pre-installed computer which we build from carefully selected components and run through 16 separate tests, we ensure that you get up and running immediately; you won't need to delve into DMA channels and PnP BIOS conflicts, and you won't get any nasty surprises like "insufficient system resources" warnings, when you try to run your software. Call us to discuss your requirements - **satisfaction guaranteed!**



Genuine Email found on Cubase newsgroup from satisfied Turnkey customer Richard Blenkinsopp:

With all the problems I get people seem to be having with compatibility I just thought I'd let about a system that works fine. You can get the whole lot from Turnkey (Soho Soundhouse) in London. Looking at the problems people have, I'm glad I did. It might do go wrong, there is only one contact point and there is no excuse for them not to help you. Mine has not caused any problems so far, and in fact creates no more requests than my Atari (did I tell anyone who doesn't know, that wasn't very often!). I wouldn't like to quote some figures, but it is certainly as good quality as anything else I've heard. I recorded the whole lot in a studio using ADAT, and at home using the PC - my PC in terms of people may have trouble believing this, but I've had every reason to be sure. Turnkey supply a fully tested system, which includes VST for under £1200. It doesn't include all the usual bundled software that normally comes with "high street" PCs, so if you want to have AutoCAD for that lovely weather she swivel, you'll have to add the cost of a decent word processor, but for a lot less. They do plenty of options for larger file drives, more RAM, a better processor. Dad's a word processor etc. That's what I've used, but I'm happy. P166 works fine with up to 20 tracks of digital audio, perfectly sync with MIDI tracks. PC - I don't work for Turnkey!

Turnkey PC Music Show

MIDI AND HARD DISK RECORDING EXTRAVAGANZA!
 Our latest event which program will fulfil your musical needs. Not sure which audio or MIDI card to buy? **TURNKEY SOLUTION** - For one night only the major manufacturers will be together under one roof, available to demonstrate and answer your questions. Anyone who's anyone will be showing off their latest hardware and software music systems. Exclusive new products on show together for the first time.

- Products on show include:
- LOGIC PLATINUM
 - CUBASE VST
 - CAKEWALK PRO AUDIO 7
 - LEXICON STUDIO
 - WAVELAB 2
 - SOUND FORGE 4
 - TURTLE BEACH
 - FINALE
 - SIBELIUS VMP
 - DIGITAL AUDIO LABS
- PLUS MANY MORE TO CONFIRM.**
UNBEATABLE "ON-THE-NIGHT" DEALS
 Wednesday 15th July 1pm - 10pm
 Entrance FREE by T-CRET ONLY
 Limited numbers so call now to reserve your ticket

CAKEWALK PRO

OVER 60% OFF PRICE
 Cakewalk has been the US #1 sequencer for ever. For a limited period, we are offering Cakewalk Pro v5.0, with 4 discrete audio tracks and 256 MIDI tracks for £79.00. That's less than the price of Cakewalk Home Studio! Upgrade option to Pro 6 (£49.99) or Pro 6 Audio (£109.99). (Comes on CD-ROM. Also includes v4.5 for Win3.1)

- Cakewalk Pro 5 + MIDIMAN Dman £229.99
 - Cakewalk Pro 5, MIDIMAN Dman + DB50 £335.99
 - Cakewalk Pro 5 + laptop MIDI interface £149.99
 - Cakewalk Pro 5 + Pentium package £999.99
- RRP £199**
£79.99

SIBELIUS-7 TOP-END NOTATION V3.5

Why do so many music academies use a program which doesn't work on the PC or Mac? Because for professional notation typesetting, nothing else comes close. "In a totally different league from anything else" - Paul Patterson, Royal Academy of Music, Future Music Platinum award. We are now an Acorn Authorised Dealer, we stock and demonstrate the exciting new RisePC computer, running RiseOS3 powered by the 200 MHz ARM processor, and with optional 486 or 586 board for running Microsoft Windows software. **Call for a DEMO. One to one tuition also available upon request.**

FROM ONLY £499.99

CAKEWALK STARTER PACK

- Intel Pentium 233MHz (optional P4)
- 16MB L2 cache RAM
- 32 Mb RAM (optional 64 Mb)
- 2 Gb HD (optional extra 4 Gb, 6 Gb, 8 Gb)
- 24x speed CD-ROM drive
- 14" SVGA display (optional 15", 17")
- Windows 95 CD, keyboard & mouse
- Cakewalk Pro Audio v5.0
- 16 bit full duplex audio system
- Processor 64K Synthesizer
- 1x1 MIDI interface adaptor

RRP £1561
£999.99

CUBASE VST STARTER PACK

- Intel Pentium 233MHz (optional P4)
- 16MB L2 cache RAM
- 32 Mb RAM (optional 64 Mb)
- 2 Gb HD (optional extra 4 Gb, 6 Gb, 8 Gb)
- 24x speed CD-ROM drive
- 14" SVGA display (optional 15", 17")
- Windows 95 CD, keyboard & mouse
- Cubase VST PC v3.5
- 16 bit full duplex audio system
- Processor 64K Synthesizer
- 1x1 MIDI interface adaptor

RRP £1561
£1199.99

LOGIC/AUDIOWERK PACK

- Intel Pentium 233MHz (optional P4)
- 16MB L2 cache RAM
- 32 Mb RAM (optional 64 Mb)
- 2 Gb HD (optional extra 4 Gb, 6 Gb, 8 Gb)
- 24x speed CD-ROM drive
- 14" SVGA display (optional 15", 17")
- Windows 95 CD, keyboard & mouse
- Logic Elements PC
- Audiowerk 2 in, 4 out card
- Logic Audio 1212 Upgrade Module
- 1x1 MIDI interface

RRP £1612
£1199.99

STEINBERG PRODUCER PACK

- Intel Pentium 233MHz
- 64 Mb RAM, 16MB L2 cache RAM
- 24 speed CD player, 4x speed CD burner
- 39 tracks CDs
- Dual 2 Gb (optional 4 & 6 Gb) IDEs
- 17" SVGA display
- Windows 95 CD, keyboard & mouse
- Cubase VST PC v3.5 & AudioTrack Dynamics
- Wavelab CD recording suite
- Logic 1212 in, 4 out PCI audio card
- Options: Synthesizer, 4ch MIDI interface

RRP £3299.99
£2299.99

- Add £249 for PII option
- Add £69 for 64 Meg RAM option
- Add £39 for 15" SVGA option
- Add £229 for 17" SVGA option
- Add £199 for extra 4 Gig HD
- Add £299 for extra 6 Gig HD
- Add £399 for extra 9 Gig HD

CODA FINALE 97

NEW VERSION NOW AVAILABLE

Finale has long been considered the "Rolls-Royce" of score programs, but at a price of £699, few people could stretch to it. Now it's an extremely powerful but complex interface many beginners were put off. With the 3.7 new release for just £499.99 (£249.99 for Academic Users) and now sports a radically redesigned user interface and revision manuals. If you're looking for a new Finale, "Finale" or Steinhausen's "Groupwise" Finale contains all the features you'll need!

RRP £699
£499.99

BAND-IN-A-BOX INTELLIGENT ARRANGER v7.0

Tired of starting each song with a Blink State? Band-in-a-Box is the world's leading intelligent arranging software. Combine your chord list with built in styles, or create your own. Includes full GS / XG compatibility, as well as "Auto Solos" which has to be heard to be believed. Notation / Lyrics display during playback. Can export music into Cubase.

#1 SELLER
£89.99

MU10 GM SOUND MODULE

OUT OF THIS WORLD MEGADEAL!

Turnkey's incredible buying team have done it again! Yamaha's MU10 was already great value for money, but this exclusive offer makes it unbeatable! The "XG" range of products (including the famous DB50XG) has long been highly regarded for its 676 excellent sounds, 3 built in effects processors and superb integration with computers.

The MU10 comes in a handy module format which means there's no need to open up your computer, no IRQ conflicts or DMA problems, you just connect it to the serial port of your Mac or PC (cable included). What's more its MIDI in and out ports means it also acts as a MIDI interface, and it can be used as a stand alone module without a computer! The 34 built-in effects can be used not only with the built in sounds, but also with any external signal (eg your voice, guitar etc) via the stereo audio input. The MU10 comes with the CD-ROM version of Steinberg's famous Cubasis MIDI sequencing software, and this incredible offer includes a shareware version of Yamaha's XgEdit editor free for detailed editing of the onboard sounds. **A complete starter kit for anyone looking to get into making music. This exclusive offer is only available whilst stocks last - get your order in now!**

RRP £199
£169.99

MIDI INTERFACES FOR PC COMPATIBLES

INTERFACES

- Steinberg Cubase Vst v3.5 Soundblaster™ v4.0 128K 639.99
- MIDI Line In, out serial interface for notebooks 139.99
- Windows 95 16bit MIDI card with Windows 95 139.99
- Windows 95 16bit, 2 out MIDI card for Windows 95 139.99
- Proton 24x 2 in, 4 out parallel interface for notebooks 119.99
- MIDI Edge 1ah 1 in, 4 out MIDI card with Windows 95 119.99
- Windows 4.2a 4 in, 4 out MIDI / SMPTE card for Windows 95 99.99
- Proton 4.2a 4 in, 4 out MIDI / SMPTE card for Windows 95 99.99

Great bundled prices with any software

ZIP REMOVABLE DRIVE

100 MB DISK & 25 PIN SCSI CABLE

There was a time when hard disks were a luxury for sampler owners, but with the advent of the ultra cheap Iomega Zip Drive, this has become a thing of the past. For under £150 the Zip drive stores 100MB (94MB formatted) on each cartridge. A must for anyone with more than 2 meg of RAM!

RRP £219.99
£149.99

YAMAHA MU10 GM SOUND MODULE

RRP £199
£115.99

DMAN 2044 PCI DIGITAL AUDIO CARD

NEW

Brand new high performance PCI digital audio card. Featuring 4 independent inputs and outputs, 30 bit sigma delta converters with 128x oversampling, on-board DSP able to perform real-time effects processing on each channel. Really really easy installation with Win95 Plug & Play! After putting the card in, switch the PC on and insert the disk when prompted. Takes about 90 seconds and will seem run like you're an existing sound card. Buy with Cubasis for only £239.99!!!

RRP £299
£249.99

1212 I/O PCI AUDIO CARD

The card that everyone's been waiting for! Now you can use Cubase VST (amongst others), and have multiple inputs and outputs, without spending a fortune. But the PCI 1212IO is far more than just a soundcard - it can become the very heart of your studio. There are stereo analogue ins and outs, SPDIF in and out, and 8 more digital ins and outs in ADAT format. All these can be used independently giving you a total of 12 ins and outs! Word clock and ADAT 9 pin connectors are also provided. Call us for more details or arrange a demo - this card could change your recording life!

RRP
£599.99

PRICES GUARANTEED



A DIGITAL HURRICANE IN YOUR PC?



99% of available sound cards use the old-fashioned "DMA" system of recording audio in order to be compatible with Soundblaster games. With the Pinnacle and Fiji, Turtle Beach abandoned this system in favour of their proprietary Hurricane architecture. Basically, it gives you more tracks than DMA on the same PC hardware, and leads to less driver conflicts.



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.

The audio quality of the Pinnacle is beyond reproach, based around a Motorola DSP with 20bit converters on both record and playback, 64x oversampling, and Delta/Sigma converters. An on-board Kurzweil chip provides a top-quality set of synth sounds, which can be augmented with your own samples which can be mapped to a MIDI keyboard via the SampleStore™ control panel. (Up to 48 Meg of samples can be loaded, depending on the size of SIMMs fitted). Create your own drum-kits, mix in break-beats sampled from CD etc... etc...

CUBASE VST
£549.99
 PACKAGE WITH FIJI

C WALK PRO AUDIO 6
£599.99
 PACKAGE WITH FIJI

LOGIC AUDIO
£649.99
 PACKAGE WITH FIJI

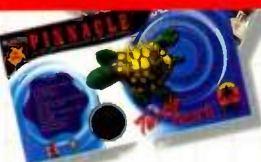
ADD £75 FOR Pinnacle INSTEAD OF FIJI
 ADD £99.99 FOR S/PDIF DIGITAL I/O

Other upgrade options include a synth daughter-board (eg DB50XG), cable for MIDI interface, and S/PDIF daughter board allowing direct digital transfer to/from DAT, CD player, MiniDisk etc... (£99.99 for either card). The Pinnacle is bundled with Voyetra's D.O.P. sequencer which gives up to 16 audio tracks with digital effects (eg reverb, delay...) depending on hardware specification.



FIJI
£299.99

A PINNACLE WITHOUT SYNTH & SAMPLESTORE ALSO INC. FREE DIGITAL ORCHESTRATOR SE



PINNACLE
£375.99

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

MOTU-2408 HARD DISK RECORDING SYSTEM

Twenty-four track digital recording for under a grand! No, you're not dreaming. Mark Of The Unicorn's new 2408 has twenty-four ins and outs in both ADAT and TDFI format, as well as eight analogue ins and outs all in a 1U rack! The system doesn't stop there though, there are also two channels of SPDIF I/O which allow digital dubbing between an SPDIF source and either ADAT or Tascam machines, and you can also dub directly between ADATs and Tascams. Synchronisation is amply catered for with an ADAT sync in, word clock in and out, and a MOTU Control track input for sample accurate Digital Timepiece sync. The PCI-324 card is included for use in either Macintosh or Windows computers, and it will allow you to connect up to three 2408s for seventy-two ins and outs, and as many channels as your computer allows! The 2408 is also shipped with fully featured workstation software for Mac, with recording, editing, mixing and real-time effects processing, whilst a standard Windows driver is included for PC compatibility. All in all, a ground breaking product in terms of price / performance, features and compactness - call today to arrange a demonstration.



NEW PRODUCT
£995.99

SOUND FORGE 4 PC SOUND EDITOR

Sound Forge 4 (now with AVI and directX support) is a full-featured sound editor intended for musicians, sound designers, and multimedia developers using the Windows platform (16-bit or 32-bit Windows). Allows sound file editing, effects, loops and regions, playlists. External samplers and sync to MIDI and SMPTE Time Code. Multiple window environment allows more than 50 sound files to be open at one time. Supports WAV, AIFF, Creative VOC, VQX, and Sound Designer SD1 files. Drag-and-drop glitch-free editing. Sound Forge is perfect for authoring audio CDs on the PC.

PLUG-INS Full range of Sound Forge plug-ins in stock
 XFX1 - reverb, time and pitch shifting, chorus and delays only £99 DirectX compatible
 XFX2 - noise gate, graphic and multiband dynamics, parametric, parametric and graphic EQ also £99 DirectX compatible
 Spectrum Analyser - nuff said £119
 Acoustics Modeller - simulates acoustical response of real environments £199 DirectX compatible
 Noise Reduction - £275
 Batch Converter - £159
 CD Architect - complete red book audio CD burning solution - £299

RRP £349
£299.99

COMPUTER NEW, USED & EX DEMO			
AUDIO WERK 8	..... £120	STERNBERG CUBASE	..... £289
CODA FMMLE	..... £449	STERNBERG CUB SCORE	..... £399
CUBASE SCORE	..... £429	STERNBERG REBIRTH	..... £129
CUBASE VST	..... £279	TURTLE BEACH FIJI	..... £279
ETC CARWALS	..... £280	TURTLE BEACH PINNACLE3279	..... £279
EVENT DARLA	..... £279	PRODUCER PACK	..... £449

SAMPLING NEW, USED & EX DEMO			
AKAI MPC2000	..... £999	EMU ESH4000	..... £999
AKAI S2000 + ZIP + 16MB	£749	YAMAHA A3000	..... £999
AKAI S3000L + 16MB	£1,299	EMU E6400 + 64MB	..... £1,799

TERRATEC EWS-64XL

Full-on standard packed full of features! On board sampler with 64 note polyphony 4MB sampling RAM all standard! Duplex audio recording DSP for real-time FX, SPDIF in and out 2 MIDI ports. Complete games compatibility Comes with a drive bay module for easy access. In stock and on demo.

NEW PRODUCT
£399.99
 Buy with Cubase VST for only £675.99

CLIBASE Steinberg
CUBASE VST FOR PC! The industry standard MIDI sequencer a now even better value than ever! Version 3 now includes full hard disk recording facilities as on the Mac that work with any soundcard!
 Get £50 off Score version at only **£449.99** **RRP £329**

CUBASE VST MAC As well as all the great sequencing and audio recording facilities you come to expect from Cubase, Power PC owners can now take advantage of up to 32 audio tracks, complete with built in filter EQ, DSP, reverb and FX! Get £50 off Score version at only **£449.99** **£299.99**

REBIRTH RB-338 SOFTWARE SYNTHESIZER
 If you're into techno, trance, ambient, hardcore, you simply must have the sound of a 303 in your arsenal of sonic weapons. As it's been one of production for well over a decade those still in existence are collector's items. They're now you in arm and a leg which has opened a market for clone products. The ReBirth RB-338 is a CD-ROM which gives you two 303s and one 808 - a software recreation of these two classic pieces of analog hardware. All the quirks and subtle qualities of the real thing are there, with full MIDI and sync capabilities. No cables, no boxes, all you need is a Mac or a PC. **RRP £149.99**

PRODUCER PACK Cubase VST is great value even on it's own, but the fabulous Producer Pack takes it to new heights! You get Cubase VST XT, the top of the range version which includes the full set of scoring features and works with professional hardware from Digidesign and Yamaha etc. Steinberg WaveLab, the superb stereo audio editing program which includes full Red Book CD burning with PQ encoding, and Waves AudioTrack, a VST plugin which includes a high quality compressor, noise gate and four band parametric EQ. Get all this for less than the price of VST XT alone! **RRP £799**
£499

LOGIC SEQUENCER RANGE New Range sporting DirectX / VST plug-in compatibility **emagic**

LOGIC PLATINUM - Up to 96 audio tracks, real-time DSP effects, support of multiple high-end hardware **RRP £549**

LOGIC GOLD - Up to 48 audio tracks, real-time DSP effects, supports AudioWork 8 and Korg I212 **RRP £399**

LOGIC SILVER - Up to 24 audio tracks 3 effects buses. **RRP £199**

MICRO LOGIC AV - 16 track audio with 2 effects and entry level sequencer **RRP £99**

SOUND DIVER - Librarian editor supports stacks of synths and modules, easy graphical interface **RRP £179**

AUDIOWERK 8 HOME STUDIO KIT For well under £500 including VAT, you can now buy a PCI card for your Mac or PC, which gives 2 analog inputs, 8 analog outputs, and SPDIF dig I/O as standard. You even get Emagic's Logic Audio Discovery sequencing & hard disc recording software, and Zap compression software thrown in! 2 cards can be used in the same computer to give 24 track recording with 16 outputs (Logic Audio 3 required). Turn your computer into a sophisticated digital multitrack! **RRP £499**
£449.99

PLUG-INS DIRECTX / VST

Up the power of your hard disk recording system with these real-time plug-ins and Native Audio Processing VST/DirectX - works with any DirectX compatible audio software

Loudness Maximizer - boosts the loudness of recordings £299
Magneto - adds analogue warmth to digital recordings £299
De-Clicker - Restore your vinyl recordings £299
De-Noise - Easy noise reduction £299
Spectralizer - spectral enhancer £299
Q Metric - Analogue sounding parametric EQ £499
Free Filter - linear phase 30 band EQ £299
Waldorf D Pole - A virtual D Pole filter £149
Waves Native Power pack - contains TrueVerb reverb/compressor/stereo imager/maximizer/paragraphic EQ all for only £399
EasyWaves Bundle - Everbit/compressor and EQ for only £125
SPL De-Esser - Virtual de-essing £149
Hyperriser - contains 25 effects including reverb, filters, ring modulation £279
TC Native Reverb - quality reverb, windows only £329
Fusion Vocode - software vocoder £125
Fusion Vinyl - add the sound of vinyl to your digital recordings £79
Fusion Filter - resonant filtering £125

VST Mac only
FreeD - 3D audio simulator £149
RED VALVE-IT - Valve tube modeling for guitar amp simulation £299
YouCiter - vocal processor and enhancer £299
Roomulator - Prosonix quality reverb £299
Amibone - 3D stereo simulator £149
Auto-tune - Corrects intonation problems of vocals in real-time £499

WOT NO SAMPLERS?!



No, we haven't stopped selling samplers or offering you the same great deals as always. See our six page Turnkey Loopstation brochure included in this magazine for all that's good in samplers, library and peripherals. No brochure? Need another for a friend? Call us now and we'll have one on your doorstep tomorrow!

EUROPE'S LOWEST

Focusrite FOCUS POCUS!

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



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

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

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

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

VIRUS

VIRTUAL ANALOGUE SYNTH

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

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

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

NEW PRODUCT
£899.99

EMU SYNTH MODULES

ORBIT
PLANET PHATT
CARNAVAL

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

The Orbit is stacked full of classic drum sounds, pulsating basses, ardent pads, as well as a huge variety of ties and effects. Planet Phatt brings a new definition to swing, and the Carnival is ideal for dance grooves as well as Latin specialists.

The inclusion of the E4's 16 different types of 6 pole filters mean that these modules have more musical filtering than any other synth. Finally the 'BEATS MODE' includes a wide selection of loops and grooves, which can have their pitch changed without tempo change and vice-versa, and even their sounds too!

V2 software now gives improved beats mode and other enhancements. Orbit upgrade available for only £69.99.

RRP £869
£609

DEEP BASS 9 TB303 CLONE

A great sounding TB303 clone in rack with 1 knob per function, all the sound controls of the 303 are duplicated, filter cutoff, scan and glide all controllable over MIDI. Audio input allows treatment of external signals by the filter etc, and CV/gate in / out also means it can be used as a MIDI - CV converter. An excellent analog bass machine - this unbelievable price on the end of the line means they will sell out very quickly!

RRP £449
£199.99

QUASIMIDI RAVE-O-LUTION 309 DANCE WORKSTATION

The Rave-O-Lution 309 is undoubtedly Quasimidi's 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, 2 on board effects processors & EQ, optional rack ears, typical German build quality - far too many features to mention here! The ultimate dance production workstation, must be heard to be believed. "superb bass synth... excellent drum sounds... one of the most immediately useable products on the market" - Sound On Sound.

Call for a free demo CD. Money back within 7 days if not satisfied (ask for conditions).

FACTORY DIRECT
£499.99

309 AUDIO-EXPANSION

3 outputs expansion board now £149.99 (was £199.99) - 3 inputs - 3 outputs - 3 external signals through the AES synthesis. Also comes with new operating system with many new features.

FACTORY DIRECT
£119.99

POLYMORPH SYNTHESISER

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

Call for more details.

FACTORY DIRECT
£769.99

ATC-1 ANALOGUE MONOSYNTH

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

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

Circuitry is analog throughout - right down to the oscillators, and the sound is boundless to say, superb. There are 2 LFO's (one syncs to MIDI), three envelopes and virtually all parameters can be controlled over MIDI. The ATC-1 is supplied with the Mini Moog filter, and can also be fitted your choice of a TB303, ARP 2600 or Oberheim Xpander filter (only £49 each), and for the filter enthusiasts amongst you, the filter Selector (only £199) takes all 4 filter's simultaneously, and the filter type is automatically stored with each patch, avoiding the need for switching. The rear panel sports an audio input, and CV & gate ins and outs as well as the usual MIDI connections.

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

RRP £899
£469.99

ROLAND JV1080 SYNTH MODULE

INC 2 FREE CARDS

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

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

RRP £1189
£909

ROLAND JV2080 SYNTH MODULE

INC 2 FREE CARDS

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 - sell us now!

RRP £1399
£909

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

PRICES GUARANTEED*

WALDORF MICROWAVE XT



THE FUTURE'S ORANGE!



A classic - with knobs on! The Microwave XT takes all the features of the incredible Microwave II and adds new software and the user interface you've been waiting for! It's simplicity of use is obvious with knobs everywhere (which all send MIDI controllers) and a 2x40 character back lit LCD, whilst at the rear, the Microwave XT has 2 fully modulatable stereo outputs which are configurable as 4 monos with panning.

Sound generation comes from a powerful DSP generating unique wavetables, and the ten voices each feature two oscillators, two wave generators, one mixer, two filters in series, one stereo amplifier, four envelopes, two LFOs, and one modulation matrix with 16 slots and several 'modifiers'! More than enough to keep even the most demanding knob twiddler satisfied! The awesome sound has been further enhanced by a superb new sound set, with many patches being a performance in their own right. And what a paint job!

All this adds up to make the Microwave XT a highly desirable instrument - call us now to make your mix (and your rack) stand out from the crowd.

- Classic and Unique Waldorf Wavetable Sound
- All Knobs Send out MIDI Controllers
- Arpeggiator per Sound Syncable to MIDI
- 8 Part Multitimbral & 10 Note Polyphonic

M-BD1 SOUND MODULE

ROLAND

UNDER HALF PRICE!

Over 50% off on this top quality bass & drum module. Packed full of superb acoustic and electronic sounds of typical Roland quality, the M-BD1 is 28 note polyphonic and 8 part multitimbral, and has 2 built in FX processors. Makes an ideal addition to any MIDI setup, providing the bread and butter sounds for a wide variety of tracks.

Very limited quantities - order now to avoid disappointment.

RRP £469
£169.99

QY70 WALKSTATION

YAMAHA

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

RRP £449
£449.99

RHYTHMTRAK 234 DRUM MACHINE

ROLAND

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

NEW PRODUCT
RRP £199
£199.99

TR-RACK SYNTHESIZER RACK

KORG

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

RRP £999
£949.99

MC-505 GROOVEBOX DANCE WORKSTATION

ROLAND

Take an MC303 Groovebox, add an extra effects processor, a D Beam infrared controller, a RAM card slot, enhance the arpeggiator and what have you got? An MC505! Well not quite in fact - the MC505 also has up to 4 tones per voice, more user patches and patterns (256 and 200) and up to 64 note polyphony. 8 front panel sliders make mixing a breeze. Initial stocks are rare - call us now!

NEW PRODUCT
RRP £949
£949.99

MC-303 ALSO AVAILABLE only £499.99

MEGADEAL ALERT NEW LOW PRICE! **FAT**

FREEBASS TB303 CLONE

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



It's the only authentic sounding TB303™ clone on the market, and it's got MIDI! 1U rack with 1 knob per function, all the sound controls of the 303 are duplicated, Cutoff, Resonance, Envelope Mod, Accent, Tune and Decay. Waveform is continuously variable from square wave to sawtooth, and an auto tune button is included to retune the oscillator - no more continual drifting!

On top of this, there's an audio input to the filter stage, allowing you to process any external signal with the FB383's powerful synthesis. The ultimate analog bass machine - this incredible price means these will fly out of the door! Another Turnkey exclusive.

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

FACTORY DIRECT
RRP £499
£129.99

DMS DRUM MODULE **ALESIS**



The DMS 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 DMS includes an ultra-fast trigger-to-MIDI converter with 12 trigger inputs, 4 audio outputs and a backlit LCD display. The drum sound for you is waiting right here!

RRP £429
£269.99

Another Turnkey megadeal!

P50-m PIANO MODULE **YAMAHA**



At this price, can your setup afford to be without a piano module - no more need to load up floppy samples or chew up valuable polyphony! The P50M takes the dazzling sounds from Yamaha's highly stage piano, the £5,000 P500, including grand and upright piano, CP80, Rhodes, Wurflizer, Clavinets and DX electronic sounds. Many instruments are sampled in stereo for stunning realism, stretch tuned versions are available, and there are 22 different artic types (2 simultaneously) to choose from, as well as a 3 band equalizer. 32 note polyphony means you should never run out of notes, but for those with a heavy right foot, two modules can be connected in overflow mode for a whopping 64 notes, and there are seven velocity response curves to choose from to suit any playing style.

RRP £399
£169.99

A bargain at the full price, this amazing deal means that stocks will not last long - call for yours now!

RY8 RHYTHM MACHINE



The RY8 has to be the most versatile rhythm machine on the market. As well as 128 of Yamaha's finest drum and percussion samples, 12 drum pads, 200 preset patterns, 50 user patterns, and 12 customisable drum kits, the RY8 also has a selection of 50 instrument sounds including basses, pianos, strings, guitars, saxes and many more. There are an additional 200 accompaniment patterns, playing 1 bass, 2 rhythm and 1 lead part each, chord changes are user definable and there are 4 sections to each pattern. But there's more! Plug in a guitar on a microphone and it's built in pitch to MIDI converter allows you to play any of the instrument sounds directly, without a MIDI keyboard or special interface. MIDI in and out (syncs to M DI clocks), headphone socket, battery or mains powerable absolute bargain!

RRP £189
£129.99

Exclusive end of line offer - buy now whilst stocks last!

MDF2 MIDI DATA FILER

Direct to disc MIDI data files stores system files from virtually any MIDI device for sound storage etc as well as recording and playing back Standard MIDI Files - perfect for live use as well as the studio!

RRP £379
£199.99

Exclusive end of line clearance only at Turnkey - buy now while stocks last!

SOUND MODULES NEW, USED & EX DEMO

ALESIS DMS	£280	KORG MSR	£380	ROLAND MC303	£399
ALESIS OSR	£549	KORG TR RACK	£899	STUDIO ELECTR ATC-1	£469
BOSS DRS	£249	KORG X5DR	£299	WALDORF MICROWAVE 2	£749
EMU CARNAVAL	£599	KURZWEIL MICROPIANO	£279	WALDORF PULSE	£299
EMU ORBIT	£699	ROLAND JV1080	£699	YAMAHA QY700	£749
EMU PLANET PHATT	£599	ROLAND MBD1	£169	YAMAHA VL70M	£299

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

EUROPE'S LOWEST

SIRIUS DANCE WORKSTATION

NEW



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

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

Call now for full details, or to reserve your unit!

FACTORY DIRECT
£799.99


Wave Synthesiser



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

PRICES FROM
£6299.99

K5000s ADDITIVE SYNTH




In this age of many 'soundalike' sample synth keyboards, it's not often you get something coming along with a completely fresh approach. Kawai have dared to be different though with the K5000s, and reintroduced additive synthesis. This has been tried in the past, but the limited DSP power has severely curtailed the possible results. The only method of synthesis that can theoretically produce any possible sound, additive has a palette which ranges from superb acoustic simulation, to timbres quite unlike those offered by any other synth. The inclusion of a traditional synthesis section complete with an incredibly powerful filter means it's also a cinch to create fantastic analogue style sounds, and a generous complement of knobs which all send MIDI controllers add to the ease of use.

RRP £1399
£849.99

Incredible new low price only at Turnkey!
RACK VERSION ALSO AVAILABLE only £999.99

QS8 EXPANDABLE SYNTH




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

RRP £1699
£999.99

QS8 ALSO AVAILABLE only £999 QS7 ALSO AVAILABLE only £799

Z-1 MULTI OSCILLATOR SYNTHESIZER



Korg's Z1 is probably the most comprehensive modelling synthesizer built to date, incorporating 13 different algorithms for stunning simulations of everything from classic analogue synths to incredibly lifelike string and brass sounds. Multitrack performance and 12 note polyphony (expandable to 18) mean this is a really useable instrument, and there's even an optional ADAT format output board for those of you trying to maintain a fully digital system. Other features like the unique polyphonic arpeggiator and 15 effect types make the Z1 superb value. Check one out today!

RRP £1699
£POA

TRINITY KEYBOARD WORKSTATION



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

TRINITY PLUS £1699
TRINITY PRO £1999.99
TRINITY PRO II £2399.99

RRP £2345
£1349.99

QS6 EXPANDABLE SYNTH



The QS6 64 Voice Expandable Synthesiser starts with an 88 note piano weighted keyboard, and a powerful 64 Voice synth engine, powered by 8MB of sound ROM which is expandable to 16MB, either through the included Sound Bridge sample transfer software. There are 640 programs and 500 'mixes', including a complete GM bank. Four simultaneous multi effects processors based on Quadraverb 2! Built-in serial port for direct interface to a computer, includes free CD-ROM of sequencers, editors, song files, and samples. Unbelievable clearance deal exclusive to Turnkey - buy now or live to regret it!

RRP £1699
£999.99

QS6 ALSO AVAILABLE only £999 QS7 ALSO AVAILABLE only £799

CLP-411 DIGITAL PIANO



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

RRP £1399
£999.99

ALMOST 30% OFF!

CALL PIANO KEYBOARD ON 0171 497 5559 FOR DETAILS

DTR-1 RACK-MOUNT DIGITAL TUNER



- Oversize easy to read LED meter.
- Auto tuning with 3 selectable modes; Strobe, Cent, Hz.
- Two tuning inputs to handle tuning of 2 instruments.
- Built-in microphone is perfect for tuning acoustic instruments.
- 3-Octave reference tone.
- Cable check function.

RRP £249
£169.99

JP-8000 ANALOGUE MODELLING SYNTH



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

Analogue 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 phase synthesiser are included, which can be easily synchronised to an external MIDI clock.

Still one of the hottest synths around - order now!

RRP £1499
£1099.99

EP-75 76 NOTE WEIGHTED ACTION



The Roland EP Series pianos are the perfect choice for those seeking a piano which is both affordable and compact. The 76-note semi-weighted keyboard is ideal for children or for those who prefer a lighter touch. 8 sounds are available, including an amazingly authentic piano sound, as well as 9 different piano accompaniment styles, built-in recorder, headphone socket & a host of other functions. 88-note version EP-85 also available.

RRP £599
£449.99

CALL PIANO KEYBOARD ON 0171 497 5559 FOR DETAILS

DTR-2 RACK-MOUNT DIGITAL TUNER



- Rack-mount auto chromatic tuner with large LED meter.
- Full 7 octave tuning range.
- Auto reference calibration function can automatically calibrate the tuner to instruments that are not easily tuned.

RRP £149
£99.99

XP-60 WORKSTATION KEYBOARD



Roland's XP60 builds on the success of the XP50 by adding a host of new features such as a 60,000 note sequencer with arpeggiator, king size LCD display

as featured in the XP90, MMC synchronization, and not forgetting of course the huge range of top quality sounds from the JV1080, and all the extras also available via the SRV expansion board series. Initial demand will far outstrip supply - get yours early in case!

RRP
£1299.99

WK-1200 MIDI KEYBOARD



Great value 73 note touch-sensitive MIDI keyboard with 2-Way Bass-Reflex Speakers for improved sound quality. The in-track sequencer, synth & mixer functions, pitch-bend wheel, backlit LCD & many more superb features make the WK1200 an outstanding instrument. Ideal for any level of performance.

RRP £299
£249.99

CALL PIANO KEYBOARD ON 0171 497 5559 FOR DETAILS

VOODU VALVE VALVE DRIVEN DSP PRE-AMP with HUSH



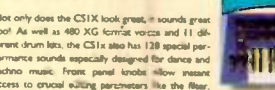
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Moog Music UK Minimoog Analogue Monosynth

It's true; the Minimoog is back! Manufactured in Cardiff by a new company, they're designed to resemble the original as closely as possible. Long-standing Mini owner STEVE HOWELL attended the UK launch.

If there is one synthesizer that will go down in the annals of history, it will almost certainly be the Minimoog; to say that it was an influential design is something of an understatement.

Conceived in the early '70s by the father of synths, Robert Moog, the idea was to produce a portable synth that could be played live without the patch cords required by the unfeasibly large (and expensive!) modular systems he was manufacturing at the time.

The Mini's simple and straightforward synthesis architecture of oscillators, filter, amplifier and envelope generators became something of a standard, and was employed in a vast number of successful synths, both analogue and digital. Even today's samplers owe something of their basic voice architecture to this simple design.

Interesting, then, that many years after production of the original Minimoogs ceased, they are now making a return. What's more interesting is that the new Mini comes not from America or Japan, but a far more unlikely source — Cardiff in Wales!

HOW DO YOU GET TO A MINI IN WALES?

I attended the recent launch of the new Minimoog, and what I learned was most interesting. It would seem that the recently

formed Moog Music UK have acquired the rights to use the Moog name and logo, and have many ambitious plans to revitalise the now legendary Moog product range. For the moment, however, the company's attention is focused on their replica Mini (and when I say replica, I mean it; even the walnut case, hinged panel, classy knobage and colour-coded switches of the original have been faithfully reproduced!). One thing that particularly endeared me to the new company is that they have been quietly working on this product for some 18 months, but are only launching it now, when they have a working synth to show the world. This is not some piece of vapourware scheduled for release at an unspecified time (as has been the case with other supposed Moog re-issues you may have read about in the past) — the new Minimoog should be available by about the time you read this.

BETTER BY DESIGN?

The new Minimoog does not employ DSP modelling to recreate the original Moog sound, but instead uses analogue circuitry throughout — although it is of course '90s analogue technology, and therefore more reliable and stable than that used in Bob Moog's original design. Nevertheless, although the new Mini has been technically improved, the designers have deliberately (and wisely!) striven to retain many of the little sonic imperfections that made the original Minimoog sound so great.

Apart from a few additions, the new Mini has exactly the same spec as the original synth, sporting three oscillators offering various waveforms: triangle, triangle/sawtooth mix, sawtooth, square and two widths of pulse. The latter two waveforms depart from the original Minimoog spec by having switchable pulse width modulation on Oscillators 1 and 2. Each oscillator is capable of producing tones from sub-sonic to 2' (just as on the original Mini) and Oscillators 2 and 3 have a tune control variable over +/-7 semitones. Oscillator 3's keyboard control can also be switched off for when Oscillator 3 is being used for vibrato or filter sweep duties.

All three oscillators can be mixed with a switchable white/pink noise source and any audio source you care to feed into the classic Moog 24dB/octave

low-pass filter via its external audio input. Once again following the original design, the filter has two keyboard track switches and a modulation switch, and is controlled by a simple ADS (with switchable R) 'contour' generator. The output of the filter passes to a voltage-controlled amplifier which may be shaped by its own ADS(R) envelope generator.

Of course, not everything remains unaltered; MIDI In, Out and Thru sockets are provided. The keyboard mechanism is also improved; the keyboard is digitally scanned, unlike the somewhat unreliable switched type on the original. Furthermore, the keyboard can be switched for single or multiple triggering.

CUTTING TO THE CHASE

This is all very well, of course, but design isn't everything. You're probably dying to know how it sounded; as an original Minimoog owner myself, I certainly was. Fortunately, I had the opportunity to have a play with one of the pre-production models at the launch, and rapidly set to making fat, pokey basses, biting Jan Hammer lead lines and much more. To my ears, it sounded pretty damned convincing. Thick and classy analogue noises just fell out of the Mini's latest incarnation fairly effortlessly — just like on my original, in fact! I was pretty impressed, although I will reserve final judgement until I am able to do a direct A/B comparison with my own trusty old box.

Many people like the idea of owning a Minimoog, but finding an original is tricky, let alone finding one that is in good condition, is reliable and stable, and is MIDI-retrofitted. The new Minimoog is all of these out of the box — in fact, one of the oddest feelings I had trying out the new one was playing a pristine Minimoog where all the knobs, switches and keys were intact, and there wasn't a scratch to be seen anywhere on the perfect casework! It even carries a year's guarantee, which you wouldn't get on a second-hand find in the SOS Free Ads.

So, the initial impressions are good, but a more detailed examination of the new Mini is definitely in order. Watch out for a full review in SOS in the very near future!

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Acoustic Energy

AE200

Nearfield Monitors

The AE200s use metal-coned drivers throughout, but does this technology offer any advantages over more conventional designs?

PAUL WHITE investigates.

Loudspeaker manufacturers are all bounded by the same physical laws, yet there are as many opinions on the best way to build a loudspeaker system as there are designers. Many of the differences centre around cone materials, with some designers being prepared to sacrifice acoustic efficiency by using heavier, highly damped materials while others prefer lighter paper or polymer cones. There's also the option of using metal cones, and there are numerous metal-diaphragm dome tweeters on the market, but metal-coned bass/mid units are less common.

Intriguingly, in designing this 2-way



nearfield monitor, AE have opted for a metal-coned 130mm chassis bass/mid driver as well as a domed, ferrofluid-damped 25mm alloy tweeter. One reason for this choice is that anodised aluminium is light, rigid and helps conduct heat away from the voice coil, which, in this case, is thermally bonded to it. A five-element crossover operates at 3kHz and two sets of terminals are provided on the back panel for bi-wiring. The maximum power handling is quoted at 125 Watts.

The AE200's black ash-finish MDF cabinet forms a fairly conventional ported enclosure measuring 185 x 3000 x 250mm, and the walls are 18mm thick and internally braced, with the front edges rounded to help reduce cabinet-edge diffraction. Both drivers are centrally mounted and recessed into the front baffle along with two flared plastic vents for the porting system.

Despite their small size, the AE200s deliver a very reasonable amount of depth and power. They're also quite sensitive, at 89dB for 1W at 1m, and the '3dB down' points are at 60Hz and 20kHz, although the usable response extends from 40Hz to 25kHz. Both drivers are magnetically shielded to permit use close to a computer monitor, and the nominal load impedance is 8Ω.

LISTENING TEST

A detailed listening test immediately revealed the futility of relying purely on measured parameters when evaluating loudspeakers, because although these speakers are designed to produce a nominally flat response, they have an obvious brightness about them. Some of this may be due to the choice of an aluminium bass/mid diaphragm, but I suspect that most of it is down to the choice of tweeter, and to be fair, you have to make compromises when you're trying to design a budget-priced loudspeaker. I've never yet heard a metal-domed tweeter that doesn't introduce some audible coloration, and in this case, there's a trace of splashiness in the high end. It isn't excessively aggressive, and it does help to make these speakers extremely revealing of transient detail, albeit at the expense of over-emphasising any sibilance that might be present in the recording. However, don't assume that these are in any way lightweight-sounding speakers, because the bass end actually turns out to be quite solid and extends well below the usual 80Hz kick drum peak. Drums and other types of percussion sound solid, lively and confident, as do basses. Voices exhibit a noticeably forward character, while plucked stringed instruments come over with quite a sharp attack. There's more than enough volume for comfortable nearfield

pros & cons

ACOUSTIC ENERGY AE200 £300 PER PAIR

pros

- Wide usable frequency range.
- Plenty of level for nearfield monitoring.
- Crisp, detailed sound.
- Good stereo imaging.
- Magnetically shielded.

cons

- Voicing has a noticeably bright edge.

summary

A well-engineered and very affordable small monitor producing plenty of level with a decent bass extension. Will suit those who like monitors with an upfront sound.

SOUND ON SOUND

listening and the stereo imaging is generally good with a usefully wide sweet spot.

SUMMARY

It's simply not possible to build a loudspeaker at this price that is perfect in all areas, but the AE200s have a lot of positive attributes alongside their tendency to be over-bright. Indeed, those used to mixing on traditionally bright monitors, such as NS10s or some JBLs, will probably find the AE200s suit them without too much of an adjustment period. I like the lively, punchy aspect of these speakers, and have no argument with their SPL capability, but I have to admit that listening at high levels for any period of time can be fatiguing. I tend to prefer very neutral monitors, but I know that a lot of studio engineers are used to monitors with a degree of forward voicing, so it may be that AE are deliberately targeting this sector of the market. Either way, you should always try to listen to monitors before you buy them, as different people seem to perceive different audio 'truths'. If the voicing suits your way of working, these are good-value monitors that are able to perform well in a small studio environment, even close to computer and video monitors.

SOS

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SPL Stereo Vitalizer Jack

Psychoacoustic Enhancer

SPL's acclaimed Vitalizer design has always been a bit harder on the wallet than other manufacturers' models — until now.

DEREK JOHNSON plugs in to their new enhancer for the rest of us...

In the world of aural enhancement, SPL stand, if not alone, then apart. Most enhancers or exciters produce their effect — brighter, more detailed sound — by generating certain amounts of controlled distortion. SPL's Vitalizer family uses an arcane mix of EQ, phase and level manipulation to produce punchier, more detailed mixes, without (so SPL claim) introducing extra distortion.

Another attribute that Vitalizers have been



known for is their relatively high cost. But now that has changed with the arrival of the Stereo Vitalizer Jack. Debuting at a little over £230, the new model provides an opportunity for almost anyone to get in on the Vitalizer action.

The new processor comes in the familiar 1U rackmount format with a black and blue 'paint splash' finish, and as the name suggests, all the rear-panel inputs and outputs are on unbalanced jacks (although the Vitalizer has been available in a jack version before, its connections were balanced). The connections are also duplicated on gold-plated phono sockets (which would also make it suitable for hi-fi use), and there's an internal power supply — a nice touch at this price. One other internal feature of the new Vitalizer, common to the whole family, is a bypass relay which engages in the event of a power failure. This is a welcome safety option for live use.

SET THE CONTROLS...

You may have noticed that the new Stereo Vitalizer has a superficial resemblance to the original Stereo Vitalizer, which was launched back in 1993. In fact, the controls on the clearly labelled front panel are virtually identical to that model. Taking these one by one:

- The Bass knob works on the bottom end of your mix. Turning it to the left produces a more round, warm, soft effect, while moving it to the right produces a tighter, harder sound.
- The Mid-Hi Tune knob sets the starting frequency of a broad-band shelving filter, allowing you to select where within the mid-frequency range the Vitalizer starts processing. While the unit has a range of between 1kHz and 20kHz, most of the action will be in the 3.5kHz to 8kHz region.
- The Process knob controls the amount of bass and mid-range intensity. Basically, it gives you either more or less of the effect you've set with the Bass and Mid-Hi Tune knobs.
- The Brilliance control works on higher frequencies, without, somehow, actually

boosting them in the way that many exciters do. The result is a more natural sound, less tiring on the ears, which adds clarity to the mix. To check out the effect of the Brilliance knob on its own, turn the Process knob full left. You'll find the Bass and Mid-Hi Tune controls now have no effect.

- The Stereo Expander uses a pretty straightforward technique (feeding opposite-phase signals from one channel to the other) to take the stereo image beyond the boundary of your speakers. It works well, making the finer details of your mix even more apparent.
- The Active/Bypass button is one to be used often while tweaking the Vitalizer, so you can compare the processed and unprocessed sound and make sure you're not overdoing it.

Unlike the original Stereo Vitalizer, there is no Stereo Expander bypass button, no

pros & cons

SPL STEREO VITALIZER JACK £234

pros

- Most affordable Vitalizer yet.
- Exceptionally easy to use.
- Built-in PSU!

cons

- No metering.

summary

At £234, the Stereo Vitalizer Jack provides truly high-level audio sweetening for the rest of us.

SOUND ON SOUND

Active/Bypass LED or any form of metering. An LED that flashed when things were getting a little too hot would have been useful.

ALL RIGHT JACK?

The Vitalizer Jack really works — indeed, its effect on the bass end of a track is indescribable. I ran fancy drum box and synth mixes through it and got a kick to the lower frequencies that was impossible to achieve with EQ alone. Even some basic acoustic guitar and voice demos were lifted with a pleasing 'soft' bass effect.

'Detail' and 'clarity' are much over-used words in mixing circles, but the Vitalizer Jack really does provide them in spades. The guitar/voice demos also benefited from the stereo expander, with backing vocals spreading out around my ears, leaving the lead upfront. Nice! The best approach, as with any enhancer, is to produce the best mix you can *without* the processor, and then add that fairy dust in the final stages. Also, keep double-checking your processing against the original audio. While the SPL's treatment is very seductive, and not

nearly as harsh as most enhancers or exciters, over-use is still possible.

Essentially, the Stereo Vitalizer Jack offers the SPL magic at an accessible price. Audibly, there are no

compromises, though there isn't quite the same amount of control as with SPL's top-of-the-range models. However, this simplicity results in ease of use: you'll be getting the best from the Vitalizer Jack in no time.

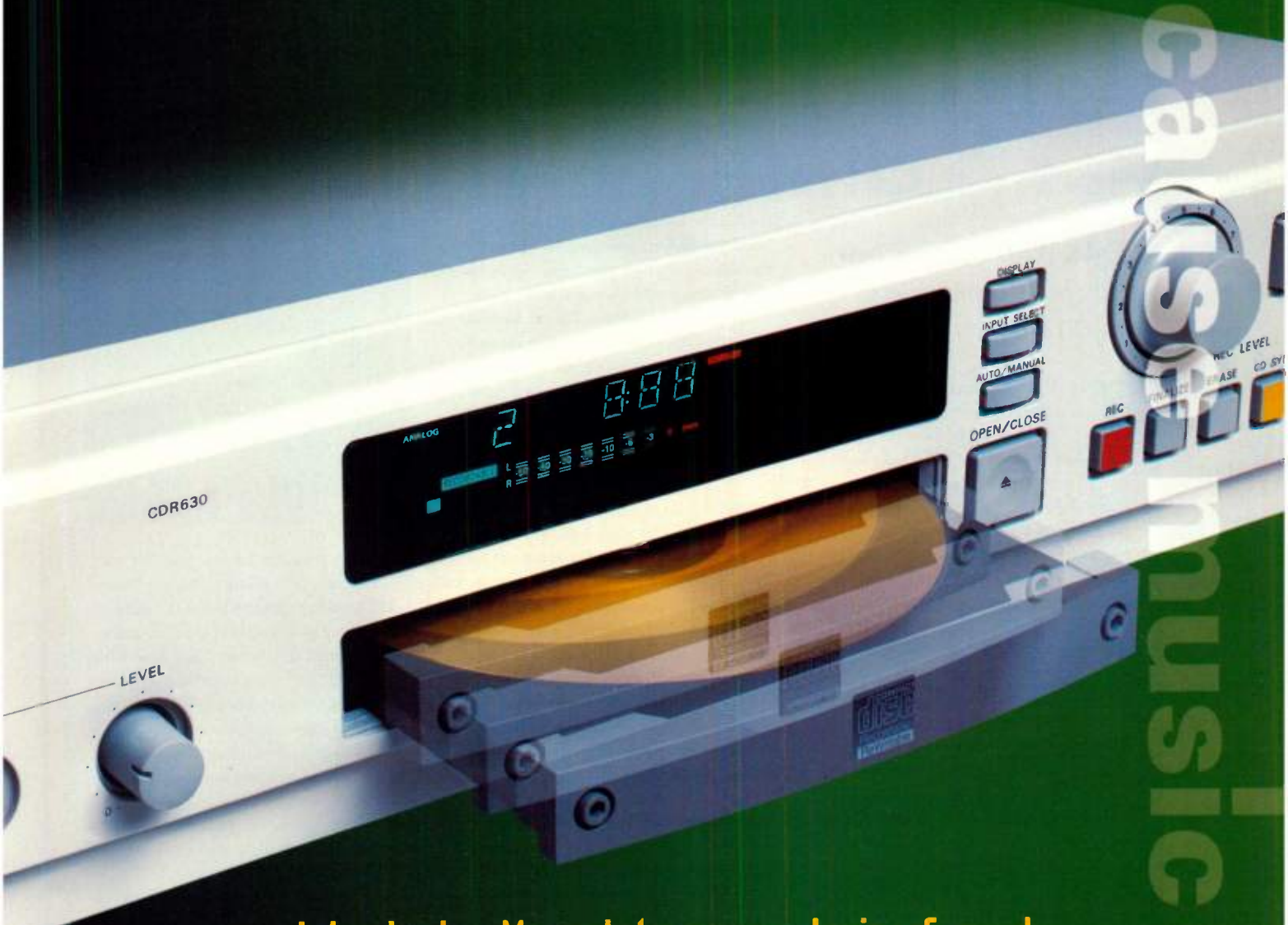
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Signex Isopatch CPJ48

48-Way Patchbay

PAUL WHITE gives a new patchbay a shameless (jack) plug...

Let's face it, patchbays are a pain: there's never enough room for decent labels, they take ages to wire up, and just when you think everything is fine, the damned contacts go all intermittent on you! What's more, most people resent spending good money on gear that doesn't make interesting noises! Yet the alternative of not using patchbays is even worse — your studio quickly turns into spaghetti hell.

One of the first British companies to build serious but affordable patchbays was Signex, whose original Isopatch managed to squeeze 22 pairs of quarter-inch jack sockets into 1U of space. They also pioneered the replaceable label strip, which is still used on their current models. When the competition designed the 24-pair jack patchbay using reversible circuit

replacement if necessary. The same type of socket is used for rear connection on the review model, though hard-wired and phono rear connection versions are also available. All the signal grounds are isolated and there's a chassis ground point for earth-bonding if required.

One circuit board holds the upper row of sockets and the other the lower row; both boards are fixed with screws to a metal U channel bonded to the front panel, and the sockets themselves seem to be positioned slightly lower than on other patchbays, which leaves more room for the top label strip. The enclosed sockets mean there is less risk of dust collecting on the contacts, although over time, the contacts may tarnish or pick up dirt from jack plugs. As with other patchbays, a quick blast of contact cleaner should help if this happens.

WHAT'S NORMAL?

Obviously you can't turn the individual socket pairs around to normalise them, so instead, the original Isopatch system of applying a blob of solder between the two halves of a 'split' circuit board pad has been adopted. There are five pads per pair of sockets and three of these need to be 'blobbed' to normalise each socket pair. The reason there are five pads is so you can choose to have the patchbay fully normalised or semi-normalised, and full instructions are provided both in the manual and on the back of the patchbay itself.

Most applications, such as insert points, require semi-normalised socket pairs, whereas outboard gear inputs and outputs need no normalisation. To de-normalise a socket normalised by mistake, the solder blob must be removed — something best done with a solder sucker or piece of solder wick. Personally, I like this method of normalising, as it's a lot quicker than having to pull out circuit boards, remove the nuts, reverse the boards, and then replace them.

Solder pads are also provided for the benefit of those wishing to hard-wire the back of the patchbay rather than using the quarter-inch jack sockets provided. Hard-wiring is clearly time-consuming, but it provides a more reliable connection and saves you the cost of 48 jack plugs for every patchbay you wire! It's also around 20 pounds cheaper to buy the 'rear solder' patchbay version that has no rear jacks. Further evidence of Signex's ingenuity comes in the form of a simple mod that involves cutting a circuit track and adding a wire link; after performing this simple procedure, you can use standard stereo leads to connect to console insert

boards for selecting normalised or non-normalised operation, the rest of the marketplace seemed to follow, but although such designs are very competitively priced, the socket positioning severely restricts the amount of space left for labelling, and if a jack is inserted too hard, the board may come loose.

The new Isopatch CPJ48, which supersedes the original Isopatch, gets around all these problems by using fully enclosed, low-profile TRS jack sockets mounted onto two printed circuit boards, rather like the original model, and these are linked via loops of ribbon cable so that the unit can be opened for socket

pros & cons

SIGNEX ISOPATCH CPJ48

pros

- Plenty of labelling space.
- Fully enclosed jacks.
- Very rigid.
- Several normalising options.
- A simple mod enables a single stereo cable to be used to connect to a console insert point, rather than the usual 'Y' lead.

cons

- Replacing faulty sockets is not quite as straightforward as with simpler designs.

summary

The CPJ48 incorporates all the best ideas of the original Isopatch, as well as several significant improvements for roughly the same cost per socket.

SOUND ON SOUND

TRS jack points rather than the usual 'Y' lead. This involves a little soldering, but is infinitely less hassle than making up lots of 'Y' leads.

Labelling is via a strip of card that slides into a flattened, transparent plastic tube on the front panel. There is one label strip per row of sockets, and changing labels is simply a matter of inserting a new cardboard strip (several spares are provided). I'd also like to mention that the brief manual provides some practical guidance on planning and wiring your patchbay system and the concept of normalisation is clearly explained.

SUMMARY

Signex's Isopatch CPJ48 is slightly more expensive than the usual budget patchbays, but is extremely solidly built, and the enclosed jack sockets should help extend the working life of the unit. According to the spec sheet, the normalising contacts have a rated life of at least ten thousand insertions. The labelling system is simple but very effective, as is the method of normalising individual socket pairs. The company make budget patchbays if that's what you want, but if you have a system that is used on a regular basis, the more professional Isopatch CPJ48 might be more cost-effective in the long run.

SOS

- E** Rear jack version £116.03;
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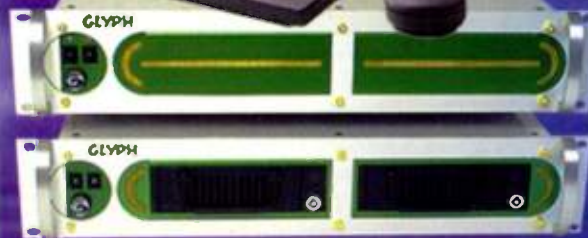
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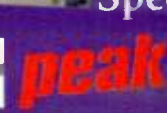
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E & O E



Tascam DA20 MkII

DAT Recorder

PAUL WHITE checks over the latest incarnation of an old friend.

DAT recorders are admittedly pretty unexciting at the best of times, but DAT nevertheless represents the closest we've yet come to as a standard mastering format, and choosing the right model of recorder is important. Very cheap budget DAT decks are tempting, but experience has shown that they don't usually last too long before giving you problems. On the other hand, if you spend too much, you can be paying for features you don't really need. Tascam's original DA20 occupied the cheaper end of the middle

on the original DA20; in addition to the normal track ID features, there's the ability to name tracks and to create a table of contents at the beginning of the tape to facilitate fast searches of individual tracks. I must admit, I've never used this on my DA20, but it's there if you want it. There's also a distinctly consumer feature that automatically turns CD track IDs (Q codes) into DAT start IDs when making a digital copy from an audio CD.

The DA20's internal mechanism has also undergone a major electronic redesign, which has added a few new features. To improve the sound quality, both the A-D and D-A converters have been upgraded to newer delta-sigma devices, and the audio signal path has been similarly optimised. The error correction system has also been made more robust, which should mean fewer incompatibility problems when playing tapes made on other machines, but best of all, an error rate display function has

been added. This is accessed while in stop mode by pressing the Counter Mode button at the same time as the Rec Mute button, after which the tape can be played to show the error rate.

Separate error rates are shown for the two heads (A and B) on the drum as well as a combined mean error rate, and you can scroll around the three error figures with the Auto ID button.

When recording from an analogue source, the track start IDs are triggered by the audio signal crossing a threshold, but sometimes this can lead to the IDs being positioned slightly late. In the DA20 MkII, the audio detection thresholds can be set to between -60dB and -30dB in 10dB steps (the factory default is -50dB). Another potential problem with some DAT machines is that to monitor the input signal, you have to enter the Record Ready mode with the tape engaged. However, the DA20 MkII has a new sampling monitor function that works if you press Record while the transport is stopped. This passes the input signal through to the outputs, both analogue and digital, as well as metering the level, but without the tape being engaged, so you save your tape and heads unnecessary wear. Obviously, this is useful for level-setting, but it also means the DA20 MkII can be used as a stand-alone A-D converter for feeding S/PDIF-compatible soundcards and suchlike.

The final major upgrade is the inclusion of a self-diagnostic system that puts up error

pros & cons

TASCAM DA20 MkII £699

pros

- SCMS can be switched off.
- Good sound quality.
- Clear user interface.
- Genuinely useful new features, including an error readout.

cons

- Analogue ins and outs on unbalanced phonos only.

summary

The DA20 MkII offers just about the perfect combination of price, reliability and features to make it the ideal project studio mastering machine.

SOUND ON SOUND

messages if certain fault conditions exist. As with most error readouts, this one is pretty cryptic, but the seven different error conditions are clearly explained in the manual, ranging from condensation and stiff tapes to broken tapes or faulty mechanisms.

VERDICT

I've always found the DA20 to be a straightforward, fine-sounding DAT recorder, so the sonic improvements in the DA20 MkII are quite subtle, but having a proper error readout is very welcome, as are the other enhancements described earlier. In my view, the only real weakness of this machine for professional applications is the use of unbalanced phonos for the analogue ins and outs, though in most private studios, that won't compromise the quality of the final recording. If you haven't used a DA20 before, you'll almost certainly appreciate the clearly set-out control panel and the positive transport. The DA20 MkII is identical in layout, and although there are some consumer features you may never use, they are arranged so as to keep out of your way unless you want them. In value terms, one of the best deals in studio DAT machines has just got a little better and a little cheaper, which is not to be sniffed at!

SOS

ground and turned out to be a very reliable studio workhorse — mine was one of the first, and it's still going strong. Now the company have significantly upgraded the model while dropping the cost slightly.

SO WHAT'S NEW?

The DA20 MkII is a 3U rackmounting DAT recorder with unbalanced phono ins and outs, and S/PDIF digital I/O also on phonos (the lack of balanced analogue I/O is about the only sign that this is not a thoroughly professional machine). The dreaded SCMS digital copy protection system is present, but it can be turned off, and unlike strictly consumer DAT machines, the sample rate can be set to 48kHz or 44.1kHz as well as to a 32kHz long-play mode via a front-panel rotary switch. You don't get the jog/shuttle feature of the more costly DA30, but audio can be fast-cued by pressing either the fast-forward or rewind buttons while the machine is in play. Most of the features are the same as



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called Phat Boy that puts 13 parameters under direct knob control (flick back to page 42 for more on this). It makes sound editing quicker and easier, and you can make real-time changes which you record in your sequencer.

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HARD CHOICES & SOFT OPTIONS

PART 1: Confusing, isn't it? Where once the only recording option was tape, you can now put a whole studio inside a desktop PC or opt for an all-in-one recording and mixing hardware solution. Then again, you could stick to tape, or buy a separate hard disk recorder. In the first of this short series, PAUL WHITE examines the choices.

CHOOSING A RECORDING SETUP

In the good old days of professional recording a studio was built around an analogue mixer, a 2-inch analogue multitrack recorder, a pair of monitors, and some outboard effects. The mastering medium was also analogue tape, and if the mix got too hard for one person to manage, you called in more pairs of hands to operate the faders.

These days, pro studios have changed surprisingly little, except that they probably have some form of mixer automation. In project studio circles, however, or in those areas of audio away from mainstream music recording, the technological options have expanded to the point that figuring out which is best can be mindnumbingly confusing; indeed, this was the theme of my April editorial. But the aim of this series is not to look at the problems this can cause, but rather to look at the more common recording and mixing options and to consider their strengths and weaknesses.

PORTASTUDIO/MULTITRACKER

It may seem strange, but the odd little 4-track cassette decks with built-in mixers that started the whole home recording ball rolling never even got a proper name. Tascam called theirs Portastudios, while Fostex

called their machines Multitrackers, but there's no generic term. Well, I'm going to call them 'cassette multitrackers' with a small 'm' and be done with it!

Cassette multitrackers still represent the cheapest way to get into multitrack recording, and their clear advantage, other than low cost, is their impressive degree of integration — you get everything you need, apart from the microphone and mastering machine, in one box. Though 8-track cassette multitrackers are still available, they're less appealing than they used to be because of the aggressively priced digital alternatives, but their 4-track brethren are cheap, reliable, and make great musical sketchpads.

I know that some people have released commercial CDs based on material recorded on a cassette multitracker, but the truth of the matter is that cassette quality isn't really up to it. Unless you have one of the more expensive machines with Dolby S, the noise reduction is likely to cause some audible side effects, and even if the noise reduction weren't a problem, you'd still have the inherent wow and flutter and the compromised top end of the cassette format. Having a cassette deck that runs at double speed helps improve the audio quality, but it can never rival open-reel (see below). What's more, because you probably only have four tracks to play with, you'll probably need to bounce tracks at least once, and every time you bounce you lose a little more quality. However, a multitracker can offer all the basic functions necessary for music recording,



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Keyfax Hardware Phat Boy

MIDI Synth Controller



PAUL WHITE takes a turn on a new hardware controller box which allows knobularly-challenged GS and XG synths and soundcards to join the rotary club.

For years now, Keyfax have been bringing us the excellent *Twiddly Bits* series of bite-sized MIDI 'samples' that you can cut and paste into your own compositions. Now, they've come up with a piece of hardware that gives you lots of twiddly bits too!

Phat Boy is a box of hardware knobs dedicated to controlling those parts of a GS or XG synth normally only accessible via edit menus or mixer maps. The advantage of a hardware control surface like this is that it's easy to make real-time changes to parameters like filter cutoff frequency during a performance. What's more, all the controller data can be stored as part of a MIDI sequence, so any real-time sound manipulation is duplicated on playback.

SNAP HAPPY?

There's one point that needs to be made about Snapshot mode: if you don't twiddle a knob, no controller data will be sent out, and there will be no overall effect. Before starting a snapshot, it's important to move each knob, then turn it to the position where the right effect is produced. Failure to do this will simply store the physical knob settings as your new snapshot, even though some of the knobs may be set at values quite different to the parameters the synth is set for.

The Phat Boy is also useful for general editing. Once you've set up a sound, a Snapshot button allows you to squirt the whole set of controller data to your sequencer. Put this in the count-in section of your song and the appropriate sound will be recreated as your sequence begins to play, even if the patch wasn't actually saved in your synth in the first place.

PHAT CONTROLLER

Despite its name, the physical incarnation of the Phat Boy is a rather slim steel box, powered by an external wall-wart power supply and fitted with MIDI In and Out sockets on the back panel. Whatever you send to Phat Boy's MIDI In — usually information from your master keyboard — is merged with the Phat Boy's controller information and sent through its MIDI Out.

Also on the back of the box is a three-position switch that sets the mode of operation for the unit. Mode I is for Roland GS or Yamaha XG synths; Mode II is specifically for Creative Labs AWE 32 or 64 soundcards; Mode III turns the Phat Boy's controls into assignable continuous controllers for use with external software such as *Rebirth*, Steinberg's TB303/TR808 emulator program. Incidentally, the Keyfax web site has a long list of devices with which the Phat Boy is known to work.

On top of the box is a power LED, the aforementioned Snapshot button (which also functions as a reset control), a 16-way MIDI channel selector and 13 other knobs. When working with GS/XG synths, these adjust Filter Cutoff, Resonance, Vibrato Rate, Vibrato Depth, Vibrato Delay, Reverb Level, Chorus Depth, Attack, Decay, Portamento, Release, Pan and Volume. Control 10 is actually labelled Sustain, but in Mode I, it controls portamento, simply because Mode I instruments don't support sustain level adjustment. In Mode II, this knob controls sustain level for AWE soundcards.

Phat Boy is accompanied by a *Twiddly Bits* style disk that contains a large library of riffs and loops drawn from the *Twiddly* archives, along with a number of utilities, such as MIDI messages which switch XG machines into TG300 GS mode, others which switch tracks 9 and 11 into drum mode, and a GS reset message. This collection of software is great for anyone just starting to get into music, as it

pros & cons

KEYFAX HARDWARE PHAT BOY £150

pros

- Affordable.
- Very intuitive to use.
- Provides real-time, hands-on control for the most important GS/XG voice parameters.

cons

- Only a limited number of voice parameters can be accessed from Phat Boy.

summary

A genuinely useful controller that greatly expands the tonal repertoire of any GS/XG synth or soundcard.

SOUND ON SOUND

enables you to experiment with track composition right away. More experienced users may also find the disk useful for checking out the Phat Boy's functions.

CHEWING THE PHAT

After all that preamble, the final section of this review promises to be fairly short, since Phat Boy proves to do just what it says on the tin. I tried it with a Yamaha MU10 GM/XG module, and found it really was a simple case of plug and play. Frequency and resonance can be altered in real time after a note has been struck, and there is no obvious 'zipper noise' to betray the fact that MIDI 'sweeps' in steps. The same is true of volume, pan, reverb and chorus. Modulation depth, however, can only be adjusted prior to striking a note — once a note is sounding, turning the knob makes no difference.

To summarise then, Phat Boy and its accompanying thin floppy put a lot of control directly into your hands. Although the number of parameters you can access is relatively limited, in practice it gives you a lot of scope to push and pull sounds into shape. Hardware control of the filter makes techno clichés a doddle, and the Snapshot button is great for saving patches as part of your MIDI sequences.

Buy one of these and you'll discover that GS/XG synths aren't nearly as boring as you thought they were!

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20 TIPS ON...

Using GM Modules

Some people view GM modules as the chartered accountants of their racks — duller than Monty Python's Mr Pewty — but believe it or not, there are ways to make them interesting, and you don't even have to take up lion-taming! PAUL WHITE and MARTIN WALKER club together to make your GM synth roar.

General MIDI tends to be frowned upon by 'serious' MIDI users, but unless your music is 100% experimental or abstract, the GM sound set contains most of the bread-and-butter instruments you need for pop music. The cheap sound chips used on budget soundcards often produce disappointing results, but don't blame this on GM. The truth is that GM sounds are as good as the manufacturers want to make them — program number 35 will be the same basic sound from one GM card or synth to another, but the difference in quality between a soundcard piano and the piano on a top-of-the range GM module is enormous. OK, 'Telephone', 'Bird Tweet', and 'Helicopter' might not be our first choices for inclusion in a set of 128 essential sounds, but you do get a useful selection of acoustic pianos, electric pianos, basses, guitars, strings, organs, brass, wind, traditional synth and drum sounds, not to mention chorus and reverb effects. In the case of GS and XG instruments, you also get alternative banks of variations on the original GM sound set, so you could have far more choice than it first seems.

Let's assume for a moment that that you don't want to make pop music — you're into dance music based on electronic sounds, perhaps mainly analogue ones. What does GM have to offer you? Most decent GM synths have envelope shapers, resonant filters, LFOs, portamento and so on, so architecturally they're little different to an analogue synth, except that you have a far greater choice of starting waveforms. With a little editing, most decent GM synths can be coaxed into producing extremely 'analoguesque' sounds, as

well as interesting variations on the original GM sounds, and even on cheaper models the digital filters sound more convincing than you might imagine. With just a little experimentation, you'll discover that a GM synth is vastly more versatile than the basic bank of 128 GM sounds, which is why we've put together a few tips on getting the most out of yours. Sadly we're limited to just 20, but as you can see, there are many ways to make GM patches sound less predictable. You only have to listen to a compositional program that uses a lot of controller information, such as *Koan Pro*, to appreciate that even a standard soundcard can produce something weird and wonderful. Of course, we're not suggesting that you should restrict yourself to using only GM synths and soundcards — most people build up a collection of different instruments over time — but don't write off the old workhorse as being necessarily boring and dull either. If nothing else, this article should highlight the fact that you only need to make a few simple edits or apply a straightforward technique such as layering or detuning to produce radically different sounds. With most GM instruments, General MIDI is just a starting point.

1 When choosing a GM synth, listen to as many different models as you can, as different manufacturers tend to have a different sound character. For example, Roland sounds are warm and rich whereas Yamaha sounds tend to be very lively and upfront. The more expensive models generally have more waveform ROM, which usually equates to better samples. Go for as much polyphony as possible, as multitimbral use (especially with busy drum parts) really gobbles up polyphony.

2 When using sounds such as the acoustic or electric guitar, add in a few of the finger squeak noises on a separate track. Don't make these too loud or the playing will sound messy, but when you get the level right, the performance will sound much more convincing. Also, try to program the part the way a real guitarist would play — don't simply play arpeggios using your standard piano chord inversions. Various MIDI file disks are available with strummed or finger picked guitar chords, so if you're not sure how to do the job yourself, try using these.

3 When playing fretless bass parts, use pitch bend to make the notes slur up to pitch in the same way as they do on a real instrument, then add a little lazy vibrato (via the modulation wheel). If you don't feel



confident about doing this in one take, record the basic notes first, then record just the bend and vibrato information on a separate track as the sequence plays through. Once you've got the feel right, merge the two tracks.

4 When playing conventional bass parts, use a bass harmonics patch on a different track to add interest. You can also mix picked and slapped bass sounds to get more of a virtuoso effect, but only if this style of playing suits your music. For pop songs, a fairly inconspicuous bass sound often works best. If you have a 'quick edit' facility for your GM sounds, adjusting the filter cutoff frequency will allow you to change the tone of the bass very easily.

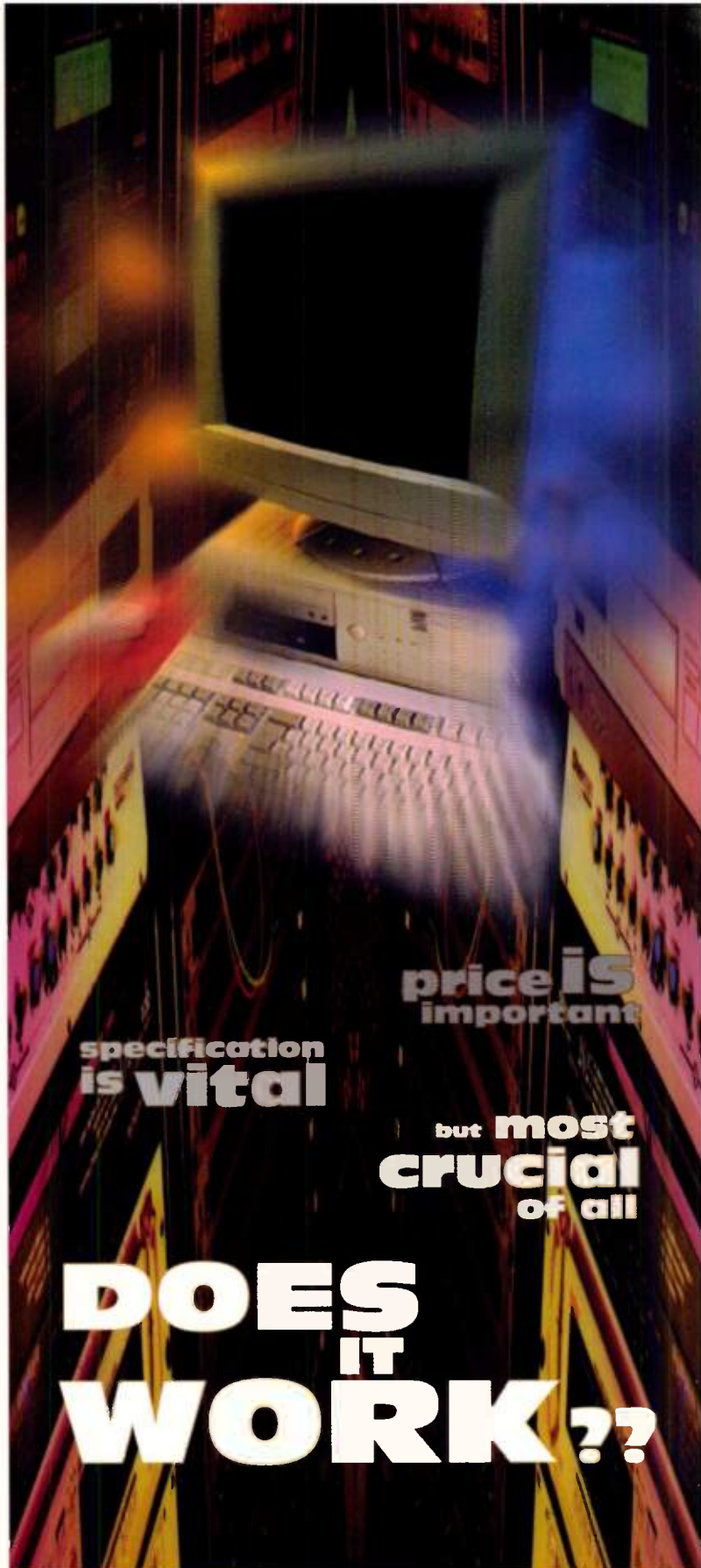
5 Don't always use the sounds the way their names suggest. By moving a sound one or two octaves above or below its normal range, you can turn it into a completely new sounding instrument. For example, flutes and pipes sound huge and demonic in the bass register, while bass instruments can make interesting lead sounds when transposed up.

6 If a sound isn't quite right, but you don't want to go to the trouble of editing it, try simply layering it with another similar sound — for example, a string pad layered with a synth pad. You can also layer a GM string sound with a non-GM string patch from one of your other synths.

7 Processing a GM sound via an external analogue or digital filter can produce unusual effects. These filters are sometimes triggered by the audio signal itself, or sometimes via MIDI. An example of an audio-triggered filter is the Fat Resinator (reviewed SOS March 1998) which has the capacity to change a sound almost beyond recognition. Unless you have multiple outputs, this trick only really works if you are playing one part at a time then recording the result — see tip 10.

8 If you're using a computer-based sequencer, set up a mixer map to control the main GM synth parameters from your computer screen rather than having to edit via the front panel. You may also be able to record parameter changes (filter cutoff frequency, perhaps) in real time to produce techno-style effects. You may find that a GM map is already provided with your sequencing software, but even if it isn't, you may find one that you can download free of charge from a music web site. Users of Yamaha's XG synths working on PCs should get hold of a full copy of XG Edit as it offers a lot of editing power in an easy-to-use format — and at very little cost.

9 A hardware GM/GS/XG controller is even better than an on-screen mixer map, as you can twiddle several controls simultaneously — and it so happens that the guys at Keyfax have come up with a low-cost controller called Phat Boy that puts 13 parameters under direct knob control (flick back to page 42 for more on this). It makes sound editing quicker and easier, and you can make real-time changes which you record in your sequencer.



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USING GM MODULES

10 Use other external processors to change the sound: speaker simulators intended for use with guitars can take the rough edge off a digital sound, warming up the low end at the same time, whereas a guitar distortion box can be used to create grungy drum loops or powerful bass/lead sounds. Unless you have a GM machine with multiple outputs, however, you'll either have to process all parts in the same way or solo the part you want to effect and then record it on a separate track of your multitrack, or an audio track of your MIDI + Audio sequencer. If you have only left and right stereo outputs, you can pan to one side all the sounds that you don't want to be affected and pan to the other side all the sounds that you do, then process only the appropriate output. This restriction applies to any form of external processing, including filters.

11 Use controller information to produce dramatic gating or panning effects. By setting controller 7 (Volume) to 128, then abruptly changing it to zero, the sound can be chopped up just as if you were using a gate. Remember to save your controller-driven gate effects in a separate song file so you can cut and paste them into new compositions.

12 If you are using layering to add more interest to your sounds, try to detune each slightly, and/or set them to different pan positions. By adjusting their relative levels you can either achieve an obvious doubling effect or create subtly enhanced versions of a single sound. You can also combine this with track delay so that one sound starts just before the other.

13 Layer two instruments to create completely new sounds, slowing the attack of one of them so that you get a 'morphing' effect as the slower one fades in. This can overcome the complaint that many people have about GM — it is possible to create completely new sounds from any GM set with a few such tweaks. Combining this trick with resonant filtering is a great way to get away from the 'vanilla' GM sounds.

14 Standard GM modules provide only chorus and reverb effects, but by applying a bit of lateral thinking you can generate others. For example, if you make a copy of a sequencer track, reduce it in level, and then delay it — either directly, or by dragging the part later in the Arrange page — you get instant Echo. Many sequencers have MIDI processing options, so that you can create complex delay effects in real time. Some even have note offsets for the repeated sounds, so that you can create bell tree or arpeggio effects.

15 Although the in-built GM chorus is great for fattening up sounds, beware of adding it to every instrument, since you will end up with a hairy swirling mass. By letting some sounds emerge with no chorus — perhaps just a dash of reverb — you can create tracks with a lot more front-to-back depth and contrast.

16 If you want to add more expression to a somewhat flat solo sound in an otherwise decent mix, add some MIDI Volume effects. Guitar swells are very easy to create, and string sounds, whether solo or ensemble, always sound far better with some Volume modulation. You can create this either manually, by drawing in the data in your sequence editor, or in real time by

using your sequencer to remap an existing controller, perhaps the Modulation wheel, to control Volume instead.

17 Although most people laugh at them (not entirely without reason!) don't overlook the sound effects at the far end of the GM set — some can be quite useful. Transposed down several octaves, you can quickly create huge industrial backdrops from sounds such as Breath Noise and Seashore, especially when layered together and mixed in with transposed percussion. Increasing the attack times will give you slowly evolving backdrops.

18 When instruments have a fast attack, followed by a fast release, you can often achieve new sounds by reducing the MIDI note lengths so that only the attack is heard, and not the main body of the sound. For instance, you could try creating short arpeggiated sounds from evolving synth pads or organ sounds.

19 When recording drum and percussion parts, don't overlook the single percussion instruments in the main GM sound set. Taiko Drum and Melodic Toms are useful. Synth Drum may sometimes come in handy, and Reverse Cymbal can be used in many ways, especially if you edit it. It may take a bit more effort to create a drum kit across several MIDI tracks, but your tracks will certainly stand out more from the crowd.

20 Finally, for anyone keen on analogue synth sounds, you can get close to recreating those classic ELP-style Minimoog parallel interval effects by copying your synth solo across to one or two more MIDI channels, and then transposing these to create a harmony or a 3-note chord. Fifths work well when you're using just two notes together. If your module has MIDI channel select and transpose facilities, you can do it directly, and generate your multi-voice polyphonic synth in real time from a simple monophonic melody.



Many GM synths are actually far more versatile and sophisticated than they at first appear.



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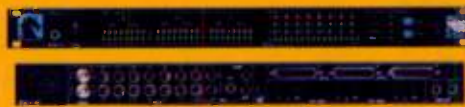
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HARD CHOICES & SOFT OPTIONS

PART 1: Confusing, isn't it? Where once the only recording option was tape, you can now put a whole studio inside a desktop PC or opt for an all-in-one recording and mixing hardware solution. Then again, you could stick to tape, or buy a separate hard disk recorder. In the first of this short series, PAUL WHITE examines the choices.

CHOOSING A RECORDING SETUP

In the good old days of professional recording a studio was built around an analogue mixer, a 2-inch analogue multitrack recorder, a pair of monitors, and some outboard effects. The mastering medium was also analogue tape, and if the mix got too hard for one person to manage, you called in more pairs of hands to operate the faders.

These days, pro studios have changed surprisingly little, except that they probably have some form of mixer automation. In project studio circles, however, or in those areas of audio away from mainstream music recording, the technological options have expanded to the point that figuring out which is best can be mindnumbingly confusing; indeed, this was the theme of my April editorial. But the aim of this series is not to look at the problems this can cause, but rather to look at the more common recording and mixing options and to consider their strengths and weaknesses.

PORTASTUDIO/MULTITRACKER

It may seem strange, but the odd little 4-track cassette decks with built-in mixers that started the whole home recording ball rolling never even got a proper name. Tascam called theirs Portastudios, while Fostex

called their machines Multitrackers, but there's no generic term. Well, I'm going to call them 'cassette multitrackers' with a small 'm' and be done with it!

Cassette multitrackers still represent the cheapest way to get into multitrack recording, and their clear advantage, other than low cost, is their impressive degree of integration — you get everything you need, apart from the microphone and mastering machine, in one box. Though 8-track cassette multitrackers are still available, they're less appealing than they used to be because of the aggressively priced digital alternatives, but their 4-track brethren are cheap, reliable, and make great musical sketchpads.

I know that some people have released commercial CDs based on material recorded on a cassette multitracker, but the truth of the matter is that cassette quality isn't really up to it. Unless you have one of the more expensive machines with Dolby S, the noise reduction is likely to cause some audible side effects, and even if the noise reduction weren't a problem, you'd still have the inherent wow and flutter and the compromised top end of the cassette format. Having a cassette deck that runs at double speed helps improve the audio quality, but it can never rival open-reef (see below). What's more, because you probably only have four tracks to play with, you'll probably need to bounce tracks at least once, and every time you bounce you lose a little more quality. However, a multitracker can offer all the basic functions necessary for music recording,



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► functions such as punching-in and out on the fly, the ability to record multiple tracks in one take (though cheaper models may only record on two tracks at once), and track bouncing.

benefits

- Cheap, archivable medium (cassettes).
- Generally reliable and easy to maintain.
- Portable: some versions even run on batteries.
- Convenient: there's little wiring, and you can use a domestic hi-fi both for mastering onto stereo cassette and for monitoring.
- Very easy to use.
- Recordings store well if kept in favourable conditions.
- Mechanically quiet, though not silent.

disadvantages

- Sound quality not as good as open-reel analogue tape — it's fine for demos, but not really up to mastering.
- Punch-in/out points are not seamless.
- A tape track is required to record timecode when sync'ing a sequencer.
- Mixer usually has insufficient channels for mixing MIDI sound sources, and both the quality and facilities will be poor compared to an average stand-alone mixer.
- Relatively slow rewind time.
- Difficult to edit.

OPEN-REEL ANALOGUE TAPE

Open-reel analogue recorders are available in a number of formats, from four tracks on quarter-inch tape to 24 tracks on 2-inch tape. For project studio use, the most popular formats are eight tracks on quarter-inch or half-inch tape, and 16 tracks on half-inch tape; also, just before analogue gave way to digital, both Fostex and Tascam produced some excellent 1-inch 24-track machines. Sadly, other than a few pro machines, analogue multitrack tape recorders are no longer built, although you can of course pick them up on the second-hand market.

Analogue machines generally offer high sound quality. Although not as technically accurate as the sound from a good digital machine, the non-linear way in which tape responds to high levels offers certain benefits — it makes setting peak recording levels less critical than in digital systems, and confers on the audio a slightly compressed, warm sound. Audio quality depends to some extent on what type of noise reduction system is being used — and unless you're running a pro machine at high tape speeds, noise reduction is a necessity. As with cassette, you'll suffer loss of quality whenever you bounce tracks, but this is less serious than with cassette.

Media costs vary from cheap (for eight tracks on quarter-inch tape) to very expensive (for 2-inch tape, especially if you opt for a 30 ips tape speed rather than the more usual 15 ips). Open-reel tape can be edited very easily with special tape and razor blades, and if it's stored properly analogue tape has a very long shelf life. Any deterioration tends to be progressive.

Because an open-reel machine is purely a recorder, you need a separate mixer, which leads to greater wiring complexity than with an integrated solution. Nevertheless, having a separate mixer and recorder allows the system to be more flexible, and to

incorporate patchbays for connecting signal processors or for changing routing.

A high quality 2-inch multitrack running at 30ips without noise reduction will invariably produce a better sound than its digital equivalent, even though it may not be technically as quiet or have such a flat frequency response.

benefits

- Simple to use.
- Generally very good sound quality.
- Available in a number of formats depending on how many tracks you require.
- Reliable, with little risk of total media failure.
- Mechanically quiet, though not silent.

disadvantages

- Sound quality still suffers when copying or bouncing; there is also a slight deterioration in quality after repeated passes of the tape past the playback head.
- Punch-in/out points are sometimes not seamless.
- All editing has to be physical, via cutting and splicing the tape.
- One tape track is needed for a sync code if sync'ing a sequencer.
- Tape costs are high when using pro formats.
- Relatively slow rewind time.
- Tape storage can require a lot of room.

