

Electronics &  
**MUSIC Maker**

MAY 1985 £1.20

INCORPORATING COMPUTER MUSICIAN



# BILL SHARPE

SHAKATAK KEYBOARDS  
& SOLO SYNTHS

## REVIEWS:

- AKAI S612 MIDI SAMPLER
- YAMAHA QX1 SEQUENCER
- TECHNICS DP50 DRUM MACHINE
- JORETH MUSIC SYSTEM
- YAMAHA TX816 MIDI RACK
- SEQUENTIAL MULTITRAK POLY
- KORG MR16 RHYTHM UNIT
- YAMAHA KX88 KEYBOARD

SEVERED  
HEADS

I-LEVEL

BOB  
MOOG

# CHECKLIST

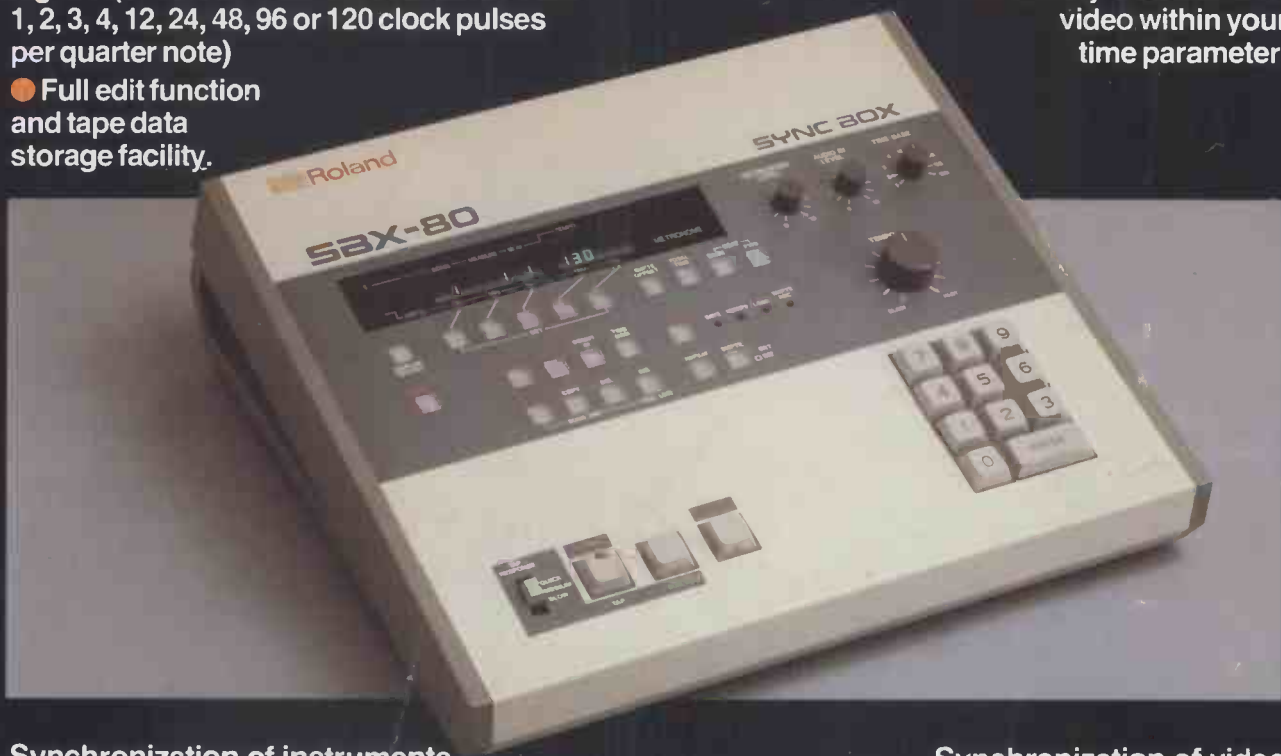
WE GIVE OUR VERDICT ON TODAY'S POLYSYNTHS

# A Programmable Tempo Controller That Reads and Generates SMPTE Time Code

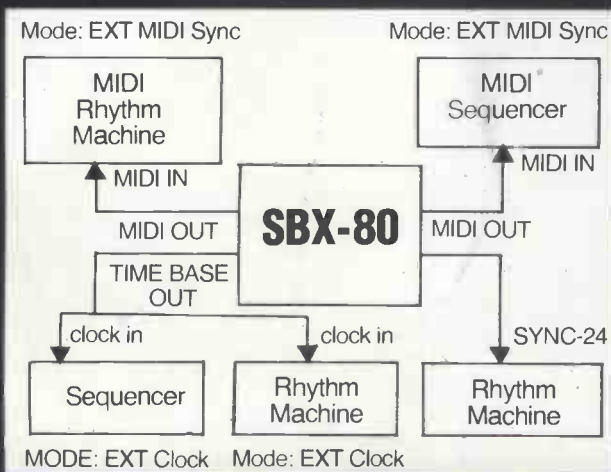
## SBX-80 SYNC BOX

### The SBX-80 – a programmable tempo controller

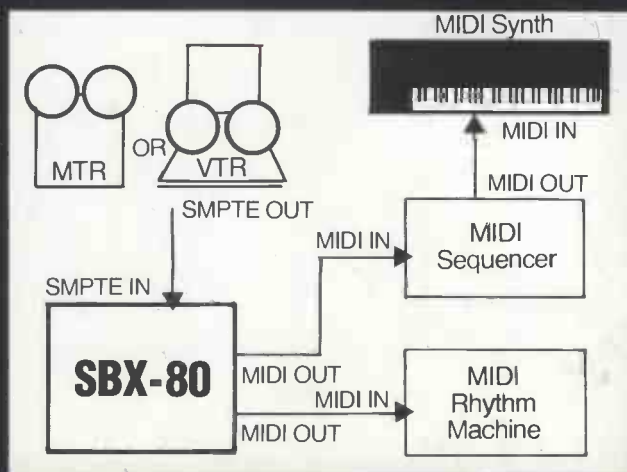
- Can synchronize electronic musical instruments that use different sync methods.
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#### Synchronization of video picture with music



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MUSIC UK REVIEW

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INTERNATIONAL  
MUSICIAN

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WHAT KEYBOARDS

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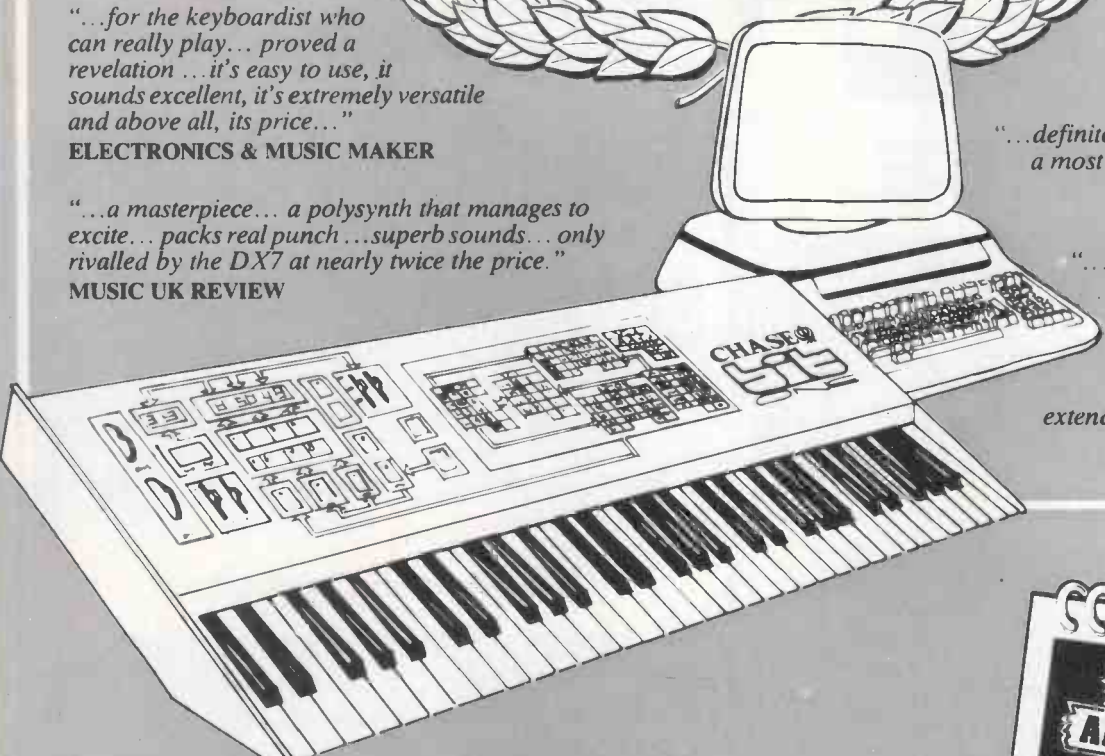
IN TUNE

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SOUNDS

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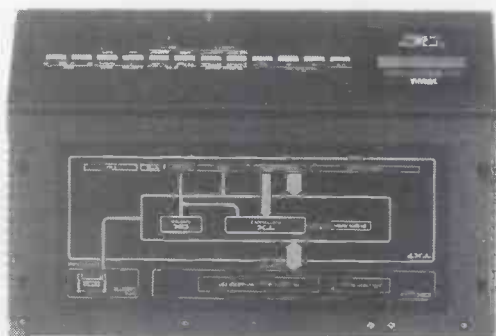
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# CONTENTS



E&MM May 1985

Volume 5 Number 3

## NEWS

- Comment** .....4  
Hats off to helpful manufacturers, plus E&MM new recruits.
- Interface** .....6  
More congratulation, criticism and query from the E&MM postbag.
- Newsdesk** .....8  
PPG distribution, Akai Active Audio Club, DX Owners' convention... If it's news, it's here.

## HARDWARE

- Akai S612 Sampler** .....10  
A real advance in the field of accessible polyphonic sound sampling. Tim Goodyer finds out if the 612's beauty is more than price-tag-deep.
- Yamaha TX816, QX1, KX88** .....17  
At last, a detailed appraisal of Yamaha's state-of-the-art MIDI system. FM rack, digital keyboard recorder and master keyboard come under David Ellis' careful scrutiny.
- Technics DP50 Drum Machine** ...26  
Technics attempt to marry the home-organ drum machine and the digital percussion computer. Success or failure? Dan Goldstein tells all.
- Korg MR16 Drum Voice Unit** .....28  
Simon Trask confronts a technological puzzle. Why have Korg put 19 digital drum voices in a box that contains no sequencing software?
- Sequential MultiTrak Polysynth** 37  
The Californians introduce a follow-up to the inventive but mixed-bag SixTrak. Simon Trask checks it out.

## CHECKLIST

- Polysynth Checklist** .....40  
The quick-reference equipment guide to end all equipment guides. In this, the Checklist's inaugural month, polysynths, expanders and controlling keyboards come under the E&MM microscope.

## MUSIC

- On the Level** .....44  
Session player, freelance producer and I-Level keyboardist Duncan Bridgeman discusses what it's like to



live in a recording studio for 11 months of the year. Interview by Dan Goldstein.

- Razor Sharpe** .....50  
First the BBC, then Shakatak, now a solo album: Bill Sharpe's list of Famous People is an impressive one. Dan Goldstein makes further enquiries.

- On Record** .....56  
Tim Goodyer reviews a selection of albums and singles from the current release list.

- On Cassette** .....58  
Readers and their music; another collection of demo cassettes examined by Tim Goodyer.

- City Slab Horror** .....62  
Severed Heads mainman Tom Ellard in conversation with Dan Goldstein -

no one in the modern music industry is safe.

## TECHNOLOGY

- TechTalk** .....64  
Robert Moog, the man who set the synth ball rolling in the first place, on the receiving end of questions from German journalist Henning Lohner.

- Short Circuit** .....68  
An add-on for last month's Time Machine project that allows direct synchronisation of the Yamaha RX15 and MC202.

- Powertran Software** .....70  
A utility program enabling storage of MCS1 sound samples on a BBC disk drive, among other things. Jim Grant and Tim Orr take us through it step by step.

- Back to Basics** .....76  
More on filters and envelopes from the educational pen of Steve Howell.

## COMPUTER

## MUSICIAN

- Editorial** .....81  
Computer music in modern education. Is it a mixed blessing?

- Rumblings** .....82  
Brings news of a new British sound sampling drum machine, a digital signal processor from Eventide, and more.

- Fairlight Explained** .....84  
Another world first for E&MM: Jim Grant takes us through the creation of a sound without using the CMI's sampling facility.

- Joreth Music Composer Software** .....88  
An extensive new MIDI software package from Worcestershire could well be the answer to many a Commodore owner's dream. Simon Trask has the details.

- The Art of Going Soft** .....92  
The start of a new series designed to guide musicians through the intricacies of computer programming. Jay Chapman takes the first steps.

...ive electronic ...u avan-  
... popular and mass media  
... this issue went ... pre-  
**COMMENT** ... significant  
... unexpected  
... The campaign  
... or to E&MM

# Mutual Assistance

Insisting on getting hold of new equipment for a reasonable length of time before passing judgement has been a strict E&MM policy more or less since the magazine's inception. The idea is that unless we have the time to test the gear thoroughly, our conclusions aren't going to be of much value to our readership. Clearly, there's little point jotting down a few paragraphs on the basis of a half-hour demonstration at a show: they simply aren't going to be worth reading.

But it's a policy that has its drawbacks. The first of these is that actually getting the equipment out of the grasp of its manufacturer can be a frustrating and at times utterly futile task, but once that hurdle has been overcome, a second starts to loom large on the horizon. What do you do if, for whatever reason, the equipment you've taken such trouble to get your hands on is lacking in some vital ingredient, like confirmation that it is exactly as the production models will appear, or appropriate documentation, or simply the leads to hook it up to an amp?

Well, the normal course of action is to get back in touch with the manufacturers. And that's where a couple of firms have been of immense assistance this month, helping us transform ill-informed, incomplete essays into accurate, comprehensive appraisals.

The first problem concerned Yam-

aha's top-notch FM production system, a costly but impressive set-up that has no overall title, but whose component parts - TX816-QX1-KX88 - read a bit like a Portuguese car number plate. Anyway, all three items of hardware arrived safely at the door of reviewer David Ellis some time before this issue went to press, something for which we were grateful enough. Only problem was, the good Doctor had no audio cables with which to connect the TX816 to his mixer.

'No sound, no review', we said to Yamaha, who responded by graciously sending about £100 worth of XLR-to-jack cables direct to David's London address. First panic over.

The second on our list of mishaps befell staff newcomer Tim Goodyer, who'd been given the unenviable task of reviewing a prototype Akai MIDI sampler. The machine - code number S612 - came without any official documentation of any kind, so there were bound to be a few technical questions we'd want to ask before publishing anything.

Fortunately, and through the good offices of Akai UK and their PR company, our questions were not only relayed to the Japanese but also replied to within a day or two after Easter. Giving us sufficient time to turn Tim's incoherent scribble into a piece of (reasonably) investigative journalism that actually makes sense.

Which brings me neatly to describing some assistance of a different sort, namely within E&MM's own hallowed chambers. For this issue sees the swearing-in of two new additions to the magazine's editorial staff, Tim Goodyer (who takes up the post of Music Editor) and Hardware Editor Simon Trask.

Actually, Simon's job title is a little misleading, because in addition to having overall control of E&MM's hardware reviews (you know, the bit at the front where we tell all those ever-so-helpful manufacturers where they're going wrong - and why), he'll also be applying his considerable software expertise to E&MM's *Computer Musician* section. And from the word go, there's been no reason to doubt Simon's enthusiasm for the task that lies ahead; he's already spent two entire nights working on reviews, the products in question being the Sequential MultiTrak and the Joreth software package.

As for Tim, he's now recovered from the shock of having the Akai sampler thrust into his unsuspecting hands on his first day in Cambridge, and from now on will be taking care of most of the artist interviews and related features that make up our Music section, as befits his title.

So with any luck, all I'll be responsible for on the June issue will be making sure the new boys can spell correctly, and trying to think of something interesting to say as a leader comment. Sounds great. ■

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Electronics & Music Maker is published monthly by Music Maker Publications, Alexander House, 1 Milton Road, Cambridge CB4 1UY. ☎ (0223) 313722. Typeset by Goodfellow & Egan, Cambridge. Printed by Thomas Reed Printers Limited, Sunderland. Distributed by Punch Distributors' Services, London. All material is subject to worldwide copyright protection, and reproduction or imitation in whole or part is expressly forbidden. All reasonable care is taken to ensure accuracy in the preparation of the magazine but Music Maker Publications Ltd cannot be held legally responsible for its contents. The Publishers cannot assume responsibility for the return of unsolicited manuscripts, photographs, artwork, or projects. Permission to reproduce printed circuit board layouts or to market kits commercially must be sought from the Publisher.

Subscriptions: UK £15.50, Europe & Overseas (surface) £16.20, Europe (airmail) £37.50. Binders: £3.95 (inc. postage).

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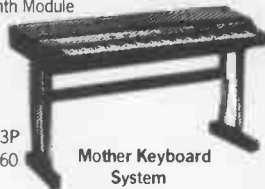
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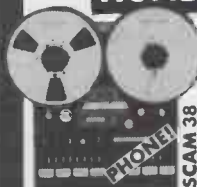
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to upgrade  
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polysynth. I've looked at the new  
of the

# INTERFACE

Write to: *Interface*, E&MM, Alexander House, 1 Milton Road,  
Cambridge, CB4 1UY

If you've a view, query or problem,  
write to E&MM at the above address.

We'll endeavour to answer every  
letter regardless of whether there is  
sufficient space for its inclusion in the  
magazine, so please include your full  
address and phone number, and don't  
worry if the reply takes a little while  
coming: some queries require more  
research than others.

## Zlatna 1

Dear E&MM,

I was very pleased to read your review  
of the Zlatna Panega ACS100 and  
TCS100 sampling peripherals.

However, it would be misleading to  
allow the British synth fraternity to think  
that the Frankfurt show was the first time  
anyone had seen these modest-looking  
but very capable pieces of equipment. I  
have been using two of these units for  
nearly two years now, complete with TCS  
thought-controllers, ever since I first saw  
them at the Bulgari Music Expo at the  
Kropotkin Leisure Centre in Plovdiv in  
1983.

I have made a few modifications of my  
own which have proved successful, the  
most useful of which was a modification  
to the MIDI interface to allow control of an  
array of MIDI instruments without using a  
keyboard or sequencer for pitch control  
of any compositional part or channel, so  
that very complex multi-timbral poly-  
phonic pieces can be created by thought  
input alone.

A colleague of mine (an Electronics  
Technician at GCHQ) also built an inter-  
face for the TCS100 to link it to my  
Yamaha CX5 computer, so now I have  
instant sampling of any sound I can  
imagine.

If anyone is interested in having copies  
of the circuit diagrams for these mods  
and interfaces, or a copy of my demo  
tape *Alexei goes to Dnepropetrovsk*  
illustrating the use of these units, I would  
be happy to oblige. Write to me at the  
address below. Nastarovia!

Andrej Smezlov  
2 Blacktop Lane  
Benhall GC29HQ4  
Cheltenham

## Zlatna 2

Dear E&MM,

Please send me the Zlatna Panega  
ACS100 & TCS100 as advertised in  
E&MM. The feature that really interests  
me is the two headphone socket facility –  
this must be the first unit to cater for us  
two-headed people. Please charge my  
PanGalactic credit card account.

Yours not very sincerely,

Zaphod Beeblebrox

PS. It's OK, guys – forget the order. The  
TCS anticipated my purchase, and the  
machine arrived this morning.

*All engineer Mikhail Beecherescu had  
to say regarding the amazing response to  
April's Zlatna Panega review was 'So  
long, guys, and thanks for all the fish'.*

## Sampler Damper

Dear E&MM,

I'm writing in reply to Martin Straw's  
letter in April's E&MM.

Basically, I agree. Sound sampling is  
the biggest drawback electronic music  
has ever witnessed. One of the basic  
ideas of electronic music was to create  
sounds that are both novel and unusual,  
yet still remain musical.

I don't think I'm alone in thinking that  
older analogue synths still have a lot to  
offer. Something like a Pro One might  
*seem* outdated to some people, but  
whether they like it or not, it's a synth that  
offers almost limitless possibilities. It also  
has a really extensive modulation system  
– just great for sound effects.

One reason I got into electronic music  
was because I wanted to be able to hear  
sounds which seemed totally alien but  
were used to produce interesting melo-  
dies and rhythms. These days, you buy a  
Jean Michel Jarre album and it's full of  
cellos that actually sound like cellos, just  
by virtue of the fact that they're Fairlight  
samples.

If a musician wants to use a cello (or  
any other acoustic instrument) why  
doesn't he just use that instrument,  
instead of going to the trouble of paying  
£20,000+ for a Fairlight when a decent  
cello can be bought for under £1000? It  
strikes me you could equip a fair-sized

orchestra for the price of a Fairlight, but  
does anybody do it? It would seem not.

Let's face it. Sound sampling is a  
complete and utter waste of time.

Paul Walker  
London

*Well, we can't deny a guy the right to  
speak his mind. Anyone care to put the  
case for the defence?*

## IEMA

Dear E&MM,

I'm generally impressed by your mag-  
azine, but am surprised no one informs  
you of the extensive electronic music  
activity here in the United States. There  
are thousands of musicians creating pure  
electronic music here, some of whom are  
very accomplished.

I run the International Electronic Music  
Association, a group of over 150 music-  
ians and enthusiasts helping one another  
in the trade since 1979. We publish a  
simple quarterly newsletter (entitled  
SYNE) covering the electronic music  
activities of the US and abroad. We're  
also planning a major expansion, both in  
membership and in our national distri-  
bution campaign to help undiscovered  
artists in the field.

We'd like to urge any and all electronic  
musicians to contact us. We offer free  
promotion via the magazine, free partici-  
pation in our Collective Music Project,  
and Co-Op Concerts planned in 1985.  
Membership fees for those residing with-  
in the US and Canada is \$12, rising to \$20  
outside the US and Canada.

Some of our members include inventor  
Harald Bode, Klaus Schulze, Synergy,  
David Townsend of USS, and Karlheinz  
Stockhausen. We'd appreciate it if you  
would mention us in your fine magazine.

James E Finch  
President  
IEMA  
PO Box 176  
Salamanca  
NY 14779  
USA

*Consider it done... Incidentally, the last  
issue we received of SYNE (March 85) is a  
20-page A5 booklet featuring a brief  
interview with German electronic music-  
ian Peter Kaminski, as well as record and  
tape reviews and news from around the  
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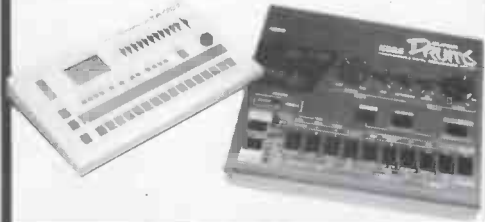
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# NEWSDESK

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## HARDWARE

Japanese audio company **Vestafire** have already made a name for themselves in the field of rack-mounting signal processing devices, and now they've made their entrance into the 'musical' effects arena with a fairly conventional range that includes the usual stereo chorus, stereo flanger, stereo delay and stereo phase footpedals. But what makes the range more interesting is that it's augmented by a curious 'Buff & Loop' pedal, which is an overdrive unit, loss compensator and effects loop switching box all in one. And as if that wasn't enough, there's the top-of-the-range



D1X, a double footpedal DDL with a 1024msec delay, 10K bandwidth, optional LFO and a price-tag of £176. The rest of the range cost between £35 and £80. Contact: *MTR Limited, Ford House, 58 Cross Road, Bushey, Herts WD1 4DQ.* ☎ (0923) 34050.

Also from Japan come **Ishibashi** ROM and RAM packs for Yamaha DX synths, which should be available from The London Rock Shop by the time you read this. The ROM has 64 preset analogue-style sounds along the lines of factory sounds 'Electric Organ 3' and 'Synthesizer Brass', while the RAM will accommodate 32 sounds, just like Yamaha's own. Both should cost around £59, and the number to call if you require further information is ☎ 01-267-7851.

## TECHNOLOGY

**Loughborough University** is to play host to a residential weekend course entitled *Music on the BBC Microcomputer* between May 31 and June 2. Computer music composer and author

Dr Kevin Jones will be at the helm, and the course promises plenty of 'hands-on' work to enliven the proceedings. Cost is £67, and further information is available from: *The Centre for Extension Studies, Loughborough University, Loughborough, Leics, LE11 3TU.* ☎ (0509) 263171 ext 213.

## STOP PRESS

Little more than a few months since the parent company launched itself into the synth world, **The Akai Active Audio Club** wishes to declare itself open for business. The aim of the club is simple: to encourage both amateur and professional musicians to share their interest in and experience of Akai equipment. Members will receive a membership card (remember Tingah and Tucker?), and regular newsletters to keep them up to date with the latest Akai news. Also planned are special offers, competitions, events, an instruction tape and a 'Swap Shop', whatever that may mean. Best of all, membership is free. Contact: *The Akai Active Audio Club, Akai UK, Haslemere Heathrow Estate, Silver Jubilee Way, Parkway, Hounslow, Middlesex, TW4 6NF.*

Still on the subject of clubs, the **Yamaha DX Owners' Club's** recent hi-tech convention in London's Covent Garden proved more successful than



Part of the software annexe at last month's Yamaha Hi-Tech Convention in London.

anybody could have dared to predict. Members and non-members alike were treated to impromptu demos of the entire Yamaha range of hi-tech hardware, and there was also plenty of activity on the software front, with exhibits from a number of specialist programming companies. So, hats off to the Club, everyone at Yamaha Kemble who took part, the London Rock Shop (who helped promote the event), and the Central London Youth

Project, in whose splendid premises the convention was held. Flushed with the sweet smell of success, Owners' Club boss-man Tony Wride says he's hoping to do something similar – though on a somewhat grander scale – to coincide with this summer's trade-and-public British Music Fair at Olympia. Watch this space.

Following the recent demise of **PPG UK** as part of company re-organisation – first reported in E&MM last month – **Turnkey** have now officially been named as the new UK distributor. So now you know. ☎ 01-202 4366.

And still on the subject of PPGs, London's **Paradise Studios** are attempting to live up to their name by adding one of the German computer music systems – amongst one or two other things – to their existing Fairlight CMI. The Fairlight itself already boasts the latest Page F add-on and the company of a Prophet 5, a couple of DX7s, blah...etc. But don't rush off to be ill just yet: the Paradise people are anxious to point out that all the above equipment is available for use at no more than the flat studio rate. If that sounds like the idea of Heaven, dial ☎ 01-747 1687 for further details.

**Cactus and C-ducer** are taking to the road over the coming weeks to demonstrate the Cactus digital electronic drum kit (complete with new voices such as cymbals and claps) and the C-ducer contact mic's many musical applications. The tour's emphasis is on education, and the seminars will cover such areas as triggering and sampling techniques. Dates are: April 20 – Musical Exchanges, Birmingham; 27 – Hessey's, Liverpool; 30 – Salop Music, Shrewsbury; May 4 – Sound Control, Edinburgh; 11 – Sound Control, Glasgow; 18 – Wisher's, Derby; 25 – J G Windows, Newcastle upon Tyne; June 1 – Gough & Davey, Hull; 8 – Hudsons Music, Sheffield.

**Arbiter Musical Instruments** are now handling the business and UK distribution rights of **CBS Fender UK**. The new owners are 'confident of a continued and prosperous future' for the company, though where that future will leave the suddenly silent Chroma Polaris polysynth, we're not entirely sure. Anyway, the company can still be contacted on ☎ 01-805 8555 if you have any enquiries.

And finally, **British Telecom** are now the proud owners of a Revox B77 reel-to-reel machine, which has replaced the company's A77 for recording the new speaking clock before digital encoding. The A77 is 17 years old but still going strong, so anyone after a secondhand bargain should phone 123 immediately! ■



**NEW**  
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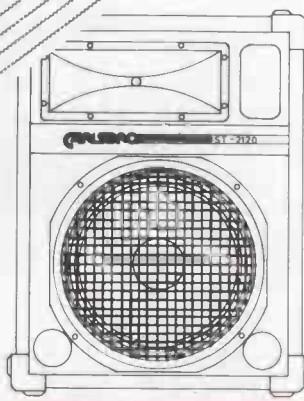
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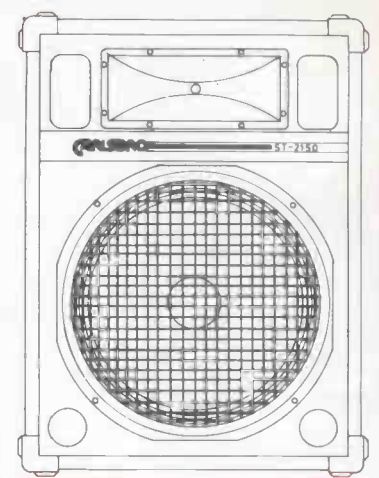
<b>Technical Specifications</b>	
Useful Frequency Response	70 Hz to 18 KHz
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Nominal Impedance	8 ohms
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Enclosure volume	51.4 litres
Dimensions	Height: 46cm Width: 65cm Depth: 29cm
Weight	31 Kilos



**ST2120 ▲**

A compact powerful cabinet designed to incorporate high performance with portability. Equipped with a powerful 12" cast chassis high-efficiency loudspeaker together with a carefully selected Radial Horn.

<b>Technical Specifications</b>	
Useful Frequency Response	60 Hz to 20 KHz
Rated Power (EIA/R5426A)	100 watts
Nominal Impedance	8 ohms
Sensitivity at 1W at 1M	103 dB
S.P.L. at 1M at Rated Power	122 dB
Crossover Frequency	5 KHz at 12 dB/octave
Enclosure volume	42.2 litres
Dimensions	Height: 56cm Width: 43cm Depth: 30cm
Weight	22.4 Kilos



**ST2150 ▲**

The age old problem of getting a good bass response whilst still retaining portability is now resolved with the new ST2150. Incorporating a specially selected professional 15" loudspeaker together with an efficient Radial Horn the cabinet produces a full crisp and natural sound with an excellent dynamic range.

<b>Technical Specifications</b>	
Useful Frequency Response	50 Hz to 18 KHz
Rated Power (EIA/R5426A)	150 watts
Nominal Impedance	8 ohms
Sensitivity at 1W at 1M	103 dB
S.P.L. at 1M at Rated Power	124 dB
Crossover Frequency	5 KHz at 12 dB/octave
Enclosure volume	73 litres
Dimensions	Height: 66cm Width: 50cm Depth: 35cm
Weight	28 Kilos

**ST8100 ▽**

Designed for use with the ST8180 as a complete system, the ST8100 may also be used independently. An excellent Sound Pressure level (S.P.L.) and Sensitivity together with good bass response provide a flexibility of approach not available with other systems. Two 10" 100 watt studio loudspeakers together with two Radial Horns provide the power behind this excellent compact cabinet.

<b>Technical Specifications</b>	
Useful Frequency Response	50 Hz to 20 KHz
Rated Power (EIA/R5426A)	200 watts
Nominal Impedance	8 ohms
Sensitivity at 1W at 1M	103 dB
S.P.L. at 1M at Rated Power	126 dB
Crossover Frequency	5 KHz at 12 dB/octave
Enclosure volume	75.6 litres
Dimensions	Height: 51cm Width: 76cm Depth: 31cm
Weight	38.8 Kilos

**ST8180 ▽**

A massive 18" 200 watt loudspeaker mounted in a finely tuned bass cabinet provide a remarkable bass response down to 35Hz. XLR connections are provided for 'Input' and 'Link'.

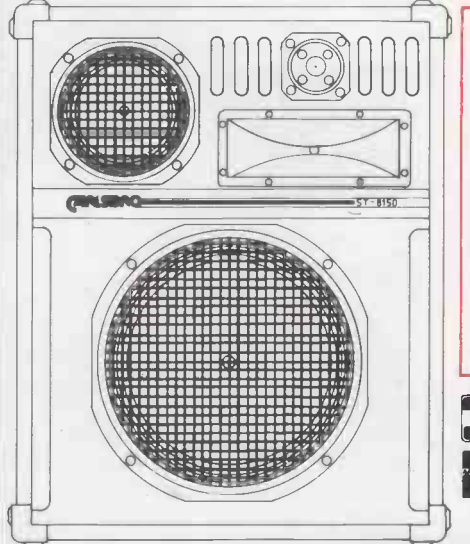
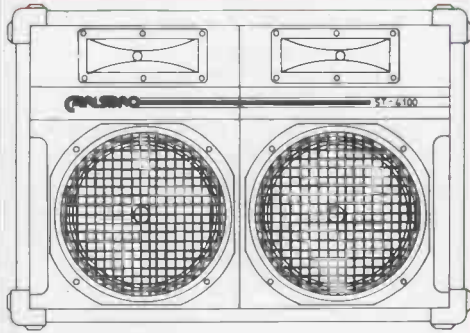
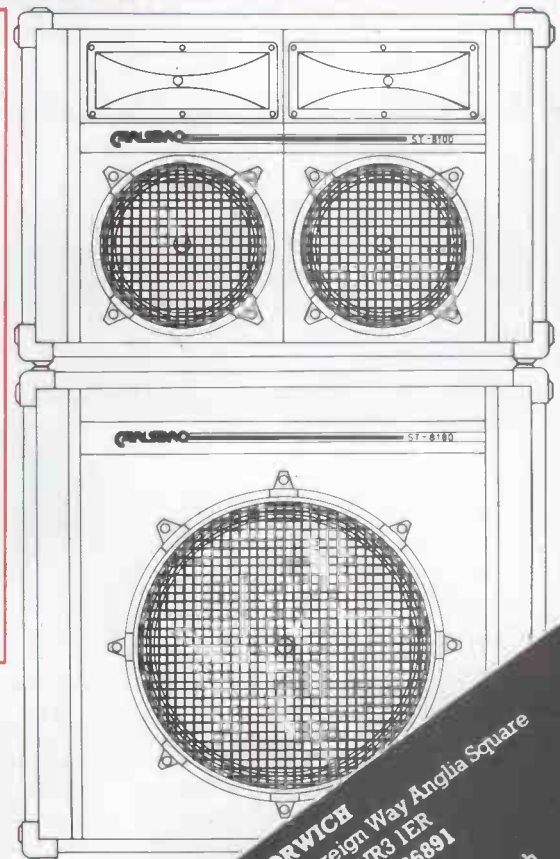
<b>Technical Specifications</b>	
Useful Frequency Response	35 Hz to 2 KHz*
Rated Power (EIA/R5426A)	300 watts
Nominal Impedance	8 ohms
Sensitivity at 1W at 1M	100 dB
S.P.L. at 1M at Rated Power	124 dB
Crossover Frequency	300 Hz at 12 dB/octave
Enclosure volume	184 litres
Dimensions	Height: 71cm Width: 76cm Depth: 54cm
Weight	48 Kilos

\*With Crossover none operative.

**ST8150 ▽**

The ultimate in all round performance, the ST8150, a Four Way cabinet, will transform your sound with unbeatable clarity and projection. Its almost unbelievable full range gives a smooth response from 20-Hz to 20KHz making it a natural for quality installations. The superb performance is achieved using 15" and 8" studio quality cast chassis loudspeakers together with a Radial Horn and the highest quality H.F. unit.

<b>Technical Specifications</b>	
Useful Frequency Response	20 Hz to 20 KHz
Rated Power (EIA/R5426A)	300 watts
Nominal Impedance	8 ohms
Sensitivity at 1W at 1M	103 dB
S.P.L. at 1M at Rated Power	123 dB
Crossover Frequency	2 KHz and 4KHz at 12 dB/octave
Enclosure volume	92.7 litres
Dimensions	Height: 77cm Width: 62cm Depth: 37cm
Weight	40 Kilos



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# HARDWARE

## Akai S612

### Polyphonic MIDI Sound Sampler

The first affordable polyphonic MIDI sampler comes from synth newcomers Akai. But as our tests have shown, their lack of a music pedigree has had no effect on the machine's operational success.

*Tim Goodyer*



Up until a couple of months ago, the art of sampling and manipulating sound was pretty much restricted to those with either outrageously expensive systems such as the Fairlight CMI, or personal computer systems – such as the Apple-based Greengate DS3 – that had ownership of some sort of home micro as a prerequisite to their use. With the notable exception of the Powertran MCS1, there was no product that attempted to offer a sampling facility to the keyboard player of modest means who already had an existing synth set-up. But then came the Frankfurt show in February, and the astonishing revelation that Akai, a giant of an industrial organisation but scarcely anything more than a newcomer to the world of music, were about to introduce a MIDI Digital Sampler that looked like being the answer to many a

modern keyboard player's dreams.

The machine in question? The Akai S612, a six-voice, 2U-high 19" rack-mounting unit, designed for external control by a MIDI keyboard or sequencer and offering a facility for saving sound samples using the company's own 'Q-disk' system, though more about that later.

We now know the S612 uses 12-bit sampling, has a playback frequency response of 25Hz to 20KHz, and has a comprehensive specification that allows pretty extensive control over the sample once it's been stored. Adjustable parameters include start and end points, overdubbing and sample looping.

Rumour has it that the 612's internals have more in common with a couple of pre-existing sampling machines than its manufacturers might be willing to admit.

Remember a year or so back, when Syco Systems were selling quaint little sampling boxes with names like 'Instant Replay'? Well, the company that designed and manufactured the Instant Replay (and its more expensive brother, the Super Replay), US-based Electro-Harmonix, recently got into a spot of terminal financial trouble, leaving Akai to burst in on the scene and purchase the rights to manufacture the Replay circuitry. Which would explain the 612's remarkably short gestation period (from vague rumour to pre-production prototype in less time than it takes to boil a kettle – well, almost).

By a strange quirk of fate, 'pre-production prototype' is exactly the term I'd use to describe the state of E&MM's review model (which is why I've just used it), because although its front panel looked positively scintillating, a quick look at the back revealed a decidedly half-finished appearance. Unless, of course, Akai are seriously contemplating selling a unit that has a bit of masking tape stuck underneath its DIN sockets with the improvised legend 'MIDI In, Out, Thru' scribbled over it in biro...

### Sampling

Beauty before utility, however: let's begin with that front panel. This gives you a choice of either Mic or Line input jack sockets, and a Record Level control with which to adjust the sample volume in accordance with the LED level meter that sits in the panel's centre display section. It also provides you with a Monitor Level control, should you wish to hear just what



it is you're sampling. Once the signal level has been adjusted to suit, Record mode is selected by pressing either the 'New' or 'Overdub' switches, depending on whether it's to be a completely new sample or simply an addition to an existing one.

The recording is initiated either when the level of the sound to be sampled triggers the S612 automatically, or when you trigger it manually using an appropriately-marked socket – this is also provided on the front panel. The stored sound can then be heard by playing it from the keyboard of the controlling MIDI instrument, though we're reliably informed that production versions will incorporate a switch allowing the choice of simple triggering from the front panel or remote triggering from another instrument.

It's the pitch of your intended sample that would seem to be the key to all this, as a low-pitched offering results in the appropriate Record LED flashing slower for longer (up to eight seconds, in fact), and a high-pitched one in it flashing faster but for a shorter period (pay attention, I'll be asking questions later). The consequent recorded sounds are consistent in their tuning (the review model gave results a little under a semitone flat with reference to the host keyboard, the tuning being adjusted from the front panel by means of a rotary pot that affords control over approximately a semitone sharp or flat). This arrangement is actually a lot harder to explain than it is to use, and once you've got over the culture shock of having so many important technical decisions taken out of your hands, it works extremely well.

## Sound Quality

Time I stated the obvious. It should be common knowledge by now that the well-worn motto 'garbage in, garbage out' applies as much to sound-sampling as it does to any other hi-tech process. Bearing that in mind, if you're using a microphone to channel audio information into something like the S612, it follows that the quality of the resulting sample will be to a large extent dependent on the quality of the mic. That said, the results I obtained using what I suppose you'd term a 'reasonable' quality mic (a Fostex M505, in fact) were agreeable to the point of making the final result dependent more on the quality of the sample being attempted than anything else. So as far as this particular sampling machine is concerned, you should get half-decent results so long as you steer clear of anything really grim in the microphone department.