DIGITAL TAPE (MDM)

Digital tape machines use either special open-reel tape or cassettes, usually a type of video cassette. Open-reel machines tend to be priced such that only professional studios can afford them, so they will not be discussed here. However, machines based on video formats (frequently referred to as MDMs, or Modular Digital Multitrackers), such as the Alesis ADAT and DTRS, are very popular and have taken over from narrow-format open-reel analogue machines in the serious project studio market as well as in a number of professional applications.

On the face of it digital tape is wonderful — the hardware is affordable, the media costs are exceptionally low, and the sound quality is equivalent to that of CD or DAT with low noise and a ruler flat frequency response. What's more, multiple machines can be synchronised if you need more tracks, and it's possible to copy tracks, or even whole tapes, in the digital domain with no obvious loss in sound quality.

The reality is that these digital systems aren't as reliable as analogue, because when a media or hardware alignment problem occurs, the error correction system simply works harder to restore the corrupted data, and when the problem gets worse, it will resort to making up data to fill in for missing samples. Further deterioration, however, will cause very audible dropouts on replay. One day everything sounds fine, the next you may have a catastrophic failure — there's no advance warning. Playback errors can also occur when tapes made on one machine are





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▶ played back on another which is aligned differently. With analogue machines, misalignment usually results in a loss of top end, and possibly level, but in the digital domain, the whole playback process breaks down. Also, as we all know from domestic VCRs, after a while the cassette reels start to stick, and the picture becomes grainy as the tape sheds oxide. Special formulations of tape and shell design are used for digital audio, but these problems are not entirely eliminated.

Another problem with MDMs is that when two or more machines are running in sync, it takes a finite time, often several seconds, for the slave machines to lock to the master. This is very irritating when performing multiple drop-ins, and it can completely destroy your creative flow. On top of this, the varispeed range of digital tape machines tends to be less than for analogue, you can't turn tapes over to make them play backwards, and the cleaning process isn't as simple as for analogue machines.

To finish on a more positive note, however, providing the machine is fitted with a suitable interface, you can generate MTC or MIDI Clock (for sync'ing a sequencer) without sacrificing a tape track, and with two or more MDMs, you can manage quite sophisticated compilation editing by offsetting one machine against the other, then copying tracks in the digital domain. And, saving the best until last, MDMs punch in and out completely seamlessly.

benefits

- Clean, quiet sound quality.
- Tracks or whole recordings can be cloned to a second machine with no loss of quality.
- Multiple machines can be sync'ed together when more tracks are needed.
- Media cost very low.
- Physically less noisy than computers or hard disk drives that include cooling fans, but a little noisier than most analogue tape machines.
- Good compatibility with other studios as there are only two main formats (DTRS and ADAT). The new 20-bit ADAT Type II machines can still play and record older Type I tapes but not vice versa.

disadvantages

- Long lock-up time when using multiple machines.
- You still have to wait for tape to rewind, though MDM is faster than analogue.
- Failures due to media damage or machine misalignment are likely to be sudden and catastrophic.
- Physical tape splicing not possible.
- Some say the sound is 'cold' and 'clinical' when compared to analogue.
- Recording levels must not exceed the 0dB point, as they can with analogue, because digital clipping sounds very nasty.
- MDMs tend to run at a 'hotter' signal level than analogue machines — +4dBm on the analogue ins and outs may correspond to signal levels of -12 to -15dB on the MDM meters. This can lead to interfacing problems with analogue mixers.
- Some MDMs have noticeably noisier mechanics than their analogue equivalents.

STAND-ALONE HARDWARE HARD DISK RECORDER

One alternative to analogue or digital tape is the tapeless digital multitrack recorder, in which a digital recording is stored on a hard disk drive of the same type used by computers. Hard drives are less prone to errors than tape, and because the head never actually touches the surface of the disk, there's no appreciable wear other than to the spindle bearings.

Unlike tape, which is a linear medium, recordings made on hard disk can be accessed almost immediately — there's no waiting to rewind, so with a little clever RAM buffering it's possible to play back sections from anywhere on the disk in any desired order without gaps or glitches. This random access capability of hard drives makes them perfectly suited to non-destructive editing. For example, you could record instruments or vocals for a chorus only once, but repeat them whenever a chorus is needed.

Hard disk drives are reasonably reliable, though when one does crash it's quite likely that all the data stored on it will be lost, not just a part of it, as is the case when a tape gets tangled in a machine. Furthermore, once the drive is full — and remember that audio recordings made at a 44.1kHz sample rate use up around five Megabytes of drive space per minute per track — you have to find a way to back it up before you can re-use the drive, and this usually means transferring the data to a removable media (such as a Jaz drive) via SCSI, or backing up to DAT via a digital output port, which may be a slow process. Two tracks can be backed up to DAT in real time, four tracks take twice as long, and eight tracks take four times as long. What's more, it'll take you the same time to load the data back onto the drive when you want to resume work. That means a half-hour, 8-track recording will take two hours to back up and another two hours to restore. Backing up to a removable drive is faster, but the media cost is high compared to DAT.

While random access is one of the great benefits of hard disk, it also makes navigating through your material less intuitive. Open-reel tape has certain mechanical dynamics, so it soon becomes second nature to spin back 10 seconds in readiness for a punch-in, but with hard disk recording, you're 'flying on instruments' all the time. What's more, though most machines will allow you to punch-in on the fly, you may find that you can't do multiple punch-ins

AUDIO COMPRESSION

The term 'audio compression', in the context of digital recording, has nothing to do with compressing dynamic range. Instead, it involves reducing the amount of digital data required to represent a section of audio by discarding any information that the human ear would be unable to detect due to the presence of other sounds having a masking effect. This isn't a simple thing to determine, as sound changes all the time, but by using clever algorithms based on psychoacoustic models of how the human hearing system is understood to work, it is possible to discard up to 75% of the information, or sometimes even more, with surprisingly few, if any, audible side-effects.

In fact, the side-effects of data compression are more evident on stereo material, because of the way the human hearing system processes tiny differences between the left and right channels to extract spatial information. In the context of multitrack recording, however, where many sounds are either recorded in mono or have artificial ambience added afterwards, these side-effects may be less significant. Nevertheless, the effects

of most types of audio compression are cumulative in that if tracks are bounced and re-recorded, they will again be subjected to compression. Eventually, after several generations, some quality loss will become evident; but to put this in perspective, the quality losses suffered when bouncing analogue tape via even professional noise reduction systems are far more severe.

Audio compression is particularly useful when recording to removable media that have a limited storage capacity or data transfer rate — Zip disks and Minidisc, for example. Without compression, not only would the recording time be pitifully short, but also the increased data throughput would reduce the number of tracks that could be recorded and played back at any one time. As with noise reduction systems for tape, there are different types of audio compression systems that offer different degrees of compression and some sound better than others. Much progress has been made over the past couple of years, and the majority of compression systems used in current recording equipment are very good indeed. Look out for a dedicated article on the theory behind data compression techniques in *SOS* very soon.

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▶ and outs without stopping the recorder each time. This is very frustrating when you're trying to patch up a vocal track as the traditional way is to leave the tape running with the singer singing along, then manually punch in and out each time a section has to be replaced. Recording with real musicians has a natural flow to it, and no matter how clever the technology, if it interrupts the natural flow it's getting in the way of you doing your job.

On a more positive note, punching in and out on a hard disk recorder is likely to be gap and glitch free, and there's usually at least one level of undo so that an unsuccessful drop-in or recording can be restored to its original condition. Another useful feature found on many machines is the ability to record virtual tracks. These are, in effect, alternative takes stored on different parts of the drive; when you play back, you can decide which one to use. For example, you could play three different guitar solos, storing two of them on virtual tracks, then pick the best when you come to mix.

The sound quality of a hard disk recorder is determined by the sample rate, the number of bits, and the quality of the converter circuits. Most stand-alone digital recorders use uncompressed audio (see 'Audio Compression' box). Depending on the model, it may be possible to record on all tracks simultaneously or only on a limited number.

benefits

- Doesn't increase the burden on your computer, which can be left to concentrate on MIDI sequencing.
- Because the converters are in a hardware box and not on a computer card, there's a better likelihood of low crosstalk and noise.
- Easily integrated with a conventional mixer.

disadvantages

- Costs more than a 'native' PC audio system (see next month's instalment for more on this).
- The hard disk drive may be noticeably noisy, which is a problem if you record in the same room.
- More wiring is involved than with a PC-based recorder/mixer or integrated digital multitracker.
- There are numerous different systems that can lead to serious compatibility problems when moving projects from one studio to another. Most file formats can be converted, but this takes time.

DIGITAL TAPELESS MULTITRACKER

The new generation of digital multitrackers build on the concept of the analogue cassette multitracker. A mixer is therefore included, which may be either analogue or digital (there's an increasing move towards built-in digital mixers, as this makes it easier to add automation), and it's also common to build in high-quality digital effects. The main alteration, of course, is the replacement of the cassette multitracker's tape drive by a tapeless digital storage system capable of recording four, eight or even 16 tracks to an assortment of fixed and removable media. Fixed systems used conventional hard drives while removable media systems tend to use Jaz drives, Zip drives or Minidisc. As a rule, the removable drive systems rely on audio compression to increase storage capacity and to maximise the number of playback tracks, while fixed



drive systems use uncompressed audio.

The benefit of a built-in analogue mixer is its familiar 'one knob per function' format, and the low cost at which additional inputs and insert points can be added. Its disadvantages are that automation isn't practical, and every time a signal is bounced, it has to be converted from digital to analogue and then back again.

Built-in digital mixers keep everything in the digital domain, and it's relatively easy to automate EQ, pan and level as well as aux send levels and even effect types. On simpler systems the automation may be of the 'snapshot' type, storing a series of console settings that can be switched at the appropriate point in a song. On more upmarket models, it may be possible to get full dynamic automation via either an internal automation system or control from a MIDI sequencer.

One disadvantage of digital mixers is that it's seldom practical to provide one knob per function, so the operating system is less intuitive than for analogue mixers. Furthermore, additional inputs, outputs or insert points require expensive A-D and D-A converters, so cost-effective models are likely to have quite limited analogue I/O facilities.

From what I've seen so far, removable media digital multitrackers are very attractive as they offer excellent sound quality, sophisticated mixing facilities, good onboard effects, and they can be used to lock up a sequencer via MIDI Clock or MTC. Given the problems that many people experience with digital audio on computers, using a digital multitracker in combination with a computer or hardware sequencer is very attractive.

SOS

benefits

- Takes up relatively little space.
- Recorders based on removable media avoid the backup problem.
- Sound quality can be very good, with very low noise.
- Minimum of wiring or external equipment needed.
- Easy synchronisation to MIDI sequencers.

disadvantages

- Recorders based on removable media tend to have a very limited recording time.
- Removable media storage systems evolve so quickly that existing drives are likely to be superseded by higher-capacity devices before long.
- Digital mixer sections can be complicated or time consuming to operate.
- Audio data compression may not be acceptable for certain applications.
- Cannot be expanded to give more tracks.
- Fixed-drive systems tend to generate more mechanical noise than analogue tape machines. Some removable-drive models tend to be quieter, though large-capacity removable drives may also be quite noisy.

Next month, I'll be looking at the pros and cons of entrusting your entire recording, mixing and sequencing requirements to a computer-based desktop system.

**NORD
MODULAR**

With the Nord Modular you are able to construct the "synthesizer of your dreams." Simply drag synth modules out onto the screen, make your connections using "virtual patch cords", and in no time, you'll have your new synthesizer in front of you. The innovative and flexible architecture of the Nord Modular allows for extensive sound sculpturing. How about a 5-oscillator-per-note synthesizer with 5 LFO's, two highly resonant 24 dB/oct low-pass filters with separate envelopes or maybe a fat string sound with 14 oscillators - in stereo. Move your body to a megafat bass sound built-up with 4 oscillators and a distorted classic analog lowpass filter. Or, why not a classic 6 operator FM patch for that "electric" piano sound or a 24 sine wave oscillator patch for inharmonic spectrum generation. The possibilities are endless and ongoing due to future FREE software updates from Clavia containing even more exciting modules, for example: Formant Waveforms, Frequency Shifter etc. etc. Available in rack and keyboard.



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



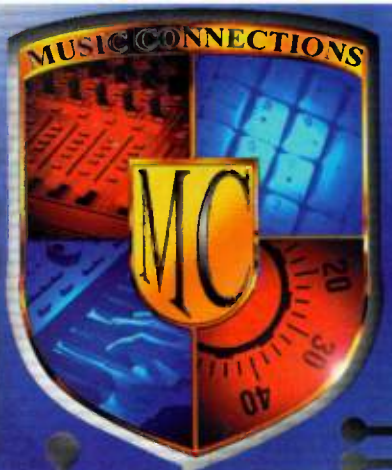
- Features:
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 - Rugged Chromed Steel rackstand with heavy duty snare basket support.

nord lead 2
virtual analog



With the Nord Lead 2, a great concept is being improved upon in many ways. The Nord Lead 2 is actually 4 synthesizers in one. It has 4 multi-timbral channels, each with it's own fully assignable output. This is an essential feature for musicians who need to access sounds independently for further processing and mixing. Nord Lead 2 comes with an "impressive" 16-voice architecture, a highly beneficial feature when creating layered sounds, "power pads", awesome leads and booming basses. 16 notes are also very useful in an instrument containing 4 independent MIDI channels. The keyboard can be split into two sections. Also, since the Nord Lead 2 has the ability to use up to four patches simultaneously, each side of a split can contain one or two patches, creating "split/layers" for even more exciting some possibilities.

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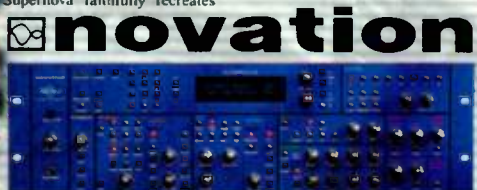
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Novation's Supernova has been in development since early 1997 and now has some of the most astounding features to ever appear on an analog synth. A 16 note polyphony, flexible effects structure, 8 audio outs and full MIDI control are just the starting points. Not to mention that this is expandable to double polyphony, programs and performances. Based on Novation's proprietary Analogue Sound Modelling technology Supernova faithfully recreates the fluid and liquid sound that until now was only available with vintage analogue equipment. Analogue Sound Modelling Technology in many ways exceeds the capabilities of real Analogue equipment and is not just a "virtual" imitation of the real thing.

And don't forget Novation's other stunning products, the BassStation and the DrumStation. Don't miss out, call now for more details.



novation

ROLAND

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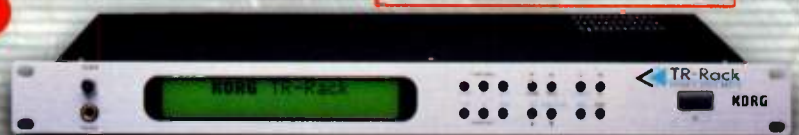
KORG

Z1
N5
TR
SG

1 All over the world, professional musicians have come to rely on the Korg brand name. Their continual innovation has now brought about the Z1, a 'next generation' synthesizer with advanced synthesis techniques that provide realism, limitless creativity and expressiveness at an unsurpassed level. For those interested in other areas of audio creativity, KORG have produced the SGproX and the TR-RACK. The SGproX is the ultimate stage piano, with an unbelievably rich and realistic sound and feel. The TR-RACK has all the features of the famous Trinity keyboard, but in rack format. This rack is sure to be a hit with those of you who want powerful synthesizer effects but don't have the room for the full keyboard. The Korg N5, an astounding number of sound programs and versatile functions in a very affordable package. The tone generator of the N5 uses the same AI synthesis system as Korg's professional synthesizers. It features 12Mb of PCM ROM containing an incredible selection of 528 multi samples and 286 drum samples. You've got everything at your fingertips, from basic necessities like piano, organ and strings, to a



1 wide range of unique synth sounds and sound effects. To put the finishing touches on you sound, the N5 also provides two completely independent stereo multi-effect units, with 48 types of effect, such as resonance filter, chorus, delay and rotary speaker, and the list goes on...



YAMAHA



Yamaha have created the most desirable audio inspiring products musicians have ever experienced. We have all the leading edge musical equipment and accessories available to man in stock and what's more we offer the most in-depth demonstrations at all of our stores nationwide. Don't believe the hype, come and try it for yourself.

THE EX-FILES

Yamaha's EX Series offers more than ever before in a single keyboard. Featuring a unique Extended Synthesis system which incorporates a number of the most advanced tone generator technologies currently available...plus a full-featured sampling system. Top-quality internal effect system so no extra sound processing equipment is required. Sequencers provide sophisticated on-board sequence programming and accompaniment capability. Offering one of the most versatile and intuitive real-time control systems.

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From the AN1X to the CS1X and the VL-70m the ML100R to the A3000



1 Featuring on-board effects, sequencer, up to 72 meg of sampling and 126 note polyphony, these synths are going to be EX-STREMELY sought after.

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The A3000 is an affordably priced 64-poly, 128 MB professional sampler that's as accessible to techno/hip-hop/dance DJ's and seasoned electronic musicians as it is to those in the market for their first sampling unit. With it's unique control knobs and easy to edit sound architecture, the A3000 takes the mystery and frustration out of the sampling process, while providing a powerful performance and composing tool ideal for stage and studio alike. Memory can be expanded to a maximum of 128MB via four 72-pin SIMM sockets. The internal DSP provides three effect blocks including high quality effects plus special types (for phrases and loops) such as real-time stretch (beat change), Lo-Fi effects, and others which can be configured specifically for each program. All of these are available for analog input audio recording and external audio mixing.

YAMAHA A3000

Dynamic filters (Lo Pass, Hi Pass, Band Pass, Band Eliminate) and a parametric EQ can be applied to each sample, which can be freely mapped to key and velocity ranges with layers and/or splits. Other features include a 4-band total EQ, an easy MIDI record/playback function for making quick song sketches, plus sound file compatibility across multiple platforms (including WAV, AIFF). All this, and more, make the A3000 the one sampler that professional musicians everywhere will want to take a serious look at.

ENSONIQ

Ensoniq's ASR-X is a hybrid machine dedicated to making it easy to sample, resample and loop. In addition it holds a built-in synth, incredible effects, resonant filters and an easy to use sequencer. The best parts have been taken from Ensoniq's famous ASR-10, MR family and all their other ideas they have never had the chance to include. The ASR-X TURBO is expandable to 26Mb ROM and 34Mb RAM not forgetting the Expansion boards and 10 output expansion options. And now your luck is really in because we are



ASR-X TURBO

now including SCSI as standard at £1199. However, as an even bigger bonus we are now including the Dance Board & SCSI in a model called the ASR-X TURBO at just £1495. Just come in and try this awesome groove machine for yourself, we can't begin to describe the power of this machine in words, hear what you've never heard before!

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CD3000

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

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

MUSIC CONNECTIONS

RHYTHMIC ECSTASY



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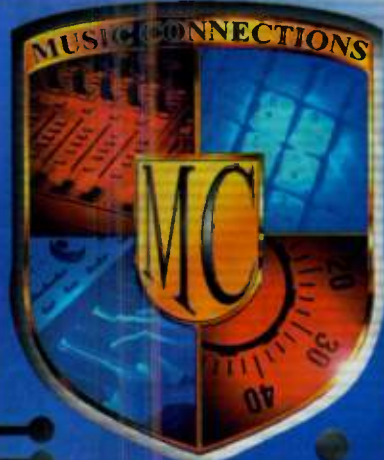


S6000



S5000

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

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All are in abundance in the stunning new Topaz Project Studio Console from Soundtracs.



Topaz

168RC

The 168RC has been created with this goal; to help you create stunning recordings without adding noise, by converting from analogue to digital and back again. The 168RC utilises KORG's renowned heritage in DSP design coupled with 16 channels of Digital I/O in the industry standard ADAT optical format. So two digital 8 channel devices can be simultaneously mixed to 8 buses digitally, using the optical link. **ENTER THE WORLD OF ADVANCED AFFORDABLE DIGITAL RECORDING**

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The M1600 series

has all the features needed in a mixing console of this standard with a sensational price tag. Available in 16 or 24 channel versions and complete with meter unit it's making a big mark in the music industry.



M1600
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YAMAHA

As other manufacturers struggle with unfamiliar technology, Yamaha's new 01v offers up to 24 inputs (16 analog plus 8 digital I/Os on optional ADAT, TDIF, or AES/EBU boards, or, from September, a further 8 analog channels), total instant recall with 99 memories, two 32-bit ProR3 based effects processors and 22 dynamic processors, 120 bands of 44-bit parametric EQ, motorised faders and full dynamic automation via MIDI.

NEW

YAMAHA 03D

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EFFECTS

KORG
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TURN THE WARP

Attention has been paid to every detail of the audio circuitry in the new DL8000R Digital Multi-Tap Delay and AA18000R Ambience Multi-Effects Processor. With high Quality, sophisticated effects algorithms and parameters, these effect processors provide advanced sound processing power at an affordable price. Intuitive two-control user interfacing allows easy access to each unit's extraordinary processing power and ultra-large high-brightness vacuum luminescent displays allow effortless visibility under any lighting condition.

PLATINUM

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

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

With such a large range of effects on the market at the present time, it's impossible to display all the effects we currently hold in stock. But you can be sure that if it's a Focusrite EQ, Lexicon reverb, Behringer compression, Presonus Midigate, Drawmer compressor, ART valve etc, etc then we are the company for you.

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11R824's deliver main monitor performance for a nearfield price. What's more, the small size and reasonable weight means these make great portable references for the travelling producer, not to mention great home cinema speakers for a Dolby Pro Logic system. Come and see what all the fuss is about you have to hear these to believe anything so small could sound so big!

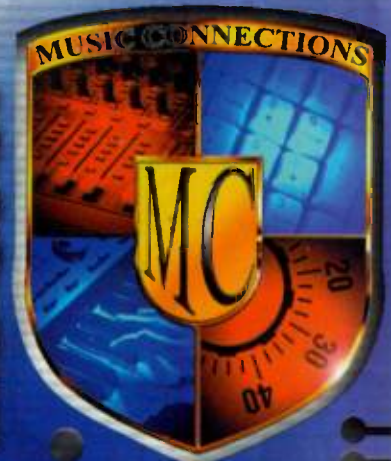
Like Mackie's world-renowned mixers, the new M1400 is built to sound perfect and last for years. A real workhorse! Call now for the best prices!

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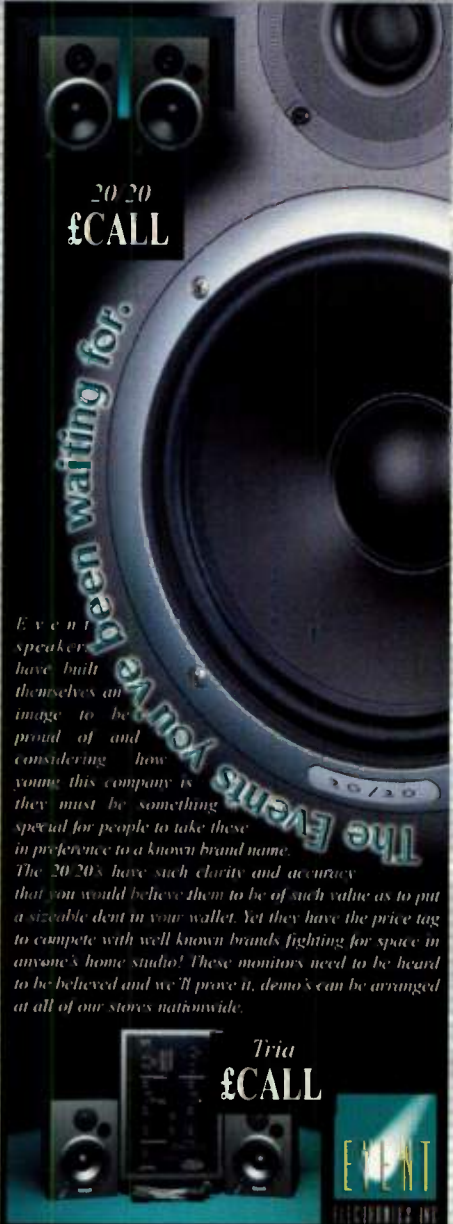


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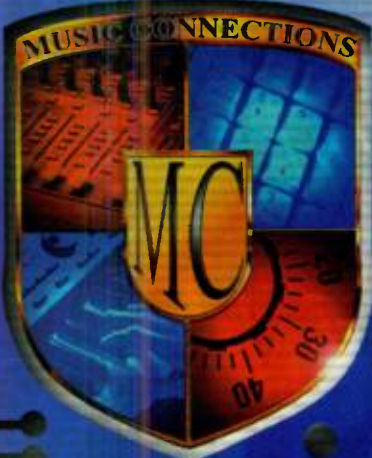
The Events you've been waiting for. Event speaker have built themselves an image to be proud of and considering how young this company is they must be something special for people to take these in preference to a known brand name. The 20 20's have such clarity and accuracy that you would believe them to be of such value as to put a sizeable dent in your wallet. Yet they have the price tag to compete with well known brands fighting for space in anyone's home studio! These monitors need to be heard to be believed and we'll prove it, demo's can be arranged at all of our stores nationwide.

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The X-14 offers independent recording on four tracks via the separate front mounted microphone or instrument inputs, or the innovative 'internal microphone'. Recorded tracks can be mixed using the four level faders, placed on the stereo stage using the pan controls, & monitored on headphones or via the standard RCA jack stereo line output. Simple operation straight out of the box is guaranteed thanks to helpful 'pictorial' legends moulded into the casing.



MUSIC CONNECTIONS

audio-technica

The Complete Microphone Solution

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



**AT4033A
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RØDE

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



**NT2
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The introduction of the Equitek series microphones signaled the most significant improvement in microphone technology in decades. The extraordinary transparency resulting from our unique servo design and exceptional flexibility have created a new 'benchmark' for cost and performance.

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Fostex

FOSTEX D90 & D160 Professional Digital Multitrack Recording.

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

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

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

NEW FOSTEX FD-4!

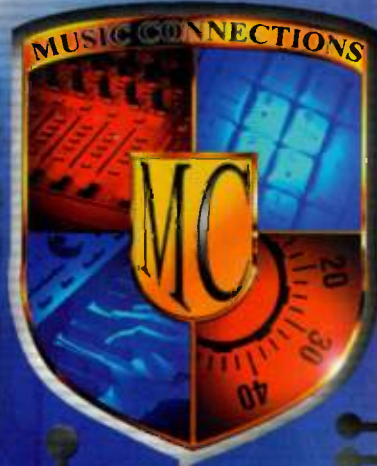
The latest dream machine from Fostex promises to be a real winner for quality multitracking on a budget. Designed to look and operate like an analogue multitracker, the FD4 uses a SCSI II port so you can record directly to any suitable SCSI drive, including ZIP's Syquest EZ Flyer and Jaz formats. Call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

It's finally here - the affordable digital multitracker which offers 8 true tracks of non-compressed CD quality recording and mixing.

Introducing the great Fostex DMF-8V1. While the competition expect you to join the 'digital recording revolution' with less than 8 tracks and compromise the integrity of your audio with cost-cutting compression techniques, Fostex know better.

After all, it was Fostex who invented the first digital multitracker and have been innovators of ground-breaking recording products for the past 15 years. The DMF-8V1 is quite simply the best package with which to enter the exciting world of digital audio. Quality, easy expansion, instant integration and a great sound. It's everything you need.

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KORG

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

The KORG 1212 LO brings the price of full function multi-channel computer

based recording to a point that just about anyone can afford. The card features 12 inputs and 12 outputs configured as two analog I/O's, an S/PDIF I/O and an 8 channel ADAT optical I/O. All I/O's can be used simultaneously for maximum interfacing flexibility. The only sensible choice for those looking for Professional quality at a sensible price!



Roland

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



AKAI

This digital personal studio is a 12 track, 18-bit in, 20 bit out digital multitracker incorporating a MIDI-automatable digital mixer. Sample at 32, 44.1 or 48 kHz without data compression to an internal Iomega 1Gb Jaz drive or other drives via SCSI. With an estimated recording time of 270 minutes at 32 kHz you must not miss this little wonder, or any of AKAI's other products that we hold in stock for that matter.



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Buy YAMAHA's MD4 for **£599** and you can have an ART Tube MP for **£69** a Presonus Bluemax for **£129** or the stunning new ART QuadraFX for **just £199!**

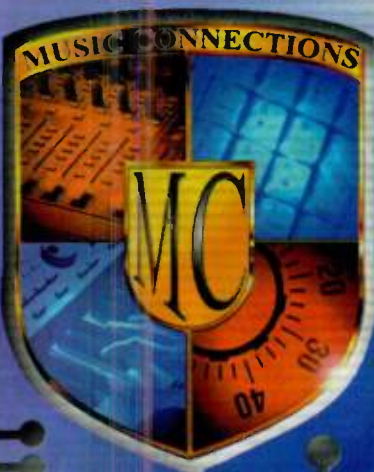
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Product
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Exclusive to Music Connections we bring you that exact piece of equipment for the amazing sum of £1495 inc vat. Yes that's right just £1495. Now when we heard this news we had to stop and think? Is there anything that's comparable at anywhere near the price to this amazing piece of equipment. To tell you the truth, we don't think so. And could this now, really be the end of tape based recorders as we know them?

This machine is so capable that it is impossible to tell you everything about it in an advert, and really? you should see it in the flesh to see just what amazing value this represents. So if you were thinking of a tape based machine, maybe you think again. Give us a call, come and try it, or forever stay in the dark ages. This offer is limited to first come, first served.

exclusive

MACKIE

If you rely on Pro Tools, Mackie's HUI studio console can boost your productivity and your creativity!

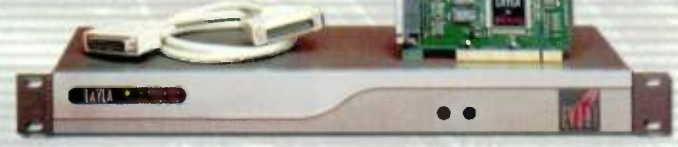
Now you can literally get your hands on ProTools digital audio workstation software Mackie Design's HUI is designed to control and respond to Digidesign's ProTools Version 4.0 and in the near future, DAE compatible software too. HUI lets you mix via a real, tactile control surface complete with motorized faders...rather than with a mouse or a unidirectional fader pack. Perform real-time, hands-on multi-channel fades, mutes; select and adjust sends; create subgroups; and change dynamics. In short; track and mix down just the way you would on a large, automated console, yet with complete bi-directional interaction with ProTools 4.0. HUI will immediately reflect all standard mixing values, functions and pointers. HUI controller architecture supports standard MIDI protocol in either 7-bit or higher resolution 9-bit applications as well as utilising simple controller and note values. Rear panel I/O includes analog jacks (three stereo audio pairs), a footswitch jack, ADB mouse thru, MIDI in and out and RS422 port for direct computer connections.



Gina is proving to be one of the most popular Multitrack recording cards we've ever stocked! Gina features S/PDIF I/O with up to 24-bit resolution, 2 in 8 out 20-bit digital to analog converters, full duplex operation and easy trim automatic input gain. A dedicated card for dedicated professionals, come and put it to the test! You won't be disappointed with its performance or our price!

Darla is designed for musicians who think computer-based multitracking is an expensive hassle. It's also the perfect step-up solution for those who have tasted the awesome power of digital multitrack recording, but who aren't satisfied with the audio quality or channel limitations of their current audio card.

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



Eight Real-time DirectX plug-in stereo effects, including reverb, multitap delay, multiband parametric EQ, multi-element chorus, analog tape flange, pitch-shift, tremolo and autopan. Intuitive graphic user-interface. 32-bit floating point processing, for precision sound at all dynamic levels. All effects parameters fully controllable automatable via MIDI. Operates in stand-alone mode or within any DirectX compatible digital audio recording application. Worldwide distribution exclusively by Event Electronics.



COMPUTERS

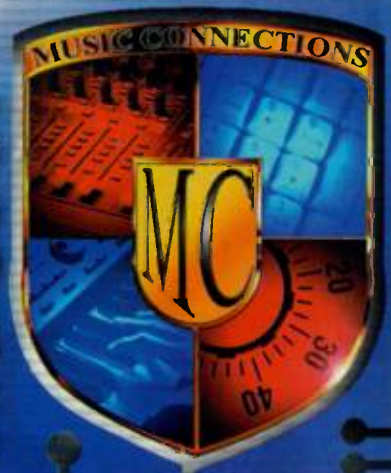
ATTENTION!

How many stores are advertising computer packages in this magazine, that frankly are virtually out of date? At Music Connections we don't do this, it's pointless. We will only spec a computer for you when you are ready to purchase. This policy ensures that you receive only the latest and best specified computer. Whatever computer package you see in this magazine it is almost certain we can better that package for you. So call us with your requirement and allow us to provide you with a system that will work, and one that we are prepared to give back-up and technical assistance to. Please do not go and buy a system off the shelf, when it doesn't work these

people will not be able to help, as they have no idea how the system is supposed to work. You must buy the system from a specialist like Music Connections.



Technical Resource Library with tips, advice and background info ...MCol



AKAI

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The AKAI DR range comes highly recommended as Digital Hard Disk Recorders with sophisticated non-destructive editing functions allowing near instant data access. The DR16 features a 16 channel programmable mixer as easy to use as a conventional MTR machine but gives true 16 track performance from a single hard disk at a highly cost effective price level.

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AMAZING END OF LINE DEAL

The ACP-8 is a high quality compressor/gates housed in a steel 2U rack mount unit. Each compressor allows control of threshold, ratio, attack, release, and output gain. Each is individually selectable for hard or soft knee, peak or auto compression.

The DCP-8 is a 8 channel, digitally controlled, analogue dynamics processor. Plug it into the inserts of your mixer, MIDI it up to your sequencer and it will give you a compressor/limiter, a noise gate, automated fader levels, automated mutes and glitch-free real time control of parameters across all channels.



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

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

In addition to fifteen presets, Blue Max can be run in manual mode that gives you full control over compression parameters including variable input/output, attack and release times as well as ratio settings from 1:1 to 20:1. Full on-board metering allows shows input/output level and gain reduction. Blue Max can be operated in stereo or mono with high gain mono inputs for plugging in instruments. Blue Max also includes a side chain for de-essing, ducking and other forms of spectral processing. Inputs and outputs are 1/4" TRS unbalanced. Operation is switchable +4dBu or -10dBV. The power transformer is switchable for international operation. Blue Max is housed in a single rack space, all steel chassis and in keeping with the PreSonus "no wall wart" tradition has an internal power supply. Using our proven dynamics processing technology.



£269

Spectral Audio's Syntrack is an amazing analogue/digital hybrid synth rack. Audio is generated from a wave table oscillator before passing through a 24dB/oct analog MOOG filter and an analog VCA with distortion control. An external audio input allows anything to be passed through the filter and distortion sections. All parameters are controllable in real-time over MIDI.

It sounds absolutely unique. Amazing DX-like basses, jungle dope-basses, squealing leads, and all manner of bleeps and thwaps can effortlessly be coaxed out of this little baby. It really hits the sweet spot!



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

The noise gates on the ACP-22 are unparalleled by giving control over threshold, variable attack and release and switchable gate range (-60dB to -8dB). The ACP-22 also has a unique Lo Pass gate filter which eliminates cymbals and other higher frequency range instruments from opening up drum and/or vocal gates without affecting the audio output. Independent gate key side chain is included in or external triggering and precise filtering. LEDs on the gate show gate position open or closed and gate range (-60dB to -8dB).

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



£199

£199

£199

ART's Dual Leveler, Dual MP and HD31 Graphic Equalizer all provide outstanding performance for home, studio or live applications. These rack units have received critical worldwide acclaim in every field of audio recording.

The subtle, mildly distorted sound is ART's and makes for an unmistakable final mix.

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The E-mu Audio Production Studio is a professional, yet affordable PCI audio card for multi-channel digital sampling and sound design.

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Eight Real-time DirectX plug-in stereo effects, including reverb, multitap delay, multiband parametric EQ, multi-element chorus, analog tape flange, pitch-shift, tremolo and autopan.

Intuitive graphic user-interface. 32-bit floating point processing, for precision sound at all dynamic levels. All effects parameters fully controllable/automatable via MIDI. Operates in stand-alone mode or within any DirectX compatible digital audio recording application.

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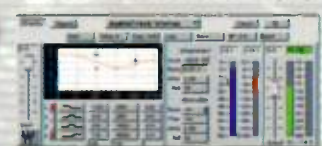
New from Waves comes three packages to cater for every need.

The Native Power Pack includes TrueVerb (virtual room reverb processor), SI (Stereo Imager), LI (Ultramaximiser), WaveConvert (Multimedia Batch File Processor), CI (Compressor Gate) and Q10 (Parametric EQ). A complete Pro-Audio system of Waves processors.



EasyWaves includes AudioTrack EasyVerb and the Waves Multimedia presentation including demos for all Waves plug-ins. EasyWaves provides users with the basic audio processing tools including Parametric EQ, Compressor, Gate and Reverb. It supports both Mac™ and PC native platforms straight out of the box!

With the Gold Bundle you will get ALL the TDM Plug-ins plus: PS-22, WaveConvertPro, AudioTrack, Renaissance and the newest plug-in MaxxBass™ not forgetting FREE updates and all the Plug-ins that Waves release in 1998.



Imagine an audio editor that offers non-linear hard disk editing, features tons of audio effects, processes, and tools, transfers to and from many popular samplers, reads and writes just about any file format out there, rearranges material in playlists and regions lists for CD mastering, manages and edits voice prompts for phone systems, processes audio files headed for the internet or computer games, cleans up background noise and tape hiss, hosts DirectX and proprietary plug-ins; executes studio quality audio for broadcast...and comes in one really cool looking box.



Wavelab 1.6 for windows

Wavelab 1.6 is a dedicated audio processing and editing system for stereo mastering applications, including CD burning with PQ encoding and master listing. Highly regarded for its ease of use and amazing processing speed, the programme has a comprehensive spec. including: Time stretching/pitch correction, Parametric & compression, File format converter, batch processor, Markers, Audio access database, Spectrum analysis, Realtime plug-in interface with 9 effects, Audio track, High quality Compression Expander Gate, EQ in a single plug-in at a remarkable price.

Steinberg

It's common knowledge that Steinberg is the industry standard for audio manipulation, it is also well known that Music Connection is the largest and most qualified chain of stores to represent such a brand name. From Cubase VST to Reveal and Rebirth we stock it all, and now you can get your hands on the superb 'Producer Pack'. This new audio package includes the renowned Cubase VST, Wavelab and Audio Track.

Cubase VST

Steinberg's revolutionary Virtual Studio Technology is at the heart of the latest Cubase VST 3.5 for Mac OS and windows platforms. It's this combination of software power and flexibility with hardware sound and feel that makes VST a uniquely productive studio system.



"Plug and play" Mark of the Unicorn MIDI interfaces ship with "plug and play" settings so you can begin using them right away with your sequencer, patch editor/librarian, and other music software, without touching the unit's front panel or running the control panel software accessory. They support both Macintosh and Windows and our Express and Timepiece families even support both computer platforms in a single unit. In fact, the Express XT and Timepiece AV can connect both a Mac and a PC at the same time, each with full access to all MIDI devices (and each other).

Digital Performer 2.3



Call in to your local Music Connections for the best deals in the country.

Alesis never approach things in the way you might expect. In some areas they push technology to new limits to bring us, say, cheap digital reverb or digital tape recording, while in others they use old technology in a slightly different way to provide specific solutions to specific problems.

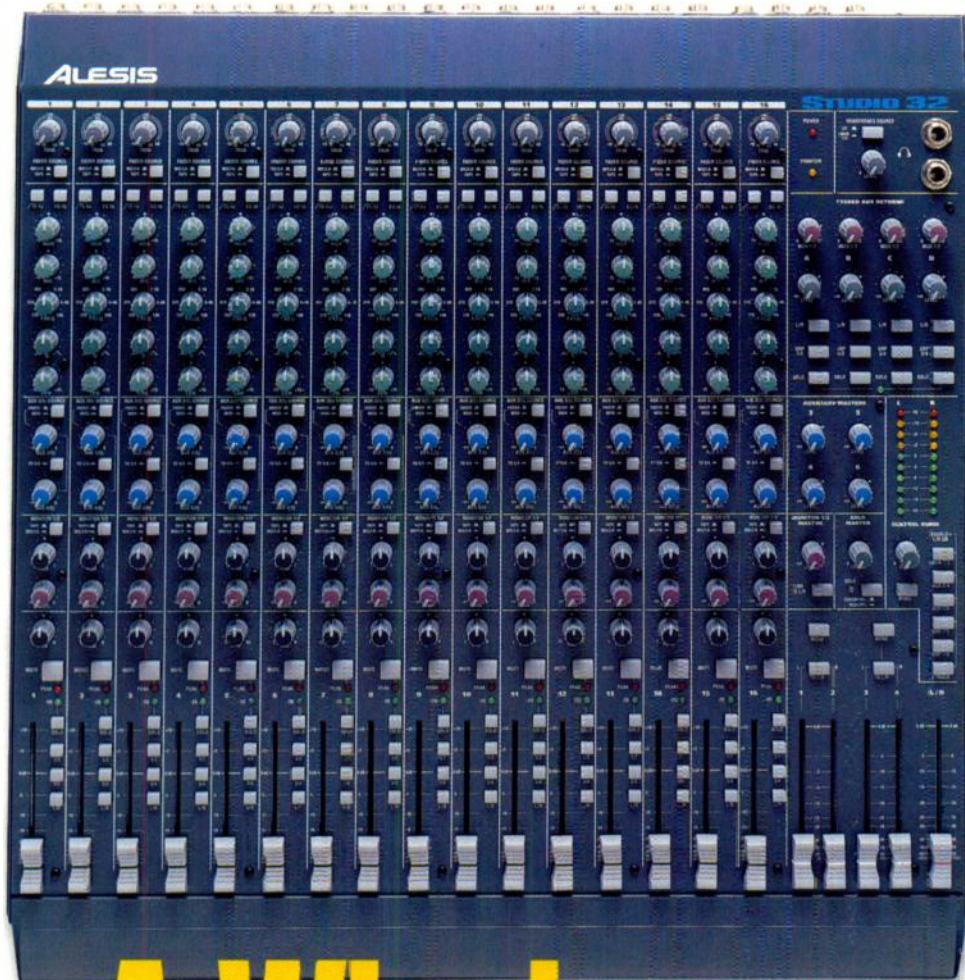
The Studio 32 is an example of the latter approach. While everybody else seems to be striving to give us fully automated, moving fader, digital consoles stuffed to the brim with effects and signal processors, Alesis have instead come up with a compact analogue console to complement their digital tape machines (or any other stand-alone multitrack recorder for that matter). It has to be said at the outset that the one area where Alesis have up to now been less than successful is mixers. Even so, this new model gives every sign of being properly thought out, so it would be a mistake to prejudge it on that score. Similarly, don't let its 'Seattle meets Hamamatsu' styling fool you either: with this mixer, lots of things are done differently from how other manufacturers might approach them.

The Studio 32 is a very compact 16:4:16:2 in-line mixer fabricated from sheet steel and finished in a textured grey finish. It's supplied with rack ears that you can leave off when using it in desktop mode. Other physical points to note: it's mains-powered, and metal nut jack sockets are used in preference to the cheaper plastic nut types.

The Studio 32 has six aux send busses, four stereo effects returns and good quality mic amps on each of its 16 main input channels. The use of the in-line format, combined with 60mm faders for the channel and group output level controls, has enabled Alesis to make this mixer small, without it being cramped. The pre-fade monitor 1/2 signal path has a Volume and Pan control as well as switchable access to the uppermost of the two channel post-fade Aux Send knobs, though there is no facility to switch EQ into the monitor channel.

Each input channel has a 3-band equaliser and, unusually, the mid section is fully parametric, though the high and low shelving sections are otherwise of conventional design. All the inputs are fully balanced on TRS jacks, and each input channel has an insert point plus a direct line out jack, whereas the monitor channel has a tape return jack. The monitor 1/2 output may be linked to the main stereo mix at the press of a button in the Master section. It has its own master level control which enables it to be used either as a conventional pre-fade send or for off-tape monitoring, depending on the position of the Tape/Mic-Line switch. By using this switch, the monitor source may be flipped from tape to the main input channel during mixdown, thereby allowing 16 additional signals to be mixed with the off-tape inputs.

Having only four mix busses for 16-track recording may seem a little skimpy, but in reality few people working at home record more than



A Winning Formula?

four tracks at a time unless they're mixing an acoustic drum kit. If you do need more tracks, the channel direct outs can be pressed into service, and though this means more patching, it provides the flexibility for serious recording.

ALL ABOARD FOR THE TOUR

No matter how you try to organise a review of a mixer, there has to be a channel and master section tour somewhere, so it may as well start here! In the case of the Studio 32, each of the 16 input channels is identical, with a balanced mic XLR input, a balanced jack line input (+4dBu nominal), a TRS insert point and an unbalanced direct out. While there is no mic/line selector switch on the front panel, plugging in a mic cable cuts out the line input thanks to the use of a switched XLR socket. The advantage of this arrangement is that you can leave your keyboards, modules and other sound sources permanently connected to the mixer, and just plug in a mic whenever you need one. The disadvantage is that if you wire all your mic inputs to a wall box using a

ALESIS STUDIO 32 MIXER

Despite their success in most other areas of music technology, mixers have never been Alesis' strong suit. With their new compact model, PAUL WHITE thinks that they may just have come up trumps.



ALESIS STUDIO 32 MIXER

pros & cons

ALESIS STUDIO 32 MIXER £1099

pros

- Good sound quality, especially the mic amps and EQ.
- Flexible and clear layout.
- Compact, yet can be used for 16-track recording.
- Affordable.

cons

- Limited post-fade effects send facilities.
- Some users won't like the short 60mm faders.

summary

Considering the Studio 32 is around half the size of some of the consoles it could replace, very few facilities have been missed out, and the sound quality would be hard to better. If you want results in a small space rather than out-and-out pose value, this is definitely a mixer to consider for anything up to 16-track recording.

SOUND ON SOUND

► multicore, the line ins will remain muted as long as the multicore's XLRs are plugged in.

The Monitor 1/2 control has a tape input (-10dBv to +4dBu nominal). This is wired unbalanced, making it suitable for use with the new, low-cost Alesis LX20 ADAT. A common Trim control sets the mic or line gain, while the adjacent Fader Source switch flips the channel source between mic/line and tape. This is used at mixdown to route the recorded signals through the main channel path under fader control. Next, the signal passes via the insert point before encountering a 75Hz low-cut filter, then it's straight into the EQ section. The EQ section has centre detents as well as a bypass switch. The high shelving control operates at 12kHz and the low at 80Hz, and both offer a +/-15dB range. The mid section covers the same cut/boost range, but here the frequency may be varied from 120Hz to 14kHz, while the bandwidth can be adjusted from around one sixth of an octave to almost two octaves.

Earlier, I said the console had six aux send busses, but then went on to say there were only two aux send knobs. This is because the Monitor 1/2 outputs are classed as Aux 1/2. So while technically I guess this is correct, by any normal reckoning it means the mixer really has just four aux sends that are usable during recording. The two Aux knobs (both post-fade) are switchable as a pair to address either Aux 3/4 or Aux 5/6 depending on the setting of the 5/6 button. The upper Aux knob may also be switched to operate in the main (Fader) signal path or the Monitor path. This means that only two

signal to buss pairs 1/2, 3/4 or L/R. Finally, smooth action 60mm faders are fitted, though I know many users will bemoan the lack of 100mm faders.

MASTER SECTION

At the far right of the mixer is the master section where you'll encounter a rocker switch for the global phantom power. A headphone amplifier with two outputs can be switched to monitor the control room signal or the Monitor 1/2 mix, and below are eight master level controls for four Aux Returns. The top row consists of four purple knobs that send the stereo returns to the monitor mix (where it may be used to set up a performer's cue mix). Beneath are four grey controls for the aux level that is fed to the main stereo mix via the L/R buttons. These also function as on/off buttons, allowing unused effects units to be isolated from the mix.

Aux-to-Group buttons are arranged so that the first two stereo aux returns can be individually routed to groups 1/2, while the second pair may routed to groups 3/4. Finally in the aux section come four Solo-in-Place buttons that allow the effects returns to be checked in isolation over the control room monitors. The master Solo control sets the level of the soloed signal, and a switch beneath permits switching from solo-in-place to PFL mode. In PFL mode, the main meters show the pre-fade channel signal level making it easy to optimise the input gain trim settings.

Moving down, there are four Aux Send Master Level controls and a pair of bargraph LED meters that track the control room signal. Six Source Select buttons allow the control room monitors to 'listen in' on the monitor mix, the aux sends (as pairs), the groups (as pairs), or a 2-track tape machine. If all six buttons are left up, the monitor reverts to the stereo mix. An overall Monitor Level and monitor Mono button is included, though there's no Dim switch. That leaves just the four group faders, two buttons to route the group pairs to the stereo mix, and two Mono buttons to create mono sums of groups 1/2 and 3/4 if required. A stereo master fader controls the stereo mix level, completing the Master section.

USING THE STUDIO 32

Putting the mixer to the test using a good quality capacitor mic showed me straightaway that the Studio 32 has impressively quiet, transparent-sounding mic amps. I was also very impressed by the EQ, which had more of the character of a good quality outboard equaliser than a budget console. The parametric mid sounded particularly sweet, even when using a lot of boost at difficult frequencies, and though I am more used to 4-band equalisers, this one beats most console EQs hands down, both in terms of smoothness and versatility. Operating the EQ and mute buttons revealed that clicks were quite noticeable if the buttons were operated with a signal passing through — certainly more pronounced than on some mixers I've tried. However, as is to be expected, they were silent if operated during pauses.

Using the console for multitrack recording is

“The parametric mid sounded particularly sweet, even when using a lot of boost at difficult frequencies.”



physical effects sends can be used at the same time on the same channel, and in a mixdown situation, these may have to be split between the main and monitor paths, which doesn't leave you with a lot of flexibility.

The bottom of the channel strip follows a familiar format with Mute and Solo buttons, plus green and red signal/clip LEDs. When a channel is muted, the red clip LED lights continuously. Conventional routing buttons send the channel

fairly straightforward providing you keep an eye on the Source Select buttons. Instead of having a single Flip button, both the input and monitor sources can be selected independently, so you can set them both to the same source. This is useful if you are using the console in a live situation where Monitor 1/2 provides the foldback mix, but it can be slightly confusing when recording.

Having four stereo aux returns in addition to the main and tape inputs is a welcome feature, though having only two effects send knobs shared between the input and monitor signal paths is limiting. It's maybe not so serious if you are using the monitor channels to bring in MIDI instruments that have their own effects, but if you're using instruments that need to have effects added, you'll have to deploy your resources carefully.

SUMMARY

In some ways, it's become hard to rate an analogue mixer in terms of value for money, because once you've added on the price of a couple of effects units and a compressor, it can prove cheaper to buy a digital mixer which has all these things built in and the added benefit of moving fader automation. However, at this end of the market, it could be argued that analogue mixers sound better, and there's no dispute that they're easier to use.

Furthermore, with analogue mixers, you get the very real advantage of insert points, allowing you to connect your own effects and processors.

Although the logical partner for an ADAT (or two) is a digital mixer with an ADAT optical interface, I have to admit that I really like the sound of the Studio 32. It's also very easy to use compared to even the best thought-out digital console. Four output groups is half the number you usually get on a multitrack desk, but when you think about the way most people actually work, I think you would agree that these are enough, especially when you also have the direct channel outputs. There's a lot to be said for compact, uncomplicated systems that let you get on with the job of making music, and the Studio 32 is such a device. It seems that Alesis have finally cracked the secret of making really good sounding mixers.

SOS

E Studio 32 £1099; Studio 24 £625.
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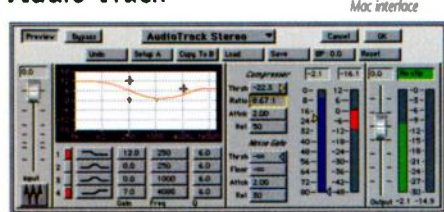
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“It seems that Alesis have finally cracked the secret of making really good sounding mixers”

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Checking in with the Choirgirl

MARK HAWLEY
• RECORDING
& TOURING WITH
TORI AMOS

Tori Amos may not yet have attained the same status in the UK that she enjoys in the US, but that hasn't stopped her setting up her own studio in a quiet corner of Cornwall.

On the eve of her forthcoming 200-date tour, HUGH ROBJOHNS talked to Mark Hawley & Marcel Van Limbeek about recording Tori's latest album and engineering the live tour.

For Tori Amos, success was anything but an overnight affair. In the late '70s, at the age of 13, she was playing popular easy-listening standards in the hotels around her home town of Washington. By 1984 she had moved to Los Angeles and signed her first record deal, with Atlantic Records, for her band Y Kant Tori Read. The fact that you have probably never heard of them says it all. The band was not a huge success and their only, eponymously-titled, album was largely ignored.

Tori's first piano and voice solo album, however, made quite an impression. *Little Earthquakes*, released in 1992, paved the way for the huge following she now enjoys. *Under the Pink* followed in 1994, and it was during the tour to support this second solo album that Mark Hawley and Marcel Van Limbeek first met up with Tori.

Mark was the tour's FOH engineer, with Marcel on monitors. Following the positive reception afforded some of their live recordings, which were released as B-sides, Mark and Marcel were asked to engineer Tori's 1996 follow-up album, *Boys for Pele*. This marked a significant departure for Tori, in that she no longer recorded as a solo singing piano player, thanks to contributions from guitarist Steve Caton. Anyone familiar with these three albums will be wondering what on earth I'm on about, as many of the tracks feature extensive musical arrangements with a wide variety of other instrumentation – but this this was all added after the original voice and piano recordings.

Her latest album, *From The Choirgirl Hotel* is different again in that for these sessions Tori played live with a band: Matt Chamberlain (drums), Steve Caton (guitar), and George Porter or Justin Medal-Johnsen (bass). The album was recorded and mastered in Tori's brand-new studio,

built in a converted barn adjoining a 300 year-old farm cottage near Bude in Cornwall.

One way or another it has been a very busy year for Mark and Marcel. After completing the *Pele* tour, Mark married Tori in February, and in September work started on their new studio. In fact, the building work was barely completed in time to start the new album, and only a few months later they were mixing and mastering its 12 tracks. The ink was hardly dry on the advance CDs when, in early April, Tori and her new band were in North London rehearsal rooms polishing their act for the start of a 200-date world tour.

After finishing their last rehearsal, Mark and Marcel talked to *Sound On Sound* about their new studio, recording Tori's latest album, and their approach to the tour, whilst all around us flight cases were being packed up and wheeled out to a waiting truck. Hours later the whole entourage flew out to the USA for a pre-tour live performance on the David Letterman show. I began by asking how



Mark Hawley — engineer for Tori Amos, both on tour and in the studio.

Mark and Marcel started working together.

Mark Hawley: "I started in studios years and years ago but became bored being in the studio all the time. I was working at a level where I could not record the kinds of things I liked anyway, so it made sense to move over into the live thing, and it was when I was working for a little PA company in Kings Cross that Marcel walked in — with a very poor English accent — looking for work. We immediately got on well and were soon working together a lot on small tours and gigs.

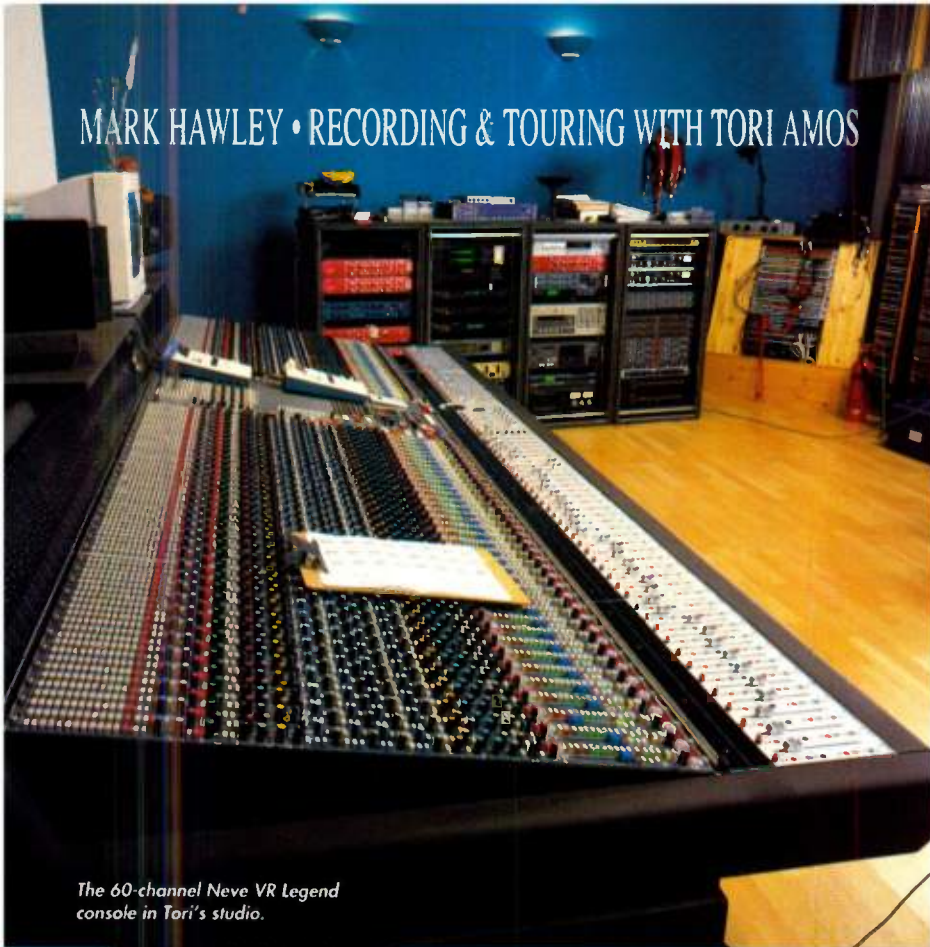
"I had known John Witherspoon [Tori's tour manager] for ages, and had done lots of work with him in the past, so when he offered me the Tori Amos tour in 1994 I asked if Marcel could come along to do the monitors. Initially, Marcel was only going to be on the job for a couple of weeks for the UK dates, but it all went so well that Tori insisted we both stayed on — and we're still doing it five years later!

"Halfway through Tori's '94 tour we recorded

some B-sides from the stage show and everyone loved the sound of those, so we were talked into engineering *Boys For Pele*, which was very good for us. Live sound and the studio are very different cultures and I think that had a lot to do with the sound we achieved on the last album — especially on how dynamic it was. Although we came at it from the live sound angle, both Marcel and I love the studio and it's a really great mixture to have the experience of both sides — a definite advantage."

Marcel Van Limbeek: "It's also really great fun importing live sound techniques into the studio, as well as the other way around. I'm thinking of things such as the extensive use of effects, although obviously we have to be more subtle in the studio than you would be on a live concert. Usually what happens on a tour is that the tour manager gives you a CD of the band and you have to try to work out how they got the effects and sounds. In this case,





The 60-channel Neve VR Legend console in Tori's studio.

▶ a few pairs of speakers and walked out with these Missions which I used all through the tour, and they have proved so good that they have since grown into our domestic reference monitors. We tried other nearfields for this album but we kept coming back to the Missions. When Jon Astley brought his mastering setup down with him for this album he used his PMC monitors, which are beautiful sounding speakers, but the Missions stood up really well in comparison. Unfortunately I don't think they make these particular Missions anymore."

MVL: "We often use the small Genelec 1031s as nearfields in other studios, but it would be silly to have them as nearfields here when we have the 1037s as the main monitors. We have a pair of NS10s, which we never use, and although on the last album we didn't mix on the Missions, we did use them a lot for playbacks in other rooms to check what we had done."

Have you had to develop any specific mic techniques to record Tori?

MVL: "For the *Pele* album we used Neumann U87s on the piano, both in the studio and on stage during the tour, simply because they sound nice, and round, and big. On the new album we still used the U87s on some tracks, but we also used AKG C414s because they make the Bösendorfer sound much more like a 'pop' piano. It sounds slightly smaller, but it doesn't sound brittle, and it sits better in the mix with the drums and the rest of the band. We also tried using a U87 on the low end and a C414 on the high end to get a really great blend of warmth and brightness, which worked very well on some tracks."

MH: "I think on the previous album the microphone choice was more critical because of the natural, real feel to it. On this album, though, everything is so hard and compressed to give it a pop sound that microphone choice plays a smaller role."

MVL: "There are also far more elements in this album. Solo piano and voice are more exposed, so microphone choice is very important, but on this new album there is much more going on and maybe big diaphragm valve mics wouldn't be so good — you can't have everything sounding huge."

MH: "We generally used a Neumann U87 or M49 valve for Tori's vocals, and although the normal approach might simply be 'OK, you are a singer — so sing, and I'm going to record your voice', Tori makes you realise that sometimes she is singing from her stomach, and other times from her throat, and they are very different things. Once you understand that, and learn to work with it, you can get a lot more out of her vocals."

MVL: "We developed a set-up in the studio for Tori's vocals which involves a Focusrite Red 2 EQ, and a TubeTech LCA2-B valve compressor. We used that pretty much for everything on *Boys For Pele*, and although we experimented a bit more on the new album, like using the EQ on a Mackie desk just for the hell of it, we kept coming back to this set up."

I've heard stories about strange singing booths. Can you tell me more?

MH: "Something that freaked us out when we first started recording Tori was separation between voice and piano, and we had seen pictures of her previous recording sessions with the piano covered with a heavy blanket to get better separation. On the previous album we found a beautiful church with a fantastic acoustic which we wanted for the piano and harpsichord, but the harpsichord is about a tenth of the volume of the piano, and we were very concerned about her vocals getting on the harpsichord mics. So, to try and keep some separation, we built this ridiculous wooden booth construction, which Tori sat in with the keyboards poking through a slot in the bottom — it was every bit as bizarre as it sounds! We made the inside as dead as possible so it didn't sound too boxy, and it worked surprisingly well."

"I think you can go too far in trying to get everything completely separate, and there is a danger that you might lose the ambient sound ▶



NOW



► of the room. A bit of crosstalk is perfectly OK, so with this album we used a simple sound board which went over the front of the piano to provide a degree of screening. We still had some crosstalk between the voice and piano, but at least it was reflected rather than direct sound.”

MVL: “We don’t really have any fixed ideas about mic techniques. If we don’t know what is going to happen then we tend to stick with the old favourites like a Shure SM57, a U87 or a Neumann KM140, depending on what the source is. But other than that we don’t really have favourites as such. If you have the time, I think it is always worth experimenting anyway. The U87 is the workhorse in the studio, much like the SM57 is for live sound, and although they are coloured compared to B&Ks, they are coloured in a very musical way which is why I like them so much.

“For the new album we miked every drum up separately but conventionally, although sometimes we would just use a pair of overheads, or maybe even just one distant room mic. We also changed the acoustics of the room, to make it more dead sometimes. It really all depended on the kind of sound we wanted for the music, and what the track was all about.”

MH: “That was the fun thing about this album compared to the last. On the last album it was all about pure audio, and if we put drums on a track, they had to sound like pure drums. This album was much more about how could we f**k the sound up to make it more pop orientated.

“For example, Matt [drummer] brought in this nasty little box which was some kind of really stupid limiter with an outrageously long release time. You can put up any mic anywhere in the room and you get this amazing sound!”

Does Tori get involved in the technical or production sides?

MH: “Tori is a pure musician and isn’t interested in the technical aspects, but the great thing about working with her is that she is never unsure about anything. She will make a decision and will say when something is right. A lot of artists are quick to say when something is wrong, but Tori will say when it is right too, and you know when she says that, it is right, and she won’t change her mind again.

“The U87 is the workhorse in the studio... they are coloured in a very musical way which is why I like them so much.”

“A lot of musicians like Tori find it very hard to listen to a mix as you are building it up, and not automatically hear it as the finished thing, so although we might be quite happy with a quick reverb slapped on the vocal, and a rough drum reverb as we are building the mix, whenever Tori walks in she hears it as the finished thing.”

MVL: “You know you couldn’t say to her, ‘Listen to this, but we haven’t done anything with the backing vocals yet’ because she wouldn’t say ‘this is great’, she’d say ‘where are the backing vocals?’. Timing is everything in terms of when she listens to the mixes, so we would tell her when we had finished a track and then she could come and listen and anything she had to say was relevant.”

How did you record and master the album?

MH: “The album was recorded onto a Sony DASH 24-track with a bunch of Tascams slaving off it. That was a great way of working because if you have something like a 48-track Sony you still only have one bit of tape, but with the Tascams locked up you can just keep recording more takes by putting new tapes in. Having said that, I think it is very important to come up with a performance and decide at the time what you want to keep, because the downside with this technique is that it can sometimes take forever to find the take you want from a large pile of cassettes! Rob Van Tuin, our studio tech, made an amazing database which we use to log everything during the session, and that makes it easier to find things. Tori also has an incredible memory for the detail of what we did on each session.

“When we came to mixing the album we used three formats. *Boys For Pele* was mastered to DAT using the Apogee AD1000, but now they have a new 24-bit system which they managed to get together for us. Unfortunately, because it was so new it wasn’t totally reliable, and so we decided to play safe and master to both DAT and to a Tascam DA88 with a bit-splitting box to handle the full 24-bit audio. The A&R guy from the record company also suggested mastering the album onto half-inch analogue, so we did that too.

“The analogue sounded gorgeous, but we didn’t actually use it at all for the CD. I think you really need to concentrate on what you are doing to get the best out of analogue, and because we were going down to three formats at the same time, it lost out something there. The 24-bit Tascam was fantastic too — really clean and open — and we used that for a few tracks, but most were taken from the DAT because it was so ‘in your face’ and that is what the album is really about.”

AUDIO EQUIPMENT LISTING

CONSOLES

- 60-channel Neve VR Legend
- 16-channel Mackie

MULTITRACKS

- Sony 3324A
- Tascam DA88s and 98s

MICS

- Neumann U87, KM140, KM130, M49, M149
- AKG C12, C414, C460, C451, D535
- Shure SM57, SM58
- Sennheiser MD421, MD441
- B&K 4003

MASTERING

- Sony PCM7030 DAT recorder

with Apogee 1000 A-D/D-A converter for 16-bit masters

- Tascam DA98 with Apogee 8000 A-D/D-A converter for 24-bit masters
- TC Electronic Finalizer

OUTBOARD

- 2 x Lexicon 480L Series 4 digital reverbs
- Eventide H3000
- Yamaha Rev 5
- 2 x Yamaha SPX990
- Yamaha SPX90
- 2 x Roland SRU2000
- Roland SDE3000
- Roland Tape Echo

- 2 x Lexicon Reflex
- 3 x Drawmer DS201 noise gates
- 2 x BSS noise gates
- TubeTech LCA2B
- Focusrite Red 3
- Summit Audio stereo compressor
- DBX 165
- 3 x Focusrite Red 2 EQ
- Summit Audio stereo EQ
- SPL Vitalizer
- SPL Valve Vitalizer
- Focusrite Red 1 preamps
- Summit Audio stereo valve preamp

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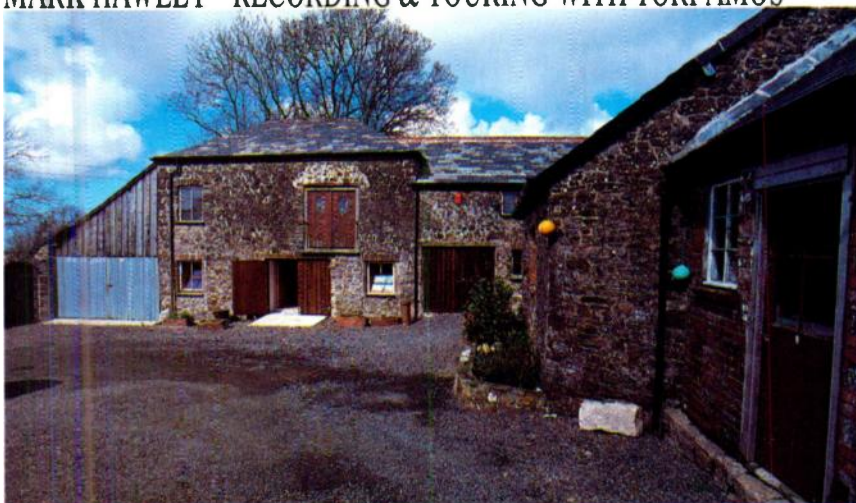
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Tori's studio in Cornwall —
"The building work was only just
finished in time to start the recording..."

THE TOURING BAND

MH: "Tori has a huge cult following in the USA — it's difficult to explain to people in this country just what a presence she has over there. We were regularly doing sheds with 12,000 people, but over here the biggest thing we do is two nights in the Albert Hall.

"Tori hasn't played with a live band since she became successful, so this tour is something rather different. She has such a good reputation for performing live in America, and that has a lot to do with the fact that the songs change every night, and she alters the set drastically to suit the audience. Obviously that is much harder to do with a full band on stage, but I think as the tour progresses the band are such accomplished players that it could quickly turn into something really special.

"In terms of the equipment, we are virtually duplicating the effects we used in the studio because they really shaped the sound of the new album. We're even taking Lexicon 480Ls out with us, which is pretty unusual in live sound, and we're also using a lot of Focusrite EQs and preamps."

Is it a big problem keeping the foldback out of the piano?

MH: "You don't come across nine-foot Bösendorfer pianos on live tours a lot, and we asked everyone for ideas on how to deal with it. We tried everything — all the usual bugs and pick-ups — but nothing worked as well as the classic studio technique of a pair of good cardioid mics. The whole idea of the bugs is to try to get rid of the ambient noise on the stage, but a lot of that is picked up directly by the piano itself — the sound board resonates in sympathy. With the piano lid open it can pick up so much ambient sound that before the show has started the piano mic channel meters on the desk would often be peaking up to the top just with the audience noise! We found if the ambient noise is already in the piano, using a pair of mics like Neumann U87s gives you a much better sound quality than all the bugs."

MVL: "On the last tour we used more or less the same microphones on stage as we used in the studio, although you obviously can't do that with Tori's vocal microphone. We used a U87 or a Neumann M49 in the studio, but on stage we used a Neumann KM140 which is a great mic, and I guess we will do

the same this tour."

MH: "In the first part of this new tour of America we're doing smallish clubs, so we're taking a baby Bösendorfer — Tori's big one will come over when we do the big stadiums. Both pianos have been fitted with Bösendorfer's own MIDI system which drives a Kurzweil piano sampler, and I'll probably be using that in all the band numbers rather than the piano mics. In the past, if we had ever suggested having a MIDI piano or sampler Tori would have freaked — her thing has always been about the sound of the Bösendorfer, but she has really changed her attitude for this tour because of the live band."

Will you be recording the tour, perhaps for a live album?

MH: "We recorded both the previous tours, but with just solo piano and vocals the recordings really didn't work as a piece of audio because of all the crosstalk. We had some B-sides off the last two tours, but they were really the best recorded tracks from 200 shows. This tour is totally different because of the band element, so we're going to record all the shows and an album might come out of that — it is more controlled this time, especially with the MIDI piano and everything."

MVL: "All the mics and DIs from the stage would normally go to both the monitor and FOH desks, but we are routing them to a rack of Focusrite preamps — an unusual approach in itself — and then to a rack of active BSS splitters with feeds to the monitor desk, FOH desk, and a pile of Tascam DA88s. There are 40 lines off the stage, and we have six Tascams so there is a spare in the system just in case. It is an unusual way of working, but the beauty of the system is that by swapping just one multi around, we can replay from the DA88s back into both desks, and sound check with last night's show without having to have Tori around. It also means we can work out new effects or something just like in the studio by working around the DA88 tapes."

MH: "Tori is not big on rehearsing in sound checks, and she actually does a lot of her writing then, so I usually have to keep a DAT running for her and can't easily try new things out. The other thing she does a lot is use the sound check for the local press reports, so I often have to give the local TV people a sound feed rather than do a proper sound check. So the Tascam idea is extremely useful from several points of view."

Do you enjoy combining the studio and live sound roles?

MH: "Although it's really great doing both the studio album and the live tour, it has been completely manic! Normally, there are entirely different teams of people looking after the two sides of it, but with this, it's all the same people. Even John, the tour manager, has been the production manager for the album, so it has been pretty hectic finishing off the album and getting ready for the tour. Of course, it's a great opportunity and very rare to follow through from the studio recording to the live tour, so even though it is all total chaos, it is still fantastic!"

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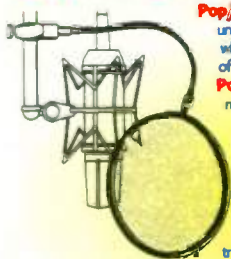
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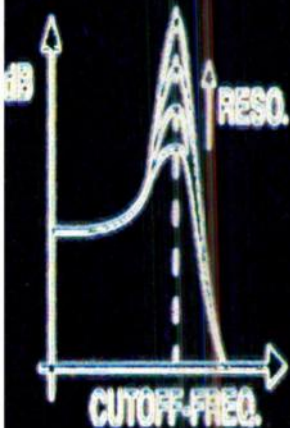
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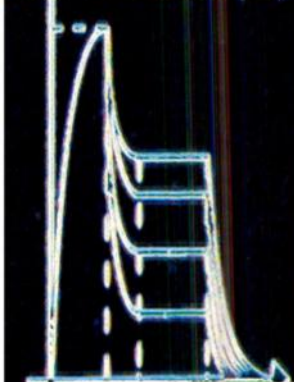
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PART 9: THE IMITATION OF ANALOGUE

Physical Modelling and Virtual Synthesis have been buzzwords for several years now, especially when it comes to imitating analogue synthesis. But what are their advantages and disadvantages, and how do they work? PAUL WIFFEN explains.

About 12 years ago, I was taken by a guy, with whom I was working on an Atari sampler, to the engineering lab where he moonlighted as a Cambridge research doctor in DSP for audio. There, from a computer which filled half a decent-sized room, I was played a series of brass and woodwind sounds which I assumed to be samples. They certainly had an authenticity I had previously only heard from sampling. But the more I listened, the more admiration I had for the guy who had made the multisamples. I couldn't hear the loops, nor the points up and down the range where one sample stopped and the next one started. I knew he couldn't have used positional crossfading, because that always gives a 'doubled', chorus-like effect. What's more, sometimes the effect of velocity (from the MIDI master keyboard being used to trigger the sounds) changed the sound subtly, in a way that velocity crossfades could not. I was flummoxed. "How's it being done?," I asked. "Physical modelling," came the reply. "One day all synthesis will be done like this!"

Two years later, at a US NAMM music fair, I was helping out on the stand of my room-mate in California. My main contribution had been to use a Roland MC500 to sequence the backing for his demonstrator, ex-Berlin guitarist Dave Diamond, and sync it to the PPG HDR, the world's first stand-alone hard disk recorder, so that Dave had something to record his guitar and vocals alongside. I had assumed that the HDR (\$17,000 with an 85MB

hard drive) was the most advanced piece of technology I was going to see during that show, but when the German designer, Wolfgang Palm, emerged from the internal booth, saying "Andy, I think I have it working again," we all huddled inside to hear an even bigger and more expensive box do a passable imitation of a Minimoog. Then he flipped a switch and it produced the kind of non-electric piano which only FM can be responsible for. The box was called the Realizer and when I asked how it was being done, the dour German replied "Virtual Synthesis." It took me years to equate this with what I'd heard two years before in Cambridge.

So before we go any further, let's just make this clear: Virtual Synthesis is another name for Physical Modelling. One term describes where it is done, the other how, but the procedure is the same. So don't let any boffins or, worse still, marketing men, hoodwink you — they are two terms for one technology.

But what is the technology, exactly? Again, you may well receive several different answers depending on who you ask. Here are just a few of them: "masses and masses of DSP horsepower"; "software models of the way real instruments produce their sound"; "built-in DSP FX taken to its logical conclusion"; and "the sonic equivalent of virtual reality". The trouble is that there is an element of truth in all of these; it *does* take a huge amount of Digital Signal processing to undertake realistic physical modelling; the software involved *does* attempt to recreate the way sounds are made in the real world; instead of just changing the basic sounds through effects processing, the sound *is* created from scratch by the same sort of chips which have been producing the effects in synthesizers for years; and the level of realism involved these days beats anything I have seen on a virtual reality system into a cocked hat.

SHE'S A MODEL...

Let's return to first principles and the word 'modelling', because this is the key to the technology. All the other methods of synthesis we have looked at over the last year have one thing in

Korg's Z1, like all modelling synths, requires masses of DSP horsepower.





Korg's Prophecy.

common: the parameters involved with each type of synthesis don't change depending on the type of sound you're trying to get. There's a filter attack parameter on an S&S (Sample & Synthesis) synth whether you're trying to produce a piano, strings, or a synth bass. There are harmonic levels on an additive synth whether you're making a brass sound or a harpsichord. The wave sequencing parameters on a Wavestation are always there, whether you use them or not!

The same is not true of a current multi-model synthesizer such as the Korg Prophecy/Z1 or a Yamaha VL-series synth. Look for the same parameters you used to make a flute sound when using the Bowed String model and you'll be out of luck: the parameters change depending on the model you have selected. This is why the time it takes to change patches on a modelling synth is often perceptible, because so many different parameters need to be broken down and re-configured. Quite often when you change models, you are quite literally changing synths. This can make physical modelling as a method of synthesis quite challenging to define, which is why the DSP effects analogy is quite useful. We expect the parameters to change when we switch a multi-effects unit from reverb to flanging or distortion; the multi-modelling synth is the same — only more so. Think of changing from a tenor sax to a soprano as akin to changing from a hall reverb to a room; changing to a violin is like selecting a phaser effect instead. The only real difference is one of scale: the amount of DSP power is greater in a modelling synth by at least a power of 10 or two.

However, this really doesn't help you understand how physical modelling does what it does, in the same way that most people don't have any idea how DSP is used to create effects. In fact, the principle is the same as with digital reverb. The designer attempts to work out what happens in the real world, and then uses mathematical calculations to attempt to recreate this in software. The degree of realism achieved depends on two things: how accurate is his analysis or 'model' of what happens in the real world, and how closely the DSP algorithms he then writes reproduce this analysis. If the designer has misunderstood how the sound is produced in the real world, then — however good his DSP code is — it's unlikely that he'll make a very realistic-sounding reverb or plucked string instrument (although he may create some great new effect or sound which can't be produced in the real world). On the other hand, however great his understanding of the processes involved, if he doesn't have the necessary DSP horsepower to hand he may get into the right ballpark, but he isn't going to fool anyone that this is a real hall or a real guitar. For this reason, I still haven't heard a halfway decent model of a grand piano, because it's still prohibitively expensive to provide the amount of DSP power needed to recreate what's going on inside a 9ft Bösendorfer (even *after* you've spent a lifetime analysing exactly what that is). I would hesitate to say that it will never happen, but I think we're probably still a few years away from a great physical model of an acoustic piano. (However, the rate of acceleration of technology we're currently experiencing, coupled with the falling price and increasing power of DSP chips, might make it sooner than I think!)

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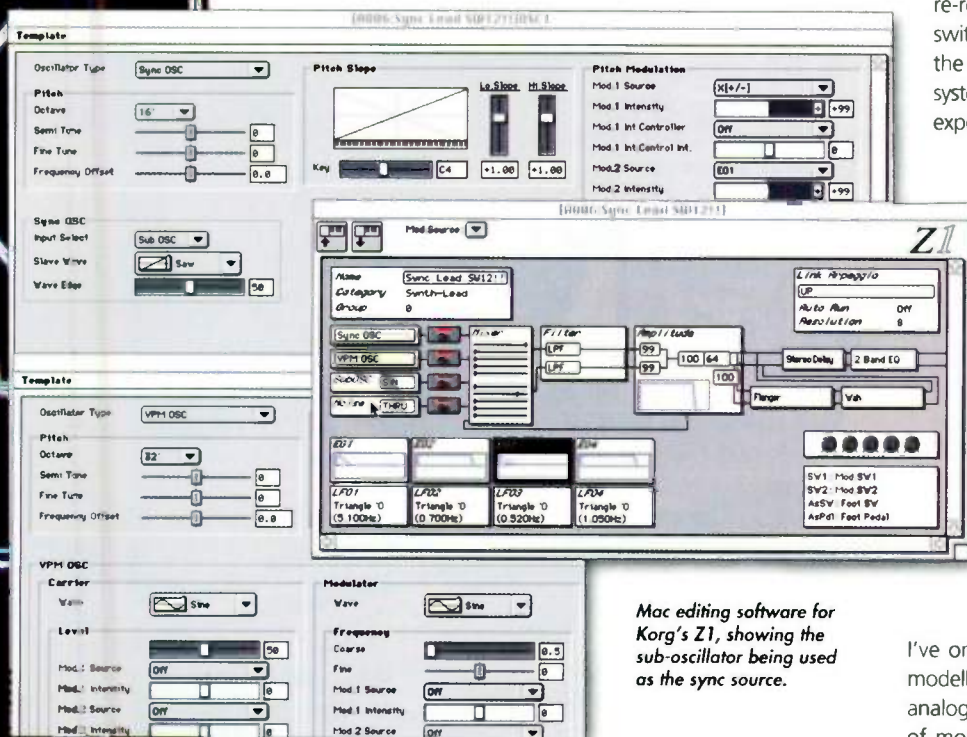
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SYNTH PROGRAMMING

► obvious example is on the Korg Z1. Instead of having one model for analogue synthesis, it actually has six different models, with different configurations.

Let's look at the Sync Osc model as a case in point. This model runs on a single oscillator (so, for example, you can have a different model on the Z1's second oscillator). Those of you who were

designer might have seen as 'mis-patching.' Of course, there were analogue synth keyboards which started to bring in these routings as standard, but they offered nothing like the complexity of reconfiguration of the standard analogue setup which is possible with Korg's MOSS physical modelling system. As the 'components' are only DSP software routines linked by more software, re-routing is not as difficult as when one had to switch control voltages coming from one part of the system to a completely different part of the system, often where the original designer had not expected them to go. Back then, a physical wire was needed to connect the source to the destination, but in the virtual world of physical modelling the designer only has to think it there, change a line of code for the address a datastream is sent to, and hey presto, it's done. Of course, you're still limited by the imagination of the designer and his fixed ideas on what you might want to do (the machines with a knob for every parameter tend to limit you in much the same way as the original synths did), but with the advent of software editors for machines like the Z1 and the AN1x, the possibilities really open up.



Mac editing software for Korg's Z1, showing the sub-oscillator being used as the sync source.

MODELLING THE FUTURE

I've only really scratched the surface of physical modelling in the imitation of analogue here: while analogue imitation may be the most widespread use of modelling at the moment, and brings certain advantages even over the original classics, it is but the visible tenth of the modelling iceberg. As time goes by and DSP chips become cheaper than the cholesterol-filled variety, we'll see physical modelling expand to take over some of the market share currently dominated by S&S machines. As I said earlier, the acoustic grand piano may be some way off, but there are already great woodwind and brass, bowed and plucked string, electric piano and organ models out there. Currently it's Yamaha and Korg who have the 'virtual' monopoly, and it is their models of these instruments which we'll be looking at next time, as well as an early 'close but no cigar' attempt by Technics, whose WSA1 synth is very close to this writer's heart. But who knows — at any moment, any of the other major manufacturers (or even a brand-new name) may burst onto the market with a revolutionary modelling system which will replace the entire orchestra.

In the meantime, see if you can get access to one of the analogue modelling instruments described here, as they are particularly rewarding for those of an experimental frame of mind. I've gone from being a sceptic to a total convert in less than 18 months (but then my favourite 'analogue' synths all had well-programmed digital oscillators anyway). The authenticity of the sound quality is, of course, purely a matter of opinion, but most people seem to find one of the current crop of analogue imitators which they can live with.

“The designer attempts to work out what happens in the real world, and then uses mathematical calculations to attempt to recreate this in software.”

paying attention to the instalment of Synth School which covered oscillator sync (SOS August '97), should be raising one eyebrow, Spock-like, by now, wondering how you can sync an oscillator if you haven't got a second oscillator to sync it to. Well, fear not. The Z1's designers have made it so that you can use the sub-oscillator as the sync source (see the accompanying screen dump from the Mac Z1 software). You then don't need to actually listen to what this oscillator is doing. In fact, the other oscillator can have a completely different model on it (in the patch shown in the screen dump, the second oscillator is set to the VPM model, Korg's equivalent to FM). The real advantage of this is that when you take the pitch of the sub-oscillator which is controlling the sync right up, the sound of the sync'ed oscillator, while very interesting, becomes very thin. Because the second oscillator is still available for playing another waveform, you can keep a solid basis to the sound, even when you making the sync'ed oscillator squeal by taking the control oscillator pitch right up.

The Z1 has different models for Cross Modulation and Ring Modulation, which (as I pointed out when we originally covered these techniques in the August 1997 issue of SOS, as above) was previously often only possible on modular synths which allowed you to patch any source to any control point — techniques developed from what the original

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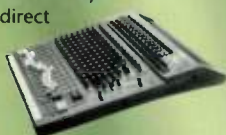
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VOICE COMMAND

FOCUSRITE PLATINUM VOICEMASTER

It's a Focusrite, Jim, but not as we know it! Is it possible to deliver Focusrite quality at such an aggressively low price? PAUL WHITE puts their latest Platinum product to the test.

Last month's issue was the first time I'd reviewed a Focusrite Platinum processor and their ToneFactory delivered far more than I expected for the price (see *SOS* June '98). If anything, the Platinum VoiceMaster goes even further. Housed in the same 1U, silver-fronted rack case as the ToneFactory, the VoiceMaster is designed primarily for processing microphone signals, although it also includes a line level input for other instruments.

This type of product is gaining popularity both as a front end for hard disk recording systems and for use in conventional studios, where bypassing the mixer during recording helps maintain a cleaner signal path. Here, the mic amp is followed first by an expander/gate, then by a very effective saturation circuit for creating valve-like sounds, then an opto-compressor, then a comprehensive EQ section fine-tuned for vocal use, and finally a sophisticated opto (photo-resistor) de-esser.

A FLEXIBLE FRIEND

To ensure that the unit is as flexible as possible for recording and mixing, rear panel connections comprise XLR mic and balanced jack line inputs, an insert point, and a further line out on a balanced XLR prior to the de-esser. As there is no high impedance instrument input on this model, guitarists will need a DI box or active pickups. The main line out is available both on a balanced XLR at +4dBu and a regular unbalanced jack at -10dBu. Having an output before the de-esser can be useful when you want to keep the main vocal sound unprocessed, but at the same time feed a de-essed version to a bright reverb.

At the input is a discrete Class A mic/line circuit with up to 60dB of mic gain and a creditably low, quoted equivalent input noise (EIN) of -128dB with a 150Ω source impedance. (Focusrite provided Audio Precision test set measurements to back up their specification claims.) Also quite staggering is the audio bandwidth, which reaches up to 200kHz (-1dB) — around 10 times higher than the limit of human hearing. Wide bandwidth is one of the factors that preserves audio transparency in high-end audio equipment. The mic amps' common mode rejection of interference from balanced sources is also particularly good.

Rather than simply provide a switchable low-cut filter, the 12dB/octave high-pass filter has a variable frequency (20Hz to 300Hz), complete with switchable phantom power, a phase switch, a line

switch and a bypass button for the high-pass filter. All individual sections of the unit have their own bypass buttons, each with an integral red status LED. A simple two LED system shows green when healthy signals are present and red when they're getting too close to clipping.

Directly after the preamp comes an expander/gate with Threshold and Depth controls. Threshold sets the level below which the signal will be subjected to gain reduction and Depth sets the severity of the gain reduction. In Expander mode, the gain reduction ratio is varied by the Depth control, whereas in Gate mode, the signal is attenuated when it falls below the threshold level, with Depth acting as an attenuation amount control. There is no release control, but, in practice, the expander is so smooth and well behaved that unless you're after a deliberately gated sound, it's probably best to stay in Expander mode. A four LED meter shows gain reduction and the Bypass button switches the Expander/Gate out when it's not needed.

After this very pure front end comes the Vocal Saturator, an FET-based soft clipping circuit that behaves not unlike an overdriven valve, though the effect is quite subtle compared with the ToneFactory unit. It can be used full bandwidth or confined to frequencies above the value set on the Tuning knob, which controls a band filter variable between 1kHz and 7.2kHz. When the Full Bandwidth button is in, the filter is switched out, allowing full-band processing to take place.

This whole section works surprisingly well. I'm generally quite sceptical about 'warmth' circuits, but with the Tuning control set to the halfway point or above, a sparing application of the Drive control brings in a very nice sounding high-end enhancement reminiscent of a stand-alone exciter type of product. Bypass takes the section completely out of circuit, so purists don't have to worry about having distortion added when they don't want it.

COMPRESS TO IMPRESS

The compressor section is based on the dual opto circuit used in Focusrite's new ToneFactory, but tweaked to make it more suitable for vocal use. Ratio is only switchable between Normal and Hard, while Attack may be switched to Normal or Fast settings. Variable controls are provided for Threshold, Release and Output level, but there's an extra knob labelled Treble. This isn't a regular tone control, but rather a type of dynamic equaliser that works by

PRICE CHANGE

Focusrite have recently adjusted their pricing of the Platinum models to £379 including VAT, making the Platinum ToneFactory slightly more expensive than the price quoted in last month's review (*SOS* June '98).



TESTING THE MASTER

To produce six different Focusrite quality functions for just £379 is quite an achievement. Of course, you're not getting the same circuitry as you find in the Focusrite Red range, or even their Green range — that would be financially impossible. But the Focusrite engineers have shown that it's possible to take carefully chosen standard components and incorporate them into well-designed circuits in such a way as to produce results that are several cuts above the ordinary.

The Platinum range is aimed at musicians. Focusrite describe the units as "results orientated", which is why the EQ controls are named after their effect rather than their place in the audio spectrum. Similarly, the artificial warmth generating circuitry would be quite out of place in a high-end professional mic preamp, but for the musician who wants more control over the results, it's a great idea.

Not only does the unit have a quiet, transparent and very classy sound (if that's what you set it to do), it also behaves very smoothly and predictably, which is worth a lot to the recording musician. For example, the expander is about as smooth as I've ever heard — you just set the threshold, then increase the depth until the low-level signal has been attenuated to an acceptable degree. Similarly, the de-esser manages to make a significant improvement to vocals afflicted with over-pronounced 'S' and 'T' sounds. If you push it hard, you can just about hear it working, but you really have to work hard to spoil a sound with the VoiceMaster unit. I also found the de-esser good for removing sibilants over-emphasised by the various enhancement and EQ options provided by the unit. Switching in either the saturator or de-esser with their controls set for minimum effect causes a very slight level rise, which sometimes makes it difficult to judge exactly what effect you're getting, as louder signals always sound more impressive. It pays to be aware of this.

Like the compressor in the ToneFactory I reviewed last month, this one is flexible enough for most jobs yet very easy to use. Both the mic amp and compressor have an open, transparent sound, though the compressor starts to become more obvious if much more than 10dB to 12dB of gain reduction is applied. The equaliser is quite ingenious in that it gives you control over the key areas of the human voice without you having to know much about EQ. I was particularly impressed with the Warmth and Breath controls. Where corners have been cut, it's been at the expense of in-depth parameter twiddling or metering rather than sound quality. The VoiceMaster provides the tools to create a pure vocal or a creatively enhanced one. I think the only problem Focusrite are going to have is making enough of the things!

SOS

EQing the difference signal produced by subtracting the compressed and uncompressed sounds, then adding this EQed sound back into the compressed signal. The more gain reduction is applied, the larger the contribution of the EQed component. Treble may be used to counteract the slight dulling that can occur when signals are heavily compressed and the result is not unlike a dynamic EQ type of enhancer — subjectively quite different from the harmonic enhancement created by the Vocal Saturator. A six LED meter shows the amount of gain reduction being applied during compression, and of course there's a Bypass button.

Following on from the compressor is a smooth sounding 3-band EQ with slopes optimised for vocals. Instead of calling the controls bass, middle and treble, they're named so as to provide some indication of how they might sound on vocals. Warmth controls the low end of the voice and has a separate tuning control covering 120Hz to 600Hz with a moderate +8/-12dB gain range. Both Warmth and Presence have bandpass or bell responses. Presence looks after the 1.5kHz range, while Breath controls the 10kHz-plus region of the spectrum using a shelving response. No section offers more than 8dB of gain as the EQ is designed for fine tweaking and polishing, not for total reshaping, but even so it seems to have plenty of range. To prove the designers have a sense of humour, there's a further button named Absence below the Presence control. The idea is to place a 4kHz notch in the spectrum to help smooth out those singers who have problems with vocal roughness (apparently this setting is optimised for female singers!).

The final process in the chain is a de-esser, again arranged around an opto gain cell and with a red warning LED to show when it's applying gain reduction. Unlike simple de-essers based on compressor circuitry that duck the whole signal level when sibilant sounds trigger the process, there's a Cut Frequency control that can be varied between 2.2kHz and 9.2kHz. When a signal exceeds the threshold set by the user, only the band of frequencies around the value set on the Cut Frequency control is attenuated. As I understand it, the circuit detects the sibilant sound, then adds it back to the original sound out-of-phase, causing it to cancel out. Treating only the sibilant part of the audio spectrum effectively avoids the sound becoming dull during de-essing, and also stops the unnatural lisping effect that full-band de-essers tend to cause. The de-esser can be bypassed when not required, which leaves only the Master Fader output level control and its associated six LED level meter. Strangely, the mains power switch is not illuminated, so if all the sections are bypassed and no signal is present, nothing will be lit up.

pros & cons

FOCUSRITE PLATINUM VOICEMASTER £379

pros

- Very good mic amp, plus five vocal processing sections in one affordable box.
- Genuinely useful tonal enhancement options.
- Easy to use without sacrificing too much flexibility.
- Exceptionally clean signal path.

cons

- Mains switch not illuminated.
- Some meter functions rather basic.

summary

Not only can you get clean signals directly into your recorder using the VoiceMaster, you also have plenty of creative control over vocal sounds or other line input sources. This must surely become the project studio industry standard.

SOUND ON SOUND

“Not only does the unit have a quiet, transparent and very classy sound, it also behaves very smoothly and predictably, which is worth a lot to the recording musician.”

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Besides reducing the physical dimensions of the stamped pits, several other techniques are employed to help increase the data capacity of the high-density layer. For example, by reducing globally the acceptable error margins in the production of the high-density substrate (compared with a conventional CD), substantial gains can be

made in data capacity — and most modern production plants are perfectly able to meet the tightened tolerances required, as are the majority of current disc-replay mechanisms. Further gains come through improved error-correction strategies which have been developed to take advantage of the increased processing power available in today's generation of decoder chips (as compared with what was available at the original launch of the CD format in the early '80s).

The last degree of increased capacity comes from the fact that data is allowed to start at a slightly smaller radius from the centre of the disc than a conventional CD (24mm instead of 25 mm). The table in Figure 3 shows the specifications of the two types of disc side by side for comparison purposes, and the chart in Figure 4 shows exactly where SACD's seven-fold gain in storage capacity over standard CDs comes from.

ENTER DSD

Sony and Philips' proposal for the high-resolution element of the Super Audio CD involves Sony's own Direct Stream Digital audio format (see 'Direct

“The idea behind the Super Audio Compact Disc has been to combine technology already developed for the DVD format with that of conventional CDs.”

MORE ON DSD

The Sony/Philips proposed hybrid disc format does not store high-resolution audio data in the conventional multi-bit Pulse Code Modulation form (PCM) used in current digital recording systems. Instead it uses a process known as Direct Stream Digital (DSD), upon which Sony have been working for some time, as a new recording, mastering and archiving format.

DSD is claimed to provide an audio bandwidth between DC and 100kHz and a realisable dynamic range well in excess of 120dB (the signal-to-noise ratio is specified as better than -120dBFS at 20kHz and the equivalent audio resolution better than 24 bits). Sony and Philips have been fine-tuning the system over recent months through extensive listening and comparative sessions held around the world, with numerous artists, producers, recording and mastering engineers, and even audiophile consumers, taking part.

Fundamentally, DSD, (which is still, strictly speaking, a PCM signal, albeit a 1-bit one) is actually created by the front end of a normal delta-sigma analogue-to-digital converter. In a conventional delta-sigma A-D, the analogue audio signal is sampled at a very high rate, but with extremely low resolution (typically only 1 bit). A feedback loop passes the inherently large quantisation error from this process back to the input, to be taken into account in the following sample — a process which can be likened to the idea of adding in the 'remainder' at each stage of a long-division calculation.

In front of the delta-sigma converter is an analogue anti-alias filter, but it can be very simple, as it only has to remove audio below half the sampling rate of typically several MHz. Such high and gentle filtering has no noticeable effect on audio quality, and all the clever stuff necessary to produce a conventional multi-bit PCM signal is performed by a digital filter called a 'decimator'.

The decimator converts the original high-speed data stream to the required sampling rate of 44.1kHz, say, at the same time as introducing the necessary 'brick-wall' anti-alias filter at half the required sampling rate (22.05kHz in this example). As part of the same process, the data resolution is translated from 1-bit to

the required number — say 16, or 20 bits — to form a conventional multi-bit PCM signal.

The reverse of this process is used in oversampling D-As. A digital filter 'oversamples' the multi-bit PCM data to produce a very fast data stream, which is then 'noise shaped', allowing a significant reduction in the bit-resolution, while maintaining the signal-to-noise ratio. The end result is an incredibly fast 1-bit data stream (Philips called it 'Bitstream', for example) which is simple to convert back to an analogue signal and requires only very simple analogue reconstruction filtering.

The key advantage of these related approaches to A-D and D-A conversion is the removal of elaborate, costly, and sonically flawed analogue circuitry performing anti-alias and reconstruction filtering to the digital domain (where they become cheaper and more accurate). Another significant benefit is the removal of all the inaccuracies between the hundreds of thousands of quantising levels in high-resolution multi-bit converters.

Over the last decade or more, this kind of technology in analogue-digital and digital-analogue conversion has improved the sonic quality of digital equipment considerably, but Philips and Sony are now arguing that further improvements are fundamentally limited by the inherent requirement for the declamation and oversampling filtering stages to produce multi-bit PCM signals for storage and processing. The basic problem here is that any form of digital filtering produces very large numbers — a 20-bit input to a typical declimating filter could easily produce a 45-bit output. Where multiple filters have to be cascaded to perform the necessary sample-rate reduction, re-quantising stages between filters (truncating the 45-bit output to a 20-bit input for the following stage) produces quantising noise and distortions which can become audible.

The idea of Direct Stream Digital is to record the 1-bit data stream generated by the delta-sigma converter directly, thereby avoiding all decimation and oversampling stages completely and, according to Sony and Philips, reaping the sonic benefits accordingly. There are other advantages implicit in this

approach too. For example, a 1-bit signal path is obviously a lot simpler and more cost-effective to design and implement than conventional multi-bit ones, and since processing delays in digital equipment are related to the sampling rate, the 1-bit system will suffer much less delay, as the sample rate is measured in MHz instead of kHz.

Less obvious advantages are that error protection can be simplified with a 1-bit system, as all bits have the same significance, and there is no need for a framing system to divide a serial data stream into multi-bit samples. Best of all, as the 1-bit signal is sampled at such a high rate, it is more nearly continuous than a conventional multi-bit PCM signal — it is more similar to a wide-bandwidth analogue system — and this allows equalisers and dynamics processors to simulate their analogue counterparts more accurately.

One problem with current digital equalisation systems, for example, is the inherent distortion of the shape of a filter's amplitude response when, say, a bell-shaped filter is tuned to a high centre frequency. The absolute audio band limit of half the sampling frequency means that nominally symmetrical curves will be far from symmetrical in the digital domain, as the upper side will have to be squashed into the available space between the centre frequency of the filter and half the sampling rate! The advantage of DSD in this regard is that the sampling rate is so high that any nominally in-band audio filtering will always remain completely symmetrical — and should therefore sound much more like the 'analogue' filter it is trying to replicate.

Current DSD systems sample audio at 2.8224 MHz (that is, 64 x 44.1kHz) and the resulting 1-bit data stream is obviously pretty big. However, it is actually 'only' four times bigger than that of a conventional 16-bit/44.1kHz PCM signal, and so is well within the capabilities of many current tape and disk recording systems — Sony are using PCM800 (DTRS format) machines with a custom interface for experimental DSD work in the UK, and in America commercial stereo DSD recordings are being made on hard disk-based recorders (Sonic Solutions manufacture a compatible system, for example).

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“There's growing evidence to suggest that the audio spectrum above 20kHz plays a far greater role in perceived quality than was first thought.”

than the capabilities of even the very best analogue recording console. From the engineering point of view, DSD also offers simplified A-D and D-A conversion processes, improved accuracy of equalisation and dynamics processing, and greatly reduced digital processing delays.

The sampling rate employed in current DSD prototypes is 2.8224 MHz (64 times higher than normal CDs) — a figure chosen partly to allow

relatively simple sample-rate conversion from DSD recordings to conventional multi-bit PCM (Pulse Code Modulation digital recording). The DSD rate can be synchronously converted to any of the current industry-standard sampling rates — 32, 44.1, or 48kHz — in a process performed by Sony's Super Bit Mapping system (see 'Super Bit Mapping Direct' box).

Sony have advocated using DSD for master recordings and archiving for some time, with their arguments centring on the system's ability to capture and preserve the ultra-sonic elements of music. Although it's not directly audible, there's growing evidence to suggest that the audio spectrum above 20kHz plays a far greater role in perceived quality than was first thought, and it has also been linked with improving imaging accuracy and the overall naturalness of recordings. The DSD system also provides benefits in the form of increased dynamic range equivalent to, or greater than, that of a 20-bit system, with all the advantages of low-level linearity that such resolution entails.

DIRECT STREAM TRANSFER

A further level of technology is applied to the data stored in the high-density layer of the Hybrid Disc — a 'lossless' data-reduction strategy. Current data-reduction systems, like Sony's ATRAC, the various

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MPEG systems, and Dolby's AC3 are all 'lossy', which means that they remove some data for ever. These systems all use psychoacoustic principles to decide which data may be permanently removed, on the basis that they are judged to represent 'inaudible' elements of the sound — always a controversial subject!

Developed by Philips, and originally intended for computer data applications, Direct Stream Transfer (DST) provides a 2:1 reduction in the audio data in a totally lossless way — on replay, the original data can be reconstructed in full, with no errors or omissions. In its application in the SACD, the DST system has been optimised for use with audio signals, which typically have a far greater level of repetition and predictability in them than would computer data.

The use of Direct Stream Transfer is important to the hybrid disc proposal, as it allows sufficient capacity within the high-density layer to store not one but two complete 74-minute versions of audio material. The intention is to combine a stereo DSD track and a 6-channel surround DSD track — plus various data, text, graphics, and even video signals, all on the single high-density layer!

COPYRIGHT PROTECTION

Copyright piracy and illegal duplication is seen as a major problem by the record companies, and any

new music carrier would have to have extensive copyright protection measures for it to be accepted by the record industry. From their point of view, the ideal system would involve some kind of non-removable watermarking system providing copyright data encrypted within the disc, which would be interrogated by every replay machine. Only suitably coded discs would be accepted and played. This kind of system could also allow some level of regionalisation if required — for example, discs could be country-coded such that they would only play on machines with the matching country code — an idea already applied to DVD video discs.

Embedding various forms of 'pilot tones' or 'pseudo-random' copyright data within the audio signal itself has often been tried in the past, but most systems have fallen at the first post, either because 'golden-eared' listeners have been able to detect their presence, or it has been too easy to strip the copyright data out. So the important question is "How can copyright data be embedded in the format in such a way that it does not interfere with the high-resolution audio, yet remains virtually impossible to strip out or duplicate?"

Sony and Philips' very clever solution to the problem is actually a form of 'Digital Watermarking' which stores the required copyright data as a modulation of the width of the injection moulded

EXPLAINING DIGITAL

For the past two issues, *SOS* has been running a series explaining digital recording. If you haven't yet seen part two of this series, which was run in the June issue, we recommend you try to read it, as it explains many of the technical terms and concepts you'll come across in the course of this article. Back issues can be ordered from our mail order department at a cost of £5.50 (to within the UK), £6.50 (to Europe) or £7.50 each, including postage and packing.

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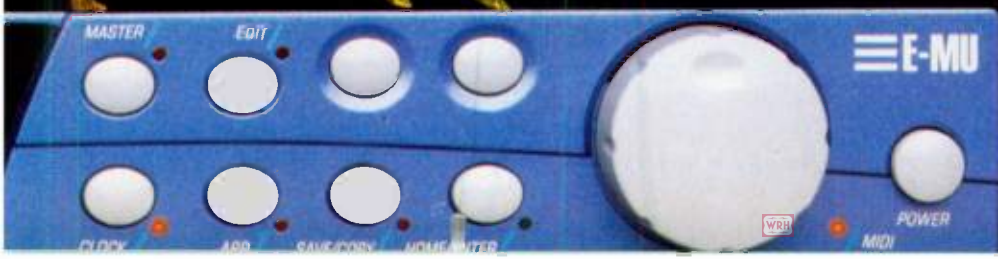
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SUPER AUDIO CD

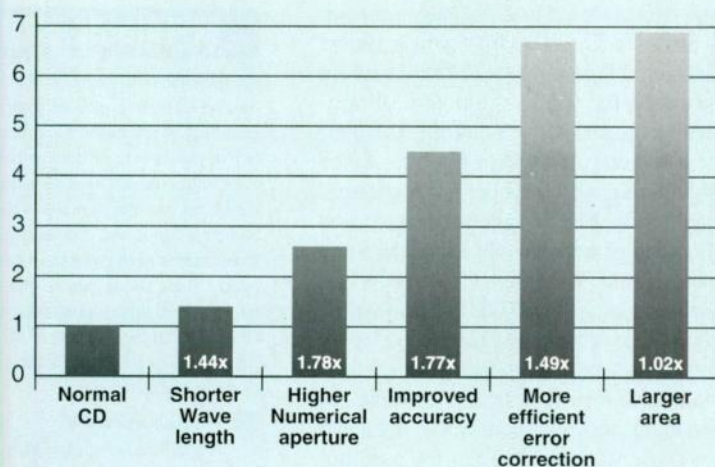


Figure 3: A side-by-side comparison of conventional CD and SACD specifications.

► 'pits' on the disc substrate itself. As such, it is virtually impossible to replicate the copyright data without the specially designed (and carefully licensed) glass-mastering equipment used to make the original disc stampers.

Another clever feature of the system is that the modulation of the pit widths can be synchronised on consecutive turns of the disc so that faint visible patterns can be formed on the disc itself, perhaps displaying recognisable words or graphics — true watermarking in the conventional sense!

The newly developed technology to encode this copyright protection data has been called Pit Signal Processing (PSP), and it works by modulating the power of the laser used to record data onto the glass master at the pressing plant. If laser power is increased, the size of the focused beam increases, and so too does the width of the resulting mark. However, if that was all the process involved the length of the mark would also be affected, and since its length is critical to the meaning of the encoded audio data, some further cleverness is required!

When the PSP equipment is installed in a pressing plant, a temporary feedback loop is introduced between the PSP unit and the quality-checking system inspecting finished discs. This feedback loop effectively 'teaches' the PSP unit how to optimise its laser modulation parameters to take into account the vagaries of the specific injection-moulding process used at the plant. The result of the teaching phase is that the lengths of marks cut into the substrate are controlled extremely accurately, ensuring that the required width modulation to encode the copyright information does not introduce unwanted length variations.

There's a very welcome spin-off from this increased precision in the lengths of the marks. The 'Eight-to-Fourteen' modulation (EFM) used to encode audio data onto a CD master allows the pits (and the spaces in between) to vary in length in integer values between 3 and 11 units. However, slight errors in length, while not sufficient to represent a different integer value (and therefore misrepresent the data representing the size of an

audio sample), cause jitter — variations in the data timing. The normal tolerances of glass mastering and injection moulding can easily create such variations in data timing, which can potentially cause blurring of the stereo image and an increase in high-frequency noise. Indeed, this is believed to be one of the reasons why different batches of the same CD can appear to sound different, or why the same CD can sound different when replayed in CD machines from different manufacturers (which may be more or less susceptible to disc jitter). The very tight control on pit length exercised by the PSP system actually reduces pressing-induced jitter by at least a factor of two, and potentially much more. So the introduction of the PSP system could mean

“I was unable to spot any reliable differences between DSD and 24-bit/96kHz, both of which gave pin-point imaging and had very natural, believable acoustics.”

that discs manufactured by different presses will become much more consistent, and the aspects of audio quality affected by the injection moulding process could be improved considerably.

As well as providing a visible 'watermark' on the playing surface of the disc itself, the width modulation of pits can be used to store all manner of irremovable identification codes for the country of origin, mastering house and pressing plant identification codes, glass master matrix number, disc ISRC catalogue numbers, and so forth.

Working prototype players fitted with copyright-protection systems have already been demonstrated with a selection of suitably encoded experimental discs. If a correctly encoded disc is inserted, the player behaves perfectly normally, but when a non-encoded disc is inserted, the machine plays the disc for a few seconds while looking for the copyright data. When none are found, replay is stopped and the disc automatically ejected.

The Sony and Philips' proposal is that only the high-density layer of the hybrid disc should be encoded with copyright protection data of this form (essentially so that the legal replay of older Red Book discs is not affected), and that all hybrid players be equipped with suitable PSP detection circuitry by law.

SUPER BIT MAPPING DIRECT

If original recordings are made with the DSD format, there will obviously be a need to convert the high-resolution DSD data stream to a conventional PCM signal — not least to encode the conventional CD layer of the hybrid disc with Red Book-compatible material. The ideal is to encode as much of the original high-resolution audio data as possible into the PCM signal, despite its limitation of 16 bits, and this is performed through an enhanced version of Sony's Super Bit Mapping (SBM) noise-shaping system. The new version is called 'Super Bit Mapping Direct', and a prototype version designed to accept a DSD input signal has already been used on several commercial CD releases of DSD-recorded material.

SBM Direct is claimed to encode a 16-bit PCM signal with a resolution approaching 20 bits through its sophisticated noise-shaping process, which is performed by an integrated digital (decimation) filter and noise-shaper operating as a very complex single-stage process. An idea of the sophistication might be gleaned from the fact that the FIR digital filter topology used in SBM Direct has an unprecedented 32,629 stages — whereas the first 4x oversampling reconstruction filters used in early CD players had only 512 or 1024 stages!

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SUPER AUDIO CD

WHERE NEXT?

Every aspect of the Sony and Philips hybrid disc proposal is currently realisable. Most of the elements have already reached production maturity, and the remaining ones are in advanced prototype form. With suitable support, it would appear that the hybrid disc could hit the shops in a very short time indeed... so what's stopping this from happening?

Both the consumer and the retailer would surely support the hybrid disc almost by default from the point of view of compatibility with current Red Book players and the advantages of a single inventory. Indeed, hybrid discs could probably be introduced to the market with few consumers even noticing any difference! The digital watermarking and sophisticated copyright protection strategies would surely be enthusiastically supported by the record companies and licensed pressing plants, and doubtless the reduction in mould-induced jitter would be a marketing advantage as far as the golden-eared hi-fi fraternity are concerned.

The only potential stumbling block I can see in the hybrid SACD proposal is the implicit adoption of Sony's Direct Stream Digital data encoding. Since its launch (an AES paper was presented on the basics of the system in 1991), DSD has

maintained a relatively low profile, yet during the time of its development the whole professional and consumer audio industry has been persuaded of the advantages of 24-bit/96kHz PCM systems. Indeed, there are already a large number of A-Ds, D-As, DASH recorders, signal processors, and mixing consoles which can accommodate 24-bit PCM signals at 44.1 and 48kHz sampling rates. There are even a quite a few digital tape and disk recorders available now, as well as one or two converters, which offer 96kHz sampling (or even 192kHz in some cases).

However, DSD actually has a larger data rate than 24-bit/96kHz (2.8224Mbits/s as opposed to 2.304Mbits/s) and therefore potentially greater fidelity. DSD also has some claimed significant advantages, such as avoiding the need for the decimation and oversampling filters required in any conventional PCM format. There's still some experimental and development work to be done in signal processing 1-bit data streams, to allow, say, the design and construction of a suitable digital mixer, but pioneering work is currently being carried out to solve these problems (not least by the Advanced Technologies Division of Sony Broadcast & Professional). All the indications are that by taking a radical approach to the problem, everything we have come to expect of an analogue or multi-bit digital mixer is perfectly achievable with DSD audio data — and potentially with greater accuracy than either of the existing technologies (see 'DSD' box).

Perhaps the industry will be swayed when professional DSD equipment becomes available, but there is already a lot of enthusiasm for the system from the growing number of studios and engineers who have experience of the prototype systems currently 'doing the rounds' in the UK and Europe.

LISTENING

The first commercial CD release of DSD-recorded (and SBM Direct-converted) material was an album featuring the guitar and flute of Joe Beck and Ali Ryerson, called *Alto* (dmp CD-521). At the Super Audio CD presentation at last year's AES convention in New York, an invited audience auditioned the original DSD recordings of tracks from this album, and compared them with 24-bit/96kHz, 16-bit/44.1kHz, and the SBM-Direct 16-bit/44.1kHz versions.

Under the inherent limitations of time and familiarity, I was unable to spot any reliable differences between DSD and 24-bit/96kHz, both of which gave pin-point imaging and had very natural, believable acoustics. However, the comparison between DSD and the simple reduction to 16-bit/44.1kHz revealed very obvious differences, particularly in a huge loss of air and space within the acoustic environment, and an 'aggressive' character to the overall sound quality.

The SBM-Direct version also suffered much of the absence of space and air in the recorded acoustic environment, but probably not to quite

“Copyright piracy and illegal duplication is seen as a major problem by the record companies, and any new music carrier would have to have extensive copyright protection measures for it to be accepted by the record industry.”

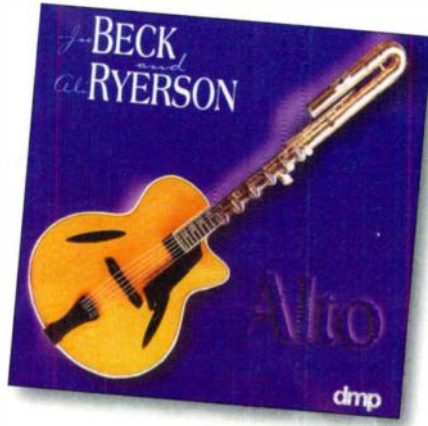
Figure 4: Super Audio Compact Disc has a storage capacity seven times that of a normal CD. The chart shows how this increase in capacity has been achieved.

	Conventional Compact Disc	Super Audio Compact Disc
Diameter	4 3/4" (120 mm)	4 3/4" (120 mm)
Thickness	1/20" (1.2mm)	1/20" (1.2mm)
Signal Sides	One	One
Signal Layers	One	Two: CD-density reflective layer and high-density semi-transmissive layer
Data Capacity		
Reflective Layer	780Mb	780Mb
Semi-Transmissive Layer	--	4,700Mb (4.7Gb)
Audio Coding:		
Standard Audio	16-bit PCM, 44.1kHz sampling	16-bit PCM, 44.1kHz sampling
Super Audio	--	1-bit Direct Stream Digital, 2.8224MHz sampling
Multichannel	--	6 channels of Direct Stream Digital
Frequency Response	5-20,000Hz	DC-1000,000Hz (DSD)
Dynamic Range	96dB across the audio bandwidth	12dB across the audio bandwidth (DSD)
Playback Time	74 minutes	74 minutes
Enhanced Capabilities	CD Text	Text, Graphics, Video

the same degree, and there was none of the hardness associated with the simple PCM reduction. These subjective observations are entirely in keeping with what could theoretically be expected of the demonstration, and I was left with the impression that DSD is at least as good as 24-bit/96kHz, and probably better. Indeed, many of the professional engineers I've talked with who have been able to compare live sound through a desk with DSD and 24/96 recordings suggest DSD is slightly better. The fact that the SBM-Direct system appears to do such a good job of getting much of the apparently enhanced resolution of the original DSD recording onto a conventional CD format is also noteworthy.

In the past I've gone on record as being highly sceptical of the high-sampling rate lobby, simply because the few examples of 96kHz equipment I had auditioned failed to convince me of any significant aural benefits. However, after a number of recent demonstrations involving purpose-designed, state-of-the-art equipment, I'm now happy to change my mind and admit that there is life above 20kHz! Moreover, it really does seem to make a difference to the music and the illusion of reality if that difference can be captured properly.

Although both 24-bit/96kHz and DSD appear to be able to achieve an extra degree of realism in music recordings, and therefore advance the cause



of high-resolution audio recording, only time will tell which format will be adopted by the industry as the standard for the new millennium. My opinion is swaying in favour of the DSD approach, mainly because of its simpler engineering principles and the fact that it is offering new opportunities beyond the confines of the traditional PCM world we have become so used to.

If DSD can win the high-resolution argument, the Super Audio CD has a very rosy future ahead of it, and I think we'll all benefit from that situation. On the other hand, if DSD is not adopted by the professional audio industry, and the audio-only DVD becomes a success, double inventories and incompatible disks will be the unattractive future of consumer music formats!

505

Peak 2.0 The Innovation Continues

Following the success of Peak, their acclaimed audio editing software, BIAS have announced Peak 2.0, a major new version that expands the comprehensive set of audio editing tools and adds some exciting new possibilities to the software that will reinforce Peak's position as the standard for audio editing on the Macintosh.

High end features include:

Real-time Adobe Premiere plug-in access that allows effects to be changed and auditioned while Peak plays. Peak 2.0 also includes access to TDM and AudicSuite plug-ins. DAE support has been provided for direct support for third-party audio cards from Digidesign. SMPTE time code synchronisation is perfect for multimedia and audio-for-picture production and Peak's new QuickTime support allows digitised movies to be imported and synchronised to the audio with better-than-frame accuracy.

Peak has the ability to record, edit and process in 8-, 16-, 24-, and 32-bit resolutions. The new Playlist feature offers an easy way to arrange audio sequences, apply real-time effects and burn the audio sequence directly to a CD-R recorder. This enables Peak 2.0 to take a project from initial recording, editing, processing to final CD production.

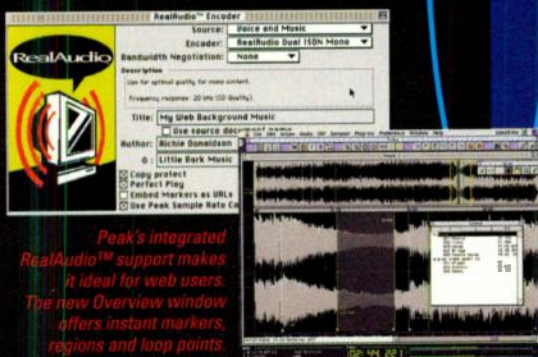
An improved user interface in Peak 2.0 includes a new customisable tool bar and floating palettes that gives instant access to the editing tools.



peak

Peak 2.0 Highlights

- Playlist with CD burning
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- Real Time Adobe Premiere Plug-ins
- Ultra fast audio editing
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- Flexible batch File Processor
- Peak integrates with Digidesign, Macromedia, MOTU, Steinberg, Emagic, Opcode and more.
- Support for almost all major samplers



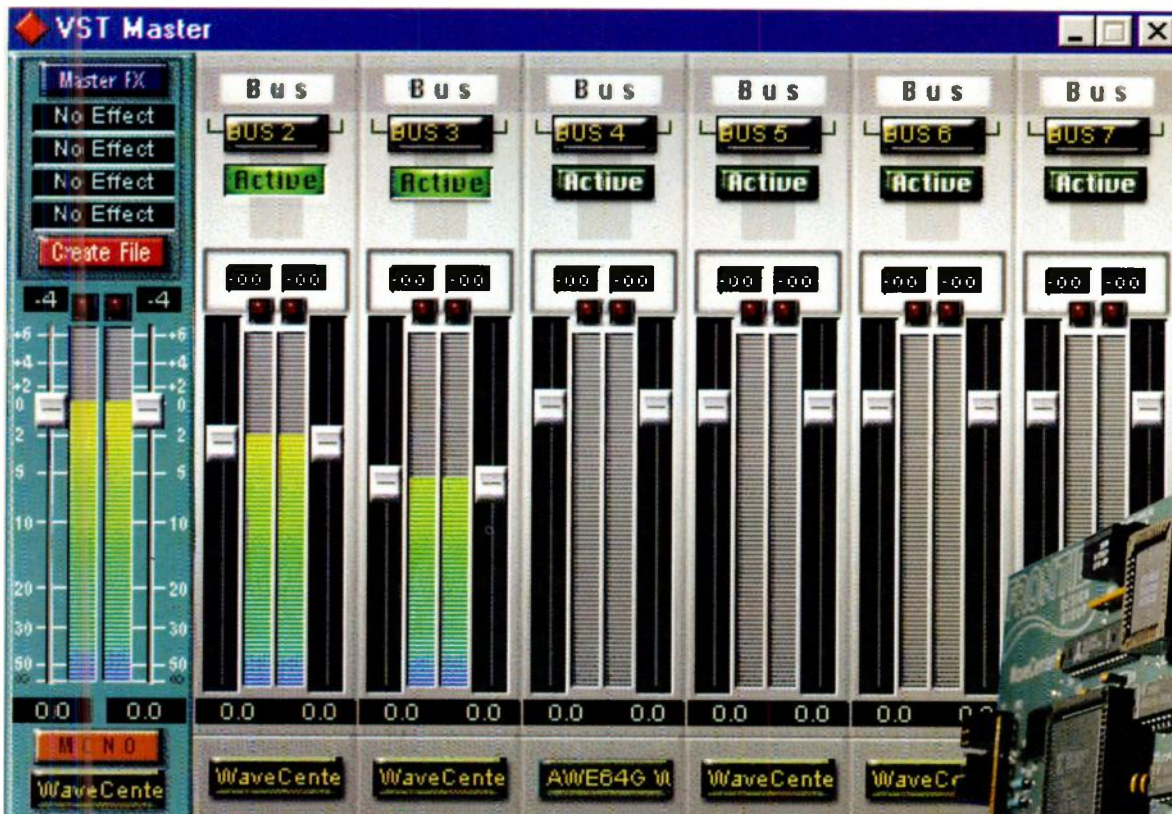
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There's plenty of choice when it comes to audio cards for Windows 95/NT PCs – JANET HARNIMAN COOK finds out what sets the new WaveCenter from Frontier Design Group apart from the pack.

The WaveCenter, from US developers Frontier Design Group, is a multichannel audio card that offers up to 10 channels of simultaneous studio quality audio playback, eight channels of recording, and a choice of digital interface options. You can connect directly to ADATs, digital mixers, hardware effects processors, digital audio workstations (DAWs), digital video recorders, CD players, CD recorders and synthesizers. Thanks to the card's support for three digital I/O formats – Alesis optical, S/PDIF optical and S/PDIF electrical – ADAT users can transfer all eight tracks to the PC at a single pass, and the WaveCenter can also be used for format conversion between S/PDIF optical and RCA phono, and between Alesis ADAT Lightpipe and S/PDIF. The versatility of the card is further enhanced by the inclusion of a very capable 1-in/3-out MIDI interface, and if 10 audio channels aren't enough for you, two WaveCenter cards can be run in tandem on the same PC to give you a

staggering 20 digital audio output channels.

To interface with the world of analogue audio, however, you will need some additional hardware, as the WaveCenter has only digital connections. Fortunately, Frontier Design Group offer two external converter boxes that add multichannel analogue inputs and outputs. The Zulu is a 4-in/8-out device, and the pro-orientated Tango offers eight analogue outputs, word clock synchronisation, and up to eight audio inputs. The possibility of the hostile PC electrical environment introducing noise into the analogue signal chain is eliminated, because audio data is transferred optically to the Zulu or Tango in either 8-channel Alesis ADAT Lightpipe or stereo S/PDIF format. Furthermore, as the Zulu or Tango can be positioned up to 10 metres away, the analogue electronics can be kept at a safe physical distance from the PC (see box for further details on the Zulu and Tango interfaces).

COMPATIBILITY

The WaveCenter can be used on PC computers running either Windows 95 or Windows NT; drivers for both systems can be found on the WaveCenter installation disk. The Windows 95 WaveCenter

drivers are MME-compatible, so the card can be used with standard Windows stereo audio editing and recording software such as Steinberg *WaveLab*, Sonic Foundry *Sound Forge* and, significantly, with any applications that support multichannel audio cards. At the time of writing these include Steinberg *Cubase VST*, Cakewalk Music Systems *Cakewalk Pro Audio 6*, Emagic *Logic Audio*, IQS *SAW Plus* and *SAW Plus 32*, and Syntrillium *Cool Edit Pro*. The availability of multiple simultaneous audio inputs and outputs presents exciting possibilities to the computer musician – it makes it possible to feed audio in real time to outboard analogue devices such as mixers and effects processors, and record the processed signal to disk. You could also use different WaveCenter channels independently to monitor audio from several audio applications, for example when using a MIDI+audio sequencer, a multitrack audio recorder and a specialist wave editor at the same time.

THE WAVECENTER PACKAGE

Besides the card itself, the WaveCenter package includes a floppy disk for the Windows 95 and Windows NT drivers, a printed 72-page User's Guide, a MIDI breakout adapter, and a cable to connect the WaveCenter card to the digital output of a CD-ROM drive. As a 16-bit ISA card, the WaveCenter goes against the current trend in multichannel audio card design that favours the faster, cross-platform PCI bus. This seems to make little difference in practice, however, as the WaveCenter performs extremely well. The short length of the card means that lack of space should not be a problem with non-ATX PC systems.

The back plate of the WaveCenter contains two TDIF optical connectors that can function either in Alesis Lightpipe or S/PDIF mode, two RCA phono S/PDIF connectors, and a 9-pin D-connector for the MIDI interface. One slightly surprising omission is the lack of any form of analogue output monitoring. The slim printed manual contains clear step-by-step instructions to guide you through the installation and operation of the WaveCenter, and also contains useful information for the newcomer to digital audio.

SOFTWARE FIRST

Soundcards can be incredibly tricky to install, and with the WaveCenter it is important to install the software before the hardware. This allows Windows to (hopefully!) detect system resources that are available for use by the card. In general this works well, and installing WaveCenter on a larger, more populated PC should be a relatively simple matter as the card is relatively undemanding of precious Windows system resources; it requires only a single IRQ and a 16kB block address in the PC's upper memory area for all of its multiple channel audio and MIDI

PC REQUIREMENTS

The performance of the WaveCenter audio card is, inevitably, directly dependent on the power of the PC in which it is used. Frontier Design Group recommend a minimum 486 processor, but more satisfactory results will be obtained using an Intel Pentium 166 MMX or better. This review was conducted on a machine with the following spec:

- Intel Pentium 233MMX with SuperMicro ATX motherboard.
- 512k pipeline burst cache.
- 64Mb RAM.
- 4Mb Virge DX PCI graphics card (running at 1080x868 resolution and 64k colours).
- 17" monitor.
- Digidesign SampleCell 2.
- Adaptec 2940 PCI SCSI card.

port activities. Sometimes, however, it may be necessary to first remove all the other devices that compete for the limited PC system resources – devices such as other soundcards, MIDI interfaces, video grabbers, samplers and SCSI cards – and install WaveCenter on the resulting 'vanilla' PC configuration.

For this review, I first installed WaveCenter on the PC in my music studio, and then on my more humble office machine. Inevitably, Sod's Law prevailed, and whereas installation on the office PC was no problem, I only managed to install the WaveCenter on the studio machine after a good deal of confusion – and after resorting to the 'vanilla' route. The problem in this instance proved to be my Adaptec 2940 PCI SCSI card, which I suspect of not telling the whole truth in the Windows 95 Device Manager about the system resources it commandeers!

Incidentally, you should take care when handling PC cards to avoid any damage that may be caused by static electricity from your hands or clothing. The safest way to pick up cards is by the edges or back plate, and at all costs avoid touching the components on the circuit board lest you corrupt the data programmed into the chips. If possible wear an anti-static strap, which are available from most electronic component suppliers for about £10.

WAVETRAY APPLLET

When the WaveCenter installation is completed the *WaveTray* applet should be visible next to the clock in the Windows 95 Taskbar. *WaveTray* gives an at-a-glance overview of the readiness of the WaveCenter, including synchronisation, S/PDIF receive error indicators, and channel status. Clicking on the applet displays a list of WaveCenter configuration options that allows you to define the input and output modes. I found *WaveTray* useful and informative, but felt that it would be improved if it included meters for signal level monitoring. I found only one bug, which is that occasionally I could only initiate playback if I first closed the applet.

ROKIT Science



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TANGO AND ZULU EXTERNAL CONVERTERS

The pro-orientated Tango is a full-width 1U modular multichannel external digital audio converter for the WaveCenter, featuring balanced analogue I/O, word clock I/O, and ADAT optical in/out/through. (The ADAT through port means that you can archive data to ADAT without repatching.) The basic model is an 8-channel output-only device that can be upgraded to also provide either four or eight analogue inputs. These optional inputs feature 20-bit 128x oversampling converters that give a signal-to-noise ratio of greater than 98dB, with 0.002% THD+N. The front panel sports LED level meters, switches for sample rate (44.1kHz or 48kHz), synchronisation type (word clock or optical), and level metering source (input or output). The rear panel carries balanced analogue input and output connectors on quarter-inch metal jack sockets, along with the ADAT and BNC word clock connectors, and an input

socket for the external power supply. The analogue audio inputs and outputs can be switched between +4dBu and -10dBV.

The Zulu, Tango's little brother, is a self-contained 4-in/8-out external digital audio converter housed in a 1U half-width steel enclosure. The front panel has LED indicators for power, optical status, and analogue input levels, while the rear panel carries -10dBV unbalanced plastic quarter-inch jack sockets for analogue I/O, the ADAT optical connectors, and an external power supply input. The Zulu boasts the same DAC specification as the Tango, and its sound quality is excellent.

Although they were developed for the WaveCenter card, the Zulu and Tango can also act as stand-alone converters for any devices that support the ADAT optical format.

when running multichannel configurations from multiple soundcards, and which produces all manner of undesirable effects from a gentle flanging to bizarre arhythmic echoes reminiscent of Stockhausen on bad acid...

MAKING CONNECTIONS

The card's outputs can operate in either 4-channel mode, using the optical and electrical S/PDIF connectors, or in 10-channel mode using the ADAT optical and the S/PDIF phono sockets. You also have a choice of two input modes: stereo S/PDIF input, or 8-channel Alesis Lightpipe ADAT format input. Another way of getting audio into the card is to transfer tracks from audio CDs to the hard drive as Windows .WAV files, via an additional S/PDIF connector that connects to the digital output of a CD-ROM drive. Note that not all CD-ROM drives are blessed with a digital output, although it should be considered vital in a PC used for professional audio, and not all CD-ROM digital outputs work as well as others. The Mitsumi 24x speed drive in my review machine, however, worked fine. If you do not have a CD-ROM with a digital out, you might as well take advantage of this extra input connector, and create an external stereo S/PDIF digital input for a second DAT machine or a CD player. All you have to do is route the cable to a phono socket mounted on a blank PC back panel. If you're still in a DIY mood, you could follow the instructions supplied with the WaveCenter documentation for making an AES/EBU format adapter, allowing machines supporting that standard to be used with the S/PDIF RCA phono input.

To conclude, the WaveCenter is a very fine, sweet sounding and economically priced card that would fit in well with PC recording systems both at the professional and semi-professional level for a wide range of audio production demands. **SO**

pros & cons

FRONTIER DESIGN GROUP WAVECENTER £498

pros

- Easy to use.
- Good sound quality.
- Two cards can be used for 16-in/20-out system.
- Economical with precious PC system resources.
- Useful MIDI interface.

cons

- Installation can be tricky.
- No input level meters in WaveTray applet.
- No analogue monitor out.

summary

A great-sounding multichannel audio card with the added bonus of a 1-in/3-out MIDI interface that will more than satisfy the functional and budgetary requirements of smaller pro and semi-pro audio recording and post-production facilities.

SOUND ON SOUND

PERFORMANCE

As always with PC systems, the performance of the WaveCenter is dependent on the power of the host computer; Frontier Design Group recommend that you have at least a 486 or better CPU. The reference PC for this review, an Intel Pentium 233 MMX with 64Mb RAM, recorded and played back eight channels without a hitch.

The WaveCenter will play and record mono or stereo soundfiles at a sample rate of 44.1 or 48kHz, and can varispeed and track the clock of external audio devices at any sample rate from 39-51kHz. The input monitoring latency, ie. the delay between sound arriving at the card's inputs and the return of the monitored signal, is 1026 samples (approximately 22ms at 44.1kHz), which in practice is quite acceptable. By way of comparison this is roughly the same delay that you might experience with a 3-head open-reel tape deck running at 30ips.

CHANNEL ARCHITECTURE

The WaveCenter presents its audio channels as six stereo pairs: the ADAT optical output claims four pairs, while the optical and electrical S/PDIF channels have one pair apiece. Each port functions as if it was an individual full-duplex stereo audio device – not only can you play back and record simultaneously on all eight channels, but you can also bounce audio between channels.

Each WaveCenter audio port references a common clock, and consequently synchronisation between channels is rock solid. This contrasts with the synchronisation drift that is often experienced

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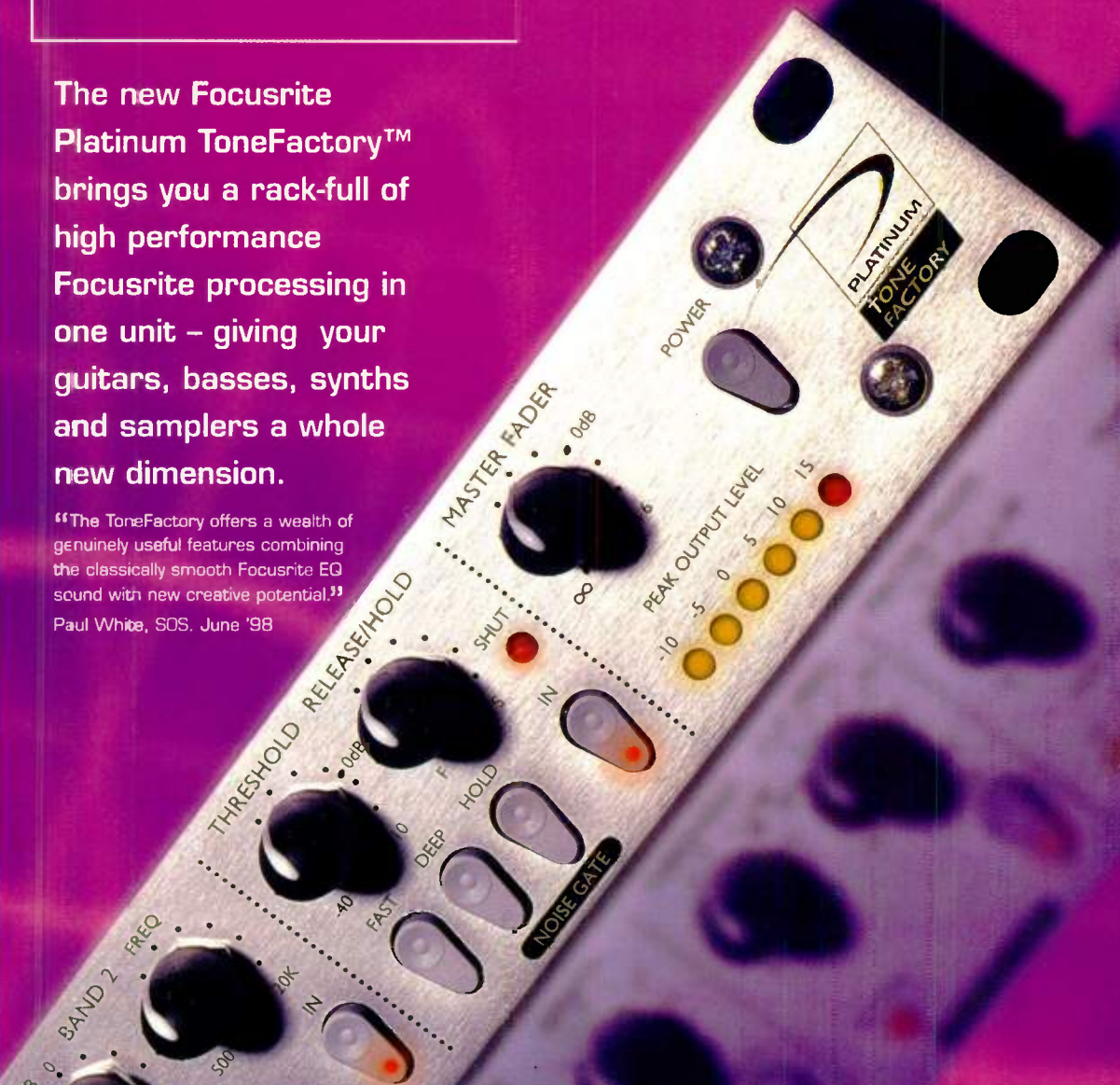
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Sight & Sound

GRAPHICS CARDS & MONITOR SCREENS FOR THE PC MUSICIAN

In the past, PC-based music software was not terribly demanding on the resources used to drive the user's means of visual feedback — the PC's monitor. But as we try to display more and more MIDI and audio information, via ever more attractive graphic interfaces, your old graphics hardware may not be up to the job. MARTIN WALKER considers your likely requirements.

As we come to expect full waveform displays of our multitrack audio, it is no longer enough to buy the cheapest graphic card and monitor available. Fully-sculpted '3D' screen displays use far more colours than the simple bevelled windows of the past, and if you want to stare at these displays for hours whilst composing your latest masterpiece you will need a large screen with a crisp high-resolution display and lots of colours.

Every PC contains a graphics card, though some have the circuitry incorporated onto the motherboard, and it is this that converts the display information sent by the computer's CPU into video signals that your monitor screen can use. In a sense, it's rather like digital-to-analogue conversion in the audio world.

The current screen image is held in a small amount of very fast RAM on the graphics card, so that it can be accessed very quickly when being converted to the analogue signal. Since increased screen resolution and more colours means that more data must be manipulated, buying a faster graphics card can reduce the strain on your computer's main processor, as it can then deal with this information more quickly. A faster card may also allow the system to update the entire screen display more often, a property measured by the refresh rate. It is normally accepted that to minimise screen 'flicker', the vertical refresh rate (the number of times the screen is redrawn per second) should be at least 70-75Hz; some people advise 85Hz. Even if you can't see a flicker at lower rates, it may still cause headaches when viewed long term.

REASONS TO UPGRADE

Despite appearances, the smart new graphic interfaces used by the likes of Ensoniq's Paris, Steinberg's *Wavelab* and so on are not true 3D — they merely appear to have depth and solidity due to the way in which the graphics have been drawn. True 3D graphics, and the graphics cards optimised to run them, are used extensively in both CAD (computer-aided design) and by games developers to produce 3-dimensional images that can be rotated, and viewed from a distance or close up. These images are formed by joining together lots of polygons (flat, multi-sided shapes). Plotting the course of these polygons in real time as your objects move requires powerful hardware (and there are other intensive operations to perform simultaneously, such as mapping textures onto the objects' surfaces). If the graphics card contains in its hardware routines to perform these functions, the main PC processor

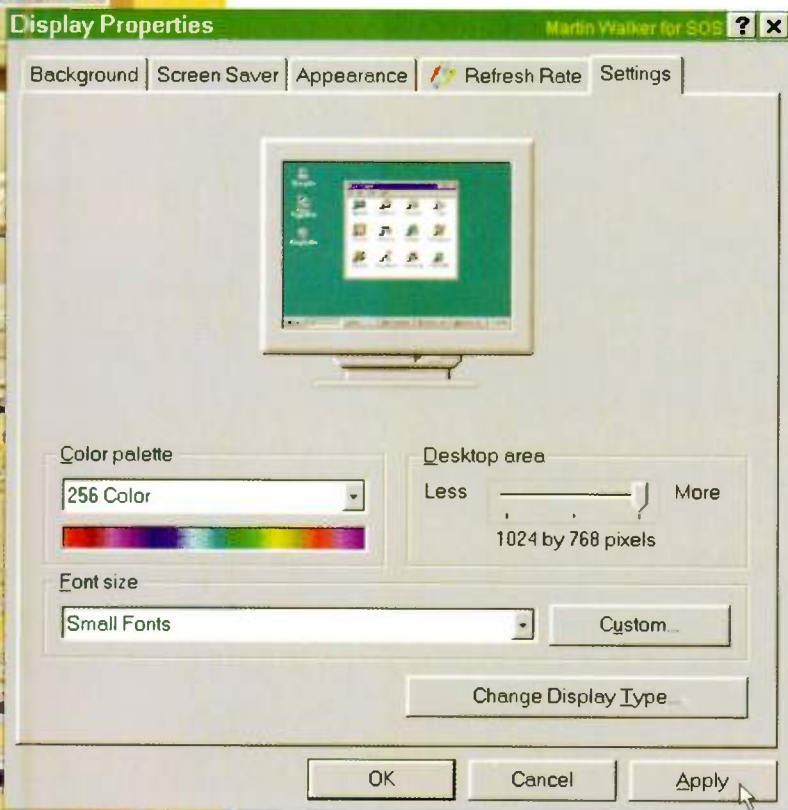


Figure 1: You can change the resolution and colour depth of your display from Control Panel/Display/Appearance, as shown here. You can also change the size of system fonts used, which will determine the size of many of the plug-in Windows, such as Waves' Native Power Pack.

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amg - drum & bass carnage

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BLACKBEAT decided to produce sample CDs after being disappointed by the quality of several products that he heard and by the lame sameness of many loops used by producers, remixers, jingle programmers, etc. Inspired by Jam & Lewis, Babyface, and of course Teddy Riley.



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Country samples, many pitched towards blue-grass. Loops and riffs in 4 keys and 5 different tempos. Drums, bass (electric & acoustic), guitar (electric & acoustic), pedal steel, mandolin, banjo.

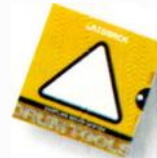


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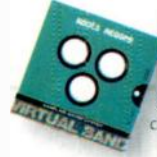


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CHOOSING PC GRAPHICS CARDS & MONITOR SCREENS



Figure 2: Here is an example of palette switching in action when using a display featuring only 256 colours. Since Steinberg's Spectraliser uses a completely different palette of 256 colours from that of Cubase VST, its colours look 'garbled' when VST is the active window.

► will not have to work so hard.

Most Windows 95 packages, however, including music applications, use only 2D graphics, so there is no point buying a fancy 3D graphics card for these alone. Most modern graphics cards have a combination of 2D and 3D features, and will therefore help with both types of imaging, but if you want the ultimate graphics card for games, you will have to make a different choice. Once again, it is worth pointing out that games and music software don't mix well on the same machine.

Most people will already have some sort of PCI graphics card, but if you are still using an ISA buss card then simply upgrading to a PCI card should produce a notable improvement in the speed of screen redraws, particularly when moving between several applications. This is because the buss is responsible for how fast the data reaches the video

card, and the PCI buss works faster than ISA. If you already have a PCI graphics card and buy a faster one, you may see only a tiny overall improvement in system performance when running music software, since the average sequencer package, despite its attractive and detailed interface, is still not particularly graphics-intensive.

So why would you need to upgrade or change your PCI graphics card, if the one you have seems to work well enough? Well, many people start off with a 14 or 15-inch monitor screen, and later upgrade to a 17 or 19-inch screen. In order to select a higher resolution that will take advantage of a larger screen, and to get more colours, you may need to add more RAM to your existing graphics card (see the 'Ramming It Home' box for details). Most modern PCs come with 2Mb of RAM on the graphics card (many come with 4Mb) but, if you have an older machine, you may have only 1Mb. At a screen resolution of 1024x768 pixels (the number of dots in each direction), 1Mb of graphics memory will allow only 256 colours. As we shall see, this may cause you problems with the latest software, and upgrading to 2Mb (or 4Mb if this is an option) shouldn't prove too expensive (tens of pounds, rather than hundreds).

Rather than upgrade the RAM, however, you could buy a completely new graphics card; such are the benefits of mass marketing that you can buy a card with 2Mb memory for about £30, and one with 4Mb from about £60. If it would cost £20-30 to expand the memory on your existing card, it might be more sensible to go for a newer and faster card that already has the extra memory. Another benefit of buying all-new hardware is that you may also achieve a much faster refresh rate,

SPEED KILLS

As always, PC musicians have a slightly different set of priorities from mainstream computer users. In the never-ending search for 'faster everything' solving problems with the timing of music software comes pretty low in the priorities of graphics card manufacturers. I have already advertised the VGA Kills web site in October's PC Notes, but to briefly recap, many graphic drivers are now optimised by letting them ignore other requests for access to the PCI buss when they are busy

plotting graphics. Whilst this makes for fast screen displays that look good in PC magazine tests, it can cause glitches in the audio output, and even spurious swapping of the left and right audio channels with some soundcards. The Zefiro Acoustics web site has the full story (www.zefiro.com).

Thankfully, many graphic card manufacturers now provide software switches that disable this annoying feature. Some solutions involve adding lines of text to Initialisation files; another general solution is to lower the Windows Graphic

Acceleration by one notch (this can be found in Control Panel, System, Performance, Graphics). However, this may compromise other aspects of graphics performance, and therefore is not really the ideal answer. Problems such as these may leave you wondering whether it's worth the expense of a fast graphics card when you only have to slow its performance down again for audio work. However, most manufacturers tend to perform the same optimisation trick, so a fast card is still likely to be faster than the others even after disabling some of its features.

CHOOSING PC GRAPHICS CARDS & MONITOR SCREENS

“If you want to wring out the last drop of system performance, temporarily switching off screen redraws might give you up to 20% more processor time to play with.”

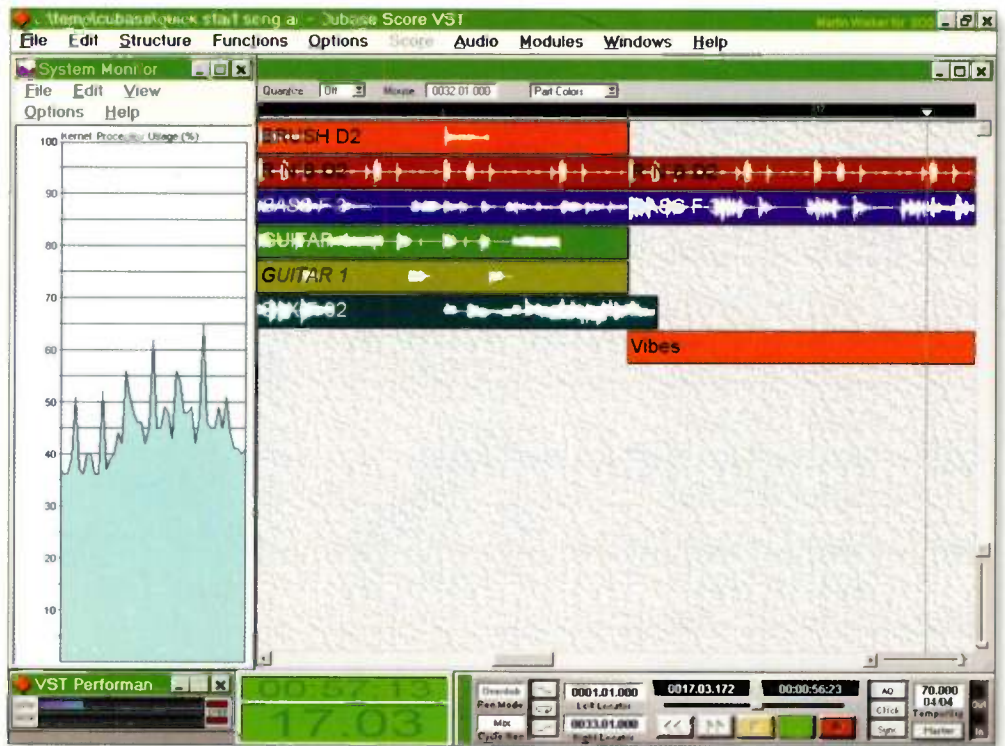


Figure 3: By running the Microsoft System Monitor alongside Cubase VST, you can see the trends in processor usage during a minute or so of playback. Each of the steep spikes above 50% occurred when the screen was redrawn, showing a rise of around 15%.

- ▶ which makes the difference between a flickering display updated 60 times a second, and a much less tiring one that updates 80 or more times a second. Let's look at the issues involved in displaying graphics, and try to reach some conclusions about what upgrade options are worth considering.

À LA MODE

When choosing a graphics mode you set, above all, the screen resolution and bit depth. Resolution determines the size of the desktop, and the bit depth determines the maximum number of colours available to the display. In Control Panel/Display/Appearance, you can change these two parameters (see Figure 1), although you will need to re-boot your PC before you can see the changes. Alternatively, it maybe easier for you to use *QuickRes* (first

mentioned in my very first *PC Notes* column back in May '97, and available free as part of the Microsoft *Power Toys* utility), as this allows you to switch modes without re-booting.

The best choice of screen resolution is determined largely by the size of your monitor screen. Although expensive graphics cards may support high resolutions on a small physical screen, you'll find yourself squinting to read some of the text, which breaks the concentration you should be turning to making music. 14-inch monitors seem to have been generally superseded by 15-inch models, and with this size of screen most people recommend using a resolution of 800x600. With a 17-inch monitor, 1024x768 becomes more appropriate, a resolution that can also be used with a 19-inch monitor (though 1280x1024 is also good at this size). For those of you with 21-inch monster screens, either 1280x1024 or 1600x1200 can be used.

The choice of colour (or bit) depth for music applications used to be easy: 256 colours (8-bit) was more than enough in most cases, and even a mere 16-colour (4-bit) screen was quite adequate for some applications. All this has changed, however, with the latest MIDI + Audio sequencers, and their slick graphic design with full display of sample waveforms.

One source of problems is in the way that 256-colour mode works, especially now that third-party plug-ins can be run within a main application. This mode uses — no surprise here — 256 colours taken from the millions available. Thus any application can use a huge range of possible colours, but with the important limitation that it can only ever display a maximum of 256 of these colours available at one time. Each application will

RAMMING IT HOME

Unless you have a graphics card that can use system RAM to store its images, the amount of RAM installed on the card itself will determine the limits of screen resolution (number of pixels wide by number of pixels high) and bit depth (number of colours). Although nearly all cards come with at least 1Mb already installed, an increasing number now come with 2Mb or 4Mb as standard. If you are thinking of buying a graphics card, you might as well go for 4Mb, as this will meet most people's requirements with all but the largest 21-inch monitors at photographic quality.

Rather than list the exact memory requirements, the figures below indicate which screen modes will work with the standard 1, 2, 4, or 8Mb sizes.

Resolution	8-bit	16-bit	24-bit
	(256 colours)	(65,536 colours)	(16.7 million colours)
640x480	0.5Mb	1Mb	2Mb
800x600	1Mb	2Mb	2Mb
1024x768	1Mb	2Mb	4Mb
1280x1024	2Mb	4Mb	4Mb
1600x1200	2Mb	4Mb	8Mb
1800x1440	4Mb	8Mb	8Mb

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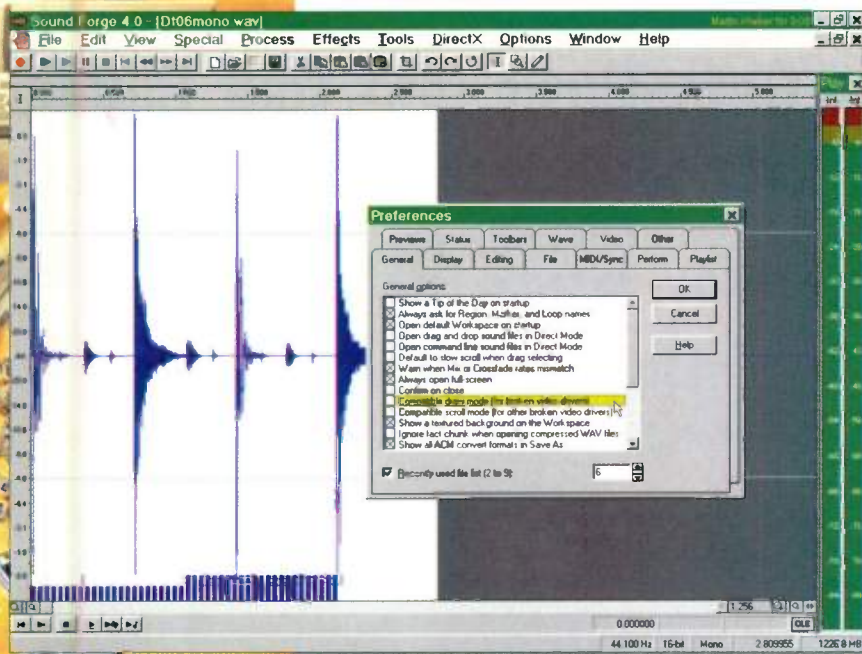


Figure 4: Some applications may show corrupted waveform displays due to problems with the graphic driver software. Thankfully, Sound Forge has an option to use a different display mode which normally bypasses the problem, but if you get corrupted plotting or colour redraws, the video driver may well be to blame.

- ▶ have its own palette of 256 colours, appropriate to its visual style.

When reviewing the *TC Native Reverb*, I noticed that TC Works advise using 65,536 colours (16-bit), particularly when using their product with Steinberg's *Wavelab*. This is because both the Steinberg and TC Works programs use a significant proportion of their 256-colour palettes, and they have quite different palettes in 256-colour mode. So, when you move from one application to the other, the palette of the 'active' application overrides the previous palette, forcing 'background' applications to use the same palette, a palette which may make them look most peculiar (see Figure 2). In the case of *Wavelab* and *TC Native Reverb*, the clash can result in both applications

exhibiting permanently flashing colours, a problem that is cured by changing to 16-bit colour depth.

Despite the fact that using 16-bit colour or better will avoid the palette-switching problem, many musicians 'in the know' tend to run sequencers in 256 colours. The reason is that fewer colours used to mean faster screen updates; traditionally, using thousands or even millions of colours offered no visible improvement with most music software, and just slowed your machine down. Nowadays the situation is less clear: most applications use more colours, and to ensure that graphics cards have optimum performance in the most popular graphics mode, manufacturers tend to optimise both their hardware and their drivers for a large number of colours. Because of this, it is quite possible that your PC will run slightly slower when running a particular graphics card in 256 colours than when running in 16-bit colour, simply because few people are expected to use such low colour depths.

Buying a faster graphics card will ensure that screen redraws happen more quickly, and will also probably speed up refresh rates. One reason why fast screen updates are desirable is that they can interrupt overall system performance — thankfully, most sequencers have intelligent buffering to ensure that updates cause the minimum upset. Screen updates are required constantly; the worst case is when the cursor, scrolling across a waveform, reaches the right-hand side of the screen and the entire display needs updating. I carried out some brief tests to shed more light on the colour depth question, using my new Matrox Mystique 220 graphics card with 4Mb of RAM (my setup, by the way, is a Pentium 166MMX with 32Mb of RAM). The results are very rough and ready, but may be of some use.

Using a screen resolution of 1024x768, I opened *Cubase VST*, ran the audio demo provided on the *Cubase CD-ROM*, and monitored the processor usage with Microsoft's *System Monitor* utility. This comes on the Windows 95 CD-ROM — if you don't have it installed already, you can do this from the Add/Remove Programs section of Control Panel (in the Accessories section of Windows Setup).

If you use the Line Chart option for Processor Usage in *System Monitor*, after running *Cubase* for a few minutes you soon recognise the blip in processor load usage whenever the screen is redrawn because the cursor has reached the right-hand side of the screen (see Figure 3). By way of comparison, I switched off the Follow Song option in *Cubase*, so that this update would not occur regularly during playback, and found that with the demo song running the average processor load was about in 50% all colour depths. As soon as I switched Follow Song back on, the processor load rose to an average of about 55%, just to plot the moving cursor. When it reached the right-hand side of the screen I measured the following peaks:

- With 256 colours (8-bit colour depth), peak load was about 65%.
- With 16-bit colour depth, peak load rose to about 70%.

A PAIN IN THE NECK

There's more to getting the most out of your display than resolutions, bit depths and graphics RAM — physical factors can make staring at a screen a mere stressful business than it need be. First of all you should ensure that the display ergonomics are right; that the screen is positioned to create the most comfortable working environment. If you are looking at a screen for long periods, you can minimise the chance of eye strain and headaches by making sure that the top of the visible screen is just below eye level, so that your gaze is aimed slightly downward (this places less of a strain on the muscles controlling the lens in the eye). Try to ensure that the screen is free from reflections and glare. Adjust the screen controls so that the image fills the tube area and does not have a large black border around it — this will not only give you a larger display, but also reduce the contrast between the edge of the image

and the monitor area, which is less tiring.

There should be a distance of at least 16 inches between you and the screen, and preferably between 18 and 30 inches. This can be hard for musicians, since the most suitable place for the monitor screen is often between a pair of nearfield monitor speakers. To maintain a good stereo audio image the screen should not sit forward of the speakers, but this is hard to arrange if you're trying to cater for the typical listening position, with monitor speakers three or four feet apart, and the listener seated roughly this far back from the speakers. A solution popular with many recording studios is to buy a bigger monitor and place it further back, out of the way of the speakers; another is to move the computer and screen to the side of the room, or even along the rear wall, so that you swivel your chair through 180° when working with the sequencer, leaving the screen well away from the speakers.

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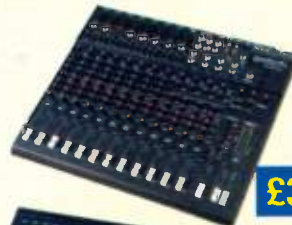
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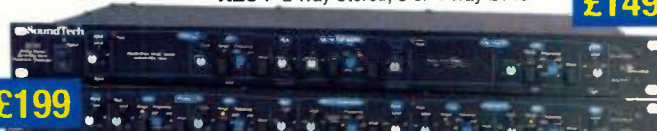
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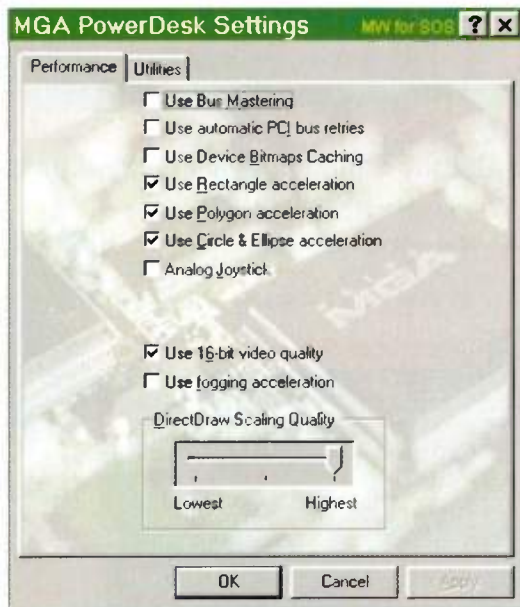


Figure 5: These are the settings I used to cure the audio glitching using the Matrox Mystique 200 graphics card (see 'Graphic Accounts' for details).

- ▶ • With 24-bit colour depth, peak load rose again to about 75%.
- With 32-bit colour depth, peak load was still about 75%.

This suggests that on a typical 166MMX system with a good PCI graphics card, you might expect peak processor overhead to drop by something like 5% if you use only 8-bit colour rather than 16-bit, and by 10% if you drop from 24-bit to 8-bit just for sequencing. However, this peak requirement will occur only once per screen update, so it's not a lot of help overall, and the figures would be different with different graphic card drivers. Nonetheless, if you want to wring out the last drop of system performance, perhaps to give your plug-ins extra room to breath in a critical mastering session, temporarily switching off screen redraws might give you up to 20% more processor time to play with.

CHOICES FOR MUSIC

For music applications, a graphics card needs to give a notable improvement when running

Windows 95 applications, not when running games software. Motherboards with built-in graphics capability are popular in some quarters, because they avoid the necessity of installing another PCI card, but their performance is not likely to be particularly good, and they can sometimes be difficult to disable when you want to upgrade to a more powerful stand-alone card.

Another recent trend is to cut costs by using system RAM for video, rather than having separate RAM (of whatever description) on the graphics card itself. Again, this at first seems an attractive proposition, because you never need to upgrade your graphics memory — you simply use more of your system RAM if you want a higher resolution screen. The problem, once again, is compromised performance, because system RAM is not as fast as the various types of dedicated graphics RAM. You may see these specialist types of RAM, all of which can shift video data at high speed, referred to as VRAM (Video RAM), WRAM (used only by Matrox cards), and SGRAM (a special graphics version of SDRAM).

Personally, I chose a Matrox Mystique 220 card (around £80 with 4Mb of graphics RAM, expandable to 8Mb), a card which is regularly quoted as being good value for general-purpose 2D or 3D use. With 4Mb of graphics RAM already fitted, this will support 1280x1024 resolution at 24-bit colour. Although there are known problems with Matrox drivers (see 'Screen Problems') these are easily dealt with by changing a couple of well-known settings.

I've noticed many mentions of the S3 Trio chipset, and the S3 Virge/DX, in systems advertised specifically for musicians in the pages of SOS. There are many such cards around that use the S3 chip, and these can be used with no problems by musicians, once again with the help of a well-publicised tweak (see the 'Other Opinions' box). But, before anyone does it for me, I should point out that there are probably plenty of keenly priced alternative cards out there that will work far better with 3D games; just remember that they may not work so well with sequencer applications.

If you are lucky enough to have one of the Pentium II systems featuring the AGP (Accelerated Graphics Port) — see January's PC Musician feature for more details), then it seems that there may be

“For music applications, avoid anonymous graphic cards, since their drivers may not have the options required to prevent audio glitches.”

GRAPHIC ACCOUNTS

Driver software can cause problems with some applications that use high-resolution graphics, such as the large waveform displays in audio editors. The anonymous PCI graphics card that came with my PC had an annoying habit of corrupting the bottom part of large waveforms with a maximised window within Sound Forge (see Figure 4). Fortunately there is an option in Preferences (Compatible Draw Mode for broken video drivers) which cures the problem. It is not uncommon to trace other odd problems to anonymous graphics cards and their rarely-updated drivers. Another bug that my old card caused was colour corruption in Cubase, whereby the Initial

screen was drawn with the correct colours, but after scrolling or opening a dialogue box, the updated part of the screen appeared with different colours.

All of these problems disappeared completely when I upgraded to a Matrox Mystique 220 card. After installing it I had a sharper screen display, with more contrast, and I measured a 300% improvement in Windows' graphics speed. As expected, I found that when running Cubase VST both my Event Glna and AWE64 Gold soundcards emitted a click every time the screen was updated. As a temporary solution, simply switching off the Follow Song option removed the clicks, since the screen was no longer being redrawn. However, I eventually discovered that

the Cubase problem could be fixed by unticking the Use Device Bitmaps Caching graphics option, which had a minimal effect on graphics speed. Dragging a small window still produced the clicks, which suggested that I might still experience problems at times, but these too were removed when I set Use Automatic PCI Bus Retries to Off (see Figure 5). Steinberg also recommend unclicking the Use Bus Mastering option — at first I didn't have any problems with this still ticked, but after VST audio recording stopped unexpectedly several times, unticking it seemed to cure the problem. Overall, the combined changes degraded the graphics performance by about 10% — but that still left me 290% better off than my previous graphics card...



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► a hidden benefit in using an AGP graphics card rather than a PCI one. Although AGP has a higher bandwidth, and ultimately will prove considerably faster than PCI, no-one will really notice until Windows 98 appears, as not all of its benefits can be used by Windows 95. Using an AGP graphics card will currently offer only a small improvement in graphics speed. However, if you use an AGP graphics card then graphics data will no longer share the PCI bus with audio data, which means that audio glitches due to badly written graphics card drivers should be a thing of the past. Only two months ago I reported that the AGP bus showed little relevance to musicians from the graphics point of view — it's ironic that in fact it offers a way to cure an audio problem rather than improving the graphics performance.

MONITOR SCREENS

There is no point in buying a monitor that can be refreshed at 85Hz if your graphics card is only fast enough to drive it at 65Hz. Conversely, simply having a fast graphics card does not automatically let you use the highest available settings for screen resolution and colour depth — your monitor screen must be able to keep up with the amount of video data being squirted down the monitor cable. Since fast graphics cards are far cheaper than good monitors, many people find themselves able to select a screen mode that sends data faster than the monitor can deal with it. The result is a picture that rolls all over the place, like a TV set with incorrectly set vertical or horizontal hold.

If this happens you'll have an interesting problem — you won't be able to see to select a different mode to achieve a stable screen again. The solution is to reboot your PC, press the F8 key to bring up the startup menu, and select Safe Mode. This always uses the standard 640x480 16-colour Microsoft driver that is guaranteed to work with any graphics card and monitor, and from here you can select a more suitable screen mode to take effect when you next boot your PC. Many graphics cards also have utilities that allow you to change screen mode, and preview the new display for several seconds before confirming the

change; if you don't, they revert to the previous settings, which means that you can recover from screen roll automatically. Remember, however, that even if your monitor prevents you using some of the higher resolutions supported by a faster card, you still get the benefit of faster refresh rates (for less screen flicker) even when running at exactly the same resolution as before.

The reverse situation — an expensive monitor with a slow graphics card — will limit the maximum resolution that can be comfortably viewed. The optimum solution is to have a graphics card and monitor screen that are reasonably matched in performance terms. For instance, when I last upgraded my PC, I initially retained my 14-inch monitor to keep the total cost down, which meant it couldn't match the faster refresh rates of my new graphics card; I had to be careful to avoid screen roll when selecting different screen resolutions. On the other hand, after finally upgrading the monitor to a Iiyama Vision Master 17, I could manage only 1024x768 resolution with 256 colours, because the new graphics card had only 1Mb screen RAM. The answer was more RAM for the card (see the 'Ramming it Home' box for details on the amount of RAM required for each screen mode).

The sharpness of the monitor picture is largely determined by the dot pitch (the physical distance between each on-screen pixel), as this determines how many pixels can be distinguished both horizontally and vertically. The finer the dot pitch, the sharper the image. For a 15-inch monitor a dot pitch of 0.28mm should be fine, but for a 17-inch monitor you should be looking for a dot pitch of 0.26mm or less — many are now available at a sharper 0.25mm, although they may be more expensive.

THE FINAL CHOICE

For music applications, avoid anonymous graphic cards, since their drivers may not have the options required to prevent audio glitches. Stick to well-known makes, and bear in mind that if you buy from a PC music specialist you should have the benefit of a pre-tested range of models — and of staff who understand specific audio problems. If you are on the internet, take a look at the excellent 'reading room' provided by Mission (www.missionrec.com), and carry out a search for information on any graphics card you are interested in — you may come across useful comments from other people already using this model in a music environment.

When choosing a monitor, picture quality is the most important factor, and you tend to get what you pay for. That said, Iiyama have a good reputation for quality without the price, and I've certainly been very pleased with the Iiyama Vision Master 17 that I bought some months ago (although the Vision Master Pro range gives even sharper picture quality at a slightly higher price). If possible, take a look at the monitor you intend buying before you take the plunge, and if you intend to buy blind through mail order then make sure you stick to well-known manufacturers.

OTHER OPINIONS

Some companies that specialise in supplying complete PC music systems use lower-cost generic cards, going against the advice I've set out here — but they can test a selection of cards and then buy a batch once any problems that arise have been cured. (Individual purchasers rarely have the luxury of buying hardware for a trial run, so it is best to stick to reputable manufacturers whose driver tweaks are well known.) RKMS of Nottingham prefer to specify cheaper cards that have been tested in this way, and recommended two in particular. The Cirrus Logic 5446 64-bit (available in 1Mb and 2Mb versions) normally behaves well once the Windows 95 acceleration is turned down to 'none', and the S3 Virge DX card (available in 2Mb and 4Mb versions) apparently works particularly well as long as you add

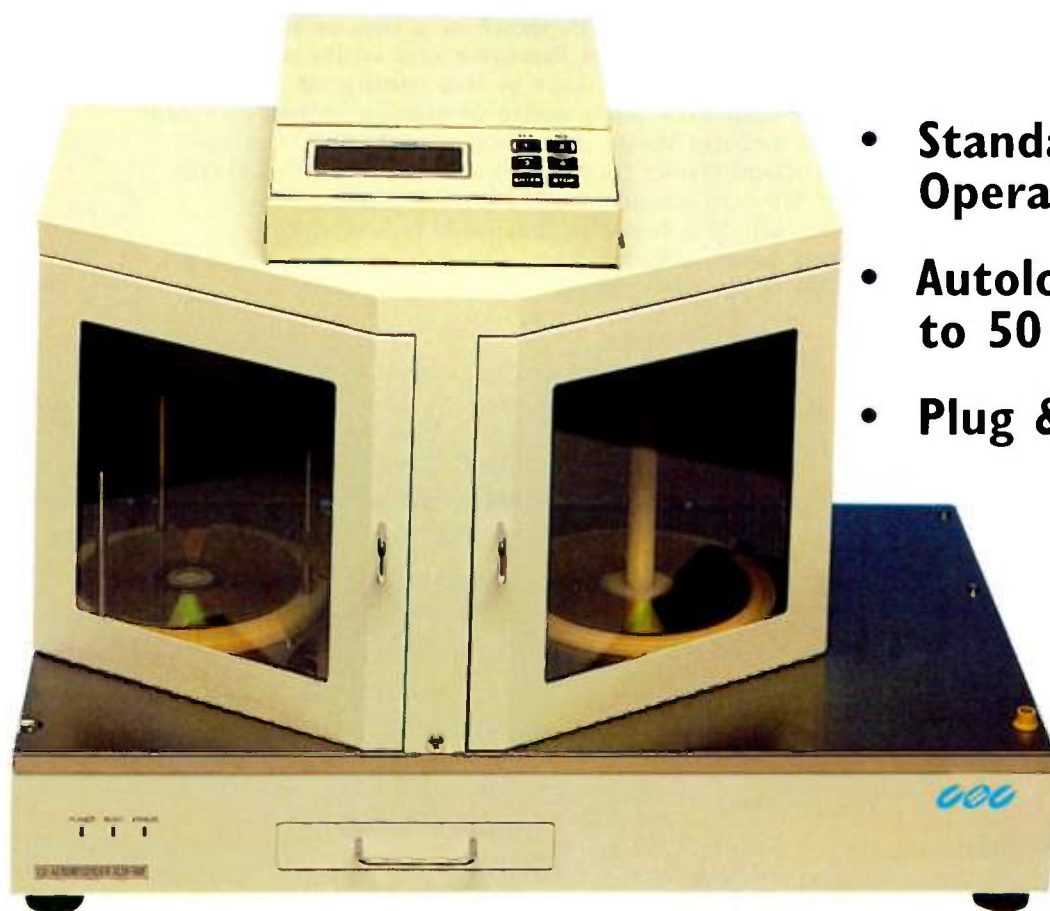
"busthrottle=1" to the [display] section of your System.ini file.

The Red Submarine Computer Company, suppliers of PC hard disk recording systems who are also happy to sell graphics cards separately, take a slightly different tack in recommending the ATI Expert@Work range, which use the AGP bus. However, for high-end systems employing Pentium II processors, and also for a few very recent TX chipset motherboards, a card using this bus is recommended (see main text for more details). Remember that both these companies specialise in putting together complete hard disk recording systems so, unlike a mainstream computer outlet, they know the potential graphic/audio conflicts. It bears repeating that the best way to avoid problems is to buy a complete system from a specialist, or at the very least to keep your PC a games-free zone to minimise the problems.