Line signals, on the other hand, are inherently easier to handle from the sampler's point of view. They're of better quality from the outset, since you remove the physically strenuous conversion of air movements into electric signal by starting off with electricity in the first place. And you'll be glad to know that the Akai behaved itself remarkably well on both

conventional musical instrument signals (like the output from a synth, for instance) and sounds from records (a teeny bit naughty, I know, but fun all the same), though one point you need to bear in mind if you're undertaking the latter task is that you have to provide a mono signal from your record or tape deck. That is, if you want to avoid discovering that the sound you wanted to sample is predominantly on the stereo channel you left unplugged.

In answer to the inevitable question – yes: quantisation noise was audible on a number of samples, but it doesn't generally become prohibitive so long as you set an appropriate input level at the sampling stage.

## Manipulation

But, and this might be the most crucial point of all, the Akai doesn't just provide

'Quantisation noise was evident on a number of samples, but it doesn't generally become prohibitive if you set an appropriate input level at the sampling stage.'

the means to make good samples. It also allows you to manipulate samples once they've been made, and the list of manipulation options from which you can choose is pretty extensive. First off, you can set the sample's start and end points using – logically enough – two slider controls marked Start Point and End Point. The Start Point slider is graduated from 0% to 100%, whilst its End Point counterpart gives you a choice of both positive and negative end points on a centre-zero slider, graduated from 0 to 30 units at each extreme. This makes it possible to play through the sound backwards, simply by setting the Start Point some way into or at the end of the sample, and the End Point at or near the start of the sample. Easy!

Now, all this is achieved using the Akai's 'One Shot' setting, as opposed to the 'Looping' and 'Alternative' options that are also offered as part of what is endearingly termed 'Sustain Mode'. The Looping option allows looping of the sample from the point marked by the Start Point slider to the point marked by the End Point one. Note that this section only plays *forwards* and then repeats. The reason I point that out is that the 'Alternative' setting runs through this section of sample first forwards, then backwards, then forwards again *ad nauseum*.

If you set your Start and End Points with some care (and this takes a bit of experience as well as a large slice of common sense) you can achieve reason-

ably glitch-free looping in both Looping and Alternative modes, the main advantage of the Alternative setting being that it gives twice as long a section of sample (which is only half as repetitive, if you see what I mean) before reaching the start of the loop again. Not wishing to offend the sensitivities of anybody who might be interested in doing something 'experimental' with the sampling process, Akai have thoughtfully made it equally easy to so arrange the Start and End Points of the sample to give pure, unadulterated glitch. Just what you always wanted, huh?

However, no matter how carefully you set the sliders, and no matter which of the two looping modes you're using, it isn't possible to loop a sample for its entire length. How great a drawback (if any at all) this represents is up to you to decide as a free-thinking, free-creating musician, of course. Personally, I wouldn't lose any sleep over it, as I place more importance on having the reverse effects that can be achieved in One Shot mode using the technique described above.

That's just about it as regards the mechanics and aesthetics of sampling with the S612. Didn't think it would be so simple, did you? We haven't finished yet, though.

To begin with, a small but effective output section gives you, the lucky user, the following collection of sound-controlling goodies. First off, a Filter with which you may lop the upper frequencies from your sample (to help eliminate problems caused by aliasing); then a Decay control, which determines the decay time after the release of a key (provided that the sample hasn't reached the end set by the End Point control – if you're in One Shot mode); and finally a Level control, to turn down the volume of your sample (*about time you found that – Ed*).

## LFO + MIDI

Yet another manipulative device provided on the S612 is a fairly standard Low Frequency Oscillator – LFO for short. Its associated parameter switches allow control over its Rate, Depth and Delay using three appropriately marked rotary pots. This should need little further explanation, except to say that it's certainly capable of adding an indefinable sonic something to certain types of sample that needed dirtying, for want of a better expression.

What a pity, though, that the LFO waveshape is fixed as a sinewave (or possibly a triangle masquerading as a sinewave?), since it would have been interesting to have been able to compare the relative effects of sine, square and ramp (to name but three) waveforms on everyday acoustic sounds. A facility for using an external source as the modulating oscillator would have been nice, too, but I suppose you can't have everything.

The MIDI facilities on the S612 need little said about them. As the more alert amongst you will already have guessed

from my hint-dropping during the masking tape episode, there's one of each of MIDI In, MIDI Out, and MIDI Thru sockets provided on the rear panel. These linked the 612 with no bother at all under test with a Casio CZ1000 and a Korg Poly 800, which is certainly encouraging.

On the front panel are three switches marked 'Mono/Poly', 'Channel Up' and 'Channel Down'. The precise purpose of the Mono/Poly switch is a little uncertain, but it *appears* to give the 612 the facility of mono or poly working in a MIDI context. Quite what this provision is for, I don't quite know, as although it's expected that production S612s will have separate outputs for each of its six voices, it'll still only be able to hold one sample (or a combination of samples merged together to form one sound) at any time. Maybe time – and further product development on Akai's part – will tell.

The MIDI channel switches are a little easier to explain: all they do is select the receive/transmit channel from one of ten (0-9) available, though why Akai should have chosen this figure instead of the full 16, I'm not sure.

The performance-oriented amongst you will be pleased to know that both pitch-bend and note velocity (values of between 1 and 127) are recognised as incoming MIDI information, though afterwards is not.

In addition to all the other items on the review model's rear panel were two unmarked pushbuttons and an LED. A little investigation revealed these switches to be a party to octave transposition over no fewer than five octaves. The precise details of this function remain shrouded in mystery, despite diligent investigation and extensive enquiries to the appropriate authority, namely Akai in Japan. The only information forthcoming from our normally reliable – but this time strangely cautious – sources was an assurance that the switches would break their cover and appear on the *front* of the production model.

## Sample Storage

You'd be right in thinking that there's little point having sampling and manipulation facilities as extensive as these *without* some means of storing the sound permanently. And as I've already mentioned, Akai will shortly be offering just such a facility in the form of their Q-disk (quick disk) system. The drive will link up with the outside world using two connectors on the 612's rear panel, one for information transfer and one for the required eight-volt power supply.

The Q-disk (model number MD280) is also a 2U-high, 19" rack-mounting affair, and will be sold, initially at least, only as a package with the S612. The MD280 will store two samples per 3.5" disk (one on each side) and have a retrieval time of a couple of seconds. Not bad, assuming it turns out to be reliable, though bear in mind that at about £2 a throw, disks are

never going to be a particularly cheap storage medium.

The 612's disk control section resides directly beneath the three MIDI control switches in the middle of the front panel.



Reading left to right, these take the familiar form of Save, Verify and Load, and having succumbed to a passing urge to press one of these switches, I was greeted with a lone 'c' appearing in the area of the central display (Save or Load) corresponding to the switch pressed, but no further activity. This leads me to the inevitable but ultimately disappointing conclusion that the dump won't work

'With an anticipated price of £1350 including quick disk drive, the S612 does a fair bit to bring polyphonic sampling into the 'affordable' category.'

without the drive for which it was designed. That'll teach me not to live in a fool's paradise.

## Summary

All in all, the Akai S612 is a very welcome addition to the world of digital sound sampling and, with an anticipated retail price of around £1350 including the Q-disk, does a fair bit towards bringing polyphonic sampling into the 'affordable' category. And the music world being what it is, it probably won't be long after the package's June appearance that its actual selling price goes down further.

There remains the ulcer-inducing question of reliability, of course. Can you be *sure* that when you play that vitally important link from the atmospheric

introduction of your latest masterpiece to the first million-selling verse, the sound you hear *will* be an eerie Aboriginal chant, and not the backwards car engine from the previous number? Since the review period wasn't really long enough to test for long-term reliability, I can't do anything more concrete than say the 612's construction and layout don't suggest it'll ever be a problem. Come to think of it, mistakes are far more likely to occur due to human, rather than technological, error.

Incidentally, another project currently in Akai's collective mind is the creation of a central sound library, comprising the disk equivalent of a series of factory presets. It's envisaged that there'll be an initial archive of 25 disks (and therefore 50 samples) from which S612 users can choose. So now you needn't actually do any of your own sampling at all, you lazy thing.

I imagine Akai are rather keen to develop the sampling system's market as quickly as possible, hence the 612's rush-release and the advent of the Akai Active Audio Club (see this month's *Newsdesk* for details). Because it can't be long before a lot of rival manufacturers come up with competing machines that do a very similar job, robbing Akai of their current (virtual) monopoly and introducing some welcome variety to the sound-sampling marketplace.

Until then, the S612 has certainly introduced some variety on its own account. It's not an Emulator beater, but so long as you're prepared to put up with its limited bandwidth and maximum sample time (and at this sort of money, you ought to be able to), you can't help but be impressed by it.

So now there's a truly viable, polyphonic, MIDI-equipped alternative to cutting up bits of tape in the hope of recreating Peter Gabriel's favourite Fairlight samples. I have only one more point to make. Whatever you do, don't sample scratched records – your ears will never forgive you. ■

*Further information on the S612 and MD280 from Akai UK, Electronic Music Division, Haslemere Heathrow Estate, Silver Jubilee Way, Parkway, Hounslow, Middx TW4 6NF. ☎ 01-897 6388.*





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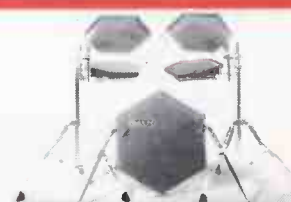
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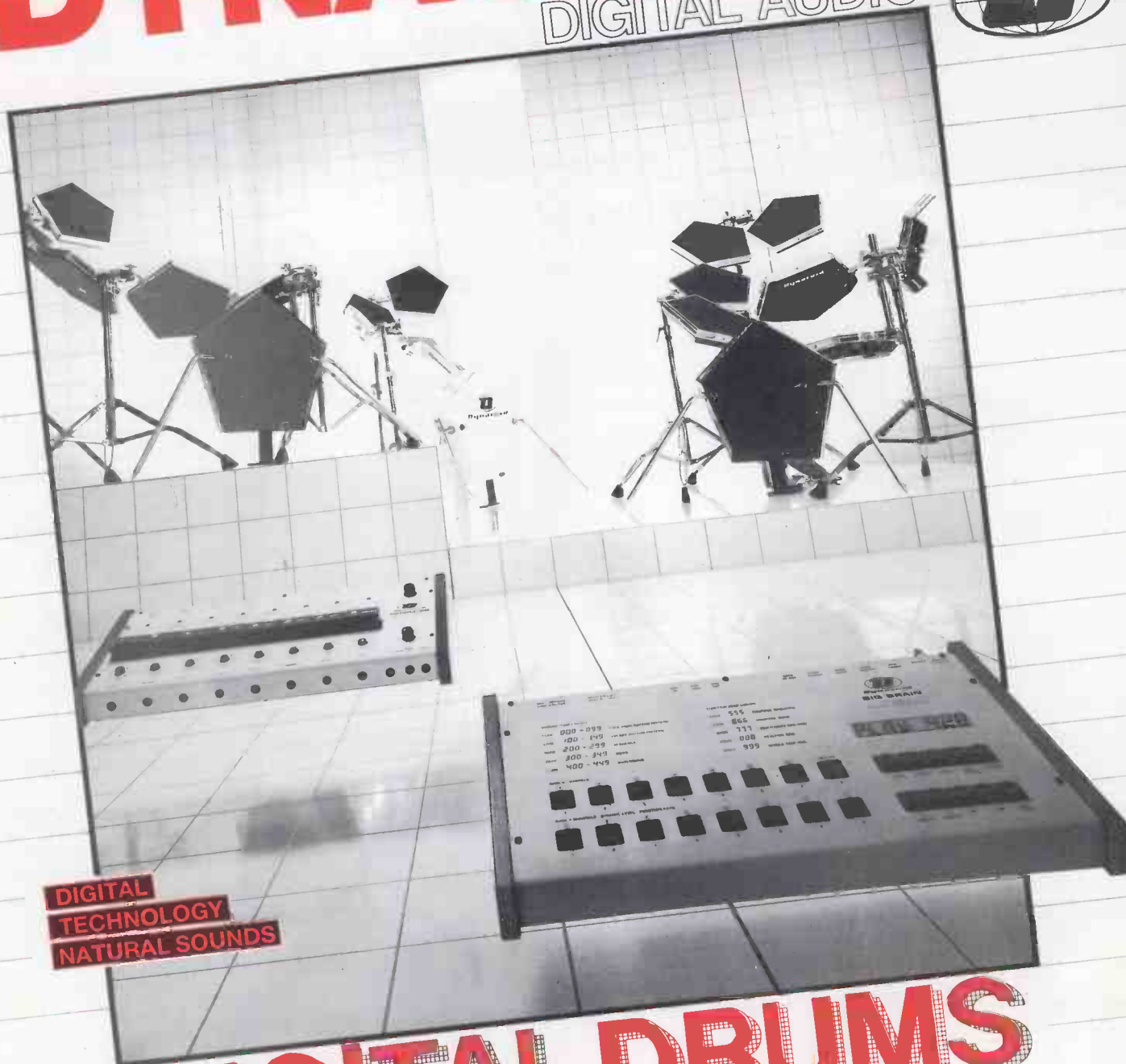
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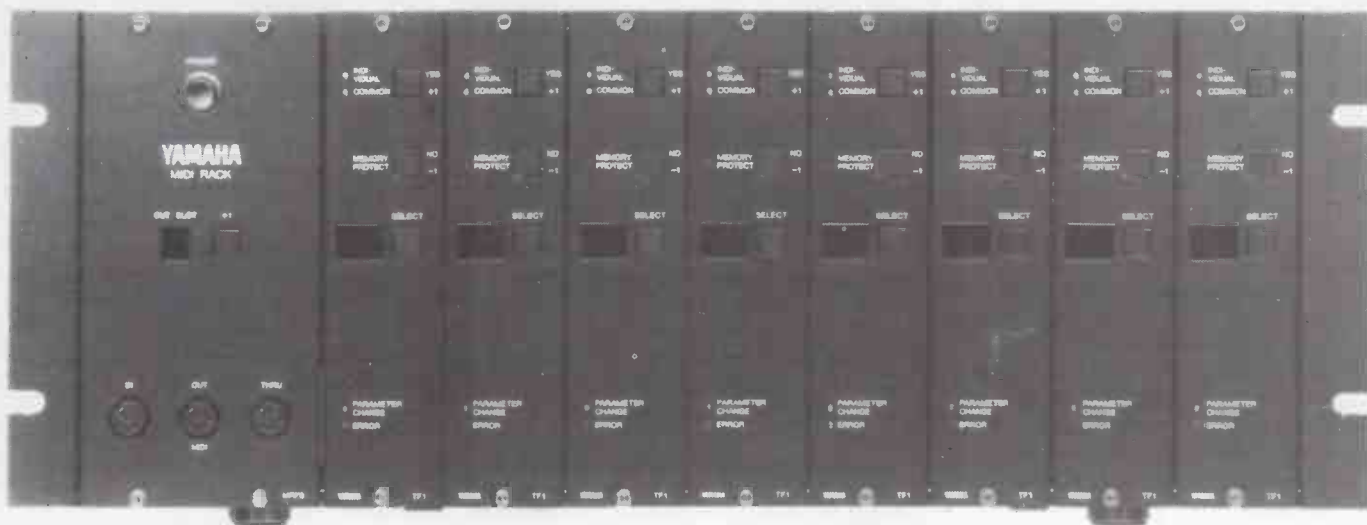
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# Yamaha X-series MIDI System

TX816 Rack, QX1 Digital Sequencer,  
KX88 Master Keyboard

We take an extensive look at Yamaha's flagship modular MIDI system. The verdict? It's probably the most expensive, most complex and most impressive such set-up currently available. *David Ellis*



Reviewing the TX816 is a bit like taking a Formula One racing car out for a spin in the rush hour – there's an awful lot of oomph under the bonnet waiting to be released, as and when life and limb isn't standing in the way. And indeed, if a sonic replica of Le Mans is what takes your fancy, there's no doubt the equivalent of eight DX7s hidden behind the TX816's rack-mounting fascia is capable of doing that whim justice, and with vengeance, too. But you can have too much of a good thing, and it's a moot point as to whether a collection of eight DX7s is actually eight times better than just the one.

Still, if the prospect of eight digital cylinders isn't exactly what grabs you, there's always the more sedate FM synthesis starting-point in the shape of the TX216, the double-DX7 version of Yamaha's flagship unit. You can tell it's the flagship by virtue of the solidly professional construction, the equally professional array of XLR audio connectors on the back panel, and the complete absence of anything like summed mono or stereo outputs. This caused some consternation in this reviewer's household, as XLR connectors are in short supply. Initial comments from Yamaha that I ought to go out and buy some more weren't exactly greeted with enthusiasm, but eventually they warmed to my plight

and provided a wodge of XLR-to-jack leads. Thanks for that, chaps.

## Modular Concerns

But whether it's the TX816 or the TX216 that's in front of you, the hardware is basically the same – there's just less of it with the latter. Specifically, what the £4250 RRP for the TX816 gets you is a rack frame unit, the MRF8, and eight TF1 synth modules that slot into the aforementioned. On its own, said MRF8 doesn't do very much apart from sit blackly in the style of an Arthur C Clarke monolith. Well, it does keep the universe ticking over by virtue of a clock or two and a power supply, but that's about it. Either way though, the means to the modular rack-mounting end doesn't come cheap. Armed with the information that it's £1899 for the TX216 and £449 for each TF1 module (goodish value, really), a simple bit of maths leads you to the realisation that the MRF8 is costing the best part of £1000. Which isn't quite such good value, to put it mildly.

Anyway, aside from the XLR audio out, there's also an individual MIDI In and MIDI Thru at the rear of each TF1 module, and then at the front, a handful of switches and LEDs. Whilst keeping the MIDI Ins at the back of the unit is undeniably a good way to avoid cluttering up the nice clean frontage of the TX816

with such irritating things as five-pin DIN sockets, I don't think many users will thank Yamaha for their aesthetic principles once they find themselves searching in the dark for the MIDI orifice at the back of a 19" rack. All that *could* have been avoided by duplicating the MIDI Ins on the front panel, but then, I'm not part of Yamaha's mighty corporate design logic. To be fair, the front panel of the TX816 does have a MIDI In, but this is merely the common MIDI In bus that all the TF1 modules share by virtue of being plugged into the MRF8.

But ere I go deeper into the TX816's multifarious ins and outs, how about some synthetic food for thought? Well, as far as the sound of the TF1 module is concerned, it's identical to a DX7 – right down to the 16-note monotimbral polyphony and the much-criticised carrier noise. So you'd expect the innards of the TF1 to be identical to the innards of a DX7, wouldn't you? You'd be wrong. Because what you have to remember is that all the keyboard-encoding circuitry on the main DX7 board is jettisoned, the power supply is supplied by the MRF8, and there's no need for the front panel PCBs that drive the LCD and interpret your finger prods on the purple, green, and brown front panel pads of the DX7.

And what's left isn't really an awful lot – a PCB measuring about 10" by 7", to be

precise – and on that there's the same brace of 64-pin VLSI FM chips that's in the DX7, four 5118 CMOS RAMs (one more than in the DX), a 16K 27128 ROM, a seemingly custom processor (marked 'HD6303') that seems to incorporate both the means for MIDI Receive and Transmit (an ACIA, in other words) and an I/O port, and all manner of chips serving underlying logic and latching, 12-bit digital-to-analogue conversion, and low-pass filtering. All very nicely put together, all very sonically impressive, and all very Yamaha.

The one area that's a slight departure from the DX7 (and where the extra RAM chip on the TF1 board comes in) is connected with what actually gets stored for each of the 32 voices. On the DX7, you're restricted to just the standard 145 parameters that make up the basic guts of the sound. With the TF1 module, the extra RAM means that there's also space for storing 25 performance parameters (or 'function data') for each voice. These

'My best judgement tells me the TX816 isn't the best way of going polytimbral, but my ears tell me I'd sell my grandmother to get hold of one.'

include such delights as portamento, glissando, modulation wheel setting, foot control, and breath control. Definitely a positive move, that.

## Programming

Because each TF1 only has three switches and a two-character LED display on its front panel, programming of the 32 voices that can be stored in each module's battery backed-up RAM isn't quite the self-sufficient process it can be on the DX7. In fact, to edit the TF1 voices you'll need either a DX7, a CX5M with DX7 voicing program, or a more or less plagiaristic equivalent running on some other micro. What the limited controls on each TF1 do allow you to do is switch between four modes – Play, Edit, Store, and Utility.

Switching on the TX816 automatically engages the mode, and what appears on the display is the current voice number. If the top push-button on each TF1 is pressed to switch the input of all eight modules from individual MIDI In to common MIDI In, then connecting the MIDI Out of a DX7 to the front panel MIDI In of the TX816 will parallel all eight TF1s to the MIDI data from that keyboard. And whether it's simply playing the DX7, using performance controls, or making voice changes, all eight of the TF1 modules will follow suit in an identical fashion.

But that's only Play mode's ground state. By going into the three sub-modes for Play (you press the switch next to the LED display once, twice or thrice in rapid succession), it's a simple matter to

program each TF1 module for the desired MIDI Receive channel, Omni on or off, and fine or coarse tuning. And although you can follow Yamaha's suggestion of de-tuning all eight modules for a 'drastic improvement or enlargement of the sound', you might also feel that turning a £4250 box of tricks into a chorus unit to end all chorus units isn't the most profitable pastime in the world.

Moving on rapidly to Edit mode, we find three more sub-modes (logical lot, the Japs). First off is one that allows you to select a program number for editing from a DX7 or voicing program-equipped micro. Next, there's the means for adjusting the output level of a particular voice. And last but far from least, we come across the 'limit lowest key/limit highest key' sub-mode. Now this really is interesting. Basically, it provides the wherewithal for allocating each voice in the TF1 to any region of a DX7 or other MIDI keyboard. By spreading all eight modules across the keyboard, with suitable parameter variations to mimic the pitch-dependent variation in timbre added along the way, this is the means of simulating the sort of multisampling approach made famous by the Emulator and Kurzweil 250. Mind you, it takes a lot of work to get the crossover from one module to another just right, so it helps if your name is Dave Bristow. In fact, the aforesaid's 'road show' has as its *pièce de résistance* a stunningly realistic grand piano created on the TX816, with the KX88 (see later) for keyboard input.

And so it's on to Store mode, where we've again got three sub-modes to explore: 'select destination' (to which of the 32 voices you want new voice or function data to go to), 'store voice and function' (self-explanatory), and 'store only function' (ditto).

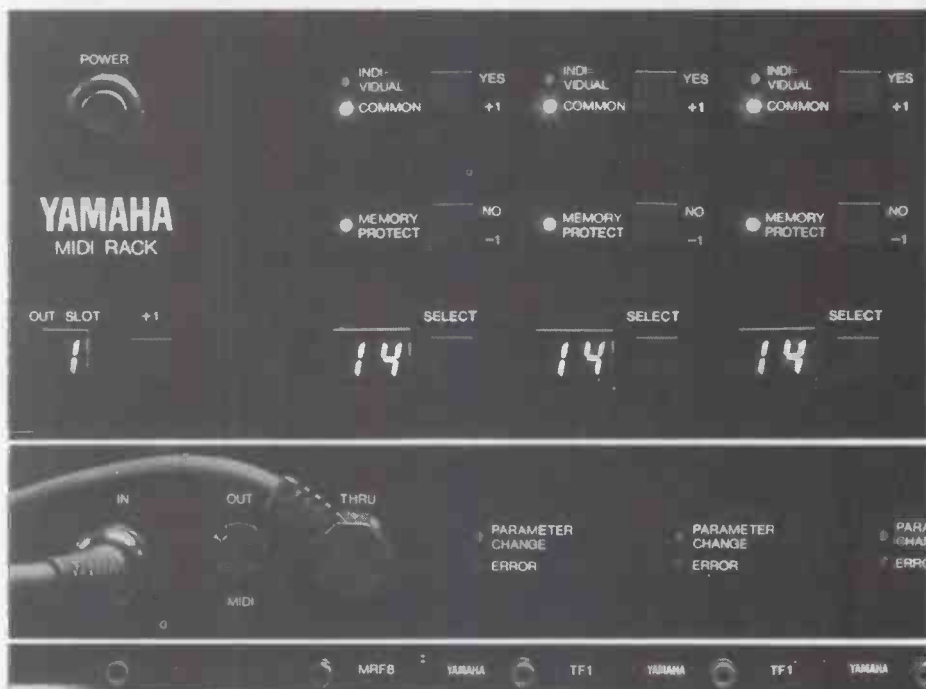
Which leaves Utility mode as the last on the TX816's spec sheet – and this time, there are four sub-modes. First along the line is 'dump all voices and functions', which allows you to dump all

the voices and functions in each TF1 to a waiting DX7, QX1 disk drive, or fellow TF1 elsewhere in the rack. As Yamaha put it, 'dumping does not mean that the data is removed from the TF1's memory'. And roast beef and carrots to you, too. Next, there's 'clear and initialise all functions' for resetting the performance scratch-pad, followed by 'audio check' (which outputs a 440Hz sine wave at -4 dBm for setting-up purposes – a nice touch) and the sublimely fascinating 'read out current voltage of battery'. And that, ladies and gentlemen, is the TX816 in a nutshell.

## Impressions

In some respects, the TX816 belongs to the school of design philosophy that believes in using a sledgehammer to crack a nut. If you want a unit that'll play 128-note polyphony with a maximum number of eight different timbres at once, then fine, but there are more cost-effective ways of playing eight different voices simultaneously. True, Yamaha have explored the cheaper side of polytimbral synthesis in their highly successful CX5M computer, but for whatever reason, they appear reluctant to follow this up in their more up-market equipment. Mind you, from a commercial point of view, it's not hard to speculate why. If each TF1 module was capable of operating in Mono mode, thereby allowing 16 monophonic lines to be played with 16 different voices, the TX216 with two TF1s would seem like a gift from Mount Olympus, leaving the TX816 in the River Styx as an example of monumental overkill.

Fortunately, eight TF1s going full pelt do sound mightily impressive. Which leaves me in something of a quandary: my best judgement tells me that the TX816 isn't the ideal way of going polytimbral, but my ears tell me that I'd sell my grandmother to get hold of one. Actually, there is no quandary now – my grandma's sold already!







**T**he QX1, on the other hand, is a rather different kettle of fish – it doesn't really have any sort of precedent, either from Yamaha themselves or from any other company currently engaged in MIDI sequencer activities. To start with, it's the first sequencer that makes a stab at parallel MIDI buses. And just as important is the jettisoning of recalcitrant cassette interfaces and dubious data recorders in favour of a decent double density disk drive (try saying *that* when you're seeing pink algorithms). But not all is sweetness and light. The major question has to be whether or not it makes a lot of sense producing a hard-wired MIDI sequencer for the hardly insubstantial sum of £2499, when personal computers that could in theory do as much for a lot less are positively in abundance – and with the added benefit of a proper display, more memory, and a less idiosyncratic QWERTY keyboard, too.

Because no matter what Yamaha might want you to believe, the QX1 is nothing more nor less than an eight-bit (6809 processor) micro with 64K of RAM; an extremely non-standard keyboard (neither QWERTY, DVORAK, nor anything else known to man or mouse); fairly vestigial display facilities (a two-row by 40-column LCD); highly specialised I/O circuitry (the eight parallel MIDI Outs, one each of MIDI In and Thru, tape sync, click out, and foot switch); and an 800K (formatted) 5.25" disk drive.

## Modus Operandi

Starting off with the QX1 is simple. You switch on, wait for the 'Welcome' message on the LCD, and then insert a disk into the disk drive. Pressing `<ENTER>` then starts the QX1's exploration of the data on the disk. If it's a disk that's never been in the machine's clutches before, you'll receive a 'Conflict disk' error message and be offered the chance of initialising the disk so that it and the QX1 can talk to each other. 'Initialising' involves dividing up the disk's total surface into manageable regions (or sectors), the locations of which are then stored in a special area of the disk called a directory. This keeps the QX1 well informed as to what's living

where on the disk. However, because the QX1's disk drive is quite generous by 5.25" disk storage standards, this initialising process takes time – several minutes, in fact. Once it's done, though, the disk is ready and waiting to receive various blocks of data as and when they're created or stored by the user.

Before we get around to considering what forms these blocks of data can take, it's worth getting accustomed to some snippets of the English language that Yamaha have seen fit to bend in the direction of their sequencing endeavours. For starters, sequences are known as 'Banks', each of which can contain up to 999 measures. Within each Bank, there are eight individually overdubbable Tracks, and each of these can be sent off in the direction of separate MIDI Outs to the individual MIDI Ins of the TF1 modules in the TX816, or indeed any other MIDI equipment you may have to hand. Finally, Banks can be linked together into 32-step Chains, in which each step can be either a single Bank or up to 32 repeats of a Bank. So, two of the possible data formats that can be stored on the disk are the Bank and the Chain. And there's space in the directory for 32 of the former and eight of the latter, the theoretical maximum for all that amounting to 80,000 notes. Not what you'd call peanuts, exactly.

The other data that can be stored on disk relates to using the QX1 with the TX816 (or TX216, of course). This comes under the heading of 'Bulk' data, and in the case of the TX816, comprises eight sets of voice parameters (Bulks 1-8) and eight sets of function values (Bulks 9-16). In fact, a further option is provided for storing all that goes to make an RX11 drum machine tick on disk, though not being an aficionado of such things, I didn't pursue that avenue of data storage.

## More Modes

Returning to starting points, we find four basic modes of operation - Record, Play, Edit, and Utility. Accessing any of these is simply a matter of pressing the relevant key on the top line of the QX1's right-hand keypad. Following the typical

stab-in-the-dark approach of the average musician, pressing `<REC>` results in the following info being displayed:

```
RECORD MODE PROT:1 USE:003K
BANK01 PIANO... TEMPO:086 TIME:04/04
```

Now, most of those display contents are pretty self-explanatory. The first part of the bottom line indicates that it's Bank 1 that's under scrutiny, and that the name allocated to that Bank when it was stored on disk was 'Piano'. Earth-shattering stuff, that. Move number two is to see what else is on tap in the bottled Banks, and that's achieved by finding the Up and Down cursor keys on the left-hand keyboard and manipulating them accordingly. The display will then scroll through the 32 possible Bank entries, with corresponding changes for the Bank number and name, preset tempo, memory usage, and time signature. That leaves the cryptic `PROT:1`, which merely indicates that the Bank has been protected from accidental erasure by idiots like yours truly who make a point of pressing buttons before reading manuals. Sensible lot, Yamaha.

## Recording

Recording a sequence is actually a piece of cake – until you start trying to get all flashy and sophisticated, anyway. The first thing the manual uses to re-attract your attention after all that disk initialising palaver is the opportunity to indulge in a 'quick demonstration' of the QX1's real-time recording. Which all goes to show that Yamaha have their heart(s) in the right place. After all, the last thing you want is to be obliged to sit through endless renditions of this or that megastar's greatest hits before actually getting down to using the thing.

So, going from the previous Record Mode display, you choose your Bank (0-32), assign it a name (and hunt for the alphanumeric characters dotted so liberally about the QX1's keypads), check that the memory protect is off (`PROT:0`), whiz the cursor along the display to enter values for Tempo and Time, press the `<CLICK>` key to switch on the click-track (output from a jack at the back of the QX1), and then jab `<ENTER>` to get into Record Ready status. Pressing `<RUN>` then gives you a two-bar count-in; and anything after that gets stored away in the QX1's 64K internal memory as Track 1 of the chosen Bank – until the `<STOP>` key (or its associated footswitch) is pressed. Remember that what's recordable also includes all the performance data you care to throw at the QX1. And with the KX88 in the MIDI driving seat, that can even extend to whatever System Exclusive data takes your fancy, as we shall soon see. So, if you've always wanted to play a line of notes with a gradually evolving filter cutoff or decaying modulation index, this is the way forward. Which is another reason why that 80,000-note storage comes in so handy...

The logical follow-up to all that is to go for a playback, so you jab at the `<PLAY>`

key. This conjures up the message **EXECUTING NOW!!** on the LCD. All this actually means is that the previously recorded data is being shifted onto said disk so that all is not lost should you or the world go berserk listening to the abysmal squeak the disk drive makes. Pressing **ENTER** then retrieves this data from the disk, moving you on to the Bank Play Ready status, and keying **RUN** starts the playback itself. Twiddling the Tempo Controller knob varies the speed of the Bank playback, pressing **REPT** repeats the playback (indefinitely!), and the **TRNS** key allows you to transpose the playback from the octave of keys at the front of the main keypad. The squeak stays the same pitch, though.

But that's only for starters. Where the QX1 really scores is in the many and varied ways in which it transforms the humble sequencer into a really powerful composing tool. The point is that, unlike the QX7 - the more affordable face of Yamaha MIDI sequencers, which achieves overdubbing by a track bouncing operation and which was reviewed in last month's E&MM - the QX1 has just about every facility you could want for creating complex, multi-part pieces. But there's a price to be paid for all that, namely the complexity of the 34 sub-modes, or Job Commands, required to mediate between your creativity and the QX1.

Commencing with overdubbing, the QX1 offers two options; either literal

‘The QX1 doesn't really have any sort of precedent, either from Yamaha themselves or from any other company currently engaged in MIDI sequencer activities.’

overdubbing (pressing **REC**, once you're happy with the first take of a Track, takes you back into an ongoing Record situation for an overdub), or track-mixing overdubbing (using Job Command 14 in the Utility mode, but then, you'd guessed that already, hadn't you?). What's more, you're able to choose where you want the overdubbing to start - a welcome break from the wretched machines that oblige you to go back to Bar 1 every time you want to do anything new to a track. And that also includes deleting notes, because included in the long and winding list of Job Commands is the means for deleting an entire Track (Job Command 15) or just a single measure (Job Command 20).

## Multitracking

But the QX1's main claim to fame, and what's likely to motivate most people into purchasing it, is the fact that you can also record in sync onto each of the eight separate Tracks in the sequence Banks, and then pipe these individually off to the

eight MIDI Outs *à derrière*. Which is why Yamaha are quite correct in claiming that the QX1 is 'just like an eight-track tape deck' - it's the output individuality that really counts here. Again, there are some Job Commands involved: first, Job Command 3 in Play mode, which programs 'terminal assign' (the MIDI channel you want assigned to each Track), and second, Job Command 2 in Record mode, which switches Tracks between Record and Playback functions.

The other side of the sequencing coin is Edit mode. Although you may question Yamaha's suggestion that 'editing on the QX1 is a truly exciting creative experience', you can't deny the QX1's editing facilities are comprehensive, to say the least, and they also provide the entry point to something equivalent to step-time sequencing.

First off is the means of 'examining music data'. Having selected a Bank for editing by pressing **EDIT**, the standard **EXECUTING NOW!!** (talk about a death wish...) message is followed by a new one proclaiming something called **INCREASABLE SPACE**. Sounds great - though it may or may not make sense to you. Actually, it tells you how much data you can add to an existing Bank. Pressing the Up cursor key then



allows you to step through the events on the chosen Track of that Bank, and the display illuminates accordingly at the same time as the note is actually played:

```
MEASURE:014 STEP:04/04 CLK:0044/3844
F..4 .... mp 077 1362 0000 060
```

To be honest, all that's likely to be pretty indecipherable unless you're a member of the QX1 *cognoscenti*. Going along the top line first, there's the measure number, the step number, and the clock number. Along the bottom, we have the note name and octave, the dynamics of that note, the note number, the gate time, and finally, the volume number. But even at this stage, all these parameters can be altered simply by moving the cursor along to the relevant part of the display and manipulating the Up and Down cursor keys to scroll the values. Easy, really. But not exactly what I'd call 'truly exciting' if you're attempting to edit an entire symphony or LP of notes.

The next editing possibility comes under the heading of 'Clocks, Steps, and Quantizing'. Or at least that's how Yamaha put it. Briefly, the QX1 handles musical events on the basis of timing units equal to 1/384th of a quarter-note. As a result, a semiquaver or sixteenth note is 96 clock pulses, a quaver or eighth note 192 pulses, and so on. However, by heading for Job Command 6 in the Edit mode, you can choose how you want to divide up measures into clock pulses,

which can't be bad.

Finally, we arrive at the areas of QX1 sequencing endeavours that fall under the aegis of the **INSERT** key. The first way of using this is to add voice changes wherever and whenever you want in a particular Track. For those into step-time antics, however, the Insert sub-mode provides the means for entering music data that's never seen the light of day on a DX7, KX88, or any other MIDI keyboard. In fact, this is Yamaha's means for creating 'sophisticated digital music, with only minimal knowledge of music theory'. This end is achieved by using a) the octave of pitch keys on the main keypad for the note, b) the row of keys above these for the note length (which includes triplets, quintuplets, or whatever), and c) the **ENTER** key to register these choices with the QX1. The clock will then move on to the next position by an amount equal to the note that's just been entered. And if you want a rest rather than a note, it's simply a question of pressing the rest key rather than a pitch key.

But **INSERT** doesn't stop there. The post-grad programming side of the QX1 allows you to do all manner of tricks on a per-note basis, though it's certainly a tough life for the old mind box. Take a decko at the following display, for instance:

```
INSERT :021 STEP:04/04 CLK:0001/0384
D..2 /4-3 .ff 002 0192 0256 106
```

Like the man said, a lot of numbers begging for elucidation. Well, it's measure 21 that's under scrutiny this time, and we're currently on step 4 of a four-step measure. That's the easy bit. Things get more difficult once clocks (CLK) come into the picture. The second figure (0384) indicates there's that number of clock pulses in a step, and the first figure (0001) indicates on which clock pulse of a step that note actually begins. Then, underneath all that maths, there's the note name and its octave, the duration (/4-3 indicating a triplet quarter note) entered from the QX1's duration keys, the dynamic, the MIDI equivalent of the note (002 in this case), the gate time in terms of numbers of clock units (192 here, indicating a 'gate on' time of 75%), the note length in clock units (256 for a triplet quarter note), and then last but not least, the MIDI velocity value.

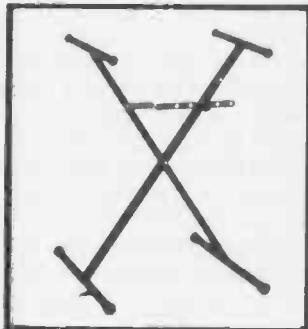
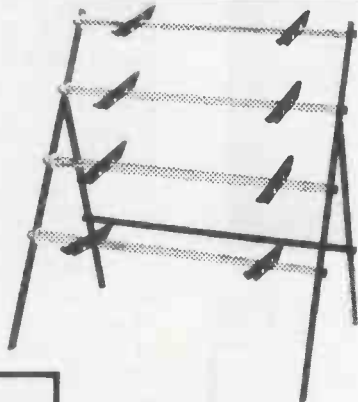
Take your time recovering from all that, because things aren't too bad in practice. The reason? Well, the QX1 follows a sort of default system for a lot of the step-time entries. So for instance, both **STEP** and **CLK** are nominally set to the values shown above, the gate time is set at 80%, and the note velocity assumes a value of '064' unless told otherwise. Which leaves you, the musician, to concentrate on the more manageable side of musical data, and the other **INSERT** options of adding tempo changes, control changes, pitch-bend, and even System Exclusive data anywhere within a Track.

Having assembled a Bank or two of notes, you have to decide exactly what you want to do with them. Play mode



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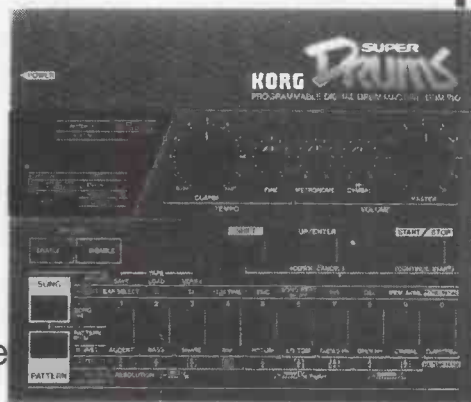
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holds most of the answers, specifically in the areas of various Job Commands and sub-modes. For instance, Job Command 2 in Play mode allows you to select particular Tracks for playback and, at the same time, whether or not you want an external sync source to play a part in the proceedings.

However, it's in the Edit and Utility modes where the lion's share of Job Commands is to be found. Of particular value on the creative side of editing are Job Commands 7 and 8, which allow you to copy measures within the same Track and transpose them. Then there's Job Command 10 ('Clock Move') for shifting part of a Track by a selected number of clocks — one way of getting unusual echo and timing effects. On the Utility mode side of the business, a fair proportion of the Job Commands is involved in the general housekeeping side of using the QX1 — changing disks, making back-up copies of disks, changing disk IDs, assembling Banks into Chains, deleting Banks and Chains, and so on. And don't forget the very useful Job Command 14, which mixes Tracks between Banks.

But it's also in this neck of the woods that we find the means for shifting System Exclusive data to and from the QX1 (Job Commands 16 and 17), and the provision for passing voice and function data between the QX1's disk drive and a TX816, DX1, or DX7, or even allowing an RX11 a look-in on the disk drive's action.

The only drawback here is that loading up all eight TF1 modules in the TX816 with

'Thinking ahead to using the QX1/TX816 combination on stage, it seems a bit thick not to have provided some way of loading the whole kaboosh of TX816 data in one go.'

data takes a fair amount of time, because each has to be loaded up separately with both voice parameters and performance data. Thinking ahead to the musician using the QX1/TX816 combination on stage, it seems a bit thick not to have provided the means for loading and saving the whole kaboosh of TX816 data in one go.

## QX Conclusions

Let's make no bones about it: the QX1 is a magnificent sequencer. But it's also a classic example of fairly cheap computer technology being hard-wired into the format of a rather expensive musical tool. And bearing in mind the imminent emergence of cheap, high performance 16-bit micros with ultra-sophisticated and user-friendly front ends, it's a difficult juggling

act to tip the balance of performance vs. cost in the direction of the Yamaha.

Aside from the squeaking disk drive, which is bad news on a machine of this price, my main qualms rest with a) the choice of processor, which surely doesn't have a chance in hell of adequately servicing eight separate MIDI buses to the 128-note polyphony extent of the TX816's capability, and b) the rather limited display, which makes life more difficult than it should be on a unit that sets out to do as much as the QX1.

As far as the former criticism is concerned, this is where only time and experience will tell. After all, filling eight 16-note polyphonic tracks isn't the sort of thing you do in your lunch hour, especially when you've got to write a review of this length. So I'd have welcomed hearing some of the demo pieces shown on page 33 of the owner's manual to see what someone with more time to hand was able to coax out of the QX1 — particularly the Philip Glass piece with a quoted duration of 3 hours! But again, this wasn't to be. Which begs the question as to why Yamaha seem to like teasing their manual readers with demos that appear to be lost in another time dimension...

But it's the display that's the major disappointment. As you'll have noticed from the review, there are an awful lot of Job Commands scattered around the four modes of the QX1's operation, which, quite understandably, involve a lot of shifting between different displays. However, if Yamaha had come up to date and used one of the larger LCDs now gracing all manner of lap-held portable micros (including those of Japanese origin), then most of this brain-muddling would have been avoided, simply because 'soft' keys around the display could be programmed to take on the mode-specific functions of particular Job Commands. Mind you, even better would have been the facility to connect the QX1 up to a decent monitor like every other micro under the Western sun. Ah, well. ■



**B**y contrast, the KX88 looks positively conventional. Don't get me wrong: the last member of Yamaha's grand triumvirate is grand indeed. But it's also possibly the least contentious of the three. After all, an 88-note remote keyboard with the luxury of real wooden keys, after-touch, and velocity is hardly breaking new ground. Well, as it happens, the KX88 does go a good deal further than most when it comes to

extra facilities for adding 'performance' to whatever's perpetrated on its rather wonderful keyboard. And those factors alone will probably ensure its popularity, even given the hefty price tag of £1399.

The main problem with the KX88 is the daunting complexity of its many and varied functions. And in typical Japanese style, the manual hardly improves matters with its page after page of functions in this or that mode. Mind you, after

wading through three other manuals for the TX816 and QX1, I've got good reason to feel the pinch of functional overload!

But starting simply, we find three modes — Play, CA (for assigning pre-defined MIDI controller codes to the various KX88 controllers), and PA (which allows you to define your own controller codes to suit whatever MIDI equipment you're using with the KX88). Next off is the fact that the KX88 can operate on two



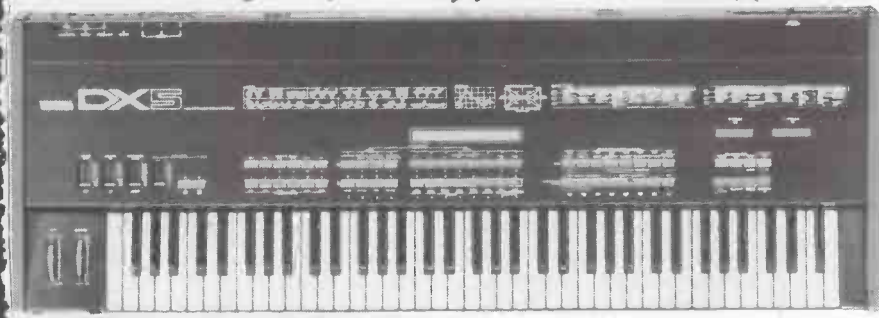
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MIDI channels simultaneously via 'MIDI Bank A' and 'MIDI Bank B'. In fact, you can choose between three different Play modes, courtesy of this duality: 'Single' (in which note information is sent via

'The really remarkable thing about the KX88 is the way it attempts to be all things to all men – and that includes other manufacturers of MIDI instruments.'

either Channel A or B), 'Dual' (in which MIDI data is piped by both Channels A and B), and 'Split' (in which events are sent off in opposite directions on either side of a split point). But remember that you won't be able to realise the delights of keyboard splits unless you've got access to MIDI equipment that's at least bitimbral. (And in Yamaha terms, this is where the TX816 or TX216 steps into the KX88 picture.

Now, aside from the obvious flexibility of being able to define your own split points, Play mode also activates a mind-boggling number of potential performance controls, including the two wheels to the left of the keyboard, the BC1 breath controller, after-touch, four sliders to the

left of the front panel, two foot controllers, five MIDI send pads (MS1-5), and two footswitches. That's 17 in toto. No wonder there are rumours spreading that Yamaha will be bringing out a MIDI-controlled robot to look after all those controls while you take care of the playing...

The really remarkable thing about the KX88 is the way in which it attempts to be all things to all men (and women, I guess). Just for a change, that includes manufacturers of other MIDI instruments. For instance, we all know that the voice banks for the DX7 and TX816 run from 1-32. So, on that basis, you'd assume that that's all the KX88 would bother about in the way of voice changing. Not a bit of it. In fact, the KX88 has two voice bank modes – one for 32-voice equipment and another for synths of the 128-voice Roland ilk.

However, contrary to what some have read into the KX88's features, this generosity doesn't quite extend to having all the different System Exclusive data for different machines encoded in as standard. That really would be asking too

'When you consider that most systems in this price bracket are still making do with 16 digital oscillators and one MIDI Out, there's no doubt Yamaha have a winner on their hands.'

much. However, what you are able to do is program in the Parameter Changes and Universal Parameters that your particular synth is programmed to respond to, and then apply these to all 17 of those performance controls. Of course, that means searching through manuals and getting to grips with the basics of hexadecimal coding, but Yamaha make it just about as easy as they reasonably could, given the present diversity of MIDI equipment.

## System Conclusions

As a total computer music system, Yamaha's grand trio is capable of creating what are beyond question some of

the most stunning sounds around. When you consider that most of the systems in this sort of £8000+ price bracket are still making do with 12 or 16 digital oscillators and a single MIDI Out, there's no doubt that Yamaha have something approaching a winner on their hands.

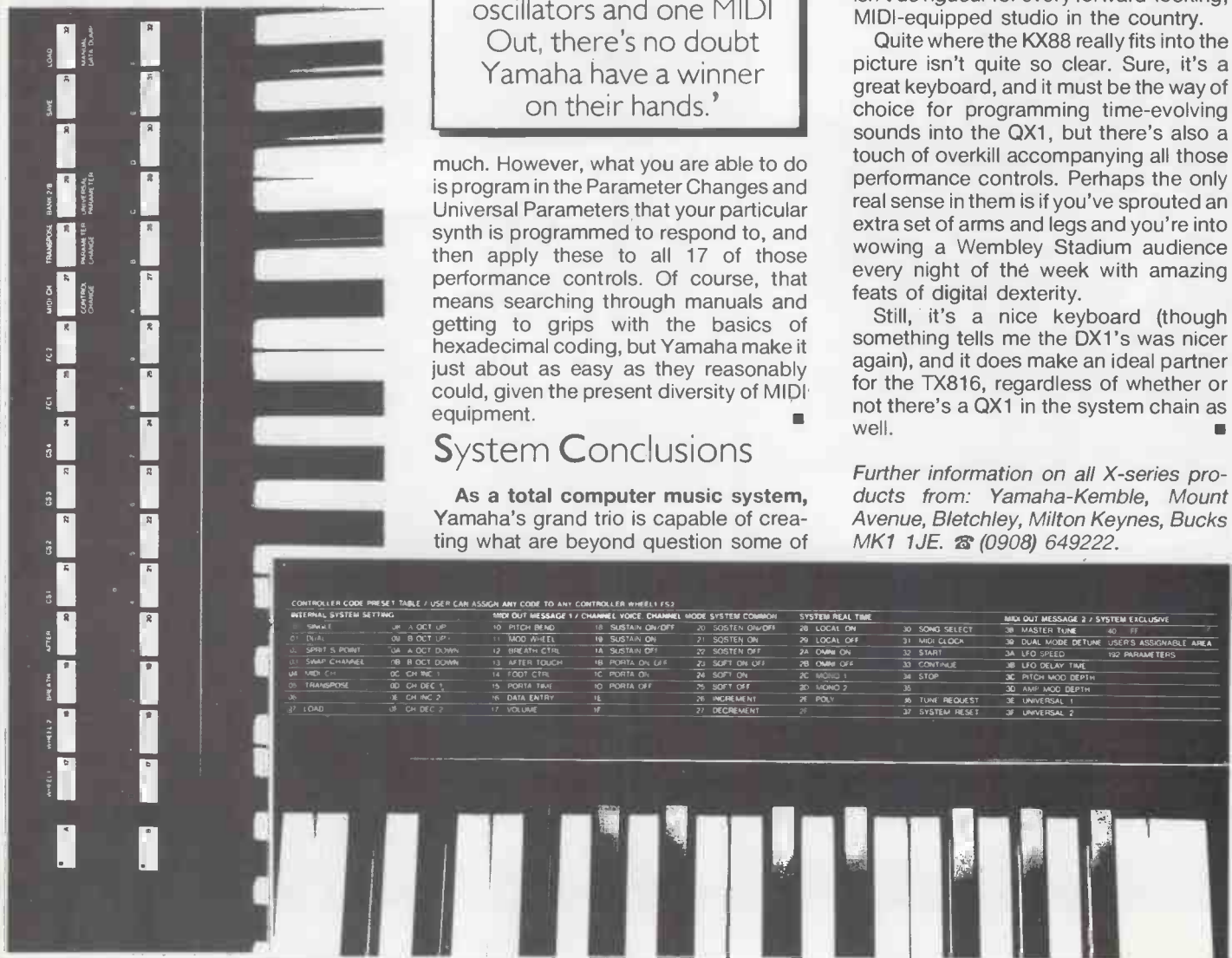
But there are problems. The TF1 modules should have moved on a bit from the monotimbral and somewhat noisy DX7. The fact that Yamaha simply transplanted the DX7 FM synthesis circuitry into the TF1 smacks of taking the easy way out, which is a crying shame bearing in mind how incredible the TX816 could have been given a little more of the company's undoubted brilliance at R&D in this field.

The QX1, on the other hand, is a much more difficult part of the system to get into. Undoubtedly, it has a huge potential for creating very complex music – if that's what you're into. But ironically, its convoluted array of sub-modes and Job Commands and limited display features are likely to deter all but the most committed to exploring it to this extent. That said, I still think it's going to become the 1985 successor to the much-revered Roland MC4 as a versatile compositional tool that requires very little knowledge of music to be operated successfully. In fact, I'd be surprised if, by the end of the year, the combination of QX1 and TX816 isn't *de rigueur* for every forward-looking, MIDI-equipped studio in the country.

Quite where the KX88 really fits into the picture isn't quite so clear. Sure, it's a great keyboard, and it must be the way of choice for programming time-evolving sounds into the QX1, but there's also a touch of overkill accompanying all those performance controls. Perhaps the only real sense in them is if you've sprouted an extra set of arms and legs and you're into wowing a Wembley Stadium audience every night of the week with amazing feats of digital dexterity.

Still, it's a nice keyboard (though something tells me the DX1's was nicer again), and it does make an ideal partner for the TX816, regardless of whether or not there's a QX1 in the system chain as well.

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01	INITIAL	01	A OCT UP	10	PITCH BEND	10	SUSTAIN ON/OFF	20	SOSTEN ON/OFF	28	LOCAL ON	30	SONG SELECT	38	MASTER TUNE	40	FF
02	SPLIT POINT	02	B OCT DOWN	11	MOD WHEEL	10	SUSTAIN ON	21	SOSTEN ON	29	LOCAL OFF	31	MIDI CLOCK	39	DUAL MODE DETUNE	41	USER'S ASSIGNABLE AREA
03	SWAP CHANNEL	03	B OCT DOWN	12	BREATH CTRL	10	SUSTAIN OFF	22	SOSTEN OFF	2A	OMN ON	32	START	3A	LFO SPEED	192	PARAMETERS
04	MIDI CH	04	CH INC 1	13	AFTER TOUCH	10	PORTA ON/OFF	23	SOFT ON/OFF	2B	OMN OFF	33	CONTINUE	3B	LFO DELAY TIME		
05	TRANSPOSE	05	CH DEC 1	14	FOOT CTRL	10	PORTA ON	24	SOFT ON	2C	MONO 1	34	STOP	3C	PITCH MOD DEPTH		
06	CH INC 2	06	CH DEC 2	15	PORTA TRIG	10	PORTA OFF	25	SOFT OFF	2D	MONO 2	35		3D	AMP MOD DEPTH		
07	LOAD	07	CH DEC 2	16	DATA ENTRY	1E		26	INCREMENT	2E	POLY	36	TUNE REQUEST	3E	UNIVERSAL 1		
				17	VOLUME	1F		27	DECREMENT	2F		37	SYSTEM RESET	3F	UNIVERSAL 2		



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# Technics DP50

## Preset/Programmable Digital Drum Machine

The DP50 isn't the first rhythm programmer to be derived from an organ-based drum box, but it has a more modern specification than most. Does it succeed in making the transition to the professional arena?

*Dan Goldstein*

You've probably never heard of a Technics multikeyboard (you'd probably call it a home organ) by the name of F3. It incorporates such wonders of easy-play technology as PCM Bass Presets and Programmable Tremolo Speed, and weighs in at an RRP only just the right side of £9000, so it's never going to be the world's best-selling keyboard instrument. You might, however, be impressed by its built-in digital rhythm machine. This is a hybrid preset/programmable device that uses PCM technology for the generation of its voices, and lets you use the F3's cartridge slot to store your own rhythm patterns on RAM packs.

Now, before you turn the page in disgust at what might appear to be a domestically-oriented product with no possible pro applications whatsoever, bear in mind there's a lot more to today's organ technology than meets the eye. And a lot of it, given half a chance, could make a sizeable impact on the professional and semi-pro music fields, as a few enlightened organ manufacturers are now discovering.

Technics, of course, have already applied their knowledge of Pulse Code Modulation techniques to a 'professional' musical instrument, the much-lauded Digital 10 electronic piano. Now they've decided that the F3 multikeyboard isn't the only place their engineers' digital drum voices could be of use, and hence the DP50, a self-contained, dedicated drum machine whose £679 price tag puts it slap bang in the middle of one of the group gear world's most currently-competitive areas.

### Specification

Imagine you're an R&D engineer at a large, forward-looking musical multinational, and you're asked to come up with a drum machine that gives the Man in the Street all the advantages of modern technology, without being an ergonomic pain in the backside. What do you do? Well, if you work at Technics, you derive all your sounds from PCM-encoded samples of real drums, but give the finished device a large number of preset rhythm patterns with familiar names like Bossa Nova, Cha-Cha and Jazz Waltz. That way, Joe Soap can have the best-sounding set of auto-drums in his neighbourhood, and not have to worry too much about what's going on inside the metalwork.



However, when it comes to taking that domestic design and adapting it for the needs of the 'serious' musician, there are a couple of additional features that need to be incorporated if the finished product is going to capture a share of the market. First, and most important, it needs some form of real- and step-time programmability: preset rhythms simply aren't acceptable to aspiring professionals these days, even if the patterns they program themselves are no more inventive than the manufacturers'. Second, it needs some facility for connection to the outside world, and this is provided on the DP50 by MIDI In, Out and Thru sockets, the machine being capable of running either from its own internal clock or from an external MIDI one.

You also need a nice, professional-looking facia design and a logical, easy-to-use control layout, and here the Technics does as well as any other programmable drum machine. It looks as contemporary as the best of them, and although there are an awful lot of multi-function switches, their spatial order has at least been given some thought by the design team.

### Drum Sounds

Actually, there are an awful lot of different percussion samples present within the DP50's memory. At least 23 of them in all, though that doesn't take into account the fact that five voices also have dual accent levels, or the unfortunate fact that nowhere in the machine's user guide will you find a list of the various sounds available. This has already caused some

confusion within the reviewing fraternity. An anonymous scribe in one of E&MM's rival magazines went as far as to mention a honking noise he hadn't even heard on a record before, let alone a drum machine. Well, to me it just sounds like a perfectly ordinary berimbau, star of a thousand Latin American carnival albums, and a few pop ones besides.

But before you get all excited about having so many different percussion sounds available for programming, you really ought to know that only 15 of them can actually be used to make up your own rhythm patterns. And it's the more exotic percussive devices (berimbau included, I'm afraid) that have been omitted from the DP50's programming section, leaving a rather ordinary selection of PCM sounds that includes bass drum, snare, four toms, two congas, and a tambourine. To be honest, this arrangement does strike me as being a little bizarre. After all, if you're going to take the trouble to PCM-encode a whole load of percussive exotica, you might as well give people some means of incorporating them into their own rhythm patterns, especially as some of the less conventional voices are clearly better, sound-wise, than their more traditional (but programmable) counterparts.

In fact, considering the way the voices have been derived and the DP50's middling but still quite substantial price tag, sound quality isn't really a strong point. Almost all the programmable voices suffer from a fair bit of quantisation noise, the worst offenders being the toms and congas. Some of the



samples are less than inspiring in themselves, too. The bass drum (at either of its accent levels) is a peculiar thud reminiscent of BBC Horror Movie sound effects records, while only a couple of the toms really cut it (they might be loud, but it's quality, not quantity, that counts). The hi-hats and crash and ride cymbals are reasonable, while the rimshot is also a pretty fair effort, but the claps are diabolical (God *knows* where they got those hands from) and the snare has all the percussive character and excitement of a wet piece of haddock being slapped across the back of a trimphone. Sorry, Technics, but if you want to sell a drum machine that can stand on its own two feet *outside* of an organ accompaniment, you're going to have to put a lot more effort into the sound quality department.

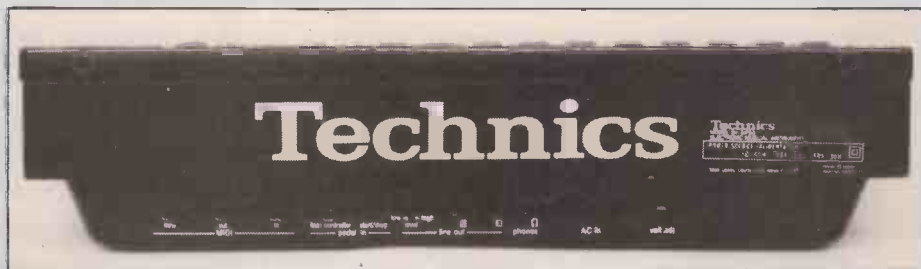
## Programming

Whichever method of entry you use, the DP50 provides you with seven Composer files in which you can store your own rhythm patterns. However, as each of these is only capable of holding a maximum of 32 measures, it doesn't take long to exhaust the memory available. Once you've done that, you can chain the patterns together using the orange Sequencer button (and there was I thinking there was some sort of digital keyboard recorder built in) to form a Song. And you're not confined to your own patterns, either, because if you're sufficiently impressed by what the preset patterns have to offer, you can incorporate one or more of them at strategic points during the Song, complete with any arrangement variations and intro/fill-ins that take your fancy.

The machine defaults to 16th-note resolution for real-time input at switch-on, but you can alter this value to 32nd-note, assuming you have sufficient confidence in your own time-keeping and digital dexterity. As soon as you've reached the 32-measure limit for the length of a pattern, the whole program loops automatically, leaving you to add or delete instruments as you see fit. And that, in a nutshell, is just about all there is to recording patterns in real time.

As far as step-time programming goes, the DP50's organ ancestry has resulted in a couple of idiosyncracies that may or may not meet with universal approval from the pro and semi-pro camps. The first of these is the way in which the machine offers you a choice of four preset patterns for each programmable drum voice, which you are free to use as building blocks around which you can order your own custom patterns. Most of these are of a predictably conventional nature, and although they might help the complete drum machine novice get started on the road to programming, I can't really see them finding favour with the rest of the pro fraternity: the majority will probably come to the inevitable verdict that they take up valuable memory space which *could* have been better utilised elsewhere.

If you've decided you can happily live



without the individual preset voice patterns, your step-time writing can be accomplished in Manual mode, and it's here that the DP50's glut of multifunction switches really becomes a pain in the *derrière*. Mind you, when you consider that the machine's voice selectors have *four* auxiliary jobs to do in addition to activating drum sounds, that's hardly surprising.

'If you're sufficiently impressed by what the preset patterns have to offer, you can incorporate them at strategic points within your own Songs.'

## Connections

As I said earlier, no self-respecting drum machine can survive these days without a decently equipped back panel. Gone are the days when all a manufacturer needed to do was give his drum machine an audio out and a sync socket to ensure interfacing success. The musician of today wants (and deserves) MIDI, separate outputs for each drum voice, a selection of trigger outputs, external sync connections with user-variable time-bases – you name it, it's in demand.

Unfortunately, the DP50 gives today's musician very few of these things. True, there are left and right stereo line outs of adjustable level, but not one of the machine's drum sounds gets its own output, which means you're stuck with the way each drum sounds, its level relative to the rest of the voices, and its (often absurd) prepanned position in the stereo image. And neither of the two jack sockets serves as a mono out when only one is connected, which obliges you to have some sort of two-channel monitoring system before you can actually hear everything that's going on.

As for MIDI, the DP50 has the usual In, Out and Thru trio of DIN sockets, and is capable of receiving data on any of 16 MIDI channels. You can choose between whether you want the DP50 to send its own clock and stop/start data to a neighbouring MIDI rhythm unit or sequencer, or whether the latter's clock can be used to sync the Technics externally. However, these syncing functions feature only the MIDI clock – no other sync

facility is provided on the DP50, nor is it capable of responding to any.

Bizarrely, the machine *does* respond to MIDI note-on and note-off data over a 128-note range, but will only do so if you've selected a preset pattern that's in the course of being played by the DP50. The reason for this is that, whereas most MIDI drum machines use MIDI note information to trigger different drum voices, the Technics assigns the notes on the keyboard to each of its factory rhythm patterns, so that changing the notes you play alters the pattern that's playing to accompany you. Pretty useful, huh?

## Conclusions

I'm disappointed with the DP50, and I think a lot of other people will be, too. The technology it uses is sufficiently advanced for it to be a real contender in the pro rhythm unit stakes, but the way that technology has been applied means the machine will never be more than an unfortunate but irretrievable compromise.

If it weren't for the fact that the programmable drum machine market were so competitive, the DP50 would be great. A selection of reasonable digital drum voices, step and real time programmability, and a large number of preset patterns and fill-ins (some of which are quite inventive, I might add) go together to form a package that looks fairly impressive *in isolation*.

But stacked up against the competition, the Technics' design failings become all too apparent. Not enough in the interconnection department, a notable shortfall in editing options, the lack of a cassette dump facility (you can save patterns to custom RAM cartridge, but the bigger of these, capable of holding just four Songs, costs the best part of £90), and a distinctly confusing system of mode selection and operation.

On the face of it, Technics have gone out of their way to make the DP50 a machine that's easy to use in a live situation: the peculiar MIDI implementation and myriad footpedal control options are evidence of that. But aside from cabaret performers and their ilk, how many pro musicians actually *need* a rhythm unit that's easy to manipulate live? Surely the idea of a drum machine is that you turn it on and forget about it, leaving your head, hands and feet to concentrate on manipulating keyboards, for example? Nope. It isn't going to win any prizes. ■

Further information from Panasonic UK, 300 Bath Road, Slough, Berks. ☎ (0753) 34522.

# Korg MR16

## MIDI Percussion Voice Generator

Why duplicate sequencing software when drum voices can just as well be triggered by an external program using MIDI? That's the question Korg have tried to answer with the MR16. *Simon Trask*



Anyone coming across Korg's MR16 for the first time could be forgiven for thinking they'd stumbled across a drum machine with a built-in touch-sensitive keyboard – or maybe even a touch-sensitive keyboard with a built-in drum machine. In fact, what Korg have come up with here is a drum machine that has no inbuilt playing or sequencing facilities whatsoever, which is probably why they've called it a 'MIDI Rhythm Sound Unit' instead. Actually, even that description sounds a mite misleading – after all, you can't have a rhythm without a sequence, can you?

So, if there's no recording or playing software onboard, how on Earth do you play the thing? Well, the answer lies not a million miles away from the first word of the MR16's designation – yes, you guessed it, MIDI. What Korg have done is take the principle of remote control of a drum machine via MIDI to its logical conclusion, and this is where the keyboard comes in. Because to get the MR16 to utter so much as a whimper, you need to connect it up to a MIDI keyboard of some description. Thus, the keyboard diagram on the MR16's front panel is for information purposes only, indicating which key or keys on your MIDI keyboard will trigger which sound on the MR16.

By now you'll probably have surmised that in order to record anything, you'll also need a MIDI sequencer of some sort,

the idea being that your drum patterns are effectively recorded as keyboard sequences and then played back on a MIDI channel to which the MR16 alone has been assigned.

If you're a trifle confused, just remember that when a note is played on a MIDI keyboard, a Note On code and appropriate value are sent down the MIDI line. Assuming it's read accurately, this data can then be acted upon in some way by the receiving instrument, the only limitation being the ingenuity (and sanity) of that instrument's designers. What Korg have done, then, is assign certain MIDI note values to each of the voices of the MR16, to enable exactly this sort of data transfer to take place.

### Overview

What you get with the MR16 are 19 PCM-encoded drum sounds which effectively constitute Korg's DDM110 and DDM220 drum and percussion voices, gathered together and put in the one box. Rotary controls are assigned to each voice (with the exception of the snare and rimshot, which form one pair, the open and closed hi-hats which make up another, and the cowbell and woodblock, which form a third, the idea being to make the couples mutually exclusive, as they are in the normal drumkit scheme of things) for setting individual level and position in the stereo image that's avail-

able from a pair of audio outputs on the machine's rear.

Assignment of voices to notes is clearly displayed on the aforementioned keyboard diagram. Cleverly, Korg have allocated some voices to several adjacent notes, which means that a reasonable spread on the keyboard is attainable without the danger of 'silent' (ie. non-allocated) notes being hit by accident. It also means you can play very rapid runs on the one instrument in real time, simply by toggling manually from one key to the one next to it and back again.

### Connections

Situated along nearly the entire length of the rear panel are individual audio outs for all the voices (except for the pairings noted above, which are also grouped at the output stage). As far as the stereo audio sockets go, the left one doubles as a mono out, but neither will drive both sides of a pair of stereo headphones, which is unfortunate as there's no headphone socket included, and messing with a machine like this can be quite disturbing to anyone within earshot who isn't actually involved with the experimentation.

MIDI is taken care of by one In and one Thru socket (no prizes for guessing why there's no Out), and there's also a row of recessed DIP switches for selecting the MIDI Receive channel (this can be any one of the possible 16). A big raspberry to Korg for this one: I can't imagine anyone taking kindly having to fiddle around with such tiny switches. Clearly the company are fond of the arrangement because their MPK130 MIDI pedalboard has it too, but it makes about as much logistical sense as a foot-operated steering wheel. What's worse, anyone not familiar with binary numbering will find the settings confusing, even though Korg have provided a table on the rear panel that gives the correct setting for each channel (and being binary, a setting of 15 gives MIDI channel 16, and so on – if this doesn't confuse you, nothing will).

### Sounds

If you aren't familiar with the recent but already popular DDM series of Korg programmable drum machines, I ought to point out that, with the two machines' sonic capabilities fused together, you get nine drum sounds of variable quality and nine percussion sounds of almost uniformly superior quality, plus an impressive ride cymbal thrown in for good measure. Unfortunately, the MR16's

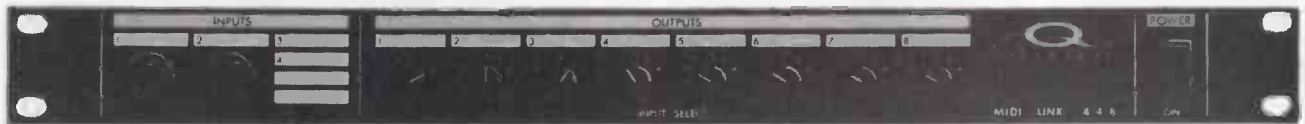


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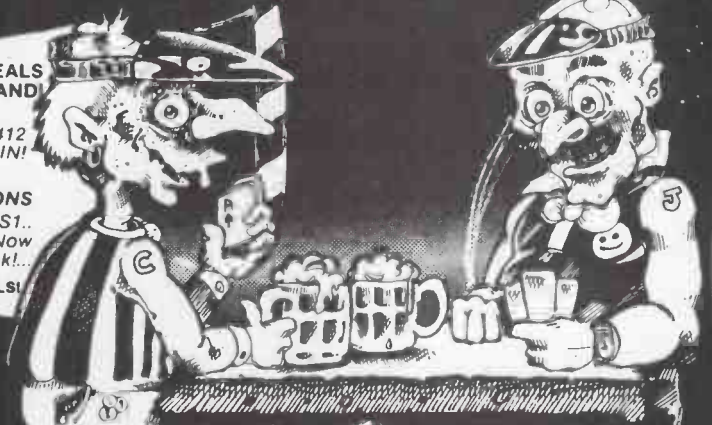
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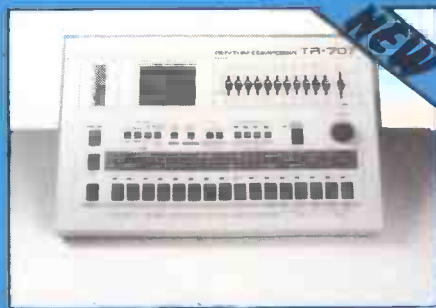
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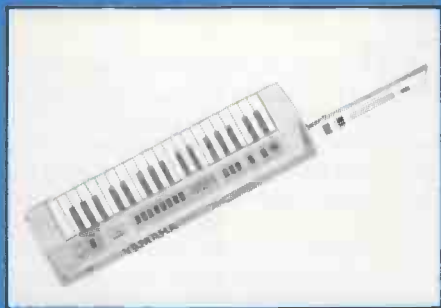
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ancestry also means that a number of the sounds have a significant digital noise element accompanying them – this is particularly noticeable on the congas and timbales. Still, the machine's array of individual outputs does increase the likelihood that the offending noise could be effectively filtered out without affecting the drum signal too much.

So, in left-to-right placing across the keyboard, we have: bass drum, snare drum, rimshot, handclaps, low tom, closed hi-hat, open hi-hat, hi tom, crash cymbal, ride cymbal, low conga, hi conga, tambourine, cowbell, cabasa, timbale, woodblock, low agogo and hi agogo. A pretty fair assortment, all in all.

This shouldn't really come as a surprise given the DDM machines' low price-tags, but the biggest problem their voices present is based around shortage of memory and, presumably, a less-than-ideal sample rate. They have neither the dynamic range nor the full time duration of their acoustic counterparts.

Having said that, most of the sounds stand up well in a performance context. With the possible exception of the tambourine and cabasa, the percussion are clear and well contoured – you shouldn't have much trouble hearing this lot through a mix. As for the drumkit sounds, the toms and ride cymbal are probably the most convincing, whilst the bass drum has a good attack but not enough follow-through, and the handclaps, sad to say, are only exceeded in 'ouch' factor by the Technics DP50's interpretation – see elsewhere this issue for details.

## Sequencing

However, the drum sounds themselves are only one part of the story, because it's what *isn't* inside the MR16 that's just as important as what is. The DDM110 and 220 were generally well received as excellent budget machines, though the question was raised (if by no one else, then at least by our own Trish McGrath in her review of the DDM220, E&MM October 84) as to whether a combined unit, which would have obviated the need for much duplication of both hardware and software, might have been a viable alternative.

Now, just four or five months later, a combined unit is precisely what we've been given, but this one actually *does away with* all the hardware and software that was being duplicated in the first place. Obviously, Korg have reasoned that any MIDI sequencer, whether it be a software package for a microcomputer or a piece of dedicated hardware, is being unnecessarily duplicated by the sequencing aspect of every other drum machine. This is irrefutable logic, but the problem is that drum machine sequencers are generally more pattern- and loop-oriented than their all-purpose counterparts; they're also configured specifically for handling the multiple-voice layered approach that's generally required of programmable drum machines.

So there are plenty of points to raise

against Korg's ideas on software duplication. Before all-purpose sequencers were around (and let's face it, they've only really begun to flourish since the ascendancy of MIDI), dedicated drum sequencers were something of a necessity. Yet even now, there's a lot to be said for a dedicated sequencer that'll handle all the percussive chores expected of it, so that your poor overworked MSQ700 (QX1 if you're rich) only has to handle MIDI Start, Stop, Continue, Song Select and Timing Clock codes whilst trundling out all those heavy Ultravox textures and Stanley Clarke bass-lines (now *there's* a combination).

I think it's called 'concurrent processing'.

## Conclusions

Sorry, but I can't help feeling that Korg's marketing and R&D departments have thrown a bit of a wobbly with this one. It's going to be up against it when it comes on sale later this month, facing competition not only from other manufacturers' machines (which offer full sequencing software, the facility to play drum voices from a MIDI keyboard, and the provision to use the drum machine's sequencer to control a synth) but from units within Korg's own range. After all, a combination of DDM110 and DDM220 would give you a versatile programmable percussion system of lengthy internal memory for about the same price as Korg want for the MR16 alone (and, if necessary, a KMS30 MIDI Synchroniser at a further £155 would incorporate them into a MIDI-only sequencing setup).

Korg in the UK would probably feel your best bet is to go for the MR16 and use it in conjunction with an EMR MIDI software package (as the company haven't made a dedicated sequencer of their own since the analogue SQ10), but that requires you to have one of the home micros EMR are writing for, and as I've already mentioned, most general-purpose sequencing software isn't well suited to rhythm pattern applications anyway.

But Korg in Japan aren't stupid. If the MR16 is to be marketed successfully in its present form, there must be something brewing in their laboratories to act as its software partner. Now, it may be that said software will take the form of a program to run on Korg's own Epson-based music micro, but if that's the case, European users are going to be left out in the cold if that micro doesn't get here; and that's what seems likely at the moment.

If you think you have a setup that might benefit from the inclusion of an MR16, then by all means investigate further. It does what it sets out to do admirably.

But whether it's setting out to do a particularly useful job in the first place is something only time will tell. ■

*Availability of the MR16 is scheduled for mid-May, with an expected RRP of £449 including VAT. Further information available from Korg UK, 32-34 Gordon House Road, London NW5. ☎ 01-267 5151.*

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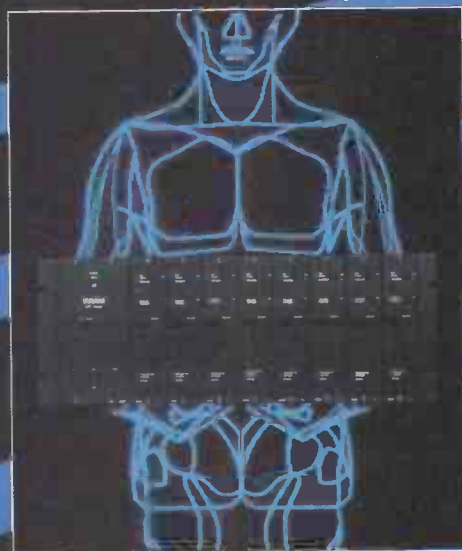
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# Sequential MultiTrak

## Programmable Polysynth with Sequencer

Successor to both the SixTrak and the earlier Prophet 600, the MultiTrak needs an excellent specification if it's to compete in the middle ranks of the polysynth world. Has it got what it takes? *Simon Trask*



It's now a little more than a year since Sequential (or Sequential Circuits Inc, to give their full but now rarely used title) introduced the SixTrak polysynth to the music markets of the world. It came at a time when the synth arena was still very much feeling the after-effects of a technological earth tremor, the one that accompanied the arrival of Yamaha's DX series of FM digital polysynths. But continuing in the company tradition of flying in the face of synthesiser fashion, Sequential gave the SixTrak a conventional analogue, voltage-controlled internal configuration. However, the SixTrak also saw Sequential going for digital parameter access and additional onboard features in a big way, and most important of all, it introduced the concept of 'multi-timbral' sound to the budget synth market.

### Specification

To be concise and straightforward for a moment (and with the MultiTrak, it's going to be a rare moment), Sequential's latest is a six-voice, multi-timbral analogue polysynth with a five-octave velocity-sensitive plastic key-

board. Other features are a built-in six-track sequencer identical in layout to the one fitted to the SixTrak and MAX, individual audio outs, a programmable chorus unit, a split-keyboard facility, Sequential's much-praised Stack mode, and an Arpeggiator. In other words, all the facilities of a SixTrak, plus a little more besides.

Those of you who may have cause to bemoan the MAX's lack of a battery-backed-up RAM will be glad to know that all sequences and stack/split assignments are retained through power-down, and as with the SixTrak, a generous 100 voice memories are provided, all of which are fully programmable and storable.

The MultiTrak comes complete with a 100-page operation manual which includes voice charts for all 100 factory presets, a 22-page MIDI Guide giving the instrument's complete MIDI implementation, a foldout instruction card giving a brief but concise overview of how to use the synth (particularly neat, this), and a schematic diagram of the front and rear panels with each area labelled and described. If you get the impression that Sequential mean business when it comes to documentation,

award yourself a gold star for perception. Style and format of the pamphlets is consistent with that of previous Sequential user guides, which means both manuals are models of clarity and comprehensiveness. If only every synth came as well documented.

### Layout & Operation

With the MultiTrak's front panel layout, Sequential have succeeded in striking a decent balance between multi-functionality and clarity, proving that 'digital access' needn't be a synonym for 'headache'.

From left to right, we find the standard pitch-bend and modulation wheels, the Sequencer (which also doubles as Stack/Split) and Arpeggiate sections, the central Control section (which includes the ubiquitous two-digit LED window and Parameter/Program selector), the Sound Parameter section (*tastefully laid out in grey, purple and crimson; eat yer heart out, Habitat - Production Ed*), and MIDI, Cassette and Chorus Sections, with Master Volume and Tune controls at the extreme right. There are two user-variable Chorus parameters in the form of Rate and Depth, but whilst Chorus on/off is programmable for each voice, Rate and Depth are not.

Virtually every area of the front panel is liberally dotted with small red LEDs (which greatly ease communication between instrument and musician), whilst unlike that of the SixTrak, the MultiTrak's LED window seems willing to impart information on just about any function's current state at the press of the appropriate button. And as a glance at this review's header photo will tell you, the MultiTrak takes its lead from the MAX in dispensing with Sequential's previously beloved MFI teak furniture look and replacing it with something altogether sleeker and more contemporary.

Actually using the MultiTrak is a refreshingly easy and economical process, due to the above-mentioned clear layout and some sensible, though never excessive, use of multi-function controls. The 40 sound parameters are listed in a 4-by-10 matrix, that is, four parameter groups with 10 parameters in each group. Each set of 10 parameters is further sub-grouped visually, all groupings being logical and (almost) instantly memorable. One button toggles between Program and Parameter modes, and when Parameter mode is chosen, the same switch is used to rotate through the groups. You use a row of 10 buttons underneath the parameters to select a program when in Program mode (logically enough) and a parameter when in Parameter mode (ditto). It's the combination of matrix display and associated LEDs that allows you to manipulate sounds in a structured way very quickly, which isn't bad going for what's still an inherently awkward programming system.