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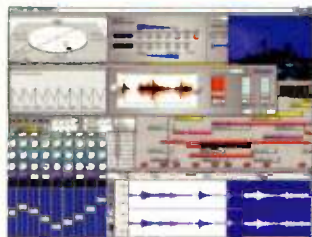
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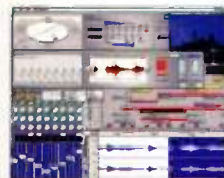
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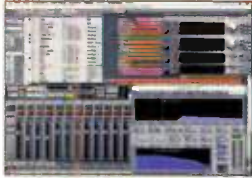
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- MOTU Micro Express 96Ch Midi Interface
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At Digital Village we believe that the DS 2416 PCI Card is the most exciting product of the year. Imagine ALL the automation, all the dynamics and all the professional FX of the O2R inside your PC + 16 Tracks (expandable) of Hard Disk Recording without making your CPU break into a sweat. Check out these specs:

- 5 DSP3 DSP Chips = 24 Channels of O2R!!
- 20bit A/D & D/A Converters
- >100db dynamic range
- Stereo RCA Input & Output and Digital I/O
- Four Band Parametric EQ + Multi Dynamics on each channel
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Creamware T-DAT16

16 channel PCI card (2 x ADAT I/O's) Up to 2000 Audio tracks (if needed!), Realtime FX, CD Red Book Mastering **£ 1599.99**

Optional

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EW564XL 4 in, 4 out, S/PDIF I/O, 32 channel Midi Daughterboard connector **£ 379.99**
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Sound Forge 4.0 Pro Audio Editor for Windows **£ 299.99**

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Pinnacle

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Enhanced Full-Duplex Soundcard RRP **£ 449.99**

Digidesign

Session 8 Core and 882 Interface 1 only **£ 1499.99**

Event

Daria **£ 299.99**

Gina **£ 499.99**

Layla **£ 899.99**

Steinberg Producer Pack - Village Exclusive

£449.99

includes: **Cubase Audio XT (VST)** - Cubase VST with SCORE and full support for Akai DR16, Yamaha CBX05 Extensions etc. Plus with an upgrade to the new VST 24 you get full support of the 24 Bit Yamaha DS2416 Card **RRP £649**

PLUS Wavelab 1.6 (Includes upgrade to New Version 2) - Audio editor, Mastering Software can use VST / Direct X plug ins. True 32 Bit program that can run on Windows 95 and NT. Offers RED Book Compatible CD Burning. The upgrade to version 2 offers full sampler support a' la RECYCLE **RRP £329**

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& YAMAHA

Picking a Digital Mixer is as easy as 01V, 02R, 03D The choice is yours...TALK TO THE EXPERTS

While other manufacturers are promising or unveiling prototype digital desks in the near future, Yamaha have been quietly supplying full recall Digital desks for years. These desks are working in professional studios all over the world and have all the advantages of Yamaha's 10 years of experience of digital desk design and the users feedback this generates which is put back into the next designs. On top of this Yamaha's proprietary processor chips give them a great price advantage.



02R • Up to 44 Inputs, 4 band fully parametric EQ & dynamics on every channel • Sparkling 20 bit A/D and D/A

• 16 track Digital I/O-AES/EBU, ADAT or TDIF via optional (8 In/out) cards

• Perfect Partner for: Alesis ADAT, Tascam DA38/88 and many stand alone

Hard Disk recorders like the Fostex D90/D160 and of course computer based systems - i.e. ProTools, Soundscape, Korg I2121/O, MOTU 2408 etc.

• 24 bit ready with internal 32 bit processing

• Digital Cascade option for more Inputs

02R + TLA PA-2 and Neumann TLM103

Was £8,155

Village Exclusive Package

£5499.99

Yamaha O2R + TLA Classic PA-2 and TLA Crimson 3011

including all leads PLUS Loom Was £8,200... **Village Exclusive Package £ 4999.99**

Yamaha O2R + CD8AT (Yamaha ADAT Digital I/O) + Alesis ADAT XT + TLA PA-2

- Complete "Valve into Digital Domain" 8-track recording.

Was £11,162.50

Village Exclusive Package £ 6349.99



03D Up to 26 Inputs / 18 outputs, 4 band fully parametric EQ & dynamics on every channel

The O3D is truly the son of the O2R, the same spec, just fewer channels.

Yamaha O3D + TLA Classic PA-2 and Audio Technica ATM4033

Was £4,000

Village Exclusive Package

£2499.99

Yamaha O3D + CD8AT (Yamaha ADAT Digital I/O) + Alesis ADAT XT

- Complete "Valve into Digital Domain" 8-track recording.

Was £5,992

Village Exclusive Package £ 3649.99

Yamaha Promix 01 including FREE LOOM

£ 995.99



01V Up to 24 Inputs/14 outputs, 22 dynamic processors & motorised faders

• 99 scene memories for storing mix snapshots • Built In MIDI Interface

• Host port for connection to personal computer

The O3D's baby brother, pretty much the same, but smaller.

01V + FREE TLA Classic PA-2

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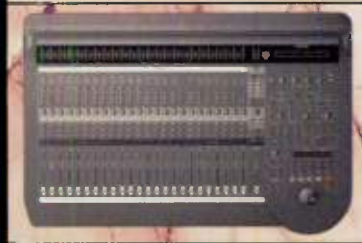
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- Optional plug-in effects
- 12 Mic ins
- 4 Band EQ with filters
- 50 Dynamic channels
- Full dynamic automation

- 12 Auxiliary sends
- Infinite scenes
- Optional monitor, keyboard and mouse

RRP **£8999.99**

Unbeatable deals on SR Series and 8 Buss Consoles.

Compact desks at new low prices!
1202VLZ **£299.99**
1402VLZ **£399.99**
1604VLZ **£799.99**



Allen & Heath MixWizard WZ 20:8:2

Superb new true 8 bus mixer at an astonishing price!

- 28 Inputs on mixdown
- 6 Aux sends
- 100mm Faders
- 4 band EQ with 2 sweep mids or mic/line channels
- Phantom power
- 2 band EQ on stereo channels

or with TLA Crimson 3011 **£ 749.99** RRP

or with AKG Solid Tube Mic **£ 1249.99** **only £699.99** £960

Soundcraft Spirit 328 Digital Desk



- 24 Bit with 128 times oversampling
- 100mm motorised faders
- Parametric EQ
- 100 Scene recall or via dynamic MIDI automation
- 16 Mono mic/line inputs
- 2 x 8trk digital inputs and outputs in ADAT optical format
- 2 x 8trk inputs and outputs on TDFIF
- 1 x AES input and output on XLR
- 1 S/PDIF input and output on phono
- SMPTE & Sony 9 Pin
- Studio clock on BNC
- MIDI in, out & thru

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Spirit Studio



These superb mixing consoles are available in 3 configurations: 16/8/2, 24/8/2 & 32/8/2 and feature:

- In line design
- Up to 72 inputs at mixdown (32ch)
- Up to 32 discrete tape sends
- 8 Buss group section and stereo master
- Fader flip to save repatching
- 6 Aux sends
- 4 Stereo FX returns with EQ
- 4 Band EQ (2 sweep mid)
- EQ Switchable between signal paths
- 2 Band EQ on each group bus
- PFL soloing on all channel and monitor inputs etc.

Legendary Soundcraft quality at a fraction of the original price!

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- 32 inputs
- 8 aux sends
- 8 groups
- 24 mic inputs
- sweepable mids
- 4 auxiliary returns

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or with TLA Crimson 3011 **£ 999.99**



MX24/4/2

- 24 inputs
- 6 aux sends
- 4 groups
- 16 mic inputs
- sweepable mids
- 2 auxiliary returns

RRP £995

£529.99

or with TLA Crimson 3011 **£ 599.99**



MX8000

Professional Ultra-low noise 48/24 channel dual input 8-bus Mixing console

or with TLA Crimson 3011 **£ 1149.99**
or with AKG Solid Tube Mic **£ 1649.99**

£1099.99

or with TLA Crimson 3011 **£ 1149.99**

or with AKG Solid Tube Mic **£ 1649.99**

MX2004 Professional Ultra-low noise, 20 input, 4-bus Mixer

VILLAGE PRICE **£ 259.99**

MX2804 Professional Ultra-low noise, 28 input, 2-bus Mixer

VILLAGE PRICE **£ 359.99**

MX2642 Professional Ultra-low noise, 26 input, 4-bus Mixer

VILLAGE PRICE **£ 399.99**



MX1602

Professional Ultra-low noise 16 input 2-bus mixer

£189.99

VILLAGE EXCLUSIVE PACKAGE

(including AKG D65S mic worth over £50)



MX802

Professional Ultra-low noise 8 input 2-bus mixer

£149.99

VILLAGE EXCLUSIVE PACKAGE

(including AKG D65S mic worth over £50)

Soundcraft Spirit 328 Digital Desk



- 24 Bit with 128 times oversampling
- 100mm motorised faders
- Parametric EQ
- 100 Scene recall or via dynamic MIDI automation
- 16 Mono mic/line inputs
- 2 x 8trk digital inputs and outputs in ADAT optical format
- 2 x 8trk inputs and outputs on TDFIF
- 1 x AES input and output on XLR
- 1 S/PDIF input and output on phono
- SMPTE & Sony 9 Pin
- Studio clock on BNC
- MIDI in, out & thru

ONLY **£3499.99**

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- In line design
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- 4 Band EQ (2 sweep mid)
- EQ Switchable between signal paths
- 2 Band EQ on each group bus
- PFL soloing on all channel and monitor inputs etc.

Legendary Soundcraft quality at a fraction of the original price!

16-8-2 ONLY **£899.99**

24-8-2 ONLY **£1465.99**

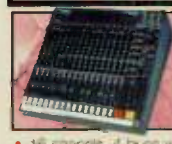
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Ghost LE and automated versions always available

- Ultra low noise inputs
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- MIDI mute automation
- MTR transport control
- 4 Band EQ with fully parametric mids

GUARANTEED BEST PRICE IN EUROPE!



Folio FX16

- 16 channels, 4-buss with Lexicon DUAL FX!
- 26 inputs to mix as standard
- 16 Mic/line inputs with ultra mic
- 4 Aux's
- 3 Band EQ
- Sweep mid
- 4 Stereo returns
- 100mm faders throughout

A PROFESSIONAL CHOICE **£849**

Folio SX

- 20 Inputs as standard
- 100mm faders
- 4 Buss structure with rear subgroups routeable to mix
- 3 Band EQ with sweep mid
- 3 Aux's
- Direct outputs from channels 1 - 8 for multi-track recording

GUARANTEED BEST PRICE



Folio 10/2

- 6 Mono input channels
- 6 Mic inputs
- 3 Band EQ with sweep mid and hi-pass filters
- Phantom powering for condenser mics
- PFL solo buttons
- 2 Aux sends

WORLD EXCLUSIVE **£199.99**



Folio F1

- 2 Versions: 14 & 16 input frame sizes
- 4 Stereo inputs & 100mm faders
- Inserts on every mono channel and mix outputs
- British 3 band EQ with creative sweep mid control
- 3 Aux's with up to 2 pre- or post-fader for foldback or FX

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Folio Notepad

- 10 inputs as standard
- 4 Mic inputs
- 2 Stereo inputs

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- 18 Filter types
- Expandable to 128 Meg
- 16 Meg + **FREE** Zip drive + **FREE** CD-Rom drive + 5 **FREE** CDs

- 64 Voices
- Up to 10 outputs

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Turbo version – just a few dollars more.



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- Up to 32 Meg of onboard waveforms (16 Meg Orbit & Planet Phatt waveforms on the dance model)
- Expandable to 128 Meg
- Up to 16 outputs
- Includes 5 **FREE** CD-ROMs

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All the sounds of these classic EMU modules on one 16 meg Rom board – The ultimate dance upgrade for the E6400, E-Synth, E4X

ASK FOR SPECIAL DEALS ON THE DANCE ROM WHEN YOU BUY AN EMU E SAMPLER

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Emu Audity 2000

- Digital Modular Rhythmic Synthesizer (DMRS)
- 640 presets
 - 16 part multitimbral
 - 4 layers per preset

RRP £1399.99



Emu Orbit

The Ambient, Trance and Techno **TOTAL PRODUCTION TOOL**



Emu Planet Phatt

The Hip Hop, Trip Hop, Swing, R & B, 70's Groove machine

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GUARANTEED BEST PRICE

THE VILLAGE STRIKES AGAIN – UP TO 53% OFF AKAI SAMPLERS!



Akai S3200XL

- Top of the range
- 20 Bit (Balanced)

£1649.99

Sampler with the **IB304F Filterboard** and the **IB208T 4 Bus FX Board** plus **32 MEG** pre-installed for only...



Akai S3000XL

- Expandable to 32 Meg
- 10 Outputs
- Industry Standard

GUARANTEED BEST PRICE

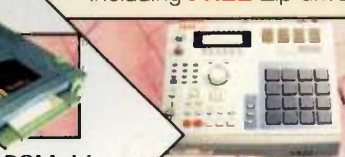


Akai S2000

- Expandable up to 7 outputs
- Same spec & quality as S3000XL

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- Including **FREE** Zip drive + 32 Meg for under



Akai MPC2000

- Sequencing/Sampling Drum machine
- Expandable to 32 Meg
- SCSI
- Waveform editing
- Rock solid timing

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Akai CD3000XL

Akai S20 Brilliant new low cost sampler

- High quality 16 bit Stereo sound
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IB208P	8 outputs + digital I/O for S2000	£ 249.99
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THE BEST SYNTH EVER – WE LOVE IT!!!

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The big brother of the ever popular pulse. This monster features 3 oscillators, an excellent arpeggiator, intuitive matrix editing, Mid syncable LFO, CV gate in/out and processing of external sound through the onboard filter.

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Analogue Mono Synth

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Waldorf Microwave 2 + Microwave XT

The highly upgraded wavetable synth still has distinctive character of its predecessor as well as 10 note polyphony, ring modulation, programmable arpeggiator and incredibly wide modulation routing. This is the synth programmers dream come true, all the tools you need to create rich resonant sweeps and gut wrenching subs.

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- 61 Note studio master keyboard

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MC505

- 8 Track total groove sequencing
- D Beam MIDI controlling
- Low Fi • The slider (MIDI gating)
- 6 Outputs
- Creative scratch and solo mode

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JX305

- All the sounds of the MC505
- 8 Track total groove sequencing
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- Easy user interface

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If you've got a space in your JV1080, JV2080, XP50, XP80 etc... and you're into any kind of dance music you can't avoid needing this new card - not just for Hip Hop, R & B, but for any style of dance production

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MBD1 Bass & Drums module £169.99



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32 Mbytes of PCM Rom, 8 Meg more than the Trinity, 40 more multi samples, 8 effects simultaneously, 512 programs / 512 combinations

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N5

64 voice poly, 1169 programs, resonance filter effect, arpeggiator, realtime control.

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The stunning new multi oscillator synth for the 21st century! Much much more than 12 Prophecies! Real polyphonic physical modelling! Incredibly realistic rhodes, wurltzers, clavs, guitars, basses, brass, reeds, and of course THAT Korg analogue model!

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88 note responsive weighted action and master hi/lo board functionality, 64 voice poly & much more!

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ALESIS NanoPiano

256 presets, 64 note poly, high quality true stereo Bosendorfer grand piano plus many more great sounds and FX.

£249.99



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256 preset bass programs, techno, jungle, acid, hip hop, house and R&B featuring resonant filter sweeps etc +all the classic basses.

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QS6

64 note polyphony, 640 sounds, 500 multibrain mixes, GM bank, 61 note velocity sensitive keyboard with aftertouch, on board 4 bus multi-effects, Mac / PC interface, 8 meg of waveform ROM, standard compatible.

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DM5

Superb Drum module

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Crunchy beats and low basses

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WITH: The rock solid timing of the QY700 • The Analog Physical Modelling of the AN1X • The Acoustic Physical Modelling of the VL7 • All affected by 12 types of Reverb, 18 types of Chorus and 78 types of Insertion and of course DSP Formulated Digital Signal Processing.

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The AHM2 chip developed for the MU'00 • The Analogue Sampler of the CS1X • The Sampling Capabilities of the A3000

EX5R £1599.99



AN1X

Analogue physical modelling, Great arpeggiator, 10 note poly

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A3000

64 note poly, SCSI as standard, Expandable to 128Mig, On board FX

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QY70 THE GROOVE BOY

Total production in the palm of your hand - Living proof that small is beautiful. Unbelievable sound and features. We love the QY70 and promise you the best price.

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Up to 78% off TLAudio Crimson

3011 2 Channel 4 band EQ
Continuously variable upper and lower mids. Frequency response 20Hz to 40kHz based on the EQ1

was £700 **VILLAGE EXCLUSIVE** **£149.99**
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3012 2 Channel Parametric EQ
Each band offers +15db of gain and variable Q between 0.5 and 5 front panel dual sensitivity input (for guitar, keyboards etc.). Frequency response 20Hz to 40kHz.

was £700 **VILLAGE EXCLUSIVE** **£179.99**
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3013 2 Channel Parametric EQ
The CRIMSON equivalent of the classic EQ2 - 2 channels each with 4 bands of fully parametric EQ. Each band/channel has individual EQ bypass switch.

continuously variable high and low cut filters with bypass switch, insert points on each channel and Stereo link.

was £821 **VILLAGE EXCLUSIVE** **£349.99**
or with AKG Solid Tube Mic RRP £1620 **Package Price £ 899.99**

3021 2 Channel Compressor
Attack and release times switchable between "fast" and "slow", dual mono or stereo linked modes. Dual sensitivity auxiliary input (for guitars, keyboards etc.) and side chain insert points for frequency conscious compression.

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or with AKG Solid Tube Mic RRP £1499 **Package Price £ 799.99**

3051 Mono Voice Processor
Continuously variable upper and lower mids, compression section identical to that of the 3021, 4 band EQ section identical to that of the 3011. EQ pre switch allows EQ to be positioned ahead of compression section. Link facility allows two 3051's to be used in stereo mode with side chain insert point for frequency conscious compression.

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TLAudio Classic PA2
The fattest sounding stereo mic Pre and DI unit in existence!

- Classic valve sound for mics
- Balanced XLR microphone inputs
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- Unbalanced instrument inputs with switchable sensitivity (guitar/keyboard)
- Peak LED's with variable brightness indicate degree of valve drive
- For warming digital keyboards
- Balanced XLR outputs
- Continuously variable input gain controls
- 48 volt phantom power
- Wonderful for guitar

was £410 **WORLD EXCLUSIVE** **£229.99**

Indigo 2011
2 channel, 4 band valve equaliser

With circuitry and facilities based on the original EQ-1 valve equaliser, the 2011 incorporates TLAudio's famously musical high and low frequency shelves, and 4 broad curved frequencies on each of the mid bands. Employing four ECC83-12AX7A valve stages per channel, the 2011 exhibits the wide bandwidth and low noise performance that characterises every TLAudio product. (Frequency response 20Hz to 40kHz +0/-10dB, your nearest route to EQ Heaven, perfect for stereo mastering)

was £704 **WORLD EXCLUSIVE ONLY** **£199.99**

Very Limited stock of Indigo 2012 Parametric EQ at £249

Check out these Mega Bundles!

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AKG C3000		Lexicon PCM80 plus	£ 1799.99
TLAudio PA2 plus	£ 399.99	Lexicon PCM90 plus	£ 289.99
Rode NT1		TLAudio Crimson 3011 plus 3011	£ 319.99
TLAudio PA2 plus	£ 749.99	TLAudio Crimson 3011 plus 3012	£ 339.99
Neumann TLM103		TLAudio PA2 plus	
TLAudio PA2 plus	£ 399.99	TLAudio Crimson 3011	
TLAudio PA2 plus	£ 399.99	TLAudio PA2 plus	
Yamaha O3D	£ 2399.99	TLAudio Crimson 3011	

Up to 46% off PCM80 & PCM90

Lexicon PCM80
THE KING OF FX PROCESSORS!
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Featuring 2 Lexi2 chips totally dedicated to Reverb
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or with AKG Solid Tube Mic **Package Price £ 799.99**

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Each channel has input and output level controls, switchable +48V, phase reverse, RFI low cut filter and Drive and Peak LEDs which indicate how hard the valve stages are being driven. Mic inputs are on balanced XLR and unbalanced jack connectors.

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Each channel offers fully variable control of input & output gain, threshold, ratio & gain make up. Attack and Release times are switchable for fast and slow modes. An expansion gate is provided with control of threshold. Metering is via VU meters. Works in dual mono or stereo linked modes.

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5051 Mono Valve Voice Processor
Combines a pre-amp with a compressor, expander and an EQ section. The one and only pre-amp gain control +48V low cut filter & an instrument input. The compressor section provides fully variable control of threshold, ratio & gain make up. The EQ section features the same type of 4-band shelving arrangement as the Classic EQ1

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5050 Mono Valve Mic Pre-Amp & Compressor
Combines a pre-amp with a compressor, expander and an EQ section. The one and only pre-amp gain control +48V low cut filter & an instrument input. The compressor section provides fully variable control of threshold, ratio & gain make up, with a choice of 2 attack & release times. The master section includes an output gain control with LED meters showing gain reduction and output level

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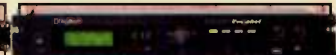
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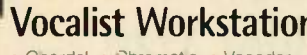
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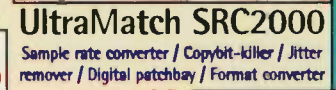
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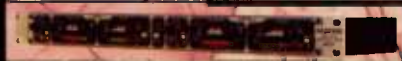
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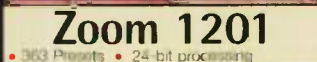
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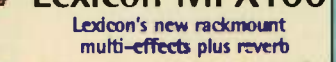


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- 12 Audio tracks
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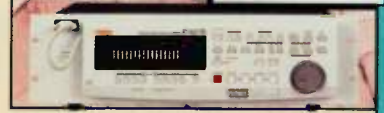
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The SolidTube recreates that Vintage

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Up to 59% off AKG

£5900 - Exceptional condenser hypercardioid performance microphone which is equally at home in the studio.

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3 FOR 2

AKG D65s

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The Ultimate Stage Vocal Mic

Stage condenser mic based on ATM4050 large diaphragm studio condenser (RRP £945).

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Pro 25 High SPL dynamic mic with a hypercardioid (unidirectional) pickup pattern. Ideal for drums, piano, bass, etc. Bundled with Bass drum mic stand.

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Yamaha

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All systems have 1" compression drivers and Sonic-Guard protection.

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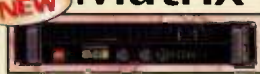


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All measurements are RMS power, 4 ohms



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Call for the very best deal possible on these amazing systems or to arrange a demo

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Chevin Research

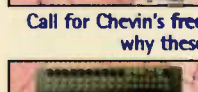


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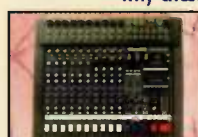
RRP £846 **£579.99**



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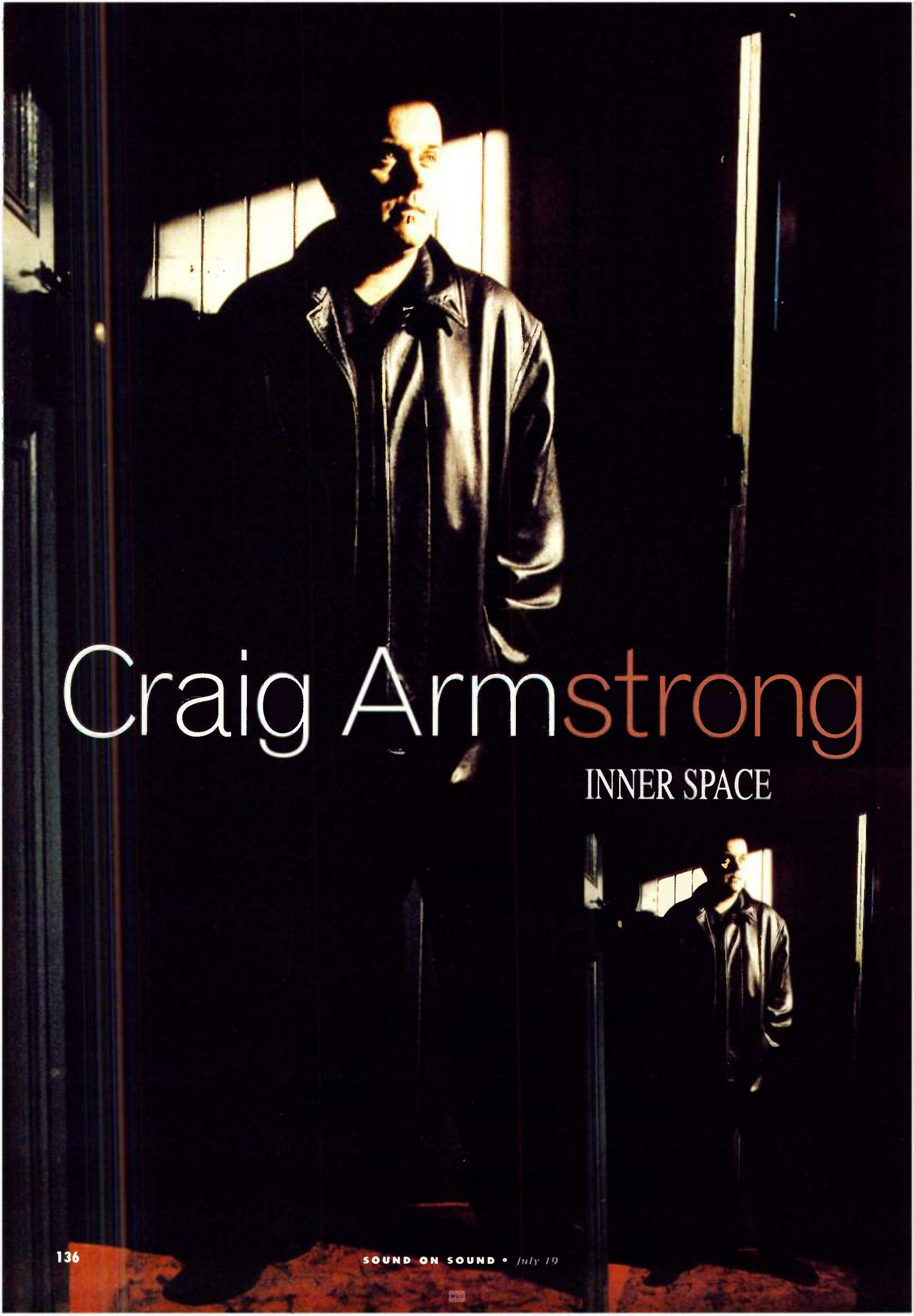


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Craig Armstrong

INNER SPACE

Although Craig Armstrong has been building strong writing and arranging credits since the start of the '90s with such artists as Massive Attack, Madonna, Suede and U2, it's only in recent months that he's come to the fore as a solo artist in his own right, with his new album *The Space Between Us*. PAUL TINGEN notches up some Frequent Flyer miles to talk to him.

It's one of those interesting little coincidences that, as I'm flying to Glasgow to interview the latest rising star in the firmament of the classical-rock crossover movement, the British Airways magazine *High Life* I read on the plane contains an article about the 'rock meets classical' issue. Paul McCartney (and his Standing Stone and Liverpool Oratorio orchestral works), Ryuichi Sakamoto, Frank Zappa, Joe Jackson, and Elvis Costello (who collaborated with The Brodsky Quartet on *The Juliet Letters*) are all mentioned as recent examples. The article argues that the rock/classical crossover — maybe we should call it R&C, for simplicity's sake — is coming of age and gaining artistic and commercial credibility, finally consigning the ill-fated pioneering efforts of ELP, Rick Wakeman, the Moody Blues, and Jon Lord and Deep Purple (*Concerto For Group And Orchestra*) to the past. The article gives classical composers who incorporate rock influences (and rock technology), such as Philip Glass, Steve Reich, Michael Nyman and John Adams, only a cursory mention, but obviously their R&C efforts have been as ground-breaking, and sometimes as ill-fated, as those of their rock counterparts.

Recently, though, a third type of crossover artist seems to be emerging, and this is the kind of hybrid composer who cannot easily be defined as belonging in one camp and crossing over to another. Karl Jenkins, of *Adiemus* and *Delta Airlines* TV ad fame, is one example; as a former member of the Soft Machine he has his roots as much in rock and jazz as in classical music [see *SOS* June 1997 for a full interview]. Simon Jeffes, the leader of the Penguin Café Orchestra, who died late last year, is another example. And many of these hybrid composers/artists (it's even unclear what we should call them) have made their name in another crossover territory, namely multimedia — writing film scores, advertising jingles and the like. The person I'm about to see in Glasgow appears to be the prototype for this type of 'hybrid artiste'. On the rock music side he has a credit list that will out-cool almost anyone: he was instrumental in the creation of Massive Attack's second album, *Protection* (1994), co-writing, playing piano and doing string arrangements; he was once voted Young Jazz Musician of The Year; he recently co-produced the next Pet Shop Boys album, and he's done

string arrangements for the likes of U2, Suede, Tina Turner and Madonna. On the classical side, he's worked with the Royal Shakespeare Company, Tron Theatre, the Scottish Chamber Orchestra, and various other established ensembles, and on the multimedia side he recently won a BAFTA award (together with Marius de Vries and Nellee Hooper) for his score to the movie *Romeo & Juliet*. He also provided the soundtrack for the Claudia Schiffer ad that's currently on TV, which advertises a car

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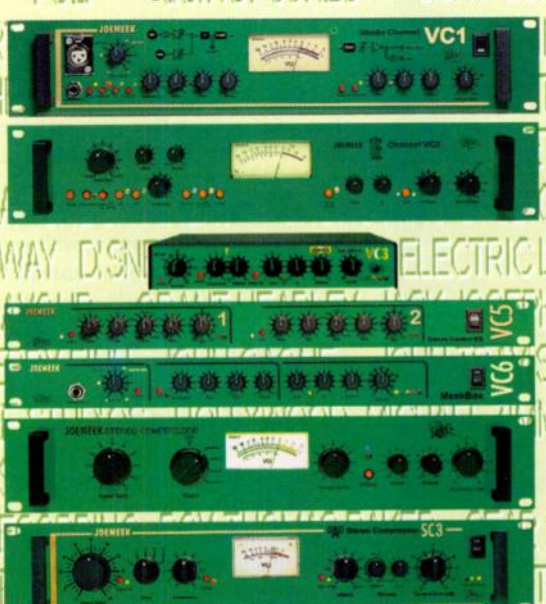
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Craig Armstrong

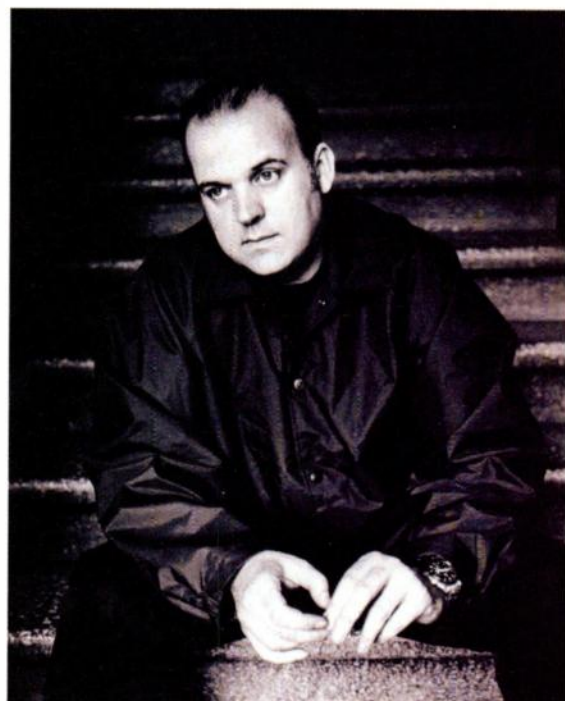
► nobody can remember the name of. (Few people will remember the music either, for the suggestion of a nude Schiffer draws all the attention...)

All this has put the man in question in the public ear, but not in the public eye. His name is Craig Armstrong, and journalists desperate for an angle like to take the one of him being the man everyone has heard, but who no-one has heard of. All that may soon change, though, because earlier this year his first solo album, *The Space Between Us*, was released. As you might expect, it's the archetypal indefinable late '90s crossover affair, inhabiting the territory that lies somewhere between classical, ambient, film music, trip hop, dance music and rock. Lush strings compete for attention with sample- and effect-driven atmospherics, usually backed by lazy looped and sampled beats that echo Massive Attack's work. Credibility is provided by the two guest singers: The Cocteau Twins' Liz Fraser, who sings the first single, 'This Love', and Paul Buchanan, who croons over Armstrong's rendition of The Blue Nile song 'Let's Go Out Tonight'. Moreover, behind-the-scenes credits on the album include programmer, engineer and producer Marius De Vries (who has also worked with Madonna and Bjork), mixer Mark 'Spike' Stent (Massive Attack and Bjork) and the ubiquitous (on these kinds of projects) orchestra leader and violinist Gavyn Wright. To further underline the Massive Attack connection, *The Space Between Us* was released on Massive's new Melankolic label (via Virgin), and features re-workings of two tracks from *Protection*: 'Weather Storm' (which Armstrong co-wrote and on which he plays some fabulous piano), and 'Sly' (on which he did the string arrangement).

RECONCILING OPPOSITIONS

Glasgow is unusually and unseasonably hot, and with regret Armstrong and yours truly descend from the sunlit café which was our rendezvous to the vaults of his rather dark and cramped studio. Still, it seems a more apt place to discuss the ins and outs of his late '90s crossover projects, as well as his opinions on late '90s music technology.

The room is fairly narrow, with a small recording area at the far end, centred around Mackie desks (a 32-track version with 24-track add-on), and Akai samplers (S3000XL and S3200XL), plus a 32-track Digidesign Pro Tools system and Emagic *Logic* sequencer running on a Mac. Armstrong, a 38-year-old father of three, who looks very much like your regular, easy-going, pub-going guy, reacts with some vehemence to my mention of the points made in the BA *High Life* article: "Well, it's true that in the '70s rock and classical was a very unhappy marriage. I think the main reason for that was that they were looked at as very different and opposing music categories. But today the whole issue has become irrelevant. I don't feel as though I'm working with either rock or classical music. When I'm writing music I do not make distinctions like that. I don't sit there thinking: 'OK, let's put a bit of classical music on top of this.' It's just much more organic.



"I cling on to the beauty of music, because life can be very difficult."

We have moved far away from sticking some Rachmaninoff over a beat. Some people may still be doing that, but for most people it's a much more diffused experience. You can't say any more that *this* is classical and *that* is rock. The whole discussion is really passé."

Armstrong's CV anticipates this reaction — his whole career appears to have centred around breaking through musical boundaries and reconciling musical oppositions. His fascination with both old-fashioned pen and paper composing and modern music technology is just another case in point. His first big move was typical: having grown up in Glasgow listening to rock and pop music as a kid, he opted to move to London at the tender age of 17 to study at the Royal Academy of Music. He remembered: "I suppose I was ahead of what's happening now. When you think back to that period, which was the late '70s, everything was very compartmentalised. One person would be listening only to classical music, and another only to rock music. But now when you visit people's homes you'll find classical, rock, jazz, and drum and bass records. One reason why I never got into those separations may be that I didn't feel affected by the class issue. If you listened to rock music while you were at the Royal Academy you were looked down on. But I come from quite a poor background and I listened to music very much as a blank page. I did not have any cultural baggage around it. So I could listen to The Beatles and The Rolling Stones and Beethoven without making much of a head switch. It was only when I went to college that I realised that this was quite an unusual attitude in those days." ►

PERSONAL SAMPLING

Armstrong states that he likes to "use electronics for what they do. I don't use them to beef up the orchestra." Instead, he likes to use samples to create effects and atmospherics, something that's especially apparent, on his album, from the stand-out tracks 'Glasgow' and 'Childhood', wherein he frames his orchestral and piano sounds in a soundscape made up from a wealth of environmental samples: thunderstorms, rain, talking, treated percussive sounds, and so on. Armstrong: "They're virtually all my own samples that I recorded with a DAT machine, and then treated in my Akai samplers, which have great filters. I will go anywhere to record my samples. I don't like using sample CDs. I don't think it works. The sounds that you take from them don't have a history, they don't mean much to you, so things will tend to sound flat and impersonal. On the other hand, when you sample something yourself, say from a record that you really love, and you change that about, you will have made it your own, and it will fit differently in your track. Incidentally, the thunderstorm-like sounds on 'Glasgow' come from the [Clavia] Nord [synthesizer], but the rest are samples I recorded."

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Craig Armstrong

► During his college years, the young Armstrong took a keen interest in all manner of avant-garde music, from Stockhausen to Birtwistle, and developed his interest in electronic music and musique concrete when he studied Electronic Music and Studio Techniques at RAM in London, and electronic music techniques with a grant from the Scottish Arts Council. His crossover adventures took another left-field turn when he was named Young Jazz Musician of the Year in 1981. He remembered: "I must admit that I never listened to much classical music. I was very much into pop music. What

“You may be down, and when you listen to a certain piece of music you look at the world as a better place again. I'm into that.”

interested me in classical music was the extreme, experimental side. So I had a really large knowledge of 20th century classical music. And as a pianist and composer I moved into the direction of avant-garde, atonal improvisation and Steve Reich-like minimalist repetitive music. It was this kind of music for which I was named Jazz Musician of the Year, even though jazz is hardly my area. My interest in electronic music came, really, from this friend of mine who had bought a Grundig tape recorder when we were about 10 years old. I still remember the absolute excitement of that. That really pulled me in. We were recording plays on it, with one track for the dialogue and another for the sound effects. So this is where my fascination with using found sounds started, which has today transmuted into using lots and lots of atmospheric samples.”

ENVIRONMENTAL SAMPLES

So the foundations for Armstrong's later career in general, and *The Space Between Us* in particular, were laid very early. Nevertheless, he's taken a long time to achieve his current status and success. During the '80s he was involved in all manner of activities which he now says were forced upon him by circumstance: "I don't disown them, but when you have kids you have to pay the rent, so I had to take any kind of work that came to me. They were not career decisions. It almost feels like those things were done by someone else. So I tend to say to people who interview me: 'forget what happened before 1990.'" (Some of what Armstrong did in the '80s is worth mentioning, nevertheless, not least the work he did with Midge Ure and his membership of the band Texas.) What happened around 1990, then? It turns out that running out of money on a recording project and a chance meeting with Nellee Hooper were two key events in the upward progression of Armstrong's career: "I had a recording contract in the US with a band called The Kindness of Strangers. Someone suggested that we work with Nellee Hooper, so I met him and we got on really well. Halfway through the project we ran out of money, so I decided to score the rest of the album. That was how I got into writing orchestral music. And it was through Nellee that I went on to work with Massive Attack on *Protection* in 1993, and that in turn led to the work with Madonna. I did this Marvin Gaye tribute track with her and Massive, called 'I Want You', and she really liked what I'd done, and called me to arrange the strings on *Bedtime Stories*."

With these credits and connections under his belt Armstrong was able to do what he calls "create a career", rather than just respond to what was offered to him. He mentions, as another deciding factor, that he went solo after leaving Texas, and after The Kindness of Strangers folded. "I thought I was old enough to be myself. I think I had a tendency to hide myself behind others". He

admits to a personality that doesn't like the limelight, commenting that "I think many musicians have that. One half of them wants to be the best in the world, and the other wants to hide in the bedroom with a piano."

Quality will usually surface in the end, though, and Armstrong's unique combination of skills — fine-tuned during many years in the commercial wilderness — have carried him to where he is now and make him the archetypal late '90s R&C artist. At the core of these are the pop sensibility developed in his youth, the classical skills acquired at the Royal Academy, and his keen interest in electronic sounds and technology. Armstrong elaborates: "I've learnt over the years to write for orchestra. I've listened a lot to Mahler and Ravel and really studied their scores. I can get really into how they do things. At the same time, I'm very inspired by musique concrete, the experiments that Schaffeur did with tape recorders in the '30s. That was an early form of sampling, really. It was his

MASSIVE MUSIC

Much of Armstrong's music appears to be driven by what he calls "found sounds", a description that suggests the influence of not only musique concrete, but also of Marcel Duchamp's ready made artworks — pieces of everyday suddenly promoted to art and exhibited in a gallery. This influence is also apparent in the sample-driven rhythm tracks on *The Space Between Us*. However, the loose, spacious, lazy beats also betray very strong influences from Massive Attack, probably not least because much of the programming was done between Armstrong and Massive-programmer Marius de Vries. The Scotsman comments: "Massive Attack were one of my

favourite bands even before I worked with them. Of course, when Nellee asked me to work with them I jumped at the opportunity. They sent me the rhythm track for 'Weather Storm', and I wrote all the piano stuff to it. That piece has a very special, contemplative atmosphere, and for my solo album I wanted to capture that with strings. With 'Sly' I took some tiny elements from the Massive original and expanded them with an almost classical approach. Of course, through working with them I also have been influenced by them very much — I think they were in turn influenced by the strings and piano bits that I did for them. But I like that minimalist, understated approach to doing rhythm very much. I'm not really a fan of very busy music. I prefer



to have lots of space and lots of room for you to think in. I love those old Visconti films, for example, where there is a kind of saturated elegance. I find that quite inspiring. My music is quite European, maybe even Scottish in that sense. I like that. When you write music you have to follow your soul."

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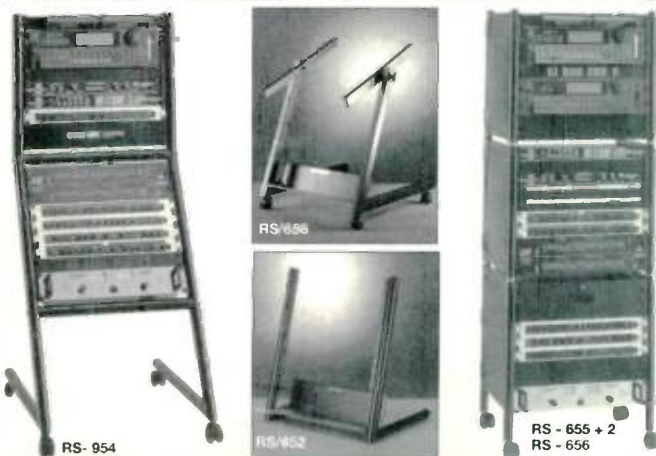
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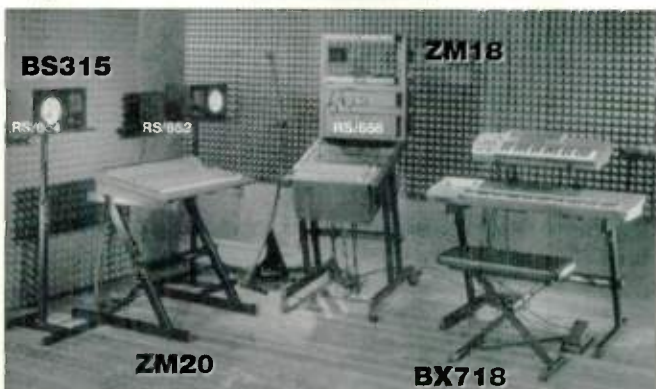


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► work that laid the foundations for the experiments of Stockhausen and Ligeti that later took place in Cologne. And so, now that sampling technology is readily available, I incorporate it more and more into my orchestral music. It's harder and harder for me to go totally acoustic."

MUSICAL MATHEMATICS

Armstrong explains that his musical ideas come to him as much from doodling at home at the piano, as from working to drum loops and rhythm tracks in his studio, Massive Attack-style: "With three kids at home it's too easy to forget a good idea, so when I'm at home I record ideas on a Walkman. In my studio I always record my ideas into *Logic*. One of the great things about this program is how easy it is to record stuff into it. Any idea you have, you just whack it down. In my studio I'll either work around piano ideas on my Roland RD1000, which has some excellent piano sounds which I used on my album, or I'll be working electronically with samples or the synths I have here, and I'll write a piece around atmospherics and sounds. I love that approach to making music. Ever since I encountered that tape recorder when I was about 10 I've been buying equipment and experimenting with it. At college I learnt to program a [EMS] VCS3, but sadly I sold it when I ran out of money. Take my advice: never sell an instrument you like! I also bought many other synths, like [Roland] Junos and JX3P, [Yamaha] DX7 and so on. I still have quite a few analogue keyboards. One of my favourites is the Jupiter 8, which I used a lot on the Pet Shop Boys album. I also have a Super Jupiter, Roland 106, Roland JD8000, Nord Lead, Roland JX10 and JD990, Waldorf Pulse, [Emu] Vintage Keys, an original Minimoog, Roland S770 sampler, and Linn 9000 and Roland TR808 drum machines. I occasionally still sample their sounds in the Akais, and then treat and sequence them in there."

But apart from his beloved RD1000, the heart of Armstrong's studio setup is formed by his 32-track Pro Tools system. He elaborates on the ins and outs: "I don't have tape recorders any more. Everything I do goes straight into Pro Tools or *Logic*. I access Pro Tools through *Logic* — I find that the easiest way of working. I'm totally happy with this system. I think the sound quality is absolutely amazing. And the great thing about Pro Tools is that you have all the effects at your fingertips the moment you enter your sound. I don't mind the computer interface. I think it's like with a lot of technology — much simpler to work than people say it is. It just takes a little bit of getting used to. I recorded all the Pet Shop Boys we did here in Pro Tools, and also most of my album.

"What I do is map everything out in *Logic* and Pro Tools, using the JD990 for the string sounds, and then I record the sequenced sections into Pro Tools as well. I save everything on a [Iomega] Jaz drive, and take that with me to the studio where the orchestral recordings are being done, usually Olympic or Air. They also have a Pro Tools system and it comes up exactly the same. That's

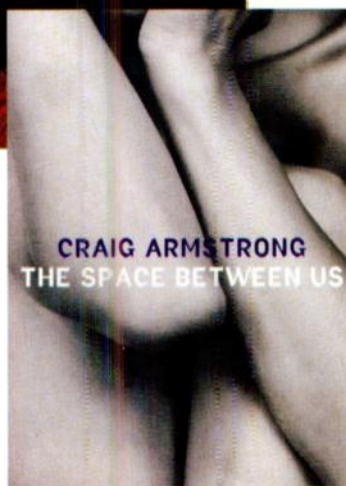
just great. I also use Jaz drives for backup. The only tape recorder that's left in my studio is my Tascam DA30 MkII DAT recorder."

The album that Armstrong is co-producing with the Pet Shop Boys is based around a musical and is planned for release later this year. Sadly, he's not allowed to talk about its exact nature. The only thing he's prepared to say is that he's been using lots of analogue synths, because "I loved the simplicity of their earlier tracks that were based around analogue synth sounds. The simplicity comes because it seems to me that when you have a good analogue sound, it takes up a lot more space, so you don't need as many sounds."

By co-producing the Pet Shop Boys, Armstrong has spread himself into yet another territory, making his activities yet more diverse. His ideal is that, one day, "all the influences that go into my work come together. I'm looking for that moment when everything blends together as if it's one mathematical equation, where everything hits the same point. At the moment, when I'm writing classical music it still is a bit more classical than on *The Space Between Us*. The Pet Shop Boys aren't interested in writing classical music, because they want to appeal to as many people as possible. They write great songs, but I would like to do something that is quite abstract and still appeals to lots of people. I haven't done that yet. So my next album will be a lot more experimental, and I will try to create something genuinely new, whereas *The Space Between Us* was really a very lyrical album, containing music that's like a kind of oasis to people and to which they can chill out.

"I see music as a positive force in life, so I think there's a responsibility attached to being an artist. People all over the world are listening to my record, and that gives me a responsibility. I cling on to the beauty of music, because life can be very difficult. And so for me the purpose of music is that it is an uplifting thing. It comes from the spiritual side of people. That's why hymns are so uplifting. I think that recently many people have gotten bogged down in the dark side of music. But with the new millennium coming up, I think that people will start to look forward again and be a lot more positive. You may be down, and when you listen to a certain piece of music you look at the world as a better place again. I'm into that. I think Massive Attack also do that. It doesn't have to be pretty music, but I do like music that leaves some hope after you've listened to it. That's the music I like to write. The music on my album is a bit melancholic, but I think it's a positive thing, rather than a negative thing. It's certainly music for adults. Young kids won't like it. I think it's spiritual music, to do with real life."

In his efforts to reach the moment where all his influences come together in 'one mathematical' equation, Armstrong is prepared to travel far. This year he's off to India to study Indian music, and add yet another colour to his already vivid palette: "For me the great thing about music is that it's infinite. You can keep on learning and learning and learning."



"When you write music you have to follow your soul."

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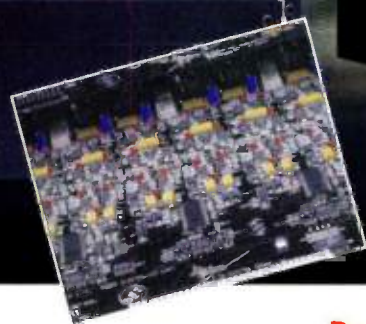
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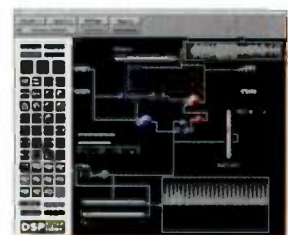
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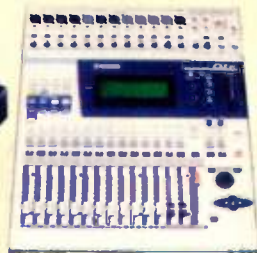
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EARTHWORKS QTC1 & Z30X MICROPHONES

Still looking for the best mics/preamp money can buy? HUGH ROBJOHNS unearths some real gems from the USA.



Earthworks is an American company that started out manufacturing specialist omnidirectional measurement microphones. Today, they have a small range of four very high quality audio microphones as well as a couple of very high quality microphone preamps designed to complement their products. Under review here are the omnidirectional QTC1 and the new directional Z30X, plus the 2-channel LAB102 mic preamp.

QTC1

The range-leading omnidirectional QTC1 is actually supplied as a boxed set of two matched microphones — and the box is every bit as gorgeous as the microphones! Each microphone comes complete with a stand adapter (with a 5/8-inch thread, but no 3/8-inch adapter unfortunately) and a paper trace of its frequency response, which is flat (within a dB) between about 4Hz and 40kHz. And it really does go down that low — during part of my testing at a friend's home studio, the microphone picked up subsonic footfalls from the children upstairs that we couldn't even hear ourselves!

Other information contained in the box included an owner's manual and an application guide. The owner's manual offered some rather unusual advice, such as allowing at least one minute for the microphone amplifier to settle if connected to a desk with transformer-coupled inputs (as opposed to capacitively-coupled electronic inputs). The other amusing thing it said was that "...for some reason, one of the first things people do when they handle the microphone is to touch the tip". This is bad, because grease and dirt will clog the screen and thus adversely affect the sound quality. Strangely, everyone I showed the mic to touched the tip! If any psychologists in the SOS readership want to suggest the reasons for this bizarre behaviour, I'd like to know... and in case you were wondering, yes, I touched the tip first too!

The microphone has a stainless steel finish and measures 229mm long and 22mm diameter at the widest part. The business end tapers down to just 7mm, which makes the microphone look very special. At 225g the mic is quite heavy for its size, but that just adds to the professional impression it creates even before you have plugged it in. The serial number is engraved into the bottom of the main body.

Being a true capacitor microphone, it requires 48V phantom power from which it draws a fairly substantial 10mA of current — but that should not be a problem for any modern mixing desk. The internal

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EARTHWORKS QTC1 & Z30X MICROPHONES

pros & cons

**EARTHWORKS
QTC1/Z30X/LAB102**

pros

- Well-designed for the job in hand.
- Stunningly transparent.
- Extraordinary frequency range on the QTC1 mic.

cons

- Expensive.
- Unusual polar response on the Z30X mic.

summary

Earthworks manufacture top-flight microphones and preamplifiers, and these are three of the best. The QTC1 omni is easily one of the best mics available at any price and the LAB102 mic preamp is the ideal partner, with a performance which perfectly matches that of the microphone. The newest addition, the Z30X directional mic, is a very credible product which comes surprisingly close to matching the qualities of the omni.

SOUND ON SOUND

▶ microphone head amplifier puts out a relatively high level compared to many capacitor microphones and the sensitivity is quoted as 30mV/Pa or -30dBV/Pa. In terms of dynamic range, the microphone can cope with signals up to 142dB SPL and its self-noise is a very reasonable (if not earth-shattering) 22dB SPL (A-weighted).

One of the key features of which Earthworks are keen to inform potential users of the QTC1, is that its impulse response is rather good. For those not familiar with the concept, an impulse is exactly that — a brief pulse or click — and the maths suggests that it contains all frequencies up to a certain upper limit defined by the duration of the pulse. Engineers like impulse responses, because they provide a very accurate way of analysing frequency and phase problems. Any filtering (mechanical or electrical) imposed on an impulse will alter its shape, typically with 'ringing' so that the pure 'spike' of the impulse will end up looking more like a mountain and range of foothills!

In the case of the QTC1, the impulse response does exhibit some ringing, simply because its frequency response is filtered (presumably as a result of the combination of the mechanics of the capsule and the electronics), but the ringing is well-damped and occupies a remarkably brief period. Indeed, Earthworks claim that the impulse response of the QTC1 is the cleanest they have ever measured. Perhaps that should be taken with a pinch of salt, but the fact remains that it is a very clean microphone.

By now you are probably wondering what good a clean impulse response is anyway. Basically, what it means is that the waveform of the sound source will be captured faithfully — it does not impose a character of its own, it simply captures the actual sound that occurs around it. In some applications, you may want to use a microphone specifically because of the character it adds to the sound — such as many of the large diaphragm Neumanns, for example. However, that is not the *raison d'être* of the QTC1. The measurement microphone pedigree of its forebears is revealed in its extreme accuracy of rendition, and there are numerous applications where you really do want the microphone to tell it like it is!

Since it is a pure omnidirectional microphone (a simple pressure transducer with no venting to the rear of the capsule, the QTC1 does not suffer from 'proximity effect' at all. Its tolerance of high sound pressure levels also means it can be positioned very close to sound sources. In practice, what this means is that you can use the QTC1 in situations where the natural instinct would be to employ a directional microphone. It is always worth remembering that there are

two ways of achieving isolation with the microphone: polar directivity (ie. use a microphone which rejects sounds from particular directions), and proximity. The inverse square law of sound propagation means that halving the distance between the mic and sound source increases the ratio of wanted to unwanted sounds by four times. So using an omnidirectional microphone very close to a source can give just the same isolation as a directional microphone at a greater distance. The only problem is that by close-miking, you only capture the sound from a small proportion of the instrument; the natural bloom in sound which the instrument generates when auditioned at a natural distance may be lost.

In my auditions, I found the QTC1 to be a very accurate, transparent microphone which conveyed even the most harmonically complex of instruments with perfect rendition. It has an extremely natural, extended and open top end (which was made all the more obvious when comparing the off-tape DAT recording with the microphone's actual output!), and a phenomenal bass response which really does go down to a very small number of Hertz. This is an important point to be aware of — monitoring through small nearfield speakers is unlikely to reveal the mass of subsonic information the microphone is collecting — but it is there, trust me! The good thing is that the bass response, though extended, is not artificial or overblown in any way, and the microphone does not require an elaborate suspension system.

QTC1 VERDICT

At £975.25 inc VAT, the QTC1 is certainly not a cheap microphone although its sound quality does justify the price tag. I would not suggest it as the first or only microphone to buy, but if you are looking for a top-flight omnidirectional capacitor mic that looks as good as it sounds — and it sounds just great — the QTC1 is certainly worth auditioning. ▶

QTC1 SPACED PAIR

Using the two QTC1s as a spaced pair, the stereo imaging was sublime — not the etched, pin-point accuracy of coincident mics of course, but a velvety smooth watercolour of sound spread out before the loudspeakers. If you like the spaced pair presentation, you'll love what the QTC1s can do. And I don't know why, but I found that I tended to prefer the mics with a narrower spacing than I would have employed with, say, B&K 4006s, although the stereo imaging always seemed more expansive!





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- E** **Problem:** Your drum mics are picking up sounds out of phase and thinning out the bass.
Solution: "Super Channels" offer Pad and Polarity switches on Channels 1 and 6 (neat).
- F** **Problem:** You want to send effects return to Main and Monitor without burning extra inputs.
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Solution: Tape input with send to Main and send to Monitor

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EARTHWORKS QTC1 & Z30X MICROPHONES

“Using the two QTC1s as a spaced pair, the stereo imaging was sublime... a velvety smooth watercolour of sound spread out before the loudspeakers”

► In terms of the remaining specifications of the microphone, it can accommodate peaks of 145dB SPL and its equivalent noise floor is the same as the QTC1 at 22dB SPL (A-weighted). The output level, however, is considerably lower than the omnidirectional microphone at only 10mV/Pa (-40dBV/Pa), and in practice I found an additional 15dB of gain was required to match levels between the two microphones. The capacitor microphone and head amplifier require 48V phantom and draw 10mA of current.

Listening to the Z30X, I was impressed with its overall quality and clarity. It managed to provide much of the openness of the QTC1 at the top end, but could add a useful degree of warmth at the bottom thanks to the (mis)use of the proximity effect. The mid and upper range of the microphone seemed extremely smooth and there was nothing by way of the (all too) common 'presence lift', which many manufacturers insist on imposing. The bottom end seemed a touch less uniform but was by no means 'lumpy' and the proximity effect, although quite strong, was manageable and usable. As I mentioned, the microphone's polar response is very wide at the front, which can be useful in many applications, and it tails off very smoothly and cleanly as sounds move around the side of the microphone. The rearward rejection is perfectly adequate, if not quite up with the best, but this was obviously a design decision in balancing the compromises and characteristics of the microphone.

Since I was given a pair of Z30X directional microphones to play with, the obvious thing to do was to rig them as a crossed pair for stereo. Starting with the standard mutual angle of 90 degrees, the Z30Xs produced sharp, well-focused images but with a tendency to bunch at the centre and stretch at the edges. The problem is that the very broad frontal pickup means that the

difference in sensitivity between the two microphones for angles around the centre of the stereo arena is rather smaller than normal. However, there is a simple solution: employ a greater mutual angle — with the mics set at 100 or even 110 degrees to each other, the centre of the image sounded much more evenly spaced, and the whole presentation seemed more uniform. The real strength of the Z30Xs in a stereo configuration is the very smooth

and natural off-axis sound which proved excellent in a test recording of a public performance by a small chamber orchestra. The audience applause, which can often sound very coloured on other crossed cardioid arrays (as it is essentially coming in on the back of the mics), sounded very smooth and natural. The Earthworks marketing brochures keep using the phrase "just like being there", but in this instance it really did sound like that!

Z30X VERDICT

The Z30X costs the same as the QTC1 (£975.25), and although it sounds very natural and detailed, and retains most of the transparency of the latter, overall I'm not quite as convinced of its blend of characteristics. There are many, many other good cardioid microphones around and a great many of those cost rather less than the Z30X.

SUMMARY

I had not come across Earthworks products before this review, but I am extremely impressed with both their microphones and the preamplifier. The QTC1 is simply gorgeous — both from the sound and styling points of view. It is without doubt amongst the finest omnidirectional microphones I have ever used, and that includes the infamous B&K 4006s. The Z30X 'enhanced cardioid' is very good indeed and manages to approach the sound quality of the QTC1 in many ways, whilst adding the advantage of some front-to-back discrimination. However, I remain slightly less convinced of its value-for-money status compared with the equally priced QTC1.

The LAB102 microphone preamp is fantastic. A simple, no-frills affair with all the money spent where it counts — on the circuitry rather than the industrial design of the box. Extremely transparent and faithful, very quiet, and with a very useful and well thought out blend of facilities.

None of the Earthworks range is obviously priced in home studio territory, and there are probably not that many professional studios that could happily go out and buy a crate-load either, but if you aspire to the best, Earthworks products are certainly one point to aim for. **SOS**

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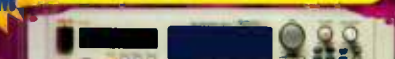


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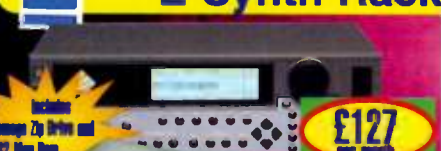


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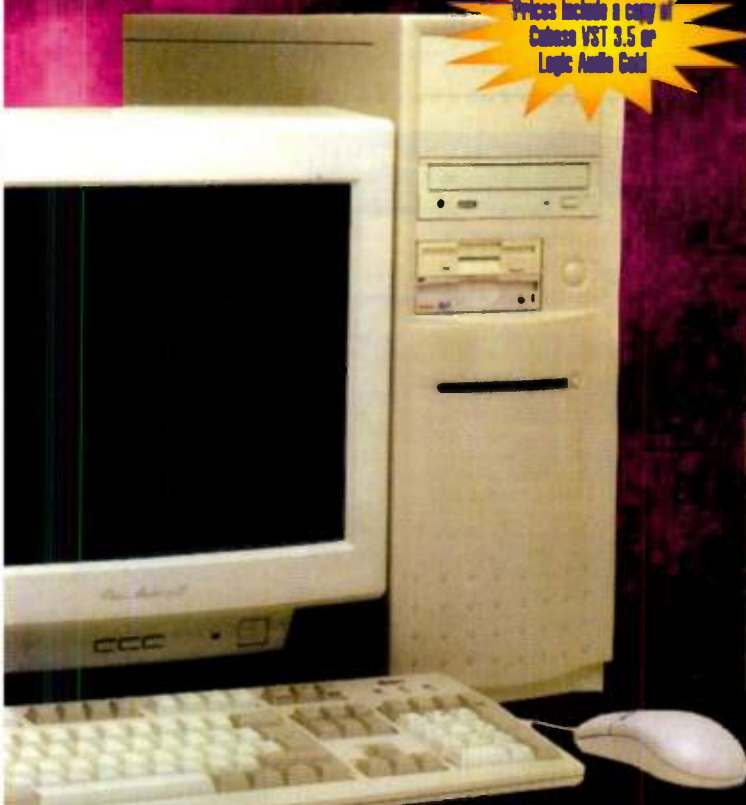
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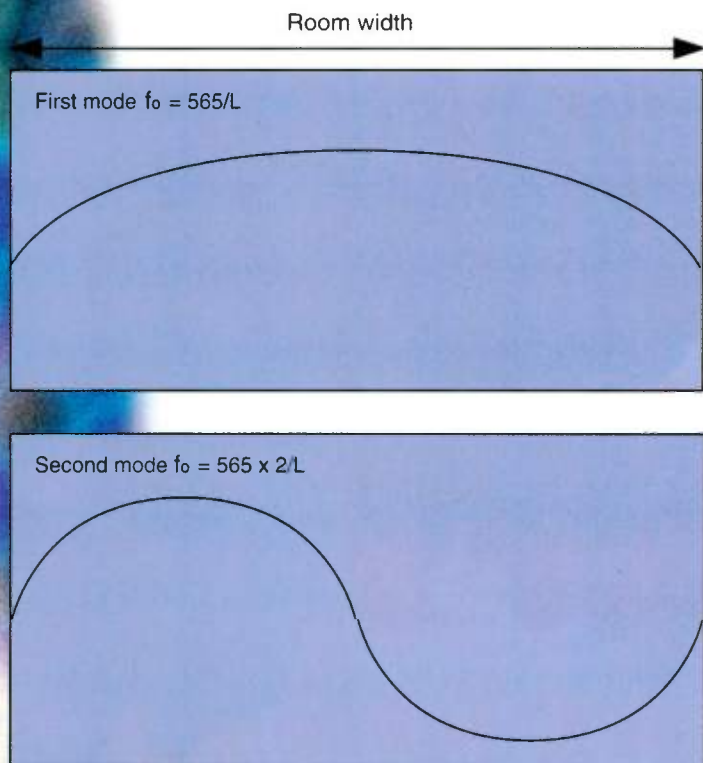
Room for Improvement

PRACTICAL ACOUSTIC TREATMENT

PART 1: PAUL WHITE examines the basic principles of acoustic treatment in order to help you improve your recording and monitoring environment.

There is a lot of confusion between soundproofing and acoustic treatment, but hopefully the recent series on Soundproofing (SOS February '98 to June '98) will have helped to explain the difference. Soundproofing is simply concerned with reducing the amount of sound getting into or out of a room, but the degree of soundproofing in no way defines how the room behaves as a space for listening to music. Indeed, it is very unlikely that it will function as a good listening (or performing) environment

Figure 1: Calculating room modes.



$f_0 = 565n/L$ where L is the distance between opposing surfaces in feet and f_0 is the frequency of the mode in Hz. n is the order of the mode (1, 2, 3 etc).

without further treatment.

A good listening room invariably combines appropriate absorption with scattering to break up strong reflections. Both these subjects will be covered as this series (which follows on from the one on soundproofing) progresses.

PRAGMATISM

The accurate acoustic treatment of a room cannot be undertaken based purely on theory, because, as we'll see later, the formulas used are not precise for small rooms, and the building materials involved may not have the same acoustic properties as stated in the tables of standard values you sometimes find in textbooks and materials catalogues. Professional studio designers use a combination of maths and measurement to arrive at a satisfactory solution, and the measuring equipment requires specialised operator knowledge, as well as being expensive.

If you interpret this as advice not to tackle the job yourself, you'd be both right and wrong. I'd never undertake a rigorous acoustic design project because I have neither the specialised knowledge, nor the tools required. But fortunately, it is possible to make significant improvements to a listening space by applying a few basic rules. What's more, because home recording tends to rely heavily on nearfield monitors, the contribution of the room's acoustic isn't as significant as it would be in a larger room with the monitors positioned further away from the listener.

The secret is to improve the room by doing as little as possible to it. Fortunately, most carpeted domestic rooms with just a few items of furniture are already pretty close to being acceptable listening environments. The purpose of this series is to explain some of the basic rules of acoustics so that you know what you're dealing with, and hopefully also to dissuade you from doing anything that might make the situation worse. For example, readers have phoned SOS after covering the entire surface of their studio with foam, mineral wool or even carpet to complain that the room sounds even worse than it did before (such distress is something that Nick Whitaker and Roger D'Arcy know all about — see last month's interview on their approach to acoustic treatment) Once you've learned the basic rules, you'll know exactly why this might be the case, and you'll have a number of options to try that have a far higher probability of success!

STUDIO AREA

While a control room should be designed to provide the best possible environment in which to listen to and evaluate the music being recorded and mixed,

the performing area or studio may have quite different acoustic properties. These might be dictated, as much as anything, by current fashion. For example, we have stone or wooden live rooms, rooms with variable acoustics, neutral rooms, and, occasionally, fairly dead rooms. Of course, some kind of compromise has to be reached in the project studio, where the recording and mixing is carried out in the same room.

A relatively dead recording environment excludes nearly all natural room ambience, enabling the engineer to start with a clean slate when it comes to adding artificial effects. However, most leading engineers and producers would agree that instruments that require a live acoustic setting invariably sound better in a sympathetic live room than when processed with artificial ambience from a digital reverb unit or echo plate. It's probably fair to say that a reasonably dead room is more useful than a very live one if it's the only room you have.

Separate live rooms remain popular for drums or certain other acoustic instruments, and a typical live room might consist of an untreated stone or tiled room with an exposed concrete or wooden floor. If space permits, it is possible to create a more general purpose recording room by designing an area that is live at one end, but damped at the other. Acoustic screens that are reflective on one side and absorbent on the other may then be used to create localised areas with the desired acoustic characteristic as well as providing some separation

DESIGN TRENDS

Over the past 20 years or so, a number of control room design philosophies have enjoyed 'flavour of the month' popularity. For example, early studios were often constructed like padded cells with mineral wool-lined walls covered with hessian. But we now know that this treatment produces a very dead acoustic, often with inadequate absorption at very

low frequencies. The result is a room that booms at low frequencies, but sounds unnaturally dead to speech.

Then we had the flirtation with the so-called 'live end, dead end' approach, where the end of the control room with the monitors was made to sound dead using a combination of absorption and geometry, while the back of the room was

allowed to contribute some reflections.

We've also seen rooms with carefully designed scattering surfaces, virtually anechoic rooms (ie, those with having a low degree of reverberation) with huge monitoring systems... and just about everything in between. Today's control room tends to incorporate a number of techniques with the aim of producing a better-balanced result.

between instruments. Such studios should not be confused with live end/dead end control rooms (see the 'Design Trends' box), which will be discussed later. Movable carpets or heavy drapes may also be used to deaden a naturally live room.

CONTROL ROOMS

The control room is the part of the studio where sounds are evaluated both during recording and mixing. So a control room must provide an acoustic environment in which valid musical decisions can be taken. However, because of the multiplicity of different monitor speaker systems and the widely differing design philosophies of control rooms, the aim of creating anything approaching a universal standard has yet to be realised. Indeed, it was once said that if you were

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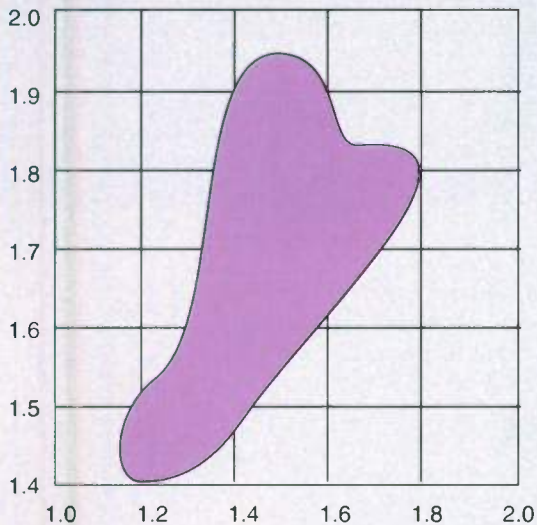


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PRACTICAL ACOUSTIC TREATMENT

BOLT-ON ACOUSTICS



The shaded area shows generally acceptable room ratios where the height of the room is 1 (the graph's axes represent the other two dimensions of the room). However, not all values within this graph are ideal, and not all those falling outside it are unsuitable.

If you don't have a room acoustics analysis software package and you don't fancy spending time with a calculator, you might be interested in Bolt's graph (he presented a paper on the subject in 1946), where the shaded space denotes acceptable room ratios. This isn't foolproof though, as some 2:1 room ratios fall into Bolt's area and some perfectly good rooms fall outside it. However it is a useful guide if some care is exercised — just check the figures after you've decided on your room dimensions to make sure there are no problems.

Several sets of preferred ratios have evolved which work well practically as well as theoretically. Three of these are:

- 1 : 1.14 : 1.39
- 1 : 1.28 : 1.54
- 1 : 1.6 : 2.33

► to take a sample of domestic living rooms and compare their acoustic performance, the results would be more consistent than a similar survey of studio control rooms. It may be an exaggeration, but it serves to show that virtually all studio control rooms sound different — though it's also true that most acoustic designers agree in broad terms what constitutes a good listening room.

But before looking at the possible fixes for acoustic problems, let's look more closely at their causes.

ROOM PARAMETERS

The first thing to appreciate is why a room should have 'a sound' in the first place — after all, it's the speakers that you're listening to. But sound bounces or reflects off all solid surfaces, so that when the sound source such as a loudspeaker stops producing sound, the reflections continue for a period of time until the energy is absorbed. Or to put it another way, the room functions as an energy store, returning the acoustic energy to the air at some point after the initial event.

Because of these reflections, we don't just hear the direct sound from our monitor loudspeakers, we also hear an appreciable amount of reverberation as the sound bounces around the room. In a good listening room, the reverb time will be too short to be perceptible under normal circumstances — although you'd notice a huge difference if it were removed altogether. However, different materials and structures reflect different parts of the audio spectrum more efficiently than others, and the dimensions of the room cause resonances or modes to be set up (more on these later), so the reverb we hear is 'coloured' — ie. it doesn't have a flat frequency response.

HOW MUCH REVERB?

The ideal listening room needs a touch of reverb to help increase the perceived loudness of the monitors and also to prevent the room sounding unnaturally dead. But the reverb time also needs to be roughly equal at all frequencies across the audio spectrum if coloration is to be avoided. Reverb times of between 0.3 and 0.5 seconds are normally chosen for control rooms, though it is also common for the very low frequency reverb time to be slightly longer (apart from in very sophisticated designs, where elaborate bass-trapping techniques have been employed).

An even reverberation time can only be achieved by the careful deployment of different types of sound-absorbing material and structures, and formulas exist that enable the areas of treatment to be calculated. However, as stated in the introduction, relying purely on calculations is likely to lead to inaccurate results, because of variables in the performance of the materials, combined with the effect of reflective and resonant studio equipment introduced after the design is complete, and the presence of people in the studio. It is also likely that the existing building has acoustic properties that can't be accurately calculated. It's for this reason that professional studio designers use very sophisticated measuring equipment and not just simple spectrum analysers to calculate room acoustics. Moreover, competent designers will generally measure the room after treating it, then make fine adjustments to ensure the measured result matches the target figures.

Because much of today's actual recording is done in the control room rather than in the studio proper, the design may be a compromise between ergonomics and acoustics, especially when equipment is regularly being moved in and out of the studio. However, once the most serious problems have been ironed out, such changes generally make less of a practical difference than you might imagine.

Once the room performance has been brought within acceptable parameters, the choice and location of loudspeakers can still have a dramatic effect on the overall monitoring accuracy of the room. This subject will be covered later in the series.

MODES

Earlier I mentioned room modes or resonances, which cause the spectrum of the reflected sound to vary at different points in the room. Assuming you have solid walls, room modes are directly related to room dimensions and, because the same physical laws apply, they will affect both control room and studio acoustics. If a sound wave is generated that has exactly the same wavelength as the longest dimension of a room, it will be reflected back and forth from the facing walls in phase with the original, thus reinforcing it — a phenomenon known as a standing wave. Accepting the value for the speed of sound as being roughly 1100 feet per second, an 11-foot room would correspond to a half wavelength

TRIPS AROUND THE BAY

One architectural feature to avoid where possible is any form of concave structure such as a bay window or curved wall. These tend to focus reflected sound into one place, just like a parabolic reflector, which can seriously affect the room's acoustic performance when you're anywhere near the focal point. Convex or irregular surfaces, on the other hand, are generally desirable, as they help to diffuse high frequencies leading to a more even sound field.



THE CHOICE IS CLEAR

WRH

PRACTICAL ACOUSTIC TREATMENT

“...much can be deduced about a room's mid-range performance simply by holding a conversation in it...”

▶ at 50Hz, the result being a strong 50Hz mode.

Any music signal played in the room would, therefore, undergo an artificial reinforcement or colouration of sounds at, or around, 50Hz — although not only at 50Hz. Two half wavelengths at 100Hz also fit neatly into 11 feet, three at 150Hz, four at 200Hz, and so on. Introducing sound into the room at any of these frequencies will cause standing waves, giving us a potential trouble spot for every 50Hz increase in frequency.

But note that this is only in relation to one room dimension. The width and height of a room also give rise to their own series of standing wave frequencies. Because they are related to the three axes of the room (length, width and height) modes caused by standing waves between parallel room surfaces are known as axial modes. There are other more complex modes caused by sound bouncing off more than one wall and travelling round the room: these are known as tangential and oblique modes. Because the sound bounces off more surfaces to produce these modes, some of the energy is absorbed or scattered, so the intensity of the modal peaks is less than for axial modes. To be more precise, tangential modes produce half the energy of axial modes whereas oblique modes produce one quarter of the energy of the axial modes.

These modes decay at different rates, so to damp a mode, absorbing material must be placed in an area of high pressure. For example, to damp a mode produced by two opposite walls, the absorbent material must be placed on one of the walls, rather than on the floor or ceiling.

OPTIMUM DIMENSIONS

Unless you make at least one of every opposing pairs of surfaces completely absorbent across the entire audio spectrum, modes will exist. In other words, if a room has dimensions, it has modes, though the absorbency of the walls will influence the intensity of the modes. The question is, how do we reconcile all these apparently nasty resonances with a flat reverb spectrum?

The best-sounding rooms tend to have their modes fairly evenly distributed, so there are no drastic peaks or dips in the room's response. In practice, modal problems are most serious at lower frequencies, and unfortunately, smaller rooms tend to be worse affected than larger rooms because the low frequency modes are often strong, with little happening between them. One approach is to use tuned absorbers to damp down the energy peaks at the main modal frequencies, although a lot of this can be avoided at the planning stage by picking room dimension ratios that produce the most evenly spaced modes. Alternatively, nearfield monitors with a restricted bass response could be used to avoid exciting the rogue room modes.

It's also possible to improve the situation at low frequencies by a combination of monitor positioning and maybe even a little monitor equalisation — though equalisation is rarely helpful at higher frequencies.

To learn a little more about the best shape for a

room, let's first consider the worst possible shape — a cube. Inside a cube, all three axial modes will occur at exactly the same frequencies and so will reinforce each other to form very noticeable peaks in the room response. Non-cuboid shapes are obviously more suitable, but if one dimension turns out to be exactly twice one of the others, then modes will still occur at the same frequencies. Even apparently unrelated dimensions can cause modal pile-ups at some frequencies purely by chance. Much research has been undertaken in the past to find sets of ratios that minimise these undesirable peaks. Currently you can buy computer programs, such as Pilchner-Schoustal's *Acoustic X*, that work out the room mode distribution from your room dimensions. Though no substitute for an experienced designer, such programs can be both educational and useful.

Large gaps between modes are also a problem because the room response will dip noticeably in these places. In practice, you might find that musical notes coinciding with these inter-mode gaps sound quieter compared with the rest of the spectrum. Clearly this is a bad thing because it will upset your perception of what you're hearing over your monitors, leading to a less accurate mix.

In most rooms, above the 300Hz mark, the modes become so closely spaced that we don't need to worry unduly about peaks or gaps. Below this frequency, the ideal situation is not to have gaps between modes of more than around 20Hz. At the same time, you should avoid closely packed or coincident modes. In a typical studio, the modal resonances tend to be around 5Hz wide, and the more reverberant the room, the narrower the modal bandwidth. However, if a room is below a certain minimum size, it is impossible to arrive at dimensions where the low frequency modal behaviour is ideal because the modes are too widely spaced.

An approximation to the modal behaviour of a room can be arrived at by plotting just the three axial modes against frequency and ignoring the tangential and oblique modes. Calculating the tangential and oblique modes is much more complicated, and a number of textbooks stress that the practical results seldom bear out the mathematical predictions. Figure 1 shows how the axial modes may be calculated for each opposing pair of surfaces in a room. By substituting the numbers one, two, three, and so on for the value of n , a whole series of modes can be calculated, though the most significant are those falling below 300Hz.

As modal problems invariably have an adverse effect on the quality of speech in a room, much can be deduced about a room's mid-range performance simply by holding a conversation in it and checking the intelligibility of the speech. As a rule, if a room sounds good for speech, it will sound good for music, though there may still be low frequency problems below the natural frequency range of the human voice.

SOS

Next month, I'll look at some of the traditional solutions to the problems I've outlined so far.

THE RIGHT ANGLE?

It is a common misconception that building non-parallel walls will improve the standing wave situation. In practice, this has minimal effects at low frequencies: the low frequency modes will develop much as before based on the mean distance between walls.

What is true is that splaying the walls by as little as 1:10 or even 1:20 will help reduce high-frequency flutter echoes caused by mid- and high-frequency sounds bouncing between two facing walls or floor and ceiling. However, this particular problem is solved even more easily in most rooms with parallel walls by using small areas of acoustically absorbent material.

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INTERACTION STATIONS!

Korg's latest i-series keyboard is the new flagship of the range, updating the i3's spec and adopting the Trinity's touchscreen graphical display. SIMON TRASK gets in touch with the i30...

KORG i30 INTERACTIVE MUSIC WORKSTATION

Korg's surprise entry into the keyboard market with the high-end i2, some four and a half years ago, was significant in several respects. For a start, the very fact that a company closely and prestigiously identified with the synthesizer market had released an auto-accompaniment keyboard was a recognition of the changing nature of keyboards and keyboard players' expectations. It was also a recognition that, in application if not in image, the high-end auto-accompaniment keyboard and the workstation synth were becoming ever more alike in functionality, quality and appearance.

With the introduction of the i-series, Korg finally closed the sonic gap between keyboard and (workstation) synth, simply by carrying over the synthesis and effects technology of their workstation synths into the new instruments. The 61-key i2 and companion 76-key i3 also kept to the

'serious' styling of their workstation synths rather than adopt a more traditional keyboard aesthetic, and were early examples of the speakerless auto-accompaniment keyboard. A few months later, Korg introduced built-in speakers with the i4S, a more affordable, scaled-down version of the i2/i3 slanted more towards the traditional keyboard buyer — though the sober appearance was retained, with the speakers blended into the front-panel design using low-profile black speaker grilles.

Subsequently, Korg have produced a number of more affordable keyboards, such as the i540, i550 and i300, ranging in price from £849 to £1199. However, the i-series has been without a high-end flagship for the past year, following the deletion of the i2 and i3 from Korg's catalogue. The new i30 sets out to remedy this situation. So just what do Korg think a flagship keyboard should be offering these days?



OVERVIEW

Korg label their i-series instruments 'Interactive Music Workstations'. The Interactive bit refers, of course, to the auto-accompaniment section (a canny application of a contemporary technology buzzword), but it also serves to distinguish the i-series from the (synth) Music Workstation that is most associated with the company. Like its flagship predecessors, the i30 is a synth workstation, but with auto-accompaniment features integrated into it. So, it has the familiar workstation combination of sample-based sound collection, multiple drum kits, onboard multi-effects, multitimbrality, onboard multitrack sequencer and built-in floppy disk drive (though it lacks the multi-Program Combis familiar from Korg's workstations). It also introduces to the i-series range the large TouchView touch-sensitive graphical LCD screen previously found on Korg's Trinity synth workstation range.

On the synthesis front, however, the i30 sticks to the AI2 sample-based subtractive synthesis familiar from the company's X and N series synth workstations rather than adopting the more recent ACCESS sample-based subtractive synthesis technology of the Trinity (so, for instance, it doesn't have the Trinity's Prophecy-derived multimode filters). This does, though, allow it to provide the 64-voice polyphony expected of a high-end keyboard these days (ACCESS on the Trinity provides a more modest 32 voices). With an 18Mb sample ROM providing 523 samples and waveforms, the i30 has the largest

sound source yet on an i-series instrument (though still short of the Trinity's 24Mb); it also has the largest collection of Programs and Styles so far, and provides full editing of both.

Other features include a 16-track onboard sequencer for recording sequences from scratch and a Backing Sequence mode for recording live auto-accompaniment plus melody performances (plus another five keyboard parts if you wish). Korg's new flagship comes in two versions, one with and one without a built-in 1Gb hard drive for storing all the instrument's data. If you need rapid selection and loading of sounds, sequences and auto-accompaniment style data for onstage use, then the £200 extra for the hard drive version will be a worthwhile investment.

ACTION STATIONS

The most striking aspect of the i30's otherwise sober front panel is its large backlit graphical LCD. But what really sets the i30 apart from the crowd is the fact that this LCD is touch-sensitive; all you need to do in order to select parameters and call up onscreen windows and menus is touch the relevant area of the screen. Fortunately you don't need to strike the screen in order to get a result; a gentle but firm touch is all that is needed, although sharp jabs work well too, if that's how the mood takes you — the LCD screen seems quite robust. Response/redraw time is comfortably fast, if not instant. (See 'A Touching Display' box for more about the touchscreen interface.)

pros & cons

KORG i30 £1699
i30HD £1899

pros

- Touchscreen LCD.
- The 'Korg sound'.
- Accessible front panel, including mixer section.
- Large collection of Programs and Styles, plus custom editing.
- Versatile, accessible auto-accompaniment capabilities.
- Smooth transition between Programs while holding notes.

cons

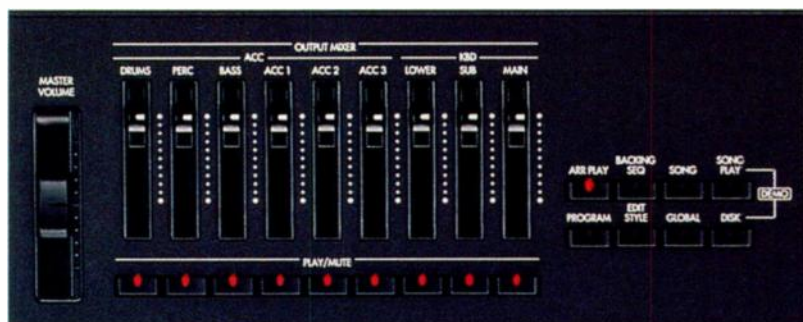
- No Combis.
- No custom sample capability.

summary

The i30 is a sophisticated, powerful and versatile keyboard/synth crossover instrument, offering plenty of high-quality sounds and Styles. As such, it should appeal to a wide range of musicians.

SOUND ON SOUND

KORG i30



“Editing is easy and rewarding using the graphical touchscreen interface.”



► The i30's front panel features a generous supply of buttons and sliders, mainly for mode and memory selection, plus selection of auto-accompaniment and keyboard settings. It's worth pointing out, though, that the large graphical display and touchscreen capability provide ready access to the i30's many synthesis parameters. Live mixing of the i30's accompaniment and keyboard parts is facilitated by the Output Mixer section at the left-hand end of the front panel. The nine level sliders allow individual control of the six accompaniment and three keyboard parts, as do the nine play/mute buttons below the sliders; you can press multiple buttons at once to drop several parts in and/or out together, eg. the drum, percussion and bass parts.

To the right of the mixer section are eight buttons for selecting the i30's various operational modes: Arrange Play, Backing Sequence, Song, Song Play, Program, Edit Style, Global, and Disk. Over on the other side of the LCD are the familiar tempo/value dial and +/- buttons for use in parameter editing along with the touchscreen, plus Menu, Exit, Compare, Reset and Tap Tempo buttons and an array of buttons for selecting Programs and Arrangements. Each i30 mode has an edit menu, called up logically enough using the Menu button, with options selectable by touching

large, clearly-labelled graphical square 'buttons' in the LCD.

Running across the lower edge of the front panel, just above the keyboard, are all the buttons for use in conjunction with the auto-accompaniment section. Here you can select the 10 sections of a Style (Intro 1 and 2, Ending 1 and 2, Fills 1 and 2, and Variations 1-4) and start/stop the accompaniment, and also select synchro start/stop, fade in/out and ritardando/accelerando options. Other parameter buttons include Chord Memory ('off' means bass and harmony parts only play when trigger notes are held down), Bass Inversion ('on' means the bass part plays the lowest, not always the root, note of a trigger chord), and Ensemble ('on' adds harmony parts around the melody line; you also get a choice of 10 voicing types). You can also lock tempo and keyboard sounds (so they don't change when you call up a new Arrangement), select Keyboard Set mode (for calling up user-programmable keyboard settings), and enable/disable the Full Keyboard trigger zone option (a welcome feature, I feel, as it can be useful to be able to drop in and out of full keyboard triggering for those moments when you need two-handed triggering for more sophisticated chords, or big chordal keyboard stabs). Also provided on the front panel are handy octave up/down and transpose buttons, allowing you to quickly change the range of individual keyboard parts (+/- two octaves) and alter the key of the keyboard and accompaniment parts.

To the left of the 61-note keyboard is Korg's familiar X/Y joystick plus a couple of buttons, Switch 1 and Switch 2. The joystick handles the usual pitch-bend and modulation functions, but can also be assigned per Program to control a number of synthesis parameters. Meanwhile, each switch can be assigned any one of 54 functions globally, in many cases these duplicate front-panel buttons, but they also include handy up/down functions (eg. Program or Keyboard Set up or down). Incidentally, this same set of functions is also available for the two assignable footswitch inputs and the five footswitches of the optional EC5 board — useful in this case as hands-free alternatives

KEY FEATURES

Keyboard:	61 keys, attack velocity and channel aftertouch.
Sound generation method:	A12 sample-based subtractive synthesis.
Sound ROM:	18Mb PCM samples and waveforms.
Polyphony:	64 voices.
Programs:	320 ROM + 32 ROM drum kits, 128 RAM + 8 RAM drum kits.
Effects:	2 digital multi-effects; 24 types, 47 effects (4 available in Arrangement Play and Backing Sequence modes).
Keyboard Sets:	64
Arrangements:	123 ROM, 128 RAM.
Styles:	128 ROM, 48 RAM.
Backing Sequence:	10 Songs.
Song Sequencer:	10 Songs.
Memory capacity	
(Backing and Song sequencers):	65,536 events max.
Display:	TouchView touch-sensitive backlit LCD, 320 x 240 dots.
Storage:	(i30) built-in 3.5" DSDD/HD floppy disk drive; (i30HD) built-in 1GB hard drive.
Connections:	L/Mono & R audio outs, two individual audio outs, headphones socket, sustain pedal input, two assignable switch/pedal inputs, EC5 multi-footswitch board input, MIDI (In, Out and Thru), To Host PC computer serial port.
Weight:	14.21 kg.
Dimensions:	109cm (W) x 34.8cm (D) x 11.7cm (H).

Definition

passive /'pæsiv/ adjective 1 submissive. 2 inert

active /æktiv/ adjective 1 given to action; working, effective. 2 practical; diligent.



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KORG i30

“If you’re a fan of Korg’s sample-based workstations and you want to get into auto-accompaniment sequencing, the i30 is the ideal instrument...”



► to front-panel operations. The synth-style keyboard has a lively action, which will be pleasing to players as it encourages clear articulation.

MAKING ARRANGEMENTS

An i30 Arrangement is a complete set of keyboard and accompaniment sounds, effects, tempo and front-panel settings grouped together with a Style selection. You can call up a different Style at any time within a given Arrangement — which can be an interesting way of randomly experimenting with different Style and sound combinations. A new Style is selected simply by pressing on the Style field in the main Arrangement Play mode LCD screen, then pressing on one of the 12 graphical musical style buttons and selecting a Style from the resulting pop-up menu. You can select from 128 ROM and 128 RAM Arrangements (great to see the user memories given equal weight), either via the LCD or the relevant front-panel buttons. The transition from Arrangement to Arrangement is completely smooth in performance (on the first beat of the next bar), so you can create performances and songs out of multiple Arrangements and Styles — ideal for user-created auto-accompaniments.

The i30’s virtual backing band has six ‘members’: drummer, percussionist, bassist, and three very

versatile multi-instrumentalists! For your own keyboard performance you get three parts — Lower, Sub and Main — each of which can, like the ‘backing band members’, be assigned its own Program. Lower occupies the left side of the user-selectable keyboard split, while Main and Sub are layered sounds on the right side of the split. You can use any combination of these keyboard sounds, and also define a velocity window, damper on/off, and joystick x-axis on/off settings for each part. Keyboard and accompaniment parts can also use external sounds (from other MIDI instruments), as each part can be assigned its own MIDI transmit/receive channel.

All the Style sections (intros, variations, fills, endings) can be selected live, of course, with seamless transitions; it’s worth mentioning that each Fill-in can be assigned one of 13 possible options defining which Variation follows on from it! But perhaps the standout Style feature is the multiple Chord Variations programmable for each section — two for each of the Intro, Fill-in and End sections, six for each of the Variation sections — greatly increasing the number of available sections. They’re called Chord Variations because each can be triggered by any one of an impressive 20 (yes, 20) chord types. This allows a lot more flexibility to be introduced into the backings where you’re playing chord sequences, but also it greatly expands the flexibility of a more modern ‘pattern loop’ approach to auto-accompaniments, where chords are used purely to trigger patterns which may have chord sequences already programmed within them.

Another neat live mixing feature is the Synchro Backing option. If you enable this for any accompaniment part, the part drops out whenever you hold down the notes of your trigger chord; this means you can dynamically drop selected parts in and out while playing, simply by the choice of when you play the trigger chord on the keyboard.

Edit Style mode lets you create your own Styles from scratch, by editing an existing Style, or by mix ‘n’ matching parts from different Styles (always a fun way to create new Styles — sometimes the results are awful, sometimes excitingly fresh). You can, of course, also mix your own parts with existing parts. Remember that you also have all the Chord Variations parts, so there’s plenty of scope for creativity. Full bar and event editing is available, and you can also record up to 99 Patterns as a common pool of material to draw on, and import accompaniment tracks into the patterns and patterns into the accompaniment tracks. If that’s not enough, you can import any bar range from any Song track into a Style, allowing you to draw on material from MIDI songfile toolkit disks. ►

A TOUCHING DISPLAY

The i30’s inclusion of the TouchView touch-sensitive backlit LCD (320 x 240 dots) is one of those significant moments in keyboard history — not only does it put the i30 on a par with Korg’s Trinity synth workstation, but it also puts the keyboard ahead of the synth market in general (echoes of the Technics KN2000 here). Actually, the i30 isn’t the first keyboard to include a touch-sensitive LCD screen; German company Wersi got there first with the Pegasus a few years back (before the Trinity, even).

I’ve commented elsewhere on the touch responsiveness of the screen (see ‘Front Panel’ section). Here I want to outline the features of the display. There are several graphical parameter field types: edit cells, pop-up buttons, check boxes, radio buttons, tabs, and select buttons.

- With an edit cell, you just press the relevant area on the screen and then use the edit dial or +/- button to change the value (this option is typically used for numeric ranges).
- Pop-up and select buttons call up menus which occupy some or all of the screen; these are typically used for selecting Programs or Styles by category.
- Check boxes and radio buttons are used for on/off parameter settings; you simply press them and a graphical tick or blob appears or disappears accordingly.

- Tabs, meanwhile, are the equivalent of the physical ‘soft’ function buttons often found below LCD screens, and are used to call up related pages

Each LCD page also has a Page Menu button in the top right-hand corner; pressing on this calls up a pop-up menu which typically has write options and sometimes copy, swap, initialise and metronome options, depending on the context. Selecting one of these options typically calls up a dialogue box with parameter, cancel and OK options. A feature of the pop-up menu is the ‘safety pin’, which you open or close by touching it; open means the menu disappears once you’ve selected an option, closed means the menu stays open.

The i30’s graphical page layouts are clear and very accessible, and the size of the screen (320 x 240 dots) in conjunction with these graphical layouts and the ease of selecting parameters and options simply by touching them onscreen makes the i30 a real pleasure to edit. To give one example, in Arrangement Play mode it’s possible to select one of six effects configurations for the accompaniment parts; the large LCD lets you see the six configurations graphically in the one display and select the configuration you want simply by touching it. Another good example is the text edit dialogue box, which gives you a graphical typewriter key layout, complete with space bar and shift and delete keys; this makes entering names a doddle, as you literally type them onscreen.

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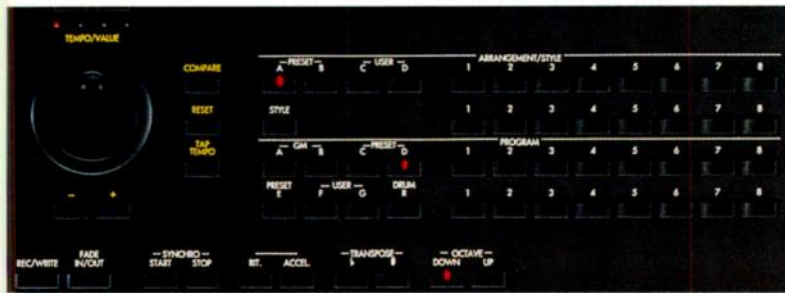
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“...the standard of the i30's Style programming is impressive.”

▶ SOUNDS & STYLES

Inevitably the Korg i30 provides a General MIDI sound set, and it's one of the more vibrant and appealing ones available, characterised by Korg's usual sonic excellence. However, the new keyboard is sonically much more versatile than this, coming with a further 192 ROM and 128 RAM Programs, sophisticated sound editing capability, and a large sample and waveform ROM complete with the usual quirky and creative Korg sounds to draw on. Editing is easy and rewarding using the graphical touchscreen interface. While the i30 treads a well-worn path sonically, it's also solid and reliable. Worth highlighting is the large number of drum kits, which as usual from Korg provide one of the more interesting and satisfying drum and percussion presences available on a workstation, including plenty of modern kits.

The i30's 128 preset ROM Arrangements/Styles



are divided into 12 musical style categories: 8 Beat, 16 Beat, Ballroom, Dance (not ballroom!), Latin, Country, Trad, Jazz, R&B, Funk, Rock and World — the usual split-personality keyboard attempt to appeal to both traditional and modern users (it's about time this situation changed). However, the standard of the i30's Style programming is impressive across the board; unlike some manufacturers, Korg do manage to come up with credible modern dancefloor Styles, and have the components and the overall sound to put them across convincingly. Now if only Korg would focus even more in this area... But whatever your musical preference, do check out the i30's Styles if you are thinking of investing in a high-end keyboard.

SEQUENCING

The i30's onboard 16-track sequencer is pleasingly flexible, intuitive, and well provided for with editing features; it also benefits greatly from the instrument's large graphical display and touchscreen access.

Each track can be set to play internally and/or externally via MIDI, and assigned its own MIDI channel; you can also set key and velocity ranges per track, as well as transposition, detune, and bend range. Overwrite, Overdub, Manual Punch-in, Auto Punch In/Out and Loop real-time record modes are provided, as is step-time recording. As well as linear tracks you can also record up to 100 Patterns that all the Songs can draw on, and move song data between Patterns and tracks. The sequencer has a

thorough complement of bar-level editing functions, and also lets you edit at event level (complete with data filtering options to simplify the data stream). As usual from Korg, then, this is no half-hearted effort; the memory, shared by Backing and Song sequencers, offers around 65,000 events in total.

The i30 can load MIDI songfiles off disk into its 10 Song memories and automatically play them back with the assigned GM patches; you can also change the patches and mute any parts individually. Of course, you can also play back songfiles on the i30 via MIDI from an external sequencer. A Jukebox option lets you create a playback list of the Songs on a disk, with the option to specify that Songs are started automatically or manually; in this way you can pre-program your set for a gig. You can save your own Songs to disk in Standard MIDI File (SMF) formats 0 and 1, and also convert your Backing Sequences into SMFs and then save them to disk (format 0 only). Converted Backing Sequences can then be loaded as Songs into the multitrack sequencer for further work.

CONCLUSION

Korg have come up with a strong contender at the high end of the keyboard market. The i30 doesn't revolutionise the concept of the auto-accompaniment keyboard, nor does it stand at the forefront of synthesis developments (that is still, it seems, the preserve of the new generation of 'real synths', such as the Prophecy and the Z1). However, if you're a fan of Korg's sample-based workstations and you want to get into auto-accompaniment sequencing, the i30 is the ideal instrument — what's more, its 'synth-like' appearance shouldn't put you off, and it also has the credibility/boasting factor of its large touchscreen LCD (though Technics, of course, can also play the bragging game with the KN5000's colour LCD). Keyboard players new to Korg have an opportunity to buy into the famous Korg sound, not to mention some of the best-programmed Styles in the business. Korg may be relative newcomers to the auto-accompaniment keyboard market, but their take on Style programming and auto-accompaniment features is credible, rich and deep. You can use the i30 as a sample-based synthesizer, a multitrack workstation synth or an auto-accompaniment keyboard, and it will satisfy in these areas individually. Its greatest strength, however, is that it provides a well-integrated and exciting combination of all three, crowned by one of the best user interfaces you can get.

505

£ i30 £1699; i30HD £1899 including VAT.

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Analogue modular synths in the late '90s are something like the old bus joke — none for ages, then loads all at once. CHRIS CARTER catches the latest arrival.

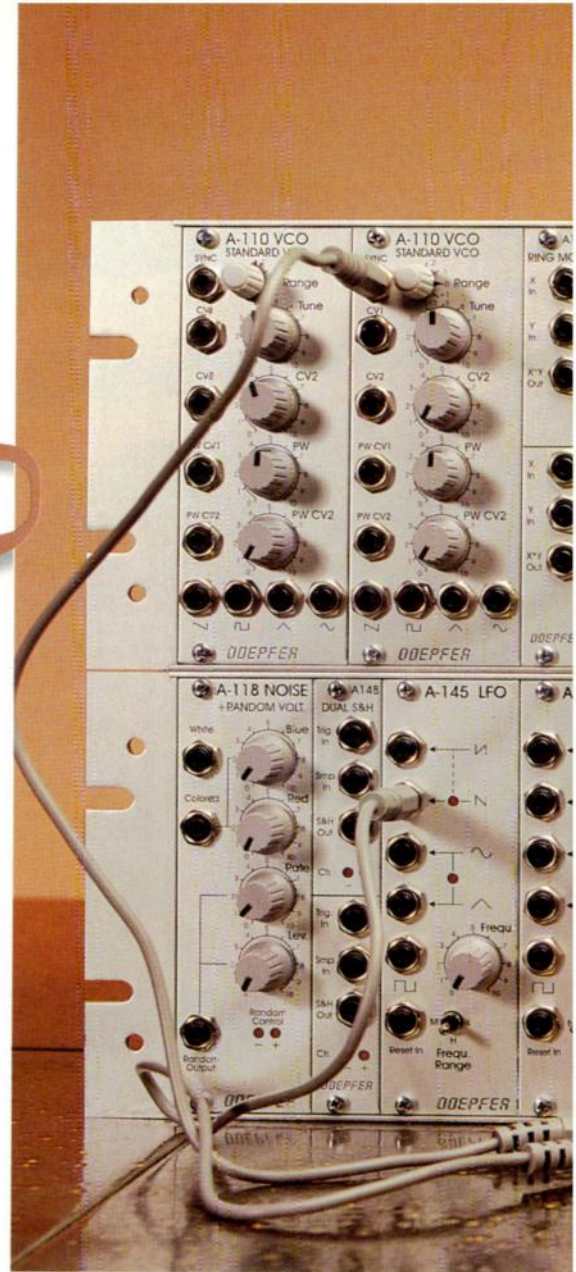
DOEPFER A100 CV MODULAR SYNTHESIZER

In the April and May issues of *SOS* Paul Nagle reviewed the Clavia Nord Modular, a hardware/software modular synth, last month I reviewed the Analogue Systems RS Integrator, and this month it's the turn of the Doepfer A100. On the horizon is the massive and scary-looking Technosaurus modular synth from Swiss company Selector, and various software modular solutions are on the way for Macs and PCs. If you're not too sure what all this modular stuff is about, you should certainly check out last month's review of the Analogue Systems RS Integrator, which includes an explanation of the theory behind modular synthesizers.

WALLPAPER

The Doepfer A100 system has been available for a while now, and is building up quite a reputation. Various configurations of modules are available, including systems based on classic analogue modular 'wallpaper' systems such as the Roland System 700, Moog 15, 35, 55 and 3C, and an ARP 2600 configuration. These don't come cheap, though — the gargantuan A100/Roland S700 configuration (about 70 modules in seven racks) will leave a hole the size of £4215 in your pocket — and that's without a keyboard. Currently, two A100 'base' systems are available: the A100 CV and the A100 MIDI. They are essentially the same system but the A100 MIDI omits the A150 Dual Voltage Controlled Switch and A162 Dual Trigger Delay modules and instead includes the A190 MIDI-to-CV module. Because the A100 CV (which is the system under review) doesn't include a MIDI module, EMIS supplied us with the Doepfer MAUSI MIDI-to-CV/Sync interface, a free-standing version of the A190, so that the A100 could be checked out with MIDI.

Analogue circuitry is used throughout (except in the A190 MIDI module), and the CV/Gate system used in all A100 systems is the standard 1V/Octave scaling with a positive trigger (V-Trig). To integrate the system with a Moog setup (which uses S-Trig) you'd need an A165 Trigger Inverter module, and if you wanted to use an A100 with a Hz/Volt system you'd need to buy the MAUSI MIDI converter or go for the MIDI version of the A100.



HP SOURCE

The A100 modules live in a sturdy 6U aluminium rack case, conforming to the Euro/HP (Horizontal Pitch) specification, with a built-in power supply and a rear-mounted power socket and switch. All the modules have 3.5mm jack sockets and grey knobs, with small but legible lettering throughout and lots of bright red LEDs — nice! The A100 base system holds 23 modules, of various HP widths, and includes two of almost everything, as many of the modules incorporate dual circuits. The A100 CV features: A110 standard VCO (x2); A114 Dual Ring Modulator; A115 Audio Divider; A116 Voltage Controlled Waveform Processor; A118 Noise/Random; A120 VCF-1 (24dB Low-Pass 1); A121 VCF-2 (12dB Multi-mode); A130 Voltage Controlled Amplifier (Linear, CV); A131 Voltage Controlled Amplifier (Exponential, Audio); A138 Mixer (x2); A140 ADSR Envelope Generator (x2); A145 Low Frequency Oscillator (x2); A148 Dual Sample & Hold; A150 Dual Voltage Controlled Switch; A160 Clock/Trigger Divider; A161 Clock/Trigger Sequencer; A162 Dual Trigger Delay; A170 Dual Slew Limiter; A180 Multiples 1 (single panel with eight sockets for linking things together if you run out of sockets on other modules).

pros & cons

DOEPFER A100 CV £999

pros

- Analogue through and through, with a pleasant sound.
- Endless patching and expansion possibilities.
- Well designed and built.
- Expandable using standard HP modules (with custom cable).
- 50+ modules available.
- Reasonably priced.

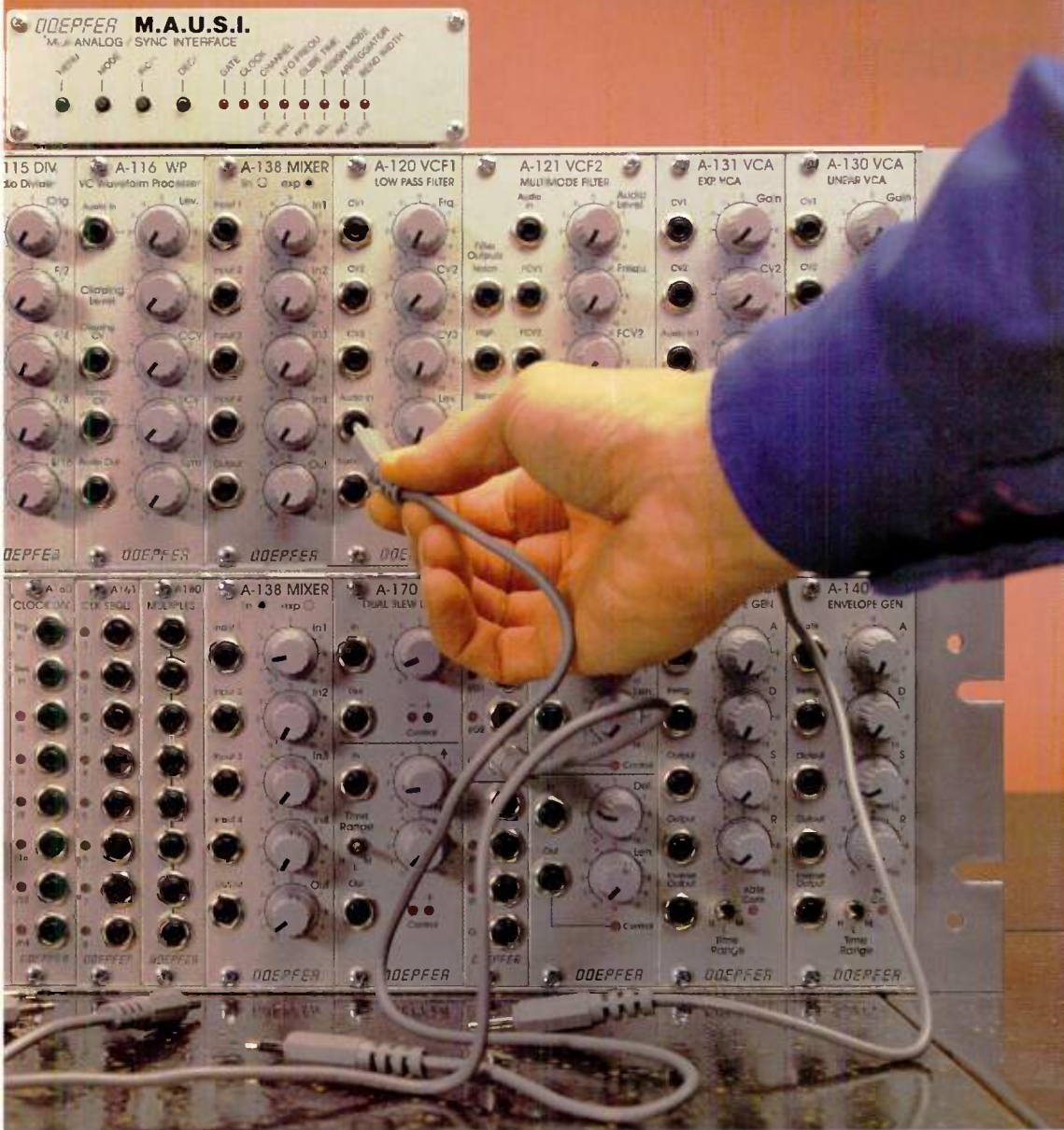
cons

- VCFs could sound better.
- A third VCO would really help.
- Some modules lacking features.
- Direct CV and Gate buss only accessible via separate module.
- You need your own MIDI-to-CV converter (only A100CV).
- Supplied patch cords not up to the task.

summary

A respectable and complex system that's capable of exciting, unique and totally outrageous sounds. A few of the modules aren't quite the bee's knees as far as features and sonics go, but the system is easily expanded with affordable and higher specified modules from Doepfer and other manufacturers.

SOUND ON SOUND



“The A100 is capable of producing some impressive sounds, and is a fine hands-on system.”

Other configurations are available using smaller and larger racks, including flightcased, wooden and custom versions.

A110 VCO

The VCOs supplied with the A100 are the ‘no frills’ A110, but don’t let this put you off — the A110 is a creditable oscillator, with an audio range covering approximately 1Hz-5KHz: not great, but fine for most purposes. There are two CV inputs, a Sync input, a CV pulse width input, and four simultaneous waveform outputs: Sawtooth, Pulse, Triangular and Sine. An 8-way rotary switch selects the VCO’s octave range, and there’s a coarse-tune control covering +/- 1/2 Octaves. For general use, a keyboard CV signal would be plugged into CV input 1, and any modulation source (an LFO, for example) would be fed into CV input 2, via the input level knob. A slight quirk here is that CV2 has an exponential, rather than linear, FM (Frequency Modulation) input, which can make the VCO ‘trill’ when you’re trying to introduce vibrato. The shape/width of the Pulse wave can be modulated from an external CV source such as an LFO or ADSR generator, useful for fatter chorus effects, and some interesting timbral effects can be achieved using the Sync input, which works by

superimposing the harmonics of one VCO over the waveform of another. Add modulation to either or both VCOs and some complex, dynamic waveforms can be conjured up. It’s worth noting that, because this is an analogue instrument, the VCO can take a little while to warm up — usually 15 or 20 minutes.

TERMS & ABBREVIATIONS

- VCO Voltage Controlled Oscillator
- VCF Voltage Controlled Filter
- VCA Voltage Controlled Amplifier
- ADSR Attack, Decay, Sustain, Release
- LFO Low Frequency Oscillator
- Clock A basic LFO, with a single-waveform output and a limited range, so called because they used to be used for clocking sequencers
- RM Ring Modulator
- S&H Sample and Hold, a circuit for sampling an input voltage when given a trigger. That signal will then be held at the output until re-triggered. It’s a bit like a sampler, but just for voltages
- Gate An on/off control signal. When you press a key, a gate signal will be sent out for as long as you keep your finger on the key
- Trigger A short on/off pulse, similar to Gate. The difference is that a Trigger signal is sent only at the beginning of a note, and is unaffected by how long you hold a key down
- Log Logarithmic scale
- Lin Linear scale
- 1V/Oct Chromatic control standard used by Moog, Arp and Roland. A change of one Volt in the control signal would mean a change of one octave in pitch. Each Volt is sub-divided into 12 for the notes of an octave, with each sub-division corresponding to one semitone
- Hz/Volt Different chromatic control standard used by Yamaha and Korg
- Slew A type of portamento; acts like a low-pass filter on audio signals

A115 AUDIO DIVIDER

This frequency divider can mix an original signal (usually a VCO waveform) with up to four squarewave sub-octave signals (halved, quartered, and so on) derived from the input signal. The front panel features a monophonic input, an output, and five knobs for mixing the sub-octave signals with the original signal. In theory, you can use any monophonic input source, even a keyboard or mic (through a pre-amp), but any signal will be converted to squarewaves at the output. Fed through a VCF this module can sound quite impressive, particularly when used in conjunction with the A116 module below.

A116 WAVEFORM PROCESSOR

The Voltage Controlled Waveform Processor is capable of producing quite complex and unusual effects from a standard monophonic VCO waveform. A good description of this module would be a kind of 'voltage controlled overdrive'. The five controls on the unit relate to Input Level, Clipping Level, Clipping CV attenuator, Symmetry (a kind of waveform width control which has an effect on the tone) and Symmetry CV attenuator. There's a single audio input and output, and two CV inputs (Clipping and Symmetry). The Input knob can attenuate or boost the input signal, into overload if required, and the Clipping control adjusts a +/-10V clipping threshold on the input waveform (which makes the sound softer or harder). With only two basic VCOs in the A100 system, the A116 module is useful for strengthening (or mutating) the sound of a 'vanilla' waveform.

A120 VCF & A121 VCF

Two VCFs are included in the system, with the A120 using a so-called 'transistor ladder', 24dB low-pass design, as pioneered by Moog, and the



A110 VCO.



A120 VCF.



A145 LFO.

A121, designed around a CEM 3320 chip, being a 12dB multi-mode filter. The A120 includes three filter-frequency CV inputs (one direct, two via input attenuators) and the usual audio in and out. The resonance control permits the filter to be pushed into self-oscillation, which allows it to be used as a sinewave VCO. The A121 module takes this feature a step further, by including two CV inputs for controlling resonance, but only has two filter-frequency CV inputs. However, the A121 does give you four separate (and simultaneous) outputs: low-pass, band-pass, high-pass and notch. These outputs work particularly well for 'stereofying' a mono signal, and some nice psychoacoustic effects can be obtained by using different output modes on right and left mixer channels. My only concern is that both filters lack a certain amount of warmth and character. I would expect this of the A121, as it's only a 12dB type, but the A120, which I had high hopes of, sounds — dare I say it? — slightly clinical. If filters were in Technicolour, a Moog VCF would be a deep and luscious red, an old Roland or Korg VCF would be less deep red, but still nice and bold, and the A120 would be a shade of orange.

A131 VCA (LOG & LIN)

These are standard-fare VCAs with two audio inputs, two CV inputs (with level controls) and a single audio output which also has a level control. Of the two types, the A131 Exponential (Logarithmic) type would usually be used with audio signals, and the Linear type for mixing and controlling CV signals,

"This configuration would benefit immensely from an additional VCO."

DOEPFER MODULES

There are 50 modules available for the A100 system, and more are due. We can't list them all, for reasons of space, so here's a selection. Prices include VAT.

- A110 Standard VCO: £69
- A111 High End VCO: £115
- A113 Harmonic Wavetable Generator/VCO: £159
- A114 Dual Ring Modulator: £49
- A115 Audio Divider: £39
- A116 Waveform Processor: £49
- A117 Digital Noise/Random Clock/808 Sound Source: £59
- A118 Noise & Random Generator: £39
- A119 External Input/Envelope Follower: £49
- A120-124: VCFs priced from £59-£69
- A125 Voltage Controlled Phase Shifter: £69
- A129 1/2 Vocoder Analysis & Synthesis: £269
- A130 VCA (Linear, CV): £49
- A131 VCA (Exponential, Audio): £49
- A135 Voltage Controlled 5-Channel Mixer: £115
- A138a/b Linear and Exponential Mixers: £35 each
- A140 ADSR EG: £39

- A141 Voltage Controlled EG: £89
- A145-147: LFOs priced from £39-£69
- A148 Dual Sample & Hold: £39
- A150 Dual Voltage Controlled Switch: £35
- A160 Clock/Trigger Divider: £35
- A161 Clock/Trigger Sequencer: £29
- A162 Dual Trigger Delay: £39
- A165 Dual Trigger Inverter/Modifier: £29
- A170 Dual Slew Limiter: £39
- A171 Voltage Controlled Slew Limiter: £49
- A177 External Foot Controller Module: £49
- A178 Theremin CV Source: £69
- A180 Multiples 1: £19
- A185 Buss Access: £29
- A190 MIDI-CV/Sync Interface: £139
- A195 MIDI interface for Vocoder module: £159
- G3 3U Base Frame (buss board, PSU, manual): £199
- G6 6U Base Frame (2 buss boards, PSU, manual): £229
- EMIS G32 Micro Rack, wood finish: £50
- EMIS G12 Studio Rack, wood finish, equivalent to two G6s: £449
- MAUSI MIDI-CV Interface (2x CV & Gate) with Sync 24: £99

A100 modules are also available in kit versions.

although — as is the way with modular systems — either type could be used with audio or CV signals. Both VCAs work well, and are essentially transparent and free of artifacts.

A138 MIXER (LOG & LIN)

These are basic, 4-channel attenuating mixers (they don't boost the signal), with four input sockets and associated knobs, and a master output level control. The only difference between the two models is that one uses linear-response and one uses logarithmic-response control pots. Each mixer can cope with control voltages and/or audio signals.

A140 ADSR ENVELOPE GENERATOR

The 140 is a run-of-the-mill ADSR EG — no CV control inputs or built-in trigger generator, I'm afraid. The front panel has, in addition to the ADSR knobs, Gate and Trigger inputs, two normal and one inverted CV envelope outputs (with LED indicator), and an ADSR Range switch which alters the time over which the envelope develops.

A145 LFO

I hope I'm not repeating myself, but these are also pretty standard offerings. The A145 has five outputs: Sawtooth, Inverted Sawtooth (with LED indicator), Sine, Triangle (with LED indicator), and Square. The LFO frequency, of one cycle every few minutes to approximately 5KHz, is controlled by a Range switch and a Frequency knob. There's no CV input for voltage control, which I'd like to have seen, but there is a reset input which allows the LFO cycle to be sync'ed to an external trigger, such as a keyboard or sequencer gate output.

A114 DUAL RING MODULATOR

This module includes two ring modulators on one panel, no controls (just sockets), an X and Y input and a summed output for each ring modulator. I found that the A114 wasn't as sensitive to slowly moving control signals as some ring modulators I've used, and there was more signal breakthrough when only one signal was present than I would have liked. However, it does its job well enough, and there are a couple of interesting example patches in the manual.

A148 DUAL S&H/A118 NOISE+RANDOM

The A148 dual Sample & Hold is almost identical in layout to the dual RM but, appearances aside, this is an entirely different type of module. The two inputs, Trig and Smp (Sample), and the S&H control output work in conjunction with external triggers/gates and high-level signals to produce random or 'staircase' control

voltages. (The latter acts as a kind of arpeggiator; a staircase generator gives the same effect as an arpeggiator, but is not controlled from a keyboard.) For example, if a white noise source is fed into the Smp input and an LFO is used to trigger the Trig input, a regular, rhythmic random voltage will be generated, suitable for controlling the frequency of a VCO or VCF. If the noise signal is substituted by a slowish sine, sawtooth or triangular signal from a VCO or an LFO, a staircase or glissando control voltage is generated instead.

The A118 Noise+Random module works alongside the A148 and incorporates a noise generator and a random clock pulse generator. The noise section includes a direct white-noise output socket, a coloured-noise output socket, and two knobs for Red and Blue noise levels (basically high- and low-pass filters). The random output section has a Rate control which governs the randomness of the clock speed, an output level knob, and two LEDs to show the speed and polarity of the random voltage output. A quirk not mentioned in the manual is that even though the two sections are supposedly independent, the red-noise level knob interacts quite significantly with the random voltage generator, and to get a decent random output level you need to turn the Red knob fully clockwise.

A170 DUAL SLEW LIMITER

Slew Limiters are normally used between a CV keyboard and VCO, and allow you to introduce an adjustable portamento effect. In this dual module, each section is slightly different: the upper Slew Limiter has the usual CV in and out sockets, a knob for adjusting the slew Time, and a couple of LEDs to indicate the level and polarity of the CV output. The lower Slew Limiter has a couple of additional features which increase its versatility; these include a 3-way Slew Range switch and two Time knobs, one for adjusting the Rising Slew time and the other for Falling Slew time. With careful adjustment and a suitable input (such as a gate signal) this section can even produce basic AR (Attack Release) envelopes, very useful in a tight situation.

A162 TRIGGER DELAY

This module contains two identical trigger delays: each includes a Gate/Trigger in and out socket, a Delay knob, trigger Length knob, and an LED to show the on/off state of the trigger output. The length of the delay is adjustable from instantaneous to approximately 10 seconds.

A150 DUAL VC SWITCH

This is another dual module, featuring two voltage-controlled bi-directional switches.

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DOEPFER A100 CV MODULAR SYNTHESIZER

“The Doepfer A100 is a very capable and exciting instrument, particularly for pure electronic, experimental and ‘out there’ dance music.”

- ▶ Each switch includes a control input, a common I/O socket, two sockets marked I/O 1 and I/O 2, and two LEDs to indicate whether the I/Os are on or off. Because the switches are bi-directional, the I/O sockets can be used as inputs or outputs, and can accept control voltages or audio signals. The switching control input can use any signal from -8V to +8V; anything above 3.6V switches it one way, while a signal of below 3.6V switches it the opposite way. This is a versatile module which can be used for all sorts of switching and triggering effects, such as switching between modulation sources. It also functions well with the following two modules.

A160 CLOCK DIVIDER/ A161 CLOCK SEQUENCER

These two work as a team, and although the A160 will function without the A161, the A161 will only function when internally connected to the A160.

The A160 Clock Divider is similar in concept to the A115 Audio Divider. However, the A160 takes a clock/LFO (or gate/trigger) signal and divides the frequency into six related sub-divisions (1/2, 1/4, 1/8, 1/16, 1/32 and 1/64 of the original clock). There are no controls — just a clock/trig input, a reset input, and six gate/trigger outputs, each with an LED.

The A161 Clock Sequencer is a basic 8-step trigger sequencer, whose input trigger comes from the halved output socket of the A160 module. It has eight trigger outputs (each with an LED), and for as long as any clock signal is present at the input of the A160 the A161 output sockets will step through a constantly looping, sequential stream of triggers. These two modules don't add up to a full sequencer, but they do yield some quite complex rhythmic effects (if you have enough ADSRs, VCAs, and so on), and the manual gives some excellent example patches.

A CHIP OFF THE OLD BLOCK

The A100 is capable of producing some impressive sounds, and is a fine hands-on system, although I wasn't entirely happy with the supplied grey patch-cords. They didn't connect as positively as they should, and on a few of the sockets they were unquestionably loose. Also, not using colour-coded patch-cords can be a nightmare when you're trying to troubleshoot a problematic or complex patch, and Doepfer don't help much, as they haven't implemented a colour-coding scheme on the modules either. I had to resort to using my trusty old colour-coded Roland patch-cords more than once, and these fitted snugly.

Ergonomics aside, how does the A100 fare as a day-to-day modular synth? Well, there are a few modules I was surprised to see in a base system, such as the Trigger Delay, Clock Divider, Waveform Processor and VCS. I would expect users to add these modules later, as they expand their system. Also, this configuration would benefit immensely from an additional VCO. The VCO is one of the essential building blocks of modular synthesis, and you quickly find yourself running out of sources if

you have only two VCOs. However, the A110 VCOs do their job well enough, as do most of the other modules — though, as I mentioned above, I found the sound of the filters slightly lacking in character. Mind you, the sound of filters and VCFs is a subjective area. One glaring omission is the lack of access to the internal CV/Gate buss, for controlling the VCOs and ADSRs from a single pair of CV/Gate sockets. To achieve this, you need to fork out £30 for the A185 Buss Access module.

MAD SCIENTIST

When the Doepfer A100 arrived, I had only just finished reviewing the Analogue Systems RS Integrator, and as both systems are so similar technically and physically (right down to interchangeable modules) it's impossible not to compare them. Ultimately, the main differences are how particular features are implemented and how the instruments sound. Some of the modules supplied in the A100 base system lack a few features I would regard as almost essential, such as voltage-controlled ADSRs, LFOs and Slew Limiter. My impression of the sound of the A100 is that it's lacking a little at the bottom end, but possibly has more presence and a more up-front (if slightly colder) sound than the RS Integrator.

Depending on the type of music you produce, the Doepfer A100 is a very capable and exciting instrument, particularly for pure electronic, experimental and 'out there' dance music. Considering the amount of engineering that goes into any decent-sized modular system, the £999 price tag seems quite reasonable, but anyone new to modular synthesis might consider starting with the A100 Mini, at £699, which is just as expandable as its bigger brothers.

Some of my observations may have come across as slightly negative regarding a few of the A100 modules, but I really am quite a fan of Doepfer. In the rest of Europe (and the US) they are well established and have amassed a lot of admirers, with some famous users too (Kraftwerk, for instance). The A100 looks as though it's meant to be operated by someone in a white lab-coat with a degree in applied mathematics, but don't let that put you off. With some time and effort, almost anyone can coax some amazing sounds out of it.

TWO-HORSE RACE

If you're looking for an affordable modular, at present it's a two-horse race between Doepfer and Analogue Systems. The two systems are very similar technically (and physically). To my tiny twisted mind, Analogue Systems are a nose ahead with the sound and features of their slightly cheaper base system (I can hear Doepfer fans screaming for my blood already). However, Doepfer are coming up fast with the sheer number of different modules available, a substantial user base, and a good track record. The A100 and its DIY-orientated racks, modules and accessories are a great way for electro musicians to build customised systems from scratch and expand them as finances allow. It's important to note that Doepfer also use the same HP racking as Analogue Systems (and Maplin), so users can mix and match preferred modules from each system.

E A100 CV system (23 modules) £999 including VAT;
A100 MIDI system (22 modules) £1079; A100 Mini system (10 modules) £699. Prices include VAT. See 'Doepfer Modules' box for individual module prices.

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Yamaha reveals its radical new concept in digital mixing. Availability.



O2R



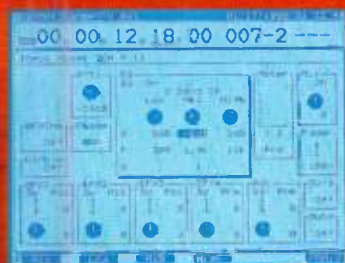
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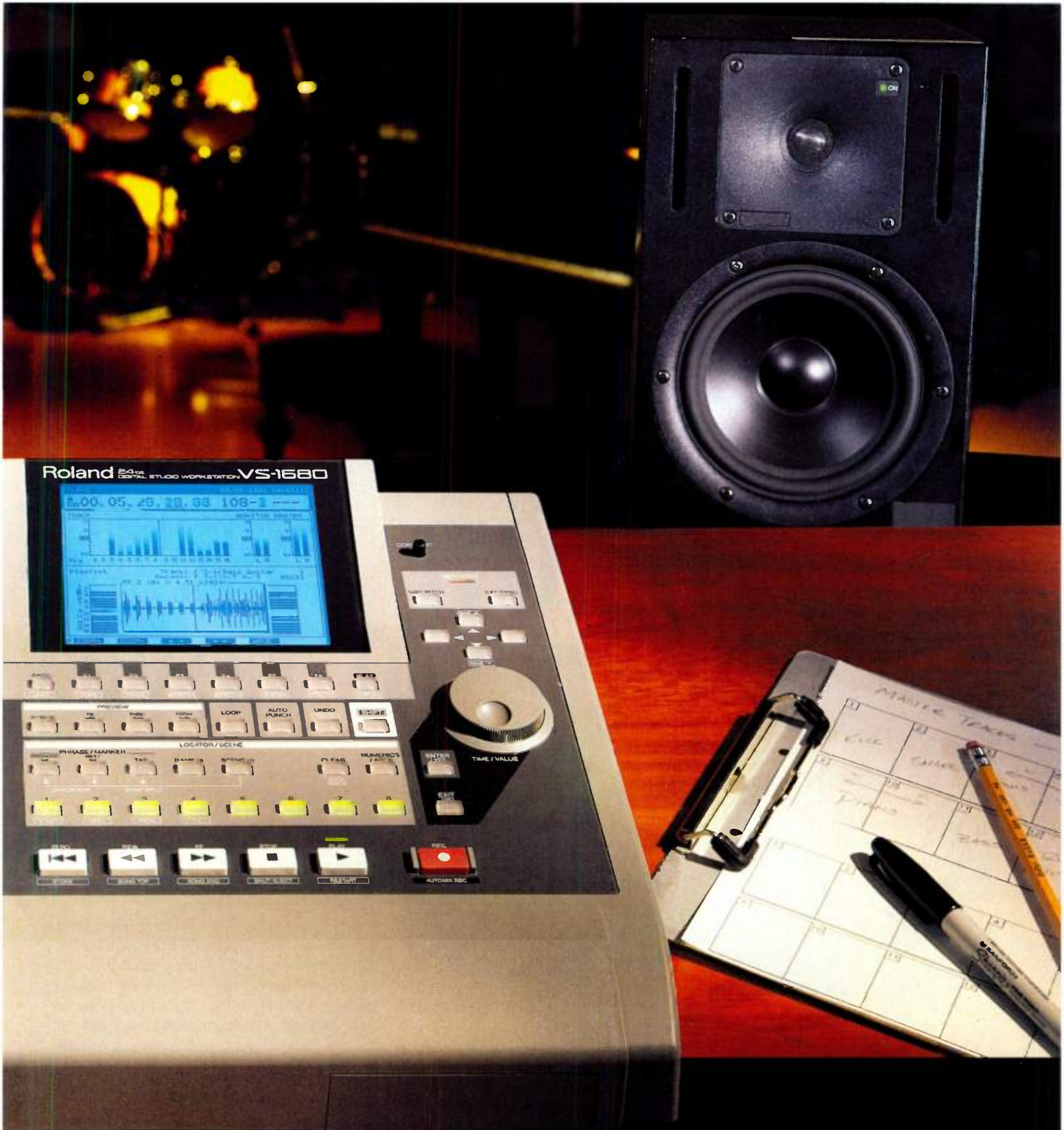


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*VS-1680P is supplied with internal 2.1 Gig H/D and one VS8F2 effect board (2 stereo/4 mono FX processors)

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Combining the famous Lexicon reverb sound with the latest hard disk recording technology, the Lexicon Studio system should win many admirers.

MARTIN WALKER falls in love.

It is a sign of the importance now being given to audio recording systems based on computer soundcards that heavyweight industry professionals like Lexicon are joining the fray. A few years ago, soundcards were regarded by some companies as toys suitable only for games — and now look what they can do!

As you might expect, the Lexicon Studio is a fully professional recording system — all the audio circuitry is contained within an external rack-mounting case for optimum fidelity, and the main analogue inputs and outputs are at +4dBu levels on balanced XLRs. However, when compared to other recent systems, there are two major differences in the approach that Lexicon have taken. Rather than moving their expertise to the

them to be able to record and play back MIDI tracks as part of the overall process of making music. Most such systems have options to sync a MIDI sequencer to the Audio software, but this is not an ideal solution. Not only does it involve running two pieces of software side by side on a single monitor screen, it also means possible conflicts when relying on the Audio software to supply tight timing for the MIDI software.

Lexicon have neatly side-stepped this problem, as well as winning many people over in the process, by working closely with Steinberg to ensure that the Lexicon Studio integrates well with their *Cubase VST* software (which already supports both Audio and MIDI in a single package). Existing *Cubase* users will be very pleased to carry on using the same familiar package, rather than having to learn new software from scratch. The other benefit of working with Steinberg is that a dedicated ASIO (Audio Stream Input/Output) driver is available from day one. This should ensure good performance in *VST*, by

Lexicon of Love



LEXICON STUDIO RECORDING SYSTEM

minimising any latencies (those annoying time delays between doing something and getting a reaction from the hardware).

Lexicon are to be applauded for ensuring good performance with *Cubase VST* from the start, but initial shipments do not include a standard Win 95 Multimedia driver. This does mean that *Cubase VST* is the only application that can currently be used, although a standard driver is expected "in the near future" along with a driver for Apple Macintosh owners.

INSTALLATION

For the purposes of this review, Stirling Audio supplied me with a Pentium II 300MHz PC containing 128Mb RAM, and an internal Ultra Fast Wide SCSI-3 hard drive (see 'System Requirements' box). The Lexicon Studio was boxed separately, so I still got the chance to try out the installation procedure.

There are three main components to the Lexicon Studio 12T system: the Core-32 System PCI buss card is common to all systems, and this has a daughterboard socket to attach the PC-90 Processor card; two sockets on its back panel allow a couple of interfaces to be connected simultaneously. There is also a 24-bit multi-channel digital signal buss, which can communicate with other Lexicon cards to expand system processing

software plug-in market, Lexicon have incorporated their PCM90 reverb hardware into the new Studio recording system, and such is the desirability of the 'Lexicon sound' that many musicians have been eagerly awaiting the launch for this reason alone. We're not talking about a simulation either. The Lexicon Studio uses exactly the same core processing engine as the famous PCM90, taken out of its original rack housing and grafted on to a PCI soundcard.

The other major difference in the approach taken by Lexicon is that of software. Many hard disk audio systems have been launched over the last year or so, offering a wide range of features and capabilities. However, while most of these new systems are audio-only, many also use proprietary software as the sole means of accessing the hardware. This is a significant area of concern for many people using MIDI keyboards, synth modules, or samplers, since it is vital for

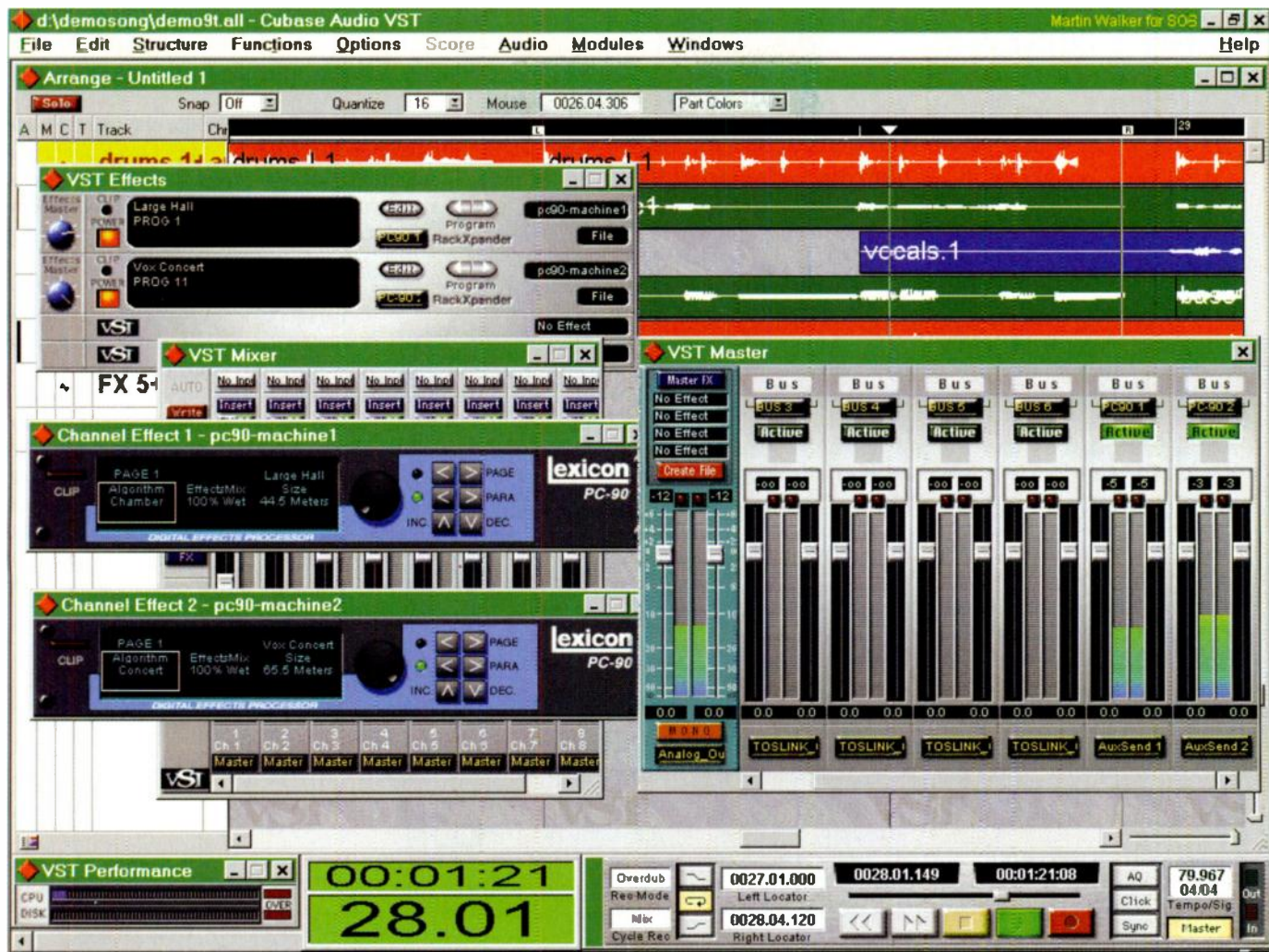


Figure 1: Main VST Screen. Both Lexicon reverb modules can be used as either Channel effects (as shown here) or as Channel inserts. Notice that the Bus Output has been set to 'PC-90 1' and 'PC-90 2' in the VST Effects window, to route Aux Sends 1 and 2 to the PC-90 hardware. The VST Master window shows the two active buses.

power. Although nothing much is being said about this at the moment, "expanding system processing power" sounds suspiciously like a DSP farm to me. Who knows? The third part of the package is the LDI-12T Interface, a 1U-high rackmount box providing all the ins and outs.

The Core-32 may be PCI, but unlike many such cards it is a full 14 inches long. The review PC was fitted with an ATX format motherboard, which allows every slot to be occupied by a full-length card, but anyone contemplating installation onto a Baby-AT format motherboard may not be so lucky — my own motherboard cannot accommodate PCI cards longer than about eight inches, due to the position of the processor heatsink.

After attaching the PC-90 daughterboard to the Core-32, installing the combination into the review PC was quite easy. Such is Lexicon's attention to detail that disposable anti-static wrist straps are provided for safe installation of the circuit boards, as well as a screw-on bracket to support the far end of the card.

Once the cards are in place, rebooting the PC allowed Win 95 to detect the new hardware, and after inserting the appropriate floppy disk, the drivers were installed with no fuss — they take a single IRQ and one 64kb memory range. Once the Win 95 desktop appeared, the PC-90 plug-in software was installed from two further floppies, and that's all there was to it. A demo version of Cubase VST was also included in the packaging,

but most people will want the full version, which will normally come already installed if you are buying a complete system.

The LDI-12T Interface connects to the Core-32 back panel via a single proprietary multi-way cable, and thankfully this is a generous three metres in length, which is quite long enough for the interface to be fitted inside a 19-inch rack. Its 1U rack casing is only four inches deep, and looks to be exactly the same as that used for the Lexicon Alex and Reflex, as does the supplied 'wall-wart' external power supply. The front panel (from left to right) features an on/off switch, followed by a balanced female XLR socket for Timecode In, a pair of gold-plated coaxial phono sockets for S/PDIF In and Out, and then the analogue I/O: a pair of male XLR (balanced) sockets for Left and Right outputs at +4dBu level, a pair of gold-plated phono inputs (-10dBV level), and a further pair of female XLR (balanced) inputs at +4dBu level.

On the back panel you will find a pair of 9-pin D-type connectors for ADAT Sync In and Sync Out, a pair of optical (Toslink) sockets for Audio In and Out (these can be used as either 8-channel ADAT format, or stereo S/PDIF), the socket for the computer umbilical, a BNC Word Clock Input (with 75 ohm termination), another 9-pin D-type RS422 Comm Port (to connect to video and audio devices capable of Sony serial control), and finally the wall-wart socket, along with a cable tidy to stop the plug being accidentally pulled out.

INITIAL SETUP

Most of the external connection options are fairly obvious: digital connections can be made either using the rear-panel Toslink sockets or the front-panel coaxial ones, for easy connection to ADATs, DAT recorders, CD players or effects processors.

below digital full scale. For the phono inputs 0dB corresponds to -10dBV, 14dB below digital full scale. These values are fairly standard and sensibly chosen to give you a useful amount of headroom. Each pair of faders can be ganged together, using a small button.

Also on this page are switches to select which of the various Input and Output sockets on the Interface are to be used, along with SCMS settings (copy-protection can be used or ignored), and a De-Emphasis switch for the analogue output. Finally, clicking the Turbo Mode box enables full 32 channel capability (this setting defaults to off, with 24 channels available at 44.1kHz and 21 at 48kHz sample rates, and will give higher quality, glitch-free audio with slower machines such as 166/200MHz Pentiums).

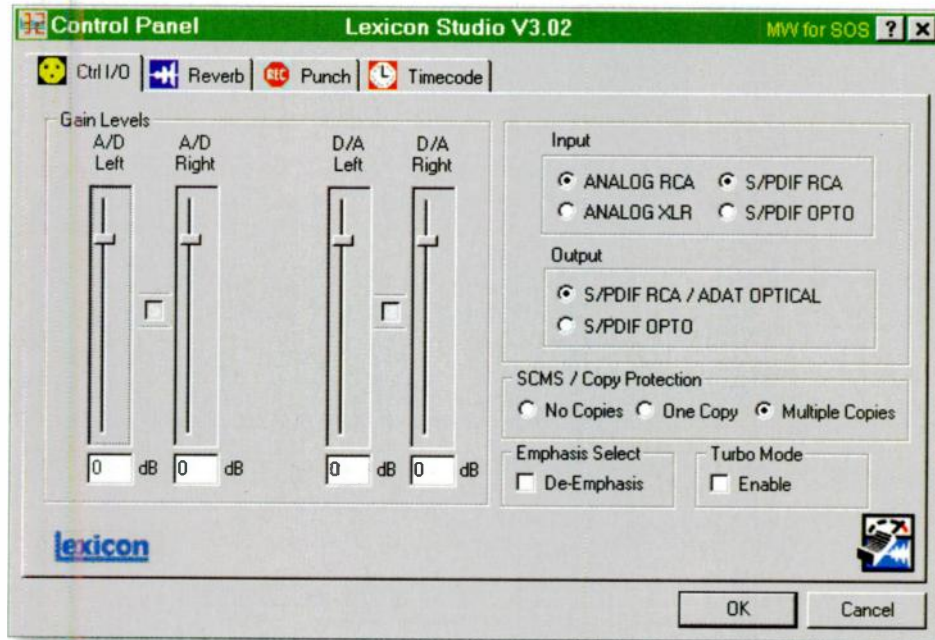


Figure 2: Ctrl I/O window allows full access to the hardware, for selecting inputs and outputs, digital options, and for setting up gain structure.

Format conversion is also available, so that you can freely route between optical and coaxial devices. I did miss a pair of unbalanced outputs, but you can make up a special lead to achieve this, so it's not too much of a problem.

As far as interfacing with *Cubase VST* goes, you simply need to select 'ASIO Lexicon Studio' as your ASIO Device in the *Cubase VST* Audio System Setup window. This is my first experience of a hardware-specific ASIO driver (there are very few yet available — notably the Korg 1212), and there are no buffers to set up — as soon as you select the driver, a latency value of 47 milliseconds appears, which is a factor of 10 better than with most recommended soundcard settings when using the ASIO Multimedia driver.

Adjustments to routing are made inside the Lexicon Studio Control Panel — to find this you need to select Audio System Setup, and then click on the ASIO Control Panel button. To be honest, you are likely to be using this Panel quite a lot initially, so it is useful to leave it open, ready to be used directly from the Win 95 Taskbar, rather than having to find it every time.

There are four main pages in the Control Panel. The first is Ctrl I/O, and this is fairly self-explanatory, providing access to functions of the LDI-12T Interface. There are two pairs of gain faders — one for the A-D converters, and the other for the D-A ones. These can be set at any value between -96dB and +12dB. The nominal position of 0dB represents unity gain between XLR input to XLR output, where +4dBu is 14dB

“The Lexicon Studio uses exactly the same core processing engine as the famous PCM90, taken out of the original rack housing and grafted on to a PCI soundcard.”

The second page is Reverb, and this allows a wide variety of sources and destinations to be routed to each of the two PC-90 DSP engines. These include 12 inputs from the LDI-12T (two analogue, two S/PDIF, and eight Toslink), 12 outputs of the same persuasion, along with four Aux sends (Aux Send 1 L and R, and Aux Send 2 L and R), and four Aux returns of the same variety. This versatility allows the PC-90 to be patched directly to an input or output signal, as well as within *Cubase VST* in the normal manner of plug-ins. It is even possible to create a cascaded reverb using both PC-90 engines in series. However, although comprehensive, this is one area in which some sort of graphic patchbay would help — it can initially be confusing until you get your head around the alternatives. Thankfully, a default routing is set for Lexicon Studio (shown in Figure 3), allowing you to use the PC-90 straight away, as an Aux effect in *Cubase VST*.

The third page is for Punch Record (with its

pros & cons

LEXICON STUDIO £2649

pros

- Excellent audio quality.
- Up to 32-channel recording with a suitable computer.
- Two built-in Lexicon reverbs.
- Good integration and performance within *Cubase VST* software.
- Flexible hardware routing.

cons

- Currently only works with *Cubase VST* on the PC.
- 24-bit recording capability not available until the launch of *Cubase 24/4.0*.
- Limited access to PCM90 parameters.

summary

An ideal package for ADAT users who want to edit and mixdown using the many capabilities of hard disk editing, and the famous Lexicon reverb sound. Full 24-bit recording later on this year (and Mac drivers) will result in an even more impressive system.

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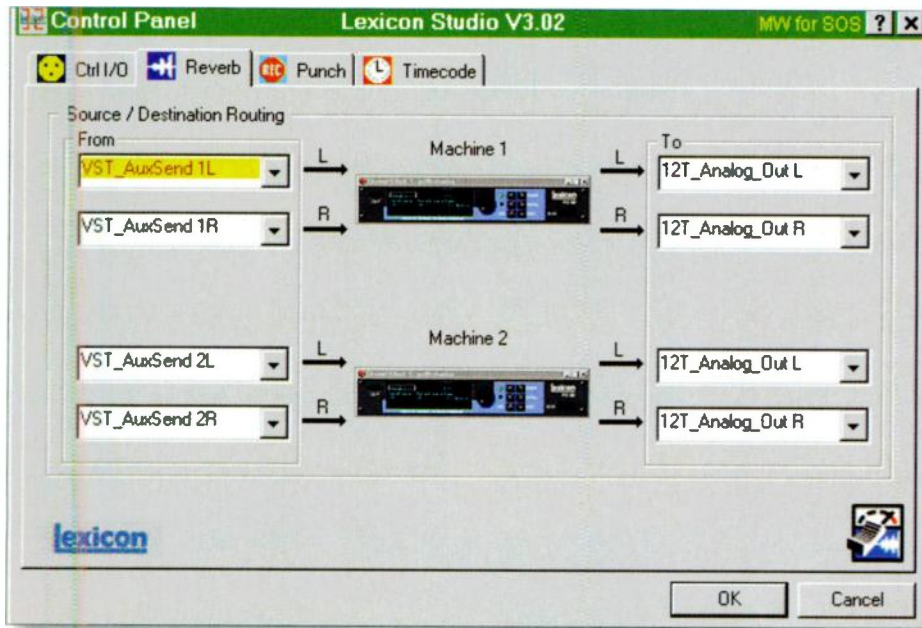


Figure 3: The Reverb window is where the routing of the two PC-90 modules takes place, and the options are comprehensive, to say the least! These are the default settings, which routes both PC-90 machines as Aux effects through to the hardware analogue outputs for monitoring.

IN USE

Given the number of inputs and outputs on offer, it takes a short while to get to grips with audio recording, but I soon had some tracks recorded. I couldn't measure noise figures using my normal software of choice due to the lack of a Win 95 driver, but audio quality was subjectively excellent. The main signs of the dedicated ASIO driver were the almost immediate Play/Stop response (the Multimedia driver, in comparison, typically takes half a second to fill up its buffers before anything happens) and the snappy response of recording and playback level meters (which reflected the actual signals much more closely). In fact, controlling VST using the Lexicon Studio felt much more like using an analogue machine — no wonder that Steinberg are so keen for other soundcard manufacturers to develop ASIO drivers.

To check that multitrack recording was working correctly, an ADAT was patched in using optical cables, and an existing

8-track ADAT tape recorded directly onto the PC's hard drive using *Cubase VST*. Once the routing was configured, and the ADAT data selected as the word clock source within *VST*, this worked very well, although some clicks were noticed during the transfer process. However, this didn't happen during further tests with a different ADAT machine, so the problem seems unlikely to be due to the Lexicon Studio. When employed in a larger digital system, using a mixer such as the Yamaha 02R or 03D, you could use its word clock output connected to the rear panel BNC word clock input of the LDI-12T, and select this as the word clock source, to provide centralised clocking for everything.

PC-90 SOFTWARE

OK, so I've left the best bit till last. Since the PC-90 uses exactly the same core processing engine as the PCM90, the reverbs and effects sound just as good, and its front-panel display will look very familiar to any Lexicon owner. There are two reverb plug-ins available from within *Cubase VST* (Machine 1 and Machine 2), and there are five algorithms available for each: Ambience (to add space around the sound), Chamber (particularly useful with voice), Concert (very clean

own Mix level fader). This is a very useful feature that allows you to bypass the normal *Cubase* monitoring, and directly patch any selected combination of Lexicon Studio input signals through to one of the Lexicon Studio hardware outputs during recording (you will need to select Global Disable for *Cubase* monitoring in its System Setup window). This overcomes an annoying problem with all Win 95 audio recording packages — that there is inevitably a latency between the input signal and the playback of previously recorded tracks during recording. On playback every track will be perfectly in sync, but if you listen to an input signal after it has passed through the software buffers, it will sound delayed, and even the low latency figure of 47ms can be tricky to work with. Of course, you could achieve the same end by monitoring the input using an external mixer, but Punch Record allows you to do it with direct connections.

The final Control Panel page is Timecode, and here you can enable timecode reading, select the timecode source, as well as displaying its current type, validity, and value. The LDI-12T uses a MIDI driver to convert the LTC (Longitudinal TimeCode) supplied by its front-panel XLR socket into MTC (MIDI TimeCode).

SYSTEM REQUIREMENTS

Although Lexicon recommend a minimum of a Pentium 166MHz processor and 64Mb RAM, I think most people spending over £2500 on the audio sub-system would be best advised to budget for a PC containing a Pentium II processor. Running Steinberg's *Cubase VST*, a good recommendation would be a Pentium II 266 or even 300MHz processor, 64Mb RAM, and an 8Gb SCSI hard drive. This should give you between 24 and 32 audio tracks, with 64 EQs, eight average plug-in effects, and of course two built-in Lexicon PC-90 reverbs. Also, contrary to the supplied printed manual, any version of Windows 95 can now be used.

To be honest, any system capable of 24-bit operation, and able to support up to 32 simultaneous audio streams, is best bought ready-installed in a suitable fully-tested computer environment, whether Mac or PC. Stirling Audio, who distribute the Lexicon Studio in the UK, have wisely decided that it is far better for them to sell through a selected group of dealers who can supply ready-configured computer systems and full technical support, although they will also sell individual soundcards to anyone keen on DIY installation.



Figure 4: PC-90 reverb module. This familiar-looking PC-90 plug-in is modelled on its hardware equivalent, and should make a lot of people happy.

halls), Room, and Inverse (for gate and special effects). Two new banks, each of 50 presets, have been created for the PC-90, although I suspect that many libraries of other effects will be quickly transported to the computer format.

Using the PC-90 was a revelation. Switching it into circuit took no more overhead than the simple Wunderverb3 plug-in supplied free with *Cubase VST*, and for all practical purposes you have simply connected your VST channels to a piece of external hardware. For anyone who has not used a Lexicon reverb before, the overwhelming feeling is of clarity — a 100% wet signal sounds just as clear as the direct one, with no metallic colouration during long decays, and it was a treat to have such a variety of quality reverbs on tap inside a PC. The other thing to note is the sheer variety of sounds on offer. Most reverbs only offer a handful of controls, but here there are up to 24 (depending on the algorithm). Scrolling through the two new banks of 50 presets created for the PC-90 shows its versatility. There are the standard rooms, halls, and churches, and beautifully clean they are too, but other special effects like Synth Hall (with pitch modulation) and CyberVerb (using the Inverse algorithm with staggered delays) show just what can be achieved. Mind you, I doubt that

AUDIO SPECIFICATION

Balanced Analogue Inputs:	14 to +18dBu full scale, 100k impedance.
Unbalanced Analogue Inputs:	20 to +12dBu full scale, 50k impedance.
A-D converters:	24-bit.
Input Dynamic Range:	104dB, (106dB A-weighted typical, 20kHz bandwidth).
Input THD:	less than 0.05%, 20Hz to 20kHz.
D-A converters:	20-bit
Output Dynamic Range:	94dB, (97dB A-weighted typical, 20kHz bandwidth).
Output THD:	less than 0.01%, 20Hz to 20kHz.
Analogue Outputs:	+22dBu full scale (balanced), +16dBu (unbalanced), 600 ohm nominal impedance, each side.
Frequency Response:	20Hz to 20kHz +/-0.5dB ref 1kHz.
System Sample Rates:	44.1kHz, 48kHz.
Internal Data Resolution:	24-bit.
PC-90 Processing:	20-bit.

“...controlling VST using the Lexicon Studio felt much more like using an analogue machine — no wonder that Steinberg are so keen for other soundcard manufacturers to develop ASIO drivers.”

I need to convince anyone of the benefits of using a Lexicon reverb!

The hardware PCM90 does provide access to many more parameters than the PC-90, but Lexicon told me that future PC-90 software updates may well add more if users demand it. ▶



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- ▶ The current interface only has three parameters visible at any one time, so some algorithms need eight display pages in total. I can't help thinking that here is a missed opportunity to provide an alternative software interface which shows more (or all) of the controls simultaneously, as well as using a graphic approach, with a flowchart for each algorithm. Yes, I know it's the sound that is important and that most people will tweak the presets, but here's the chance to make existing Lexicon owners green with envy, and possibly gain some more potential customers.

SUMMARY

Lexicon seem to have designed a system that has a very useful balance of features. For many people who work with tape-based 8-track recorders such as the ADAT or DA88, moving the data to a computer-based system for editing and mixdown is ideal, and for nearly all such applications a couple of high-quality reverbs will always be needed. Implementing reverb functions in software demands a great deal of processing power, and the better the quality of the reverb, the more DSP power it normally consumes. By building in a pair of hardware reverbs, offering the legendary quality of the PCM90, Lexicon have created a winning combination, since all of your computer power remains free to run more channels of audio, or a wider selection of other less intensive plug-in effects.

“Lexicon are to be applauded for ensuring good performance with *Cubase VST* from the start.”

By opting to integrate their system with *Cubase VST*, many people who have already devoted a large amount of time learning the Steinberg software can immediately achieve useful work, without starting at the bottom of yet another software learning curve. The people who grumble about timing and latency problems with *VST* are unlikely to have used a powerful PC with hardware-specific ASIO drivers and built-in reverb hardware, such as the Lexicon Studio. If they did, they would find a system with huge power and few compromises, which should win over the majority of doubters.

COMING SOON...

For anyone requiring more extensive I/O, there will be a larger Lexicon Studio system available in the future incorporating the LDI-16S (16-channel) interface. This offers eight sets of balanced analogue inputs and outputs, S/PDIF and Word Clock connections, plus a 8-channel TDIF connection for a Tascam DA88 or DA38 digital recorder.

The following optional screw-in modules

will also be made available:

- AES-8 — this provides an additional eight channels of AES/EBU digital ins and outs (with real-time sample conversion between any pair).
- MDM (Modular Digital Multitrack) — this provides another TDIF connection and two ADAT optical ones, as well as ADAT Sync.
- STC-1 — this is a timecode reader/generator that generates LTC, and reads and generates VITC.

No prices are available yet.

PC TWEAKS

Since the review model PC supplied with the Lexicon Studio system seemed representative of what both Stirling Audio and Steinberg are recommending, I took a closer look at the way it had been set up.

The main programs were installed on a 2Gb drive, but as expected, the audio hard drive was entirely separate from the one used for Windows 95 installation (for optimum performance). A Western Digital Enterprise E4360 drive had been installed. This is a 4.3Gb device with Ultra Fast and Wide SCSI-3, a quoted access time of 8ms, and rotational speed of 7200rpm. The SCSI adapter itself was for Adaptec and built into the motherboard.

In Windows 95 itself, Read Ahead optimisation had been switched off, and Write-Behind caching had been disabled for all drives, as recommended by Steinberg. The typical role of the machine had been set to 'Network Server' (opinions are divided on whether this adjustment gives an improvement). Finally, in the System.ini file, the Vcache settings had already been adjusted to MaxFileCache=32768 and MinFileCache=32768.

Lexicon's audio hardware is also well thought out. By providing 24-bit A-D converters, as well as internal 24-bit resolution, you are assured of high audio quality recordings. The fact that the D-A converters are only 20-bit is less important, since the majority of audio ends up as 16-bit in the final master, and you are normally using these converters for monitoring, rather than as part of the recording chain. However, when using *Cubase VST v3.55*, recording is currently restricted to 16-bit resolution. The forthcoming *Cubase 4.0/24* (initially for the Mac from June 98, and then later in 98 for PC) will remove this restriction, allowing full 24-bit recording, as well as a host of new features.

The main limitation of this version is the lack of standard Win 95 drivers (and Mac ones). Both of these are promised within a few months, and then the Lexicon Studio could be used with any Audio+MIDI sequencer, albeit with greater latency. Lexicon intend to specifically support other sequencers, to provide optimum results a package at a time. Personally, I think their approach is sensible, given the many potential problems when using a universal driver. Overall, I think Lexicon have a definite winner on their hands in the Lexicon Studio 12T, and I suspect that they may be initially hard-pressed to keep up with demand.

SOS

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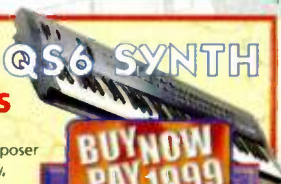
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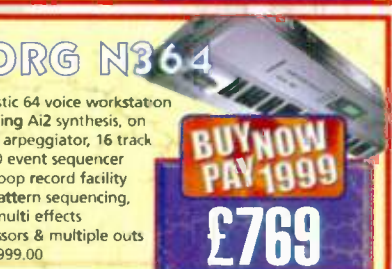
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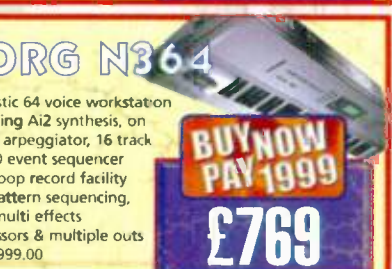
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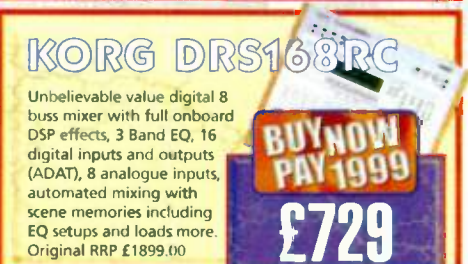
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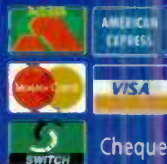
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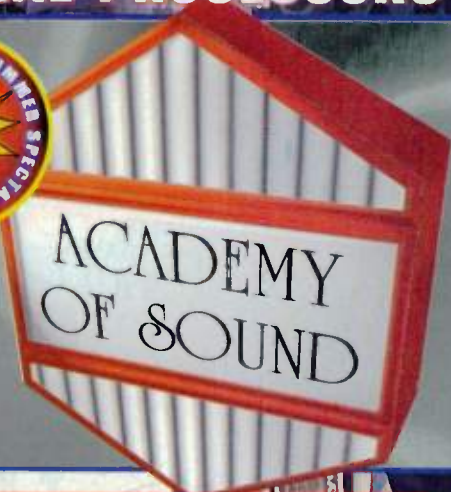


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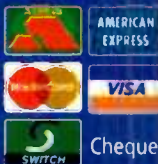
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One bit at a time

Last month, we concluded our examination of the basic operation of an analogue-to-digital converter with a look at the various problems and clever solutions associated with quantising. This month, we will consider what has to be done to protect the binary data generated by the A-D from recording and transmission errors.

The first thing to appreciate is the sheer amount of data created every second by a stereo A-D converter. Assuming for the moment a converter working at, say, 44.1kHz with a 16-bit output, the total data generated every second is:

$2 \times 44100 \times 16 = 1,411,200$ bits per second or 176,400 Kilobytes per second

So in one minute, there will be something like 10.5Mb of audio data to store and in one hour, 635Mb! If you scale it up for a 48kHz converter with 24-bit resolution, an hour's worth of recording would require just over 1Gb of storage. That is a *lot* of data to have to look after — and as yet we have not given any thought to adding error protection data or any auxiliary subcodes for copyright status or timing information.

At present, there is great pressure within the recording industry to move up to digital systems running at a 24-bit resolution and with a 96kHz sampling rate. In such systems, the amount of data stored during recording doubles — roughly 2Gb per hour for stereo, and 6Gb for six-channel surround! This is the reason why the high-resolution audio lobby are desperate to get the agreements sorted out over the audio-only version of the Digital Versatile Disc (DVD) with its 4.7Gb (per layer)

ALL ABOUT DIGITAL AUDIO

PART 3: In the third instalment of our series on the techniques and technology of digital audio, HUGH ROBJOHN'S turns his attention to digital audio error detection and correction — and some of the problems associated with them!

capacity — an ordinary CD can only store about six minutes or so of six-channel high-resolution audio!

ERROR PROTECTION

The data generated by an A-D converter carries the quantised sample values of the original analogue audio and so any corruption to that data will result in erroneous sample values, and, ultimately, an incorrectly reconstructed waveform (which may appear distorted or 'clicky' to our ears). Clearly, any form of audible error is undesirable, and so steps must be taken to preserve the original data with an error protection system of some kind.

The error protection strategies used in digital

ERROR STATUS

The kind of detection, correction and concealment systems used on current digital audio systems is, without exception, extremely powerful and it is only in cases of extreme provocation that problems become audible. For the consumer, this kind of serene perfection is one of the most desirable qualities of a digital audio system. However, for the professional it can be a real problem.

With analogue systems, quality deteriorated progressively — for example, if the tape heads became dirty, the gradual loss of high frequencies would hopefully be noticed by human ears before it became a serious problem. However, in a digital system that is no longer the case. Dirty heads on a DAT machine will cause an

increasing error rate, but the error correction system will cope... until it really can't any longer, and has to interpolate. But even then, there is a good chance that you will be none the wiser until even the concealment system gives up and the output mutes in disgust!

Since you can no longer rely on your ears to detect problems in the replay transport or medium, digital systems really should incorporate some form of indicator of how hard the error correction and concealing systems are having to work, which will give a good idea of the state of the transport and the quality of the tape or disc.

All that is needed is a pair of lights, one to illuminate when an error has been corrected and the other to show when correction was impossible and an interpolation has occurred. The

correction light would flash occasionally — the rate being dependent on the format, medium, and transport. After all, the error correction system is there for a good reason and you would expect it to earn its keep. However, the correction light flashing more frequently than normal could mean the medium is nearing the end of its useful life, or the transport is suffering in some way (such as dirty heads or opto-sensor). At this stage, making a digital clone would preserve the original audio data by placing it onto a more robust medium. If the concealment light flashed more than very rarely it would be a good indication that real problems are lurking just under the surface and something needs to be done rather urgently to preserve the sonic integrity of the signal.

Virtually all the error protection chips used in CD players, DAT machines and digital multitracks provide the signals required to drive the kinds of indicator described here, but very few machines actually implement the feature. A few professional DAT machines offer the facility — the Sony 7000 and the Fostex D-series DAT machines for example, and some of the Panasonic DATs provide a numerical log of corrected errors — but they are very much in the minority. Manufacturers are very reluctant to put big lights on the front of their 'perfect' machines which say Error or Interpolation (for obvious reasons), but it is something which we should be demanding as users. How else can we discern the condition of the machinery or the precious master tapes we record and replay on it?

ALL ABOUT DIGITAL AUDIO

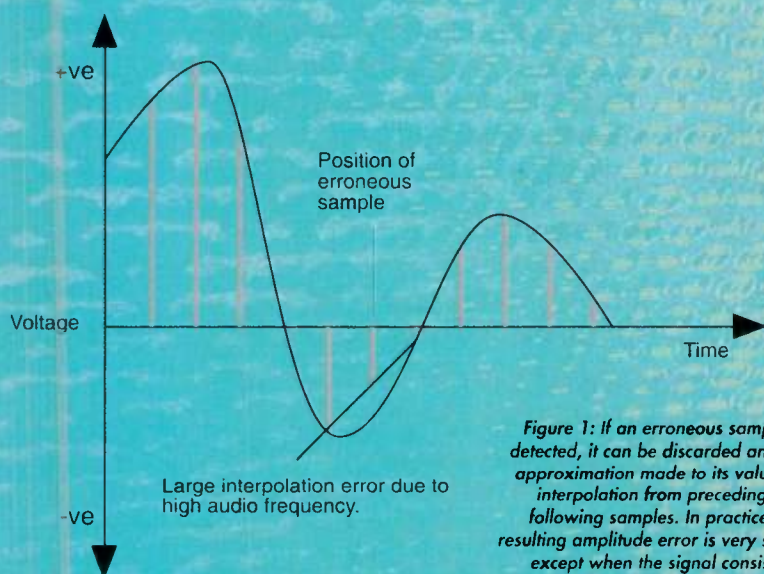
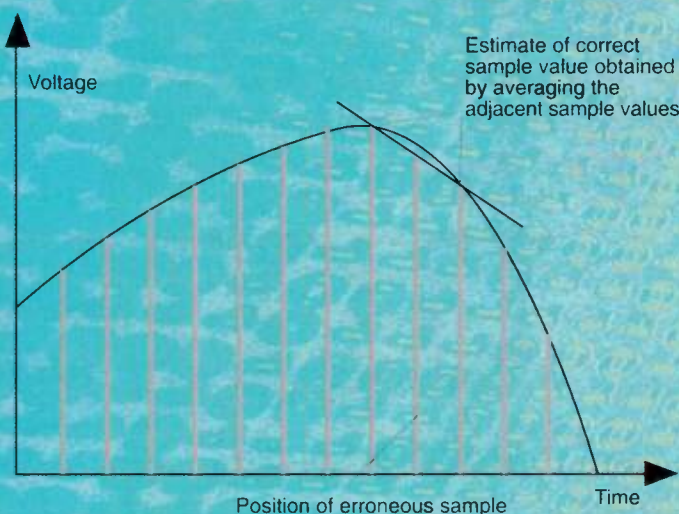


Figure 1: If an erroneous sample is detected, it can be discarded and an approximation made to its value by interpolation from preceding and following samples. In practice, the resulting amplitude error is very small except when the signal consists of loud high frequencies.

- ▶ audio systems are extremely complex and are optimised for a specific medium — the system employed by DAT differs from that used on CD, for example, because the nature of the predominant errors are different. However, all audio error protection systems follow the same basic strategies, which start with a mechanism for detecting the presence of corrupted data. After all, the best error correction system in the world is no good if it can't spot corrupted data in the first place!

The simplest way to spot corrupted data is to use a *parity check* — a very common system in use in everything from ISBN codes on books to barcodes on tins of soup! The idea is to add some extra information to the data which imposes a

known property on the digital data. For example, in an 'even-parity' system, a single data bit is added to the original data such that the total number of 1s is always an even number (the parity check bit is shown in brackets):

1011[1] and 1010[0]

Should one bit of the data (or parity check) become corrupted, the parity check will fail and the system will know that the data is not valid. This simple system can only detect a single bit in error — two corrupted bits will appear to provide a valid parity check and this demonstrates an important facet of all error detection systems, no matter how elaborate: firstly they have to burden the wanted data with additional bits (often called redundant data), and secondly, there will always come a point where the system fails to spot the errors.

Error detection systems are designed to be capable of detecting errors beyond the anticipated peak error rate of the medium concerned, and the amount of redundant data added to the audio data is never so great that storage times are adversely affected. In the case of the CD format, for example, roughly four bits have to be recorded for every three audio data bits which seems like a lot but in fact, employing a decent error detection/correction system actually allows more data to be stored on a given medium rather than less, because the data can be packed more densely. Although this will lead to more data becoming corrupted by flaws in the medium, the presence of the detection/correction system enables the data to be recovered accurately.

A commonly employed error detection system in digital audio applications is the Cyclic Redundancy Check Code (CRCC) which typically achieves an error detection success rate of better than 99.9985% — which is, to all intents and purposes, perfect! In fact, the CD specification claims to suffer fewer than one undetected error in every 750 hours of replay, in the worst case.

CONCEALMENT

A simple system like parity checking can detect the presence of errors but can not correct them, because it has no way of identifying which bits are corrupt. In this situation, all that can be done is to discard the faulty data and try to guess at what the true value was, based on the preceding and following data — a process called Interpolation or Concealment. This process is never used in pure data applications (such as on the hard disk of your PC), and is usually a last-ditch mechanism in digital audio systems (although the NICAM stereo television system relies on exactly this as its main error handling strategy!)

To give you an idea of the rarity of interpolation, the CD specification states that an interpolation should be required fewer than once every 10 hours of replay. However, when required, the interpolation system can actually accommodate 12,300 missing data bits, which equates to something like ▶

“...the interpolation system can actually accommodate 12,300 missing data bits...”

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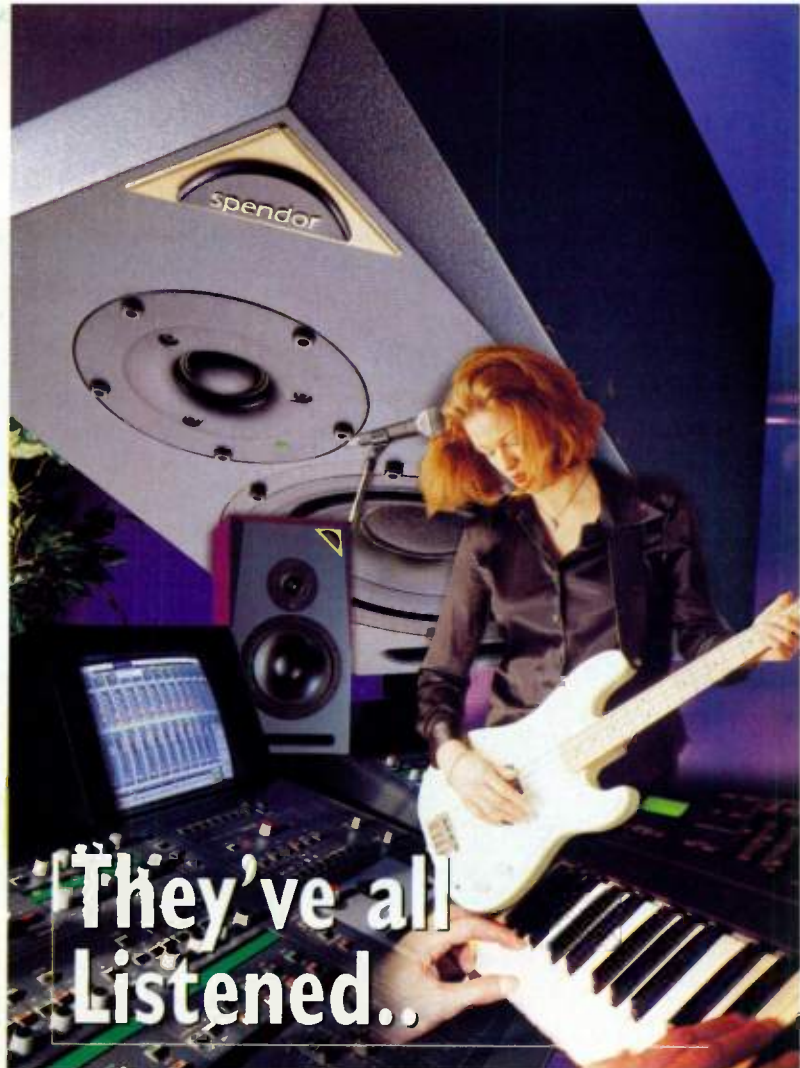
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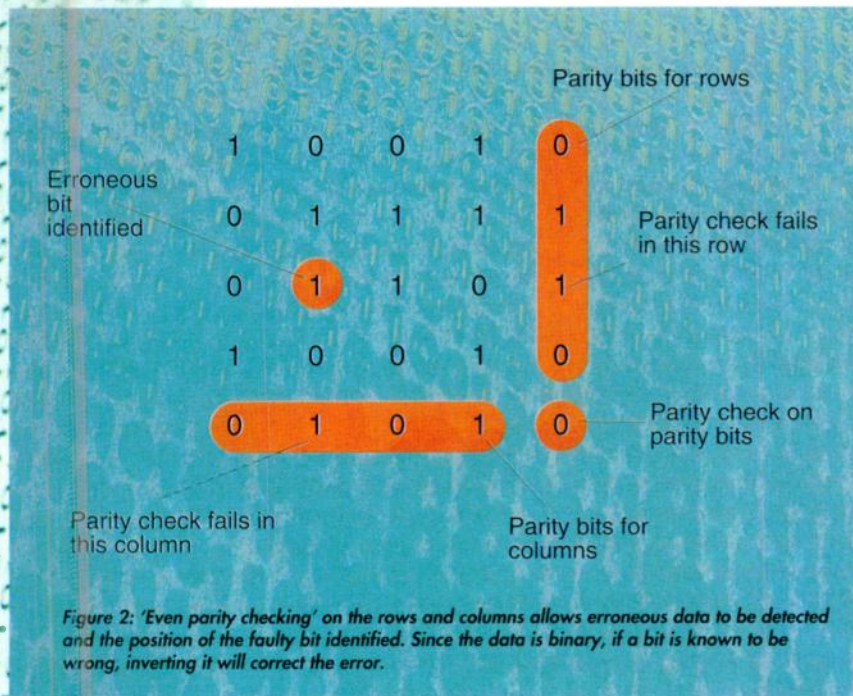
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ALL ABOUT DIGITAL AUDIO



- ▶ 10 milliseconds of audio and about 8mm of damaged disc surface.