However, there are one or two minus points to be notched up on the imaginary scoreboard. First of these concerns the (unsprung) pitch-bend wheel, which was annoyingly stiff on the review model: the instrument in question was no pre-production sample, so I fear for the worst. I also find it disappointing that Sequential have stuck with the rather carelessly-implemented range control that besetted the SixTrak's pitch-bend wheel, namely a maximum of a major third up and just under a minor third down. There's really no excuse for not having a pitch-bend wheel implemented with a range that's selectable from a semitone to an octave either side — much like the one on the DX7, in fact.

The sequencer's Speed control is another source of displeasure. It doubles as an External Clock selector when turned extreme anti-clockwise, which is a bit risky — especially when there isn't even a clickstop to help separate one function from the other.

Also worth a mention here is the keyboard, which isn't really playable enough for a synth in the MultiTrak's price bracket. In fact, a quick side-by-side comparison told me I preferred the full travel of the SixTrak's keyboard to the sponginess of the one on the Multitrak. And to think Sequential used to lead the world in this field...

## Sounds

Sadly, the MultiTrak's sonic capabilities offer little advance on the SixTrak or the MAX, bar the addition of velocity-sensitivity and a voice-assignable Chorus facility. What that means is that all six voices have their own VCO, VCF and VCA (each with its own envelope generator) together with an LFO. Frankly, I think it's a pity Sequential haven't seen fit to endow their new flagship with some sort of more substantial sonic update, (having two VCOs per voice would have been nice), but having said that, the MultiTrak's factory preset voices are a great improvement on the SixTrak's, and that's without the addition of Chorus. As you might expect, Sequential's in-house programmers have given us a fair number of string, organ, bass and lead sounds, along with all manner of weird (though sometimes not so wonderful) sound effects, plus a rather weak selection of percussion sounds. All in all, it's a bit of a mixed bag. Some of the sounds are lively and dynamic, but others have about as much interest and vitality as a stuffed olive.

Velocity-sensitivity is assignable per voice program, and can be made to affect amplitude, brightness of tone, and vibrato amount. It works downwards from a default maximum amount, the highest amplitude peak allowing the quietest sound, for instance.

About the only addition to the MultiTrak's sound-generating capabilities I haven't men-

tioned is the extension of the VCO, VCF and VCA envelope generators' attack, decay and release times from 11 seconds to 15 seconds. And that's hardly going to stun everyone into awe-struck silence and deep reverence for Sequential' R&D expertise. Ah well, so much for progress.

## Sequencer & Arpeggiator

The MultiTrak's sequencer section allows a total of four real-time sequences to be held in memory at any one time, with dynamic allocation of a 1600-note storage capacity. This represents a welcome doubling of the SixTrak's capacity, and as was the case with the SixTrak, one voice is assigned to one part, and each part may have a different voice program. Which, if you've been paying attention, you'll know results in that wonder of modern synth terminology we call multi-timbral music.

Any number of voices up to six can be recorded at one time simply by putting the appropriate tracks into Record mode, though needless to say, all selected tracks have to use the same voice program. Individual tracks can be erased, and the volume level of each track

'The MultiTrak allows a total of four real-time sequences to be held in memory at any one time, with dynamic allocation of a 1600-note capacity.'

can be adjusted while the sequence is playing back. Pitch-bend and mod wheel usage isn't recorded, but the other side of this particular coin is that you *can* use either wheel while playing over the top of the sequence as it's replaying, without affecting the sequence itself in any way.

There are several additions to the Sequencer section which make it an altogether more attractive proposition than its SixTrak predecessor. Most notable of these is an Append To function, which allows one sequence to be appended to another. It's a fine example of a facility which can't have been all that difficult to implement, yet increases the flexibility of the sequencer a hundredfold. The possible applications are too numerous to list, but basically it allows a working file to be maintained in one sequence (or how about three working files in three sequences?) which can be added to a

master sequence at any time. And just in case you don't like the results of a particular Append, a Truncate function is included which enables a sequence to be truncated at any point; a feature that should also come in handy for tidying up improperly recorded endings.

A prominent metronome beat can be turned on or off at any time during recording, and auto-correction of your playing is possible to the nearest eighth note, 16th note, eighth note triplet or 16th note triplet; a 'hi-res' mode acts as a numbing influence on the auto-correct function, letting the Sequencer record your music exactly the way you play it, warts and all. Another new feature is the ability to erase portions of a sequence, or particular notes from any portion of that sequence, selectively over any number of tracks. Nice one, Sequential.

The result of all this is an eminently useful and usable sequencer which lets you do all the ordering about. With the individual audio outputs and sync-to-tape facility that have been implemented on the MultiTrak (see below), the synth will no doubt become an attractive proposition for small studios and similar environments. That's my feeling, anyway.

For the less creatively inclined, the Multitrak has a built-in Arpeggiator as well, though this offers little new over and above what came with its SixTrak predecessor. There are two modes, Up/ down and Assign, with the former giving straightforward ascending and descending reiteration of any held keys, and the latter replaying held keys in the order in which they were pressed, and thereby acting as a sort of mini-sequencer. It therefore follows that rests are not a part of the Arpeggiator's vocabulary, which is a shame. Another problem is that, no matter what mode you're in, the arpeggio is only latched when the Sequencer Record button is pressed *whilst the notes are held down*. This is where the optional footswitch really becomes a necessity, as without it, any arpeggio is effectively limited to what can be accomplished with one hand in one span, unless you want to have a go at activating the Record button with your nose or some other suitable appendage. Even so, I'm somewhat at a loss to understand how any player can take advantage of the stated maximum of 16 simultaneously-held keys...

Your arpeggio is always assigned to Voice 6, so once you have it merrily chugging away, you can play along using the other five voices and change the sound assigned to those voices at any time (whilst the arpeggio's voice remains fixed). One advance on the SixTrak is that your arpeggio can be transposed whilst it is playing, simply by pressing the Sequencer Record button and the key that's to act as the new root.

## Stack & Split

For those of you who don't already know, a Stack is a multiple layering of voices (in this case up to six), each of which can have its own voice program. This allows for the creation of quite complex and varied sonorities, albeit with the inherent disadvantage that only one stack may be played on the keyboard at any given time. With four or more sounds stacked, only monophonic playing is possible, with three sounds two-note playing, and with two sounds three-note playing. A fairly straightforward lesson in voice assignment, really. Ten different Stacks can be stored on the MultiTrak (compared with the SixTrak's two), though the mode's allowance of memory is shared with keyboard split assignments, so that if Position 8 is allocated to a keyboard split, it can't hold a dedicated Stack assignment.

The Split facility allows a keyboard split to





be assigned at any point on the keyboard, and any number of voices (up to five) to be assigned to either side of the split point. For a split side to be polyphonic, all voices on that side have to be assigned the same voice program, because as soon as voices are Stacked together, that side becomes monophonic. This means that four voices on one side of a split can't be given a two-voice stack and two-note playing, but then again, who's quibbling?

## Interconnections

The SixTrak, you may recall, had a number of shortcomings in this area, none of which were remedied on the MAX. However, on the back panel of the MultiTrak we find such relative exotica as separate audio outputs for each of the six voices, and Tape In and Out sockets for saving and loading data. These latter sockets are particularly useful, as they also allow syncing to tape and to non-MIDI drum machines, for which the MultiTrak expects a clock pulse of 24 pulses per quarter note.

In fact, the Tape sockets allow complete Sequencer and Program data to be saved and loaded individually. Program data saving takes about 50 seconds, whilst Sequencer data saving depends on exactly how much information is actually present. An extra touch that should aid reliability is provided by Sequential's tape interface verification system, which prevents accidental recording over a 'dropout' area on the cassette.

Also to be found on the back panel are the more familiar footswitch socket (the optional pedal can be used for, among other things, controlling sequence record and playback), the ubiquitous MIDI In and Out (but still no Thru – clearly Sequential have got something against it), and a pair of stereo audio outputs, each of which is capable of driving a mono amplifier. It would have been nice to have had each socket on the rear panel labelled at the appropriate place on the rear of the front panel, though. A small point, I know, but it would make life a lot easier for musicians not particularly enamoured of having to look at the rear panel every time they want to make a new connection.

The MultiTrak has no headphone socket as such, but either of the stereo outputs will drive both sides of a pair of headphones. When any of the individual outs are used, the corresponding voices disappear from the stereo outputs, but this shouldn't be an inconvenience, as anyone using the individual outs will most likely be monitoring from a mixing desk, anyhow.

## MIDI Implementation

As I implied earlier, the MultiTrak carries on its manufacturer's tradition of excellent MIDI implementation by offering a number of different MIDI Control options. These are easily summoned from the synth's front panel, and act (a) as high-level implementations of MIDI codes included in the instrument's MIDI spec, and (b) as filters for certain MIDI commands. This strikes me as being a Very Good Idea, and deserves to be developed further. Anyway, the most obvious candidates for such treatment are the MIDI Modes. The MultiTrak can operate in three such modes and one pseudo-mode, all of which are selected by pressing the MIDI Mode button and twiddling the parameter control to get the right value. Mode 0 isn't strictly a MIDI mode, as it simply toggles between enabling and disabling MIDI send and receive. The other modes are Omni On/Mono Off (Mode 1), which

enables data to be sent on the Basic Channel and received on all channels (default Basic Channel is set to 3, which is a bit odd); Omni Off/Mono Off (Mode 3), which only recognises messages in the Basic Channel (the MultiTrak can send/receive on any one of the 16 available channels); and Omni Off/Mono On (Mode 4), in which each of the MultiTrak's voices is automatically assigned to one of six adjacent MIDI channels. It's this last mode that offers the most potential for exploitation of the MultiTrak's multi-timbral characteristics, as it enables each track to be sent over a different MIDI channel. Sequential have included a Double Mode function which selects this mode, enables external wheel and program changes, and forces the slave synth into the same configuration and channel number as its master – a very handy addition. Incidentally, Mode 2 (Omni On/Mono On), which assigns all MIDI information to one voice of an instrument, isn't implemented on the MultiTrak.

Other MIDI Control options implemented on the MultiTrak are program change enable/disable (bi-directional), wheel change enable/disable (incoming), and external keyboard pressure enable/disable (incoming – if enabled, this allows a pressure-sensitive keyboard to control the MultiTrak's mod-wheel function). There are also commands for dumping all programs and stacks, all sequences, the current sequence, and the current program via MIDI, while the Local command can be toggled on and off. Offhand, the only non-Sequential synth I can think of which implements a similar set of facilities is Roland's JX8P, so you're looking at a rarity, kid.

Virtually all the above facilities are accessed by pressing the MultiTrak's MIDI Channel button and an appropriate Program/Parameter button – which really is simplicity itself.

'It's a bit of a mixed bag. Some of the sounds are lively and dynamic, but others have about as much interest and vitality as a stuffed olive.'

MIDI Timing Clock bytes are sent when an Arpeggio or a Sequence is playing, and together with MIDI Start and Stop codes, this means that your sequences and arpeggios can be synchronised with a MIDI drum machine; I used a Yamaha RX11 and Roland TR707 without any hitches, though I imagine Sequential themselves would rather you use one of their own rhythm units, such as the excellent Drumtraks or the forthcoming TOM.

A further, altogether more exciting possibility is synchronising two six-track sequencers to give what's effectively a 12-track recording setup. Sequential's MIDI Implementation manuals are reasonably thorough when it comes to giving details of how to get their products functioning together, but whilst the MultiTrak's MIDI Guide goes into some detail regarding synchronising the MultiTrak with a drum machine, it doesn't discuss synchronising two sequencers at all. There's no immediately apparent way of accomplishing this feat, but discussion with Sequential's technical department in Holland revealed that it is possible to sync any combination of MultiTrak, SixTrak and MAX. This is accomplished by putting the slave instrument into Poly mode and selecting a channel that the master instrument isn't sending on, and then setting the slave to External Sync. The slave will then

read only sync information, so all that's left to do before starting the master sequencer is to select the sequences you want to use on master and slave. All in all, I reckon the potential for sequencer expansion these options offer could make a lot of people happy – so long as they don't make the mistake of discarding the old SixTrak to help pay for the new arrival.

Finally on the MIDI front, it's a shame that given the flexible split keyboard facility Sequential have provided on the MultiTrak, no MIDI Control function has been implemented to allow notes on either side of the split to be assigned to a different MIDI channel or channels. After all, the Siel DK80 can do it, and that costs about half as much money.

## Conclusions

I've made frequent reference to the SixTrak during the course of this review, and with good reason. It's possible to pick up a SixTrak for around the £500 mark nowadays, and considering that Sequential's RRP for the MultiTrak is set at over three times that (and with dealer discount not likely to knock a great deal off that in the immediate future), you'll need to ponder carefully before considering whether or not to go for what is basically an upgraded SixTrak.

Perhaps the most surprising thing about the MultiTrak, aside from its price-tag, is that Sequential have done little to update their sound circuitry since the SixTrak came out over a year ago. Besides financial competitiveness, it's the sonic *flexibility* of a synth that determines how it will fare (witness the success of the DX7), and I have a feeling this side of the MultiTrak may let it down. But hang on a moment, we're talking about a multi-timbral synthesiser here, and this feature alone should ensure continued (and deserved) interest in the Sequential way of doing things.

And while other manufacturers have made half-hearted attempts at onboard real- and step-time sequencers, Sequential alone have made the connection between multi-timbrality and multi-part recording, thereby taking things to their logical synthetic conclusion. With the MultiTrak, the company have reaffirmed their faith in this approach, and come up with an infinitely more flexible sequencer as the heart of the system.

Because whereas the SixTrak always made you aware of its limitations, the MultiTrak is an altogether more powerful musical tool. It's friendlier, too, thanks to a more directness on the user interface side of things than its predecessor. The separate audio outputs and the tape interface are both welcome additions, even if some people may still prefer to use a computer/disk MIDI setup. And if you're one of those people, you'll no doubt be interested to know that Sequential have some disk-based MultiTrak software for the Commodore 64 in the offing. Advance reports suggest this will allow sound parameter editing and storage facilities, and increased sequencing capabilities, too.

Bearing in mind my reservations about (a) the sheer cost of the MultiTrak, and (b) Sequential's apparent reluctance to do anything more than tinker with sound-generating circuitry that dates back to the Prophet 600, the machine's onboard facilities are sufficient reason for it to merit serious consideration. It's a synth that won't please all the people all the time, but it makes a pretty good shot at it. ■

*Manufacturer's RRP is £1565 including VAT. Further details from Sequential (Holland) at PO Box 16, 3640 Mijdrecht, Netherlands. Review model supplied by London Rock Shop.*

# CHECKLIST

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**C**HECKLIST is a new, monthly price guide designed to help you as you wend your way cautiously through today's hi-tech music market. Each issue, we'll be concentrating on a different section of that market, and the first instalment sees a comprehensive listing of all the polysynths, voice expanders and remote controlling keyboards currently on sale or soon to be introduced.

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## POLYSYNTH Checklist

### AKAI

**AX80** — £999 Eight-voice, two-oscillator per voice analogue polysynth; 32 preset and 64 programmable onboard voice memories, five-octave velocity-sensitive keyboard. **+** Three LFOs, chord memory, good keyboard, excellent bar graph system makes digital parameter access more user-friendly; **■** Doesn't really possess any sonic character of its own; **■** Recent price reduction makes Akai's first synth more attractive than it previously was. Yer pays yer money....

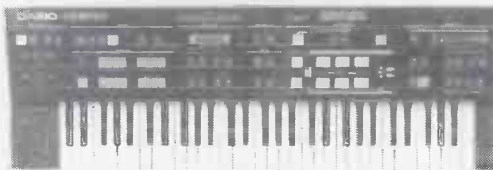
**AX90** — £TBA Eight-voice polysynth, splittable keyboard. To be reviewed — further details unavailable at press-time.

### CASIO

**CZ101** — £345 Four/eight-voice, two/one DCO per voice, Phase Distortion polysynth; 16 preset and 16 programmable voice memories, four-octave miniature keyboard. **■** Excellent range of both 'analogue' and 'digital' synth sounds, five-

octave MIDI-compatible octave range, voice layering, comparatively easy to program, built-in ring modulator, 16-voice RAM cartridge storage, eight-stage transient envelopes, fine MIDI implementation; **■** small, short keyboard, awkward bend wheel; **■** revolutionary Phase Distortion principle offers value for money without sonic compromise — if you can stand the mini-keyboard.

**CZ1000** — £495 Spec as for CZ101, but with full-size, four-octave keyboard. **■** the professional's Casio: nothing around to beat it for versatility, ease of programming and MIDI features at this price level. Preset poly, digital sequencer, MIDI guitar synth and sound sampler still to come from Casio before 1985 is out...



**CZ5000** — £TBA Eight/16-voice, two/one oscillator per voice Phase Distortion polysynth; 32 preset and 32 programmable voice memories, five-octave keyboard. To be reviewed.

### CHASE

**Bit One** — £799 Six-voice, two-oscillator per voice analogue polysynth; 63 programmable voice memories, five-octave velocity-sensitive keyboard. **+** superb range of analogue sounds, both acoustic and electronic, plenty of keyboard performance options; **■** no sequencing or arpeggiation features, suspect MIDI implementation; **■** all in all, probably the best budget analogue poly, now available through wider range of retail outlets.

### CHROMA

**Polaris** — £1699 Six-voice, two-oscillator per voice analogue polysynth; 132 programmable voice memories, five-octave velocity-sensitive keyboard. **+** good, rich analogue sound, neat onboard sequencer, extensive interfacing facilities include wide range of MIDI options; **■** complicated to use, overpriced, some design priorities now outdated, doubtful availability; **■** a synth with a lot of potential for those with enough patience to exploit it, but the competition is already too tough, and getting tougher all the time.

### ELKA

**Synthes** — £1399 Eight-voice, two-oscillator per voice analogue polysynth; 40 preset and 40 programmable voice memories, five-octave keyboard. **■** considerable (but largely ignored) sonic versatility, split and layering facilities using

two MIDI channels, onboard sequencer, digital ring mod; **■** some may find sound dated, possible servicing difficulties now that synth is out of production in Italy; **■** good facilities for its (recently reduced) asking price: if this is your sound, go for it.

### KORG

**Poly 800** — £549 Six-voice, two-oscillator per voice analogue polysynth; 64 programmable voice memories, four-octave keyboard. **■** competitive price, three six-stage envelopes, onboard sequencer and chorus unit, portability; **■** only one filter for all six voices, short keyboard, **■** the world's best-selling polysynth, in spite of its limitations: but there's competition looming.

**Poly 61M** — £699 Six-voice, two-oscillator per voice analogue polysynth; 64 programmable voice memories, five-octave keyboard. **■** tidy if undistinguished sound output, more sturdily constructed than either of Korg's latest polys **■** only one EG, not the easiest digital access synth to program **■** basically a Poly 61 with MIDI fitted, though that's not necessarily a bad thing: likely to disappear as the DW6000 becomes more widespread.

**DW6000** — £999 Six-voice, two-oscillator per voice, digital waveform generation polysynth; 64 programmable onboard memories, five-octave keyboard. **+** first synth to combine clarity of digital voicing with easy access of analogue synth configuration, six-stage VCA & VCF envelopes, built-in chorus **■** keyboard has no velocity or after-touch sensitivity, poor feel of performance control joystick **■** the polysynth world's biggest technological compromise — but it works.

### OBERHEIM

**Matrix 12** — £TBA Spec similar to that of two Xpanders controlled by XK keyboard — see relevant sections for details. To be reviewed.

### OCTAVE PLATEAU

**Voyetra 8** — £3999 Eight-voice, two-oscillator per voice analogue polysynth; 100 programmable voice memories, velocity- and pressure-sensitive five-octave keyboard. **+** excellent sonic potential in the American analogue tradition, built-in polyphonic sequencer and arpeggiator, comprehensive split and layering facilities; **■** hideously involved system of parameter access makes editing a real chore, dollar-inflated price-tag; **■** competent, professional synth system — at a price.

### ROLAND

**JX3P** — £699 Six-voice, two-oscillator per voice analogue polysynth; 32 preset and 32 program-



## CHECKLIST

mable voice memories, five-octave keyboard. **+** still quite sonically versatile, built-in sequencer; **-** requires PG200 programmer (optional) before sound editing becomes a realistic proposition, dodgy MIDI implementation; **+** justifiably popular synth section has formed basis for MKS30 module and GR700 guitar synth, but basic model now out of production – so you might pick one up cheap.

**Juno 106 – £799** Six-voice, one-oscillator per voice analogue polysynth; 128 programmable voice memories, five-octave keyboard. **+** ease of use, built-in chorus; **-** retains last remnants of Juno thin-sound disease, lacks arpeggiator; **-** monosynth parentage means 106 is still a great beginner's poly, even if it doesn't sound as impressive as the Juno 6 did three years ago...

**Synth Plus 60 – £899** Similar spec to Juno 106,



but with the addition of built-in amplification and twin speakers.

**JX8P – £1250** Six-voice, two-oscillator per voice analogue polysynth; 64 preset and 32 programmable onboard voice memories, five-octave pressure- and velocity-sensitive keyboard. **+** another example of Roland squeezing new sounds out of old design techniques (the 8P competes with the best of the analogues), voltage controlled mixer section, RAM cartridge voice storage, good MIDI implementation; **-** only eight memories hold after-touch and performance data, requires optional PG800 programmer for sound editing to become really straightforward; **-** lacks character, but ulti-

mately a rewarding and versatile analogue poly that proves Roland aren't going to be left behind without a fight.

**Jupiter 6 – £1299** Six-voice, two-oscillator per voice analogue polysynth; 48 programmable voice memories or 32 patch presets (for split programs), five-octave keyboard. **+** inherently flexible and versatile programming system, excellent sonic potential, split-keyboard facilities, sophisticated – and syncable – arpeggiator; **-** no velocity- or pressure-sensitivity, might just have too many facilities for its own good **+** excellent analogue synth that continues Jupiter tradition admirably, but complex control layout has meant shortage of takers, hence newly attractive price level.

## SEQUENTIAL

**SixTrak – £595** Six-voice, one-oscillator per voice multi-timbral analogue polysynth; 100 programmable sound memories, four-octave keyboard. **+** unique (in this price range) multi-timbrality extends to built-in six-channel sequencer, 'stack' mode and MIDI implementation; **-** awkward parameter adjustment, short keyboard, synth doesn't actually sound too impressive; **-** in the process of being displaced by newer MAX and MultiTrak, therefore very cheap.

**MAX – £625** Six-voice, one-oscillator per voice, multi-timbral analogue polysynth; 80 preset voice memories, four-octave keyboard. **+** as SixTrak; **-** also as SixTrak, but not readily user-programmable without CBM64 and software; **-** tries to be computer peripheral and voice expander in one, succeeds in being neither.

**MultiTrak – £1499** Six-voice, one-oscillator per voice analogue polysynth; 100 programmable voice memories, five-octave, velocity-sensitive

keyboard. **+** adds 'professional' facilities to SixTrak spec; **-** doesn't add anything better in the sound department; **-** conspicuously over-priced, but the only choice if you value sequencing and MIDI facilities above sheer sonic potential.

**T8 – £4700** Eight-voice, two-oscillator per voice analogue polysynth; 128 programmable voice memories, six-and-a-half octave keyboard sensitive to pressure and velocity. **+** excellent analogue sound capability, weighted-key action and individual after-touch for each key, fine split and layering facilities, built-in sequencer; **-** heavy on the hand and even heavier on the wallet; **-** professional instrument at a professional price.

## SIEL

**DK80 – £699** Six-voice, two-oscillator per voice analogue polysynth; 10 programmable and 40 preset voice memories, velocity-sensitive five-octave keyboard. **+** more facilities for the money than just about anything; **-** 40 fixed memories, basic sound could be better; **-** really astonishing value for money, though first impressions might not be all that favourable.

**DK600 – £999** Six-voice, two-oscillator per voice analogue polysynth; 100 programmable voice memories, five-octave velocity-sensitive keyboard. **+** fine sound quality (especially brass and percussion presets), programmable dynamics, plenty of good software available; **-** the odd operational idiosyncrasy; **-** competent but underrated analogue poly, neatly styled and well constructed.

## WERSI

**MK1 – £TBA** 16-voice polyphonic Fourier Synthesis polysynth; five-octave velocity- and

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# CHECKLIST

pressure-sensitive keyboard. To be reviewed – available September.

## YAMAHA

**DX9 – £799** 16-voice, programmable FM digital polysynth; 20 programmable voice memories, five-octave keyboard.  despite its humbler electronic origins, it still sounds extremely good;  undynamic keyboard, no cartridge storage facility, lacks DX7's charisma;  underrated cheap DX, now out of production due to lack of sales, so pick one up while you can. 'Baby' DX21 due in the shops mid-August.

**DX7 – £1250** 16-voice, fully programmable FM digital polysynth; 32 voice memories, five-octave velocity- and pressure-sensitive keyboard.  immense sonic and programming versatility still unmatched by any competing instrument, vast range of custom-designed hardware and software now available to accompany it from a variety of sources;  a real pig to program, hence many preset sounds becoming clichéd, still niggling doubts about ability to recreate fat, traditional analogue synth sounds;  an industry standard like no synth before it, and justifiably so – if only it was as easy to edit as it is to listen to...



**DX5 – £2999** FM digital polysynth, spec similar to two DX7s with additional performance memories; 76-note touch- and velocity-sensi-

tive keyboard.  excellent sound and facilities;  beaten on price by Yamaha's own DX7/TX7 combination;  now you've a choice between convenience and cost, though sizeable back orders for the DX5 indicate some people are wealthier than is good for them. (To be reviewed.)

**DX1 – £8999** 16-voice polyphonic, FM digital polysynth; 64 programmable voice memories, six-octave velocity- and touch-sensitive keyboard.  easier editing than cheaper DXs thanks to comprehensive control and display layout, marvellous weighted-action keyboard has individual after-touch for each key;  bulky, weighty and outrageously expensive;  thoroughly desirable – the ultimate dedicated FM poly, but logic says it's outclassed by cheaper hardware from the same stable.

## EXPANDER

# Checklist

## AKAI

**VX90 – £TBA** Similar facilities to AX90 poly, but in 19" rack-mounting format. To be reviewed.

## CHASE

**Bit 01 – £699** Identical in spec to Bit One poly, in rack-mounting unit and with improved MIDI implementation. To be reviewed.

## KORG

**EX800 – £449** Identical in spec to Poly 800: 64 programmable voice memories, built-in sequencer.

## OBERHEIM

**Xpander – £3945** 12-voice polyphonic analogue/FM digital hybrid synthesiser; 31 LFOs, 30 EGs, 12 oscillators, 90 VCAs, 100 programmable voice memories, recognises MIDI pressure and velocity information.  vast range of sounds both analogue and digital, easier to program than most digital access designs, matchless programming versatility;  only the cost;  brilliantly conceived and superbly built – if you can afford it, don't hesitate.

## ROLAND

**MKS30 – £875** Same overall spec as JX3P poly, but 64 programmable voice memories, and fully responsive to velocity and pressure information.  it doesn't sound bad;  requires optional PG200 programmer for conventional 'pot' control;  module costs more than a JX3PI.

**MKS10 – £990** Eight-voice polyphonic piano-family voice module, fully velocity- and pressure-responsive, 16 preset voice memories.  Neatly styled, built-in chorus/flanger helps strengthen sound output;  eight voices only accessible through mother keyboard, expensive for what it is;  only really of value if you've got



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## CHECKLIST

a keyboard—and a playing technique—that'll do it justice.

**MKS80 – £1800** Similar spec to now-discontinued Jupiter 8: eight-voice polyphony, two oscillators per voice, 64 voice memories and 64 patch preset memories onboard, fully responsive to velocity and after-touch information. **+** wonderful range of analogue-type sounds, optional RAM packs can hold 128 voices or patch presets; **+** again, requires optional programmer (this time the MPG80) for editing not to be a chore; **+** an excellent package that's notably good value next to the other Roland modules, but price still puts it firmly in the professional league.

### SIEL

**Expander 80 – £399** Similar in spec to DK80 poly, but only monotimbral. To be reviewed.

### YAMAHA

**TX7 – £649** Identical in spec to DX7, with addition of performance memories for each voice. **+** a logical upgrade for all DX7 owners; **+** but not so much fun if your controlling synth is analogue; **+** Yamaha's most economical route to FM duplication.

**TX216 – £1899** Two DX7s (or one DX5) in rack-mounted format, with facility for adding TF1 modules (one DX7's worth) at £449 each. For comments see TX816.

**TX816 – £4299** Essentially eight DX7 voicing modules in one rack, each with its own MIDI connection. **+** Who could say no to eight DX7s?

**+** MIDI implementation could be better; **+** the ultimate FM music synthesiser, no self-respecting studio should be without one.

## CONTROLLER

### Checklist

#### AKAI

**MX76 – £TBA** Six-and-a-half octave, velocity- and pressure-sensitive, weighted-action splitable keyboard; 96 voice selectors. To be reviewed.

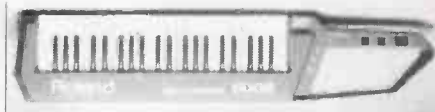
#### KORG

**RK100 – £475** Three-and-a-half octave portable keyboard with volume, pitch-bend, modulation controllers, 64 voice selectors. **+** price, spec includes thoughtful touches like lockable MIDI connectors; **+** octave range sacrificed in the cause of portability, no dynamics; **+** all things considered, the best-value 'poser's keyboard' currently available.

#### ROLAND

**Axis 1 – £999** Three-and-a-half octave portable keyboard with volume, pitch-bend, modulation controllers, velocity- and pressure-sensitivity, 120 voice selectors. To be reviewed.

**MKB300 – £999** 76-note mother keyboard, split and layering facilities, 128 voice selectors, volume, pitch-bend, modulation controls. **+**



sturdy construction, looks; **+** not sensitive to either pressure or velocity, price; **+** overshadowed, in most respects, by MKB1000.

**MKB1000 – £1499** Velocity- and pressure-sensitive 88-note keyboard, overall volume, pitch-bend, modulation controllers, 128 voice selectors, MIDI split and layering facilities. **+** excellent action from weighted wooden keys, superlative construction; **+** no individual level controls, lack of remote programming facilities, price; **+** another professional people's product, though even they might find its acquisition hard to justify.

#### YAMAHA

**KX5 – £399** Identical in spec to KX1, but, miniature keys. To be reviewed.

**KX1 – £799** Three-and-a-half octave, velocity- and pressure-sensitive keyboard, volume, pitch-bend, modulation controllers, 32 voice selectors. To be reviewed.

**KX88 – £1399** 88-note velocity- and pressure-sensitive weighted keyboard, 17 user-assignable performance controllers, split and layering facilities. **+** vast range of performance options, onboard programming facilities coupled with user-assignable parameter control area, keyboard adds new dimension to many DX voices; **+** keyboard has slightly spongy feel absent on DX1; **+** more of what a master keyboard should be, though is a piano-type keyboard the best medium for applying after-touch? **+**

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# On The Level

Few people would envy the lifestyle of a man who spends almost every waking hour within the confines of the recording studio, but I-Level synth player Duncan Bridgeman is just such a man. What does the studio do for

him? *Dan Goldstein*

In a large, smartly furnished 24-track studio less than a short-hop bus fare from Arsenal football stadium, a blond-haired, slightly-built figure is standing over a hot DX7, desperately trying to perfect an overdubbed synth line. The sound is that of a marimba – the DX's own factory preset being augmented by an acoustic sample courtesy of a Powertran MCS1, the two linked together through MIDI – and the player is Duncan Bridgeman, session musician, freelance producer, and one-third of I-Level, one of this country's best long-term 'dance-floor-with-feel' prospects.

The band have had a second album, *Shake*, released last month by Virgin, but Bridgeman has already undertaken a further project in the form of an album production job for Spanish hopefuls Radio Futura; the marimba overdub is for them. He works in conjunction with I-Level bassist Jo Dworniak, and together the duo already have a number of production achievements to their credit. Most notably, they played on John Foxx's 1983 long-player *The Golden Section*, and formed I-Level with reggae singer Sam Jones the same year.

'Jo was working as house engineer here at Musicworks', recalls Bridgeman, having successfully completed the overdub at the fifth attempt. 'I was working as an insurance clerk, without ever realising that it was even possible to make a living out of making music. I mean, I'm from a fairly conventional middle-class background, and you don't get given music as a possible choice of career when you're at school – you're just told to be an insurance clerk.'

'It was only when I met Jo that I discovered the possibility of studio work, and we started playing and recording here in the early hours – when there was no one booked in to record. Then Sam's old band, Brimstone, came in to do some recording, and when Jo played Sam a tape of some of the stuff we'd done together, he wanted in. He put some vocals on one song we had called 'Give Me', and that was our first single.'

Any problems getting a record deal?

'No, none at all. Virgin were the first company we took it to, and they agreed to put it out straight away! They've been great ever since, giving us as much time as we need to make each album, and as much money, too.'

'The single was quite successful, especially in America, and it was good to have that success early on, because it set us up here before we'd even got started as a band.'

Since then, though, none of I-Level's 45rpm releases have looked likely to hit headlines. As the press release says, they gave the charts a warm glow without ever setting them alight.

But the non-arrival of superstardom isn't for want of trying. Certainly, the band's songwriting skill, playing ability and inventive production technique *deserve* wider attention, even if Bridgeman and Dworniak have other irons in the fire.

'That's the good thing about earning your living as a producer as well as a

'I'm from a middle-class background, and at school they don't offer being a musician as a career - they just tell you to be an insurance clerk.'

musician', comments Bridgeman, who clearly relishes the prospect of fulfilling either role. 'If you're just a musician in a band you're lucky if you do one album a year, but if you produce other bands as well you get the chance to do maybe four or five, which means you spend almost all your time in the studio.'

Doesn't that get tiring?

'Nope. I love it. We've been at Musicworks almost continuously for the last five years, but it's really the only one thing I love doing. At the moment I'm living off doing production work with Jo, though we never take on something we don't feel is worth doing. You can't really attempt to

produce an album properly if you've got no interest in it – that's why it's important that we enjoy everything we do.'

## From Production to Playing

So much for Bridgeman the producer. His keyboard-playing skill (the odd overdub or two excepted) is also beyond question, and he's been playing synth on and off ever since meeting up with Dworniak. What got him interested in electronics in the first place?

'Difficult to know, really. I guess I was just getting into playing music when the first reasonably cheap synths were coming out, so it seemed natural to get involved with them.'

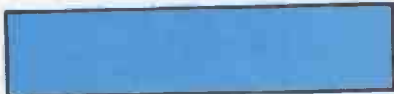
'The synth I started off with was a Korg 700S monophonic, which was old but good, plus a Roland string synth that I could play chords on. Since then I've been through a whole load of stuff, mainly polysynths. I've had a Jupiter 4, a Prophet 5, a Rhodes Chroma, a PPG Wave 2 and, most recently, the DX7.'

'One thing I have realised is that timing is all-important when it comes to buying keyboards. I paid £1600 for my JP4 and even more for the Prophet, but they'd hardly be worth anything at all now. I don't think I could give the JP4 away now even if I tried, and the Prophet's hopeless because even though it's a V2, it's still impossible to keep it properly in tune. You know, you'd put it in Unison mode and it would sound like you were playing five notes at once!

'A similar thing happened with the Chroma. I bought mine just before the DX7 came out, and I suppose I bought it for the idea of it as much as anything. You know, the idea of all that programmability, that was what appealed to me. But then the DX7 arrived, and that's got another degree of programmability again, so now I tend to keep the Chroma at home and use it for doing Joe Zawinul impressions; it sounds just right for those!'

The DX might have programmability, but few people have so far managed to





exploit its potential to the full. Has Bridgeman succeeded where so many would-be programmers have failed?

'No, not really. I *have* managed to come up with some really great sounds of my own, but I haven't worked my way into the DX in any logical way. If someone heard one of my DX sounds and asked me to change one particular component of it, I really wouldn't know where to start.

'But that doesn't seem to matter, because the DX sounds so good even with just its preset sounds in it. It's particularly good in natural ambience.

'If somebody heard one of my DX7 sounds and asked me to change one particular component of it, I wouldn't know where to start.'

There's a great room here at the studio where we plug synths into amps to get the sound of natural acoustics. But actually, I still prefer the *sound* of the PPG, because the DX can still sound a bit thin when you put it in a mix. You know, the PPG always stands out no matter what you mix in with it, but you find you have to work on DX sounds before you can really hear them properly, especially bass sounds.'

## From Synths to Samplers

Yet in spite of his love affair with digital synthesis, Bridgeman has found himself

even more attracted by the potential offered by sound sampling, as he explains.

'I love playing with studio toys, and the latest one I've got is the Powertran MCS1. I bought mine ready-built not long ago, but already it's come in really useful. It's so much easier to use than something like an AMS, loops are dead easy on it.

'I've been sampling all sorts of things. One thing I've been doing a lot of is sampling bits from old I-Level master tapes. I know it sounds funny, but it means you don't have to go to the trouble of creating a good bass sound when you know you've used something like it before. And the other thing I've been doing is sampling records, which is a lot of fun. I've got a whole album full of Gerry Anderson TV music, so I've been nicking bits of string sounds from *Captain Scarlet* episodes; and the bass line from the *Avengers* theme music – that's a great one to sample...'

No worries about the copyright situation, then?

'Oh yeah. But that's part of the art of sampling. You've got to alter the character of something like a snare drum sound, just in case somebody recognises their sound. I've been going through my collection of Beatles records, trying to find a Ringo Starr snare strike that hasn't got guitars all over it as well, but even if I find one, I'll have to change it a bit.

'But the whole thing seems a bit stupid to me. I don't really see how anybody can claim to *own* a sound. I mean, nobody *owns* the sound of a violin, do they? And what's the point in people developing all this sampling technology if nobody's going to be allowed to use it? It's daft, if you ask me.'

## From Pop to Jazz

Well said, that man. Mention of Zawinul and the Beatles leads us to the question of Bridgeman's musical background. I-Level have their own, distinctive summer-funk style, but the keyboard player has been involved with all sorts of different musical projects. What are his main sources of inspiration?

'Well, I was brought up on The Who and Bowie, so I've got my roots firmly in pop music. But then I met Jo and he's a real jazzier. He introduced me to people like Weather Report and all that sort of stuff, and over the last five years I've been listening to an awful lot of jazz.

'But lately, we've both been listening to a lot of pop music again, especially 12-inch singles. I think the 12-inch is a really great medium, because it lets the producer or engineer show his work to anybody who wants to listen. If you put a lot of effort into, say, recording a backing track, you know that on the seven-inch it's going to get lost because what matters most is the song. But on a 12-inch, you've got the time to put the spotlight on something like the drums or the bass line – the things that don't get heard usually.'

If the pop music of today is more attractive to Bridgeman than that of five years ago, does he think the standard of pop music has gone up since that time?

'Well, not so much the standard of the music, because I think it's the music staying the same that makes pop successful, but certainly *production* has improved a lot. If you listen to something like Frankie or Scritti Politti, the things that are on their 12-inchers are a real step forward; that's the sort of standard I'd like to live up to as well.'

By this time, four swarthy Spaniards have entered the Musicworks control room, and Bridgeman has waltzed over to his keyboards to pose for photographer Vosburgh. Once the Radio Futura album is out of the way, where do he and partner Dworniak go next?

'Well, we're going to be doing more stuff with I-Level quite soon, plus any production work we feel like doing. What would be really nice is if we could have a couple of really big hits with I-Level. That way we'd earn enough to maybe record some more serious music. Obviously I like what we're doing in the band now, but now and again Jo and I get into a really good groove and start playing really well together.

'When we first started playing here, we were both a bit innocent and we didn't really know what we were doing. We misused a lot of the gear, but what we came up with was fresh and exciting. It's that freshness that I want to get back to. Neither of us are ever going to be that innocent again, but we could get that feel back by taking things the other way – making music for other musicians to listen to. Muso Music, I guess you'd call it. Yeah, that sounds good; I like the idea of doing that.'