Interpolation works tolerably well in audio systems because sample amplitudes generally change slowly and reasonably predictably from one sample to the next due to the majority of audio energy being concentrated in the low frequencies. Thus, averaging the preceding and following samples to approximate a missing one in the middle works surprisingly well and it is only with very loud high-frequency signals that the interpolation process produces audible amplitude errors. Figure 1 shows how an erroneous sample is discarded and a new one interpolated, and also

how large errors can arise when interpolating high-frequency signals.

CORRECTION

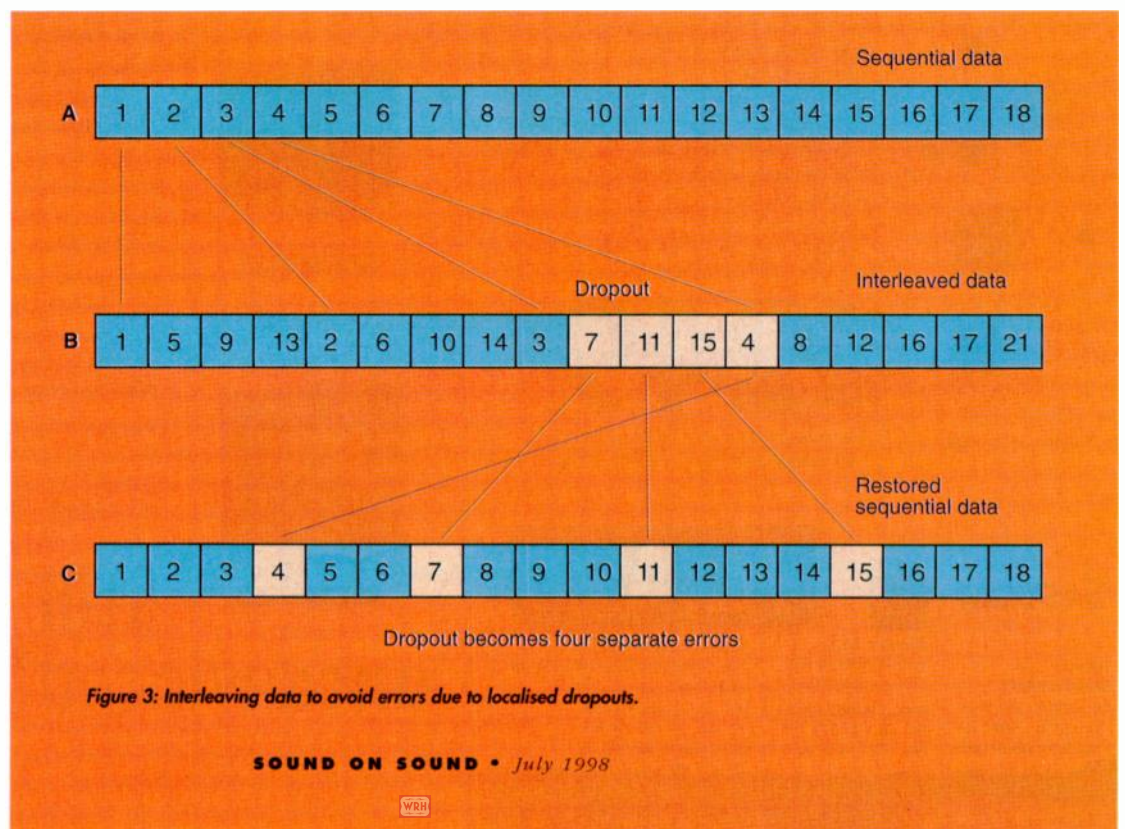
Concealment is obviously not the ideal solution, and some means of correcting detected errors would be preferable. However, this relies on the detecting system being able to pinpoint the erroneous bits which implies some form of cross-checking. As a simple example, consider a 16-bit digital word arranged as four, four-bit words in a 4x4 table, with even parity added to both the rows and columns (including a parity check on the parity bits!). Practical error correction systems are far more elaborate than this, but the concept remains valid.

In the example shown here, one of the bits has been corrupted and because it is now possible to cross-check the parity on the rows and columns, the faulty bit can be identified. Again, this simple system can only correct a single corrupted bit. Two faulty bits will lead to the system being unable to identify their location, but at least the system still flags the entire word as invalid and so concealment could be employed.

Practical error correction systems are frighteningly complicated and go by names such as the Cross-interleaved Reed-Soloman Code (used on CDs) and the Double Reed-Soloman Code (used on DAT). To give an indication of the power of these systems, the CIRC system on a CD can completely correct a block of 4000 missing bits, which equates to 2.5mm of unreadable data on the disc.

INTERLEAVING

With any error protection system, if too many erroneous bits occur in the same sample, there is a risk of the error detection system failing, and in practice, most media failures (such as dropouts



Samples interleaved by column order

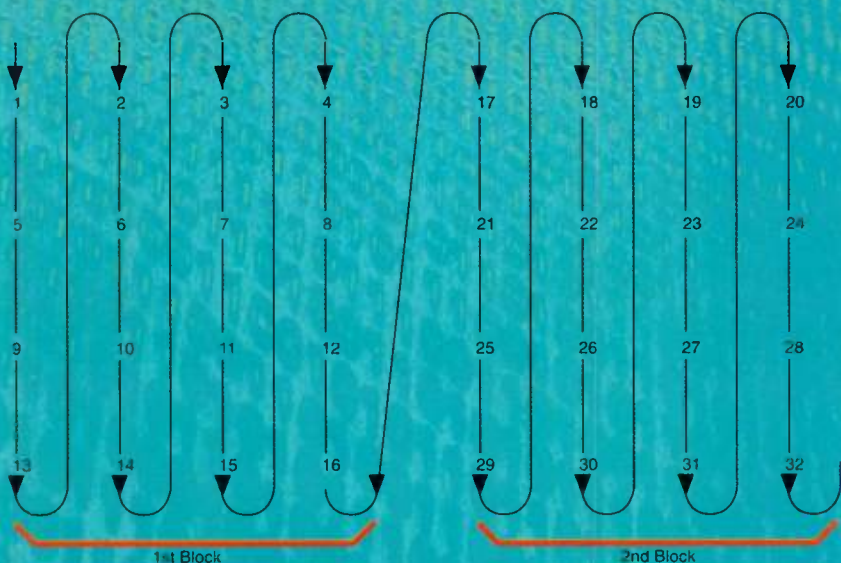


Figure 4: In a Block Interleave system, data within the block is scrambled in a known sequence, but the data on the block boundaries always remains sequential, allowing edits or record drop-ins to be made without upsetting the interleave structure.

on tape or dirt on a CD), will result in a large chunk of data being lost, not just the odd data bit here and there. So a technique called interleaving is used to scatter data around the medium in such a way that if a large section is lost or damaged, when the data is reordered many smaller, manageable data losses are formed, which the detection and correction systems can hopefully deal with.

In Figure 3, the original sequential data (A) is scrambled in a known sequence (B). If a section is lost through, say, a tape dropout, then when the data is unscrambled (C), the large block of missing data which would defeat the error protection system becomes several small blocks which are retrievable.


Interleaving is a standard element in the error protection process, but it has a number of implications when it comes to digital editing and punching-in or out of record. The problem is that because the data is not stored sequentially on the tape or disc, how can a precise edit point be located? Imagine wanting to punch in after sample eight in the example above. On the tape, sample nine is actually stored some way before sample eight — and so whether you started recording new data after sample eight or before sample nine, the interleaving structure would be destroyed and no error correction system would be able to make any sense of it! The result would be a fairly major splat of the kind that most DAT machines make when you drop into record on pre-recorded material!

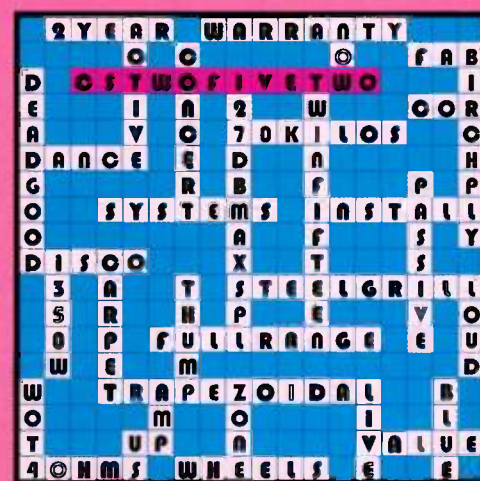
One solution is to use a form of interleaving known as Block Interleave, a simple version of which I have used in

Figure 4, above. The idea is that the data is grouped into blocks and although the data within each block is scrambled according to the interleave rules, the first and last sample always remain in their original positions so that at the block boundaries the data is always sequential, although only for those two adjacent samples. In the example here, the block interleaving is performed by loading the sequential data into a 'memory' on a row-by-row basis, but recording it in a column-by-column order. Thus, sample 16 and 17 will always be adjacent and a drop-in could be made at this point without destroying the interleaving structure.

In fact, a block interleave system like this is used in DAT, but the block boundaries only occur once every 30 milliseconds, and although it is perfectly possible to design a DAT recorder to only enter or exit record at a block boundary, most don't bother, hence the inevitable clicks and splats! In any case, it could be argued that only being able to edit at 30-millisecond intervals is not good enough — it equates to about 1cm of tape at 38cm per second (15ips) and most proficient tape editors could do a lot better than that! Fortunately, there are ways to overcome the problems of block interleaving which involve four-head head drums and pre-reading — something we will look at next month.

COMING UP...

In the next instalment of this series, I will describe some of the inner workings of the common digital tape formats, including DAT and the various multitrack formats. 



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V for Victory?

YAMAHA 01V
DIGITAL MIXER



“The 01V
is an awful lot of
mixer for the money.”

The 01V assumes a position as the entry-level product in Yamaha's digital mixer line-up, effectively replacing the Promix 01 and unifying the highly evolved operational philosophies and practices developed through the 02R and 03D across the complete range. Of course, the digital mixer market is now becoming a hotbed of competition, with the new Soundcraft Spirit 328 and Tascam TMD1000 (see this month's news pages) on the horizon. The Yamaha 01V looks positively cheap next to some of its digital competitors, yet it benefits from the familiar interface, the onboard effects and dynamics processing, and the undeniably advanced technology that made the 02R and 03D possible.

Essentially, the 01V is more a simplified 03D than an updated Promix 01. However, whereas the 03D has full onboard dynamic automation, the 01V has snapshot automation, but requires the assistance of a MIDI sequencer to provide full dynamic automation. Like the 03D, it can accept one of a selection of plug-in interface cards, which increase the number of ins and outs in either the digital or analogue domain, depending on the card you pick (more on these in a moment). There are 16 main analogue inputs arranged as 12 mono mic/line channels and two line-level stereo pairs, each with its own dedicated fader. Rather than dedicated stereo, buss and aux outputs, there are four assignable so-called Omni outputs that can be deployed as required.

OVERVIEW

Pre-launch publicity has suggested that the 01V is intended to appeal to anyone considering upgrading an analogue mixer in a sophisticated music system. With that in mind, the 01V offers enough facilities and flexibility to convince of the advantages of going digital, but in such a way that the learning curve is shallow and eases the user gently into the unfamiliar world of digital mixers.

In terms of hardware, the 01V is based on the same technology as its siblings with Yamaha's custom 32-bit DSPs providing the number-crunching engines. However, the desk has taken advantage of improvements in converter technology by incorporating the latest Crystal 20-bit 128-times oversampling delta-sigma A-Ds and 20-bit 8-times oversampling D-As.

The new desk is a distinctive light silver and it fits standard 19-inch racking with the optional rackmount ears. The majority of analogue connections have been brought onto the top surface for ease of re-plugging, but the rest of the control surface bears a strong family resemblance to the 02R and 03D. The main setup and configuration buttons are on the left-hand side of the 320x80 LCD, and over to the right are a set of dedicated equaliser and pan controls and a stereo bargraph LED meter. A parameter wheel, increment/decrement buttons, cursor controls, and an Enter key fall conveniently to hand in the front right-hand corner of the desk.

As already explained in brief, the 01V provides a wealth of connectivity with 12 analogue mic/line inputs, two dedicated stereo analogue line inputs, and a stereo digital input. If one of the optional expansion cards is installed, another eight digital

inputs become available in either ADAT, TDIF, or AES/EBU formats. A fourth card option provides four analogue outputs, which doubles the number of assignable analogue outputs from the desk, and a fifth sports eight analogue inputs. These last two cards will not be available until later in the Autumn.

The built-in analogue inputs boast a very adaptable 4-band parametric EQ, delay, plus a flexible dynamics processor, and each channel can access six auxiliary sends, two of which are dedicated to internal effects processors. Channels can be routed to the main stereo output, one or more of the four internal mix busses, or to a direct output. In addition to all the signal-processing capacity on the input channels, the main stereo and auxiliary output chains also have their own 4-band EQs, dynamics processors, and up to 300ms of additional delay.

Input channels are controlled via motorised faders and although the markings on the escutcheon give the impression that these are long-throw faders, they are actually only 60mm in length, identical to those on the Promix 01 and 03D. As with the other Yamaha digital mixers, the faders can be 'paged' to control alternative functions such as the aux and effects sends, master levels, the eight digital input channels, or to control some other remote device via MIDI.

Uniquely, the 01V's four auxiliary sends do not have dedicated outputs. Instead, an unusual 'matrix' facility assigns the four available Omni outputs to provide signals derived from either the four auxiliary outputs, the four mix busses, the stereo main outputs, or direct outputs from any of the 16 analogue input channels. A similar arrangement configures the eight optional digital outputs.

As with the other 0-Series desks, mono channels and auxes can be paired for stereo working, there are three fader and three mute groups, and the desk also incorporates a line-up oscillator.

GETTING CONNECTED

It would be impossible to cover all of the desk's facilities here — the owner's manual which does exactly that (and very well too) runs to over 300 pages! However, I will endeavour to give you a flavour of the 01V's capabilities, and to highlight the particularly useful or unusual facilities.

The 12 analogue mic/line channels are each equipped with an XLR and quarter-inch jack socket mounted on the top surface — both electronically balanced and wired in parallel so that either input connector can be used for any source. Phantom power is available on the XLR sockets (switched in two banks) and line levels are accommodated by switching in a 26dB pad. The gain control covers -16 to -60dB, (+10 to -34dB if the pad is switched in) but the 01V offers about 6dB less overall gain than the 03D, which explains why the 01V's mic inputs sound quieter than the 03D's on full gain. The phantom power, pads, and input gain controls do not fall under the watchful eye of the desk's snapshot automation.

The two stereo input channels are equipped with a pair of balanced jack sockets and gain controls covering +10 to -20dB. Channels 15/16 can be switched to accept the signal from the two-track return connectors instead of the jack sockets, and channels 13/14 can be swapped with

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HUGH ROBJOHN'S
is most intrigued...***



Yamaha 01V

pros & cons

YAMAHA 01V £1399

pros

- Good user interface.
- Flexible analogue and digital connectivity.
- Makes the all-digital studio even more affordable.
- Powerful and capable EQ and Dynamics.
- Motorised faders.

cons

- Potential traps in the monitoring section.
- Even harder to think of an excuse not to go digital!

summary

Following in the footsteps of the 02R and 03D, the 01V is an excellent addition to Yamaha's 0-series. Priced just below the 03D in terms of facilities, but well below it in price, it gives little away in flexibility and nothing at all in terms of signal quality. Only lacking the in-built dynamic automation of its siblings, the 01V is a very capable and well-specified machine which will suit a very wide range of applications.

SOUND ON SOUND

► the S/PDIF digital input through a software menu. Unbalanced -10dBV phono sockets provide the two-track recorder interface and another quarter-inch jack socket provides a headphone outlet.

The remaining interface facilities are on the back of the desk, with a pair of balanced jack sockets providing the stereo monitoring output, and four more balanced jack sockets for the assignable Omni outputs. The main stereo buss analogue output is via a pair of balanced XLRs, whilst a pair of phono connectors provide the only digital interface fitted as standard — S/PDIF in and out with full 24-bit capability. To the right-hand side are the usual trio of MIDI connectors and a To Host mini-DIN socket for linking two Yamaha 0-series desks together, or to interface directly with a computer. At the bottom of the rear panel is a removable plate hiding the socket for the Option I/O cards. The mains lead is captive, with the power switch located at the base of the rear panel.

A STROLL DOWN THE SIGNAL PATH

The 01V's signal path is better equipped than most analogue consoles, but none of the structure I'm about to describe really exists — it is all in the mind of the programmers and resides as algorithms inside a bunch of DSP chips! Following the analogue input section and digital conversion, the channel signal reaches an equaliser block which includes a phase-reverse facility and a digital attenuator (the role of which is crucial to the correct operation of the desk and is described in the 'Digital Headroom' box). The 4-band parametric equaliser is extremely comprehensive, yet easy to use, thanks to the dedicated control section to the right of the LCD panel. After the EQ section comes the dynamics processing and then a delay (up to 250ms) which can be specified in terms of distance (in meters), samples, or milliseconds. The balance between direct and delayed signal can be adjusted, as can the amount of feedback around the delay line, allowing simple delay effects to be created. The layout is completed by the On switch, fader, and output routing.

THE EQUALISER

The dedicated equaliser controls are assigned by pressing the Sel button above a channel fader. Access buttons are provided for four separate bands although in fact each can traverse the entire 21Hz to 20kHz range (in 1/12 octave steps). Alongside the four push buttons are three rotary encoders labelled Pan, F (frequency) and G (gain).



A range of optional cards offer additional I/O capability.

The provision of a dedicated panning knob in the EQ section is a bit of a mystery, but useful all the same! The F knob determines the centre or turnover frequency of the selected band and the G knob controls the cut or boost (up to +/-18dB in half dB steps). The two mid bands have variable Q (bandwidth) parameters scaled from 10 (extremely narrow) to 0.1 (very broad), adjusted with the parameter wheel or the Inc/Dec buttons. The high and low bands also have adjustable Q values but in addition at the narrow end of the range, an extra position introduces low- or high-pass filters respectively, and at the broad end of the range an additional position imposes a shelf response.

The extreme right-hand side of the LCD shows three virtual knobs corresponding to the Pan, F and G controls, with numerical readouts and a label informing the user which channel is being adjusted. On the stereo input channels, the internal effects returns, and on any paired channels, the virtual knobs are shown with dotted lines leading off the side of the screen to indicate that another channel is also being adjusted. Besides these virtual knobs, the LCD shows a graphical frequency response with a dotted vertical line to indicate the position of the selected band's frequency control. There is also a table of numerical values of all 12 EQ parameters (frequency, gain, and Q or filter type for each of the four bands).

The entire EQ section can be bypassed by pressing the Enter button and it can also be reset to flat by pressing the high and low-band buttons simultaneously. However, this last function would benefit from a suitable marking on the panel (as the 03D has). In common with other Yamaha digital desks, an EQ Library is provided in which to store favourite EQ settings, copy settings between channels, or to recall any of the 40 factory presets.

The ultimate question, of course, is what does the equaliser sound like? Well, anyone with experience of the larger 0-series desks will already know because the 01V uses exactly the same algorithms as its siblings. The EQ sounds clean, but tending towards clinical rather than warm, and is capable of subtle artistic enhancements as well as really quite savage 'corrections'. It is intended to get the job done with the minimum of fuss and the maximum of flexibility — something it achieves admirably.

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▶ offset! Another potential pitfall is that the main output monitoring can be selected to either pre or post main fader — when in pre-fade mode, wagging the main output fader up and down doesn't change what you hear one iota but messes up your recording! However, once you have set the desk up the way you want it, you are unlikely to fall into these kinds of traps, but because of the nature of the desk with its assignable controls and hidden facilities in menu pages, it is possible to think the desk is



“...there is very little I can criticise about the 01V. It is an excellent mixer which will appeal to a very broad spectrum of users...”

working in one mode when it is actually in another.

The Omni outputs default to the four aux sends, but can also be assigned to provide analogue mix buss outputs, the stereo main outputs, or direct outputs from channels 1-16. The assignable Omni concept is new to Yamaha's 0-series, and gives you a degree of extra flexibility. For example, you could interface a multitrack recorder in the analogue domain — but at the expense of available aux sends. There is also a delay facility shared between the Omni and main stereo outputs of up to 300mS which can be very useful in multi-speaker sound reinforcement applications, for example.

The monitoring arrangements are very comprehensive, if unusual, and the appropriate menu page allows the main monitoring signal to be derived from the main stereo output, the stereo cascade input, the four auxiliary busses, or the four mix busses — all pre or post-fader. A mono facility is provided, as is a useful monitor trim control which allows domestic amplifiers to be used safely with the +4dBu monitor output.

There is also a very elaborate solo system which can be set to one of two modes: recording and mixdown. Mixdown mode is the usual solo-in-place arrangement where non-soloed channels are muted while monitoring the main stereo output — often referred to as destructive soloing. In Recording mode soloed channels are fed purely to the monitoring system without affecting any of the main recording outputs. The desk also offers the choice of whether the solo switches cancel each other, or mix together when more than one is pressed, and there is a separate trim control to adjust the relative level of soloed signals in the monitoring chain.

MIDI & AUTOMATION

The 01V has lots of MIDI. Everything is controllable through the usual patch change, control change and system exclusive messages, whilst the faders and the On and Sel buttons can all be used to send MIDI control data to operate remote equipment, including MMC commands. The implementation is extensive and there is something like 40 pages in

the owner's manual dedicated to the subject!

Integral snapshot automation is provided through 'scene memories', but dynamic automation requires the services of an external MIDI sequencer. The 100 scene memories can be crossfaded (up to 25 seconds) and channels can be made 'safe' to remain unaffected when the rest of the desk is reset. There is also provision to undo unwanted scene changes or to compare a stored scene with the current desk settings. The scene memories store pretty much all the operational controls, with the exception of the analogue ones like the input pad and gain controls.

OPINION

The 01V is an awful lot of mixer for the money. Eighteen analogue inputs, up to 10 digital inputs, 10 digital outputs, and 10 analogue outputs, all in a 19-inch rackmounting frame and with instant recall of most parameters. That adds up to a very powerful package by any standards and the machine is easy to use once you have become familiar with Yamaha's operating style.

It should also be remembered that only a few years ago, you would have paid the cost of this mixer purely to buy effects boxes with the capability of the 01V's onboard effects, and that's before you consider all the dynamics processors. These go a long way towards mitigating the lack of analogue insert points on every channel (something we're going to have to get used to with digital desks), though you can still use the analogue inputs and insert a processor between the recorder's line output and the mixer's analogue input. Furthermore, without one of the optional multitrack I/O cards, the 01V is probably best suited to work where recording is done one or two tracks at a time. With an appropriate card fitted, however, you have all the buss flexibility necessary for conventional multitrack recording with a single ADAT or DTRS machine.

In a desk which is trying to be all things to all people, total flexibility inevitably leads to the potential for some confusion, and I have already highlighted one or two instances of that, but on the whole there is very little I can criticise about the 01V, especially at its price. It is an excellent mixer which will appeal to a very broad spectrum of users, professional, semi-professional and enthusiastic amateur alike.

505

E 01V £1399; optional digital I/O expansion cards (MY8AE AES/EBU card, MY8TD TDIF card, and MY8AT ADAT optical card) £199 each. All prices include VAT.

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Gate	Compressor	Limiter	De-esser	and More
Set parameters for threshold, ratio, attack, hold, release, and output gain. See the effect of your settings on the graphical display, as well as on the gain reduction and audio level meters, they all interact in real time with your manipulation of the parameters. Start with a threshold setting of about -60dB to clean off the noise in between the vocal takes. You can save your final gate settings as a "gate preset" building block and recall it into any other setup you do.	The effects of the gate settings are visible on the graphic display to help you determine where to set your compressor threshold. Move through all the regular parameters (displayed in real time), like threshold, ratio, attack, release, and output gain. For vocals use a threshold of about -25dB, a ratio of about 3:1 or 4:1, and a slow attack and fast release for the most natural sounding effect. Your compressor settings can also be saved as a building block to be called up into any other preset.	Changes you make to the limiter settings are also seen on the graphical display. You can adjust the level and also the speed at which the limiter lets go of the signal as it goes below the threshold. This is truly smooth limiting, with patented dbx PeakPlus™ algorithms, so rest assured that wherever you set your threshold level, your tape will not distort. And like the other parts of the processor, your limiter settings can be named and saved for later recall.	De-essing works the same way; see the effects of your settings displayed on the graph. Parameters here are the common ones: threshold (800Hz to 8kHz), and amount (%). Other processing includes EQ - both in-path and sidechain - for special-effect types of processing. When you are editing any of the building blocks, its icon is visible on the display, and the parameters are shown on the graph, so it's always easy to know where you are.	You can also work in stereo, or set up a completely different and independent processing chain for the other channel. Optional digital output with the TYPE IV™ Conversion System with TSE™ (Tape Saturation Emulation) provides up to 24-bit output in either AES/EBU or S/PDIF formats with the trademark digital processing of TYPE IV™. The DDP also has full MIDI/Automation capability, with separate midi in and thru jacks.

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Some things never change...

If you're reading this magazine, chances are you're a musician. - Not a rocket scientist, not computer wiz, and certainly not a geek.

So why is it that other manufacturers expect you to have a degree in button pushing just to get at the mid-band EQ or to adjust the aux send level of track 2?

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Fostex have long had the knack of stuffing their multitrackers with innovative features, yet making them incredibly easy to use.

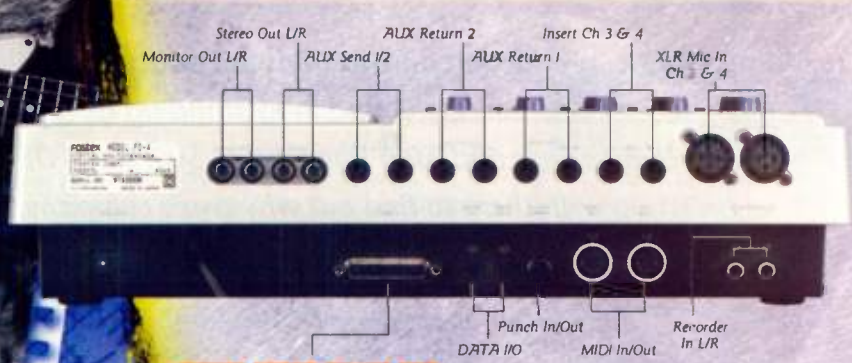
They also insist that your recordings are not compromised by compression techniques.

...some things never change.



* Requires optional E-IDE fitting kit

FD-4 quick start guide



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 SCV London recommend SyQuest drives and media

Clive Langer & Alan Winstanley

► first day at art college and we decided to form a band — Deaf School. We did some gigs and it all took off. Then Steve Lindsey, our bass player and now a music publisher, entered us for a *Melody Maker* competition, which we won. Suddenly we were being offered deals by everyone. We signed to Warner Music via Derek Taylor and Rob Dickins, who told us about TW Studios in Fulham and suggested we used the facility for demos. Alan engineered them and they sounded great, so when the band split up and I went solo I got Alan to produce my tracks. Martin Rushent was supposed to produce me, but he didn't turn up and I was left with Alan — look where that got me! It didn't take me long to realise that when Alan wasn't available and I had to work with someone else, things never came out

well. I guess I figured out something from that.”

Although Clive Langer was pursuing a solo career as a musician, he was also dabbling with production, and it was through him that the two got involved in their first joint production, *Madness* (see 'Complete Madness' box).

“I was doing production work for Stiff Records, which was who *Madness* eventually signed to,” says Winstanley. “I was also in the process of building a recording studio, Genetic in Berkshire, with Martin Rushent, who had become a close friend.”

Langer: “That first co-production was a huge hit, and the next thing we did together was three tracks

Clive Langer:
“Having two sets
of skills means we
can do the whole
package without
anyone else.”

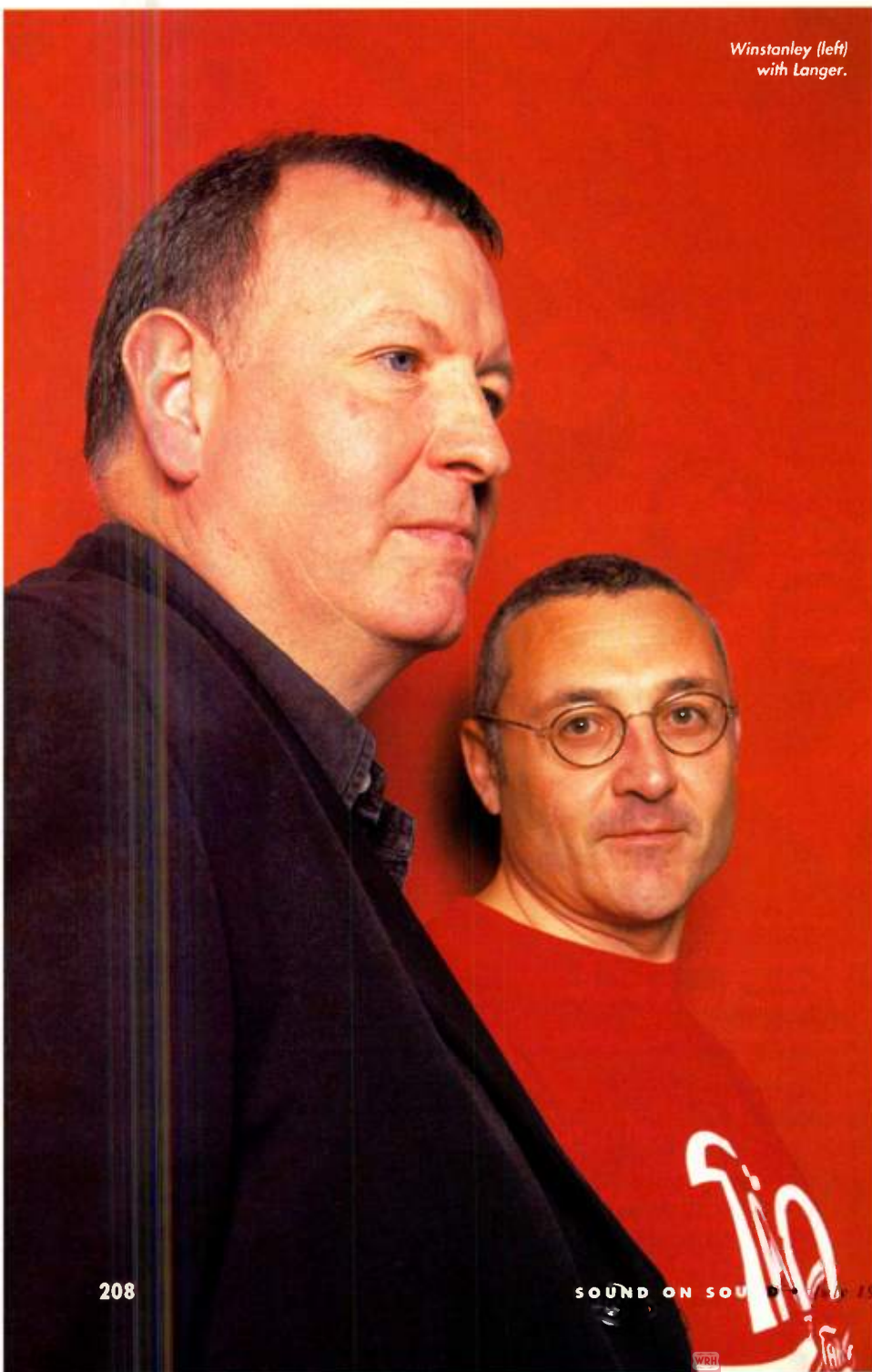
on The Teardrop Explodes album *Kilimanjaro*, plus their single 'Passionate Friend'. We didn't plan the future and we certainly weren't thinking in terms of staying partners, but I think the rest of the world was beginning to see us that way. People became aware of us as a team because of the first *Madness* album and we consolidated it quite quickly with lots of other things. But it wasn't until we did the Dexy's album *Too-Rye-Ay* that we started calling ourselves a partnership and telling record labels that we came as a package. In our own minds we still didn't consider it to be a long-term thing. That only happened in 1983 when we made a commitment to build Westside Studios together — and even then we knew there would be occasions when we would work apart. Before that, although we worked as a team on a lot of recordings, I still hadn't given up hope of being an artist, and in between the first two *Madness* albums I was on the road as Clive Langer and The Boxes, supporting Elvis Costello. For me, production was another interest. When I did one thing for too long I found myself wanting to do the other. If I'm honest it's probably still the same today, but at that stage my artist career was more successful, while these days my production is more important.”

MODUS OPERANDI

Working with someone else for a long period of time, especially in the highly-charged atmosphere of a recording studio, is no easy feat. How do Langer and Winstanley see their respective roles?

Langer: “I concentrate more on the arrangements and rehearsals at the beginning of each project, but when we get into the studio it becomes much more equal. I might get more involved in a guitar overdub while Alan might get more involved in a vocal, but it could just as easily be the other way round. Alan

Winstanley (left)
with Langer.



COMPLETE MADNESS

In 1979 Madness burst onto the music scene with their first single, 'The Prince', which rocketed up the UK charts and stayed there for weeks. This seven-piece band from North London followed up their early promise with a string of hits, including 'Wings of a Dove', 'My Girl', 'One Step Beyond', 'Baggy Trousers', 'Our House' and 'House of Fun', not to mention eight enormously successful albums.

If George Martin can justify the tag of the fifth Beatle, then Clive Langer and Alan Winstanley should surely be considered the eighth and ninth members of Madness, given that they produced every track the band recorded over a seven-year period which finally culminated in 1986, when the boys went their separate ways. Indeed, it was Madness that brought the two producers together, thus sowing the seeds of a partnership that has proved far more durable than the band itself.

The success of Madness owes a lot to Clive Langer, who first met the band when he was playing in Deaf School. He explains: "I met them through an old school friend, the older brother of one of the band. Whenever Deaf School played, they came to see us and

eventually we got talking. I offered to go to their next rehearsal to see if I could help and was sufficiently inspired to borrow £200 from Rob Dickins — now chairman of WEA — in exchange for the publishing on one track, so that I could get them into a studio."

Langer produced 'The Prince' on 8-track at Pathway Studios. It was released through Two Tone and was an immediate hit. Then the band signed to Stiff Records and went straight back into the studio to record their first album.

"They wanted me involved as their producer and I wanted Alan involved as a partner on the production, because I didn't feel I had much production experience," explains Langer. "Alan was already doing a lot of production work for Stiff so the whole thing came together quite naturally."

Winstanley takes up the story: "We recorded the first album, *One Step Beyond*, at Eden and TW, then mixed it at Genetic, a studio I was in the process of setting up with Martin Rushent. At that stage Genetic was only half built, because we had run out of money. However, the equipment turned up so we stuck it in a bungalow in the grounds of the main house and

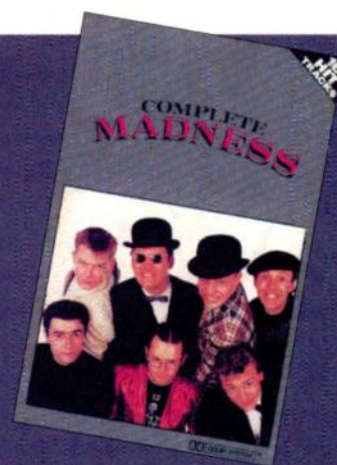
mixed the album there.

"By the time the second album was ready for mixing — again, it was recorded at Eden, which was very much a Stiff studio in those days — Martin and I had earned enough money to complete Genetic, and Clive and I were able to mix in a proper control room. We recorded the third album in the Bahamas because the band needed to get out of the UK for tax reasons. Again, it was mixed at Genetic. The rest of the albums were recorded at Air Oxford Street which, by that stage, had pretty much become our base."

Although Langer and Winstanley were an intrinsic part of the Madness sound, neither producer is willing to claim anything more than a production credit for their efforts. Langer: "We never considered ourselves to be the eighth and ninth members of the band. Our roles were different: they were the band and we were the producers, and that was how it stayed. However, they certainly cemented our relationship as producers."

Both men say that the Madness albums remain their favourite projects — and not just because they made a lot of money from them!

"They went on for such a long time and we had so much fun working on



them," says Langer.

"We had a lot of hits together and became so comfortable working as a team that it was always really enjoyable being in the studio with them. When you work with a band for that length of time you're bound to end up close friends. I used to hang out with them more than Alan did, because I lived near them in North London. For a while I was even living in the same house as Suggs, who's married to Bette Bright, the singer in Deaf School."

The band may have split up but the friendship remains, which indicates just how well they really did get on.

spends more time at the desk than I do because he handles things like comping vocals and mixing. He's definitely more of an engineer than me, because he has a very strong engineering background, so it makes sense for him to have that hands-on role. Having two sets of skills means we can do the whole package without anyone else — or we used to be able to, before remixing! We don't get involved with remixing because it's not where our interest lies. Originally we did — we used to do all the 12-inch remixes for Madness and other bands of that era, but it has become more of a specialised thing, and as we never ventured into the world of *Cubase* and Pro Tools we prefer to leave it to the experts."

Almost inevitably, the pair do have occasional differences of opinion. Langer: "We disagree quite often but usually one of us backs off. It depends on how strongly the other feels. Sometimes I'm a bit off the wall and maybe not as sensible or commercial as I should be, and Alan's good at pulling me back into line. I quite often disagree with the band as well. I don't mind if things are ragged or out of tune, whereas Alan is much neater."

Winstanley adds that, despite their occasional differences, theirs is a very equal partnership and he doesn't believe that any of their joint productions would have sounded the way they do if only one of them had been involved. "Sometimes the balance will sway towards one or other of us, but we are very much a team," he says. "It's not an easy thing to define because we both have extensive influence. This could just be down to agreeing not to change something on a demo or warning each other off touching a mix because we can both see it works. Sometimes I think people — especially younger producers — want to prove a

point by stamping their particular sound or authority on a record. I don't think that's something either of us tries to do."

Maybe not, but surely they feel they have a particular sound — something that sets them apart from other producers and makes them so much in demand?

Winstanley: "People used to say to me 'that sounds like a Langer and Winstanley record' and I wouldn't know why. We've done everything from Madness to Symposium and Bush, and you can hardly say they sound the same. I was told that one record company executive, when she heard the Bush album, said 'Langer and Winstanley couldn't have done this — there's no plinky-plonk piano on it'.

I don't know why she thought there should be. We don't tell the band how to play — we're there to help the band achieve the sound they want, not the other way round."

Langer agrees, "When we did Birdhouse with the trumpet sample in the middle, people would say 'oh yes — that's Langer and Winstanley', just because it had a bit of trumpet in the middle. For years there was a tendency for us to work more with acoustic instruments, so we were well known for working with strings and horns. But that's gone out the window. And anyway, while we were doing that we were also working with bands like Hayzifantayzee, who were very 'modern' at the time and used a lot of effects machines."

The two projects the pair are currently working on — the new Republica album and a film score for a movie called *Still Crazy*, based around a 1970s rock band — should indicate still further how versatile they really are.



Winstanley and Langer produced all of Madness' singles.

Alan Winstanley:
“I like to use
speakers that are
similar to those
people have at
home. That’s why
I hate NS10s.
Only A&R men
have those.”

► TOOLS OF THE TRADE

Given that Langer and Winstanley are about as high up the tree as any producers could be, it’s not surprising that their equipment choices tend to involve equally high-end gear. After all, they do own Westside, a fully commercial recording complex which has one studio based around a Neve VR60 console and a second studio with an SSL 4080. With facilities like that at their disposal, it’s hard to imagine them hanging out in a bedroom with a Mackie and an ADAT.

“We tend to use fairly traditional technology based around good desks, good microphones, good monitors and so on,” says Winstanley. Langer: “A few years ago I felt we needed to move with the times and get our heads around sequencing and Pro Tools rather than concentrating solely on acoustic performances, but we didn’t do much about it and now I think the fashion has changed again and bands are coming back to recording real instruments.

“Luckily we’re in a position to employ someone with specific skills if we need them. I would like to get hold of Pro Tools and play around with it, but I still think it’s better to be a master of one set of skills rather than a jack of all trades.”

One shouldn’t read technophobia into these statements; Westside has just invested in 24 tracks of Otari Radar digital recording, which both producers are delighted with. “I love having the ability to move sounds around,” says Winstanley.

Other items on the Langer/Winstanley shopping list change all the time, depending on what’s released and what Westside clients are asking for.

“As new equipment is released we often find ourselves saying ‘I’ve just got to have one of those’,” says Winstanley. “The latest things we’ve fallen for are the Vac Rac [valve-based processing rack] and the AKG Solid Tube mic. With those two and a Radar we can do vocals anywhere. This certainly frees you up and makes recording more spontaneous.”

Langer and Winstanley like to use Neve consoles to record and SSLs for mixing — hence the choice of desks for Westside. “I really like the SSL automation and I know my way round it so well,” says Winstanley. “Mind you, I hate the new SSL J Series. It may be the best sounding SSL ever but I think the automation is awful. For years SSL needed to improve the sonic performance of their consoles, but the one thing everyone loved was the automation. They’ve now done a great job with the sonic performance but why change the automation when that was what SSL was all about?”

Both studios at Westside are equipped with Quedsted main monitors, although Winstanley says he rarely uses them for mixing. “I use the big monitors for recording because they are excellent when you really want to hear what’s going on with the sound. But I prefer mixing on nearfields — Spirits usually, or KRK or AR18s which we’ve had for years. I like to use speakers that are similar to those people have at home. That’s why I hate NS10s. Only A&R men have those. We have NS10s for other clients, but



In the studio with their beloved Otari RADAR.

they’re like many pieces of equipment that studio owners must have even though they’re rarely used.”

Westside invests regularly in new equipment, but every buying decision is weighed up carefully in terms of demand, because, as Winstanley points out, no studio can afford to buy everything. “If you tried to do that, you’d have to rent each room out at £3000 a day to make any return on your investment. If we don’t have something that Clive and I — or another client — wants, we hire it in.”

A MATCH MADE IN HEAVEN?

With 20 years of joint productions behind them, it seems likely that Clive Langer and Alan Winstanley will remain a double act until they retire gracefully into the sunset. But is that how they see it?

“I should think so,” says Langer. “The partnership works well and I see no good reason to change things. We do occasionally work solo if the budget for an album isn’t sufficient to pay both of us. And sometimes we are asked to work individually, which we will do, especially if we have two projects overlapping.”

Winstanley: “Working together gets claustrophobic sometimes, so it’s good to have the occasional break. At the beginning — and occasionally even these days — we annoy each other by asking irritating questions about the order we were going to do things in, but usually we’re both thinking the same thing and everything happens automatically. If we start to get pissed off with each other, we back off until things calm down.”

Both producers describe their partnership as similar to a marriage. “It’s probably easier than being married,” laughs Winstanley. “After all, I’ve spent more time with him than I have with my wife!”

SOS

FLAT

NOT

FLATTERING

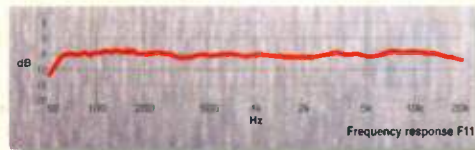
Roger Quedest's reputation stretches back to the early seventies. The advent of high efficiency drivers meant speaker manufacturers had the means to deliver new levels of enhanced highs and lows and many went down this route. In contrast Quedest installations from Abbey Road to The Hit Factory are still identified by their accuracy and ability to reveal the music's finest detail. In this respect, the new F11 (pictured left) redefines the standard for compact monitors. Whilst many speakers strive to impress with their sound, the F11's offer a level of flatness and accuracy which is unsurpassed in their class.

F11 for ample headroom, and then directly coupled to the drivers (magnetically shielded as standard), which gives an extremely high damping factor for excellent cone control.

The specially selected 28mm soft dome tweeter, mounted in precise alignment with the woofer, has ultra low mass for minimal inertia and distortion, and its dome characteristic together with the waveguide moulded into the cabinet, give unrivalled stereo imaging and a huge listening area. The cabinet is ported at the front rather than the rear, which avoids stifling the bass when positioned close to a wall.



To set a new standard for compact monitors, the F11s had to be different by design - and they are: the F11s are the combined result of Roger Quedest's experience, and hundreds of man hours of listening tests. The cabinet is made from a specially formulated and patented mineral loaded material, which is 50% denser than the MDF used by most other speaker manufacturers, and far stiffer. Another advantage of the material is that the entire cabinet is moulded as a single piece, complete with mountings, which together with the increased density and stiffness, cuts down internal rattles and resonances to virtually zero.



But the differences don't end here: the built in active crossover has been fine tuned for a completely seamless crossover point, and subsonic and supersonic filters are employed to prevent any unnecessary frequencies entering the system. Two custom designed amplifiers are used per speaker, with a conservative rating of 150W RMS. These are backed by their own heavy duty power supply

And the result? As shown in the diagram above, design innovation means that the F11's are accurate to within $\pm 2\text{dB}$ over the quoted frequency response range (65Hz - 20kHz), and indeed to an incredible $\pm 1\text{dB}$ over more than 95% of that range. The sound is transparent, detailed, and above all, accurate; and at well under £1,200 a pair, the price of honesty is less than you think.

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KURZWEIL K2500X

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EMU E-6400 SAMPLER

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EMU ESI4000

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- Stereophonic audio input for processing external signals through the filter, amplifier and effect stages of the Microwave XT.




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Mackie 1202VLZ Mixers

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- 12 Line Inputs
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CLAVIA NORD MODULAR

The Nord Modular is a polyphonic synthesizer where you create your synthesizers, from scratch, on a computer screen. The sounds are generated by an external hardware module. The hardware modules are available in two versions. One with a two octave keyboard, perfect for easy editing and real-time playing and one 19" rackmodel. On the screen the user is able to create patches using "virtual cables" that he connects between the various modules (OSC, VCF, VCA, LFO's, filters, all of the classical synth building blocks you might expect, plus a vast range of other useful modules). The modules are 100% software and new modules will be added by Clavia. The Nord Modular is 4-part multi-timbral and offers a minimum of 4 voices or more depending on patch complexity.



RRP £1499
Sutekina £POA

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•Analog Modelling Synth

- 8 voices, 4 part multi-timbral.
- Arpeggiator, Range: 1 - 4 octave. Modes: up, down, up/down, random.
- 10 analog drumkits.
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Sutekina £POA

YAMAHA A3000

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What lies within the A3000 is a 16-bit sampler with a generous 64-notes of polyphony, a standard 2 MB of RAM expandable to a whopping maximum of 128 MB, plus all the dynamic filters, multi-effects processors, EQ and everything else you need to realize virtually anything you can imagine - and even open up new world of spontaneous creativity that you never knew existed. The A3000 provides you with an enormous range of control over your sounds not only as you edit individual samples and set up and edit Sample Banks and Programs, but also in realtime during play.



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SHERMAN FILTER BANK



The Sherman Filter is basically a small modular synth with external inputs instead of oscillators. Its equipped with 23 rotating knobs and a rotary toggle switch. The Sherman also incorporates a lot more than just a low pass filter and a normal VCA. The knobs allow you to go over the top. Like you've always wanted to but never could. The VCA's are specially designed to achieve the 'overdrive' behaviour. Once familiar with a Sherman you will understand what it means to have no limitations in sound shaping.

NEW ITEM
Sutekina £499

KORG N1 88 NOTE SYNTH



The N1 System, with a gigantic 18 Mbytes of PCM ROM. The first 12 Mbytes are identical to the N5, covering everything from imitative acoustic instruments, synthetic waveforms and more. The additional 6 Mbytes (found only in the N1) provides 35 new waveforms including a gorgeous stereo sampled piano, many new electric pianos, a second clavinet tone, more organs and even a vintage CP-80 piano! With a total of 563 multi-samples and 286 drum samples you have all the sounds you need at your fingertips. In addition, the N1 has two completely independent stereo multi-effect units with 48 types of effects, so you can put the finishing touches on your sound. The internal preset area contains 1,169 sound programs, and 302 combinations (N5 compatible). Each combination can bring together up to eight program sounds to create even richer timbres. The user area contains 100 sound programs that take advantage of newly added waveforms, plus 100 combinations. The N1 gives you a total of 1,269 programs and 402 combinations for unbelievable potential.

NEW ITEM
Sutekina £POA

0% Dep £289 - 12 Payments £92.50

DBX DDP




All the classic dbx sounds in gating, compression, limiting, de-essing, and sidechain EQ

- The most extensive metering available
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Sutekina £POA

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Mutronix Mutator Analog Filter

- 2 Stereo input / Dual Mono
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- 2 LFO's or Envelope Follower Per Channel
- Envelope follower extracts the contour of an external signal and applies it to the filter cutoff

RRP £799
Sutekina £699

YAMAHA SU10



Stereo Digital Phrase Sampler plus Realtime DJ Effects, for Recording and Performance Environments

- Record and replay up to 48 stereo waveforms.
- Maximum sampling rate is 44.1kHz, equivalent to audio CD. Or select a lower sampling rate to increase available sampling time - to a maximum of 54 seconds. You can set playback direction, loop type, and pad action separately for each sample. Set arbitrary start, end, and loop points. Adjust relative playback volume
- Assign arbitrary MIDI note numbers to your samples. And more

RRP £299
Sutekina £POA

ROLAND VS840



The VS-840 brings Roland's VS recording technology to musicians at a price that's almost too low to believe. Of course, this makes the VS840 a great track expander for current VS-880 owners, but it doesn't mean the VS840 can't stand alone. This recorder sounds amazing and offers some features that even the mighty VS880 doesn't.

The VS recorders' pointer-based audio editing allows you to copy a song or sections of a song to instantly try a new version. If you don't like your edit, or if you still aren't sure, there's no need to worry; with 999 levels of 'Undo' control at your fingertips, you can try different arrangements and audio edits to your heart's content -- with no loss of quality or added noise!

The VS840 records its digital audio to 100MB ZIP disks, allowing you to easily store and retrieve songs and collaborate with friends. Depending on the recording mode you've chosen, the VS840 can store between 37 and 75 minutes of digital audio on a single, inexpensive ZIP disk!

Don't even think about creating drum loops on a digital tape! MiniDisc system. Unless you've got two machines and a gift for offsetting them, tape isn't going to work, and MiniDisc systems don't have this level of audio-editing power.

NEW ITEM
Sutekina £BEST

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EVENT GINA PCI HARD DISK RECORDING

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- 8 Analog Outputs
- Full Duplex recording
- Compatible with CUBASE, LOGIC, CAKEWALK and other
- SPDIF Digital I/O
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RRP £459
Sutekina £POA

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2 Port In / 4 Port Out - 64 Channels

- Up to 3 units may be linked for 6 In / 12 Out and 192 Channels
- Full LED display - 8 large activity indicators
- 64 voice compact Parallel Port
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- Very large SMPT-E viewer and software for studio work.
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NEW ITEM
Sutekina £99.00

YAMAHA MU8



With the MD8, tape hiss is a thing of the past. Crystal clear, dynamic sound quality, on par with compact discs, is where it's at. The MD8 records digitally to a small but durable MD DATA disc with a sampling frequency of 44.1kHz, delivering flat frequency response from 20Hz to 20kHz with inaudible 0.02% total harmonic distortion (at 1kHz), at a signal-to-noise ratio of 36dB. The MD8 has zero wow and flutter and zero pitch fluctuation, ensuring that sound quality will never degrade over time.

RRP £999
Sutekina £POA

KORG TR RACK




32MB of waveform memory featuring the sounds from the Korg Trinity

- 512 programs, 512 combinations
- 16 Part multitimbre
- Powerful effects section, 14 Main effects, 100 Insert effects
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YAMAHA MU90



No matter what kind of music you're into, the MU90R has all the sounds you need. Packed into this latest member of the stellar MU-series is an incredible total of 779 realistic, dynamic instrumental Voices plus 30 Drum Voices. These new Voices are the richest, punchiest, and most authentic instrument sounds ever created - just the thing you need to put your music over the top. Full 32 Part multi-timbral capacity. Fully A/D inputs for mixing external sound sources with the MU90R's Voices and effects. Built-in TO-HOST terminal for instant integration with a computer. Six Independent Multi-Effect Sections

RRP £699
Sutekina £3??

ASTONISHING NEW LOW PRICE

YAMAHA MD8



With the MD8, tape hiss is a thing of the past. Crystal clear, dynamic sound quality, on par with compact discs, is where it's at. The MD8 records digitally to a small but durable MD DATA disc with a sampling frequency of 44.1kHz, delivering flat frequency response from 20Hz to 20kHz with inaudible 0.02% total harmonic distortion (at 1kHz), at a signal-to-noise ratio of 36dB. The MD8 has zero wow and flutter and zero pitch fluctuation, ensuring that sound quality will never degrade over time.

RRP £999
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ROLAND

JX-305 GrooveSynth is




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RRP £949
Sutekina £POA

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Yamaha CBX05	Voyetra V22 Midi Int	£89	Oberheim Eclipse	£999
Yamaha MT4X	Voyetra V24s Midi Int	£229	Peavy DPM5X+SP	£499
-Computer	-Outboard And Effects		Roland JV1000	£999
Antaris IQ TDM	Art FXR elite	£149	Roland PMA5	£395
Antaris JVP TDM	Art MDM8	£450	Roland S760boxed	£1199
Digidesign Sess 8 PC	Bellari MP220	£360	-Amps & Speakers	
Emagic Zap	Bellari ADB3	£135	QSC USA 370 amp	£350
Emagic CBX Extension	Digitech TSR12	£279	Tannoy PBM8	£385
Emagic12/12Extension	Focusrite Green 1	£725	Tannoy System 800	£485
Ensoniq soundscape	Focusrite Green 2	£829	Tannoy ASM8	£1899
Evolution Mk161	Focusrite Green 3	£880		
	Lexicon PCM80	£1799		


AKAI S5000/6000



The hardware specs for the two machines are impressive and include 128-voice polyphony (standard on some configurations of the S5000 and upgradeable from 64-voices on the S5000) and the ability to install up to 256 Mbytes of RAM. The operating system runs from easily upgradable flash ROM and the two MIDI In/Out/Thru ports allow 32-channel multi-timbral operation. Stereo digital I/O is offered as standard and both models are capable of handling up to 16 individual analog outputs which can be configured as stereo pairs. Two SCSI ports are also fitted as standard.


RRP TBA
Sutekina £TBA

YAMAHA DS2416



A breakthrough computer audio card that provides a complete digital mixing and recording environment inside a standard personal computer -- at a breakthrough price that puts pro quality sound and performance within reach of more musicians and audio production professionals than ever before. Taking advantage of Yamaha's unique position as the world's leading manufacturer of audio DSP, the DS2416 offers the mixing power of the Yamaha O2R digital mixer, complete with 24 channels of digital mixing, on-board digital effects and dynamic processors, along with everything else professionals need, plus 16 tracks of hard disk recording with up to 32 bit resolution.

RRP £TBA
Sutekina £TBA



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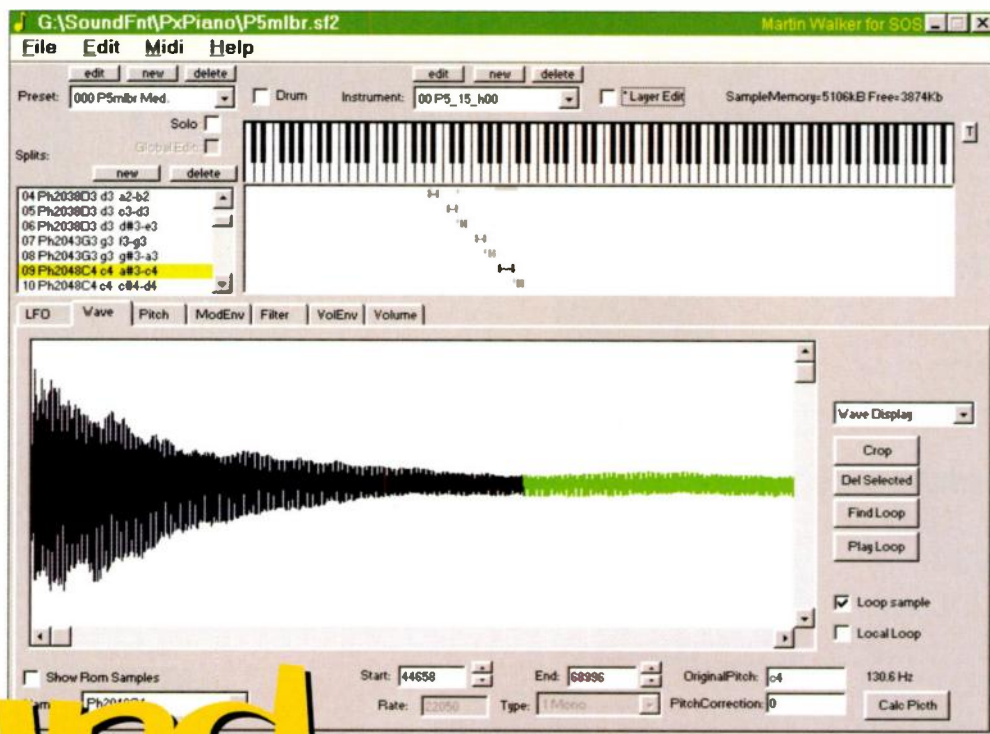
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ALL FINANCE IS SUBJECT TO STATUS

SoundBlaster cards no longer need to rely on a complete set of GM sounds crammed into 1Mb of ROM now that SoundFonts allow up to 28Mb of RAM expansion. MARTIN WALKER feels the quality of Time Signature's new collection.



Sound Bytes

TIME SIGNATURE WAVEIT SOUND FONTS & WIEN EDITOR

Figure 1 The Wien SoundFont Editor has a host of useful timesaving features. Here it is auditioning the P5mlbr-4 Piano (five octaves, mellow and bright options), which is an 8Mb SoundFont containing 42 samples and 32 velocity layers.

it include all of the sounds of its predecessor, but also has better versions for those with larger memories (up to 4Mb). In all, there are 300 SoundFonts, 1200 presets, and nearly 3000 samples.

In addition, *Waveit Gold* includes an editor, *Wien* (the German spelling of Vienna) to help you create your own SoundFonts, and there is also a full version of Emagic's *MicroLogic Fun* sequencer which provides access to SoundFonts directly from the bank selector, as well as allowing real-time filter control.

SERIOUS SOUND FONTS

I dutifully listened to the sounds, which were very good (see boxes), and I have to admit that it wasn't until I met TimeSignature at the recent Frankfurt MusikMesse that I took much notice of the *Wien* editor. Having now seen *Wien* demonstrated, I would suggest that the distributors make a bit more of a song and dance about it — this is a clever and very useful piece of software for any AWE user, and not just yet another SoundFont editor.

To give you an idea of the possibilities, Time Signature recently made a presentation of their new *Waveit Piano* sounds to another company, but rather than demo a carefully tweaked SoundFont, took along 96 piano multisamples and the *Wien* editor. They then simply dragged all 96 samples simultaneously onto the *Wien* icon, and seconds later played the finished SoundFont. During the load process *Wien* uses an FFT (Fast Fourier Transform) algorithm to analyse each fundamental pitch. Once your samples have loaded you will find any slightly out of tune samples retuned relative to A440, as well as being already key-mapped across the appropriate notes, and any data after the loop points discarded. This saves a huge amount of tedious work. Appetite whetted?

Many people still see SoundFonts as cheap and cheerful sound collections suitable only for amateur and home use, but they would be wrong. Over the last couple of years, the increasing number of SoundBlaster AWE owners who want to be more serious about their music, and the existence of the S/PDIF output on the AWE64 Gold card have both conspired to raise SoundFont quality to new heights. There is nothing inherently lo-fi about SoundFonts; they are simply a standard way of specifying the WAV files, loop points, filters, envelopes and LFO settings that comprise one or more complete 'instruments', to be played back using any SoundBlaster soundcard. In addition, now that both Ensoniq (of Paris fame) and E-mu are subsidiaries of Creative Technology, we are likely to see more high-end products such as E-mu's new Audio Production Studio, which uses the SoundFont standard in a more professional package.

Here in the UK, Arbiter Pro Audio are now marketing the *Waveit* range of SoundFonts on CD-ROM, and these have been developed by Time Signature with a great deal of care and attention to fine detail. The original *Micro Waveit* CD-ROM is still available for £19.95, and this provides a huge array of quality sounds that can fit into even the unexpanded 512K RAM. However, for the more serious musician who has a SoundBlaster card with a larger memory, the new *Waveit Gold* collection is a much more sensible proposition, since not only does

pros & cons

WAVEIT GOLD £50

pros

- *Wien* editor has some great time saving features.
- *Waveit Gold* contains a wide range of quality sounds.
- *Wave it Piano* contains possibly the best acoustic piano SoundFonts currently available.
- Both packages are excellent value for money.

cons

- *Wien* Undo feature not yet implemented.

summary

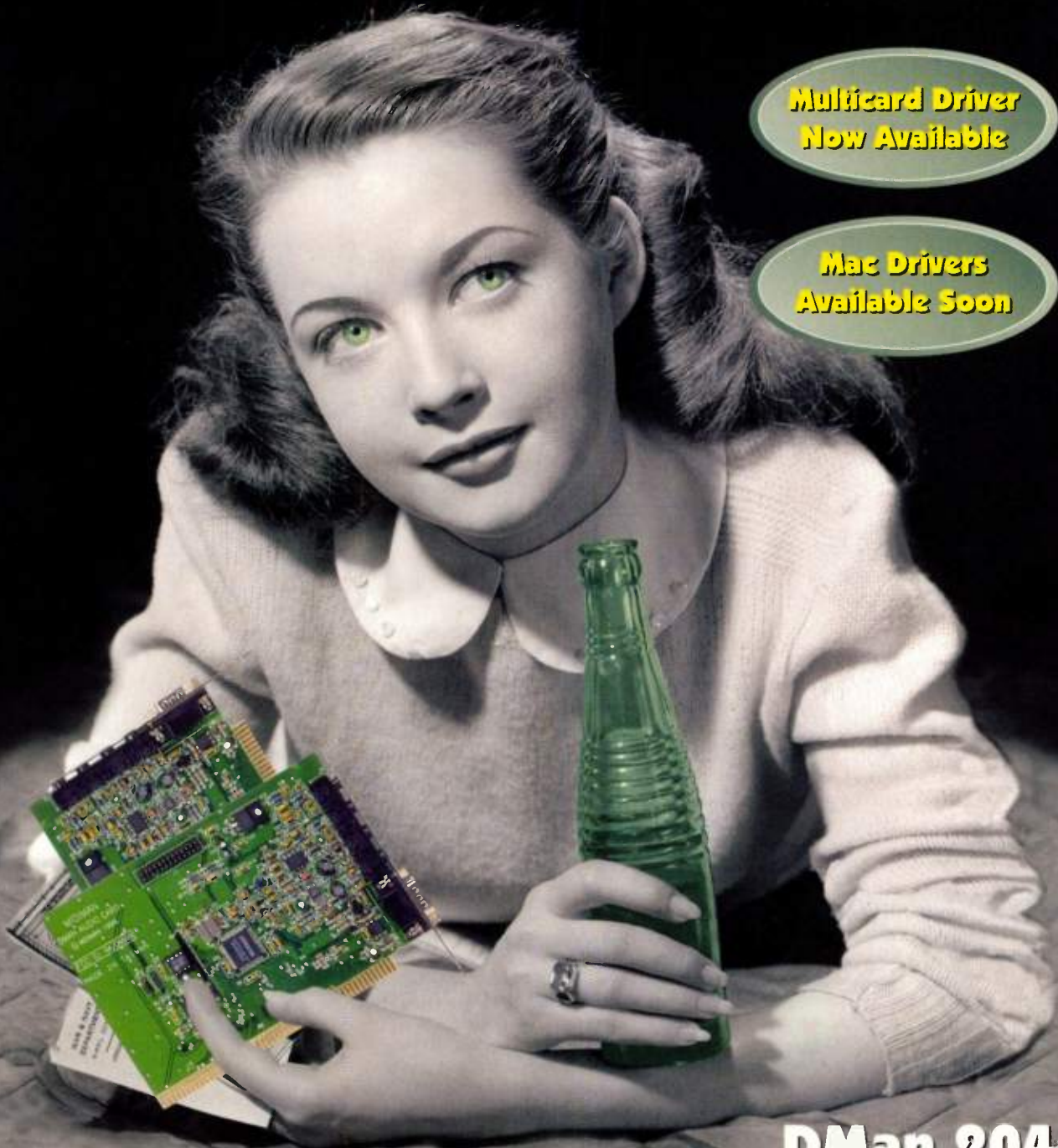
An excellent range of quality SoundFonts, along with the extremely clever *Wien* editor which has features that put many dedicated samplers to shame.

SOUND ON SOUND

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- Audio connections via female jack break out cables
- Supports all major MME compliant software
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- **Optional breakout box available now**



Audio Buddy

Dual Mic Pre amp with 48v phantom



FlyingCalf A/D

20 bit A/D converter



Co2

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WAVEIT SOUND FONTS & WIEN EDITOR

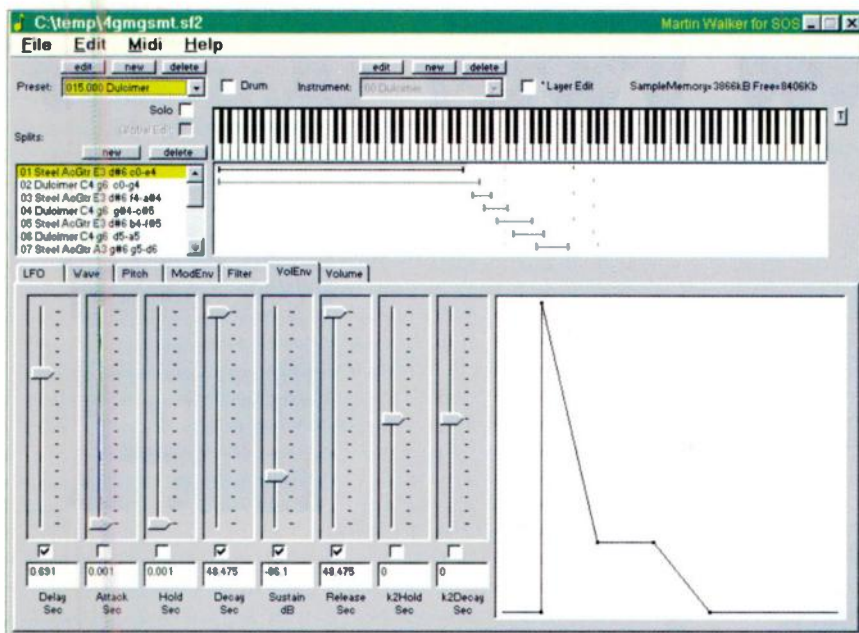


Figure 2. The Toolbox. A comprehensive set of controls allows access to every parameter of Wien, including click and drag envelopes as shown here.

GETTING STARTED

Wien is a beautifully clean program, which even runs directly from the CD-ROM, and doesn't stuff folders full of extra system files onto your hard drive. However, for a faster load time, it is best to copy the files across to a new folder on your hard drive. One thing to watch out for here after copying — using Explorer, right click on Wien .ini and select properties, and then untick the read-only box. All files on CD-ROM are by definition read-only, but once copied to your hard drive you will not be able to save your own preferences to this initialisation file until you can overwrite it.

SoundFonts consist of four levels: sample, split, instrument, and preset. Each sample loaded into Wien creates a split according to its pitch and any other samples already in place. As you add other

samples, they are automatically split across the keyboard, and the complete set of splits (along with their associated parameters such as volume, envelope, tremolo, vibrato) is called an instrument. An instrument can be restricted to a keyboard or velocity range, and you can stack or split several instruments in a preset — either several different sounds, or variations of the same one. Finally, up to 127 presets can be present in a SoundFont — either different instruments or variations of the same one.

To create your own SoundFonts, you can start by either dragging WAV files directly onto the area beneath the Wien keyboard display, or by using the appropriate menu option. Since Wien provides auto-mapping, auto-tuning and auto-truncating, this may be all you need to do, apart from saving the completed SoundFont. Drum samples normally need to be allocated to a specific keyboard note, so you drop the WAV file directly over the desired key graphic. You can edit at all levels (Splits, Instruments and Presets), and Global Edit is provided so that you can simultaneously adjust the parameters for all splits within an instrument. If you want to hear how well all your splits sound in context, the tiny Test Play button next to the splits keyboard will play each split sample in context from bottom to top, which makes it easy to hear how smoothly your split transitions are sounding.

TWEAKERY

Once you have your selection of WAV files in place (one for each split), the many parameters associated with the split can be edited. These are neatly grouped under seven tabs labelled LFO, Wave, Pitch, ModEnv, Filter, VolEnv, and Volume. Apart from Wave, each of the other options has between four and nine click and drag vertical faders, although you can also click in the text value box beneath them, and then enter new values directly. There is also a click box for each parameter which selects between local and global editing, so that you can fine tune a particular local split value, or revert to the overall global setting. Both the Modulation and Volume Envelope also have a graphic display of the envelope, and this can be directly clicked and dragged instead of using the faders.

The Wave tab is a special case, providing a mini waveform editor with a surprising number of features. It can show the standard waveform (like most other editors), but also be switched to show just the looping portion, as well as an FFT display (which is extremely useful if you want to see the harmonic structure of your sounds). You can find and play loops, delete any portion of the waveform, or crop an edited sample immediately after its loop point to save memory. It is also possible to calculate the pitch of the loop, which will also set the Original Pitch and Pitch Correction values automatically.

ON THE MENU TODAY

Further menu options make light work of perfecting your SoundFonts. Most of the File Menu options are self-explanatory (providing various import and export functions), but in the Edit menu there are

WAVE IT GOLD SOUNDS

Thankfully, considering the total number on offer, the sounds are well arranged into 23 categories, each in a separate folder. Each SoundFont has a descriptive filename, which makes selection far simpler. The size is also indicated (those ending in L are larger than 2Mb, those with M are larger than 0.5Mb but smaller than 2Mb, and those with S will fit in even an unexpanded 0.5Mb memory).

The SoundFonts include a couple of dozen acoustic drum and other loops grouped by tempo, but most of these also contain variations at the same tempo, so there is more on offer than at first appears. There is also a huge selection of drumkits to suit all styles of music from Busker to Ballistic, as well as many individual drums and percussion sounds.

On the instrumental side, we start with four acoustic pianos (these are good, but obviously can't compete with the sounds of the dedicated *Waveit Piano* set), and a large selection of both acoustic and electric basses (including a nice plucked acoustic bass which sounded exactly like the one from Lou Reed's 'Walk on the Wild Side'). There is a small selection of Choirs, tuned percussion (bells, vibraphone and xylophones), and

then some electric pianos (Clavinet, Rhodes, Wurlitzer), followed by Dulcimer and Koto.

Guitars of all persuasions are provided (nylon, acoustic, mute, jazz, Strat, heavy metal), as well as harp, plucked strings, and various organs. Most orchestral instruments are represented — woodwind is available, brass in both solo and ensemble (including many saxes), and there is a wide variety of solo strings and ensemble strings. Along with a selection of synth leads and pads, most basic sounds are provided. Along with the 23 folders of SoundFonts, there is also a further 26Mb of other single WAV loops on the CD-ROM.

Despite the fact that the majority of the *Waveit Gold* SoundFonts use 2Mb or less, they sound very good, with neat looping where used, and all of significantly better quality than the ones in the ROM set (as you might expect). Of course you don't get long evolving sounds using this amount of memory, but overall, at £49.95 (including *Wien* and *Micro Logic*), this pack is very good value for money. If you only want the sounds, the original *Micro Waveit* is still available at £19.95 (but with only the 0.5Mb versions). Any existing owners who are interested in *Wien* can upgrade to the expanded SoundFonts as well for only £30.

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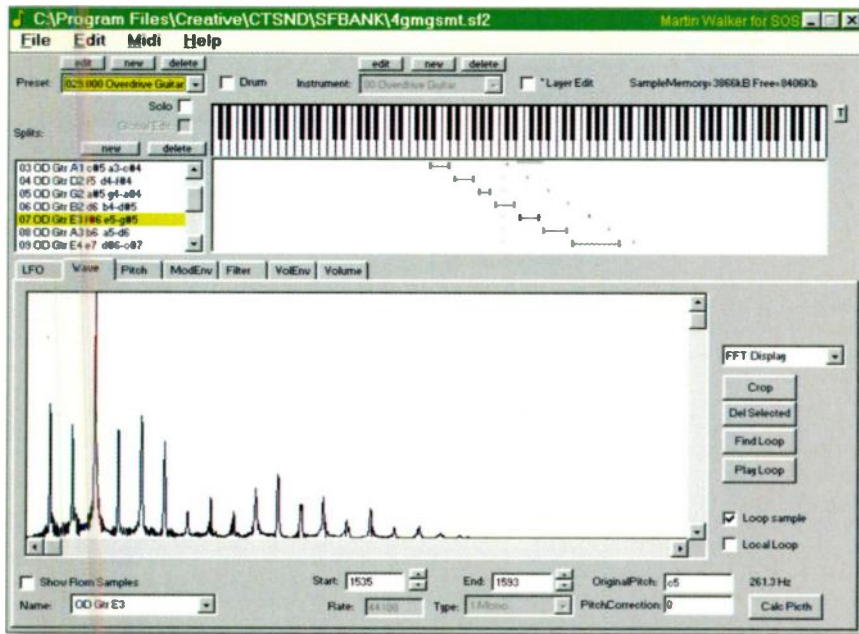


Figure 3. You can also learn a lot from the FFT (spectrum analysis) display window — here you can see the strong 3rd harmonic content of an overdriven guitar sample.

► some very useful additions. Unfortunately the Undo function has not yet been implemented, but Duplicate allows you to duplicate presets (for creating variations on the same sound), or layers (for chorused sounds), or samples (before you cut or otherwise modify an existing sample), as well as several other options. Spread Samples will remap whatever samples you currently have in your Instrument, which is useful if you have deleted some splits, and want to map the remainder across the keyboard range.

Since AWE cards don't have an option to control the filter frequency with velocity level, the Velocity Layers function instantly sets up a user defined number of splits according to velocity, with a minimum filter value and a filter sensitivity. This only takes a small amount of memory, since the same samples are being used, but allows the filter frequency to be opened up as you play harder on the keyboard. This method can sometimes be even more expressive than having filter frequency mapped to velocity values, since you have precise control over every part of the

velocity range. To accommodate parameter editing on all of these new layers at once, Layer Edit is provided — several parameters unsuitable for Layer Editing will be greyed out (including the velocity and note range), but the remainder will all display zero, and you can then increment or decrement the particular parameter values in every layer by the same amount.

Under the MIDI menu there are three options. MIDI Input allows you to play the editor from a MIDI keyboard (very useful when auditioning sounds), 'sf to AWE' forces a new transfer of sounds to the soundcard (after deleting some samples for instance), and Analyse MIDI file contains another of those neat tricks — apart from creating a user bank number, it scans the notes contained within the desired MIDI file and then deletes any instruments, presents, splits and samples not used by the file, minimising the SoundFont size.

Wien was originally created to help design the SoundFonts in the WaveIt range, and it shows. There is a host of timesaving functions here, so that you can get on with what you really want to do — create the best SoundFonts from a set of multi-samples and get on with making music.

SUMMARY

Wien is an excellent editor, and given the number of extremely useful sampling tools provided, E-mu sampler owners will be pleased to hear that a new version of Wien will soon let them in on the action too.

The WaveIt range shows that SoundBlaster owners no longer need to be embarrassed about their sounds, particularly if they have an S/PDIF output feeding an external D/A converter. These SoundFonts are ideal as both additional solo sounds (to use in conjunction with the onboard ROM set), or as standalone ones for use with other MIDI equipment. For the many musicians who normally only use their SoundBlaster card for games, now might be the time to reconsider. I must also admit being surprised at how good the onboard SB reverb and chorus were in context. The only real limitation left when comparing these sounds to other midrange synths is the lack of multi-effects (which can transform most patches).

The next WaveIt volume should be available around May, and this will include 'tons of vintage synthesizer SoundFonts, techno/Rave drumbeats, Arpeggios and nasty synth lines'. Should keep lots of people happy then!

SOS

WAVE IT PIANO SOUNDS

Shortly before my review of WaveIt Gold was completed, a copy of WaveIt Piano arrived, and this should interest any SB owner who tickles the ivories. In similar fashion to its stablemate, the piano sounds are supplied in various SoundFont bank sizes from 0.5Mb all the way to 8Mb. There are twelve piano banks in total (including a surreal one with some useful and fun alternatives such as upside down piano), along with a further selection of electric pianos, organs and synth pads. A tremendous amount of work has gone into all these sounds, but the acoustic pianos in particular are a programming tour de force.

There are up to three samples layered according to note velocity, and up to 32 levels of velocity layering are used, along with fine tweaks of other aspects such as release time and attenuation. There are several fonts for each RAM size, and these are graded according to their

optimum note range (5, 6 or 7 octaves), and velocity maps (which determine the timbre — choices are available depending on the bank from mellow 1 and 2, through medium, to bright 1 and 2). Each bank also has several variations, which add reverb and chorus to suit different styles of performance.

Once you make the best choice depending on the length of your keyboard, style of performance, and even the rest of the mix, the sounds range from extremely responsive (more useful for solos) through to bright or dark for ensemble work. Even the smallest 0.5Mb bank is very respectable, and looping is excellent throughout, but the larger banks are extremely good. I hadn't really considered using a SoundBlaster grand piano in my own music before, but having heard these sounds I might change my mind. If you need quality acoustic piano sounds this is excellent value at £19.95, especially considering the huge amount of work that has gone into it.

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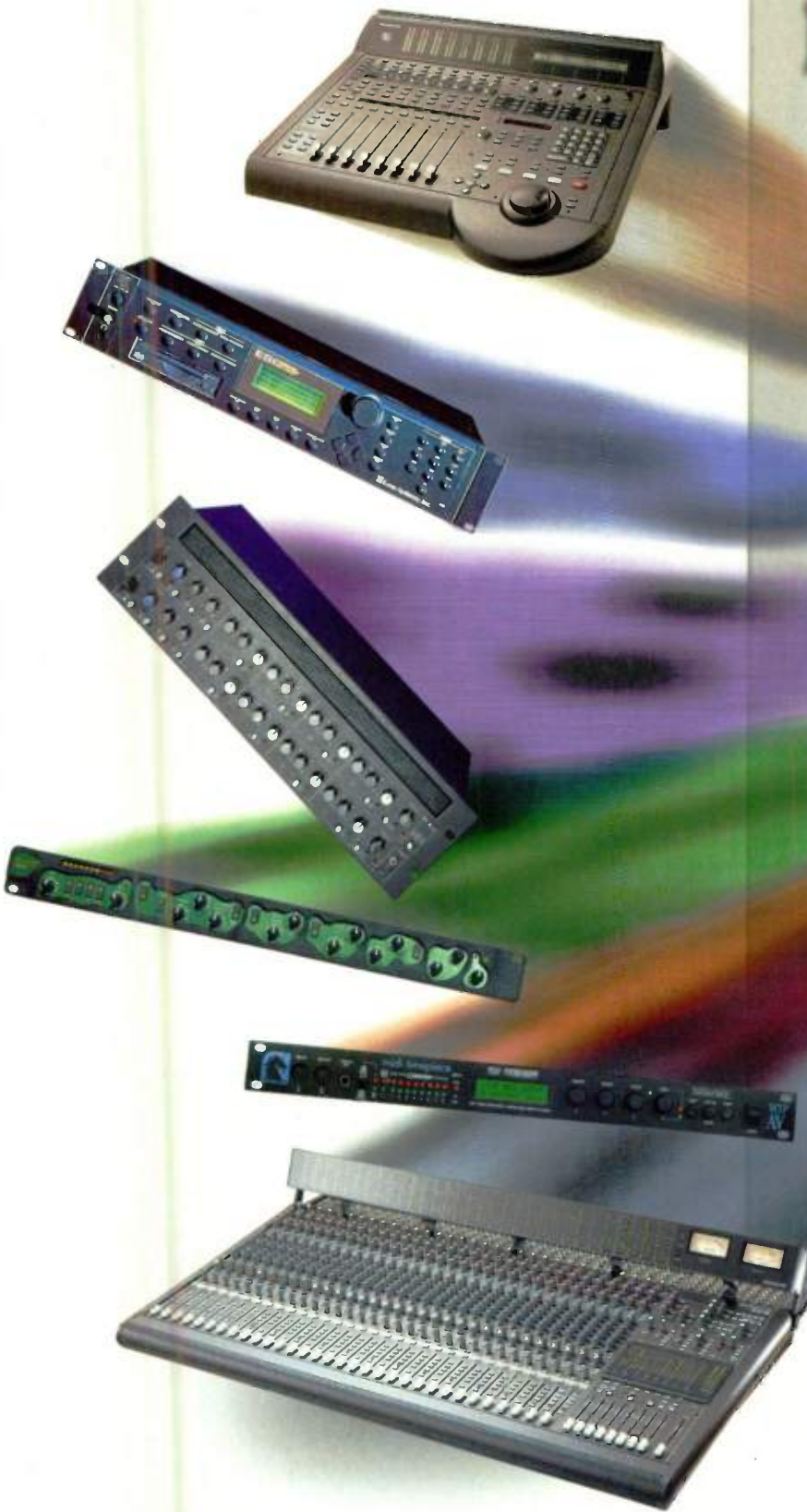
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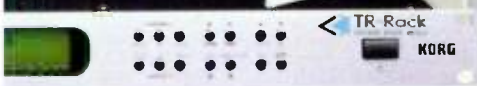
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ART have been championing the cause of musicians on a budget for years with their great value multi-effects units. CHRISTOPHER HOLDER checks out their latest effort, offering true 4-in, 4-out capabilities for under £300.

ART were one of the first effects manufacturers to begin answering the challenge of offering more features for less money. With the Multiverb series, they demonstrated that decent effects were well within the grasp of anyone wanting to play and record music. Now they're are wading in with the Quadra/FX, a 4-channel, programmable, digital multi-effects processor featuring DEA Technology and a twin 24-bit engine. OK, now that I've read everything that's printed on the cardboard box it may be time to open it.

QUAD & CHIPS

Out of the packaging it's easy to see exactly what the Quadra/FX is about. The back panel sports four ins, and four outs, which accounts for the 'Quadra' part, while if you have a look around at the front you get to the 'FX' part. The front panel is divided up into six main zones, each with a button underneath to access that zone's setting. On the left of the unit is a 3-digit LED display with associated Store and Bypass switch, and then an alpha dial — or encoder, as ART prefer to call it — which takes care of all the parameter alterations. Continuing from left to right, you first encounter the Routing section, where you have four options: Discrete 4, giving you four mono ins and outs; Twin Stereo,

which is pretty self-explanatory; Cascade, which places the two stereo engines in series; and Stereo, which combines the engines into a single, more powerful stereo processor. The second section on the front panel, Engine, allows you to select one of the four engines for editing: the Quadra/FX will only allow you the sort of access that's applicable to the type of routing you've selected — so, for instance, you may select any of the four engines for Discrete 4 mode, but all the engines are combined for Stereo mode. Next up is the Effects zone, which offers you a choice of one of the 12 effects types. Further to the right is the Class section, which gives you a choice of six variations on the effect type you've selected. Next is the Parameter area, which allows you to fine-tune your patch with as many as 12 different editing possibilities. Finally, there's the Smart Meter section, which ostensibly provides you with a generous 6-segment LED input meter, but also allows you to access the MIDI control functions of the unit.

WATCH THIS SPACE

The black front panel with amber LEDs gives the Quadra/FX a retro feel, like those early giant digital wrist-watches which made you look as though you were wandering around wearing a watch that

In Quad

ART QUADRA/FX 4-CHANNEL EFFECTS PROCESSOR

we trust



didn't work — until you pressed a button. The LEDs are nice and bright, but because they're a little way behind the fascia you really have to look at the unit head-on to avoid being deceived occasionally as to the true status of an LED. The buttons click in and out nicely, but the power button is identical to the rest of its counterparts, which is great for symmetry but does make accidental powering down a strong possibility. A rocker switch, or even a button that required two seconds of being depressed to work, would have been a good idea. The alpha dial is a smooth turner rather than a 'click, click' one, and proves to work just fine. All '70s wrist-watch jokes aside, I think that the user interface is well conceived and easy to drive. ART could easily have gone the well-worn LCD route and probably have finished with a much cleaner-looking unit in the process, but credit to them that they went for ease of use first. Plus the Quadra/FX looks cool when it's on and you turn off the lights in your studio — always a bonus!

TO BE TAKEN AURALLY

When I first powered up the Quadra/FX I went straight to patch number 1, the unit's showcase Hall reverb. It uses Stereo routing, which harnesses the power of all four engines into one algorithm, in order to offer something truly souped-up — that's the theory, anyway. Using this patch as a basis, let's run through some of the editing power that's on offer. Looking at the front panel, I can quickly tell from the Effect zone that the reverb is based on a Hall algorithm. If I want to fine-tune this patch I'll leave this section alone, while if I

want to start from scratch I can change the Hall algorithm to a Delay, a Flanger, or whatever tickles my fancy. I've decided to tweak the existing preset, so I'll move onto the Class section on the front panel. Clicking the Class button allows the rotary encoder to move me up and down to select the type of reverb I'm after. I choose Concert, which is intended to give a realistic, neutral reverb simulation. I can move between Vocal, Instrument, Gated, Ambient and Dynamic, each offering varying degrees of density, low-/high-end roll-off, and other characteristics. The Dynamic variation allows you to have the reverb triggered only when the input level exceeds a certain threshold. I'm feeding the Quadra/FX an analogue synth source, and I like the sound that the Instrument class gives it — the low end, in particular, maintains clarity, while the upper register is bright and lively. Once the Class is selected, there are up to 12 elements of the patch to edit in the Parameter section: Mix, Lo EQ, Hi EQ, Delay, Size, Regen, Decay, Shape, Pitch, Speed, Width, and Special. Most of the parameters are self-explanatory, while others are more arcane, and their character may change depending on the effect algorithm that's been loaded in. For the reverb patch I'm creating, Mix, Lo EQ and Hi EQ all function as you would expect, the EQ supplying low- and high-pass filtering, with a maximum boost or cut of 15dB. The Delay parameter in a reverb context means pre-delay; the Size parameter is a little more complex, simulating the size of the reverberant space, and consequently alters the tonal characteristics, echo density, and delay between reflections. In itself, it

pros & cons

ART QUADRA/FX £299

pros

- Easy to use.
- Good clean sound.
- Reasonably priced.
- Good MIDI spec.
- Useful manual.

cons

- Not enough preset memory.
- Not enough presets using all the I/Os.
- Reverbs using just one or two engines 'ring'.

summary

With an attractive price, good clean sound, quality effect algorithms, good editability, and four I/Os, the Quadra/FX is instantly likeable and easy to use. Unfortunately some aspects of the unit seem a little bit undercooked, and it isn't at its happiest acting as two or four separate processors, as might be hoped. That said, it's the cheapest dual stereo processor on the market today.

SOUND ON SOUND

“What surprises me is that ART haven't capitalised on the unit's principal selling point, the four I/Os.”

doesn't increase or decrease the decay time (except for gated reverbs). The Regen parameter obviously controls feedback for delay patches, but in a reverb context it controls diffusion (how much echo density there is initially, and how that density increases as the reverb decays). Decay, as you would expect, is the reverb time control. The Shape parameter performs more than one job: lower settings shape the attack time of the reverb's early reflections (ER), while higher settings control how those ERs diffuse in time, and at the highest extreme Shape simulates the slap-back delay you hear in large halls. The Pitch parameter is intended to make long decay times sound more natural and random if the decay tail begins to sound periodic (as though it's looping). Use the Speed parameter in conjunction with the Special parameter to set up a gating effect, such that the reverb is introduced after the input signal crosses a certain threshold — Speed sets how fast the gating occurs. The Width parameter in a reverb patch alters how far the listening position is from the sound source; this has implications for ER levels. As mentioned previously, the Special parameter alters a gating effect, changing the





- ▶ amount (in 1dB steps) by which the reverb is attenuated or gated. When Special is used on a Dynamic variation of a reverb, it sets the input level that will trigger the reverb.

That might be the most tedious guided tour you've ever read, but it does demonstrate the level of editing that's available to you with the Quadra/FX. Some of the parameters radically alter the effect, while others change things almost imperceptibly, but the range of alternative combinations is practically infinite. All the parameters can and do perform different functions for a delay patch or an auto-panning patch than they do for a reverb, for example, and often you really just have to wade in and use your ears to hear how the parameter is affecting your sound.

CLEAN MACHINE

Sound quality is all-important, and for starters the Quadra/FX sounds very clean. I didn't notice the kind of digital dirt that one sometimes encounters with cheaper effects units, and chorusing, phasing and flanging presets don't sing away in the background during quiet sections, which does inspire a certain confidence.

The reverb patches, of course, need the closest scrutiny in a review, given that they are the most complex and the most difficult treatments to accurately produce. At this end of the market you're never going to be absolutely blown away by the eerie authenticity of a reverb, but I think you have to consider how pleasing the sound is to the ears, and the Quad/FX is pleasing to mine. I set up an A/B Concert Hall reverb test with my now-venerable Boss SE70, which is still a bit of a benchmark for budget reverb quality. Playing a Korg grand piano sound through both, I made a few value judgements. It was a close call, but I finally reached for the controls of the Quadra/FX to bring it more in line with the SE70. For my taste, the ART's early reflections are a little too dense and intrusive, while the decay of the reverb tail is a touch too thin. I was able to tweak the Quadra/FX parameters to achieve something I was more pleased with, and I don't want to overstate any dissatisfaction, because the Quadra/FX's Stereo-routed reverb emulations are still high-quality performers.

On the other hand, the reverbs using less than the whole of the Quadra/FX's processing power are a tad scratchy. There's definitely some looping

to hear, and the decay 'rings' too much to sound very natural. On the plus side, a white noise click can be triggered to sample the reverb's qualities, saving you the trouble of reaching for your master keyboard.

The other Quadra/FX patches are good fun and seriously useful. Choruses, phasers and flangers are dynamic, and all of the 'moving' effects have a wide range of choices of LFO shapes, depth, width and offset, so you can set the effect to flit about in the stereo field in just the manner you desire. Delays are suitably clean, and are outstanding for their editability. Conventional delays are joined by retro low-bit variations, as well as delays that duck in or out depending on the input level, while a tap-tempo function lets you quickly set your delay time without consulting a calculator or delay chart. Also well worth a mention is the Ambient Delay, simulating close and distant miking techniques, which really works. Using the Size parameter, the delay can shrink or spread the signal across the stereophonic field.

Pitch-shifting works reliably, and incorporates a few nifty tricks as well. The pitch-shifting algorithm gives delay options as standard to thicken and

“The Quadra/FX is fun, easy to use, and will always give you a good result.”

double your sound. If regular pitch-shifting isn't enough, something called Whammit! might get your juices flowing. When activated, Whammit! glides up or down to a set note interval once the signal crosses a set threshold. The effect operates a bit like portamento, and although I couldn't find a practical use for it in the short period of this review, I'm sure some bright sparks out there will apply Whammit! to good effect.

THE HAND OF QUAD

The Quadra/FX is fun, easy to use, and will always give you a good result. But why would I buy it over a competitor at around the £300 mark? Clearly, the four ins and four outs will be the major selling point of the Quadra/FX, and I think a few more words should be said about this feature. Those who buy the Quadra/FX intending to have all the I/Os plumbed in, as a one-box solution to their small home studio effects needs, may be a bit surprised to find that startlingly few of the 100 presets utilise the four I/Os (I count only 28 in all). The remainder use Cascade and Stereo routing and, with due respect, those 72 patches are not in themselves 'gee whiz' enough to make the Quadra/FX a 'must have'. I'd like to have seen more use made of the Discrete 4 and Twin Stereo routings. Of course, I'm only talking

MIDI: GIVE ME ASSIGN

The Quadra/FX has a very useful MIDI spec. Along with the MIDI In and Out sockets and the usual program-change functions, the unit can have any of its 12 parameters mapped to four assignable controllers. The manual explains it like this: "Each engine (or engine group) can have up to four MIDI controllers assigned to change parameter values. Discrete 4 routing, which has four separate engines, can have up to 16 MIDI controllers mapping per preset. Controller mappings can, for example, make a synthesizer's modulation wheel change reverb time, a footswitch bypass an effect, or even allow keyboard notes to spin up the rotary effect." The assignable controllers can have your rotary speaker simulation spinning from low to high speed, or can decrease reverb decay in real time. Warm up your MIDI mixer maps and mod-wheel fingers.

HANDY HANDBOOK

Thanks to the well laid-out user interface, driving the Quadra/FX is incredibly easy, but the unit has hidden depths; some of the editing parameters and key combinations need some explanation. Fortunately the manual is excellent. It's easy to read, yet comprehensive enough to be a real asset to users.

about the presets, and writing your own effects patches is dead easy, but the 100 presets are all the memory locations you have — you can't tweak a preset and then save it to user RAM: you're forced to overwrite a preset.

To ART's credit, they have built in a level of editing sophistication I never would have expected at this price. Every algorithm is tweaking heaven, and the layout of the user interface means that nothing is buried beneath a hundred LCD pages. However, in this area of the market I suspect that some of the editing possibilities are unnecessary. Unless you're a post-production engineer precisely attempting to simulate the original ambience of a dry recording in a specific acoustic, you may never touch the Shape parameter, for instance, and if you were such an engineer, you'd probably be tweaking a Lexicon or a TC Electronic unit anyway.

In summary, I like the Quadra/FX: on the whole I find the sound quality pleasant, and I like the layout and some of the tricks which set it apart from the crowd. What surprises me is that ART haven't capitalised on the unit's principal selling point, the four I/Os. If the Quadra/FX concentrated on offering more patches that supply useful Twin Stereo and Discrete 4 combinations of (albeit slightly under-powered) reverbs plus delays, reverbs plus chorusing, and so on, I think it would be a



much bigger hit. At the moment the Quadra/FX falls between the two stools of a cost-effective alternative to a more expensive unit like Alesis' Quadraverb or the Ensoniq DP4, and a fairly priced 'set and forget' preset-oriented unit, of the type that's proving so popular for those new to the recording game (Alesis Microverb, Digitech Studio Twin). The Quadra/FX is great for the price — I only feel a little frustrated because it's tantalisingly close to being brilliant.

SOS

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GEORGE CLINTON



(MIXED-MODE AUDIO/WAV/MIXMAN CD)

This Time & Space Soundisk offering is formatted for use within the inexpensive *MixMan* (PC only) live mixing software package which neatly handles sample synchronisation and real-time pitch changing, but in addition to the WAV files, the samples are also presented as conventional audio tracks that can be played on a regular CD player. As you might expect from George Clinton, this collection might best be described as 'funk with attitude' and comprises a vast series of interlocking riffs, grooves, loops, solo instruments and vocals. Though the WAV versions are designed to provide instant gratification via the *MixMan Studio* playback and mixing engine, they can be used in any WAV compatible application.

Two disks are supplied, the first of which contains a version of *MixMan Studio LE* and the second all the samples. Straight off come a bunch of bass riffs, some played through an envelope filter, and these are followed by a good selection of drum loops with lots of feel. There are a few seriously 'skankin' rhythm guitars, some with filter treatments, and loads of exceptionally good brass harmony riffs to give you that big funk band sound. In addition to the riffs, there are also brass stabs, and as with the

other sounds, they can be layered or interchopped to create your own continuous piece of music.

Next up come a few bass plus drum grooves (as opposed to bass and drum grooves!), and again the envelope filter features heavily, as does distorted bass guitar on occasions — this is full-on 'slap and pull' funk with plenty of edge. As the collection progresses, guitars and horns join the rhythm section so what you have is, in effect, a full arrangement chopped into short sections that can be reassembled in any order to create a new backing. Inevitably, we eventually come to one section with a guitar solo over it, and then a few with moody vocals. The riffs just seem to go on and on, each example as impressive as the one that went before, and then it's over to solo pianos and sax before being treated to a superb selection of processed and layered vocals. Many of these feature harmonies, heavily reverbed and some with echo, though there are a few dry vocal samples as well. To conclude, George adds a lot of 'funkily' delivered vocal phrases, all of which sound impressive and mean absolutely nothing, and again many of these exhibit the type of echoes you'd more likely associate with a dub band.

After listening through this collection, I have to admit to being impressed by both the musicianship and the overall feel achieved, though no bpm rates are noted on the sleeve. *MixMan Studio* looks after this sort of thing if you're using it as the playback engine, but for those putting the sounds directly into their own compositions, bpm settings would have been helpful. If you're a George Clinton fan, then this 'roll yer own' Clinton album kit won't disappoint, either on quality or quantity.

Paul White

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SKINNY PUPPY



(MIXED-MODE AUDIO/WAV/MIXMAN CD)

Like the *George Clinton* offering, this CD also comes in Soundisk format for use with *MixMan Studio*. *Skinny Puppy* takes the same approach to industrial strength techno, combining frenetic drum loops with heavily processed machine-style sounds and processed synths. The result is rather more refined than this description might lead you to believe though, and some of the rhythmic programming is very clever. Not everything is full-on machine headache either — some of the samples are quite hypnotic, and there are lots of stabs or single sound riffs that can be overlaid on your own loops. There's a large selection of single cymbal hits, plus some nicely original drum loops featuring processed industrial sounds and 'broken speaker' style kick drums.

A whole section is devoted to guitars, although most traditional guitar players probably wouldn't recognise their instrument in any of these sounds. These are heavily distorted, cruelly filtered and often flanged, usually at the same time. Actually, some sound as though the guitar is still being built, but just happens to be plugged in at the time! This is followed by a large section of individual drum hits or simple rhythms played on single sounds — and again, they all create the impression that your speakers are disintegrating! This section is a goldmine of techno drum sounds, especially if you don't have access to samples taken from those old favourite drum machines to use as a starting point.

After having your brains beaten out by the drums for a while, it's back to weird effects — and if anything, the coefficient of weirdness increases slightly as we move into the pads

section. This guy has obviously been influenced by Distorted Reality — or maybe he's just been influenced! Just as things are getting nicely surreal, it's back to percussion loops, then into a whole set of rhythmic effects, most of which sound like they were recorded in a steel works. Then it's snare drums, more sound effects, and a few synth sounds complete with a final section of zaps, gronks and thwungs. Along the way are also some very heavily treated vocal sounds — not just flanged, but chopped up and diced.

This is one heavily processed sound collection and lots of fun to work with. Even if you don't use it all, you can learn a lot from the way the loops are put together, but like the previous CD, it suffers a little from not having beats per minute rates listed in the sleeve notes. A second disc includes *MixMan LE* so that PC owners can try their hand at live mixing. *Paul White*

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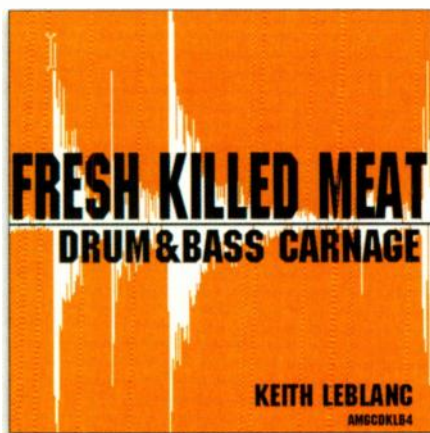
FRESH KILLED MEAT — DRUM & BASS CARNAGE



(AUDIO CD)

This is the fourth CD from Keith LeBlanc, drummer of Tackhead fame. This time, he's decided to attack the world of jungle/dub with his usual idiosyncratic disregard for normality. The first track is a disappointment — anybody can speed up a bit of standard drumming by a factor of 1.5 to 2. (Then again, maybe there are samplists out there for whom the possibility of such radical tempo-bending has never occurred?) There's quite a bit of this palaver on the earlier part of this CD. Fortunately, there are other more interesting offerings too. Like where Keith plays speedy/busy beats in something more akin to real time. Or where an effects unit gets taken into areas unforeseen by the manufacturers.

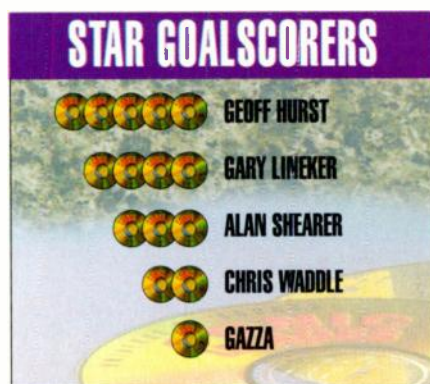
Then there's track 14: a huge, stunning mesh of live, skippy drumming, underpinned by a rush of superfast echoes and the odd hard regenerated flange fills. Talvin Singh drops in on track 16 to provide some well left-field tablas over a slow beat with intricate hi-hats. Next up



it's dub city, with in-time diffuse echoes adding atmosphere all over a snappy snare. The effects get stronger, with echoes, long reverbs and swept flanges adding evolutionary interest to pretty jazzy but hard drumming.

Another peach is track 20. I can't adequately describe it except to say that it sounds like nothing that has come before and I can't sit still. Is that 808 congas I can hear in the background? Aha — this next track (21) is simply the wet signal from a non-linear reverb program. Totally diffuse, and as useless as the last track was brilliant. Now we're into percussion, but not Latin. Think Sheffield Steel.

Later on it's hard to see where the drummer was at all. Track 31 has a spiky sequence (maybe a DX7 attack only) playing a rhythm with a much-maligned "Do it" sample. A classic in its own right! Some of the sequenced noises used are really nasty — track 35 makes some of Tackhead's stuff sound positively elevator. There's plenty of audio angst in the old boy yet! Track 38 — are those sequenced seagulls??? Ouch! For no logical reason, in the midst of all this mayhem, we get treated to one long track of typical and tidy



KLB drumming with no FX-inflicted damage at all (except a bit of tame reverb).

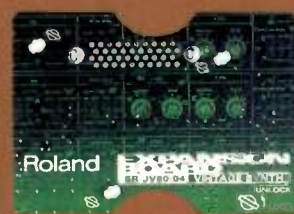
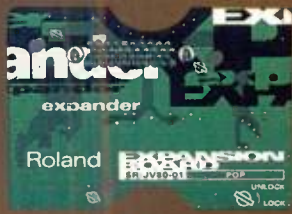
Now we're into dry drumming — tricky hi-hats, staggered kick and busy snare — typical KLB. Nothing remotely to do with jungle. More drumming follows, but with sweeps on the hi-hats and reverb drops on the odd snare. My criticism here is that the beats are just too busy, too much like drum solos to do anything useful with. Plus it does seem to go on and on...

Track 63 heralds a return to form after some so-so tracks. This is a jungle classic — the snare messed up by a flanger on rapid sweep, giving a warbly effect which is then fed through reverb. Meanwhile the kick and hats are dry. Dubby and hard at the same time. Keith's incredible ability to keep perfect time means that he can send live drums through precision echoes to create clean complex beats. That's what he is up to on tracks 64 onwards.

Bringing up the rear comes a beautifully recorded selection of hits from Keith's kits. (Whether anyone will actually want to go to the bother of multisampling yet more sets of live drums must be open to serious doubt, though if presented on a CD-ROM with full velocity switching I bet these kits would have many admirers!) There are loadsa dynamics, drums are presented open and damped, and there are also effected and dry snare hits.

One of Keith LeBlanc's enduring attributes is an ability to simultaneously work on multiple timelines with vastly differing intervals. Therefore it would seem logical for him to attack the populist speeded-up world of jungle. He fails, but not miserably, for on the best of this CD you get something completely new — a storming mix of man and machine so in sync it sounds out until you get your head around it. There's no logical layout here (except that the single hits are at the end), just play the CD through to see what gets you off. Some of it is beyond redemption, some incomprehensible, some actually tedious, but enough is variously insinuating/inspiring/disturbing to make investigation worthwhile. I would definitely take a punt on this. *Wilf Smarties*

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Despite numerous attempts by various manufacturers over the last 15 years to promote alternative hardware controllers, MIDI remains predominantly associated with keyboard-based instruments. This is, as I have opined in many past *SOS* Leader columns, mainly due to the nature of MIDI itself; being an electronic system, it prefers the unambiguous nature of data created by a series of on/off switches, which is, of course, all a MIDI-equipped electronic keyboard is. MIDI guitars, on the other hand, can be played very expressively, but the technical challenges of converting the string vibrations to MIDI information have still not been fully resolved.

Wind instruments, however, also lend themselves reasonably well to 'MIDI-fication'; hence, for example, Yamaha's original foray into the realms of wind controllers in the late '80s, which produced the

pressure causes the pitch to rise). In Loose Lip mode, the normal resting position of the reed causes no pitch change so that only upward bending is possible. Substituting the reedless, recorder-style mouthpiece precludes the use of any lip pressure techniques. In either case, both the wind and lip sensor sensitivity are adjustable to suit the user.

FINGERING THE GOODS

Along with the choice of a reeded or reedless style mouthpiece, the WX5 provides a choice of four selectable fingering modes: three saxophone modes and a flute mode. Saxophone A is essentially the same as regular sax fingering, except the fingering is the same for all octaves and the separate octave keys are used to change octaves. Saxophone B is similar, but incorporates a pair of trill keys for whole-tone and semitone trills. Saxophone C allows alternate fingering, which produces slight changes in pitch and timbre. Flute mode uses a similar fingering system to regular flutes, but the lip pressure sensor, if used, will cause a one-octave jump to

WIND POWER!

YAMAHA WX5 WIND CONTROLLER

PAUL WHITE, with a little help from RACHEL FLETCHER and PAUL FARRER, gives a blow-by-blow account of a controller that allows MIDI modules to harness the power of wind.

original WX7 (reviewed way back in *SOS* December '87, pre-history fans). The keys of a wind instrument can be used to operate note on/off switches in much the same ways as the keys on a piano-style keyboard, and it is then relatively simple to convert breath pressure into MIDI controller information to determine, for example, the loudness of the note. Beyond that, it's also easy to add sensors to enhance the degree of musical expression — for example, lip-pressure sensors, bender thumbwheels and so on.

Which brings us to Yamaha's new WX5, a MIDI controller for '90s wind players. With no sounds of its own, the WX5 is analogous to a dumb master keyboard — you'll need to connect it to a MIDI sound generator of some description. The most obvious choice for a monophonic wind controller is Yamaha's own VL70m physical modelling sound module, not least because the VL70m has a dedicated WX connector that obviates the need for a MIDI cable.

Physically, the unit is arranged much like a saxophone with 16 keys. Though the construction is largely of plastic, the unit feels substantial and nicely engineered, with a smooth, positive key action. Power comes either from six AAA batteries or from a conventional external PSU (although this is not supplied). The latter is obviously cheaper and you could probably live with it in the studio, but it would be rather less elegant on stage, as you already need one other cable to carry the MIDI or WX signal. There's a cable clip on the body of the instrument to prevent the plugs being pulled out inadvertently, as well as a fixing eye for a lanyard.

The reed-style mouthpiece has a hinged and sprung simulated reed, and putting pressure upon this enables pitch-bending to be accomplished. There are two modes available: the delightfully named Tight Lip and Loose Lip. Tight Lip mode means that some lip pressure has to be applied at all times to maintain a normal pitch (so lessening the pressure will cause a pitch drop, while increasing the

occur rather than a continuous bending of pitch.

There are four octave keys operated by the left thumb that provide octave shifts of one or two octaves in either direction. Smooth pitch-bending is possible via a sprung rocker wheel operated by the right thumb, and this provides a much greater bend range than the lip sensor. The wheel is contoured and has a notch to accommodate the thumb, giving positive control. It's possible to reconfigure the wheel so that different directions from the centre position produce different MIDI messages, the choices being pitch-bend in both directions, pitch-bend down and mod wheel up, MIDI controllers 16 and 17 (non-reserved), or brightness (controller 74). Just in front of the wheel is the Key Hold button that may be used to hold one note while continuing to play others over the top (although this, of course, relies on the use of a sound module that is at least duophonic). There are four choices as to what exactly the hold mode does, including functioning as a MIDI sustain key or a portamento switch. Also located beneath the instrument are Program Up/Down keys, though it's also possible to call up a patch directly (including bank selection) using combinations of these buttons and note keys.

GETTING THE WIND UP

I make no claim to being a wind instrument player, other than occasional dabbings on wooden flute or didgeridoo, so I enlisted the help of Rachel Fletcher, a professional wind player and music teacher, as well as *SOS* regular Paul Farrer, who used to play clarinet and sax in his school orchestra (for detailed comments from Paul, see the 'Going Back To My Flutes' box).

Rachel felt the key action was rather lighter than on 'the real thing', but added that this could benefit certain players. She thought the octave switches were too easy to press by accident, and suggested that a dimple between the two groups of switches

pros & cons

YAMAHA WX5 £549

pros

- Well-engineered.
- Wide range of MIDI control options.
- Alternative fingering modes.

cons

- PSU not included.
- Octave keys too easy to operate inadvertently.

summary

A well thought-out and nicely engineered controller that allows wind players to capitalise on their existing skills to play MIDI instruments expressively.

SOUND ON SOUND



SETUP

The WX5 offers a choice of Mono or Poly MIDI operation while other interface customisation can be done using DIP switches found beneath a rubber cover on the underside of the instrument. Here you can set various parameters relating to fingering style or breath and lip control, or you can set normal or fast response and whether the high D and D# keys should function as playing keys or control change switches for real-time performance control. It's also here that the bend wheel function is selected. Rotary presets beneath the body allow the wind gain and zero to be adjusted, lip zero. These come preset to sensible values, but individual players will probably want to fine-tune them to their own playing style.

YAMAHA WX5



“The ability to play different sounds using a familiar fingering technique could be very creative.”

► to help locate the thumb might be helpful. Similarly, she felt the bend wheel required quite a lot of thumb movement, which could interfere with the playing of more complicated musical pieces. While operating the bend wheel, it is also quite easy to press on the Hold button by mistake. She felt that it was possible to adapt your playing style to all of these differences, but that the instrument would be best suited to playing non-wind instrument

GOING BACK TO MY FLUTES — PAUL FARRER

Prior to my teenage years, I was quite happy playing my beloved clarinet and tenor saxophone in the school orchestra. However, from about the age of 15 onwards, the idea of blowing down an oddly-shaped wooden or metal tube to produce a rather uninspiring monophonic noise became increasingly rather strange to me; and my fascination with the piano (and, more importantly, keyboards and synthesizers) became a bigger and bigger part of my musical life. When I was 15, I bought my first synthesizer, a Yamaha DX100. This had more sex appeal than a million clarinets and loads of cool sounds too (even some clarinet and saxophone presets!). What use did I have for mere wind instruments when I could now become a Jedi master of FM synthesis? First, the clarinet was stuffed into a box behind the piano, and a few years later my shiny gold sax was part-exchanged for a second-hand DAT machine.

Fast-forward a few years; the editor of *SOS* asks me to have a look at the new Yamaha WX5. He sets me up in his studio, plugs the WX5 into a VL70m tone module and leaves me to it. After just a few moments of blowing away the woodwind cobwebs from my mind, I was impressed.

The fingering styles and general layout of the instrument are very much in keeping with the saxophone, the main exception being the four Octave Shift buttons on the back. As traditional saxophones only have a single one of these, it took a while to get used to the fact that I now had up to seven octaves to play with. Having said that, the layout and function of these four buttons is logical and allows you a much higher degree of flexibility and, of course, playable range via MIDI than you would perhaps expect.

The other big performance difference is the pitch wheel located next to the thumb rest on the back of the instrument. Obviously this is going to take the traditional sax player a while to come to terms with, but after the initial shock of having a completely unfamiliar controller to use, I found it to be most effective, and it can be assigned to transmit a wide range of standard MIDI commands (such as Modulation, Control Change, and Brightness). Once you have mastered it, this will

prove to be an undoubtedly valuable and expressive performance tool.

I found the pressure sensor under the reed on the mouthpiece a little more difficult to cope with. Acting as a sort of additional pitch controller, it allows you to bend notes up or down slightly, depending on the Lip Mode you have selected. I'm sure many users will have fun with this, but for my money the whole concept felt just a little too alien. Luckily, the WX5 comes with an additional recorder-type mouthpiece without a reed (and therefore with no lip-bending potential). On the whole, I felt more comfortable playing with this than the sax-style mouthpiece.

One niggle I do have is that the left-hand thumb plate on the back of the instrument is often difficult to feel; I found that my thumb slipped off more than just a couple of times, hitting one or other of the Octave Shift keys and causing sudden pitch leaps. Perhaps a slightly concave indentation or more of a slip-free surface could improve things a bit. Having tried the WX5 with its perfect partner the Yamaha VL70m, I can honestly say that wind players in search of expression with full MIDI control and realism are not likely to be disappointed; although I would add that using the WX5 on its own as a simple MIDI controller for a sampler or tone module does limit its expressive potential slightly. Despite this, the WX5 has to be seen as a triumph of intelligent design.

After they've overcome the novelty of having more features than they are used to, I think sax players should find themselves feeling reasonably at home with the WX5. Using it as a studio-based programming tool, the competent player will be impressed by the range of control over MIDI sound sources that this instrument can offer.

As a performance instrument the WX5 looks the biz, and although it would be easy to dismiss it as a gimmick, if you take time to get to know it, it will make you realise just how inexpressive and lifeless simply triggering notes from a keyboard can actually be. After luring me away from my clarinet and saxophone all those years ago with the DX100, Yamaha have now finally given me a solid reason to start thinking seriously again about the expressive power of wind!

sounds, as it doesn't respond in anything like the same way as a true acoustic instrument. In particular, the amount of expression that could be introduced via breath pressure and lip pressure fell far short of what could be achieved with the real thing.

Rachel's conclusion was that it was wrong to expect the WX5 to drive a VL70m or other sound module with a wind patch selected and then expect it to be as organic as the real thing. The transition is rather like a piano player moving over to a synth with a plastic keyboard and limited dynamics, then complaining that the natural resonance of a large piece of wood is missing. It has to be treated as a new instrument that just happens to let wind players use their existing fingering and breathing skills. Her overall verdict was one of enthusiasm, although with the proviso that the WX5 was used creatively and not simply to produce 'fake' wind sounds.

THE JURY RETURNS

Reviewing a piece of gear by committee is a little unusual, but in this case, I think the results more than justified the approach. The WX5 is a well-engineered instrument and its mechanical action is very similar to that of its acoustic counterpart, albeit a little lighter. There was general agreement that the octave switch arrangement could be improved by providing a thumb depression. Both players felt the experience of controlling a real wind instrument by breath was rather different from the way the WX5 plays, and that there was little to be gained from trying to play, say, sax-like sounds from the WX5 when a real sax would do the job significantly better. That said, it was acknowledged that the ability to play different sounds using a familiar fingering technique could be very creative. Paul Farrer seemed more positive about the WX5 on the whole, which isn't surprising given his less 'acoustic' background. Then again, he was the least happy with the lip sensor as a means of pitch control.

VERDICT

Yamaha have tried very hard to make this a professional quality controller — a fact which is reflected in the price — but musical instruments are very personal devices, and it is clear that not all wind instrument players will take to the WX5. However, it seems that anyone who already knows how to play the sax or flute could adapt to it reasonably quickly, if they wanted to experiment with non-traditional wind sounds. In the right hands, there's no doubt that the WX5 is capable of great musical expression.

SOS

E £549 including VAT. Some dealers will also be packaging the WX5 with the VL70m at £699 including VAT.

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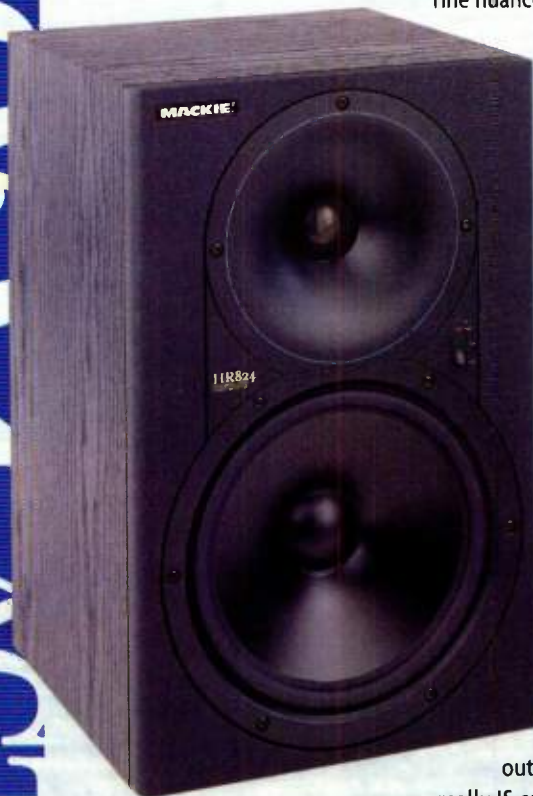
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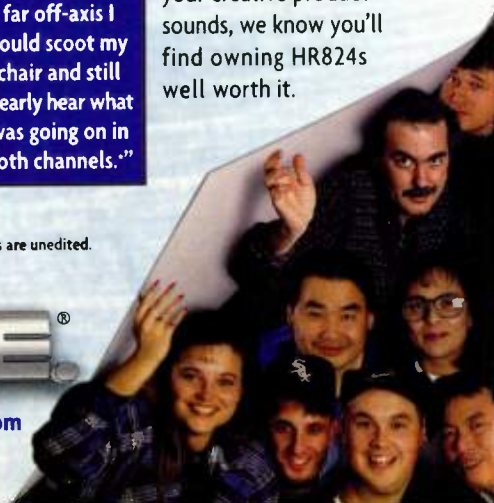
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A Gentleman Among Players



MIDITEMP MP88W MIDI & DIGITAL AUDIO FILE PLAYER/DATA FILER/MIDI MATRIX

It's a MIDI patchbay! It's a MIDI data filer and player! It's a sample playback unit! It's... impossible to sum up in a few words. MARTIN RUSS is delighted to make the acquaintance of the grand seigneur of all MIDI file players.

A MIDI Matrix (or MIDI patchbay, as they are often known) is a very significant purchase; it often marks the transition from an amateur home studio to a semi-pro project studio, and typically means a marked change in the way that work is done. Essentially a MIDI version of a patchbay, it ensures that reconfigurations of your MIDI setup can be effected in minutes rather than hours, without the need for MIDI switch boxes, tedious reorganisation and replugging. Provided the patchbay is easy to install and set up, it should result in a faster, more productive working environment.

So far, so humdrum; a MIDI patchbay is undeniably useful, but scarcely the sort of gear that sets the pulse racing. Now imagine a device which is not only an 8x8 MIDI patchbay with all the functions you need to make life in your studio easier, but also has the following:

- 64-track MIDI file playback and record capabilities;
- a WAV- or AIFF-compatible RAM wave (ie. sample) player;
- a hardware remote controller for all functions;
- a high-density floppy drive;

- SCSI connections for attaching a CD-ROM, additional hard disks or your host computer;
- optical interface to connect other units like this one (all still driven from just one remote controller);
- the option to install a GM soundcard (with WaveBlaster upgrade connector);
- a Flash-EPROM-based upgradable operating system;

- an internal (hooray!) universal power supply.
- and, finally, a couple of optional extras — an internal 2.5-inch hard disk and a CD-ROM drive.

Clearly, you're no longer just imagining *any* old MIDI patchbay; in fact, you're thinking about the MP88W from German manufacturers Miditemp.

The MP88W is described by its designers as a Multiplayer, presumably because it's quite hard to sum up everything it's capable of in an easy-to-digest title (as the above feature list shows). This unit is, in fact, so much more than just an 8x8 MIDI patchbay; it can become the focus of all of the MIDI cabling and messaging in your studio, and on the road, it removes any need for a computer. In fact, it might leave a few studio computers with more time on their hands, too...

THE REMOTE

You access the MP88W's host of functions with a very nice remote controller panel which looks as if it has come straight from a multitrack digital recorder. The remote very neatly combines the standard Transport controls used by the built-in

STOP PRESS!

Just as *SOS* was going to press, Miditemp announced details of a software Windows-based Matrix editor, which will obviously go some way towards addressing Martin's concerns about the editability of the MP88W via the LCD made in the 'Patchbay as Synth' box and the conclusion of this review. We'll have more details on the editor in next month's News pages; until then, check out Miditemp's web site (address at the end of this review) for more on this.

Sequencer with all of the other functions, and packages all of this into a robust box that would be equally at home on your master keyboard, or on your mixer (the front panel of the main rack unit is correspondingly light in controls!). The software user interface is a mixture of dedicated buttons, the ubiquitous data wheel, and display-related softkeys which double up as numerical keys for value entry. The interface steals double-clicking from computers, but, sadly, only has a 2-row, 40-character backlit LCD display instead of a monitor. There's also a MIDI 'panic' function, and a reasonably straightforward set of menus.

The major menu headings, like those that deal with the MIDI matrix, the sequencer, the wave player, and so on, all have their own individually named buttons, and you then use the softkeys to dig deeper into the menu hierarchy via the slightly arcane three-letter acronyms on the display. In use, this means that you do tend to hop around between the dedicated buttons (Matr, Seq, Drive, and so on) and the softkeys, which can take a bit of acclimatisation. Although it is perfectly logical to separate the primary functions in this way (all the functions relevant to the switching matrix/patchbay are accessed via the Matr button, for example), the jumping about between buttons and softkeys interrupts your flow, and I would probably have preferred to have less dedicated buttons and longer softkey acronyms. Although not up to the mouse-driven graphical sophistication of some patchbays, the MP88W's interface is arguably more convenient for use whilst playing, and probably encourages the use of the facilities in a live environment, whereas I always feel that a mouse and monitor on stage can be a liability.

THE MIDI PATCHBAY

It's when you turn to the Matrix functions of the MP88W that you first encounter the storage hierarchy of the unit. The terminology (Program, Bank, Group etc) seems complex when you first encounter it, but in fact, it closely resembles that of a multitimbral synth (there's much more on this in the 'Patchbay As Synth' box below). Once you've mastered this, setting up the Patchbay is reasonably straightforward.

The basic role of any 8x8-port MIDI patchbay is to route data from individual MIDI channels on any of the eight ports to any individual MIDI channel on any other port. However, routing is just the first part of the real-time processing that the MP88W can carry out on the MIDI information that passes through it. The Input Filter is the first processing element through which MIDI data passes, and it allows you to determine exactly what sort of information is passed through the routing switches. For example, you can remove real-time messages like MIDI Clock, stop System Exclusive information from being processed, or even separate out a specific MIDI Controller. You can then split each port into up to 16 zones (defined by MIDI note number), and each of these zones can then be processed separately if you wish. Controller and pitch-bend information is not split, so that it may easily be routed to multiple outputs to act as a 'control' channel.

The Transpose function can then process the note data passing through a port or zone, shifting its pitch by up to 64 semitones. The Velocity function allows you to set up a form of velocity-dependent routing; note data played in with a velocity below a certain user-definable figure is routed to one destination through the patchbay (say, to be

PATCHBAY AS SYNTH — MP88W ARCHITECTURE

The MP88W's internal architecture is actually rather like that of an eight-part multitimbral synthesizer. The routings for the 8x8 matrix routings and MIDI processing options are stored in Programs, and these can in turn be stored in Banks of 128 (Just like Patches and Banks on a multitimbral synth), and everything can be stored away on hard or floppy disk. Unlike many patchbays, you can have eight separate routing Programs active at once (again similar to a multitimbral synth), so that you do not need lots of individual Programs with minor variations to cope with permutations of inputs and processing: instead you can dedicate individual programs to specific devices or processing functions. As a result, when you need to change just one part of the routing, you merely change one of the programs and leave the processing in the remaining seven completely alone. Neat and very effective.

On a synth, a complete memory of the multitimbral setup would be called a Performance. On the MP88W, the equivalent is called a Group, and each of these may at any one time contain eight Programs from any of the possible 8 x 128 Programs you may have stored in the MP88W's Program memories (there are 128 Programs in each of eight Banks, remember). In fact, the eight

programs in each Group are very much like the Parts in a multitimbral synthesizer, and so as you would expect, there is a priority order, which is great for creating 'global' over-ride programs. Once you realise that this is organised as a routing 'synthesizer', things get much easier, and the concept of having special 'tweak' programs as ways of adding to a master global routing program allows enormous flexibility for individual song setups, special debugging routes, and so on.

The architecture of the MP88W is sophisticated enough to deal with just about any requirement that I could think of; my only problem with it was trying to keep track of exactly how I'd set up all my routing! This is the serious catch to the MP88W — due to the limitations of its LCD display, you can only ever see the lowest level of your routing at any one time. What's really needed in a device of this potential routing complexity is the sort of overall graphical feedback given by a computer monitor displaying, say, an OMS routing diagram or the Environment window in Emagic's *Logic*. Miditemp do provide a very useful way of 'scrolling' through all the active bits of programs, but it doesn't really suffice [but check out the Stop Press box for some late-breaking news — Assistant Ed].

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MIDITEMP MP88W



pros & cons

MIDITEMP MP88W

pros

- A versatile, powerful combination of useful facilities in one box.
- Convenient remote control.
- Well suited to live performance usage.
- Expandable via SCSI & optical network ports.

cons

- Deep and complex: a lot to learn.
- The small display makes visualising routing functions very difficult.
- The lack of synchronisation facilities might restrict its possible number of applications.

summary

There's a lot here. With a big hard disk, time spent exploiting the programming possibilities, and a master keyboard, this could be a very powerful tool for the gigging solo musician.

SOUND ON SOUND

▶ played by one of your modules on one particular MIDI channel), while data above the velocity split point is routed elsewhere (to another sound on an altogether different module). You can also crossfade this function, so that over a range of velocities around your velocity switching point, data will be routed to both locations. Comprehensive control over the input/output curve of velocity can also be achieved using the built-in MIDI Limiter, Compressor, or Reverser (which inverts all MIDI values it sees, so that notes played in with a velocity of 126, for example, emerge from the inverter with a velocity of 1). There's also provision to scale up the velocity output of the Yamaha DX7 mark 1 (which could only output a maximum MIDI velocity of 100) so that values extend across the full range 0-127, and an arbitrary eight-stage curve to control exactly how the velocity data is processed. The LCD on the MP88W's remote control is really not suited to displaying of this type of graphical detail; I had to resort to drawing graphs to figure out what was happening. The unit's controller mapping function is more straightforward, allowing you to remap one type of MIDI Controller data to another Controller number. The manual gives one practical example of where you might want to use this; Böhm MIDI-equipped-organs use MIDI Controller Number 0 for Volume data instead of the standard number 7, but with the MP88W, you can remap such potentially incompatible controller information. There is also a host of creative applications that you can produce using this remap function (you just knew I was going to say that, didn't you!). For example, you could remap the controller information output by one synth's mod wheel to control other parameters in different synths: say Pan in one, Modulation in another, and Filter cutoff in a third...

Finally, the Program Change function allows you to embed program change messages into a routing Program so that the messages are transmitted when that patch is selected, which is useful for automatically selecting the sounds on all of your MIDI gear. MIDI Volume (or any other Controller) and System Exclusive messages can also be sent, which allows you to potentially reconfigure an entire MIDI rig!

THE SEQUENCER

The MP88W's sequencer is actually a MIDI File player and recorder, which also doubles up as a MIDI data recorder, so it can be used as a simple playback device, or record your live playing whilst playing back an accompaniment, or even capture SysEx or live controller messages and subsequently replay them. The sequencer has a resolution of 384ppqn and can deal with format 0 or 1 MIDI Files, but the only synchronisation option is MIDI Clock. As with most MIDI data storage devices, your data is stored in Songs (which are also stored in Banks — 128 Songs in a bank, and there are a total of 56 banks!

As with many aspects of the MP88W, the words 'more than you are ever likely to need' apply again).

Unlike most MIDI File Players, and more like the hardware sequencers of old, you do not need to just hit the 'Play' transport button on the remote controller and play along with the pre-recorded MIDI File backing track. Loopable cue points within the song allow rather more complex control on the fly via the remote controller. In fact, you can rearrange songs on the fly, by looping around Verse-Chorus pairs, or even having a looped middle eight for gross soloing exhibitionism. In a world where live performance is often little more than regurgitating the same piece of music again and again, being able to break out of the straightjacket of fixed playback is wonderful.

Building on the automation facilities that you already have in the routing, you can build up chains of songs, add control events, select programs, and generally automate quite a lot of the functions of a performance by using a list of instructions called a Job. This is just a list of events that you step through — a script of what happens at each stage. The footswitch socket on the front panel allows simple control over the progress through the Job, and can be set, for example, to allow premature stopping of a Song to allow for variation during a set. Although the button on the remote says 'Seq', this is rather more than just another tame playback sequencer.

THE WAVE PLAYER

Behind the Wave button on the remote controller lurks the Sample Player, with either WAV- or AIFF-format samples, in mono or stereo, at 8- or 16-bit resolution, and with sampling rates from 5 to 50kHz. There are eight Banks of 128 waves, which provides 1024 storage locations for your samples. The Wave player loads in waves in their entirety from the internal floppy drive and plays them back from RAM, but if you're playing back from the optional hard disk, the samples are loaded and played back a block at a time, and subsequent blocks are loaded as required. Hard disk playback therefore allows the use of large samples with only limited amounts of RAM (the review model was supplied with 1Mb, but you can install up to 16Mb). Effectively, this provides two audio tracks alongside the MIDI sequencer, which opens up the possibility of non-MIDI accompaniment (like backing vocals) for a solo live performer. The wave playback and the soundcard audio can be assigned to either of two stereo phono outputs on the MP88W's front panel. Waves can be triggered from MIDI notes via the sequencer, an external MIDI controller or keyboard, or from the remote controller.

MANUAL

The 94-page A4 manual has an overview, description of the basic functions, and then detailed explanations of everything. The MP88's learning

TESTING, TESTING

Midtemp use a custom chip to do the MP88W's MIDI routing and processing, and this coped very well with the streams of System Exclusive data interleaved with Note On and Offs, pitch-bend information and other controllers that I threw at it. In normal usage, I would deliberately keep SysEx messages separate from real-time messages, but this misuse is one of the traditional tests for MIDI patchbays. The other test involves merging two or more sets of MIDI information together to see if the processing 'chokes' when trying to combine them into a single stream. Merging two extreme mixed sets of intense pitch-bend, note, aftertouch/channel-pressure, polyphonic pressure, release velocity, and SysEx data did not upset the MP88W, and the expanders connected to it did not have any problems decoding any of the information — the acid test for the merged MIDI data. I did notice some time delays because of the interleaving, but this is a consequence of trying to squash too much real-time information into a limited-bandwidth transmission medium, and not a problem with the unit.

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MIDITEMP MP88W



“You get the strong feeling that this has been designed by people who actually use it every day for making music!”

► curve is quite steep at first, but the manual does a good job of taking you through the initial setup, device-naming and configuration process, whilst giving plenty of guidance on how to use the facilities. You get the strong feeling that this has been designed by people who actually use it every day for making music! [Surely shome mishtake? — Ed]. Some information, however, just isn't in the manual — like the fact that the optional GM Soundcard (a Roland SCB7 in this case) is connected internally to Port 7. I could also find no mention of how to change this assignment. There was also no MIDI Implementation Chart in the manual (it would make interesting reading!). After using the unit for some time, I felt that a more advanced section on 'Making the Most of...' would have been useful.

VERDICT

There are plenty of 8x8 MIDI patchbays (MOTU's MIDI Time Piece, or Opcode's Studio 4 are two popular examples), but the combination of MIDI Matrix, MIDI File Player, Wave player and soundcard player, plus floppy drive and SCSI is more unusual. I suspect that you would have to add a MIDI File Player with a built-in GM expander to get part of the way towards producing an equivalent, but I don't know of any that have SCSI or Wave player facilities, so I don't think that this DIY approach would get you anything like the depth of facilities available in the MP88W. Realistically, it is difficult to see what else could have been put into this box apart from more sophisticated synchronisation facilities (if you were working with video or film, the MP88W's lack of MTC/SMPTE facilities would be a serious restriction), but I suspect that the intended market is live gigging.

I am very happy with my existing MIDI patchbay, an Opcode Studio 5LX, but the MP88W made me look at things in a very different light. I liked being able to use the remote controller anywhere in the studio — in fact, it ended up on the convenient flat surface on the right-hand side of my master keyboard, next to the remote keys for my Mac sequencer. I especially liked being able to see, control and edit patches without needing to have the computer switched on. The GM expander module and the Wave playback would be very, very useful when gigging, but less so in my studio environment where I have several GM units and sample playback. But I don't currently gig with my setup, and if I did, I suspect that an MP88W would be high on my list of essential purchases, because I can't see any way that I would take my computer on the road. And don't forget that you can probably cross a GM expander and a sample playback unit off that list...

I couldn't find anything serious to fault technically with the MIDI Matrix patchbay and processing functions, and the MIDI file player did exactly what you would expect, even with my wacky MIDI files (see the 'Testing, Testing' box). But nothing is perfect, and there were one or two minor concerns. I missed having permanent real-time indication of MIDI activity (you can display activity, but not whilst doing anything else with

the display), and I was also a little worried about some glitching on the WAV playback, but this was restricted to one 22Mb sample (not the largest one used in the demos, either) and one song — The glitching was also independent of MIDI playback speed, wave memory or pre-load memory, and so may not have been a real problem with the hardware, but some problem with the WAV file instead. The demonstration usage of long WAV samples to provide vocal accompaniment to GM songs is perhaps a little artificial (and the choice of demonstration material was a little too MOR for my taste), since you are then fixed to one tempo for the sequence playback (but altering the tempo of the sequencer can produce some memorably out-of-time singing if you feel wicked!); I assume that the samples are much more likely to be used as 'spot' audio effects instead, where the unit behaved fine.

In some ways, the sheer wealth of facilities the MP88W offers gives rise to problems. The display may be conveniently located as part of that ever-so-neat remote controller, but it makes getting to grips with some of the functions very difficult — you especially lack any way of seeing the big picture at any one time, rather than the fine detail. For live performance, where you will be calling up pre-prepared programs and songs, everything is fine. But setting up those performances is going to take time, lots of notes on paper (or a remarkable memory and grasp of the unit), and considerable effort to get everything exactly right — especially debugging if you have problems with a routing Program. It will take time and effort to maintain an MP88W so that it does what you want, and you need to factor this in to your assessment of this unit's match to your working style. This is one unit which could take over your studio AND your life!

Overall, this is a very useful workhorse for the dedicated person who wants a setup that can be used in the studio or on tour. This is not a shallow product in any way; there's a huge amount to it. Even bearing in mind the provisos I've mentioned above about visual feedback, it's worth serious consideration if you need a MIDI patchbay with MIDI File playback and more.

SOS

PRICES

Miditemp do not have a UK distributor at present, but you can buy direct from them (this is why all the following prices are shown in Deutschmarks — check the current exchange rate before you convert, as at the time of going to press this was dropping from its previously stable point of around three marks to the pound). Contact Miditemp themselves for further details on shipping charges to the UK.

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Note: the MP88W with the CD-ROM drive is a 2U device instead of 1U.

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Every studio needs a CD recorder, but buying a 'write once' unit, or one that needs a computer to run it is a mistake - you know how stretched your Mac or PC is running the latest MIDI/audio programs - just wait 'til the next update comes! The new Philips CD recorder is a re-writable, stand

alone device that is simplicity itself to use. With automatic track numbering from CD, DAT, DCC & MD sources, auto-start recording and synchronous dubbing from CD, nothing could be simpler - all you do is hit record.

Philips CD Re-Writer cuts no corners and incorporates a precision die-cast transport, continuously calibrating converters, a full host of coaxial and optical I/O's as well as infra-red remote control. Used with Philips premium quality CD-Recordable media your Re-Writer will give you exceptional sound quality whilst ensuring error-free playback.

Put together the functionality, versatility, engineering quality and price of Philips new CD Re-Writer and it's quite plain which CD recorder you should buy.

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Apple NOTES

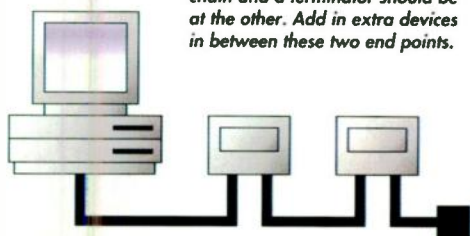
► My PowerMac has built-in Ethernet networking. Also, unmanaged network hubs (using a 'star' configuration similar to some MIDI setups) are now remarkably cheap. It took about five minutes of recabling, and I then had 10 million bits-per-second networking between my Macs. Moving big *Sound Designer II* and AIFF files was suddenly not a good excuse for making a cup of coffee! Of course, when recording from a MIDI sequencer, you should disconnect the network before powering up your Mac, so that the only thing affecting the processor load (and therefore the timing) is your sequencer!

SCSI — SODDING CONFUSING, SILLY & IRRITATING?

You may remember that my first days with my PowerMac were plagued with inexplicable crashes whenever I tried to copy files. Well, I'm pleased to report that although they came back temporarily, I now know what caused them. I tracked the problem down to the chain of SCSI peripherals that I had assembled on the PowerMac's external SCSI buss. Serves me right for trying to use all those old 40Mb hard disks!

It seems that when I connect more than four or five SCSI devices, then the risk of having a mysterious lock-up while copying files seems to increase. Having honed down my SCSI boxes to four essentials, everything has been OK since. That's until I got a CD-R writer. One more device... surely no problem? Think again!

The Mac is at one end of a SCSI chain and a terminator should be at the other. Add in extra devices in between these two end points.



Yep, putting the CD-R writer into the SCSI chain brought back all the previous problems. Everything would work perfectly for a while, and then the Mac would suddenly hang — with a reset being the only way out. Powering down your Mac, recabling the SCSI and the restoring the power is slow, but it soon showed me exactly how many devices I could connect together reliably.

So here's a new set of SCSI hints:

- Power down your Mac.

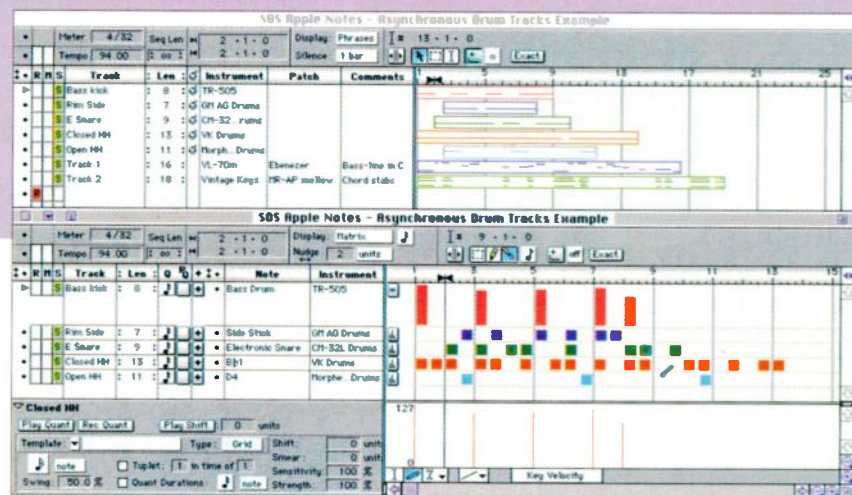
enormous. In the example shown here, this asynchronous looping technique needs more than 72,000 beats before it repeats — the equivalent of 10 hours worth of 120 bpm drumming!

I've mentioned this before, but it is worth noting here that the update to v4.0.1b4 of *Studio Vision Pro* was available from Opcode's web site when I got my upgrade CD to v4.0. It's a big download, but a very good way of getting the absolute latest bug fixes. Contact SCV (0171 923 1892) for more details on any Opcode products.

W www.scvlondon.co.uk
W www.opcode.com

A MAN OF VISION

Once I had re-keyed all the Metadata relating to the assignment of MIDI notes to drum voices (see main text), I couldn't resist using the Pulse window in Opcode's *Studio Vision Pro* v4.0 to make the most of all that work. I've always liked being able to run loops of different lengths at once so that you get complex sounding drum patterns from simpler underlying patterns, and this window makes it very easy. While the bass drum kicks along at four to the bar, all the other loops are either shorter or longer. By using odd numbers of beats, the total number of events before the drum pattern repeats can get



Lots of music for very little effort, thanks to Opcode's Pulse window.

- Disconnect all your SCSI devices.
- Connect one device, and terminate the other connector.
- Power up the Mac, and check for problems.
- Add extra SCSI devices one at a time, remembering to always power down the Mac each time you make a cabling change, and to make sure that the end of the chain has a terminator. Changing cables might (or might not) make a difference.

SO5

APPLE NEWS IN BRIEF

• i, MACINTOSH!

Apple's new iMac is the long-awaited low-cost Mac, and at \$1,299 in the States, its 233MHz PowerPC G3 processor, 32Mb of RAM, 4Gb hard drive, built-in 24xCD-ROM drive, 33.6kbps modem, Universal Serial Bus (USB), 15-inch built-in colour monitor, and stereo surround sound should give PCs serious competition (though whether the dollar price will have a sensible sterling equivalent when the iMac appears here in August is anyone's guess). But the translucent casing harks back to the badly capitalised eMate (and if you check out the

US-only, G3 All-in-One Mac, the specs are very similar to the iMac, except that the iMac lacks the PCI ports and floppy drive, but gains the USB).

Commentators have been quick to point out that this price area is heavily congested, but if anyone can succeed with a quality product there, it is Apple — and don't forget that many big-name PC manufacturers have tried and failed. I just hope that the iMac makes people pause to look before buying a PC.

From a Mac musician's point of view, there's only one minor difficulty — the lack of a floppy drive means that the copy protection schemes used for music software delivered on CD-ROMs may require the purchase of an

additional external drive! This is the first CD-ROM-only machine that I've seen, and I don't suppose it will be the last; perhaps the days of the now pitifully small capacity floppy disk are numbered. I hope so.

W www.apple.com

• PROFIT, NO LOSS

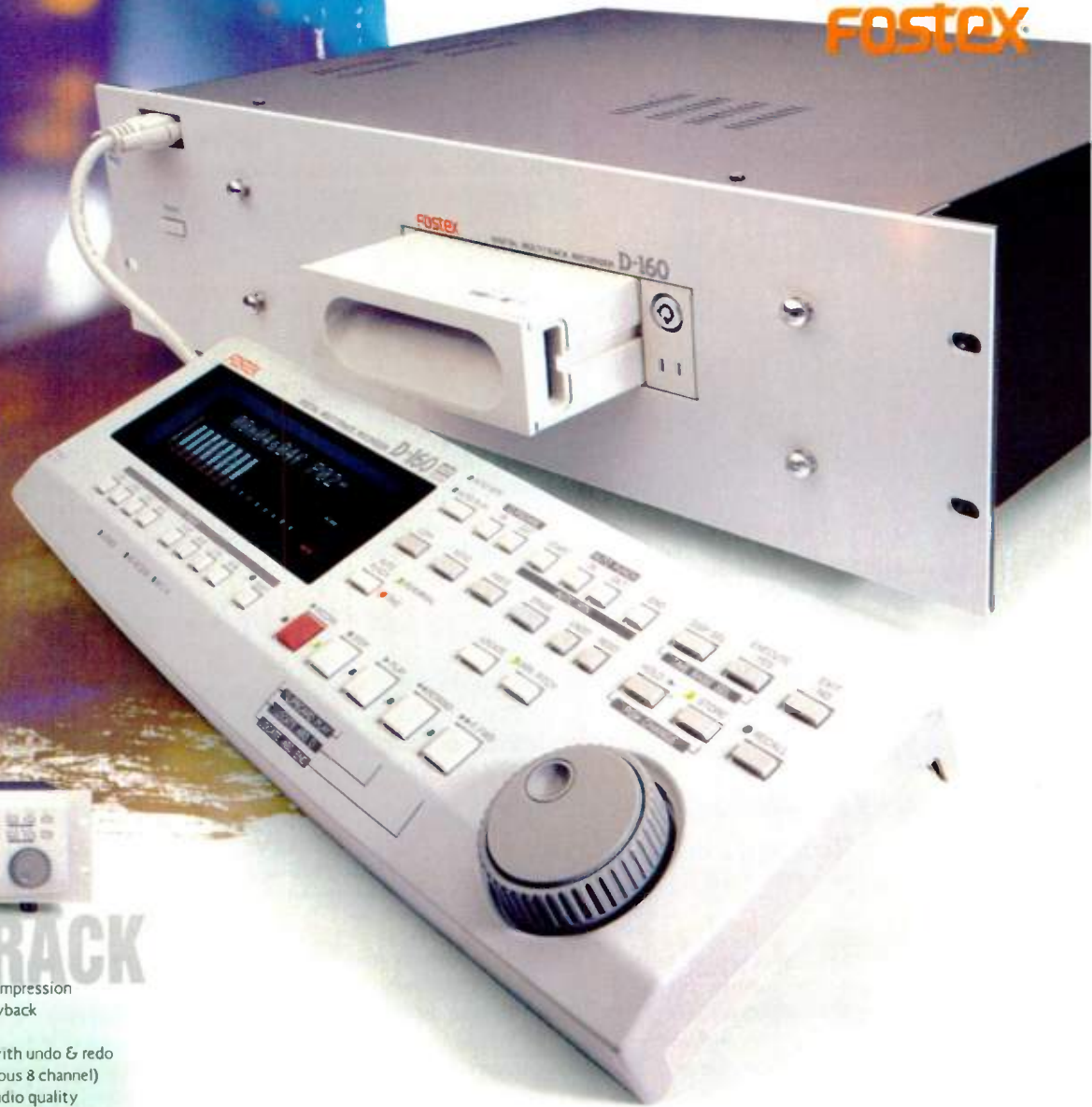
Apple are firmly back in profit. The last two quarters have seen a gradual consolidation of performance with two sets of figures in profit, and the company now seems back on track again after a worrying time. Steve Jobs seems to be established back in the driving seat, and sales are gradually picking up. The new G3 Macs seem to

have the right combination of power and price, the 292MHz G3 PowerBooks are fast and very, very nice (especially with a built-in DVD-ROM drive) and the iMac has restored Apple's reputation for leading-edge design and style. In fact, I can't think of a better time to buy a Mac instead of a PC.

• APPLES IN STORE

The UK Apple Store allows you to put together your own Mac, have it built in Ireland, and then shipped over to you — all from a web page. Apple claim that the US version of this page has been a major contributor to the recent return to profitability!

W www.apple.com/ukstore



D-90 features..

- 8 track digital multitrack with no compression
- 8 track simultaneous recording / playback
- 44.1 or 48kHz (selectable)
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- ±6% pitch control with no loss in audio quality
- MMC & Fostex Exclusive Message for controlling transport from external MIDI device, e.g. sequencer
- Approx. 30 mins recording to 1.3GB drive @ 44.1kHz
- 9 'Virtual reels' ■ Versatile chase mode
- Tempo mapping - create up to 64 tempo & signature changes per song
- Midi clock with song position pointer
- Analogue & Digital I/O (S/P-DIF & ADAT interface)
- SCSI-2 interface option for fast backup of sessions



D-160 features..

- 16 track digital multitrack with no compression
- 8 further 'ghost tracks' for additional takes
- ADAT™ Digital Interface (simultaneous 16 channel)
- ±6% pitch control with no loss in audio quality
- SCSI-2 interface as standard for fast back up
- 44.1kHz & 48kHz sample frequencies
- Up to 99 'Virtual reels'
- Tempo mapping - create up to 64 tempo & signature changes per song
- Midi clock with song position pointer
- MMC & FEX implemented for external MIDI control
- Copy, paste, move & erase editing with undo & redo
- Analogue & Digital I/O (S/P-DIF & ADAT interface)
- Optional LTC Timecode board with Word & Video sync
- Balanced I/O option (+4dBu I/Os on D-sub 25-pin)

Digital Multitrack Recording - you have a difficult choice

Choosing to 'go digital' is fast becoming one of the easier equipment decisions you have to make.

But choosing the right digital multitrack can be a little more taxing as you have to be sure your chosen recorder excels in four critical areas: audio quality, expansion, synchronisation and editing.

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An ingenious caddy-held hard drive system means that increasing recording

time is simply a matter of popping in a larger hard drive.

SCSI back-up of recording sessions is available too.

Sync facilities are as you would expect from Fostex. Both models are equipped with the ability to chase to incoming MTC; MTC plus S/P-DIF or ADAT™ (optical); or run free after MTC lock.

In addition, timecode sync facilities can be added to the D-160 via an optional board.

Finally, being non-linear machines, full copy, paste, move and erase (with undo & redo) editing is available across all tracks.

So maybe the choice isn't so difficult after all.

At least you know it'll be a Fostex.

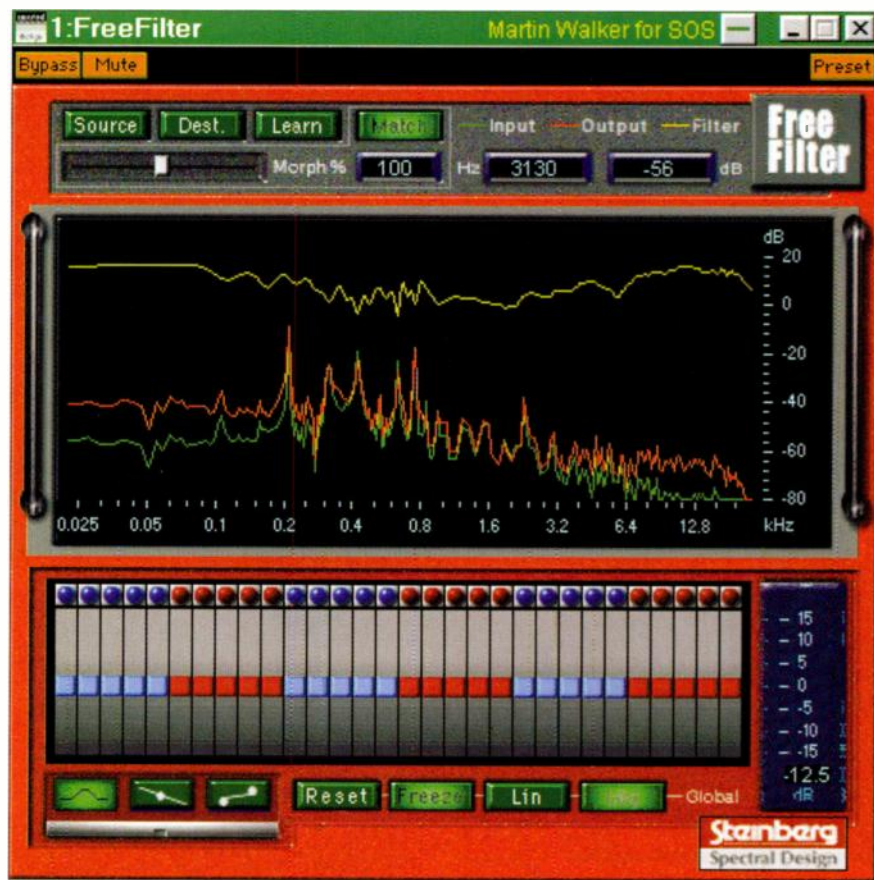
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Unexpected crashes happen to all of us — even SOS PC guru! MARTIN WALKER tells a tale of troubleshooting, and falls for Steinberg's new Freefilter.

Something strange happened to my PC recently. One morning, out of the blue, it hung during the boot-up procedure, after the Windows 95 screen had appeared. It had been working fine the previous evening, so it was hard to think what was causing the problem. I have no AUTOEXEC.BAT or CONFIG.SYS files (which is where any DOS-based drivers will be loaded), which narrowed down the problem areas considerably. Fortunately I could still get into



Steinberg's new FreeFilter 'learns' the frequency response of one piece of music then applies this to another. In the main graphic window, the green trace is the input frequency plot, the red one is the resultant output, while the upper, yellow trace shows the current 'learned' filter response that is being applied. See main text for more details.

Safe Mode, which confirmed that the problem was driver-related. (Because Safe Mode uses only a very basic set of drivers, if your PC will start up in this mode you know that the problem is one of the extra drivers that is loaded in a normal boot-up. The trick is finding out which one...)

Bearing in mind my previous troubleshooting experience, I went into Control Panel, Device Manager, System, and clicked on Properties for my Adaptec SCSI card. At the

bottom of the general page is a box labelled Device Usage. I un-ticked the Original Configuration (current) box so that the card driver would not be used the next time I booted. Sure enough, my machine safely reached the desktop on its next try. The problem still re-occurs on cold mornings, so I suspect that the dreaded borderline SCSI chain may once again be at fault — but after the machine has been switched on for a while I can just tick the same box again and the driver is activated immediately. I can live with that.

Un-ticking the Original Configuration box is a useful way to leave drivers in your system without actually using them. This is ideal for me when reviewing soundcards, because I need to temporarily remove my own card but don't want the hassle of re-installing its drivers when I've finished with the test hardware. It's also good for disabling things like unused joystick drivers in such a way that they don't load into memory, but are still known to the system so that you don't get a 'New Hardware Found' message next time you boot up.

FREEFILTER

Now that there are DirectX plug-ins available from so many manufacturers, it's good to find one that stands out from the crowd. One such is Steinberg's Freefilter, written by Spectral Design (whose excellent Magneto, Loudness Maximiser, Denoiser and Declicker are already well known to plug-in users). There has been

TINY TIPS

Further to my multiple boot feature (in the May '98 issue), I have discovered another way to boot from a second hard drive, a technique that means you can keep a clean version of Windows 95 for music purposes. Even if your BIOS won't let you boot from any drive other than C:, it may be possible to fool it by entering the main page and then temporarily changing the hard drive entry from User or Auto (the defaults for most people) to None. When you exit the BIOS, this drive will be ignored, and you should find that your D: drive becomes the C: one. I haven't tried this myself, but it sounds promising. Remember that you won't be able to access your previous C: drive at all.

For any of you still trying to find the list of recommended VST soundcard settings on the Steinberg web site, click on the Support icon, then select Knowledge Base, then Cubase, Audio, Timing. If you then click on Fixing Timing Problems you will get to a screen full of useful hints, including all the latest soundcard settings for Cubase VST. It is well worth downloading the 'Trouble.zip' file, at the

bottom of this page, which expands into a 199K Acrobat file containing a large amount of collected wisdom on the subject of timing.

While you're visiting the Steinberg site, you might also download the latest VST update to v3.553 (1.8Mb). Among a couple of dozen small bug fixes, there are improvements to both the high-quality EQ and MIDI Time Code functions. However, after the upgrade the software MIDI Thru inside my VST disappeared altogether, and several other people have apparently had this problem. Steinberg Germany have been informed, but in the meantime it may be better to stick with v3.552 unless you're prepared for a re-install if the worst happens.

If you are having problems with MIDI, but you're not sure whether your hardware or your sequencing software is to blame, the best course of action is to try playing back a standard MIDI file using the Windows 95 Media Player. If this, the most basic Windows MIDI application, plays back the file correctly then your MIDI interface and hardware are probably OK, and the problem is down to your sequencer.

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► quite a lot of interest in *Freefilter*, since it claims to 'learn' the sound of one piece of music, and apply to another.

In essence it is a linear-phase 30-band third-octave equaliser, with a built-in spectrum analyser. All the controls of a standard 30-band graphic equaliser are provided in the bottom portion of the display (see screenshot), along with three special tools for global control in the small box beneath. The Rubberband tool can be used to select any portion of the frequency graph above; the faders that control this portion of the graph will then be grouped together and operate as one. The Filter Level tool acts on all faders at once, setting them in a steady slope whose angle and central point you can determine; the Bone tool performs a similar function over any selected portion of the frequency response. Of course, the faders can also be clicked and dragged individually; you have +/-15dB of control for each of the bands.

The really exciting stuff, however, is found above the graphic frequency response window. To analyse some music, just start playback and click on the Source button (the Learn button illuminates as well). Between this moment and the time that you stop the Learn process by unclicking the Learn button, the program builds up an averaged frequency fingerprint of the chosen material — you may want to play an entire track, or just a short section, depending on what you're trying to

achieve. Once the source has been analysed, you select the piece of music that you want to match to this original, start playing it, and press the Dest (destination) button. The Learn button again illuminates, and analysis of the new material continues until you hit the Learn button again.

Now comes the interesting bit: clicking the Match button generates the exact filter response needed to modify the frequency characteristics of the destination to match those of the source. The Morph slider, which determines how much filtering is applied, defaults to 100%, but you can change this to anything from 0% (no change) through to 200% (highly exaggerated). At this point, the graphic controls still remain flat, so that you can use the individual sliders, and the global tools, to further modify the sound. You can hear all of your changes in real time.

After trying *Freefilter* with a wide variety of source and destination material, I felt it was ideal not only for learning more about other people's mixes (by attempting to match your own material to platinum-selling chart-toppers), but also for mastering albums, since you can tweak one track to match another more closely in timbre. Whether you want to sound more like your favourite band, or correct anomalies where different studios were used to record different tracks, *Freefilter* can help. You could also use it on individual tracks, to match the sound of a new take to

that of an older one. Filter presets are provided (from '1965' to 'Techno'), which you can use instead of a Source track; you can also save your own Source analyses for later use.

If I were to suggest improvements, a lower resolution filter response (ie. smaller FFT size) for the learn process would be among them, so that the many sharp peaks and troughs in the frequency plot of a real track could be replaced by more gentle curves — as it is, the graphic sliders do not offer sufficiently fine frequency resolution to match the more complex shape. It might also be useful to apply *Freefilter* to a shorter section of a track, with the option of fading its processing in and out.

I found that *Freefilter* works best inside *Wavelab* (using 70% of a Pentium 166 MMX processor), since this allows you to move between any number of WAV files while the plug-in window remains open. *Cubase* loads the presets, but without names, while *Sound Forge* and *Cool Edit Pro* won't currently work at all.

Of course, there's more to good mixing than frequency response, and *Freefilter* doesn't take account of dynamics or frequency masking, but it should still prove invaluable for anyone working with lots of different material. It is a clever and useful plug-in for both PC and Mac platforms. At £299 it won't sell by the bucketload, but could certainly become an indispensable tool in many studios. Contact Arbitr Pro Audio (0181 207 5050) for further details.

SOS

PC NEWS IN BRIEF

• SPEED THRILLS

Intel have just released 350 and 400MHz versions of their Pentium II processors. Depending on what

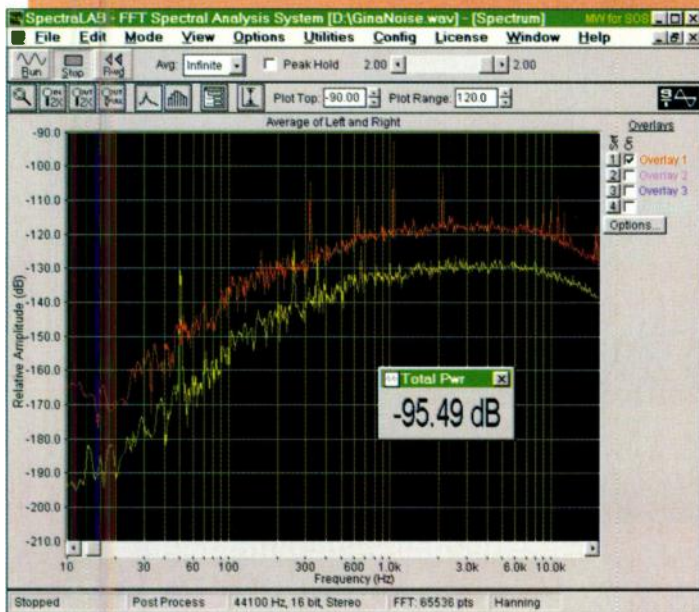
software you are using, the 400MHz version is likely to run between 50 and 100% faster than a 266MHz Pentium II. Part of the improvement is due to the new chips' higher buss frequency of 100MHz, which is significantly higher

than the 66MHz used by most other CPU chips.

• ANALYSIS, PLEASE!

For anyone interested in measuring audio performance, US company Sound Technology has a range of software which turns your PC into a serious real-time spectrum analyser. Various versions are available, from *SpectraPlus*, which runs on Windows 3.1, to *SpectraLab*, the top-spec Windows 95/NT version. Using any soundcard, the Sound Technology software can not only measure the performance of the card itself, but also measure and analyse external audio signals, providing real-time measurements of signal/noise ratio, THD (Total Harmonic Distortion), THD+N, and IMD (InterModulation Distortion). The graphical readouts are excellent,

providing a wealth of information in either the time or frequency domains. There are loads of useful extra features, such as averaging (which slowly builds up a steady and accurate plot when values are fluctuating), and various filters, including an invaluable one for A-weighting. Remember, however, that the performance of the software when measuring external signals will depend on the quality of your soundcard. 30-day trial versions of the software can be freely downloaded from the Sound Technology web site (www.soundtechnology.com). Note that if you are using Norton *Speed Disk* to keep your hard disk defragmented, it may cause problems with the Sound Technology protection — if you defrag your drive without fixing various small protection files in their initial positions, your 30-day trial period will end abruptly.



Using *SpectraLab*, I can finally measure the A-weighted background noise figure for my Event Gina soundcard — and here it is, at -95dB (the yellow trace), along with the higher one for my AWE64 Gold (the red trace, which measures -83dB). Notice the mains breakthrough at 50Hz with both cards, and the few spurious lines at higher frequencies. Time to go in search of earth loops, methinks...

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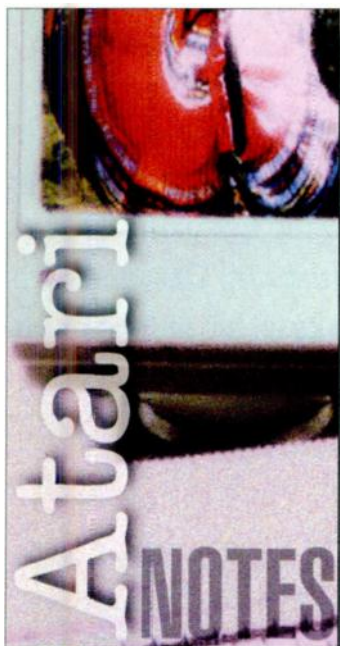
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DEREK JOHNSON ventures once more into the bizarre world of Atari software...

You can't accuse Atari owners of not being inventive: the strangest software to come my way for some time has to be Kenneth Medin's *Fret Calculator*. This utility's sole purpose in life is to assist players in the tuning of instruments with movable frets to different historical temperaments — the pre-classical viol family comes immediately to mind. *Fret Calculator* handles up to 12 frets and 24 strings in any tuning, and makes it possible to compensate for instruments with strings of different lengths. In addition, you can have normally enharmonic

tones (C# and Db, for example) simultaneously on different fret positions. MIDI support is provided, with full simulation of the resulting tuning being sent to a MIDI instrument. *Fret Calculator*, should it be of use to you, is available (in English or Swedish) from www5.tripnet.se/~kennethm/FRETCALC/FRETCENG.HTM. Documentation is in the increasingly common *STGuide* hypertext format.

A GEM FOR THE WEB

If you're using your Atari to browse the Internet — and the tools are out there, as discussed in this column in previous months — perhaps you're feeling a little left out when it comes to the audio content of some web sites. A solution to your problem is now available. *GEMJing* (from <http://members.aol.com/hoffart/software.html>) is a small sample player that plays WAV, NeXT/au, DVS, AVR, HSN and SMP audio files, some of which may be embedded in web pages. The program runs on any ST or Falcon, and positively relishes the thought of being controlled by other applications — it runs quite happily as a plug-in for popular Atari web browser, *CAB*. One neat feature of the latest version (v1.06) of *GEMJing*

which we've covered here before. This month I'll make just a quick mention of *Pretty MidPlay* (FF90), a simple MIDI File player with plenty of options for customising the file's playback. *Pretty* is not to be confused with the company's *MidPlay* combination MIDI file player/software General MIDI sound source, but it does have a 'record' module that allows you to record the performance of a MIDI File direct to the Falcon's hard disk.

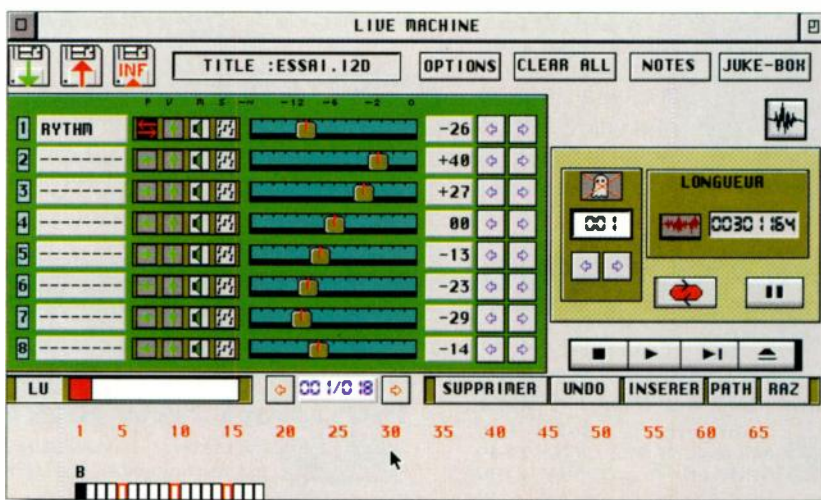
Expand, Softjee's virtual sound module/playback sampler for the Falcon (FF390), has been updated: it can now play back AIF (*Cubase Audio*) sounds, load WAV files, and lets you set the polyphony for each MIDI channel (specify number of voices or choose dynamic allocations). A new version of *Expand* (v2.0) will be available soon.

A piece of Softjee software which we haven't mentioned in the past is *Live Machine* (FF390), a live-orientated direct-to-disk recording tool. You have access to eight direct-to-disk audio tracks, and each can be of a different length. Using MIDI messages, these tracks can be controlled in real time, and each track can be looped or played as a single shot. There's

SOUNDPOOL KEEP THE NOISE DOWN

SoundPool have launched *SoundPool Denoiser*, a "major breakthrough in native DSP noise reduction technology". This new DSP software module for SoundPool's Falcon 030-based *Mastering Suite* has been designed to do one job: remove hiss, noise and complex interference from audio recordings, in real time. It can handle audio coming in via the Falcon's analogue inputs or, if your Falcon is equipped with the appropriate hardware, via S/PDIF or ADAT interface. We haven't heard the program working yet, but SoundPool's Rainer Baumgärtner says: "We really racked our brains for this one. Feed the computer a noisy analogue cassette recording and watch it put out noise-free, crystal-clear digital audio at the other end. The denoiser now does just that. We couldn't believe the sound quality of the processed signal when we first heard the results!"

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Softjee's Live Machine for Falcon.

is that it comes with documentation and resources in many different languages — French, German, Italian, Fijian, Japanese, Turkish, Spanish, Latin, Filipino, Esperanto and Bishlamaro (spoken in the Solomon Islands, apparently!)

One page on the Internet that won't bother you with sound files in the background, but which will provide you with a solid amount of useful information about your Atari is Nicholas Bales' Atari ST Quick FAQ (www.perso.hol.fr/~nbales/quickfaq.htm). This page is ideal for newcomers or for those of us who might occasionally need to be reminded of some specific details of their machine. This site is updated regularly, and offers links to other sites.

FRENCH POLISH

French Atari developer Softjee have a healthy collection of software, mainly for Falcons,

even a basic ADSR envelope control.

Lastly, time for a plug for *Digital Tracker* (FF290), a 32-track digital sampler/sequencer combo. Audio can be sampled at any frequency (from 1kHz to 50kHz), at 16-bit resolution. Each track has level and pan controls, and a comprehensive range of effects is available. Play back tracks via a velocity-sensitive MIDI keyboard, or sync the *Digital Tracker* to an external device. A full range of sample and sequence editing tools is available: cut, insert, reverse, echo, set volume, and set volume envelope for samples; and mask function, search, delete, clear, copy, paste, and transpose for sequences.

Contact Softjee direct for details of their full range, and shipping costs to the UK: Softjee, 47200 Longueville, France (email softjee@wanadoo.fr, web site <http://perso.wanadoo.fr/softjee/>).



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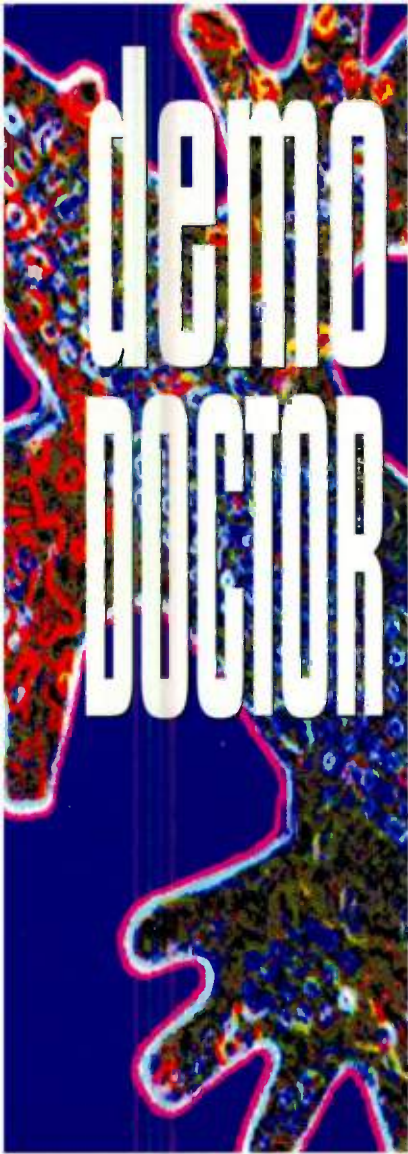
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SHOCK CORRIDOR

Venue: Home

Equipment: Fostex B16, Yamaha R800 mixer, AKG C3000 mic, Phillips CDR870, Behringer Composer, Digitech TSR.

Shock Corridor, a duo from Nobottle in Northamptonshire (yes, it does really exist — we checked!), recorded this 6-song demo in "fits and starts over the last six months". I'd loosely describe it as guitar-based rock/pop with a bit of edge. This is certainly evident on the opening song, 'Her Name Is Lisa', where a biting guitar sound cuts through well. A lot of compression has been applied somewhere along the line, which certainly adds punch, but it also tends to squash the dynamics a bit too much. The guitar certainly sounds over-compressed and the programmed drums don't really need much of this kind of processing as the triggered sounds are already pretty flat dynamically.

The rest of the tracks all seem to have had the same treatment, and some have come out better than



others. 'Sandy Underground' is a case in point, with its more natural guitar sound, yet there are some problems with this mix. The vocals, for example, lack clarity and need a boost in the 5kHz region to improve things. The crash cymbals are too prominent in the mix — I noticed this on some of the other tracks — and are unsupported by a bass drum or snare hit, which makes them sound a bit weedy.

'She will live forever', with the best bass guitar sound and the most contemporary guitar part, was my favourite song. □

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.

JOHN EDMONDS

Venue: Home

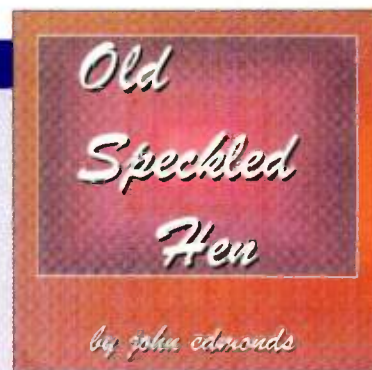
Equipment: Digidesign Session 8, Steinberg Cubase 3.05 XT, Behringer 1602 mixer, Alesis 3630, Alesis Nanocomp, Alesis Microverb, Alesis Quadverb, Lexicon Reflex, ART Dual MP and Leveller, Behringer Ultraflex II, Yamaha NS20 monitors, Tascam DA20 DAT recorder, AKG C1000 and 3000 microphones.