Muso Music it is, then. ■





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**YAMAHA**

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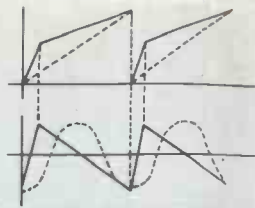
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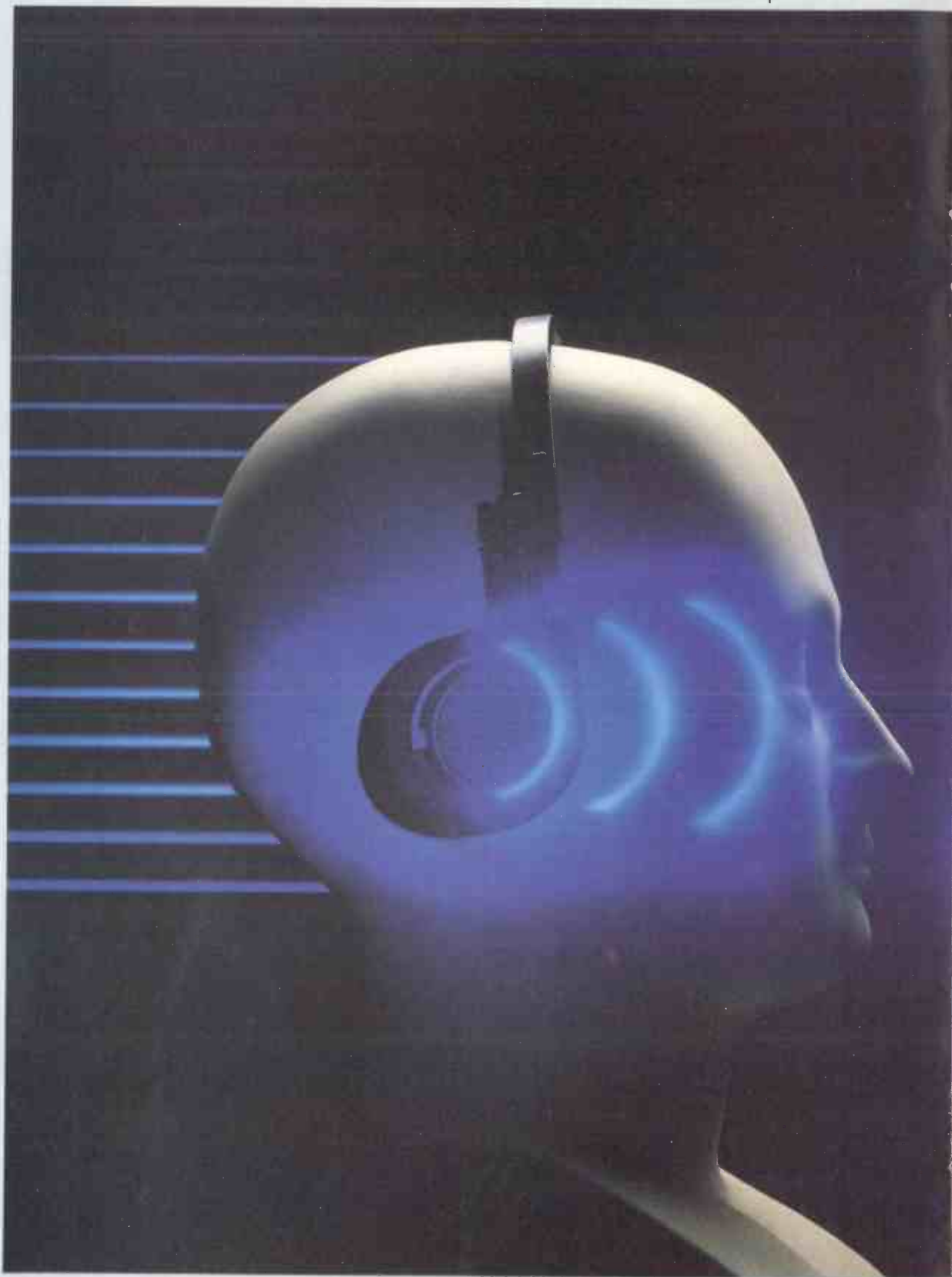
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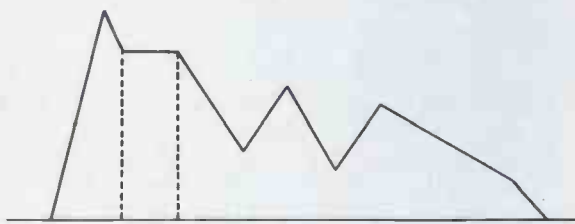


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# RAZOR SHARPE

Shakatak keyboardman Bill Sharpe has sprung a surprise on us by coming up with a solo album that throws his musical creativity into a new light. How does a session musician with a staid reputation come up with something so fresh and inspiring? *Dan Goldstein*



Sharpe and singer Tessa Niles in a still from the 'Famous People' video promo.

The recipe is now a familiar one. You take a musician, classically trained, very experienced and extremely competent, and put him in a field of music that pays the bills but doesn't stretch the ol' creative genius nearly as much – or as often – as it should. After a while, your musician will come to feel there's something lacking in his present way of working, and if he's really worth his salt, he'll seek to alter the current *status quo* by striking off at a tangent – doing something a little less formulaised, a little more *risqué*.

That, simply, is what Bill Sharpe has done in 1985. As a session keyboardman of some repute, he's done more than his fair share of playing just for the sake of playing, most notably as a founder member of soft-core dance group Shakatak. The band have been successful, no doubt about it. Sharpe now has a large, detached house in the part of Northeast London that would rather be called Essex, and an income level that guarantees a pretty comfortable lifestyle for at least the next couple of years – even if he

were to do no more work in that time.

Yet Sharpe is still very much in business. Four years of writing, recording and touring with Shakatak came to a temporary end last summer, as Sharpe decided it was time to do his own thing.

'I'm constantly writing new material, and I'd got to the stage where I had a lot of songs that just weren't suitable for Shakatak. We were touring a lot in Europe and Japan last year, and when we got back, I decided to have a go at doing my own thing.

'So I bought some studio time at Rock City Studios in Shepperton, and started recording my own album. I was anxious not to use too many people from the band in the recording, because I wanted it to have a different feel from anything I'd done with Shakatak.'

## Solo Album

And Sharpe has succeeded. The album, *Famous People*, is a varied and colourful collection of songs and instrumentals. They all have a vaguely jazz-funk feel to them, but rarely do they

encroach on Shakatak territory. There's the YMO-influenced electro bop of 'Catching a Train', the synthesised tranquility of 'Peace', and the stunning dynamism of the first single 'Change Your Mind', to name but three. As many of you may already know, 'Change' saw Sharpe forming an unlikely collaboration with Gary Numan, who part-owns Rock City and guested on lead vocals for just that one track.

'It was an interesting combination – especially as we come from such differing backgrounds. He's from a totally synth background, whereas I'm a classically trained musician.

'It all came about by accident, really it was a fairly dull track to begin with, but then Gary put some vocals on it, and when some record company people heard the mix, they said they thought it was a hit record – they were right!' The success of 'Change Your Mind' has come as a pleasant surprise to Sharpe, but having hit singles isn't exactly a new experience for him, and he doesn't feel obliged to make a follow-up record with



Numan in the near future.

'I'm not sure whether we're going to do anything like that again. Neither of us are going to have much time in the immediate future, because I'm recording the new Shakatak album now, and Gary's got plenty of his projects of his own. We might even decide we're not going to cash in on it at all, in which case we won't do anything.'

But Numan was far from being the only guest contributor to Sharpe's solo album. Pino Palladino came in to play fretless bass on a couple of the record's more downbeat songs, several members of the Morrissey Mullen band put in appearances at various intervals, and on the vocal front, Sharpe enlisted the help of session singer Tessa Niles for the lead on the album's title-track, which is also the new single.

The weeklies, of course, have taken to *Famous People* like a cat takes to water. Accusations that the album comprises nothing more than a load of Shakatak out-takes have been rife, but it hasn't bothered Sharpe in the least; he's experienced enough to know that very few music critics actually know anything about music.

'I've read a couple of reviews that have said it sounds like Shakatak. Anyone with an ear would realise that isn't the case, though obviously there are a couple of tracks that do sound similar. But I can take all that. The band has always been a target for criticism, so I'm used to it now. Mind you, some of the things Gary has had done to him by the press have been incredible - at least I haven't had to go through *that*.'

## The History

Like I said, Sharpe's background is a conventional one. Classical tuition on piano from an early age, a teenage immersion in the piano music of the romantic era, and study for a degree in Music Theory at University. But Sharpe the student had never confined his interests to the classics, and in time, jazz and rock began to take their effect on his own musical endeavours. He joined several jazz-rock groups as keyboard player in and around his native Bishops Stortford (one of the most successful featured one Trevor Horn on bass), but found himself even more entangled in the rock scene when he fell feet-first into a job as Trainee Engineer at the BBC's Maida Vale recording studios.

'Those were the days', he recalls with relish. 'I guess I was a bit lucky, just walking in there and getting a job. I started off as a tape-op, but within only a matter of months I was sitting in as engineer on sessions for the John Peel and Kid Jensen shows. We had all sorts of bands in there: The Police, The Jam, Duran Duran, you name 'em. Actually, the training was very useful. The BBC teach you an awful lot about recording and production that I don't think you can really learn anywhere else. That helped me appreciate the more technical side of making music, though I was still a playing

musician first and foremost.'

In fact, it was Sharpe's skill as a playing musician that landed him the job as keyboard player and chief songwriter with Shakatak, the band itself being an initially informal get-together of like-minded studio friends. But he was keen to stay on at the Beeb lest the band suddenly fall apart, which meant spending the first two years of Shakatak's

'The instrument I've been most impressed with lately is the Kurzweil... but it'll never play like a piano, no matter how much it might sound like one.'

existence (during which the first handful of UK hit singles was notched up) working as an engineer by day and a musician by night. It was only when Shakatak began to break in overseas territories that things really got out of hand, and Sharpe jacked in his engineer's job to become a full-time working musician.

'It still wasn't an easy decision to take', he muses. 'But I realised I wasn't really getting the time to do either job properly, so I started playing with Shakatak full-time. Not that I got an awful lot of time to myself then, either, but at least I only had one thing on my mind.'

## The Keyboards

It had been a couple of years earlier, back in Sharpe's pub band days, that

he'd discovered what electronics could do for his act. Up until that time he'd had a Hammond organ and an ancient Fender Rhodes ('I've still got it, though it's a little bit the worse for wear now'), but once he'd come across the likes of the Minimoog and ARP Odyssey, there was no turning away from synthesisers. He bought both, and still uses them today.

'There's nothing today that can touch the way a Minimoog sounds. I think it's basically just a question of filters, because none of today's synths have a design quite like that. They might be polyphonic, but they just don't cut it the way a Minimoog does.'

The only thing I don't like about it is the wheels. I prefer the touch pads on the Odyssey: they're easier to use because pressing them is more like pressing keys on a keyboard, it's more natural. But they're both getting on a bit now, and they're difficult to use live because they keep going out of tune.

'Lately I've started using a DX7 quite a bit, like a lot of other people, I suppose. There's a lot of it on *Famous People*. In fact, 'Change Your Mind' is basically just a DX7 and a LinnDrum, with the odd bit of grand piano here and there. There are so many things the DX can do - I'm still exploring the preset sounds, editing them a bit. I'd love to get into programming it in a big way, because it's such a great instrument, but so far I just haven't had the time. It's something that I've been meaning to do for ages, to really get into programming synths and computers, but time has been the big problem.'

'The instrument I've been most impressed with lately is probably the Kurzweil. I've been through it quite thoroughly and I'm really pleased with it. I guess I might just have to buy one! And the one I've been looking at didn't even have the



user-sampling; the sounds inside the machine really are that good. The way I figure it is that I'll be able to replace a lot of my on-stage equipment with a set-up basically consisting of a Kurzweil and a DX7, linked together through MIDI. That'll mean no more out-of-tune monosynths, and no more having to lug a Yamaha Electric Grand around the place!

And yet, against the impending flood of new technology in the Sharpe household, there stands an immaculate Bösendorfer grand piano, an instrument that sees use just as often as its owner can find the time to sit down at it.

'Yeah, I still practice whenever I can. It's still my favourite instrument. It's the feel of it, I suppose – it's such an expressive instrument. The Kurzweil will never play like a piano, no matter how much it might sound like one. It's such a great feeling, having all those mechanics in front of you and banging out a load of Chopin or whatever.

'I chose a Bösendorfer because it suits the sort of stuff we play. Some people prefer Steinways, and I can see their point because they do have a bright sound that carries really well at a concert. But for recording the music I'm involved with, it has to be a Bösendorfer, because it's so warm and vibrant, so smooth. Actually, Gary's got a great Bösendorfer at Rock City. It's a bit bigger than mine – a seven-foot-four – and it really sounds tremendous.'

## The Players

But Chopin can't have been the only historical figure to have influenced Sharpe during his brief but nonetheless successful career so far. What keyboardists does he listen to himself?

'Well, I like a lot of the great jazz pianists like Oscar Peterson, Art Tatum, and Nat King Cole who was an absolutely great pianist, no question about that. But my man has to be Herbie Hancock. As a musician he's amazing, because he's one of the few guys who's managed to keep his jazz roots without getting left behind by what's happening in the charts. He's got two sides to his music – the jazz side and the 'Rockit' side – and they're both equally as good in their own way. He's obviously a great jazz pianist, but he's great at manipulating synths as well. I suppose it comes down to where he puts the notes; he manages to apply such a great jazz feel to everything he does. I guess I must have seen him play about eight times...

'There are a few rock players I respect as well. When I was at school I was a great Keith Emerson fan, because I like that very lyrical style of playing. You do need to have had a classical training to really appreciate that, though.'

But does Sharpe consider his training to have been an advantage, now that he's got as close to the top of the keyboard-playing world as makes no difference?

'Well, it's certainly been a help. It's important to have had a classical training if you want to be able to play like Keith Emerson, because it's the only way you'll be able to acquire that technique. I like



that style of playing a lot, which is why I did the training and still practice now, but there are a lot of guys today who don't want to play like that at all.

'With the modern gear that's coming out now, it doesn't really seem to matter how much training you've had. Which is great, because it means you don't have to go through the strain of endless practising, but you can still make records. Vince Clarke might not be able to play

black notes or chords, but he can still make some great records!'

Well, Sharpe can take heart in the fact that a lot of doubting Thomases I've exposed to *Famous People* think it's not a bad record at all, even if Shakatak's own brand of sugary jazz-funk is beyond the bounds of their taste. As for the man and his career, it's back to Shepperton for the recording of the next Shakatak album, and an end to the limitless opportunities solo projects afford their instigators.

But this won't be the last we see of solo Sharpe. Flushed by the success of the album in general and 'Change Your Mind' in particular, the keyboardist has already drawn up a shortlist of material for a follow-up LP, which he hopes to start work on before 1985 is out.

'I'd like it to be a weird album', he enthuses. 'Not weird in the sense of odd material, because I'd like to carry on writing good songs, but weird in the way it's arranged. I want to do something that really sounds different. With a bit of luck I'll have been able to get deeper into programming by the time I come to record the album, so I should be able to come up with some sounds that'll really surprise people.'

Not that *Famous People* hasn't done that already, of course, but there's a look in Sharpe's eyes as he declares his future plans that tells you his best work hasn't yet seen the light of day. Let's hope looks aren't deceptive. ■





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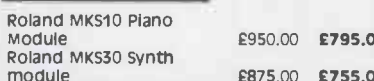


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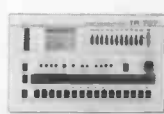
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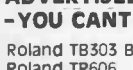
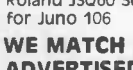
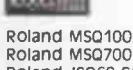
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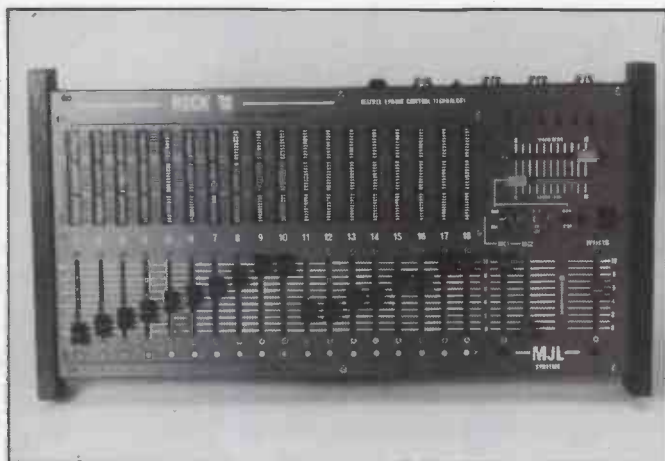
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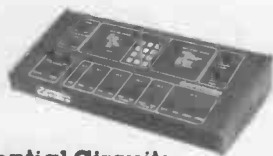
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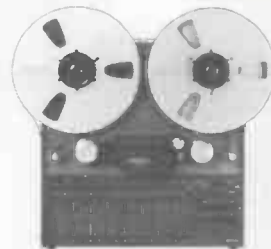


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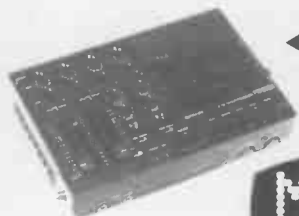
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## ON RECORD

Another selection of current music examined for your enjoyment and education. *Tim Goodyer*

Yello  
Stella

Electra EKT 1 960 401-1

*Stella* is not, as originally suspected, a venture into alcohol sales by the record industry, but the latest vinyl offering from the musical facet of enigmatic Swiss-German artist Dieter Meier. It contains 11 original pieces with lyrics by Meier and music by the equally mysterious Boris Blank.

Side 1 opens with 'Desire', a leisurely instrumental background with a narrative vocal laid inconspicuously over the top – the delivery sets the tone for the record as a whole. 'Vicious Games' takes up where 'Desire' leaves off, with a more up-tempo backing and a striking female vocal contribution from Rush Winters, though it's still punctuated by a narrative vocal from Meier. 'Oh Yeah', meanwhile, sees this vocal slowed and mixed as if it were a part of the percussion pattern to striking effect.

The guitar, thus far present only in modest quantities, comes to the fore on 'Desert Inn', an otherwise strongly percussive piece that's immediately and starkly contrasted by 'Stalakdrama', which begins by trying to convince you you're about to listen to FGTH's 'Relax', but turns out to be a series of differing soundscapes that range from dripping water to some very classical styled strings! The side closes with 'Koladi-ola', a piece that even manages to incorporate a little jazz drumming into its varied tone colours, just for good measure.

Side 2 continues in a similar vein, and includes a little bit more of the Frankie way of doing things in the form of the sequencing on 'Domingo' (together with a French vocal from Ms Winters), before extracting a little bit of the feel of Pink Floyd's 'On The Run' for 'Sometimes'. After the pleasant instrumental aside that is 'Ciel Ouvert', the album finishes with its best song, 'Angel No'. Another up-tempo piece, this uses all the tricks previously exhibited elsewhere on the album, which I guess is Yello's way of trying to get you to play the whole thing again. It works.

## Vangelis

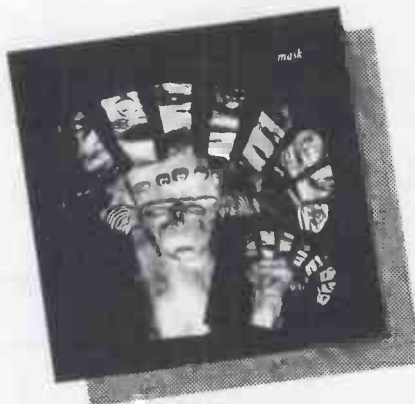
## Mask

Polydor 825 245-1

The press release accompanying *Mask* makes mention of the fact that Vangelis' *Invisible Connections* LP has been released by prestigious (and normally rather conservative) classical label Deutsche Gramophon, and as chance would have it, his latest offering is about the most

classically-oriented thing he's yet come up with. Recorded as usual at Nemo Studios in London, *Mask* sees the man himself taking composition, arrangement and production credits as well as all the playing ones. However, the vocal department sees him gain assistance from an unnamed (why?) chorale section, whose sensitive and spirited performances give the album its distinctive sonic character.

*Mask* comprises six sections titled 'Movement 1' to 'Movement 6' (how



dull!), three of which appear on each side of the album. The first movement opens with some grandiose choral work not dissimilar in structure to certain parts of *Heaven and Hell* (the composer's first album), and this gives way to a furious, repeating piano run which later appears as a sequence in the same movement. Timbrally speaking, the orchestral approach prevails and carries us through into the second movement, which consists broadly of more of the same. One noteworthy aspect of both this and the next movement is the inclusion of what I can only describe as truly enormous classically-styled 'bangs'! Aside from those percussive explosions, the third movement is based around two chords whose articulation is similar to that imposed by the old Mellotron. Remember the ungainly attack and total lack of any sustain whatsoever? Well, it's recreated here in all its low-tech glory, I'm afraid.

Fortunately, the other side of the platter has a few surprises in store. Retaining a classical overtone, the fourth movement moves right up to date in its sound content, employing more percussive, electronic sounds in a sparser, less cluttered instrumental setting. Because whereas the first three movements are drab and unexciting, the second side has a sparkle of ingenuity that lifts it well above the standard of *Soil Festivities*, Vangelis' recent excursion into the world of computer music systems. The contemporary (DX7 tuned percussion arpeggios) is counterpointed by the traditional

(lots of Latin from the chorale), and the whole thing gels nicely.

*Mask* is a work of some daring that doesn't quite come off in a lot of places, but it's ultimately rewarding to listen to, and it should reach a wider audience than *Soil Festivities* ever could.

The Durutti Column  
Say What You Mean...

Factory FAC 114

Vini Reilly's Durutti Column bring us a six-track 12" single comprising a mixture of vocal and instrumental pieces, all of them unmistakably Durutti.

This is delicate, introspective music that really needs to be *listened to* to be fully appreciated. No point trying to do the ironing to this one, I'm afraid. The opener, 'Goodbye', is an instrumental that acts as an appetiser for 'The Room', which follows. This showcases some excellent sax work, as well as a vocal that's positively *fragile* in its appeal. Another instrumental, A Little Mercy, ends the first side, while the flip's most notable track is the lengthy 'Silence', a song that takes Reilly's lyrical stance into new depths of melancholy, if such a thing is possible.

Personally, I'm beginning to wonder if The Durutti Column will ever get the attention they so richly deserve. Maybe their music is simply too thoughtful, too sensitive, and too gentle for the mass media to cope with, though I doubt Reilly will lose any sleep over the fact.

## Milton

## Love is like a Violence

Embryo CELE 2T

Pictured on the front of the sleeve of this 12" single clutching a saxophone, Milton is presumably responsible for the manic brass-playing on 'Violence'. The track's opening reminded me of a cricket suddenly discovering rhythm for the first time, though it quickly acquires a sparing repetition of electronic noises that play host to another narrative vocal. Obviously Flavour of the Month, those. Actually, the vocal style is highly affected but quite individual – decidedly odd, in fact! More drums arrive towards the end of the song before the cricket returns to tell you to put the other side on.

'Violence' isn't really strong enough to be modern dance music as the current charts interpret it, but I wait with baited breath for the Milton album, itself promised for release soon. ■





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## ON CASSETTE

A selection of tapes from readers brave enough to run the gauntlet of an E&MM review. *Tim Goodyer*

3D Fiction

3D Fiction *Rotherham*

Possibly a familiar name to some readers, as the band have been featured in 'On Cassette' twice before. Of the three tracks on this, their latest tape offering, the first two are alternative mixes of the Edwin Starr hit 'Eye To Eye Contact', the third is a band composition entitled 'Sometimes'.

One previous criticism this column had of 3D Fiction was the lack of a song good enough to attract record company attention, but this tape is certainly a spirited reply to that criticism. Recorded during December last year, all the songs are tight, finely-executed examples of modern electronic dance music. 'Eye To Eye Contact' is as infectious as the Editor remembers it, so all credit to the band for preserving the sparkle, while 'Sometimes', though not as inherently strong as the Starr composition, is nonetheless an excellent 'demo' (some of the credit for which the band allot to MIDI) and it could only benefit further from professional production.

What worries me about what's an otherwise invigorating tape is that the blend it contains is a little too familiar: I'd liken the sound to a cross between Dead Or Alive and Donna Summer. Still, 3D Fiction claim to have found favour for 'Contact' in the clubs and are threatening to press it themselves if there are no takers. Either way, I hope they succeed.

The Lucy Ring  
*London*

This one features an unusual phenomenon: the successful transfer of 'atmosphere' to a demo cassette. The song is 'Way of the Heart', and it relies on a fatally intriguing rhythm/percussion arrangement, around which is woven an intriguing vocal line. Setting aside its similarity to latterday Japan, I really think someone should hear this! I'm not sure if the other three tracks on the tape really are much weaker than 'Way of the Heart', or whether the competition presented by

this one song just makes them seem so. More of this, please, and soon.

Another Russian  
*Winter North Shields*

Four Northerners under some misapprehension over just how far north they actually are, offering two songs they've written themselves and one penned by a former scribe for this page. Now let's get one thing clear: you can neither bribe nor blackmail E&MM staff (*did I miss something - Ed*), and what we actually have here is a truly tinny TR606 drum sound doing its utmost to support a set of unimaginative songs and some drably singalong vocals. The day comes closest to being saved by George Todd's rough but lively guitar, but it isn't quite enough. Concentrate on the songwriting, boys.

Similar Vein *Australia*

Something a bit out of the ordinary, this. On first inspection, the tape (titled *Anomie*) appears incredibly pompous, containing not only an elaborate plot, but a *moral* too, would you believe. Plucking up enough courage to put the tape into the machine reveals a collection of well written, competently performed songs linked by short sound effect bridges (cue audio backdrop of bar scene) a touch reminiscent of Sniff and the Tears. The band's list of equipment (the most up-market synth is a Poly 800) belies an overall sound of startling quality, with the most convincing acoustic drum impersonation I've yet heard from a Yamaha RX15. Amazing what a bit of thoughtful programming can do...

Mark Flowers/Vision  
*Leamington Spa*

Opening with a repeated sequence that adamantly refuses to progress, 'Ocean of Awareness' sets the scene for most of the five tracks here. If you're going to try to create an atmosphere in a piece of music, your choice of sounds is of paramount importance (a good recording is an advantage, too), and this is where Mark has failed, I'm afraid. Admittedly, equipment is at a bit of a premium (just the one Poly 800, though we've just seen what one of those can be made to do), but that's no excuse for underdevelopment. Underdeveloped sounds and underdeveloped music leave a lot of unexplored ground - in both areas.

So, shorten the pieces, expand your collection of sounds and experiment with different rhythms and sequences, Mark. But keep the keyboard stand - at least until it's required for Sunday dinner!

*The Best of the Rest*

NML is the astonishingly imaginative name chosen by Leicester's Nigel M Lloyd for his musical alter-ego. In spite of providing us with the Bold Sleeve of the Month, Nigel seems to have a tendency to make music that's simply too reserved for its own good. There's not really much point inflicting yet more directionless TR606 drum patterns overlaid with bubble-gum synth lines on everybody, at least not as far as I'm concerned. Maybe someone out there will love it. **Chapter 29** come from Torquay, where it seems the job of the vocalist is to support the band as well as hide at the back of the promo pics. Come on, Julie, let the world know you're there. The band have recently replaced 'an ancient 1960s Vox organ' with a new DX7, but frankly I can't tell the difference. Was it worth it? Remember what Elvis Costello achieved with his! Anyway, from Finland we have **IPPU**, the creation of one Seppo Tapaninen. An eight-song demo shows Seppo using an extensive selection of equipment, some of which is home-built, to occasionally fascinating effect. All the pieces are instrumental, and cover everything, feel-wise from Madonna to Kraftwerk. There's even an attempt at running entire pieces backwards, though that's no excuse for the rest of you to run off and try it. The tape we received was accompanied by a very comprehensive list of equipment that also details the ways in which it has been patched together to achieve various results. A quick mention for the vocoder here, as I don't think it's been used to its full potential by *anyone* to date - and as if to prove my point, Seppo manages to sweep his vocoder's filter with a Syntom to produce some intriguing sonic results. So go to it, demo people: let's get the old vocoders dusted off and into action. After that technological euphoria, we come to this month's final example of reader endeavour, another unprovoked Drumatix attack from Sussex's own **Chris Winn**, who would do well to concentrate on writing for the Eurovision Song Contest. This sounds like Christmas again, right down to the sugar-coated vocals and singalong melody lines. Still, there's a market for it somewhere. ■

*If you've made a demo you'd like us to hear, send it well protected (accidents do happen) to On Cassette at the editorial address. Feel free to include as many equipment/recording details as you can, plus the odd photograph or two if possible. And as from next month, we'll be printing contact numbers and addresses for featured demo artists if we're requested to, so don't forget to attach them to your tape as well.*





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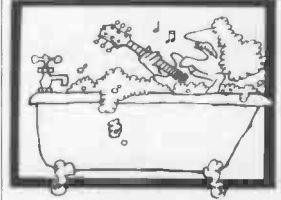


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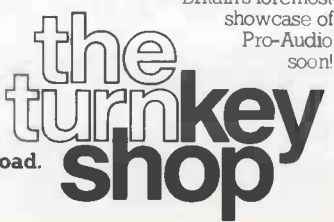
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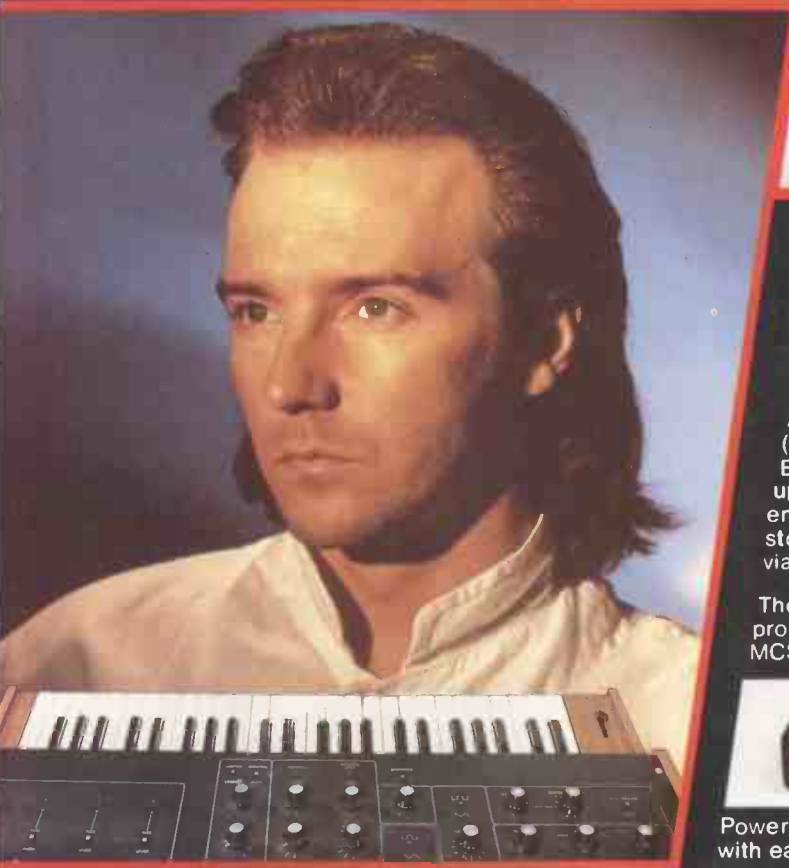
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EXCERPTS FROM

# CITY SLAB HORROR

This month, Australian electronic industrialists Severed Heads release their second UK album to a small but loyal following that knows musical courage when it hears it. Chief Head Tom Ellard answers the questions after the band's first live performance in Britain. *Dan Goldstein*

**E&MM: What, precisely, does Severed Heads consist of, and what's it achieved so far?**

It's an Australian band; the name's been in use for about four years now. We put out our first record at the beginning of 1980, and one every year since then, mainly independently in Australia. It's not a very healthy place for electronic music, as the big thing in Sydney is still very much rock 'n' roll. So it's hard to get very far doing anything that's at all experimental, there aren't any recognised channels for it outside of specialised cassette labels and so on.

Two years ago we were struggling, but then Dave Kitson from Ink Records in London picked up a copy of our *Since the Accident* LP when he was over in Australia doing research for a compilation album, and he was sufficiently impressed to want to release it here himself. And it's done quite well here, because in England you can find a decent-sized audience that's into something a little bit out of the ordinary.

I think what a lot of people in Europe like about what we do is that it is a little bit off at a tangent from what's going on here. Being slightly cut off from what's current in the UK and Europe means our music has an individual flavour to it, a novelty that people seem to like.

In Australia you can get all the same information you can get here, all the same magazines you can get here, and even most of the same equipment you can get here. But the difference is that there isn't the same network of people. You don't get to experience avant garde music live, and you don't get to talk to other people very often about what they're doing.

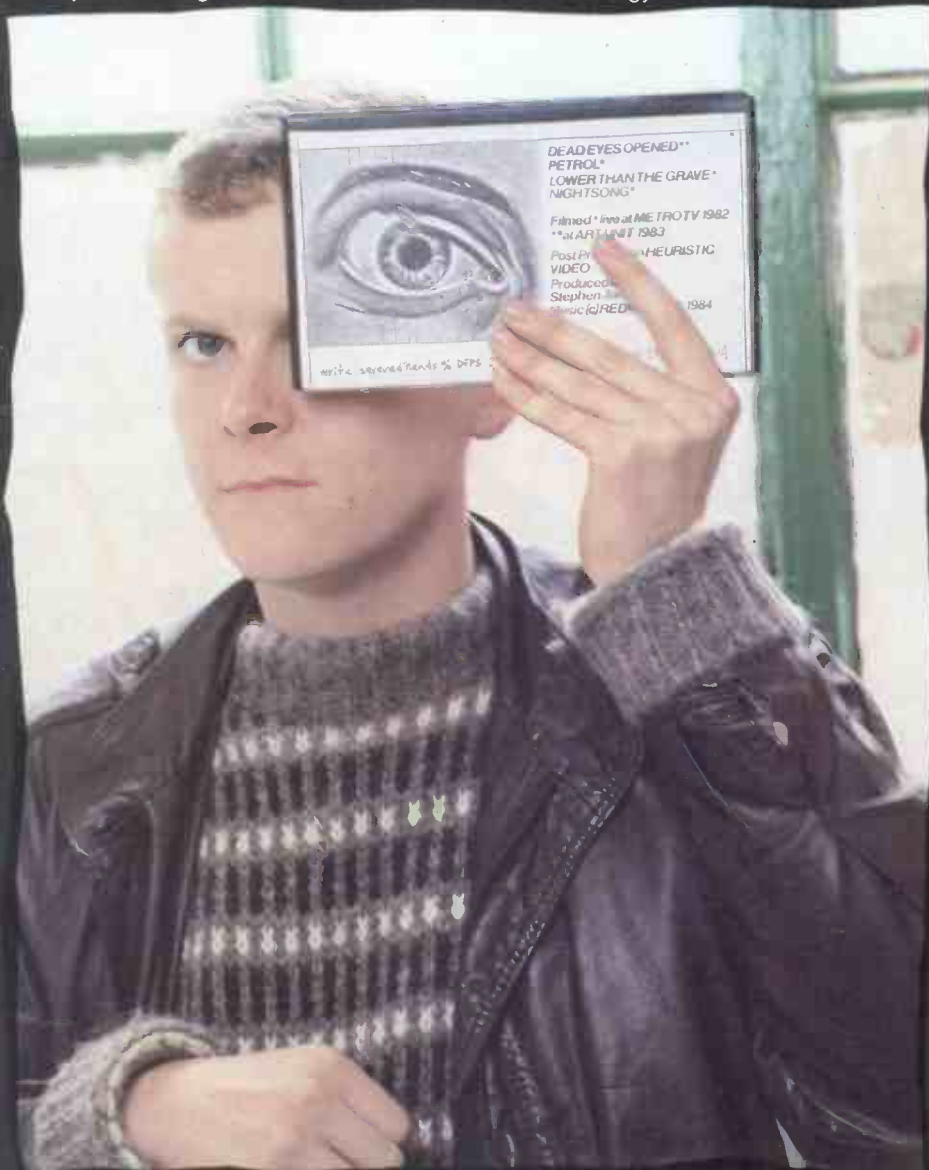
**So what got you interested in electronics and computers in the first place?**

Well, it was really that big spate of what was called industrial music or electro-punk, about '78 or '79. People like Daniel Miller, Throbbing Gristle, Cabaret Voltaire. I was never really into punk as such, but when you get people using really cheap electronic gear in interesting ways – that's when it starts getting exciting.

Around that time I bought my first drum machine, a fuzz unit, and a third-hand Kawai 100F monosynth. It was terrific, an absolutely brilliant piece of machinery – honestly! It makes the best squealing and ranting noises you ever heard. It's probably more like fifth-hand now, but I still know where it is.

As you can imagine, there wasn't much

motivation in Australia, except that SPK were just starting up and doing a few concerts in and around Sydney. But we got offered half a record to play around with quite early on. It only cost us around £250 to be involved in, so we did it. We came up with an absolutely abysmal bit of noise! But it was worth it, it had its own kind of energy.





**Presumably your range of gear has increased since that time...**

Oh yeah, though the improvements haven't necessarily been for the good. At the moment I've got a DX7 and I've just got a Commodore 64 and a Jellinghaus 12-track software package, but I'm very disappointed with a lot of it. The program I'm using has still got a few bugs in it, and using the German scale doesn't help.

And so far I haven't got much of interest out of the DX, either. I've got maybe three or four sounds that I consider to be incredibly aggressive and fun, but the problem with an instrument like that is that it's easy for it to become predictable. If you take the trouble to try and understand the principles by which it works - which admittedly takes a long time - you begin to understand what you're going to get out of it before you've actually achieved anything. With something like an old modular synthesiser or a roomful of Korg MS20s (which is one particular trick we pulled on one occasion), you're never quite sure exactly what's going to happen next. I'm not really interested in doing what Dave Bristow does, just replicating other sounds, so I don't really know - I hope I'll be able to get into the DX eventually.

As for the Jellinghaus, let's just say I wish I'd gotten a Roland MSQ700. Then at least I'd have been able to transport it. Carrying about a Commodore, the interface, the software and the disk drive all over the place can get quite difficult - everything's so bulky! Plugging a Micro-Composer into an MS20 is easy, but this MIDI stuff can get damn awkward; you end up with a mass of leads all over the place. The cost is immense, and the results aren't really all that spectacular. **So what's the equipment on City Slab Horror, the new Heads album?**

Well, it's mostly MS20 and Roland MC202, not exactly hi-tech stuff. The MC202 is brilliant, one of the best synthesisers Roland ever built. It runs on batteries, so I can bring it over with me to England and use it on stage, it's easy to use once you've got into it, and you can run just about anything off it. In fact, almost everything in my home studio runs off the 202; the drum machines, the synths, even the Jellinghaus software.

The monophonic set-up is one that I like a lot. With an MS20 and a Micro-Composer you can fill up seven tracks and dump down, then fill another six and carry on like that, so there's quite a bit of potential, and the most important thing is that the *quality* of sound can be a lot higher than you get with polyphony. With an MC202 system you can have seven different tones and amalgamate them, where as something like a DX7 gives you polyphony but only one sound to play with at any one time.

**So as far as you're concerned, the highest-tech music hardware doesn't really fit into the Severed Heads scheme of things?**

Well, look at it this way. Dave Kitson has offered me time in a 24-track studio that has a Fairlight in it, but I went in there

on one occasion and thought: 'I can't do anything in here!' The problem lies in the fact that if you've only got a limited amount of studio time with a Fairlight, then obviously you're going to use the preset disk sounds and obviously you're going to get in a good engineer to handle all the sounds for you. And the way things are at the moment, it's in a band's interest to use sounds that are instantly available *and* that have proven to be successful for other artists.

'The first synth I ever had was a third-hand Kawai 100F monosynth - an absolutely brilliant machine. It makes the best squealing and ranting noises you ever heard.'

That way, you get an endless cycle of sound that's very difficult to break out of. The radio plays songs with untreated LinnDrums on them, so bands record with untreated LinnDrums because they've heard them on the radio, and engineers get more and more requests for successful sounds that they feel obliged to comply with. And so it goes on...

**It's imperative, then, that you have a home studio of some sort that enables you to work without any time restriction?**

Absolutely. We've got an eight-track now, though like a lot of people we started off with a couple of cassette recorders and worked our way up from there. Actually having that number of tracks to work with is important to us,



because so much of what we do is based around tape loops. If you get an eight-track loop going, you can create some bizarre percussive effects just by fading tracks in and out in time with a drum machine pattern. That's what results in those great, lolling rhythm patterns that have become very distinctive for us. It is low-tech, but it's good; it's got plenty of feel and aggression, the qualities I'm interested in.

**But there's a fair bit of sound sampling on Severed Heads records, how was that achieved?**

Well, most of it on the recent album is done with a Boss DE200, plus plenty of sound effects from tape. We used the Boss to trigger some really aggressive samples like punching noises and cars crashing. But the main problem with sound sampling is the pressure to show off the fact that you have one. If you

sample the sound of a crashing car, there's a temptation to let it run on to let everybody *know* you're using a crashing car. In fact, the best thing to do is to use just the part of the sound that has the most emotional impact, to work things so that the original sound is no longer recognisable.

I don't really think sound sampling as a technique has got very far yet. The main hold-up lies in the fact that people are trying to make narratives with it, rather than sitting down and *listening* to the aesthetic qualities of the sound itself. If you try to use sound samples for the purpose of storytelling, they get in the way of the music.

It's happening largely because the technology is still coming in. When the first movies came out, people were using the new technology in a very heavy-handed way and the movies they made suffered. It was only as the gear developed that people started using it in subtler ways; that's what should happen with sampling. What we have at the moment is a lot of people making glorified sound effects records with Fairlights, but it's a stage we've got to go through. Something like a Fairlight lets you sculpt a sound in detail after you've sampled it, but I don't hear much of that going on when I listen to records. The emphasis is still on the sample itself; the sculpting will come later.

**So what do Severed Heads have in store for us? What's next on your agenda?**

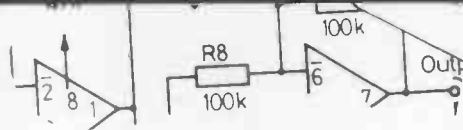
It's difficult to say for sure. *City Slab Horror* was made basically by me and a couple of other guys that I'm no longer involved with. One of them, Paul Deering, is working on a project to build an enormous FM synthesiser with John Chowning, who's the guy who came up with FM synthesis in the first place.

Right now I'm working with a video engineer, Steven Jones, who's done work for Fairlight and is now developing a huge video synthesiser of his own. The concert we did here last week wasn't really very live; it was basically me improvising on an MC202 to a pre-recorded video we've been working on in Sydney called *Kato Gets the Girl*. Steven's video synth is a wild instrument, full of possibilities, but it's just too big to bring over.

I haven't got much stuff recorded for another album, mainly because I'm still trying to find my way round the digital equipment. Soundwise I'm working solo and stuff is slowly coming, but I don't think I'm going to release anything more just yet because it wouldn't make sense to produce something while I was learning how to use the equipment - it would sound awful.

I'm interested in making some longer pieces of music, things that don't necessarily have to be just four minutes long. And the other thing I'll be doing is going out with a tape recorder looking for some more sounds to sample or make loops out of. These days it pays to have a very long mic cable, you know? ■

# TECHNOLOGY



## TECHtalk



Moog in recent action, opening last year's Ars Electronica festival in Linz.

We start an occasional series of interviews with the people behind today's musical technology. First behind the microphone is Robert Moog, father of modern sound synthesis and now Chief Scientist for Kurzweil.

*Henning Lohner*

**E&MM:** *You've probably told the story many times, but how did you get around to working with Kurzweil? Was the fact that your own company stopped making synthesizers the main reason you looked for someone else to work with?*

Bob Moog: I left Moog Music in 1977 – that was about when my employment contract came to an end. I felt at that time that I wasn't going anywhere, and Moog Music – or the company that owned it at the time, Norlin Industries – didn't seem to know exactly what I should be doing for them. So I thought I'd do some consulting and some custom instrument-building, which I did from '77 till about 1982 or '83.

But I always thought it would be nice if I could find a company with a management team that I respected, where the head of the company understood what my contribution could be. And finally it happened! In the summer of '83 I visited the very first Kurzweil exhibit at the Music Merchants Convention. At that time there wasn't even

a commercial product, just a demonstration of a computer program which you could play from a keyboard. Then I met Ray Kurzweil and several of the other people who were with the company at the time. At the beginning of '84, I was hired as a consultant for one project, completed that project, and was then hired in an ongoing consultancy capacity.

The more I worked for them, the more I enjoyed the work and, apparently, the more they saw the benefit I could be to the company. Finally, at the end of last summer, they made me an offer which I found very attractive... I decided it was in the interest of everybody for me to move to Boston and join the company full-time.

**So what exactly is your function within Kurzweil?**

My title is Chief Scientist, though that doesn't really describe what I've been doing. It's an interesting position. In fact, for someone like me who has a lot of ideas but not much administrative capability, it's an ideal position.

I exist partly in marketing and partly in engineering. The engineering side of my effort is directed towards what you would call 'basic research': exploring new ideas before they actually have to be incorporated into new products, so we know what they're capable of doing. In particular, I'm interested in new designs for keyboard actions and keyboard motion sensing. It's an ongoing thing – a very little bit of my work wound up in the 250, but a lot more of it will find its way into succeeding products that'll be introduced in the future.

I began my consultancy by working on keyboard designs, making certain recommendations to improve the feel of the keyboard on the present 250. Those recommendations were in fact incorporated before the instrument went into series production.

Right now, I'm not directly involved with any other parts of the instrument. There's a limited amount that I can do to get everything done properly in a reasonable



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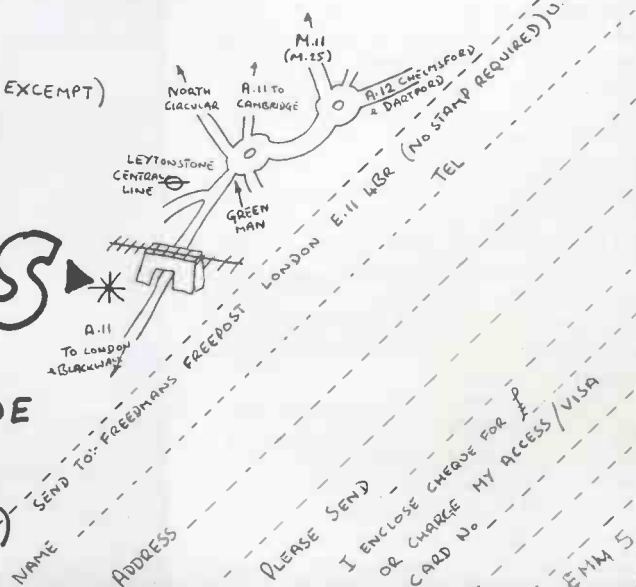
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amount of time. I'm concentrating on keyboard work, and I'm also helping the rest of the engineers with my own experience. For instance, one contribution I made to the audio channels of the 250 was by way of just working with one of the engineers to give him my experience of working with that sort of circuitry. And that was a great help to the company.

**Are you going to do anything with sampling and/or the synthesis of sounds themselves?**

I think eventually, yes... Now that we have Kurzweil users sampling and the 'MacAttach' method of connecting the keyboard to the Apple Macintosh computer, it shouldn't take too long. If you're wondering, the reason we weren't majoring on that side of things at Frankfurt this year was simple. We began by having a Macintosh computer on top of one of the instruments during the demonstration, and we found that in the short time that there was to demonstrate the instrument, a lot of people were getting confused. They thought you *had* to have the computer in order to operate the 250; in fact, you don't need it at all. Right now, the computer is just used to dump sound files and sequence files onto and then recall them from. Eventually, the computer will be used for more than that as the software develops, but at the moment it's just the storage medium. All the usual manipulation of the keyboard and its sounds, as well as the storage of an individual sound sample itself, takes place within the 250.

**There's been criticism of Kurzweil's decision to tie the user-sampling facility in with the Apple Macintosh. After all, it isn't really the world's most accessible micro. Have you worked with any other computers besides the Macintosh?**

No. Needless to say, we had a lot of discussions about which computer we should go for. In the end, the Macintosh was selected for three main reasons. The first is that its graphics capabilities are really terrific, and they're in line with what we needed in order to have a system that could operate with a musical instrument. We wanted to be able to dispense with the alphanumeric keyboard as a means of input, and in fact all the software being designed now conforms with that. To store and retrieve information, all you need is a 'mouse' and the music keyboard.

The second thing is that the operating system of the Macintosh is easily compatible with that of the 250. They're both 68000-based machines, and that makes it relatively easy to do some fairly complex interactive things. And the third reason is that the Macintosh is getting to be — in the United States anyhow — a very popular and readily available computer.

**So can we conclude that you'll be working with computers a lot more in the foreseeable future?**

Yeah. Up till now, there was no possibility to use the 250 with a computer, even though a computer 'porthole' and some software already existed inside the machine. Now we have some software for the Apple Macintosh, and we'll certainly have a lot more, so in that sense, all our customers will have much more to do with

computers in the near future than they have now.

**Still on the subject of the 250, can you explain the concept behind Contoured Sound Modelling?**

Well, it's a proprietary scheme. And 'proprietary' is a polite word for 'we're not going to tell you what it is!' It's a very complex, elaborate set of software programs used to compress the data of a series of sounds. What it enables us to do is get a

**'As time goes on, composers are going to be looking more towards writing for electronic instruments than they are for acoustic ones.'**

lot of data into a reasonable amount of memory.

If we took just raw sounds and digitised them, we'd run into problems. For instance, every key on a piano is different, and within each key, every level of dynamics has its own waveform. It's not just a matter of loudness — the whole waveform changes.

Now, we want to get all that information in there because we want to be able to reconstruct all those differences, but we also want to eliminate all the superfluous information — the redundant data that's not needed in order for that reconstruction to take place. And that's what Contoured Sound Modelling is all about. If all the sounds that are in the 250 now were there without their data being compressed, we'd need more memory chips than are manufactured in a year.

**So where does the Kurzweil system go from here as far as add-ons are concerned?**

Well, we have a couple of options that are available right now, though both of them need to be installed at a Service

Centre, obviously. The first is the provision for user-sampling, and the second is a whole new block of factory sounds that have been developed recently. This new block is called the 'daughter board': it contains several dozen of the sounds that our software people have gotten through to compressing.

I want to stress that Contoured Sound Modelling is not *one* program. It's a lot more than just one little trick. It would take hours and hours to explain all the things it entails, because the software engineers that use those programs to develop and compress sounds spend *months* on any given sound, getting it to the point where it's suitable for playing on a keyboard at all dynamic levels across the entire length of the keyboard.

**That applies especially to the grand piano sound, then?**

Well, we actually started off with recordings of grand piano sounds, but it's not all the same piano. We actually picked one grand piano for the bass, another for the midrange, and a third for the top end. That way, we found we got what seemed to be a richer, more even range than we could have achieved with any of the instruments on their own.

**So, putting commercial considerations to one side as far as possible, how do you feel the Kurzweil compares to instruments like the Fairlight and PPG?**

The PPG, Fairlight and Synclavier, instruments of that size, are primarily studio instruments. You're expected to develop your own sounds and spend a lot of time putting music together on them. OK, you can play a PPG or a Fairlight perfectly well in a live situation, but their orientation is still very much towards the studio type of environment. You have your alphanumeric keyboard and your display, and with a lot of work, you can do some very beautiful things. Which is fine — the way you create beautiful things is by putting a lot of work into them.

But the 250 is the only machine that's conceived primarily as a performance

Lecturing on music synthesis back in the autumn of 1982 — though the technology looks older.





instrument. Of course, it has plenty of studio features as well, such as a complete multi-channel sequencer and a great sound synthesising and editing capability, but when you're all done, it's easier to *play* those things from the 250 than from any other instrument. You've got an 88-note keyboard which is velocity-sensitive, there's an enormous amount of memory to hold all the sounds so that you don't have to load in every sound off disk, and all those sounds are rich, musical voices – piano, violins, guitars, xylophone, trumpets – and they're all available instantly.

I actually have a Fairlight myself, and I love the damn thing! It's like a wonderland to me – all these things you can do. But if I wanted to give a sit-down concert the way our musicians do at a show like Frankfurt, I'd much rather have a 250.

**What personal projects are there that you'd still like to realise, apart from being at Kurzweil now? Do you have anything particular on your mind that you'd like to achieve?**

Well, my work on keyboards is just a part of my overall interest in manual control devices. I really think the next big frontier in electronic musical instruments is going to be touch-sensitive control. Even the keyboards we've got now don't offer anything like the amount of control that we could achieve. The keyboard could be much more sensitive to physical exertion.

**Is it part of your current philosophy to try to extract the performability of acoustic instruments from electronic devices? Are you trying to make electronic music more 'live'?**

Well it already is live! What we lack right now is control over nuance, I think. I know some people believe that's the way electronic music is and probably always will be, but I don't see it that way. If you can take the same sound generators that we've had all along and attach to them very sensitive control devices that you can manipulate with your hands, your breath, or your feet, then there's no reason why you can't play music that is more interesting, more appealing, more responsive than what you can currently achieve with what we have now.

**Do you see a blending together of electronic and acoustic instruments ever occurring in the field of, say, symphony orchestras, as opposed to rock bands?**

I don't know about symphony orchestras. The symphony orchestra is a mature, complete medium of musical expression. It hasn't *changed* that much in the last 100 years, and I really don't think it's going to change any more. There might be special synthesiser-and-orchestra type things, but when you start getting into the world of the electronic band, you're really talking about a *different medium* of musical expression.

There'll continue to be symphony orchestras, just as there'll continue to be string quartets and concert pianists – and they'll continue to play. I think that among people who play 18th, 19th and 20th Century keyboard music, the acoustic piano will still be looked upon as *the* instrument. But as time goes on, I think composers are going



The Kurzweil 250. Is it the Artificially Intelligent successor to the grand piano?

to be looking more towards writing for electronic instruments than they are for acoustic ones.

**So you see the two sides co-existing for the foreseeable future, in much the same way as cinema and theatre, for instance?**

Exactly. You know, just because you can go and see *Raiders of the Lost Ark* on a super-wide screen and with six channels of Dolby sound, doesn't mean to say theatre is dead. People will always want to go and see plays.

Let's take something else. When you have dance troupes going around performing in different parts of the world, you start talking about practical matters. My wife loves to go to see both classical ballet

recently, and that was a big event – high culture for where we were at the time. He brought just four musicians with him because that was as many as he could deal with. A synthesist, a keyboard player, a violinist, and I think a percussionist: and that was it. After that performance, my wife and I got talking with the synthesist on the subject of music for dance and I happened to mention that I was working for Kurzweil. To cut a long story short, that same musician is now going out as Baryshnikov's *only* musical accompanist – on a Kurzweil 250. And that wasn't something we pushed or got our PR people to do; it just happened.

It's going to happen a lot more, too, because a couple of people sitting at a couple of 250s can, for all practical purposes, make all the music a lot of dance troupes will ever need. They can make it live, and they can make it sound good. And you know, that seems to be a perfect compromise between dancing to a tape recorder and a couple of speakers on the one hand, and having to pay through the nose to hire a bunch of musicians on the other. So that's how I see things going.

My boss, Ray Kurzweil, has made the outrageous statement that he's going to bury the acoustic piano. And I think he might just pull that off, at least as far as home instruments are concerned. You know, most of us learn to play the piano not on a nine-foot Steinway grand but on a spinet or an upright piano that our parents managed to save up for with great effort. Now that's becoming harder because wood is getting more expensive, labour is getting more expensive and, by and large, the pianos you can get for a reasonable price are getting lower and lower quality. On the other hand, the 250 and the instruments that'll follow it will be getting cheaper and cheaper – that's the way it is with electronic equipment. ■

**'My boss, Ray Kurzweil, has made the outrageous statement that he's going to bury the acoustic piano – I think he might just pull that off.'**

and modern dance, so over the years I've seen a lot of these troupes come through from all over the world. Some of them have been strictly classical, some of them highly experimental, and some of them right in between, but what they all have in common is a desire for decent music to dance to. Usually, what they wind up doing – even the world-class ones – is bringing along a tape recorder and a couple of speakers.

For instance, we saw Baryshnikov quite

# SHORT CIRCUIT

## Time Machine Revisited

As a follow-up to last month's Time Machine project, here's a simple circuit that lets you start and stop RX drum machines from devices fitted with the Roland DIN sync standard. *Steve Hartwell*

Paul White's thorough, wonderful Time Machine design (E&MM April) solved a lot of electronic music's most troublesome syncing problems, but what it can't give you is a usable method of starting and stopping a Yamaha RX drum machine direct from equipment fitted with Roland's 24ppqn sync standard, henceforth known as 'Sync 24'.

The problem is a simple one. Sync 24 incorporates a clock signal that's present all the time, and if you take that signal from a suitable machine and connect it to a Yamaha RX, the two instruments will run in sync *only* if your reflexes are agile enough to press the two Start buttons at exactly the same moment. And if you're trying to play a couple of synths at the same time, that's not a particularly easy task to accomplish.

The extraordinary feat of modern technology you see before you solves this problem by taking the Start signal from the Sync 24 bus and using it to operate the footswitch input of the RX. Simple, huh?

### Sync 24

Before we go any further, a few words about the Sync 24 standard are probably

in order. The interface – designed by Roland but subsequently implemented by a good few rival manufacturers as well – appears *from the outside* to be similar to MIDI, since it uses identical five-pin DIN connectors. But don't be deceived – the two standards have precious little in common besides their connecting plugs, and are completely incompatible. The Sync In and Out sockets are wired identically, so a straight-through connecting lead (ie. Pin 1 to Pin 1, and so on) is all that's needed to link up a couple of compatible machines.

Pin 1 carries a +10V signal for the whole time a sequence or drum pattern is being played; if a Continue button is used to start a pattern, a pulse is produced on Pin 5. Pin 3 carries a TTL-compatible clock signal, and this runs at a rate equivalent to 24 cycles per quarter note, hence Sync 24. Finally, Pin 2 is the common ground.

### The Circuit

There's no way of starting and stopping either the RX15 or its costlier brother, the RX11, externally other than by using a footswitch. However, the RX footswitch input works in a slightly

unusual way in that the machine in question starts and stops at the point of transition from closed circuit. We can make use of this by operating the normally closed section of a relay each time we want the RX to stop or start, but the only signal we can use is the start signal on Pin 1, and if we connected it directly to the relay, it would only be able to start the RX, not stop it.

What we need to do is generate a switching pulse each time the start signal changes state and, luckily, this can be achieved by inserting a capacitor in series with Pin 1 and the input of the relay driver. This produces a short positive pulse at the 0V-to-10V transition and a short negative one at the 10V-to-0V change. Unfortunately, the relay driver will only respond to positive pulses – hence the full wave rectifier to ensure all pulses are converted into positive signals.

We also need a high-gain amplifier to drive the relay properly, and this is achieved thanks to the presence of two transistors (TR1, TR2) in the Darlington pair configuration. D5's purpose in life is to prevent the large backward EMFs produced by the relay coil from damaging

Figure 1. The circuit diagram.

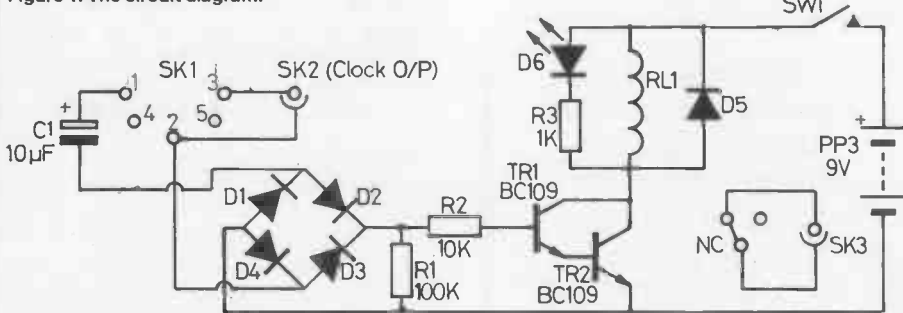
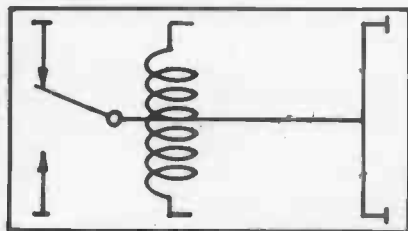
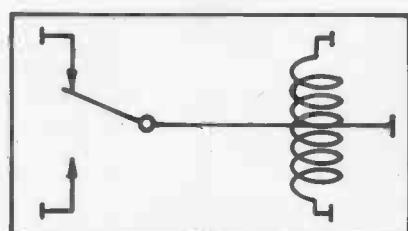


Figure 2. Maplin (left) and RS Components relays in detail.

Relay lead outs (viewed from below)



FM91Y



346-637

### Parts List

#### Resistors

R1	100K, 10% 1/4W
R2	10K, 10% 1/4W
R3	1K, 10% 1/4W

#### Capacitor

C1	10μF, 100V electrolytic
----	-------------------------

#### Semiconductors

D1-5	IN916
D6	Red LED
TR1-2	BC109

#### Miscellaneous

SK1	Five-pin chassis-mounting DIN socket
SK2-3	1/4" mono chassis-mounting jack socket
SW1	Single-pole changeover sub-min toggle switch
RL1	6V 100ohm changeover relay, single-pole (Maplin FM91Y; RS 346-637)
	Connector for PP3 battery
	LED clip
	Box, veroboard to suit



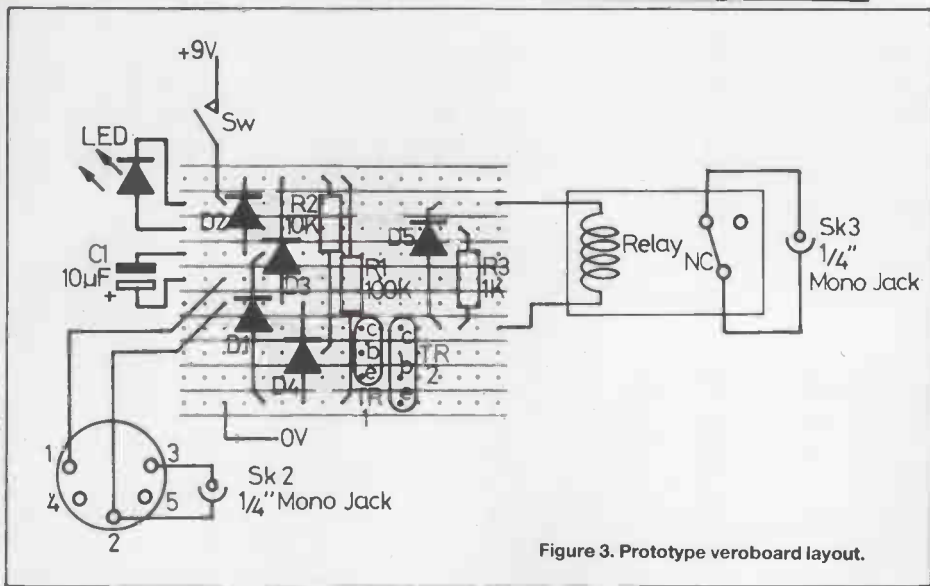


Figure 3. Prototype veroboard layout.

the transistors, while R3 is the current-limiting resistor for the LED (D6), which should light each time the relay operates.

Whilst the relay is operating, the current drawn is about 80mA, but since this happens only for short periods and the current is negligible the rest of the time, average current drain should be fairly small.

## Construction

As you can see, the circuit is extremely simple and can most easily be put together on a small piece of veroboard,

though the exact size of this will depend on whether or not you're mounting the resistors, capacitor and semiconductor in that order, making sure you've got everything the right way round – this is of vital importance in the case of the electrolytic capacitor (C1). Choice of output sockets (SK2, SK3) is up to you; I used quarter-inch mono jacks because I already had suitable leads made up. The RXs use a 3.5mm jack socket for the clock input and a quarter-inch mono jack

for the footswitch connector. The whole thing should fit neatly into a small plastic box, assuming you have one to hand.

for the footswitch connector.

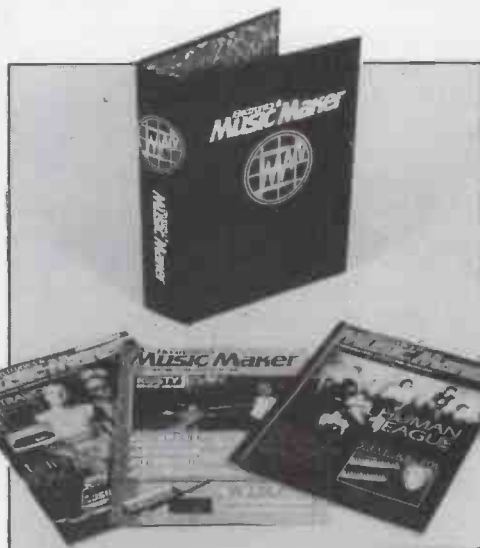
The whole thing should fit neatly into a small plastic box, assuming you have one to hand.

## In Use

The connections that have to be made are as follows. The five-pin DIN socket (SK1) should be linked via a straight-through cable to the Sync Out socket of the master machine. SK2 should be connected to Cassette In on the RX, while SK3 is hooked up to the footswitch socket. You now need to set up the RX for use with an external clock (beware – some RX functions don't work in this mode), with the timebase set to 24ppqn for Roland equipment and 48ppqn for Korg machines like the Super Drums and Super Percussion.

Make sure you use the Start button, *not* Continue, to set the sequence or drum pattern in motion, because the RX11 and 15 are always started from the beginning of a pattern when the footswitch is brought into play. And beware: if you use the Continue facility, start and stop too quickly or switch on the master controller with the interface and RX already powered up, the two machines may become nicely out of step with each other – exactly the situation we've set out to avoid. If this happens to you, press Stop on both machines and start all over again.

May your patterns be eternally synced. ■



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# Powertran BBC Software

We take a look at the utility program that links Powertran's MCS1 sampler and computer interface to the BBC Micro.

*Jim Grant & Tim Orr*



Now that we've described the hardware that makes up the Powertran BBC MIDI Interface, we can go on to look at the company's software in detail. As we mentioned last month, the Interface is capable of acting in two operating modes, one as a standard MIDI-to-computer link, the other as an MCS1-to-computer link using non-MIDI codes.

The MCS1 Disk Program is a utility package that performs a number of useful functions relevant to either application. The four main functions are as follows: 1) Upload sounds from the MCS1 to a BBC disk drive; 2) Download sounds from the BBC disk drive to the MCS1; 3) Act as a File Manager to Delete, Rename and Create sound disks; and 4) to test for correct MIDI operation by sending Note On and Note Off codes and displaying MIDI data.

## In the Beginning

If your Beeb is in BASIC mode, the program boots automatically: all you have to do is place the disk in Drive 0 and press SHIFT and BREAK simultaneously. By way of entertainment, a nice picture and accompanying copyright notice are displayed at this point – see Screen 1. Pressing the space bar or waiting for approximately five seconds results in the loading of the program, and displayed on the screen at this point is a list of the files on the boot-up disk and a second table of the commands available within the program. At this stage, and assuming you've got only a single disk drive, it's a good idea to remove the systems disk and replace it with a sound disk.

One further point worth noting is that whatever drive you're using, you should always request the systems disk catalogue by pressing the BBC function key (f0 to f3) corresponding to the drive number. This prevents erroneous (and potentially very confusing) catalogue

displays from manifesting themselves on screen. On the other hand, you've also got to be careful not to press keys for which you don't have drives, or else the system will 'hang'. If this happens, press BREAK, and type OLD followed by RUN.

Let's start off with the creation of a sound on disk. The first point to bear in mind is that a sound disk must be totally dedicated to holding MCS1 data – if you try to use it to store other files, you'll hit trouble. So, place a formatted 80-track disk in the drive and press function key 4. This should result in some disk activity, and once you've answered YES to the menu's first two questions, the display should look pretty much like the example in Screen 2.

The filenames shown are reserved by the program to indicate blank areas on the disk that are set up to receive data from the MCS1 via the BBC. These are legal DFS files and can be manipulated in the usual way using the '\*' commands.

## Saving and Loading

Once Created, a blank sound disk is

ready to accept MCS1 data. Let's say you've already sampled a sound into the MCS1 and that said sound is now residing within the machine. What you want to do now is dump the sound to disk, and this proves to be an exercise of remarkable simplicity.

First off, connect the interface to the MCS1 using a five-way DIN cable, and plug the interface into the BBC's 1MHz bus. Then press f7 on the Beeb, type in the requested filename, and press the switch marked 'BBC' on the interface. If all is well in the interconnection department, a message will spring onto the screen informing you that the two machines are in fact on speaking terms with each other. The message you should be reading is HELLO – MCS-1 VN1.1 HERE. Intellectual stuff, eh? Data is saved to disk immediately after this transfer has taken place, and while the saving operation is going on, a small graphics display at the top of the screen toggles between H and + just to reassure you that something is actually happening. The interface's Data LED should light up at this stage, too, so there shouldn't really be any cause for alarm.

When all has been completed, the program displays the disk catalogue – complete with new filename – and comes up with the prompt READY. The MCS1 then goes back into Voice mode automatically.

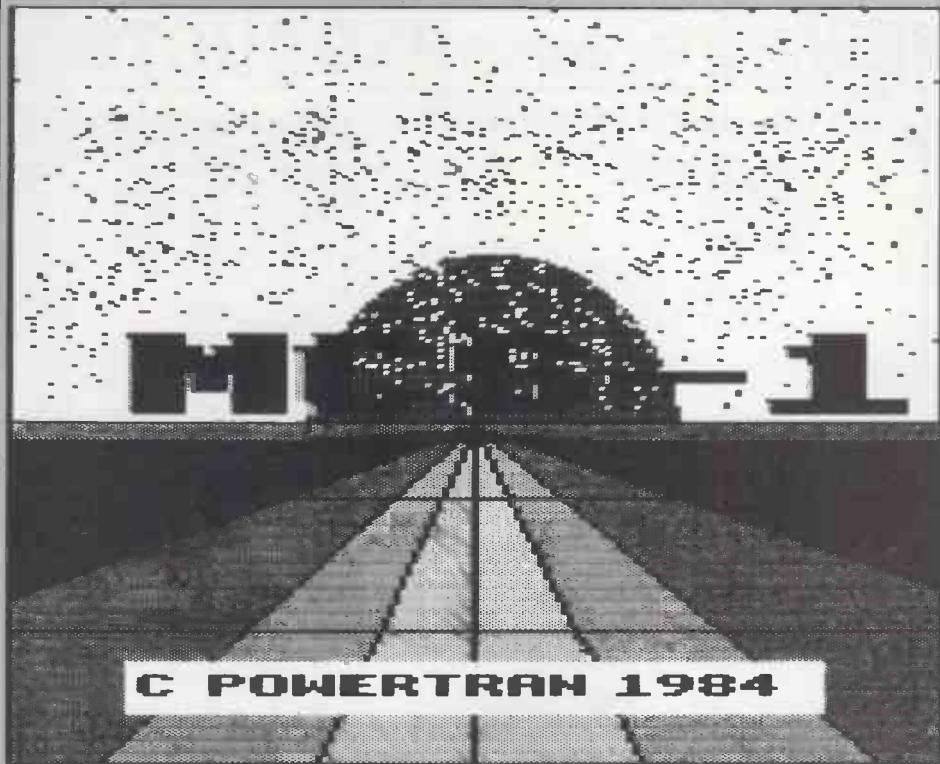
The exact destination of the data on-disk depends on the number of blank files available. There are three files available, each comprising 64Kbytes of sound and the associated loop parameters. If all three files have been taken up by previous DSAVEs, a Disk Full error message is displayed on the screen.

The reverse process of loading a sound file from disk into the MCS1 is simply a





Screen 1.



Screen 2.

## DISC CONTROL

**STATUS**

**DRIVE: 2**

**READY:**

1 **SOUND: 1**  
2 **SOUND: 2**  
3 **SOUND: 3**

f0  
f1  
f2  
f3  
:  
:  
:  
**DRIVE NUMBER**

f4 **CREATE**  
f5 **RENAME**  
f6 **DELETE**  
f7 **DSAVE**  
f8 **DLOAD**  
f9 **MIDI**

**C Powertran 1984**

Screen 3.

## MIDI TEST

**KEY STATUS**

**TX CHANNEL: 1**

f1 **OFF**  
f2 **OFF**  
f3 **OFF**  
f4 **OFF**  
f5 **OFF**  
f6 **OFF**  
f7 **OFF**  
f8 **OFF**

f0 **MIDI CHANNEL**  
f9 **ALL NOTES OFF**  
**<X> TO EXIT**

MIDI received  
Note ON 00011101 C#5  
Velocity 01101011 107

**C Powertran 1984**

case of pressing f8, entering the requested filename, and pressing the MCS1's 'BBC' button. The same start-up message and graphics symbols should appear on-screen at this point, and as is the case with the DSAVE operation, the MCS1 reverts to Voice mode as soon as a DLOAD has taken place, and the program displays a READY prompt. Since the original loop parameters are loaded, along with the sound data itself, the sample is instantly playable once it's been transferred to the MCS1.

Two auxiliary filing functions are accessed by pressing f5 and f6 respectively. The former is RENAME, and not surprisingly, this allows you to give a file a new name, and automatically guards against files being given the same name or one of the CREATE filenames.

The other function is DELETE, and this declares files blank by giving them a blank filename. If, by some unhappy accident, you use this function by mistake, don't panic. It's only the filename that disappears, not the sound, and things can easily be rectified by the RENAME function.

## MIDI Testing

Pressing f9 gets you into the MIDI test display page, and this presents an entirely new set of key functions, as shown by the example in Screen 3. As you may already have gathered, function keys 1 to 8 transmit Note On and Note Off codes in a toggle fashion, while f9 turns all notes permanently off, and f0 changes the MIDI transmit channel.

The MIDI Receive section is capable of accepting both Note On and Note Off codes from an external MIDI device, and displaying both their binary value and position on the music keyboard. It can also display key velocity in both binary and decimal. Bear in mind, though, that some MIDI keyboards don't actually transmit Note Off commands at all - they use Note On codes with velocity values of zero instead. Once you've carried out as much MIDI testing as you see fit, pressing 'X' on the Beeb's keyboard will take you back to Disk Control.

A few last points. The utility program can only be used with an 80-track disk drive and on a Beeb without a second processor connected. If you press ESCAPE at any time, the program will RUN from the beginning. However, this function does not allow you to ESCAPE from the DSAVE or DLOAD sections, as these are machine code routines, and the ESCAPE key is scanned by BASIC. Finally, if you press BREAK by mistake at any stage, typing OLD followed by RUN will recover your program at the drop of a hat.

*Further information on both the BBC-MIDI Interface and the utility program described above can be had from the manufacturers, Powertran Cybernetics, Portway Industrial Estate, Andover, Hants SP10 3EM. ☎ (0264) 64455.*



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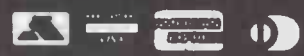
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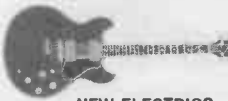
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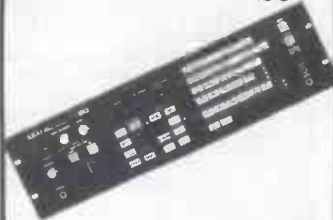
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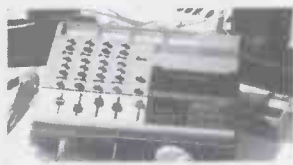




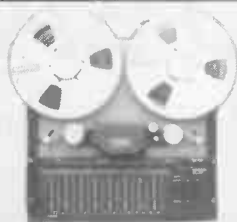
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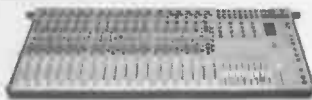


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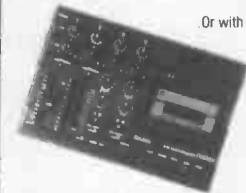
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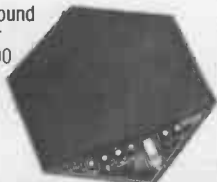
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# BACK TO BASICS

Our beginner's guide to synth programming continues with a quick peep into the world of envelope shaping and filter sweeping. *Steve Howell*

Last month we saw how a synthesiser can be used to 'shape' a sound, simply by the user applying a rising and falling Envelope Generator (EG) voltage to a Voltage Controlled Amplifier (VCA) to vary a sound's amplitude during the course of a note.

Now, it so happens that in addition to a sound's amplitude altering during the course of its existence, its tone usually varies to a greater or lesser degree in accordance with those amplitude changes. More often than not, the louder a sound is, the brighter it will be. Why? Well, the reasons boil down to a question of energy. Play a musical instrument with vigour, and you supply more energy not only to the overall level but also to the harmonics, especially the higher ones. Result: a sound with a significant amount of extra top end information.

Another acoustic phenomenon, also connected with principles of energy, is the way these higher harmonics die away more rapidly than lower ones; they simply don't have enough energy to sustain for as long a period of time as the lower harmonics and cannot, therefore, survive as long.

Well, I'll be quite frank with you and admit that the above is a highly summarised version of events as they occur in real life, but it's as much as you'll ever need to know in the field of synth programming, so don't panic.

As we've already discovered, an EG is nothing more than a voltage generator whose output voltage is shaped using a synth's ADSR (or whatever combination of initials you happen to have) controls. Normally, this module does nothing whatsoever without receiving a gate/trigger pulse of some description, this being commonly derived from a keyboard. It's this pulse that initiates an envelope transient which, in turn, is applied to the VCA so that the sound can be given an envelope shape.

So, given that the EG is nothing more than a voltage generator, it follows that its output can be applied to any voltage-controllable module within an analogue synthesiser for any number of programming purposes – so long as your synth has the sort of routing versatility such operations demand. For the moment, though, we'll confine our activities to the application of the EG to the control input of a Voltage Controlled Filter (VCF).

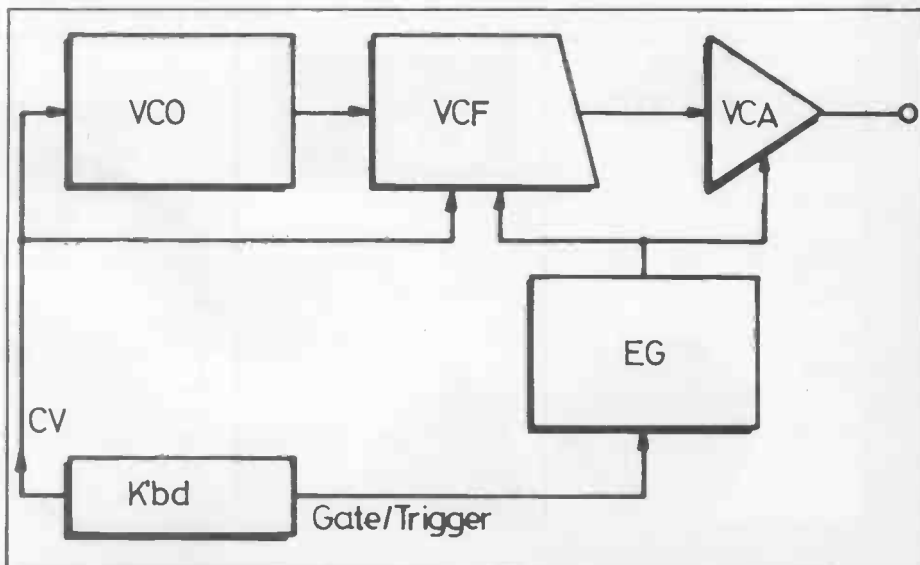


simple synthesiser such as a Roland SH101 or any of its Juno series polysynth derivatives. The important point to note is that the EG is connected not only to the VCA but also to the VCF. It's this arrangement that allows the creation of the strangled duck effects made (in)famous by the unimpeded musical tastelessness of a few mid-seventies keyboard players.