John's prog-rock influenced CD has a surprisingly contemporary sound to it, with some nice electric guitar sounds; as the CD largely features instrumentals that rely on the guitar to provide melodies as well as improvisation, this is rather important. He likes to use a lot of sustain on the overdrive sound, and gets a good, fat sound out of the Les Paul/Boogie combination that's not a million miles from the sounds of his fave band Camel. In contrast, the Yamaha FS413 acoustic is DI'd, and its brighter sound sits nicely above the

electric in the mix. Occasionally, when John lays into the guitar, the sound becomes brittle, something you always have to watch with DI'd acoustics. Another danger is making them so toppy that they compete in the same frequency range as the hi-hat and ride cymbal, and unless the guitar is played very accurately it can have an adverse effect on the rhythm track. Fortunately, John's CD doesn't suffer from this problem, because he's too good a player to let it happen!

Although he obviously doesn't rate his voice very highly, the tracks with vocals are fine. I found his songs reminiscent of Steely Dan, and the singing style is similar too. The vocals are well mixed, with no sudden jumps in level, probably because of careful use of compression. The drums, on the other hand, sound very compressed — I don't recall the Alesis D4 sounds sounding quite this flat. The drum sounds that John has chosen are rather neutral, and some of the songs would certainly have benefited from the use of one of the more open-sounding snares like voice 27 (High Piccolo) or 48 (Brassy).

The dry sound of the mix suits some of the



tracks tracks, but a more ambient reverb would lend energy where it's otherwise missing. I'd suggest a room reverb with a short high-frequency decay, although the Quadverb makes it notoriously difficult to program good room sounds. The Microverb is probably a better bet, and if John's Lexicon Reflex has a program without too much treble decay, I'd recommend that for the drums.

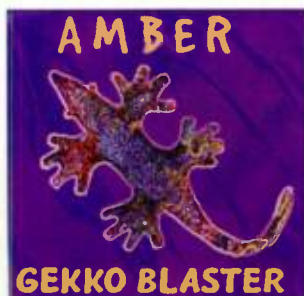
John has no desire for fame, and has been sucked into technology largely to produce backings for his guitar compositions. So, apart from offering these few minor production tips, I'd say that this CD doesn't need much in the way of improvement. □

Venue: Home.

Equipment: Studiomaster Proline Gold 16:8:16, Alesis MIDVerb 4, Behringer Composer and Ultraflex II, MOTU MIDI Express, Spirit Absolute 2 monitors, Shure SM58 mic, Sennheiser headphones, Sony TCDD7 DAT.

The opening track on Amber's CD makes fine late-night or lazy-morning listening. A slow groove builds out of an ambient synthesized flute trill which has been placed well back in the mix, almost to the point of being subliminal in fact, using delay and reverb. The crunchy drum track therefore comes as a bit of a surprise, especially the snare, which sounds just a bit harsh for my taste — almost a case of 'join the bits to make up the rest of the sample'. However, it works in the context of a mix which is otherwise very mellow, enabling the drum track's snare, hi-hats and maracas to occupy their own position in the frequency range.

A sense of the underground is



brought to the production by a well-played and recorded dub bass part, and a mix whose bass end is on the verge of distortion. There's also good use of a touch of echo on solo brass instruments, with upper-mid EQ boost that enables them to sit back in the mix yet still cut through. The vocals of Sara Holmes, drifting effortlessly over the track, were perfectly complemented by the additional instrumentation on this first song.

'Wild', the second of 10 songs on this CD, keeps to the same mood but adds a world dimension to the instrumentation with some tabla and ethnic flute. Once again the warm bass line holds things together with a fine groove pattern. Skipping on to some of the later tracks, we find more variations on a theme, with tracks featuring similar pace but different instrumentation. This gives the album a cohesion that makes it a good background listen, but there's more to it than that — playing the tracks again you hear how much detail has gone into the programming. I was a little concerned about how deep the bass end is, but given how often I hear my car stereo struggling to reproduce this kind of thing, I guess they've got it about right. Best and possibly most commercial track: 'Sway'. □

WIN AMPEX TAPES



As an incentive to send in your best demos, Quantegy, makers of Ampex tapes, are kindly providing prizes for the best demo tape submitted each month. The lucky winner has a choice of:

20 x Ampex 472 90-minute chrome audio cassettes, 10 x Ampex 467 DAT 90-minute cassettes.

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Venue: Home

Equipment: Cakewalk Pro v3, IBM-compatible 386PC, Music Quest 8-port SE, Alesis ADAT, ART MP Tube preamp, CAD E-200 Condenser, Peavey PVM 480, Sony A8 DAT recorder, Behringer Composer and Ultraflex II, DBX 1066 compressor, Ensoniq DP4, Lexicon MXP1, Yamaha O2R, Alesis Monitor 2, Yorkville Monitor 1.

Am I the only person in the world without a Behringer Ultraflex? It certainly seems that way judging by the equipment lists this month. And speaking of equipment,

pre-amplification equipment between your sound source and the recorder, bypassing some (or even all) of the console's normal channel signal path and using the desk mainly for monitoring. Use as little console EQ as possible; on budget consoles this is where the sound quality will tend to be most compromised.

Geoffrey's Yamaha O2R, being a digital mixer, shouldn't really suffer from this problem, which brings us round to the question of A-D conversion.

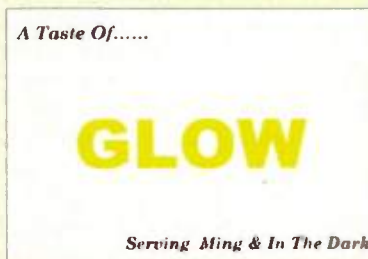
I have no wish to open that particular can of worms in a column of this length — it's time to talk about the music — but suffice it to say that blindfold listening tests can occasionally yield very interesting results!

Listening to the

opening track, my first impression was of a sound that is very clean overall, and pretty busy in the upper-mid range. It seems to me that Geoffrey could be a bit more daring with compression, and perhaps invest in a decent tube EQ to warm up sounds and occasionally push things to the verge of distortion. The bass end in particular is a little too polite; running the bass through a tube EQ or applying some compression to it would give better results.

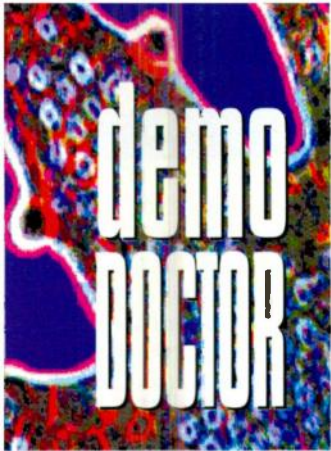
As far as instrumentation is concerned, to get a more modern sound I'd concentrate less on the digital-sounding keyboard sources and more on the analogue ones. I don't hear a lot of filter modulation or experimentation with modulation effects like phasing and flanging, which are so important in dance production.

This might sound a little dismissive, but a serious question deserves a serious answer and there are plenty of things that are right about this demo. Vocal sounds, the general mix balance, the use of reverb, the arrangement and rhythm programming are all good; what I'm suggesting will just be the icing on the cake. □ ▶

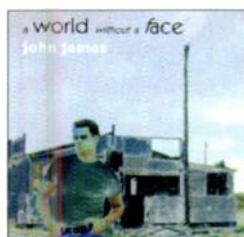


Geoffrey Low (Mr Glow himself) seems to have quite a neat setup in his Singapore-based home studio. Even so, he's not satisfied with the results, saying that his goal is to achieve the dynamically wide, saturated-sounding mixes that he hears on other professional recordings. He asks whether this is a result of using SSL desks, but that's hard for me to say as I haven't had access to them for long enough to make a judgment. It seems to me, however, that you can produce excellent results as far as saturation is concerned by using quality equalisation and compression equipment either at the mix or post-production stage. Personally I make a lot of use of the TLA C1 valve compressor and, where necessary, a wide-band EQ. There are many other good processors on the market, but it's been my experience that you get what you pay for in this department.

It's true that budget consoles can limit your bandwidth, and that the quality of their components will have an impact on your final sound. You can often get better results by using high-quality front end



▶ QUICKIES



John James' 3-song CD was recorded partly at home and partly in a local studio. As he's pitching for a major record deal, the soul/dance material has to have some impact. The vocals have come out well, which is a good start as this is what a record company most wants to hear. The opening song doesn't grab me as much as the second, 'Sexual Deception', although the bass synth in that song is a little too dominant in the mix. Less open-filter rasp on the bass would have better suited the smoothness of the rest of production, too. The remaining synth instrumentation is well chosen, with some cool, dry brass stabs, while the addition of real acoustic guitar lends a summery, breezy feel to the production.

Audley Genus: As a relative newcomer to recording, Audley was wisely decided to keep it simple for his first demos. He also likes to go for spontaneity and wonders if he's leaving too many mistakes on the recording because he doesn't want to lose the feel of the performance. Well, I couldn't hear many glaring errors (though there's certainly one at the end of the first song), so it comes down to the question of what you consider good enough. On the technical side, the tape sounds a bit woolly because the bass has been mixed too loud, and is over-equalised. This could be because the speakers used for monitoring are bass light, but I can't say for sure as I've never before come across B&W DM110s (the

monitors in question). My favourite song is 'Promise', though the vocals are off-pitch in places and need re-recording.

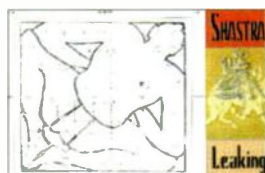
Organica: Gordon Kennedy has produced an impressive demo of instrumentals, teasing some tortured



sounds out of analogue synths and a sampler. The name Organica suits the music well, with its rawness and earthy quality — it could

almost be synth grunge in places, but slips cleanly into jungle with jazz overtones, and into simple heavy groove in others. Generally the tone is dark, with a cleverly thought out soundscape that pays little attention to upper-mid frequencies, and which would benefit from a few dBs presence boost without compromising its character.

Shastra: Iain Dawson decided to set up a home studio after seeing Orbital at Glastonbury and FSOL on TV. The results certainly show the



musical influences, but technically Iain could use a few tips. The hi-hats are mixed nice and loud, but could sound fatter; some 1kHz boost would fix this. The bass drum also needs EQ because it's thin and clicky. I would suggest trying to take out some of the upper-mid frequencies (around 2-4kHz), and adding boost at around 120Hz if possible. An easier option would be to choose another, warmer sounding kick sample. There are some good sounds on this demo, but the length of the tracks demands more subtle interplay in this department. I particularly liked the pulse wave sound playing the melody on 'Leaking', heavily reverbed and soaring across the track.



Nemo: There's precious little information about this tape, apart from the fact that Jack handles vocals

and guitars are Kam's department. The first track, 'Kneel', mixes aggressive guitar pop with jungle, moving from a moody half-time verse groove to a frantic chorus. The production is treated rather like a fast-cut video, with completely different sounds in each section — frenetic dance beats with power chords move to lighter moods and dreamy soundscapes. I liked it! The post-grunge of the second track 'Howser' has more continuity, and perhaps Nemo are showing their true colours here. The production isn't great, with an abrasive upper-mid and fairly thin sounds. Even so, it would make a good demo for record companies, amply demonstrating what the band are all about in terms of mood, and containing some good material and performances from Jack and Kam.

X Zen Tricks: Yes, it does sound like the title of a progressive rock album, but I suspect this is just what Jaime Watt, the keyboard player who put the tape together, intended. His influences are, after all Yes, Rush, Marillion, It Bites and Dream Theater, to name but a few on his list. It seems a shame that he decided to make this demo completely instrumental, but he intends to get a band together this year. Sonically, the keyboard sounds are thin but well arranged, and my impression is that they've been over-equalised in the upper-mid and high frequency ranges. The strings, in particular, do not come over very well, especially the lower chord inversions. If these were balanced higher in the mix, this would put the buzzy string/bell combo above it into a better frequency context. One of the interesting things about the old prog rock bands was that the keyboards were mostly played live, but Jaime's tape relies quite heavily on sequencing. This isn't to say that he can't play the parts, but their repetitive nature means that for live work a sequencer will still be necessary. Occasionally the tracks get a bit messy — the second track, for example, features a frenetic bass drum pattern towards its end that's simply mixed too loud. A real drummer playing a double bass drum pattern, which I presume this is trying to copy, would have produced a far more open, double headed sound. Still, it's early days and this demo should enable Jaime to find some like-minded musicians.

Red Feather: This is an excellent first CD from Gloucester/



Stroud-based Red Feather. The pop/dance combo have managed to get a warm, full sound from their hard disk recorder, with just a slight crunch in the top end that betrays its origins. Drummer Richard has made a good job of recording and sub-mixing his parts, laying down a full, punchy sound and a great groove, which is amply supported by the warm tones of a 5-string electric bass. The songs are good and the vocal performance of Ian Sharp brings out the best in them. Yet one of the most intriguing things on the CD is the inclusion of a trombone in the instrumental line-up. It is well recorded, gets a solo or two, and adds a fresh dimension to an otherwise fairly standard pop/rock line up.

Steven Sproat recorded his tape at the Le Mons studio in Newport, Gwent. The sound is pretty good, with just a slight lack of definition in the bass end which I suspect is caused more by the waffly bass sound than the studio engineering. The kick drum could be mixed a little higher on the first track, but sounds fine on the second, and there's also some good natural room reverb on that song's drum track. As for the songwriting, Steven's Crowded House influences certainly show, but



the songs can still stand up for themselves. Melodic, with clever and interesting lyrics, they have that air of melancholy which Crowded

House seemed to capture so well. 'Moving On' is a case in point, where the arrangement eventually reaches a high on the payout, with the addition of backing vocals, after taking a few bitter twists and turns. Generally the quality of the playing is OK, but there are some slips. Steven has trouble pitching on the third track, which rather spoils the song. This apart, this demo might also be improved by the addition of some earthy keyboard moments to broaden the sound. □

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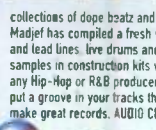
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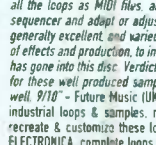
East West (USA)



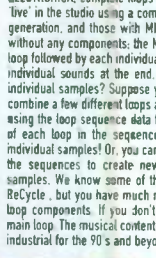
BLACK BUTTA
(9/10 REVIEW) Produced by Madjet Taylor for East West.
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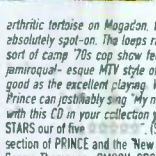
SMOOV GROOVES
Produced by Michael Bland & Sonny Thompson for East West.
This 42-track CD doesn't bother with any demos or clumsy spoken introductions: it just kicks off with the first of the loops-and what a great way to start. Slow and meaningfully funky vibes seem to pour out of every note and, despite being more laidback than an arthritic tortoise on Mogacon, the timings, as you might expect, are absolutely spot-on. The loops range from 60 to 100bpm, and vary from sort of camp '70s cop show right up to the familiar spaced-out jamrock-esque MTV style of the '90s. The recording quality is as good as the excellent playing. With these guys as his rhythm section Prince can justifiably sing 'My name is Prince, and I am Fon-Keh', and with this CD in your collection you can now say the same thing. FIVE STARS out of five. (Sound on Sound, UK). From the rhythm section of PRINCE and the 'New Power Generation' - Michael Bland & Sonny Thompson. SMOOV GROOVES is the sequel to the critically acclaimed Funky Ass Loops CD and contains all the loops you need to lay down everything from slow grooves to 70's funk (the tempos range from 60-108 BPM). First you get a full mix of each loop, followed by the drums, bass guitar, percussion, keys etc. SMOOV GROOVES comes to you from one of the world's funkiest rhythm sections - Sonny T. & Michael B. Audio CD. £39.95. CD-ROM (AKAI or Roland). £99.00



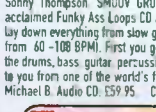
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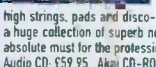
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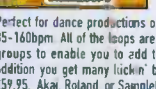
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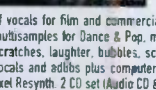
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Perfect for dance productions or exactly tracks. Tempos range from 85-160bpm. All of the loops are soundly based and sorted into bpm groups to enable you to add them easily to existing tracks. In addition you get many kickin' bass drums as a bonus. Audio CD. £59.95. Akai, Roland, or SampleCell CD-ROM. £99.00



XX LARGE NO KICK
NEW from Germany's No.1 Sample CD developer, BEST SERVICE. Another blockbuster from the XX-Large team and this time an absolute novelty, the first drumloop collection with more than 1500 brand new add-on, percussion and effect loops without bass drums or low frequencies.
Perfect for dance productions or exactly tracks. Tempos range from 85-160bpm. All of the loops are soundly based and sorted into bpm groups to enable you to add them easily to existing tracks. In addition you get many kickin' bass drums as a bonus. Audio CD. £59.95. Akai, Roland, or SampleCell CD-ROM. £99.00



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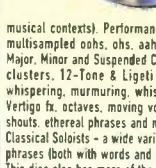
Spectrasonics (USA)



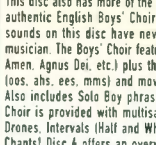
SYMPHONY OF VOICES
From acclaimed developer SPECTRASONICS comes an epic production - the most extensive collection of voices ever assembled on CD-ROM. This massive FOUR CD-ROM SET produced by Eric Persing includes a breathtaking variety of multisamples, phrases & FX from some of the world's most prestigious singers. An invaluable tool for the serious composer and producer, & designed to be inspiring for years to come. Disc 1 is devoted to richly-detailed samples of the 80-voice London Choral, recorded in a large cathedral in England - the first sampled choirs ever presented without heavy vibrato (more playable and useful in any musical contexts). Performance variations include multiple dynamics of multisampled ohs, aahs, ees, humming, intense staccato stabs. Major, Minor and Suspended Chords with high & low chord voicings, thick clusters, 12-Tone & Ligeti FX, natural Crescendos/die-crescendos, whispering, murmuring, whistling, accents, falls, Avante garde guides. Vertigo fx, octaves, moving vowels, swoops, chattering, guttural groans, shouts, ethereal phrases and more! Disc 2 brings the beauty and power of Classical Solists - a wide variety of license-free, Multi-ethnic Tenor & Soprano phrases (both with words and melismatic), & multisamples of each singer. This disc also has more of the London choir samples. Disc 3 focuses on an authentic English Boys' Choir and a Gregorian Mens Choir. Many of the sounds in this disc have never before available to the electronic musician. The Boys' Choir features multisampled phrases (Kyrie, Allelujah, Amen, Agnus Dei, etc.) plus the soft and loud multisampled static vowels (oo, ahs, ees, mms) and moving vowels (Oh-Eh-Ah and Ah-Eh-Ee-Oo). Also includes Solo Boy phrases and multisamples. The Gregorian Mens Choir is provided with multisampled soft and loud Ohs, Mms, Ees, Fifth Drones, Intervals (Half and Whole Step Up/Down), and ancient Gregorian Chants! Disc 4 offers an overwhelming variety of Lush Multitracked Pop Stacks, created from over 10,000 perfect vocal performances! These 'Enya-esque' pads are a must-have for Pop, R&B and New Age music. This disc has the most comprehensive multisampled vowels in the collection including Oos, Ahs, Ees, Ees, Ohs, Mms, Vvs and Zs. Moving vowels, Washes and 'Scopped' notes. Gorgeous male and female textures that will add that smooth silk to your next hit!!



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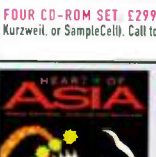
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Ten out of Ten!
(First 10/10 EVER!!!)
(Keyboard, USA)
FOUR CD-ROM SET. £299.00. (Choose either Roland, Akai/Emu, Kurzweil, or SampleCell). Call to check availability - there's a rush!!!



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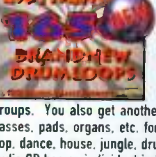
HEART OF ASIA
This product got a 5 star review in every magazine in UK, US & Germany! The most comprehensive collection of Asian instruments & phrases. This remarkable 2-disc set includes over 10b of exotic Chinese, Malay, Nepalese, Tibetan Javanese, Hindi, Sanskrit, Mandarin, Thai & Indian samples, including instruments, phrases, opera divas, chants, speech, gamelan orchestra, monks. Perfect for your next film score, album or remix project. "A treasure chest of lovingly sampled performances" (Keyboard, USA). The range and subtlety is faultless. You won't find a better collection of ethnic sounds anywhere else." (Future Music, UK). Audio 2-CD set. £79.95. CD-ROM 2CD set. £249.00



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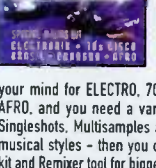
ADVANCED MEDIA TRAX
NEW from Germany's No.1 Sample CD developer, BEST SERVICE.
It was time to take sampling to a whole new level!!! Advanced Media Trax is an unmissable collection of FIVE CDs - the new standard for film and multimedia productions and sound tracks, featuring synth pads, stacks, orchestra hits and lines, atmospheric backgrounds, single pads and multisamples, cutting edge textures and hyper-SFX. And all licence free. Includes over 1 GIGABYTE of Akai CD-ROM data!! (also compatible for Emu and Roland users). Five-CD-Set (Mixed Mode Audio/AKAI). £129.95



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INDEPENDANCE
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If you have enough of those Techno and House sampling CDs which contain sounds that you feel you could easily create on your own, and you want to open your mind for ELECTRO, 70's DISCO, BRASIL, BHANGRA, and AFRO, and you need a variety of exactly tuned Drumloops, Singleshots, Multisamples and Grooves in really different musical styles - then you can't miss this Dance construction kit and Remixer tool for bigger beats & grooves. Audio CD. £59.95



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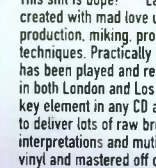
Zero-G (England)



PLANET OF THE BREAKS
(Zero-G). It has become increasingly difficult to unearth both rare and unused drum breaks - in fact, almost a mission impossible. Planet Of The Breaks introduces a new generation of 'Raw-funkin'-dirty-ass-boogiebeats' to sample. Original loops that mix old school style and sound with the sonic science of the new school. Drums recorded through vintage analogue and valve gear, then digitised, sliced, diced, tweaked and freaked. This ain't no ordinary sample set by some famous drummer. This shit is dope! Each break has been individually created with mad love using a wide variety of production, mixing, processing, recording and sampling techniques. Practically every make of drum kit out there has been played and recorded at twenty different studios in both London and Los Angeles. Variety of sound is a key element in any CD and a huge effort has been made to deliver lots of raw breaks for your own sonic interpretations and mutilations. Hell, Zero-G even cut to vinyl and mastered off of that! Planet Of The Breaks delivers! OUT NOW!! Audio CD. £59.95.



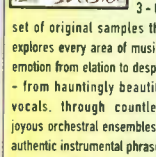
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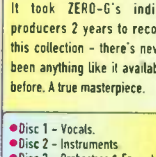
DEEPEST INDIA
The aim of Indian music is to create spiritual awakening in man"
- Sangeet Karyala, India
One of the most exquisite and beautifully recorded sets of samples ever created. A 3-CD set of original samples that explores every area of musical emotion from elation to despair - from hauntingly beautiful vocals, through countless joyous orchestral ensembles to authentic instrumental phrases. It took ZERO-G's indian producers 2 years to record this collection - there's never been anything like it available before. A true masterpiece.



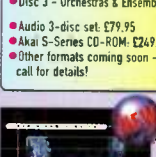
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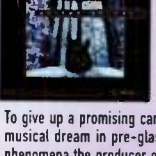
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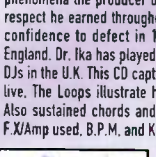
GUITAR ODYSSEY
REVIEW: "Very cool FX... A surprisingly versatile assortment... Perfect for anything from Trip Hop to Funky House... A highly recommended disc... PLATINUM AWARD" (Future Music).
To give up a promising career in Brain Surgery to pursue a musical dream in pre-glorious U.S.S.R. says what kind of phenomena the producer of this stunning collection is. The respect he earned throughout Western Europe gave him the confidence to defect in 1993, fleeing with his family to England. Dr. Ika has played with most of the big name Dance DJs in the U.K. This CD captures the essence of what he does live. The Loops illustrate his effortless speed & accuracy. Also sustained chords and FX. For each sample the Style, F.X/Amp used, B.P.M. and Key are given. Audio CD. £59.95



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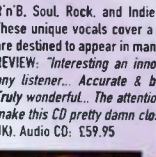
VOCAL XTC
EXTREMELY HOT dance vocal sample collection from ZERO-G (UK), performed by some of the hottest session singers from the UK! Totally original pro samples for all your music productions: Gospel choir, Ad-Libs, Melodies, Harmonies, and Backing Vocals. Styles featured include: Dance, R'n'B, Soul, Rock, and Indie. Both Male and Female singers. These unique vocals cover a wide spectrum of application and are destined to appear in many a chart record in the near future. REVIEW: "Interesting an innovative... Impressing the pants off any listener... Accurate & beautifully arranged d harmonies... Truly wonderful... The attention to detail an wide range of styles make this CD pretty damn close to perfection" (Sound on Sound, UK). Audio CD. £59.95



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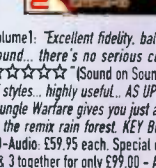
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e-Lab (Sweden)

VINYLISTICS 3

NEW!! Featuring Ruff-style Breaks which have crossed over in all styles, from HipHop to House to Tekno & Jungle - Vinylistics 3 is an important source of Groove inspiration. Loops (with variations) plus their component drumsamples. UltraMonk5 - an experimental trip duo, together with DJ Toby, have made the loops as Funky & Rough as possible. Edited & mastered with SP1200 sample simulations & Valve Ed's - so the beats are phat & 'dirty' to the bone. Often the loops have 2 variations to make them even more varied. Special Filtering gives you that hi-hat/loop microphone sound which makes the loops even more creatively useful as 'Groove Backdrops'. Use them behind a programmed beat to increase the 'live' feel for Your Rhythm. This CD, like the others in the Vinylistics series, utilise the 'LoopMap™' system developed by e-LAB for the X-Static Goldmine series, making the loops easier to use & 'intermix' with each other. If you can only afford one 'Vinylistic' CD get this one. Audio CD (plus bonus demo CD): £59.95

STRICTLY HOUSE

NEW RELEASE!! Are you a Remixer? A House DJ? A PRODUCER? Maybe you are still looking for the Perfect Beat? STOP SEARCHING NOW!!! THIS IS THE CLUB SAMPLE CD!!! PUMP! HOUSE & GARAGE LOOPS 2 DA MAX. A COLLECTION OF TUFF & DEEP HOUSE LOOPS (120-130 BPM) plus the Loops Library and their component drum SAMPLES. INSPIRED TO CUT SOME RIFF & GROOVY HOUSE TRAXX!!! Audio CD. £59.95 "Spot on, you can't really fault this CD" (Future Music)

X-FILES OF JUNGLE

Coming soon - Another in the new X-Files series from e-LAB in Sweden (makers of the X-Static Goldmine series) X-FILES OF JUNGLE features Drum'n'Bass & Jungle LOOPS & SAMPLES. These Rollercoaster beats will set off your system like nothing else. Super-Fast beats for anyone looking for the underground sound of Jungle or Drum'n'Bass. Loops, Samples, FX - they're all in there. Please call to check availability - scheduled release date of this HOT new title is April/May '98 (Call for latest news). Audio CD. £59.95

X-FILES OF TECHNO

NEW! - and in stock NOW. Another unmissable CD from the makers of the X-Static Goldmine series. X-Files of Techno features ACID/HARDCORE/TEKNO LOOPS & SAMPLES - the styles which have been dominating Europe's underground scene for Years. The TR909, TR808, TR303 are all in there - Distorting like crazy. These are the hard beats of The Underground Charts that set the Trends which others need to follow. Created by a successful Producer of this underground rave phenomenon. Audio CD. £59.95

X-FILES OF HOUSE

This one's a Goldmine of Deep & Progressive House loops & samples. To give you an idea, the loops and samples are in the style and mood of Armand van Heliden, Tod Terry, or Deep Dish. These loops & samples will make your Hair Stand Out - pure joy!! You won't be able to stop moving your feet when you hear this one. All samples provided with variations so you can create your own deep house tune - variety - perfect for injecting The New York club sound into your music - the sound of people like 'Masters at Work' OVER 1000 PHAT LOOPS AND SAMPLES. Audio CD. £59.95

STRICTLY 12-INCH

This classic from e-Lab features Dance/Remix/House LOOPS & DRUMS. WHAT VINYLISTICS IS FOR HIPHOP, THIS CD IS FOR DANCE. The idea is similar. Loops, with variations, together with separate hits. This is a Remix CD for anyone in the need for good STOMPING House & Garage Loops. Very much 'DJ sounding', & produced by a Remix/DJ team. If you want the sound of the dancefloor - get this one. All Loops have been tested for reaction on the floor!! Audio CD. £59.95

VINYLISTICS 1

From DJ/Producer PHAT FABE (Neneh Cherry, Shaba Ranks, Cherno, Tibo) etc. HOT Loops & samples from Jungle, breakbeat/techno to R&B and hiphop. Extended variations of many loops make this CD great for club DJs, and provide the opportunity to create smaller custom loops. The loops have a vinyl quality about them. An optional floppy disk is also available featuring the MIDI-files of the loops (Specify AtariPC or Mac). REVIEW: "A real bargain... a CD that any r&b/hiphop/soul producer will be pleased to own." (The Mix, UK). Audio CD. £59.95 Akai CD-ROM £99.00

X-STATIC GOLDMINE 1

The original dance production mega-collection, re-released by popular demand & completely reworked by creator Erik Svahn. FEATURES OVER 4000 SAMPLES & LOOPS! - an unbelievable resource. One of the most revered and largest collections of dance samples & loops ever released. And the AKAI S1000 CD-ROM version is the same price! REVIEW: "One of the most astonishing value-for-money purchases in recent years. In the 'pound per sample' challenge, nothing else comes close." (Sound on Sound, UK). Audio CD. £59.95 Akai CD-ROM £59.95

X-STATIC GOLDMINE 3

A journey into the clubs of the world. House, Tekno, Rave, Garage & Jungle. Over 500 stereo & mono loops - all made to fit with LoopMaps™. Plus over 1000 samples cut from extensive programming & vinyl manipulation. •Sub/Synth Bases •Acid tones/loops •Tekno riffs/samples •Vintage analog seq drums •Strings •Tekno FX •Perc & hooks •Optional MIDI-file floppy disk (specify AtariPC or Mac). REVIEW: "Well chosen, in-your-face dance material which you would be well advised not to be without... a collection with plenty of attitude which will not disappoint." (Sound on Sound) Audio CD. £59.95 Akai CD-ROM (over 3000 samples) £99.00

e-Lab (Sweden)

X-STATIC GOLDMINE Vol. 5

Another winner from the 5-star producers at e-Lab. Electro, Techno, Trance, Ambient, House - whatever Your angle is, this CD is an unbelievable resource. 1500 Loops & Samples with incredible crossover potential. e-Lab Used & Abused all kinds of Electronic gear to create the widest possible variety of Synthetic Loops, Patterns & Samples. Tons of Computer Generated Trancey Synth & Acid-like Tones, Loops & voices. Plus a Massive Dose of Vintage Old Modulars - producing Zapping Blips & Twangy Bleeps. Sweezy Synthetic FX and Artificial Electronic Drum & Percussive Samples - all made to fit with the LoopMaps™, developed by e-LAB to enhance the intermingling of Samples with different BPM's. The clear links between X's 5 bands (like Kraftwerk) & today's technoelectro innovators (like Aphex Twin, LFO & Carl Craig) shows that electronically produced music is vital to keep the 'innovative' Dance styles up-to-date with the next Millennium. So get this CD if you want the Ultimate in Artificial, Analogue & Experimental Loops & Synth samples. "Pure Artificial Intelligence" - or as Kraftwerk put it - "It's more fun to compute." Audio CD (plus bonus demo CD): £59.95

SYNTHASIA 3 - LOOPLAND

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XTORTION 1

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Welcome to FUNKLOG and SYNTHASIA ONE. Analog dance / Remix sounds & samples into drum loops, only samples! The perfect complement to all e-Lab's dance loop CDs. Analog dance samples made for Dance Producers by Dance Producers. Many danceloop CDs lack good clean, solid & deep synth sounds. This CD will solve your problem of finding the right fun & inspiring analogue synth sample. •Tones •FX •Basslines •Arpeggios •Chords & lols more from new like the Nordlead! to vintage (the phat Prophet S). Also TB 303, TR 909, JUNO 106, JUPITER 8, KORG POLY 6, OBERHEIM M6, & many more Over 1100 CLUB SAMPLES! Audio CD. £59.95

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STRICTLY R'n'B

NEW! Prepare yourself & NU Classic Soulbreakers: 800+ X-Closest Swing & Soul loops & samples (no instruments - only loops & hits). Black traxx from the sons of Soul. Swingbeat & HipHop loops all with variations plus the component drum samples. A very black-sounding CD, perfect for anyone in need of phat/slow Rumpskaker beats. Like 'Vinylistics', but with a more slick R'n'B touch. Styles range from HipHop's smoother side to the slicker sound of 90's soul. From the same DJ who produced 'Strictly 12-inch', this loop CD must be on top of your list! A great mixture of s&b & groovy loops (80-102 BPM). Are you ready 2 make some slick Black traxx? Audio CD. £59.95

VINYLISTICS 2

The best-selling sample CD from DJ/Producer PHAT FABE (Neneh Cherry, Shaba Ranks, Cherno, Tibo) etc. Incredible loops and samples in styles ranging from Jungle, breakbeat/techno to R & B and hiphop. Once again, the extended variations of many of the loops make this CD superb for club DJs as they provide the opportunity to create custom loops by cutting out small portions of the main loop. Phat Fabe has put together another stunning collection. REVIEW: "A real bargain... the range in kit sounds can't be faulted... everything from squeaky clean to rough and raw." (The Mix, UK). Audio CD. £59.95

X-STATIC GOLDMINE 2

A journey from the JB's to Snoop, from East Coast to West Coast, a steady stream of phat loops, Grooves & of Skool Funk samples. Deep Bass Tones & Grooves, Funky Guitar Riffs, old Clavinetts, Dusty Bumpers & Organs, Horny Horns & Saxes, Heavy Synths, Jazz Bells, Vinyl FX, Rolls, Fills, Drums & more... OVER 1500 KICKIN' SAMPLES (over 1000 on the Akai CD-ROM). •Optional MIDI-file floppy disk (specify AtariPC or Mac). "One of the most complete funk/hip-hop sample discs you can buy" (Future Music). Well composed and exciting, a wonderful resource. Buy this one for its loops - they're tough to beat! (Keyboard, USA). "As phat and funky as they came and incredibly flexible." (The Mix, UK). Audio CD. £59.95 Akai CD-ROM £99.00

X-STATIC GOLDMINE 4

e-LAB have done it again! Over 1500 Ambient and Chill Out Loops & Samples from the dark side of the Moon. TRIPHOP & CHILL-OUT LOOPS, SPEEDY JUNGLE BEATS & SMOOKIN BASS BOOSTERS, ETHNIC CHANTS & BUBBLE BATH DIGGERDOOS, WET CHILL OUT CHORDS & XPERI-MENTAL SYNTH VIBES, ANALOGUE SEQ FX & ENO-STATE VECTOR LOOPS, PSYCHADELIC DELAYS & DUB-ECHOS, AMBIENT BIRDS & JUNGLE WEATHER, SPOOK FX AND LOTS MORE! "I will say this just once GO OUT & BUY THIS ONE!" Absolutely brilliant! (Muskier Magazine, Sweden). Audio CD. £59.95

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sounds, allowing solo performers to use the Rhythmtrak to provide a complete drums and bass backing for guitar/keyboard and vocal work. A groove loop function allows rhythm composition on the fly, and any one of the 99 groove loops or user-programmed patterns can be pre-assigned to each of the 13 velocity-sensitive pads and subsequently played or muted with each pad-press.

Another feature worthy of attention is the Rhythmtrak's Sound Jammer function, conceived with the creative musician firmly in mind. The Jammer uses the slider (which can also be assigned to pitch or volume) for real-time adjustment of attack, decay or crossfades. It can also toggle between sounds, allowing instant jamming over pre-recorded song patterns. Further control is possible via MIDI for those using external sequencing and remote triggering devices, or by way of a foot pedal for use in live situations. The Rhythmtrak 234 retails for just £199, but you won't have to worry about the price if you manage to win one of the three on offer here!

Zoom set a new standard for budget effects when they released the 1201 last year (see the SOS review in September '97). 363 preset effects and combinations are contained in the 1201, with audio quality ensured



QUESTIONS

1. Zoom made certain the Rhythmtrak was well-endowed with bass sounds; but how many?

- a. 147
- b. 007
- c. 777
- d. 50

2. Which one of the following is the name of a Zoom Rhythmtrak function?

- a. Fire Starter
- b. Sound Jammer
- c. Solo Incapacitator
- d. Acoustic Twister

3. The Zoom 1201 has a bank select switch; what are the names of the banks in question?

- a. A, B and C
- b. X, Y and Z
- c. Barclays, Lloyds and Midland
- d. The South Bank Show

4. How many effect presets does the Zoom 1201 have?

- a. 666
- b. 999
- c. 363
- d. A large handful

Would you like to receive more information on Zoom or Tech 21 products? If not, please tick this box.

Name

Address

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Post your completed entry to: SOS Exclusive Distribution Competition '98,
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Competition

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Welcome to the second instalment of our two-part competition. In association with Exclusive Distribution Ltd, we have £2000 worth of equipment waiting to be won.

In case you've forgotten what's on offer, the prizes are as follows:

- 1 x Tech 21 Trademark 60 combo
- 2 x Zoom 1204 effects
- 3 x 234 Rhythmtrak drum machine
- 4 x Zoom 1201 effects unit

Last month the Tech 21 and the Zoom 1204 came under the spotlight. so this month it's the turn of the Zoom Rhythmtrak drum machine and the 1201.

There haven't been too many new, stand-alone drum machines released of late, so Zoom have taken the initiative and created the Rhythmtrak 234 (see the SOS review in the May '98 issue). The Rhythmtrak is a compact, easy-to-use drum machine with plenty more features than just its impressive array of drum sounds. The 124 drum kits are augmented by 50 bass

by 18-bit oversampled A-D conversion. The 1201 is an all-rounder in the studio with a full complement of reverbs, modulation effects and the addition of some unusual effects too. It's also pretty easy to use, with all the main effect types written on the front panel. These are separated into banks A, B and C and are then sub-divided again into 11 character variations. A rotary control allows reverb time to be adjusted on all programs. Round the back the unit sports a pair of stereo quarter-inch jacks for both input and output, plus a bypass footswitch jack for use in live situations.

In his review, our editor, Paul White, thought that the effects were 'quite inspiring, with the vocoder section being particularly good', and went on to say 'this unit is just about as much fun as you can have with your clothes on.' Say no more.

Now you've done the reading it's time for some winning! Correctly answer the questions provided on the left of this page, make sure you have completed the tie-breaker on last month's form and then put both completed competition forms in an envelope and post them both to us at the address below by the closing date: **Friday 7th August 1998**. Single-form entries will be assigned to the bin. Good luck!

the small print

1. Only one entry per person is permitted. 2. Employees of SOS Publications Ltd, Exclusive Distribution Ltd, and their immediate families, are ineligible for entry. 3. No cash alternative is available in lieu of the stated prize. 4. The competition organisers reserve the right to change the specification of the prize offered. 5. The judges' decision is final and legally binding, and no correspondence will be entered into. 6. No other correspondence is to be included with competition entries. 7. Please ensure that you give your DAYTIME telephone number on your entry form. 8. Prizes winners must be prepared to make themselves available in the event that the competition organisers wish to make a personal presentation.

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Seconds Out

EMU SYSTEMS EMAX II SAMPLER

The high quality converters and resonant filter imbue the 16-bit Emax II with a musicality and sonic character second to none, claims JANET HARNIMAN COOK.

The Emax II 16-bit sampling keyboard from Emu Systems made its debut in 1989, and although it sold well in the USA it met with only modest success in the UK and Europe, partly because of the wider range of production and editing facilities offered by its main rival at the time, the then 'industry standard' Akai S1000. Although both instruments featured 16-bit recording, the S1000 also provided 20Hz — 20kHz bandwidth thanks to its 44.1kHz sampling (Emax II tops out at 39kHz), XLR connectors, SMPTE triggering, and a large easy-to-read parameter display.

Nine years on, it is easier to forgive the shortcomings of the Emax II as a studio production tool and recognise its strengths as a classic musical instrument that sounds excellent, even when judged by current standards. The sweet musicality of the Emax II converters and its rich resonant filter are capable of producing not only vivid acoustic instrument emulations, but also exciting synth textures. Complemented by a powerful MIDI clockable arpeggiator; a 16-track sequencer, which although not suitable for studio applications could be useful for live sets; additive synthesis functions; rock solid reliability together with a currently low street price, it becomes clear that the Emax II still has much to offer the bargain hunter.

NICE PEDIGREE, CHUM

The Emax II has an illustrious pedigree: Emu Systems popularised keyboard sampling with the release of the Emulator in 1980 and the Emulator 2 in 1984 and, although both these instruments cost over £7000 at the time, they provided a viable 'budget' alternative to vastly more expensive sampling systems from Synclavier and Fairlight. Responding to the market need for an even less expensive sampler in 1987, Emu Systems introduced the original Emax keyboard and 3U rack modules, which featured 12-bit mono sampling and optional hard drive. The 16-bit Emax II appeared in 1989 — the first models were mono instruments with 1Mb RAM and were priced at £2850, and during mid-1990 these were superseded by stereo models with a lower price of £2450 for the standard version. When Emu ceased production of the Emax II in 1995, the final

shipment sold for around £1400 each, a far cry from the wacking £5290 that was the asking price for the original Emax II Turbo models!

My own introduction to sampling came in 1986, when I encountered the Emulator 2 whilst I was producing a track for Red Wedge at Paul Weller's Solid Bond Studios — I was stunned by its awesome string and wind voices, and I consequently bought one of the first stereo 2Mb Emax II keyboards. Over the years, this was upgraded to the maximum 8Mb of RAM and a 150Mb internal hard drive was added to house its sample library. After nearly seven years of constant use, it is still my first choice for acoustic instrument emulation and is — along with the Roland Jupiter 8 — the most musical-sounding instrument in my studio. But there again I'm biased - I'm an Emax II fan!

FEATURES

The Emax II is attractively finished in textured black resin with a distinctive pink logo, grey legending and functions map, complemented by stylish, ergonomically raked parameter buttons and sliders. The 61-note, non-weighted, velocity-sensitive keyboard has a pleasant positive feel and features a choice of 14 velocity curves, but sadly is not pressure-sensitive (although the Emax II does respond to MIDI aftertouch control). Keyboard velocity can be set to control VCA level, VCA attack, VCF cutoff, VCF attack, and VCF Q — yes indeed, the Emax II filter has resonance! The two recessed performance wheels can be programmed for a variety of real-time and MIDI performance options, including control of pitch, filter cutoff, envelope attack rate, level, panning and LFO modulation types. Additional performance controllers are available via the rear-panel CV pedal insert and the two footswitches provide control of sustain, release, patch change, arpeggiator on/off, and sequencer start/stop. Also located on the rear panel are the MIDI In and combined Out/Thru connectors; Clock

EMAX II CONFIGURATIONS

The original Mono models (1989) were:

- Model 2201 — 1Mb Keyboard
- Model 2202 — 1Mb Rack
- Model 2203 — 1Mb Keyboard (w/HD)
- Model 2204 — 1Mb Rack (w/HD)

These Stereo models were introduced in mid-1990:

- Model 2212 — 2Mb Keyboard
- Model 2213 — 2Mb Rack

Stereo 'Turbo' models:

- Model 2205 — 4/8Mb Keyboard (w/HD)
- Model 2206 — 4/8Mb Rack (w/HD)

(Details were unavailable of when Emu switched from 4 to 8Mb RAM and from 40Mb to 105/127Mb Hard Drives.)



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Allen & Heath GL3000 24:8:2 8 aux	IN STOCK
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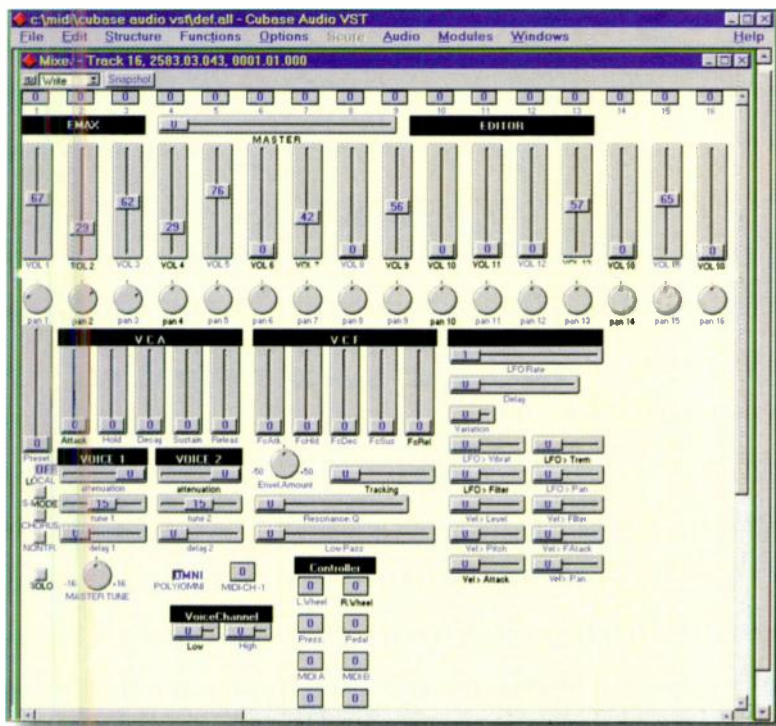
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EMU SYSTEMS EMAX II SAMPLER



Cubase has a ready made Mixer Map for the Emax II.

Samples within Presets can be assigned velocity crossfade and velocity switching, and can be zoned or split with up to four samples triggered by a single keypress. The Emax II digital filters are utterly superb — listening to them, it is hard to believe they are not high quality analogue devices; they sound so rich, fat and warm — and of course, filter cutoff frequency and resonance (Q) can be modulated by velocity or assigned to respond to mod and pitch wheel movement. Each Preset has a lowpass filter (VCF) and VCA — both with 5-stage AHDSR envelope generators, an LFO with adjustable rate, delay, and speed variation, and may also be routed without loss of polyphony through the Chorus module.

Sample editing at the Preset level is non-destructive and as long as the original source data is unchanged, samples can be virtually copied between Presets without consuming extra memory, just as virtual copies are created on a computer hard disk recording system. Editing the sample data at source level is the domain of the Emax II Digital Processing module, where we find facilities for determining the length of the sample; its loop points; plus basic cut, paste and combine; sample rate conversion; pitch-shift and also morphing (which creates an interpolated crossfade between two samples).

ARPEGGIATOR

The onboard arpeggiator is powerful and has many excellent features — it will output MIDI and 24 ppqn Clock messages with an internal tempo rate of between 40 and 240bpm to a resolution of .01bpm, and can alternatively be

▶ inserts; an RS422 computer interface; the stereo analogue sample input; a headphone socket; and the eight audio channel outputs, which are configured as stereo pairs each with assignable panning and a send and return loop for outboard processing.

The small blue backlit LCD is used to access the parameter pages — the limited amount of information contained on each page inevitably necessitates lots of button-pushing, though fortunately the operating system (final revision 2.14) is easy to understand and has much in common with that used in the Proteus range.

SCSI

The built-in floppy drive reads both DD and HD disks, but because part of the operating system is written to disk during formatting, each floppy has a maximum sample data storage capacity of only 524,286 bytes (0.5Mb). Realistically, the only practical method of voice bank storage is to hard drive — an 8Mb Emax II bank spans 16 floppies and takes about eight minutes to load. Although the standard model does not ship with an internal SCSI hard drive, fitting one is a doddle as Emax II ships ready-wired and second-hand 150Mb drives can be bought for about £50 through computer magazines such as *MicroMart*. Additionally, the Emax II includes as standard a SCSI interface on the rear panel for simple connection to external devices such as hard drives, CD-ROM and Iomega Zip drives.

SPEC CHECK

Emax II is 16-voice polyphonic, regardless of whether stereo or mono voices are played.

Each Preset can be assigned its own MIDI channel and the Emax II can also be used multitimbrally in 'Supermode'. Internal processing is 32-bit, and sampling is via 16-bit linear DACs with 64x oversampling, with 18-bit DACs used for playback.

Five sample rates are available: 20kHz, 22kHz, 28kHz, 31kHz, 39kHz, and Emax II will also play samples recorded at 44.1kHz. The 39kHz sample rate (which is the same as that found in the Proteus range) gives a frequency response of 20Hz — 18kHz and a standard 2Mb Emax II gives 13.4 seconds of stereo sampling (26.8 seconds mono); a fully expanded 8Mb instrument provides a respectable stereo sample time of 53.6 seconds (107.2 seconds mono). Signal-to-noise ratios are good, measuring greater than 90dB and 102 dB for input and output respectively, and harmonic distortion and noise (THD+N) is rated at below 0.05%.

VOICE ARCHITECTURE

Banks consist of 100 Presets, which can only be saved or loaded as part of a Bank; and although Emax II does not recognise MIDI Bank Change messages, Banks can be loaded from hard disk via a simple consecutive program change routine.

The timbral characteristics of each Preset are determined by the parameter settings in the Preset Management and Preset Definition menus, and every Preset can contain multiple samples each with individual performance characteristics such as keyrange, level, pan position, tuning, output assignment, and modulation response settings.

EMAX II SOUNDS

In addition to Emu's 15 factory Emax II Banks, there is also a good selection of high quality ready-to-load Emax II sounds available on CD-ROM:

• Invision Lightware (2 volumes, priced \$99 each) - Volume 1 Pop Instruments; Volume 2 Classical Instruments.

W www.cybersound.com/docs/bckrnr.html

• Northstar Productions (3 volumes, priced \$195 each). Max 1: pop, rock and rap Banks; Max 2: orchestral and ethnic; Max 3: synthesizers.

A Northstar Productions, 13716 S.E. Ramona Street, Portland, Oregon 97236, USA.

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• Universe of Sounds Library (4 volumes, price \$79 each; \$279 for all four): Vol.1 and 2 Sound Effects; Vol.3 Percussion, Rock and Ethnic; Vol.4 Orchestral.

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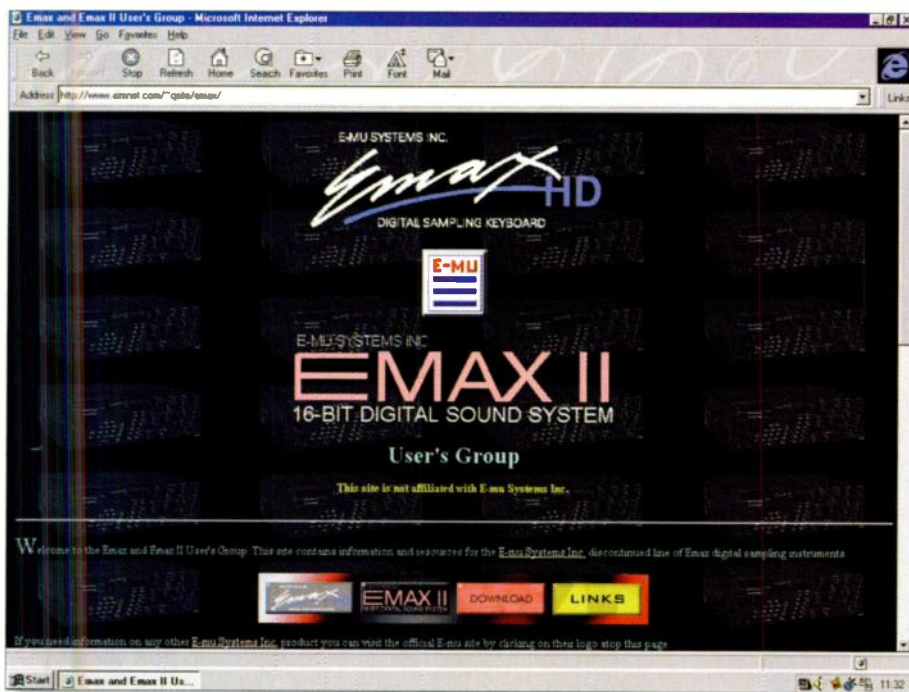
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EMU SYSTEMS EMAX II SAMPLER



On the net: the Emax/Emax II user group is a good source of utilities and information.

▶ controlled externally, via MIDI or from devices such as older drum machines that transmit 24, 48, or 96 ppqn clock pulses. Six arpeggio patterns are available including random, and notes in the arpeggiated sequence can retain their original input velocities. The arpeggio can be modified so that its sequence is extended beyond its original range; two harmony parts may be added and the arpeggiator keyboard range is used to define the range of keys that triggers the arpeggiator.

SIMPLE SEQUENCING

The Emax II sequencer is a very basic 16-track MIDI recorder. Although it does not possess editing features and cannot record program changes, it is nonetheless a very useful sequencer for live use, for triggering sounds from both the Emax II internal banks and from external MIDI devices. To achieve this you must first record your song on your main studio sequencer and then transfer it into the Emax II sequencer, assigning the external instrument channels to an empty Preset on the Emax II — the MIDI data will then be output to the external MIDI devices you wish

EMAX II ON THE NET

The best place to start is the Emax/Emax II User's Group (www.aimnet.com/~qsite/emax), assembled by John Silveria II and last updated in April 1998. The site contains links to information including frequently asked questions, technical information, CD-ROM compatibility and free downloads of OS files, voices and EMX v1.1 — a DOS/Windows 95 utility program by Mike Prudence (mjp@hplb.hpl.hp.com) that enables your PC to read, write and format Emax and Emax II DS/DD floppy disks. The sound banks are a mixed bag of user-created banks in PC Zip format and include Bouzuki, Chords, Mandolin, Mellotron, Piano, Proteus 3 voices, TR-808 and Synths.

to control. As Emax II supports up to 99 Presets and 99 Sequences, you can have your whole set (complete with Preset voices) assigned to a single Emax II bank with minimal load time between songs.

HOW'S IT SOUND?

The factory Presets that shipped with the Emax II were of a uniformly high quality and were derived from the flagship Emulator III

sound library. My special favourites are the grand piano, the arco strings, the woodwind, the solo cello, the soul and ooh choirs, the synth basses and the vintage keyboard sets. These voices are also found in the Proteus modules, but side-by-side comparison shows the quality of the Emax II voices to be superior to the data compressed Proteus equivalents. Several Emax II sample libraries are still available on CD-ROM, and a few samples can be downloaded from the Internet (see boxes for details). A degree of MIDI voice editing at Preset level is readily available from Steinberg Cubase, which includes a Mixer Map template for the Emax/Emax II. Sadly there is no PC sample editing software available, although this is possible on the Macintosh using Digidesign's *Sound Designer*.

SYNTHESIZER FUNCTIONS

In addition to its sampling functions, Emax II provides two methods of sound creation:

- Transform Multiplication starts with two samples which are merged, common frequencies are accentuated and the remainder are discarded; the process achieves its best results with harmonically rich sounds but is of limited appeal as results are unpredictable and the actual processing is very, very slow indeed — it takes around 40 minutes to process one second of material!
- Spectrum Synthesis is an additive synthesis method that again is time-consuming, but is capable of producing impressive results, as the Spectrum Synthesis factory voice set ably demonstrates.

There are also a couple of useful diagnostic utilities offered by Emax II — the MIDI Activity monitor works in real time and analyses MIDI data transmitted and received, and provides message type and channel information; the Emax II Diagnostics are hidden away in the Master/Special 9 menu and are a bundle of SCSI hard disk, floppy drive, RAM and GRAM test routines; to access them you must first enter the code number 3629 (ie. E-M-A-X on a touch-tone phone!).

VERDICT

Emax II is a neglected classic instrument — the audiophile quality of its converters and its warm, rich filters give the voices a presence and musicality that the JV1080 in my studio lacks. Despite its small 2x16 character display, the 39kHz top sample rate, and the absence of portamento, pressure-sensitive keyboard and onboard effects, the Emax II still has a tremendous amount to offer the contemporary recording musician — those filters are really wicked and the tremendous scope for synth voice creation should especially endear the Emax II to the dance music producer on a low budget.

SOS

BUYERS GUIDE

You should expect to pay between £450 and £600 for a standard 2Mb stereo Emax II keyboard or rack complete with manual, OS disk and sound library. Fully expanded 8Mb hard disk instruments (with 100Mb hard drive and library) go for between £700 — £900, with the best buy being an 8Mb Emax II Turbo with the internal 105Mb Quantum hard disk, complete with its original Emu sound library.

A good place to start looking for an Emax II is in

the SOS Readers Ads [also available on the SOS web site at www.sospubs.co.uk/adverts].

As memory upgrades are very expensive and mono to stereo upgrades are no longer available, the earliest mono 1Mb Emax II is best avoided — unless you are offered one for really silly money! Prices will vary according to hard disk size and RAM capacity, and the quality of the sound library. Also well worth having is the Emax II manual, written by MIDI guru and SOS contributor Craig Arderton.

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YAMAHA V50 workstation, in very good condition, manuals, £400. **Gavin (anytime) 0411 312507** (Gloucester).

YAMAHA V50 synth keyboard, original sound library, £300 ono, Kawai K4 sound module, 2U rack 8 outputs, £250. **Steve 0181 950 1844**.

RECORDING

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JOEMEER stereo compressor, £750, Microtech Gefell UM925, pure valve-mic and accessories, £850, TL Audio stereo valve-EQ, £250, Yamaha MIC8 digital MIDI patchbay, £125, Symetrix quad gate, £125, Alesis Midiverb & Midifex, in very good condition, £125. **0181 875 9712**.

LINEAR PHASE 8810 studio monitors, 125W, 12-inch vinyl coated woofers, built-in circuit protection, brand new, boxed, £800 ono. **Rupert 0117 973 3673** (Bristol).

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MACKIE 24:8:2, as new, £1700, Nord rack, £500, Roland TR909, £700, Drawmer DS301, £200. **01892 664006**.

MARANTZ CDR615 CD recorder, including remote control, £950 ono. **0181 245 0929/0467 891425**.

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NEUMANN TLM193 large diaphragm condenser mic, mint condition, original box, wooden case, instructions, matching elastic suspension, £650, Spirit Folio 12 2 mixer, box PSU, £199. **0118 975 2036** (Berkshire).

NEUMANN U87 mic, the original, mint condition, shock-mount suspension, offers. **Muhammad 0181 948 6757**.

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PROFESSIONAL PLATINUM 16:8:16:2, modular mixer including full PPM bridge, wing loom 48x oscillator, 6 aux, perfect condition, as new, £1100. **Tim 01179 046512** (Bristol).

REVOX B77 2-track master, lex-Slovie and the Banshees, recently serviced and in excellent condition. **01273 604160** (Brighton).

ROLAND JV1080, £550, PG800, £180, Juno 2, rack, editor, £300, Prophecy, £400, Wavestation, bag, 2 cards, £480, JP8000 wanted. **01523 172676** (Lancs).

ROLAND RPS550 RACK multi-effects, MIDI, digital dimension D, vocoder, mint, rare, £350. **Nick 01275 462762** (Bristol).

ROLAND VS880, 2Gb hard drive, effects card, flightcase, £1100, Tascam DX20, £275, AKG C1000, £100, 12U SKB case, £120. **Chris 0266 372925** (London).

ROLAND VS880 V-Xpanded digital multi-track recorder, fully expanded, built-in effects board, complete with tutorial video, manual, absolutely immaculate condition, boxed, £1100. **0958 607578** (West Midlands).

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SECK 18:8:2 mixer, 48 inputs on mixdown, 4 effect sends, 3-band EQ, £450, Drawmer LX20 compressor/expander, £120, Korg DRV1000 reverb, £60, all ono and home use only. **0131 447 5279** (Edinburgh).

SIMMONS SMP 8:2 8-channel MIDI mixer, £120, Kawai RV4, 4 channels, stereo effects, £280, Enmix II, 4Mb, in very good condition, £450. **01732 354665** (Kent).

SKULLY 8-TRACK, 1-inch taped recorder, model 280, open reel, good condition, BBC 10-channel stereo mixing desk, circa 1960s. **01539 621243** (Cumbria).

SONY TCD D7 portable DAT recorder, 44.1kHz sampling, boxed as new, used twice, £380. **0121 458 2286** (Birmingham).

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SOUNDCRAFT 16-TRACK, 2-inch tape machines-series 760, best analogue format ever, fantastic sound, synchro unit, all manuals, £1700. **0171 738 9222/0958 290047**.

SOUNDCRAFT 600, classic analogue mixing desk, very warm sound, excellent EQ, cost £7000 new, must sell, only £1200 ono. **Richard 01865 248732/0860 709816** (Oxford).

SOUNDCRAFT 200 SERIES, 16 channels, £550, Roland S550, £450, Korg Prophecy, £400. **Alex 01865 513180** (Oxford).

SOUNDCRAFT 24:8:2, 8 aux, 4 stereo effects returns, 3-band EQ swept mid, and low, HPF EQ in/out, boxed with manuals, £1350 ono. **0181 442 9822**.

SOUNDTRACS PC MIDI mixer, 24-channel in line, on-board MIDI muting, £1150. **Jon 01773 823805**.

SPIRIT STUDIO 16-track, Fostex D90, Tascam DA20, Philips CD recorder, Tascam ATR60, Atari, synths, effects. **Gavin (evenings) 01274 607717** (Bradford).

SPIRIT STUDIO 24-channel 8-buss mixer, £495, no offers, Lexicon LXP1, classic reverb, £295, Boss SX700, £250, Behringer Composer, £120. **0113 248 3728** (Leeds).

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STUDIOMASTER DIAMOND PRO, 12, 3, 12-channels plus 2 stereo-returns, 4 aux, 3-band EQ, good condition, cost £500, will sell for £200 ono. **Andy 01733 253283** (Peterborough).

STUDIOMASTER MIXDOWN Gold, 16:4:8:2, 3-band EQ, 6 aux sends, mute solos, inserts on each channel, phantom power, excellent condition, boxed manual, £425 ono. **Nail 0181 365 0235**.

STUDIOMASTER SERIES II 16 16 2 desk, with 2 by 8-channel expanders (providing 32 16 2), recent service and good condition, will split, £1000. **Andy 01203 520643** (Midlands).

TASCAM DA38, 2 for sale, Soundcraft Studio, 16 8 2 desk, Behringer composer, Ultraflex, Yamaha and Digitech reverbs, 16:4 multicore, 30-meter, selection of mics, AKG, Sennheiser, Beyer, Shure. **Iain 01603 427552** (Northfolk).

TASCAM 38 8-track, excellent condition, new

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head fitted, manual, flightcase, 2 dbx noise reduction units, regular servicing by BBC engineer, £850. ☎ 01224 636287/592899 (Aberdeen)

TASCAM 388 studio 8, 8-channel mixer and 8-track reel-to-reel in one unit, dbx noise reduction, immaculate, stacks of tapes, £700 ono. ☎ 01333 673770 (Northants)

TASCAM 424 MKII, never used, boxed, manuals, as new, £350. ☎ 0181 427 5918

TASCAM PORTA 2 4-track, £100, Alexis HR16 drum machine, £120, Boss ME6 guitar multi-effects, £20. Boss reverb unit, £60. ☎ 01473 214440 (Suffolk)

TASCAM PORTA 05 4-track, £100. ☎ 01223 312171 (Cambridge)

TASCAM M25 24 8 24, MIDI muting, £1150, Roland JD800, boxed, £1195, Alexis ADAT v4, £850, Roland RRH with 808, 909 cards, £380, EVS1, £100, CZ101, £65. ☎ 01776 361253 (Cornwall)

TASCAM TS8R half-inch 8-track, dbx, home use, boxed, de-magnetiser, £850, Fostex 812, 12 8 2, flightcase, mint condition, £450, Yamaha XV30, £150, Gelfint UM70 mc, £250. ☎ Nick 01938 379924 (Milton Keynes)

TEAC AC900 4-track, 15/7 5ips tape deck, microphone inputs, small-synch monitoring, 10-inch reels, excellent condition, £100 ono. ☎ 0181 941 4893

TL AUDIO INDIGO valve voice processor, channel compressor, EQ and preamp, £200, Indigo 2-channel EQ, £140, Behringer Ultraflex, £90. ☎ Norman 0191 378 9703/86 8918 (Durham)

2-INCH TAPES once used, 10-inch/14-inch reels from £20 per reel. ☎ 01425 473432

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YAMAHA MD4 digital recorder, as new, £400, RAM 10 4 8 2 desk, 3-band EQ, 2 aux, £100. ☎ Roger 01450 870763/870225

YAMAHA MTB multitrack cassette recorder, hardly used, £350. ☎ 01375 673411 (Essex)

YAMAHA MTBX 8-track recorder, excellent condition, £450. ☎ Mark 01223 322498 (Cambridge)

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SEQUENCERS

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ROLAND TB303, £650, Roland TR909, £750, Juno 106, £410, MK550 module, £310, W30 sampling workstation, £600, Akai S01 sampler, £300. ☎ 01422 699674/6140116 (Beds)

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AKAI S950, fully upgraded, mint, box, manual library. ☎ Nick 0181 672 5135

AKAI S950 digital sampler, fully upgraded, 8 outputs, boxed, £495 ono. ☎ Jude 01524 844394 (Lancaster)

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AKAI S2000, 32Mb, 8 in/out, new with CDs, £1050, Powerbook 1400/117/36, £2 135 SyQuest, 10 cartridges, £200. ☎ 01227 456413 (Canterbury)

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ROLAND S760 CD-ROM, 12Mb, huge sample library, £999, Roland JV1080, £699, Mackie 1202, £299, Novation Bass Station, £199, Roland PC200, £99, SKB 4U flightcase, £59. ☎ Ian 01223 312945 (Cambridge)

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ROLAND TR909, good condition, manuals, £800. ☎ James 01978 362910 (Wrexham)

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APPLE MAC 630, 8Mb RAM, 350Mb hard drive system 7.4 plus other software, manuals, boxed, as new, CD-ROM drive, TV card, £450. ☎ Jan 0411 565417 (Essex)

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APPLE OWER MAC 6400/200, 2 pci slots, 24Mb RAM, 2.4Gb hard drive, 28.8 modem, £800, Logic Audio/Discovery, £175, Apple 15-inch multiscan, £200 or everything above for £1100, PowerMac 7200/90, 512 cache, 3 PCI slots, 32Mb RAM, 500Mb hard drive, 4 speed CD, graphics card, boxed, £550, Behringer 1602, £175, MOTU last-lane MIDI interface, £50, Yamaha MU10, mint, £130, MK149, full-size MIDI keyboard, £70. ☎ 0115 958 6991 (Nottingham)

APPLE QUADRA 650, 16Mb, Digidesign Audiomedia II and Session 8 core GRM tools, Hypermix, Cubase Audio XT, £2000 for the lot or will split. ☎ Mark 0171 251 6388/0370 921967

ATARI FALCON, 14Mb FPU, SVGA, CD-ROM, modem, Cubase Score, DTP, £500, Korg i5s keyboard, as new, £400, Emagic Logic Audio v3 for PC, £250, all ono. ☎ 01287 635356 (Cleveland)

ATARI MUSIC KIT, word processor, disks, games, joystick, bargain, £50. ☎ 01453 56006 (Gloucester)

ATARI STE with SM124 monitor, 4Mb, E-Magic Logic v2 with Logic 3, Unitor 2, Export, all in perfect condition, boxed with manuals, £350 ono. ☎ Dan (evenings) 01938 570356 (Powsy)

ATARI 1040 with 2Mb of RAM, software, £50 ono, LMTC processor, controlled synchroniser for Atari and Tascam, £40, Midtex MIDI in/out expander for Atari, £75 ono. ☎ 0141 423 1106 (Glasgow)

ATARI 1040 STFM, 1Mb high-res monitor, Epson LQ100 printer, Cubase, DR-T's editing software, word processor, spreadsheets, games, joystick, home use only and in very good condition, £199. ☎ 0191 372 2297 (Durham)

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MOTU DIGITAL PERFORMER v5 manuals, £90, Alchemy v1.2 sample editing, £50, Band-in-a-Box v5, £300, additional software, American Powerlight module, £20. ☎ Peter 03 30 to a 30 pm 01305 854651 (Donset)

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POWER MAC with Cubase VST 3.52, Recycle, Alchemy, Rebirth, Time Bandit and more, monitor available, offers or swap for whatever you have. ☎ Alain 0171 720 7744/642 5643

POWER MAC, 604e, 200MHz, 2Gb hard drive, 24 x CD, 512 L2, 64Mb RAM, Cubase VST Score 3.52, Rebirth, Recycle and more, all original and as new. ☎ Dan 07771 728110 (Norfolk)

POWER MAC 7100, 48Mb, £450, samplecell sampler, 32Mb, £450, Logic v3.0, £200, or £1000 together. ☎ Peter 0118 978 2408 (Berkshire)

SONDSCAPE S5HDR1 with XLR option, 1.6Gb hard disk drive, new with manual, £790, or swap for any analogue synth. ☎ 371 7323054 (Lathia)

STEINBERG AVALON Universal sample editor/librarian, Avalon 16-bit D/A stereo converter, manual, dongle, Atan ST/STE, £260, Yamaha TG77 sound module, 12 outputs, Steinberg Synthsworks, £625. ☎ 0181 883 4329/0956 339577

TURTLE BEACH multi soundcard, £90 with additional I/O daughter board, 3 months old, £250, Midram Portman 2x4 parallel PCI MIDI interface, extremely portable, £75. ☎ 01488 638928 (Berkshire)

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TURTLE BEACH TROPEZ PLUS for PC, 8Mb upgradable RAM, 32-voice synth with 4Mb ROM and MIDI interface, easy install, plug and play, box manuals, £135. ☎ 0181 270 0509

WAVELAB v1.6 24-bit wave editing package, includes effects, add ons, £200. ☎ Stuart 01275 847600 (Bristol)

MISCELLANEOUS

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YAMAHA MDF2 MIDI file player, £150, Midram 1x4 thru box, £20, Fostex Con2 combi-optic converter with cable, £30, all completely unused. ☎ Stuart 0115 904 3526 (Nottingham)

WANTED

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EMU 6400, in exchange for my ES32 with 32Mb plus cash, offers please. ☎ Alan 01426 159525 (Suffolk)

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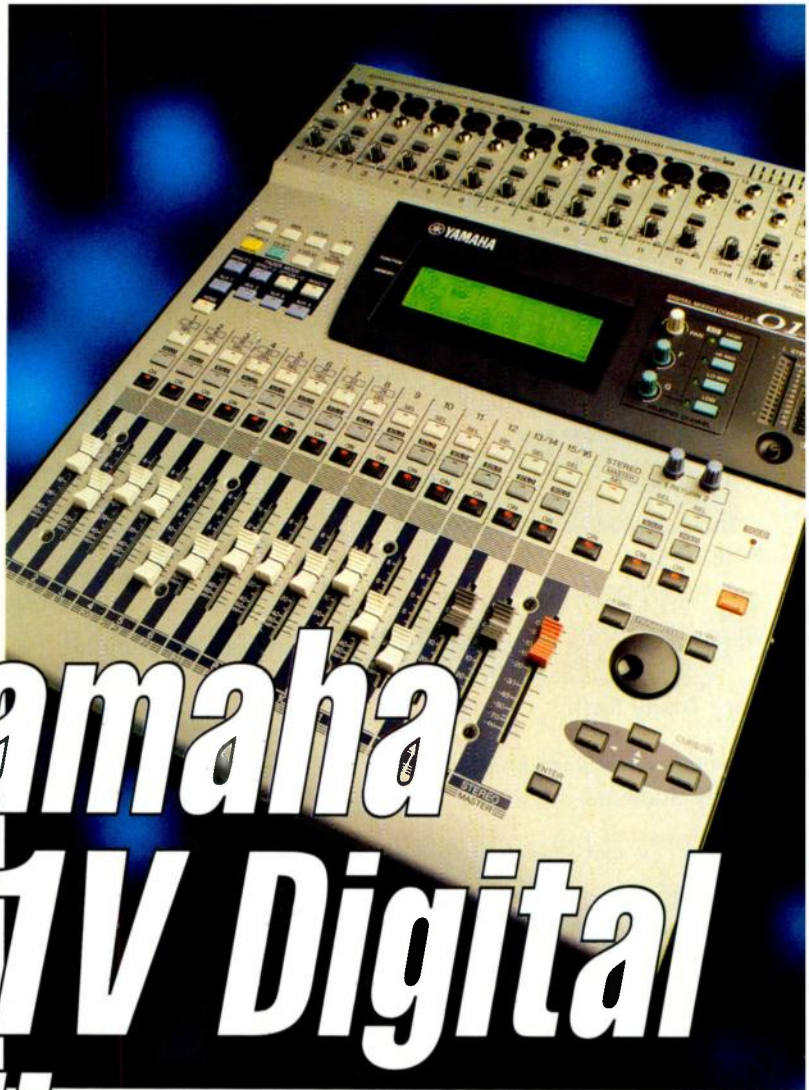
win

The mixer is one of the key components in any recording studio and Yamaha's new 01V offers more for the money than ever before. The 01V digital mixer offers a high quality signal path, sophisticated EQ and effects and a host of I/O options at a cost of just £1399 (for the full review, you only need turn to page 194 of this very issue). For one lucky reader this month, however, the price won't be an issue, because *Sound On Sound*, in association with Yamaha-Kemble Music, are giving one away free!

The 01V is the latest addition to the growing family of 0-series Yamaha mixers founded by the groundbreaking Promix 01 in 1995. Similar in design and concept to the upmarket 02R and 03D, the 01V offers the same uncomplicated user interface and sound quality, and there are plenty of input/output options too, with 16 analogue ins and a further eight digital I/Os available on ADAT, AES/EBU or TDIF boards (for use with external recording format of your choice). Analogue input signals undergo a high-quality conversion into digital via Crystal 20-bit 128-times oversampling delta-sigma A-Ds, with the digital-to-analogue stage handled by 20-bit 8-times oversampling D-As.

There are 100 scene memories on board which can recall entire console setups, either instantly or with a crossfade, and with the aid of an external sequencer, full dynamic automation is possible. The 01V can be extensively controlled via MIDI, responding to patch change, control change and system exclusive messages, and the mixer faders themselves can send MIDI data to external devices.

All in all, the 01V packs an incredible amount of power into such a small box; so how do Yamaha do that? On a traditional mixer, every function has to be accessed via a dedicated knob, slider or switch, whereas on a compact, assignable control surface such as the 01V, the physical controls are re-allocated to a number of different tasks as and when they are needed. It all makes for a desk with far more features than meet the eye, and certainly more than there's room to list on this page, so please check out the review.



Yamaha 01V Digital Mixer

Prize kindly donated by
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the small print

1. Only one entry per person is permitted. 2. Employees of SOS Publications Ltd, Yamaha-Kemble Music, and their immediate families, are ineligible for entry. 3. No cash alternative is available in lieu of the stated prize. 4. The competition organisers reserve the right to change the specification of the prize offered. 5. The judges' decision is final and legally binding, and no correspondence will be entered into. 6. No other correspondence is to be included with competition entries. 7. Please ensure that you give your DAYTIME telephone number on your entry form. 8. Prize winners must be prepared to make themselves available in the event that the competition organisers wish to make a personal presentation.

To win a Yamaha 01V, all you have to do is EQ the transparent answers from the crowded mix of questions on this page (OK, we mean answer the questions), and then buss your completed forms to the address below. Make sure your forms get to us by the closing date of Friday 7th August 1998.

QUESTIONS

1. Which of the following is also a Yamaha digital mixer?

- a. 0171
- b. 0NE
- c. 03D
- d "Oh, you are awful"

2. The 01V scene memories can be used to provide snapshot automation; how many memories are there?

- a. 180
- b. 147
- c. 21
- d. 100

3. Which one of the following is not one of the optional I/O boards?

- a. ADAT
- b. T-DIF
- c. B-TIT
- d. AES/EBU

TIE-BREAKER

With more and more studio equipment going digital, what area of the recording process do you think has benefited most from conversion to the digital format and why? Answers should be a neat 30 words or less.

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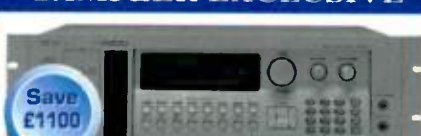
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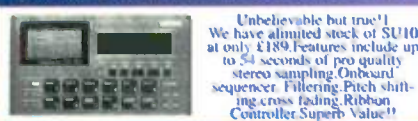


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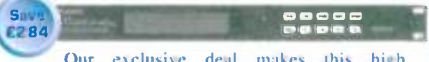
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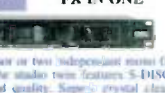
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By David Mellor

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MUSIC BUSINESS

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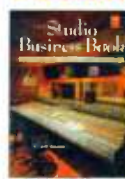
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THE STUDIO BUSINESS BOOK



by Jim Mancini
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Written & compiled by Annie Gunning
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EMAGIC

THE EMAGIC LOGIC TUTORIAL VIDEO

Produced by Emagic themselves, this video once again goes. Tim Walter in the tutor's chair. This takes you through the first steps of getting the software up and running, and covers virtually all the controls you'll need. This video is valid for all versions of Logic, whether being run on an ST, Mac or PC. Presentation is rather interesting, with a mobile camera that helps to hold the interest more than the average training video and some interesting graphics that aid comprehension and help to quickly find specific tutorials and bits inside tutorials. Contents as follows:

- Tutorial 1: The Arrange window and basic sequencing
- Tutorial 2: Playback parameters & Toolbar
- Tutorial 3: Controlling MIDI data flow
- Tutorial 4: Manipulating sequence data
- Tutorial 5: Moving around in Logic
- Tutorial 6: Windows and key commands
- Tutorial 7: Music sequencing
- Tutorial 8: Score
- Tutorial 9: Looking at the Event List
- Tutorial 10: Editing the Event List
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CUBASE

STEINBERG CUBASE

This manual is presented by Chris West, Steinberg expert. It's very much a practical 'get up and running' video, showing the novice user exactly how to install and begin using Cubase, whether you're running the program on an ST, Mac or PC computer — there's even a basic background on using the computer themselves! All of Cubase's controls are shown, explained and demonstrated in depth. Once you're familiar with the basic controls, Chris takes you slowly through recording your first session, followed by overviews of the various edit screens. It's rather like having an expert tutorial that you can run again and again in the comfort of your home, until you can use Cubase like a true pro.

Topics covered include: the main screen, customising names and outputs, copying and pasting between arrangements, MIDI filter, cycle mode recording, the tool box, all edit screens.

CODE V011 £29.99
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SYNTHESIZERS

ROLAND XP-80

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ROLAND XP-50

This XP-50 video owners manual is produced by Roland Corporation US, and covers all the major features of the instrument in detail. This is an application based video that provides many examples of how your new found knowledge can be applied. Just a few of the 30 separate topic areas covered are: Effects, Choosing Sounds, Loading a Song, Loop Recording, Copying a Track to Pattern, Making an RPS Set, Track Editing, Multitrack Recording, Patch Editing, Creating Splits & Layers in a Patch.

CODE V063 £24.99
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ROLAND JV-1080 VIDEO MANUAL

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VOICE TRAINING

VOCAL WORKOUT Video

By Sam West
Singers of varying abilities will find this video a great aid in assisting their vocal efforts. It begins by explaining the principles of voice production. Breath control exercises plus general vocal techniques are all explained and visually demonstrated. All the exercises are written out in an accompanying booklet, with piano accompaniment.

VIDEO CODE V067 £22.95
Running time: approx. 30 minutes
Postage: UK £1.75, Europe £4.95, R.O.W. £5.95

VOICE BUILDING

Cassette/CD



By Sam West
Although geared towards singers of varying abilities, voices and styles, the contents of this recording are often challenging even to the professional singer! The video (code V067) goes into more technical detail, whereas the CD or Cassette concentrate on more intensive practicing. First of all the exercises are sung, in various keys and then with musical accompaniment and melody line, so you can concentrate more on your voice while practicing (karaoke style). Vocal exercises can be boring, but this studio recording has been produced and presented to a very high standard, with interesting musical accompaniments to the exercises.

CASSETTE CODE MC001 £7.95
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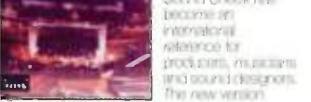
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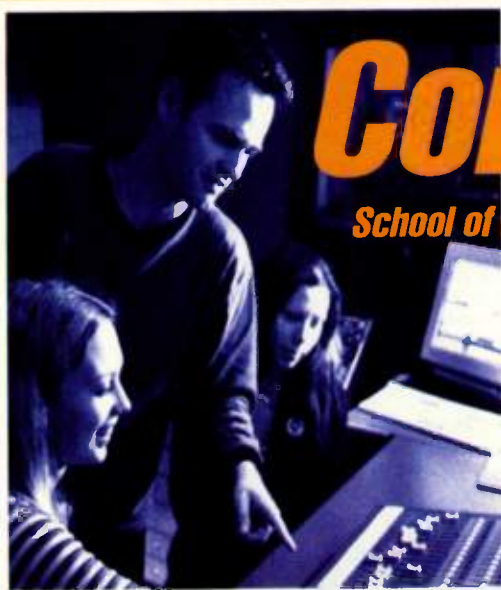
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KORG N5 SYNTH

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YAMAHA A3000 Version 2.0

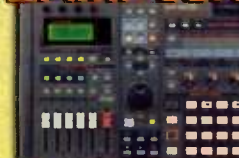
Yamaha's ground breaking sampler that took the market by storm last year looks set to do it all over again with new V2 software. Everything you expect from a pro sampler and more at an unbelievably low introductory price. Call now for details.



NEW MEGA LOW PRICE - £CALL

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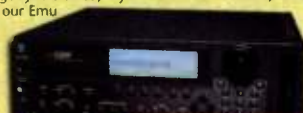
Roland are back on the sampler market and look set to take it by storm, the SP808 features 64 sample banks, 46 minutes sample time at 44.1kHz, 3 band para EQ and on board effects with over 1024 patches. All this can be saved on to the built in Zip drive making this the perfect all-in-one sampling work station.



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AKAI DSP12

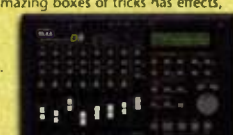
Twelve tracks of pure digital multi-tracking with 8 individual inputs, this is a must for any home or project studio. All songs are saved onto JAZZ discs via the on-board JAZ drive, if you do need more memory, just use more discs. No other digital multi-tracker offers as much for the same price and in terms of quality it's everything we've come to expect from Akai, simple to use, great build quality and amazing value for money.



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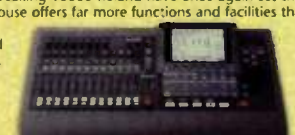
The most affordable digital 8 track on the market and that's official. Korg have long been at the forefront of synthesiser technology and now look set to take over the home digital recording market. This amazing boxes of tricks has effects, guitar and mic inputs, internal hard drive and SCSI, nothing else give you so much for so little. Destined to become a classic, order yours now.



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Roland MCS05

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sounding Off

History is littered with people who proclaimed that the latest musical development was 'just not music' — Mozart, rock & roll, and techno have all come under fire in the past. PAUL NAGLE would normally be the first to decry such conservative musical attitudes, but some of the latest developments in music technology have got him worried; the end results just don't seem, well, like music anymore...

As more and more products appear which are designed to minimise the effort of making music, I can't help but worry that we're on the brink of one shortcut too many. I'm all in favour of cutting the red tape between music and its creator, but what if the creator's very existence is threatened? Some of the latest instruments and computer programs provide the facilities for everyone and anyone to put together superficially great sounding tracks, almost instantly. No effort is necessary — just

assemble some ready-prepared building

blocks, and hey presto! Even the experienced composer/writer is

at risk, because the easy results are far too tempting to ignore in a tough commercial world.

The fear of an erosion of musical skill isn't a new one — it

happened when the synthesizer

first appeared. Experienced musicians

quaked in their boots and protested that this was the work of Satan and would put them out of a job. Orchestras would be pensioned off; other instruments would cease to exist. If you had a synth, ran the accepted wisdom of the time, you merely had to hold down a single note to sound wonderful; no musical training was necessary.

Well, time passed, lots of people held down notes, and it became clear that the synthesizer, with its arcane knobs and sliders, was quite a difficult instrument to master after all. What's more, it wasn't necessarily suitable for automatic use with just any kind of music. Synth manufacturers, eager to please — and successfully sell some of the damn things in quantity, of course — produced all manner of new varieties, with simplified controls, hundreds of stored sounds to get you up and running right away, and familiar keyboards, so pianists and organists could play them from day one.

Progress continues its onward march, and the most recent instruments, with their Dance or Groove labels, should eliminate forever the chances that anyone will buy the 'wrong' box again, although a look at the second-hand market, which is periodically clogged with 'yesterday's synths', hints otherwise.

What I'm suggesting is that when an artist's role is merely to cut and paste existing material, it's time to take a serious step back and ask ourselves what the point is. I can understand the justifications of someone who makes multimedia presentations and wants to 'knock up some music' themselves. But to create something lasting (and something for future generations to sample!), there's no substitute for inspiration, real musicianship, and good old-fashioned graft. Also, you often understand and remember something far better when you work it out for yourself. OK, so you may spend precious hours learning to master the settings on a compressor or struggling with a difficult chord sequence, but it can be time well spent — not least because if you do discover something amazing, you'll know how you got there.

I'm certainly not advocating that we undo all the advances we've made, or suggesting that anyone gives up their hi-tech toys. But both musical and studio skills are important, and it takes time to learn them. A shortcut might be the easiest way to get from A to B, but it's not always the best; by taking the fastest routes all the time, you're in danger of missing the most beautiful scenery.

Time and again, I am asked "what gear should I buy to make techno?" and "what effects box do I need to sound like The Prodigy?" but if you could just spend money to get musical talent, don't you think The Spice Girls would have done it by now? And if there is no effort on the part of the music maker, what enthusiasm can this generate in an audience, and how will the listeners judge between one artist and another? After all, if this music lark is really such a doddle, why should the audience bother to be an audience at all? Think about it.

SOS

If you'd like to air your views in this column, please send your ideas to: Sounding Off, Sound On Sound, Media House, Trafalgar Way, Bar Hill, Cambs CB3 8SQ. Any comments on the contents of previous columns are also welcome, and should be sent to the Editor at the same address. Email: sos.feedback@sospubs.co.uk

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