Just in case you missed E&MM March, the response slope of a typical VCF is given in Figure 2. As you can see, the higher harmonics are drastically attenuated above the cutoff point, allowing only

the lower harmonics to be heard. The Cutoff Frequency control on the front panel of your synth lets you choose the exact location of that point, giving rise to all manner of timbral manipulations (tone changes, dummy!). If you want a graphic illustration of what sort of effect varying the Cutoff Point actually has, place the left-hand edge of a fag packet at an angle of 45 degrees over the diagram and move it from left to right – you should see harmonics being lopped off at intervals as you move the packet back and forth. The very fact that a synth's filters are voltage-controllable means that the

Figure 1. Block diagram of simple synthesiser, with one EG being used for both amplitude and tonal shaping.

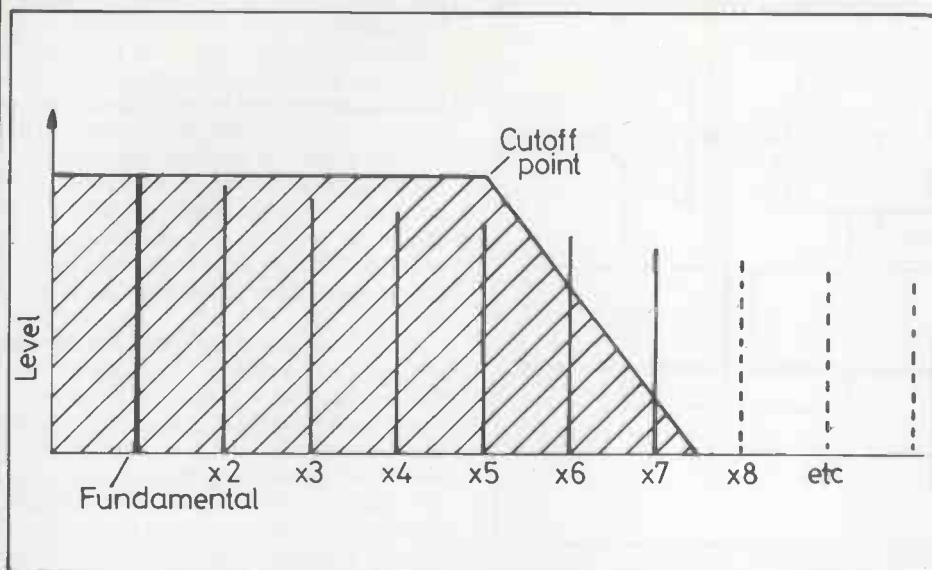


## Envelopes & Filters

Let's kick things off with a good ol' diagram. Figure 1 shows the layout of a



Figure 2. Response slope of a typical VCF – the shaded area represents the sound we actually hear.



cigarette packet can be replaced by a device that generates a voltage of some form to do the job automatically. Enter the EG, a wondrous piece of electronic wizardry that accomplishes all the tasks required of it, and as a bonus, happens to be cheaper (in the long term), healthier and less anti-social than 20 Benson & Hedges will ever be.

Given that as a sound dies away into oblivion, its upper harmonics are first against the wall, it follows that if we sweep the VCF with the same voltage that's opening and closing the VCA, the upper harmonics will fade along with the sound's amplitude, as the voltage sweeps downward through the filter's cutoff range. Thus, the sound becomes 'softer' as well as quieter.

Well, that's the theory anyway – in practice there are a couple of things you'll need to bear in mind if you want your filter-sweeping activities to be the envy of all and sundry...

## Sweeping Statements

Back in March, we mentioned the fact

that a filter has a summing amplifier at its control input that allows you to mix voltages together. The Cutoff Frequency control does nothing more than route a DC voltage through this summing amp, and all other voltages are then added to it so that, in effect, the control sets the working area of the sweep. And in the case of the EG, it sets the lowest level of cutoff, whilst the EG Modulation Amount sets the upper limit of the sweep.

Let's say the uppermost limit of the filter is set by pumping five volts into it. Setting the Cutoff Frequency control to maximum will do just that, and any sound you choose to route into the VCF will pass through unaffected. Now let's say you want to sweep through the filter – simply turning up the EG Modulation Amount will have no effect, because no matter how much additional voltage you ram into the filter's control input, its effect will be ignored by a filter that's already at its maximum setting courtesy of the DC voltage from the Cutoff Frequency control. So if you want some kind of sweep, you've got to decrease the setting of the Cutoff Frequency control to give a point

from which the EG can take over.

What we end up with as a result of all this is a couple of rules of thumb for those aiming to get the best sweeps from their synth. Very wide sweeps are best achieved by setting the Cutoff control quite low and the EG Modulation Amount relatively high, but the procedure for more subtle sweeping effects is a mite more involved. You're best off setting the Cutoff point fairly high and then adjusting the EG Mod Amount to give the exact degree of sweep you're after. Remember that you can set the Cutoff control higher than the EG Mod Amount and still hear a sweep; an arrangement comprising the former control on full and the latter on minimum will result in the filter being almost fully open, with the application of the EG's voltage opening it still further.

## Sustaining Interest

Now, unfortunately, we come to another complication. Whilst we've discovered that the Cutoff control governs the lowest range of an EG's sweep and that the EG Amount control governs the upper regions, there is in fact a further level control to consider.

Imagine you've set the Sustain control on your EG to halfway. The tone of the sound will come to rest at that point as you keep your finger(s) on the keyboard. But maybe that sustained sound isn't what you're looking for: and if it isn't, there are three possible ways of altering the status quo. You could adjust the Sustain level directly, but that won't necessarily give you the amount of sweep you're looking for. Alternatively, you could alter the Cutoff Frequency control, but this could alter the character of the sound quite drastically, as could adjustment of the EG Mod Amount parameter. Unfortunately, I can't supply any concrete answers to this predicament – all I can say is 'listen for yourself', and bear in mind you might need to alter a couple of other parameters in addition to the three mentioned above to get exactly the effect you're after.

OK, time for yet another complication. Many of the more recent synth designs have a feature that allows you to invert the EG voltage, a process that simply turns a normally positive-going voltage upside down so that it's going to a negative value – see Figure 3. In fact, all this means in practice is that you have to turn all my words of wisdom (!) upside down: set the Cutoff Frequency control high so that the EG has a point from which it can sweep downwards (remember the summing amp!). If you set the control too low, adding the negative-going voltage will take the filter out of its lowest range and the whole sound will be filtered out, leaving you with one hell of an embarrassing silence...

Set the controls correctly, however, and inverted envelope sweeps can give a huge range of extremely effective sounds – especially on polysynths.

Figure 3. Inverting an envelope shape.

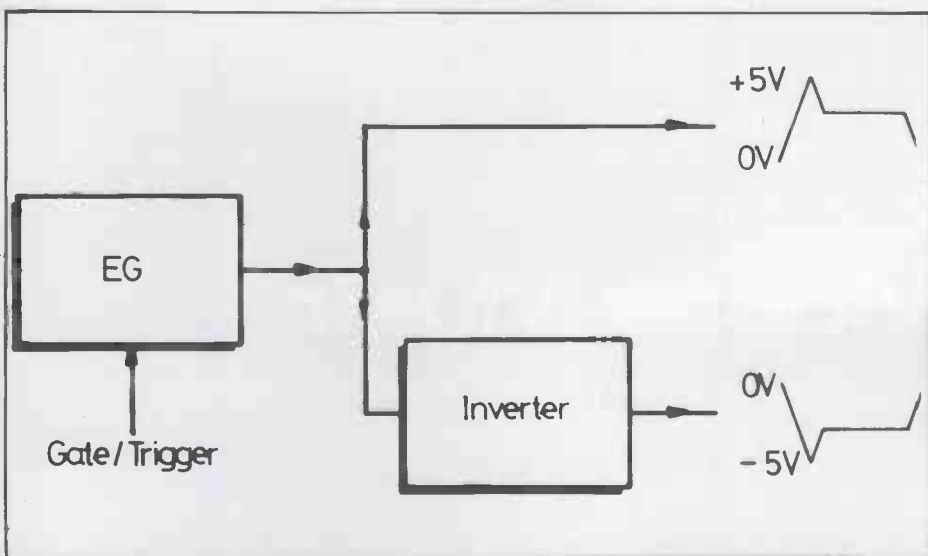
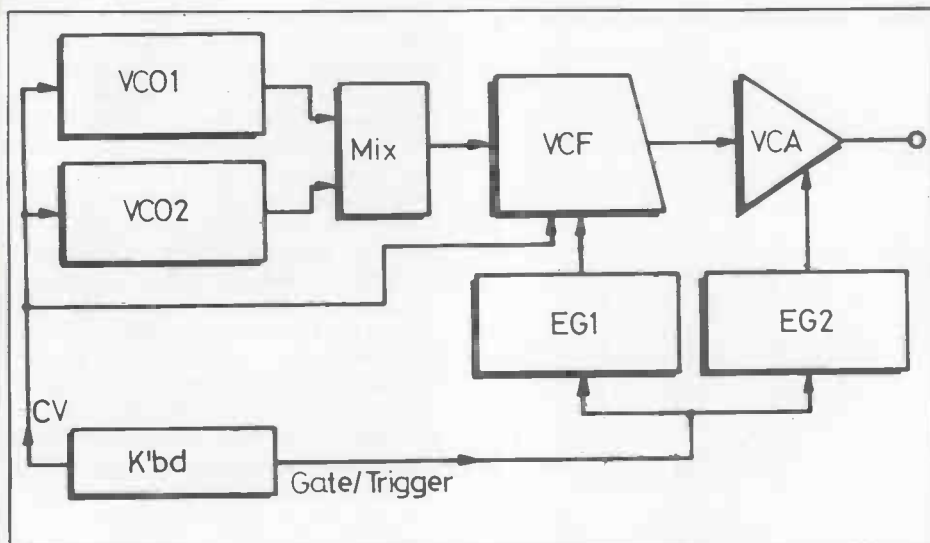


Figure 4. Layout of more complex synthesiser, with two EGs for independent shaping of VCF and VCA.



### Extended Options

Thus far, I've been looking only at budget synths that have just one shared Envelope Generator built into them. But when it comes to more upmarket (though these days, that doesn't necessarily mean they're all *that* expensive) designs, a pair of EGs is more the norm – a typical layout is shown in Figure 4.

Not unexpectedly, this arrangement offers a good deal more in the way of versatility than the shared shaping

option, because although having just the one EG to cater for both amplitude and tonal shaping *sounds* like a reasonably logical idea, really complex envelope structures (such as those exhibited by most acoustic instruments) are well-nigh impossible to achieve using such a simple bit of design. The crucial factor is that many acoustic instruments display tonal changes that take place separately from changes in amplitude – and sometimes, the difference between the two is quite marked. A gong, for example, has a

distinct harmonic composition when it's first struck, but an increase in upper harmonics as its sound dies away.

Recreating this sound on a synth with only one EG would be distinctly tricky, but relatively straightforward on a machine equipped with two. All you need do is set the attack on the VCA-linked EG to instantaneous (for the initial part of the acoustic sound) and adjust the VCF's EG attack to a fairly slow setting (for a subsequent build-up of harmonics as the EG sweeps upwards through the filter's range).

And, of course, these principles can be applied to completely 'new' sounds as well as recreations of acoustic timbres. It could be, for instance, that you're looking for a sound that has a downward filter sweep but whose amplitude shape has a soft attack, in which case the gong patch above is reversed: the filter EG's attack time should be instant, while the amplifier EG's attack time is slowish. Thus, the filter will be swept downwards, the VCA going through its attack cycle when the filter is going through its decay period.

If you've sat through the last few paragraphs in the knowledge that your synth has only one Envelope Generator, don't despair. A lot of people with dual-EG synths set the two envelopes up in a similar fashion anyhow, since there's still a lot you can do with a single module. We haven't exhausted the EG's possibilities, either, so stay tuned till next month... ■

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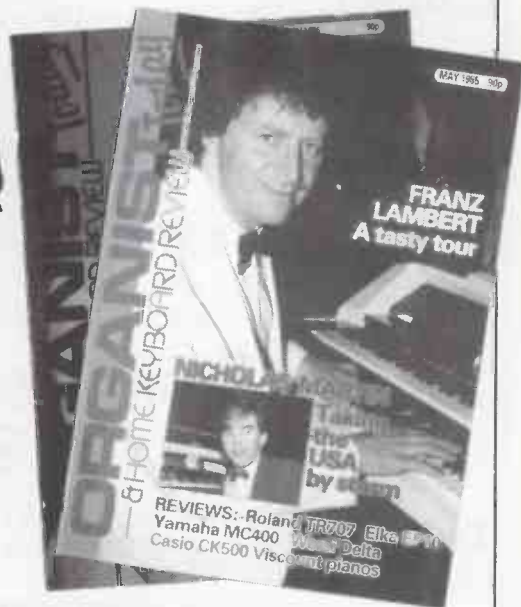
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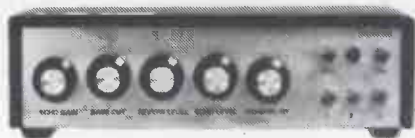
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# COMPUTER MUSICIAN

One of the more bizarre sights on television recently was a quartet of schoolkids on Commodore 64s, under the watchful gaze of their music master, doing battle with SID chips. A sort of 'Fanfare for the Common Micro', if you like. The programme, if you hadn't already guessed, was Channel 4's remarkably inept *4 Computer Buffs*. (I mean, with a title like that, what more can you possibly hope to expect?) But to return to the act and its artistes. What was actually being perpetrated on the 64s' keyboards was music – courtesy of *that* Music Composer program and its plonk-on plastic keyboard. But even given the very obvious limitations of the Commodore 64, and the even more obvious limitations of the software, the whole charade raised the thorny question of what on earth was actually being achieved. After all, hi-tech being used for lo-tech purposes is about as interesting as a Farfisa press launch. And why Commodore 64s, rather than Casio keyboards?

Well, lest all that sound like an unjustified attack on school music-making, let me put the record straight. I see micros in the music room as one of the most encouraging things to have hit the music educational scene for a long time. The problem is that an error of judgement seems to have crept in along the line – that of using micros for the sake of using micros. And it still doesn't seem to have sunk in that any new technology demands new ways of using it, which extends not only to how music is played and composed, but also to how it's taught.

A year or so ago, *Rumbings* reported on a group calling themselves 'TIME' (Technology In Music Education) that had been set up with the intention of setting 'standards for the collation and dissemination of software, schemes, and hardware relating to music education'. But sad to say, there's been an ominous silence ever since. Now that may reflect a regrettable

fact of life that E&MM's grapevine doesn't stretch that far into education, or it may signify a switch-off to TIME's draconian qualities, but my own gut feeling is that it may simply be symptomatic of a general feeling of confusion amongst the teaching profession, which has been obliged to take on new 'instruments' that are beyond its ken.

Certainly, judging by my own experience of question and answer sessions after talks I've given to teachers, it's all far from clear as to how and where the combination of computers and music fits into the curriculum. Of course, they might feel more comfortable if there were Associated Board exams in computer music, and 'O' and 'A' levels in computer music analysis and performance. But who wants a hundred-and-one ghastly attempts at turning what should be fun and mind-expanding into yet another offshoot of the academic rat-race?

In the States, they've got it much more nearly right (and so they should – they've had the technology for a good bit longer). Programs abound for teaching the rudiments of music, composition, and even instrumental technique, leaving the teacher to concentrate on the more human side of music education. On top of that, there's a flourishing inter-school communication link for sending around new individual and class pieces by modem, and regular vacation get-togethers for all and sundry to experience each other's ideas.

So why not the same in the UK? Take Prestel, for instance – it's simply itching to dig deeper into the educational training ground. And what about replacing some of those holiday orchestra, classics-bashing sessions with something new and vibrant in the computer music field? Let me know what you think – perhaps we can even get something going ourselves... ■

David Ellis

# Rumblings...

Another batch of revelations gleaned from the press releases of the world's computer music industry. *David Ellis*

Remember my comments back in October about the too-good-to-be-true floppy disk recorder from US company **Compusonics**? You know, the box of tricks that promised an hour of digital stereo on a single 5.25" floppy... Well, this time, fact has proved to be as strange as fiction, and what's more, there's not an April Fool in sight, even in Bulgaria.

What this Denver-based firm have done is to develop an advanced form of data compression that removes the redundancy in the average audio signal. Well, that's what they claim. How they put everything back at the other end of the conversion chain is another question, but there's no doubt the machine that makes use of this technique – the DSP1000 digital recorder – works, and works well.

Aside from all the usual function controls, the DSP1000 also offers 'tele-record' (digital recording via telephone – now that's *really* useful), a scrolling LED display for user information, and an interface for an IBM PC, thereby permitting 'applications in music editing and synthesis' as well as providing a general mass-storage system for computers. The price that's being quoted for the DSP1000 fluctuates between a 'typical high-end price' (which sounds pretty non-committal) and 'under \$1000' (which sounds a touch over-optimistic) depending on who you speak to. But whatever, you can bet your bottom dollar that Compusonics will be getting a lot of calls at 323 Acoma Street, Denver, CO 80223, USA (☎ 303-698-0060). And just when you thought the only thing Denver had going for it was *Dynasty*...

## Striking Anvils

You might have thought it was now safe to venture out of the office without companded cats and digital dogs descending on the old bonce, but watch out. Because here comes a new product that looks set to get an awful lot of tongues awagging – namely, the Anvil Percussion Synthesiser from **Anvil Synthesisers**. What's more, it's British to the hilt, all the way in from its ultra-slick case designed at the Royal College of Art.

Briefly, the Anvil is a 16-channel sampling system that samples with 12-bit resolution at a 40kHz sampling rate into 750K of RAM, with pointers that are dynamically re-allocated as needs want. That translates to 13 seconds of sampling at a full 16kHz bandwidth, and built in as standard is a 1Mbyte 3.5" disk drive for rapid loading and saving of sounds. In fact, it's the combination of a really fast



disk system and lots of RAM that sums up the Anvil design philosophy – no more expensive ROM chips, just a high-class sampling and storage facility that allows you to build your own library of sounds on cheap and (fairly) indestructible disks.

As well as the more or less conventional sampling side of the Anvil ('less conventional' because the RAM-based samples also allow truncating and merging to be carried out on them), there's a synthesiser side as well. This digitally simulates analogue processing of both the samples and fixed or pre-defined waveforms. Add the sequencer, which permits both pitch and amplitude control of each of the channels, the usual MIDI trio (for both syncing and keyboard control) and an up-coming SMPTE facility, and you begin to get a taste of a pretty powerful machine. And the price? Well, 'around £5000' is what's being suggested at present. Not cheap, I grant you, but if it turns out as good as its specs suggest, there are going to be some purple faces on the other side of the Atlantic! At present, distribution deals are still pending, so all we can say is 'watch this space...'

## Music Data

If shortcuts to MIDI and drum machine programming are what grabs you, take heed of the name **MusicData**. Aforesaid US company inhabits the healthy, wealthy, though possibly less than wise environs of Beverly Hills, California, and they'll be happy to supply you with disks, cassettes and ROM packs of data for multifarious musical machines programmed by such West Coast luminaries as Jeff Baxter, Ray Manzarek and Denny Seiwell. So if you agree with their comment that 'you didn't spend years learning to play your instrument only to become a casualty of the high-tech

revolution', contact MusicData at 8444 Wilshire Blvd, Beverly Hills, CA 90211, USA (☎ 213-655-3580).

Personally, I'm less than convinced by all that. If pre-programmed ROM and RAM packs proliferate, then as sure as night follows day, we're going to end up with a load of lazy musicians afflicted with the ROM pack syndrome: guys who've never bothered to dig beneath the surface of their instruments but prefer instead to reach for the nearest six-pack of presets. You want evidence? Well, how about the oft-quoted tale of the Prophet 5 presets – namely that 70% of the machines returned to Sequential for servicing had the same sounds in them as they did when they were sold. And the same is pretty much true for the Yamaha DX7.

What's more, consuming only what you're given is an open invitation for manufacturers to pre-program musical tastes and styles – Sequential's Max is an example of what could happen there. Nope, the answer is greater programming accessibility – and that comes from being healthy, wealthy *and* wise.

## Digital Spuds

Of all the digital reverb units currently on the market, one of the top units has to be the **Eventide** SP2016; and as signal processors go, its price tag of \$9495 is just about par for the course. The latest news is that Eventide have taken their machine one stage further, by announcing an expansion that turns the SP2016 into a *bona fide* Digital Signal Processor. This has been achieved by the addition of a Hewlett-Packard Series 200 computer such as the HP9816, whose job it is to communicate with the SP2016 via a 'general programmable interface bus' running at a rather impressive speed of 2Mbytes per second. MIDI, eat your heart out...

According to the publicity blurb, this combination allows the user to develop audio signal processing programs in Spud, an 'interpretive array-processing language' that runs on the 6809 processor inside the SP2016. The so-called 'Spudsystem' is provided with a desktop oven for burning the spuds (only kidding, folks – actually, it's yer standard EPROM burner sans culinary pretensions) and stereo 16-bit DACs and ADCs, and the total cost for this delectable slice of *pomme de terre digitale* is expected to be up in the region of \$20,000. For more info, contact **Eventide**, One Alsan Way, Little Ferry, NJ 07643, USA (☎ 201-641-1200).



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# THE FAIRLIGHT

## EXPLAINED

In which we take a look at the difference between linear and logarithmic conversion, and incidentally end up creating a sound using the Fairlight's synthesis facilities. *Jim Grant*

Most people involved in the modern music industry are already aware of the Fairlight's incredible potential as a music production tool. These days, you switch on the television, radio or record player in the almost certain knowledge that a CMI will make its presence felt somewhere along the line, and when you consider just how useful its specification is to studio engineers and producers, that's hardly surprising. Even in 1985, there aren't many machines capable of spreading six octaves of sampled sound across the keyboard, and manipulating that sound within user sequences to the nth degree of precision.

But if you're fortunate enough to sit in front of a CMI for any length of time *without* any production deadlines to meet, you'll soon discover that its creative power lies as much with sound synthesis as it does with music production *per se*. Pages 4 and 5 are good examples of this in that they offer the fairly standard synthesis tools of harmonic sliders and profiles, but Page 6, which we introduced last month, is something of a software oddity, since it allows control over the whole waveform — from a single byte to macro type commands such as GAIN, MIX and MERGE.

Now, for any command or process to be really useful in the field of sound synthesis, it must be responsible for some radical change in the sound structure that's both intuitive and easily understandable. For example, the VCF of an analogue synth changes the sound a great deal, and can be simply explained and understood in terms of the attenuation of harmonics. FM synthesis, on the other hand, also results in vast timbral differences, but comprehension of the processes involved (and their possible results) is a lot more difficult. That's why actually arriving at a pre-specified sound on something like a Yamaha DX7 requires so much in the way of practice and patience — and why so many musicians prefer programming analogue synths, even if the ultimate sonic potential isn't as great.

Fortunately, the Fairlight's internal configuration side-steps most of these operational problems, and a good example of how this is done is the ADD command. This takes a choice of segments from one loaded voice and adds

them directly into the same segments of the currently selected voice, scaling the amplitude to avoid clipping if necessary. If you were to ADD all the segments into another, playing the keyboard would result in both sounds being heard together but only using one voice. Figure 1 shows a square wave and Figure 2 a

sinewave both resident in different channels of the CMI: the result of ADDing them together is shown in Figure 3. The addition's proportion can be varied by using the GAIN command prior to the action, or by repeatedly ADDing one voice to another to increase its amplitude relative to the composite sound.

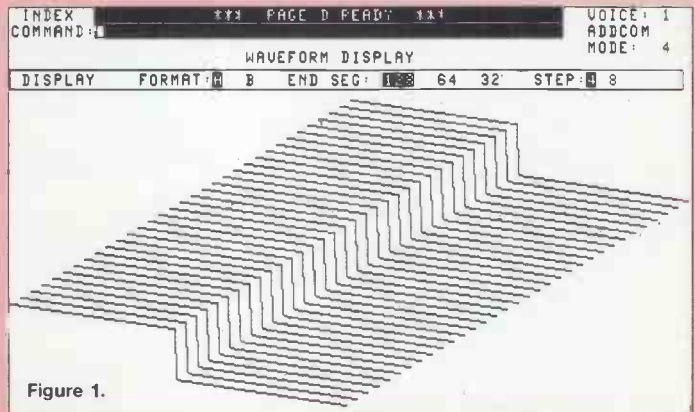


Figure 1.

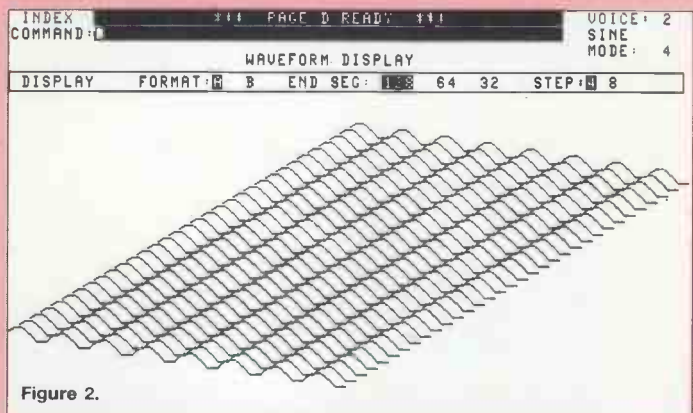


Figure 2.

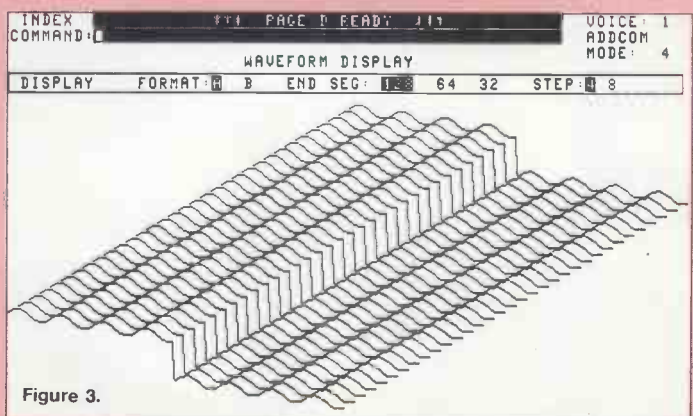
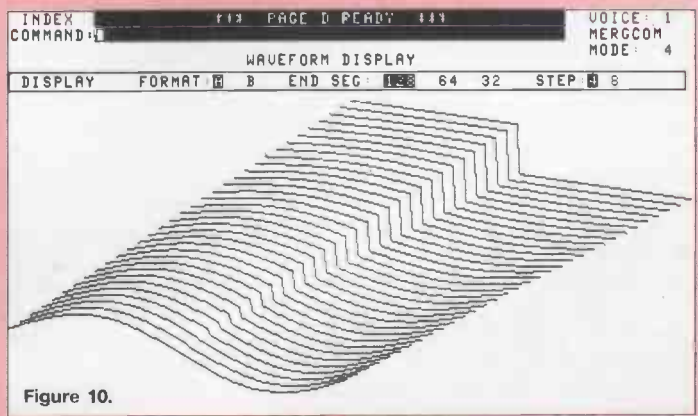
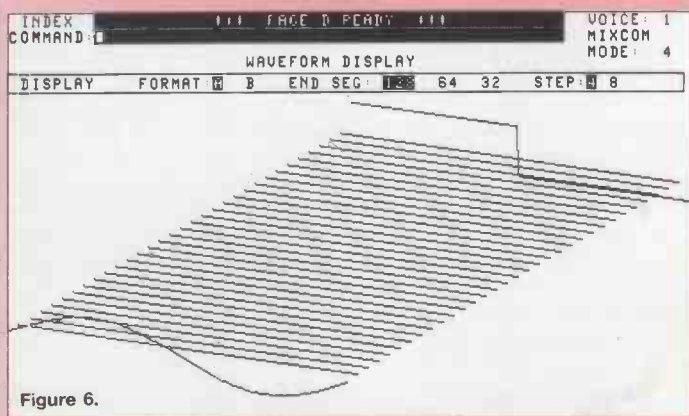
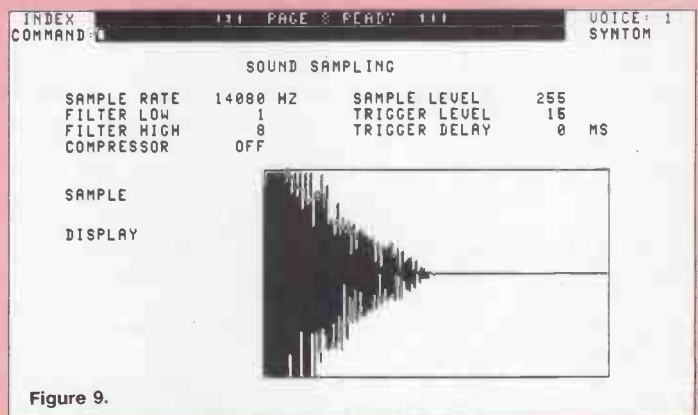
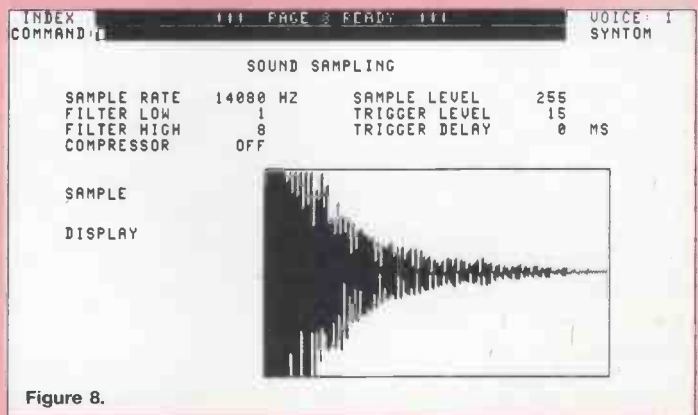
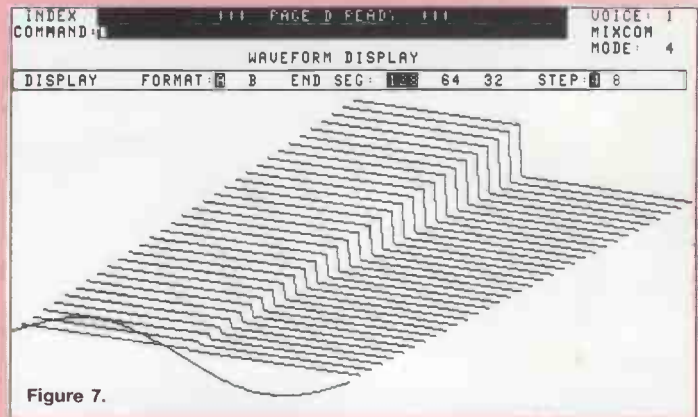
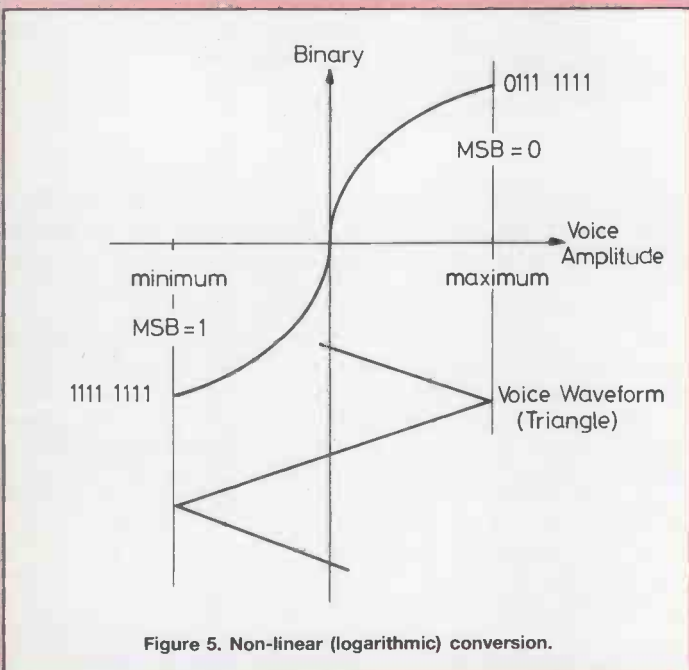
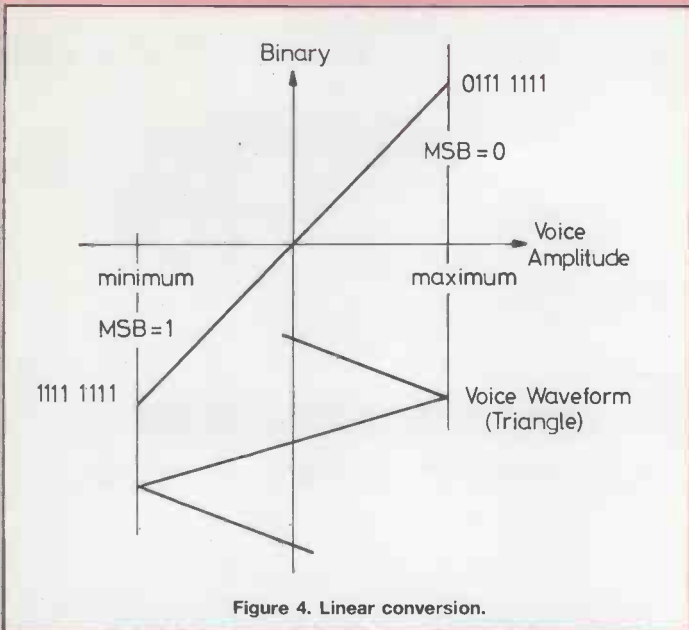


Figure 3.





## Linearity

Now seems as good a time as any to explain something we've mentioned many times in the past but haven't really discussed in any detail, namely the difference between linear and non-linear voice data. As you may remember, a

waveform is stored in 16K of RAM, in which each byte has a binary value that corresponds directly to the amplitude of the waveform at that point. A byte consists of eight bits, and considering all the possible combinations of these results in the amplitude of the sound at any point being limited to one of 256 levels.

The term 'linear' refers to the relationship between the actual amplitude and the value of the binary number used to represent it. If all this sounds a bit on the technical side (and it ought to), have a quick glance at Figure 4. This shows that zero amplitude corresponds to binary 0, while maximum negative excursion is

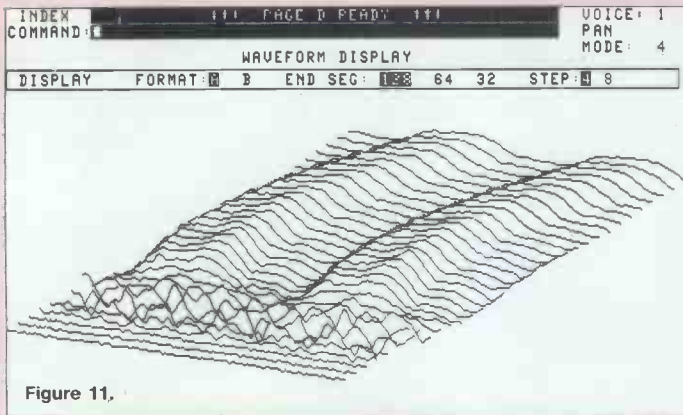


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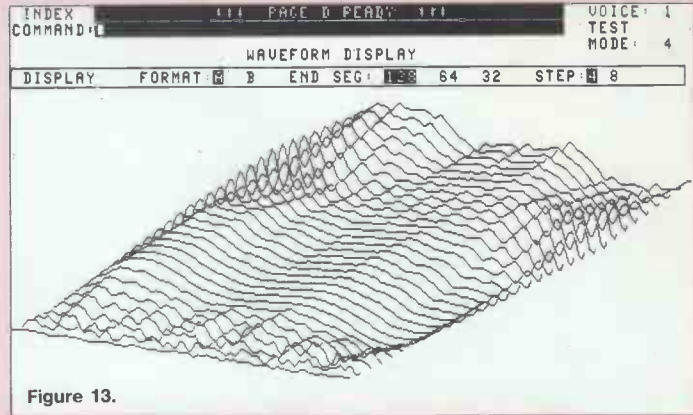


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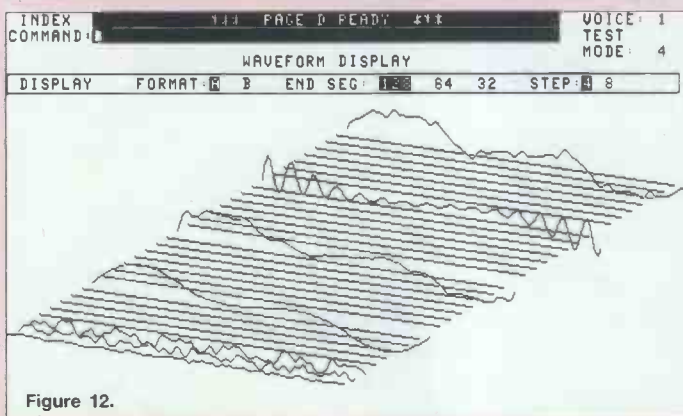


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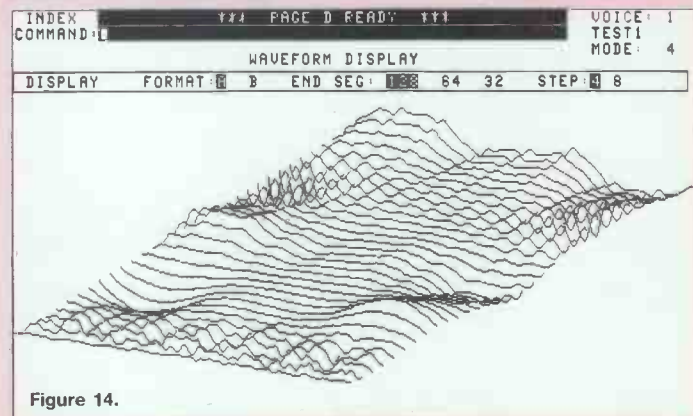


Figure 14.

represented by 1111 1111, or 255, and the maximum positive value is held as 0111 1111, or 127. Still confused? Well, the value of the Most Significant Bit holds the key. If that value is 0, the waveform is positive, while a 1 gives negative excursions. Anything else in between is in simple proportion. This form of representation results in a ratio between the smallest and largest signal that can be handled (or in other words, dynamic range) of about 48dB. You might consider that to be not a particularly impressive figure, since it means that at low signal amplitudes, the sound is more or less surrounded by hiss.

The fact is, storage (in one form or another) of low-amplitude sounds is a perennial engineering problem, to which the most common solution is some sort of noise reduction system such as Dolby. In the digital world, and as a direct result of research into digital telephony, a different solution is to use more binary bits of the byte to represent low-signal levels than you use for the high ones. This is shown in Figure 5, in which the lower values of the triangle wave use up more of the binary bits than a corresponding increase at large triangle amplitudes. The binary data is now no longer linear – it's logarithmic. For the waveform to be recovered, the data must be passed through a DAC that has a curve bent the opposite way to 'straighten out' the sound. I know all this sounds more than a little involved, but it does bring the magic dynamic range ratio up to about 72dB, which is at least respectable. Only catch is, the process only achieves this with a corresponding increase of quantisation noise at larger signal levels, though this is masked by the volume of the signal itself.

You might be familiar with this conver-

sion process under its commonly used name of companding, and it's a system used by many hardware manufacturers including Linn and E-mu.

So if it's so good, why doesn't the CMI use it? Simple. Remember your school days when you added log numbers to multiply? Well, this is what would happen if the `ADD` command was used with sounds held in the form generated by Figure 5: instead of adding the sounds together to produce a mix, we'd get the product, and end up with VCA-type effects at low frequencies and strange sidebands at higher ones. Which isn't, all things considered, a particularly desirable state of affairs.

## Mixing

Anyway, enough of the lecture and back to the Fairlight. The `MIX` command can also drastically alter the waveform RAM. Essentially, it generates a crossfade between two specified segments which must not be adjacent, ie. there must be at least one segment in between. The waveform memory of each segment between the start and end points contains a proportion of the existing waveform in that segment and that of the end segment: this is best illustrated by examining Figure 6 and Figure 7 for before and after views. Remember that the new contents of each segment is a mix between where you are in the waveform and the destination segment. Thus from Segment 2 onwards, the waveform simply fades up to a square wave. `MIX` is most commonly used to add a clean fadeout to a sound that decays to noise or doesn't decay properly in 128 segments.

Have a look at the percussion sound

sampled using Page 8 and shown in Figure 8. It's pretty clear that the sample ends in a dither of noise. Now, suppose we needed nothing more than a short percussive strike, and that only the beginning of the sound was of any interest to us. A quick solution would be to turn to Page 6 and `ZERO`, say, Segments 64 to 128, halve the sound, and then `MIX` from Segment 45 to 64. Looking at Figure 9 shows the result – a sound that dies away evenly to a noise-free end, much to the relief of all concerned.

`MERGE` is fairly similar to `MIX` – with one fundamental difference. Again, a form of crossfade is generated between start and end segments, but this time, the previous contents of intermediate segments don't figure in the result. Quite simply, the segments in between contain a decreasing proportion of the start segment and an increasing proportion of the end segment. Figures 6 and 10 (oh yes, *very logical* – Ed) reveal all. The `MIX` and `MERGE` commands are tremendously powerful for splicing together sounds of differing origins and producing an even fade from, say, a violin bow attack to a sung 'ahh'.

## Creating a Sound

So, now that we've discussed most of the commands available, let's try to create a sound using everything *except* the Fairlight's Page 8 sampling facility. The question is: am I allowed to use Page 2 and pull a sound off-disk to work with? Well, I've decided I'll have to cheat a bit because I already have a thoroughly marvellous sound called `PAN.VC`, which attacks with the characteristic breath chuff of pan-pipes.



First off, we configure Page 3 to generate two voices, one with an NPHONY of 7 in Register A to be played on the keyboard, the other monophonic in Register B as a scratchpad voice. Using Page 2, we load Register B with PAN.VC, which can be seen in Figure 11. The breath chuff is clearly visible at the beginning of the sound, but unfortunately, the sampling started a fraction too soon, and the waveform has a few initial segments of low-level rubbish – nothing to do with *Electronic Soundmaker*, you understand. The cure is to rotate the voice left to bring the start of the sound proper coincident with the start of the RAM.

The next step is to flick to Voice 1 in Register A and ZERO it. Using a new command, TRANSFER, the first few segments from PAN.VC can be copied to the blank voice currently selected. Stabbing the keyboard at this juncture reveals that all is well, so the next thing to do is to

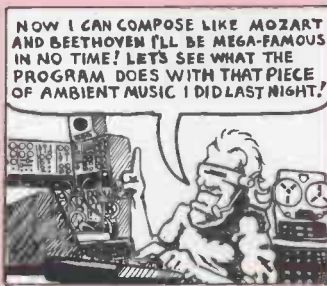
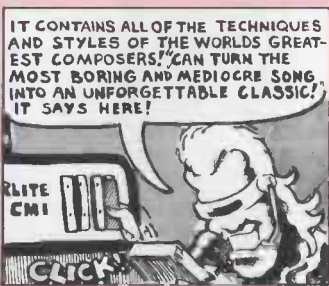
work on the body of the sound itself.

Before any sound can really make the grade as far as aesthetics are concerned, it must have plenty of timbral and amplitude movement within it. A good way of producing harmonically-rich waveforms is to use Page 5 and create a few segments spread across those unused by the chuff. Figure 12 gives the general idea – note that the created waveforms are all different. So what about the segments in between? Well, this is where MERGE comes in handy, filling in the ZEROed segments, and using the segments created on Page 5 as the start and end points.

OK, so far it sounds quite interesting timbrally (and looks it too, as Figure 13 shows) but it's still in need of some amplitude variation. An easy way to achieve this is to invert a couple of segments (numbers 32 and 96, say) and MIX from segments 1 to 32, 64 to 32, 64 to 96 and 128 to 96, using Page 6. If you

look closely at the differences between Figures 13 and 14, you shouldn't have much difficulty identifying the variation in amplitude, especially in the sound's first quarter.

All that remains is to insert loop points on Page 7 or Page 4, and adjust the attack and damping on Page 7. ■



GARY McLEOD

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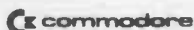
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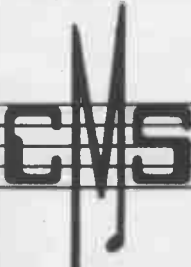
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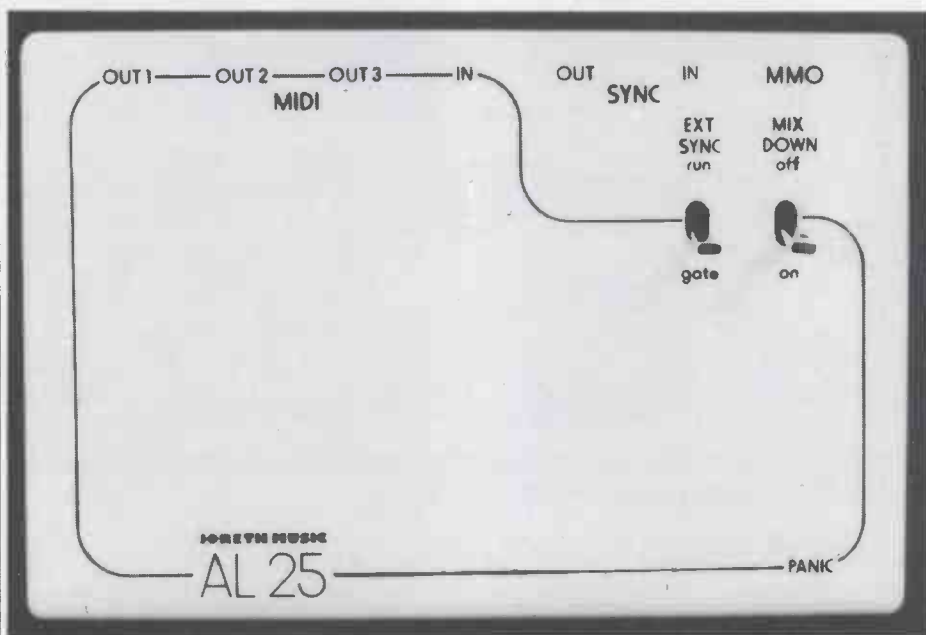


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# Joreth Music Composer System

## MIDI Software and Hardware for Commodore 64

Music software packages for the CBM64 aren't exactly thin on the ground, but this new British offering has a claim to being the most comprehensive. *Simon Trask*



To begin in a conventional manner, the Joreth Music Composer System (henceforth referred to as the JMCS) is a disk-based software package for the Commodore 64, which offers eight-track polyphonic recording in both real and step time, and a stated capacity of 6000 notes. You'd be justified in fearing the arrival of yet another tedious MIDI sequencing package, but bear with me. The last word in sequencers has not yet been spoken, and whilst I'm not claiming that this package is the last word, it's nonetheless a quality product that merits a good deal of attention.

The package has a projected price of around £250, and for this you get not only the software, but also Joreth's own MIDI interface (the AL25 MIDI-LINK) into the bargain, along with a comprehensive manual, a handy Quick Reference Guide card, a ribbon cable connector, a registration card plus disk voucher (in case of legitimate damage to your disk), and a further piece of software called STYLE, complete with a manual of its own.

### System Overview

Concentrating first on the hardware, the AL25 has one MIDI In and three MIDI Outs, together with a Line Sync In and

Line Sync Out for use with various non-MIDI equipment; use of a suitable signal processor such as the MPC Sync Track makes syncing to tape a possibility, too. An External Sync switch enables the interface to handle both one-shot and continuous sync signals, and other features include a Mixdown switch that facilitates bouncing down of one or more parts onto a vacant track, a MIDI Mixdown Override jack footswitch socket which enables drop-ins to be made whilst mixing down, and a Panic button (!), which allows the system (together with all your data) to be recovered in the event of a system crash. Thoughtful lot, these Joreth people.

The software can be neatly divided into two main units, the Real Time System & Performer and the Step Time System. Both are resident in the computer at the same time, and you can move freely from one to the other. Adjuncts to the Real Time System are the Real Time Trimmer (not the latest in steel-edged garden hardware, but a utility for, among other things, 'trimming off' lead-in beats) and the Real Time Editor (meaty stuff, this, giving access to the actual MIDI codes generated by your latest attack on the keyboard - handle with care).

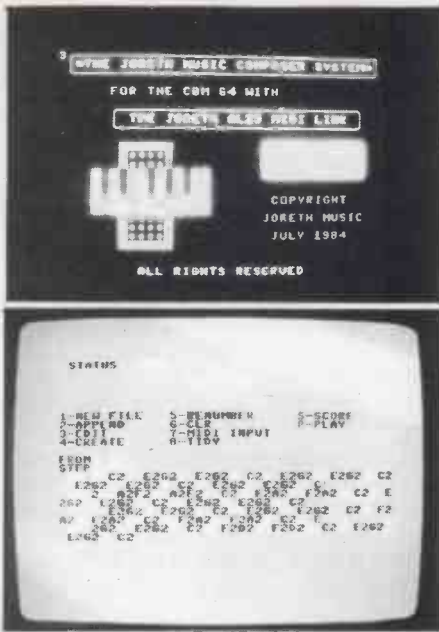
The Step Time System features a low-

level Music Composition Language called, reasonably enough, 'Composer', along with a very useful facility for step-time entry of notes and durations via a MIDI keyboard. Another invaluable aid is the 'Composer Syntax Checker', which reads through a completed Composer file and duly informs you of all your mistakes, but unfortunately, the system prohibits the Real Time Editor and Composer Syntax Checker from residing in memory at the same time, no doubt in the interests of conserving precious memory space. It would have been useful if either program could have been loaded from within the system instead of at the very outset - I found in practice that once I'd syntax-checked a Composer file and transported it across to the Real Time System for performance, I wanted to discard the Checker and work with the Real Time Editor. Having to reload the entire system, this time with the Editor selected, becomes a mighty laborious procedure.

The JMCS starts off in Real Time mode, though you can move straight to Step Time mode by keying <SHIFT> C if you so wish. The Real Time screen is pleasantly uncluttered, but manages to display MIDI channel, quantisation, transposition and page allocation for each of the eight parts/tracks at once,







which is no mean achievement. The standard facilities – Record, Play, Save, Load and Erase – are all present, along with information on velocity assignment, currently-selected sync options, and the current metronome rate. The system allows tracks (or Parts) to be grouped into any of eight Tunes, which in turn can be sequenced together to form a Song. Thus, the screen also displays the currently-selected Tune and the various Parts allocated to that Tune.

There are one or two gripes on the user interface side of things, like the fact that the display redraws itself every time you undertake some sort of action, a process that takes a full three seconds and rapidly becomes an unwanted irritation. I also found it annoying to have to step through each option from a fixed starting point every time (why not assign a key letter to each option?) and to be forced through the settings for all eight Parts during Transposition, Quantisation and MIDI Channel selection, when all I wanted to change was one value. Then there's the thorny topic of MIDI channel numbering. The MIDI 1.0 spec allows the 16 channels to be numbered either 0-15 or 1-16, each system having its own logic. It's perhaps symptomatic of the ensuing confusion that the JMCS requires Channel selection input to be in the range 1-16, but then displays any input in the 0-15 range – ridiculous, really.

Those points aside, the Real Time System is extremely easy to use, and it doesn't take long to get something up and going. The only thing you've really got to avoid is forgetting that just because you've got a whole load of wondrous multi-channel facilities at your disposal, doesn't mean they'll turn a poorly-equipped synth into a mega-studio.

## Real Time

To begin recording in Real Time, all you need to do is select a Part number and a 'beats in' value – the latter can be as high as 255 beats, though you'd have to be pretty patient to want to select a count-in of that sort of length. In fact, the number

of beats has no relevance to your first track, as recording won't begin until you start playing (a nice touch, this). However, subsequent tracks conform to the value you selected initially. The metronome rate on Record and Play is selectable between 20 and 999 (!) beats per minute (default value is 100), and comes in the form of a click-track generated by the 64's SID chip. There's no need to worry about trailing rests on any of the Parts, as these are automatically deleted from the note file when Record mode is exited. Memory is dynamically assigned, too, which means that no fixed amount of space is allocated to each Part.

Parts can only be erased individually, and a track that's been recorded on once can't be used again until its current contents have been erased – a sensible precaution. There's no facility for overdubbing onto a track already in existence, but as I've already mentioned, it is possible to bounce down one or more Parts onto a vacant track.

When it comes to tuning groups of Parts into Tunes, there are another couple of mild disappointments, the first of which is that Parts aren't Tune-specific – and neither are MIDI channel, transposition and quantisation parameters. I'd also like to have seen Part-assignable looping: at present, there's only one

'Just because you've got a whole load of multi-channel facilities at your disposal, doesn't mean they'll turn a poorly-equipped synth into a mega-studio.'

overall loop governed by the length of the longest Part, which is a mite inflexible, if you ask me.

On the credit side, velocity information can be filtered out of the input on individual Parts, even when they've already been recorded – useful if you decide to transmit a Part to a synth not equipped with velocity sensing: why transmit unnecessary data, after all? The program is capable of storing both pitch wheel and patch-change data but not, apparently, mod wheel information, though the potential offered by the Real Time Editor section is big enough to offset this disadvantage in practice.

## Step Time

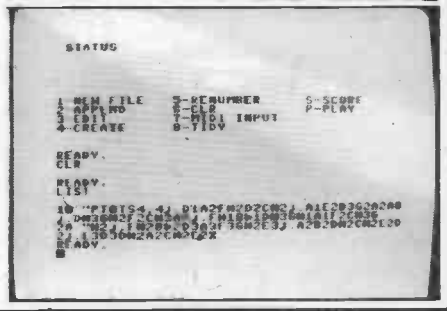
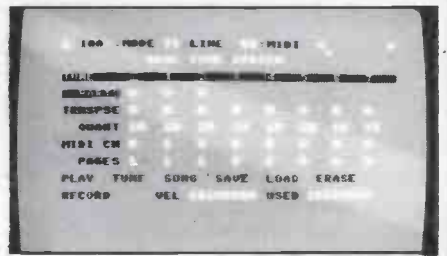
The other side of JMCS is its Step Time mode, represented primarily by the Composer MCL. And unlike some other software houses who seem to think a step-time section can be as complex as it needs to be, Joreth have done a great deal in the quest for easing the input of note and duration values. As with the Real Time System, you can input notes polyphonically for each Part, but you can also assign a different duration to each

step in each Part. It's easy to see what's going on, too, thanks to a custom-designed music character set that gives everything from a hemi-demi-semi-quaver to a semi-breve. And you can add qualifiers to the basic durations to give triplets, dotted and double-dotted notes, pauses, accents, staccato, and tied notes. A pretty comprehensive range of options, all in all.

If you're entering notes from a MIDI keyboard, pitch and duration are displayed on the VDU as if they had been typed in, but while full Commodore editing facilities are available during input from the QWERTY characters, editing a file created via MIDI necessitates entering Edit mode and working from the QWERTY keyboard. Still, Edit mode does give you full cursor control for inserting and deleting, and allows you to send your file out to a printer, while a further facility produces an expanded, clarified version of your Composer file, which can also be printed out.

It's worth mentioning at this point that all step-time input must be preceded by line numbers, and be entered in the form of strings (ie. enclosed within quotation marks). MIDI mode confines line-numbering to an automatic process, but working from the QWERTY keyboard lets you number the lines yourself, the idea being that you don't have to work on your composition sequentially – though you have to use the Tidy function to order the lines before you can do anything really useful with your file.

Once you've come up with something you think you might actually want to hear, it's advisable to call up the Composer Syntax Checker, as this is the only way you're going to discover any errors (other than playing back in Real Time and finding nothing but silence, of course). Watch out, though. Once you're in the Checker's control, there's no escape until every error has been flagged – a very humbling experience! Having studiously removed all your mistakes, you save your Composer file to disk, whence it can be picked up by the Create option and translated into data comprehensible to the Real Time System. Pressing 'P' takes you into that System, where your Part or



Parts are assigned to a Tune, and then played back in all their technicolor glory.

The manual contains a reassurance that Step Time mode can be re-entered without penalty, but I found repeatedly that my Composer file had vanished on re-entry. I guess it's at this point that you begin to appreciate the value of having to save your file to disk before the Create option can be brought into use. Incidentally, the only way to load or save a Composer file is to enter the Edit function, something that proves decidedly difficult when there's no file around to edit. It is possible to get into Edit by selecting either Clear or New File (and immediately typing 'end'), but the manual, alas, doesn't tell you that. Another annoying feature of the Real Time/Step Time interface comes to the surface when you re-enter Real Time mode after modifying a previously Created file: the Part assignments you set up first time around aren't retained, so you have to set them up again. Very silly.

## Music Printing

Difficult to believe though this may seem, the JMCS offers a score-printing facility in addition to all the other Composer functions—it's a remarkably simple system, but it does the job. A maximum of two parts can be printed/displayed at any one time, the only limitations being that they must be in different clefs and share the same key and time signature. The music notation is clear and sensibly organised—a worthwhile feature.

If all the Composer did was accept note and duration values, it could hardly lay any claim to being a Music Composition Language. As it is, it lacks any degree of higher-level structuring beyond the simple Part/Tune/Song structure of the Real Time System. However, it does offer no fewer than 21 commands that can be used throughout the music. Some of these, such as key signature (KY) and metronome rate (ME) affect all Parts in any given Tune, whilst others like Tonebank change (TN) and MIDI channel assignment (MD) are Part-specific. And amongst other things, there are commands to toggle a Hold pedal on and off, to define key velocity and quantisation, to control drum machines (see below), and to allow a stream of MIDI bytes to be embedded in your file. This latter facility is a useful entry point into the very depths of MIDI, as it should allow both the novice and the experienced user to increase the program's flexibility through the handling of, say, System Exclusive control parameters.

For those not in the know, System Exclusive is the area of MIDI where individual manufacturers implement their own particular features, and these can be specific to both machines and manufacturers. Now, whilst this open-endedness is necessary for MIDI's survival, it does pose certain problems for software writers, because no single package can hope to support every MIDI implementation on

the market. Such a package probably isn't desirable anyway, but one way to incorporate built-in flexibility is to allow the user to work with his or her specific MIDI gear using some sort of harness. Which is exactly what Joreth have done with the JMCS.

## The Deep End

You may have noticed a gradual move into deeper and deeper MIDI waters during the course of this review, and truth to tell, it's a move that's indicative of the sheer scope offered by the Joreth system.

Of all the more involved MIDI-based options offered by the JMCS, the Real Time Editor is one of the most intriguing. This can be called up at any time (assuming you selected it initially) from the Real Time System by keying <SHIFT> E. What it does is allow you to work one step removed from the 'unadulterated' MIDI codes by presenting you with commands that are mnemonics of selected codes. In fact, the Composer system works in much the same fashion, and like the Composer, the Real Time Editor includes a facility for inserting a stream of pure MIDI codes so that you can go beyond the limitations of the JMCS command structure if you so wish. Joreth have thoughtfully included a list of MIDI codes at the back of the user manual to help you on your way, though if you're after a fully comprehensive rundown of what MIDI is all about, you won't find it here.

The Editor works on Parts that have been entered *via* the Real Time sequencer (and, presumably, any Parts that have been faithfully transferred from the Composer), so once you've recorded a Part, you can flip across to the Editor and get a MIDI representation of your music—in the aforementioned mnemonic form—up on-screen, with each command and each item of data assigned its own line number. You can then change any line by overwriting it, and it's possible to insert and delete lines, even though the full range of BASIC editing facilities isn't available here.

Moving between Sequencer and the Editor is usefully quick, and any altered Real Time file is immediately available for replay. And quite apart from offering some pretty powerful control possibilities, the Editor is a relatively painless introduction for anyone interested in finding out just *how* MIDI handles all those lightning-speed runs and whacky pitchbends.

## Synchronisation

As I've already noted, it's possible to sync the JMCS to both MIDI and non-MIDI drum machines and sequencers, and to choose either the software or an external source as the controller. At least, that's the theory; the practice was nearly as good. Both a Yamaha RX11 and a Roland TR707 responded admirably on the MIDI front, while on the non-MIDI side of things, the 707 worked well on its Sync channel in both directions, though a Korg

DDM110 refused to control anything *via* the AL25's Line In. And just in case you get confused, the top row of the Real Time display gives the necessary details in the what-controls-what department.

Problems? Well, synchronisation parameters have to be set up outside of Play mode, and I found myself regretting (a) that drum machine start/stop commands couldn't be sent manually from the Joreth whilst a sequence was playing, and (b) that sequencer and drum machine couldn't be triggered or 'released' simultaneously.

It's possible, using the Real Time Editor, to insert the appropriate control codes at any point in your sequence, whilst the Composer section includes control facilities as part of its instruction set, though it would be nice to have 'high-level' control as well. One particularly welcome inclusion is a MIDI Reset facility which can be used for cutting off notes that are left hanging when a Real Time sequence is terminated (and it does happen). This worked during the test with a Siel DK80, but failed with a DX7—maybe that's more a reflection of that machine's MIDI implementation than on the Joreth system itself.

The JMCS can also handle any of four different values for MIDI clock and Sync rate, the available options taking the form of quaver, crotchet, minim or semibreve metronome beat selections. The system uses 24 clocks per metronome beat as its default value, but selecting a different timebase makes connection with drum machines of different clock standards a realistic possibility.

## Conclusions

Well, I guess that just about wraps the Joreth system up. It's a package that impresses both with the breadth of its coverage and the depth with which that coverage has been implemented. The software is robust as well as thoughtfully planned, and it's nice to see a program that never lets its user get stuck with an option that's been selected in error.

The system's configuration is clever enough to satisfy both the seasoned programmer wanting to get into the guts of the MIDI standard, and the MIDI/computer newcomer who wants an easily and instantly usable real-time sequencer. That said, if the JMCS has a weakness, it's that it doesn't offer enough in the way of high-level real-time facilities, something that could tempt musicians back towards dedicated MIDI sequencers and away from micro-based packages such as this one.

There are a couple of minor additional quibbles and, on the pre-production review sample, a couple of unsorted bugs as well. But they don't come close to discolouring what is, on the whole, a very favourable picture of a comprehensive and versatile piece of music software.

Commodore owners, this is the one. ■

Further information on the JMCS on ☎ (0386) 831615, or write to Joreth at PO Box 20, Evesham, Worcs WR11 5EG.



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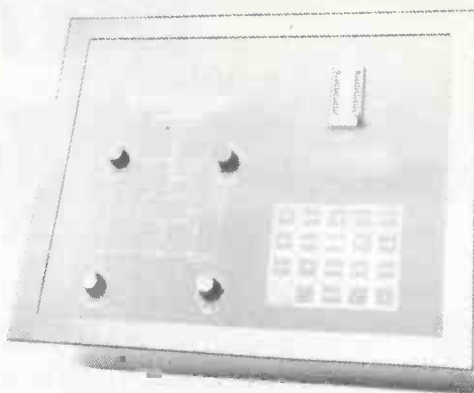


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- Priorities can be set to higher or lower notes to send to MIDI keyboard via CV/GATE.
- Option of 8 MIDI Channels.

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# MAKE THE MOST OF MIDI WITH JMS

# THE ART OF GOING SOFT

Introducing a new series that takes the mystery out of writing music software for home computers. *Jay Chapman*



computers or in music.

There's really no excuse for this yawning gap in education for the budding computer musician. After all, the process that takes somebody from programming novice to experienced software writer isn't *that* lengthy — just a teeny bit forbidding initially. That, in a nutshell, is why we're starting this new series. It'll be running more or less monthly, with a variety of different authors talking about a variety of different machines. The aim will remain consistent throughout, though: to describe commonly-used programming techniques and the application of programming language features by relating them to the sort of problems almost every writer of music software comes up against at one time or another.

It won't be easy, working your way through specific musical features and how software can be written to implement them, but since all the examples we'll be printing will be adaptable for use in your own software, there'll be no shortfall in the sort of rewards your endeavours will be capable of receiving.

interesting-looking newcomers from Commodore (the Amiga) and Atari (the ST range) just around the corner. Watch this space for details.

As for programming languages, the choice here is somewhat less clear-cut, since it revolves more around suitability for specific problems than simple availability.

Almost all home microcomputers have some form of BASIC built into them, and most of the newer ones have progressed to some form of structured BASIC, which is a huge improvement. Unfortunately, BASIC is sadly lacking where the definition of data structures is concerned; and what's more, the structure of permissible program code simply isn't flexible enough for many musical applications. Result? An awful lot of confusion for programmers trying to use the system in a musical context. The fact is, BASIC can cope fine when problems and their software solutions are relatively simple: if anything, it has positive advantages in such situations. However, once you get into programs and problems of greater size, BASIC brings you a whole load of complications and code convolutions to go with them, and it's for these and other reasons that the language Pascal is generally a better vehicle for examples and their explanations.

So, we'll be using Pascal quite a bit to illustrate the use of data structures and programming techniques. And if you aren't familiar with Pascal as a language, don't worry: the meaning of Pascal programs is usually pretty self-evident, and in many cases, it reads pretty much like English (well, some sort of English, anyway). In cases where the translation into BASIC isn't too obvious, we'll be showing that language's more restricted facilities to the same effect, though since most micros incorporate Pascal as an optional language, most of you will be able to use Pascal directly in any case.

What we won't be providing is a programming course as such. There simply isn't the space for one thing, and for another, there are plenty of suitable books currently available that do the job better than we ever could — simply because they concentrate on a wide range of programming applications, not just music. So, a quick trip round your

Convinced by the advertising on TV, the sales talk in the High Street showroom, and the ramblings of *Computer Musician's* regular contributors, you've done the logical thing and got yourself a home micro. You've also got a fair bit in the way of electronic music hardware, too, but so far, your attempts to fuse the two sides of modern technology together have proved less than fruitful.

In your search for education, you've consulted said High Street showroom, the computer's distributors, and several of the home micro magazines — all to no avail. You've also given E&MM's software articles more than a passing glance, but found them to be too far advanced, language-wise, for you to handle with any confidence.

Well, as the author of several of those software articles, I have to admit that, while most of them should have been of some educational value to those already fairly familiar with the ins' and outs of computer programming, they'll have done nothing to relieve the novice's state of confusion. Why? Because unless you've got some grounding in computer programming, vast listings of programs aren't going to give you a lot of educational meat to chew on, regardless of whether your interest is primarily in

## Which Micro? Which Language?

Like I've said, the question of precisely *which* home computer to go for won't be answered by this series, as different months will see the spotlight shed on different micros. However, there are a few obvious good buys, like the low-cost Spectrum, the Commodore 64, and BBC Model B, all of which have enjoyed considerable attention from the professional music software writers over the last year or two. Alternatively, there are the Japanese MSX-standard micros, of which the Yamaha CX5M is not only the most musically comprehensive (thanks to its SFG01 FM sound chip and extensive range of Yamaha-originating music software) but also the most popular among musicians. The fact that it's also far and away the most expensive MSX machine is almost incidental.

There are some outsiders worth considering, like Amstrad's CPC464 and the Sinclair QL, or, if you're not yet in the market for a micro or are prepared to wait a little while, there are a couple of

PRINT: 0  
PRINT: 0  
PRINT: 0  
FOR J=1  
T=T+1  
IF T<10  
IF T<10  
IF T<10  
GOTO 630  
NEXT  
PRINT "3"  
RETURN  
PRINT "4"  
PRINT "5"  
INPUT H  
NN=0: N  
RS=""  
IF O=2  
IF MCN=0  
IF MCN=0  
RS=1100  
IF R=1  
IF Q=0  
PRINT "0"  
5 REM CSR  
PRINT "0"  
110 IF DD  
120 IF DD  
130 PRINT  
140 FOR I  
200 PKINT  
210 PKINT  
220 PUKE  
230 PUKE  
240 PUKE  
250 PUKE  
URN  
TCHET1 BEH  
MANY TIM  
M: I=1  
56577,N2  
HEN 640  
HEN 670  
ISHED PL  
WILL ER  
YOU WANT  
PRINT: IF  
L=0: Q=0  
Q=1 THEN  
EN RS=""  
1 THEN RS  
\$,N,1)+R  
EN RS=""  
EN RS=R\$+  
P.....  
ILENAME"  
C" THEN U  
D" THEN U  
NN  
TO NN: PH  
ILENAME"  
C" THEN U  
D" THEN U  
NN  
TO NN: IH  
ARE YOU SH  
ONLY "YES"  
78,PEEK  
3,4: PUKE  
1,0,0,0  
PER MIN"  
INPUT  
T=T+L2  
NG: PRIN  
THE COMP  
157 H REP  
C"YES" I  
U-1, LL-  
=" I" REM  
M SHF1  
K\$  
+K\$  
+MID\$(N  
\$(N\$,1,  
\$(N\$,0,1  
UP...CSR  
INPUT F:  
N2,1,1,F\$  
N2,8,2,"  
N2,NZ(1)  
INPUT F:  
N2,1,0,F\$  
N2,8,2,F\$  
IT#2,NZ(1)  
YOU WANT  
HLL HLL  
78)OK3  
78)HND2  
272,20:  
+K\$  
RINT#2, LZ  
N1 F3: PK  
NPU#2, LZ  
D FINISH"  
U TO END"  
R3  
IT#2: EN  
20: EN  
0 IF AS="N" THEN N=6: R=0: GOSUB 900  
0 IF AS="M" THEN N=7: R=0: GOSUB 900  
0 IF AS="P" THEN MCN= 1: GOSUB 900  
0 IF AS="F" THEN MCN= -1: GOSUB 900  
260 IF AS="B" THEN N=5: R=0: GOSUB 900  
260 IF VAL(AS)>8 AND VAL(AS)<8 THEN  
390 IF AS="E" THEN GOSUB 800  
400 IF AS="K" THEN GOSUB 1000  
410 IF AS="L" THEN GOSUB 1100  
420 IF AS=CHR\$(13) THEN GOSUB 500  
440 GOTO 170  
500 X=SCZ(N)+MCN): IF X>12 THEN O=O+1  
510 NN=NN+1: NZ(NN)=50: IF R=0 THEN N2  
520 LL=2\*(L-1)\*3: IF U=1 THEN LL=LL\*2  
78: EN-2: THEN U=1: L=272



# COMPUTER MUSICIAN

local bookshop (under the guiding hand of a knowledgeable friend, if possible) should yield plenty of informative bedtime reading material.

In the end, it'll be a combination of books, magazine articles, and above all, hands-on experience that turns you from a programming novice into someone capable of transforming a Casio pocket calculator into a Fairlight CMI. We'll just be giving you a helpful nudge or two in that direction.

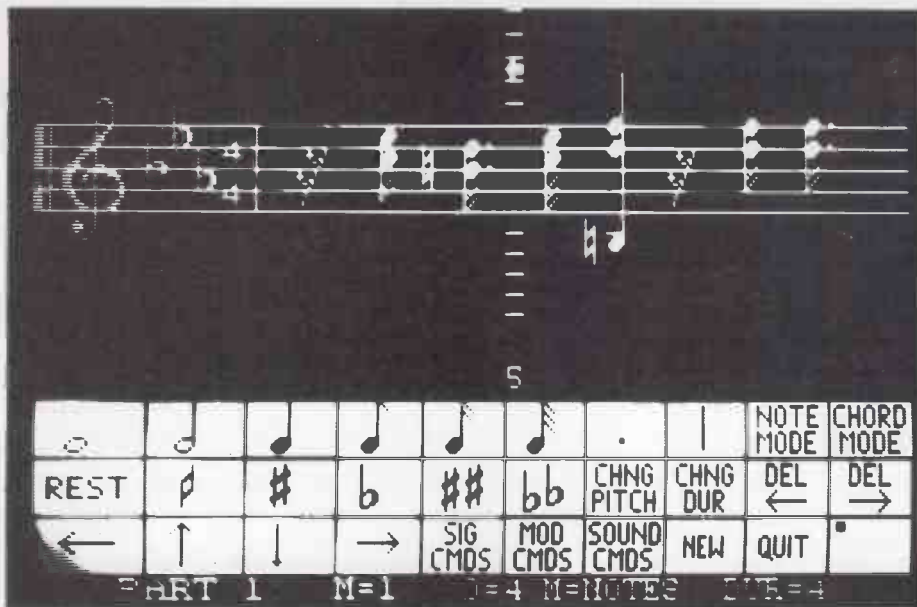
## Sub-Programs

A good many of the sample problems and solutions we'll be discussing won't actually result in the creation of complete programs. More likely, it'll be a case of the data structures that describe what a program is to work on (it might be anything from a chord to a complete musical score, or a real-time MIDI data stream, or some useful screen graphics, or...) being defined, and specific tasks that need to be performed on the data then being detailed in turn. Sometimes, these tasks can become quite complex, so it's useful to describe sub-tasks and their solutions, which can then be used as a kind of 'software toolset' in building the more complex solution to the main problem.

In fact, the idea of carefully designing and encapsulating a sub-routine is common to most programming languages. In simple forms of BASIC, the idea surfaces as the `GOSUB <line number>` statement, in which the diamond brackets enclose a general description of what can appear: thus, `GOSUB <1000>`, in which 1000 is a specific line number in a program. This statement directs the BASIC interpreter to go off and execute at the given line number, and when the corresponding `RETURN` is found, execution continues after the `GOSUB`. There's no denying the usefulness of this facility, it allows a section of code to be called up several times from different places in a program, but it doesn't allow us to pay any attention to the interface between calling routine and called routine. What's more, no encapsulation of data has taken place - see later.

In several forms of structured BASIC and in Pascal, it's possible to give a sub-program a meaningful name in the cause of better understanding: compare `GOSUB 1000` with `edit-score`. It's also possible to declare data structures that are private to the sub-program (the process is called 'encapsulation') so that global data structures, which usually hold data belonging to some other part of the program, aren't affected by what goes on inside the sub-program, unless we say so, of course. This means we can go about programming each new sub-program in an almost totally independent manner, without having to worry about clashes of variable names causing unexpected bugs, for example.

Most important of all, we can define the interface between sub-program and potential callers explicitly. By use of



what's called parameter passing, data can be passed into (and, depending on the language, out of) sub-programs. Thus, we can write a general routine that'll read in, say, MIDI data from either of two data ports and specify (by way of the parameters passed) which port is actually to be used.

As it happens, several previous E&MM programming features, written in BBC BASIC, have made extensive use of parameter passing and procedures. The sub-program interface is defined by the `DEF PROC<name>( <parameter list> )` statement, while any local variables are defined in `LOCAL <variable list>`, within the `PROC` code body.

So, we might define our routine to read MIDI ports with `DEF PROCread-MIDI-port ( port-number )` and call it with `PROCread-midi-port ( 2 )`. In Pascal, the definition would become procedure `read-MIDI-port ( port-number : possible-port-number )` and the call `read-MIDI-port ( 2 )`.

Note that the type and range of data that each variable and parameter can hold has to be defined in Pascal, which is why the `: possible-port-number` appears. This turns out to be an excellent idea, since if a silly value is assigned to a variable or parameter in a Pascal program, it'll complain there and then: a BASIC value will most likely run on and use the silly value quite happily. For example, if `possible-port-number` was defined in Pascal to allow only the values 1 and 2, a call of `read-MIDI-port ( 1725458 )` (in which 1725458 is the chosen port) would fail, giving you a useful point from which to begin debugging. In BASIC, on the other hand, the program might trundle on for some time doing nothing of any use whatsoever, and you'd be none the wiser. And that's not a happy state of affairs for any programmer, I can tell you.

Don't worry if that last bit of language explanation has left you gasping for breath and in a state of mental confusion,

because we'll be tackling the subject in greater detail in the not too distant future.

## MIDI

Well, no series on programming for musicians can be complete these days without considerable attention being paid to MIDI. It is, after all, the means by which most home micro owners escape the confines of their machine's internal sound chip, as well as the means by which synth users can give their instruments access to a computer's facilities. Which means that quite a few of the coming months' examples will relate to the driving of synthesisers and associated equipment from home micros. And if those examples are going to be of any practical value to anybody, we've got to make sure you understand the intricacies of the MIDI standard itself.

This is an important subject area that hasn't really been comprehensively explained from a potential programmer's point of view, so that's yet another gap for this series to fill! The MIDI standard defines the communication between machines rather than what information a program may care to define internally, but there's always going to be some fairly close correspondence in a lot of cases. An obvious example is the conversion between MIDI absolute and running status, something which, incidentally, can be awfully useful when it comes to saving on precious micro memory space.

With luck, future instalments will see us looking into the way different models of synth implement MIDI system exclusive information, and we also hope to be exploring the use of MIDI for driving sound-sampling modules and more specialised devices, too.

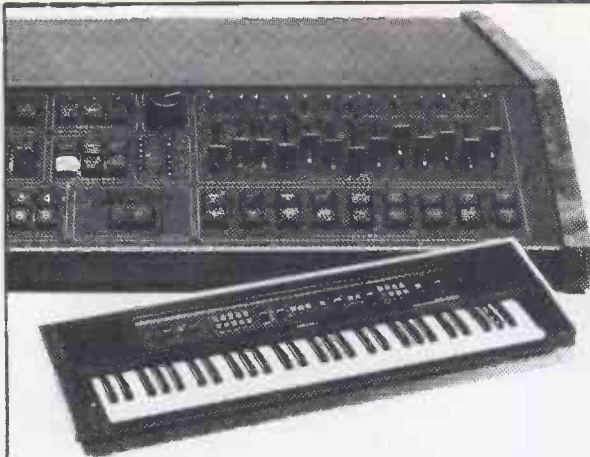
So, if you're interested in programming your own musical software packages that do exactly what you want, are inherently flexible, and can be expanded as and when you see fit (to accommodate extra gear, say), and will cost you nothing more than blood, sweat and tears, you've come to the right place. See you next month.

PER MIN: INPUT PRINT  
 10 PRINT CHR\$(142): POKE 56334,PEEK(56334)  
 20 FOR I=0 TO 2047: POKE I+9152,PEEK(53248+I): NEXT  
 40 POKE 1,PEEK(1):POKE 56334,PEEK(56334):OKI  
 50 POKE 56578,PEEK(56578):OKR3  
 80 FOR I=1 TO 12: NZ(1)=44-I: NEXT  
 90 DIM NZ(12),NZ(1000),LZ(1000):SCZ(7)  
 100 PRINT "CASSETTE OR DISC (C OR D)": INPUT DD\$  
 110 FOR I=1 TO 255  
 120 FOR J=1 TO 12: NZ(1)=44-I: NEXT  
 130 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 140 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 150 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 160 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 170 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 180 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 190 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 200 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 210 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 220 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 230 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 240 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 250 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 260 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 270 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 280 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 290 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 300 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 310 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 320 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 330 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 340 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 350 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 360 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 370 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 380 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 390 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 400 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 410 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 420 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 430 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 440 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 450 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 460 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 470 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 480 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 490 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 500 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 510 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 520 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 530 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 540 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 550 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 560 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 570 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 580 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 590 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 600 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 610 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 620 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 630 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 640 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 650 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 660 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 670 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 680 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 690 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 700 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 710 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 720 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 730 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 740 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 750 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 760 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 770 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 780 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 790 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 800 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 810 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 820 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 830 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 840 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 850 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 860 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 870 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 880 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 890 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 900 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 910 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 920 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 930 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 940 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 950 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 960 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 970 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 980 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 990 FOR J=1 TO 1000: LZ(1)=44-I: NEXT  
 1000 FOR J=1 TO 1000: LZ(1)=44-I: NEXT



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## Index to Advertisers

ABC Music .....	53
Akai UK .....	32,33
Alpha Music .....	80
Argents .....	25
Bonnors .....	7
Cambridge Rock .....	6
Capelle Music .....	29
Carlsbro Sales Ltd. ....	13
Carlsbro Sound Cen. ....	9
Casio Electronics .....	48,49
Chase Musicians .....	1
Chromatix .....	23
Computer Music Studios .....	87
Dougies Music .....	54
Dynachord .....	16
Eddie Moors Music .....	19
Elka Orla (UK) Ltd. ....	83
E.S.S. ....	21
Freedmans .....	65
Future Music .....	73, 73, 74, 75
Gigsounds .....	2
Hobbs Music .....	21
Honky Tonk Music .....	14,15
I.T.A. ....	55
Jones & Crossland .....	29
Korg (U.K.) .....	IBC
London Rock Shop .....	59
MJL Systems .....	54
Northern Audio .....	96
Phonosonics .....	80
Powertran .....	63
Rock City .....	30,31
Roland U.K. ....	IFC
Rosetti .....	91
Rose Morris & Co Ltd .....	41,43
Sadlers Wells .....	54
Simmons Elec. ....	36
Soho Soundhouse .....	57
Solasound .....	21
Summerfield .....	OBC
White Electric .....	30,31
Quark .....	79
XRI Systems .....	80
Yamaha .....	34,35,47



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