MUSIC
technology

FRANK ZAPPA
"Shut Up and Play Your Synclavier"

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ENTS

MUSIC
technology

SHOWING OUT

AS I WRITE this, a jumbo jet is about to whisk me away from the frozen wastes of England, and toward the relative warmth of Los Angeles. Not because I'm going on holiday (though that might be an idea), but because there's an international exhibition going on in California that needs covering.

As I look down on snow-covered Britain, there'll be plenty of food for thought – particularly as the music industry is now entering a critical phase in its development, a phase which both sides of that industry (instruments and records, for want of a better distinction) will have to deal with in close collaboration with each other.

It's showtime again. The NAMM Winter Market, which takes place every January in Anaheim, LA, has been growing in importance over the last few years, to the extent that it now threatens the summer NAMM show as the supreme event in the American music industry calendar.

It's a big show, and there should be plenty of big things to see. Like Yamaha's long-awaited replacement for the DX7, Casio's new range of sampling keyboards (see this month's Mission Impossible competition), and the full public unveiling of three instruments reviewed comprehensively in the magazine you're now holding: the Stepp DG1 guitar, the Oberheim DPX1 sample replay module, and the Sequential Studio 440 drum machine/sampler/sequencer.

After the sun of Anaheim, of course, comes the wintry grey gloom of Frankfurt. Now, I happen rather to like the Frankfurt Musikmesse, partly because it's better organised than any American show, and partly because its added length (five days as opposed to Anaheim's paltry three) means you get a bit longer to survey what's going on around you and place it all in context.

But whatever the personal preferences of an English journalist, the fact is that Anaheim and Frankfurt are *business* shows first and foremost. They're about "product", "units", "market share" and "budget". The subject of music hardly intrudes at all.

Wandering around one of these shows with a Press badge on is like walking round a Conservative party conference with a red rose in your buttonhole. Few people want to talk to you, and fewer still want to lose valuable selling time as you casually discuss the state of modern music, take the odd snapshot which you probably won't have space to print, and steal as much free drink as you can lay your hands on.

This attitude (theirs, not mine) is perfectly understandable. Few exhibitors go to a show like Anaheim or Frankfurt without sales figures at the front of their minds, and it would be foolish to expect them to behave otherwise.

In fact, it's a relatively simple matter to separate commercial considerations from technical and musical ones at trade shows like the two I've just been describing. Of course the manufacturers want to sell more instruments, and so do the retailers. But ultimately, the better instruments become, the more people will start to make music. And the more people start to make music, the better the business will do.

What is more serious is the result of applying the same commercial thinking to the matter of music itself. At a time when modern popular music has reached what I can only describe as a state of stale mediocrity, it's disheartening to see events like the New Music Seminar (a sort of record industry equivalent of Frankfurt or Anaheim) degenerate into little more than a glorified yearly market, where people come to buy, sell, and possibly listen to a minute or two of music.

So, while it may not be too dangerous for the trade to treat musical instruments as "product", doing the same to artists' creativity is something much more sinister – and potentially damaging.

Because if pop music gets duller and duller, fewer people will want to take up playing it. And then the musical instrument side of the industry will have to take a long, hard look at itself, and wonder what it's done wrong.

Food for thought, like I say. ■ Dg

At around £50, Fairlight ought to be more than a little worried.
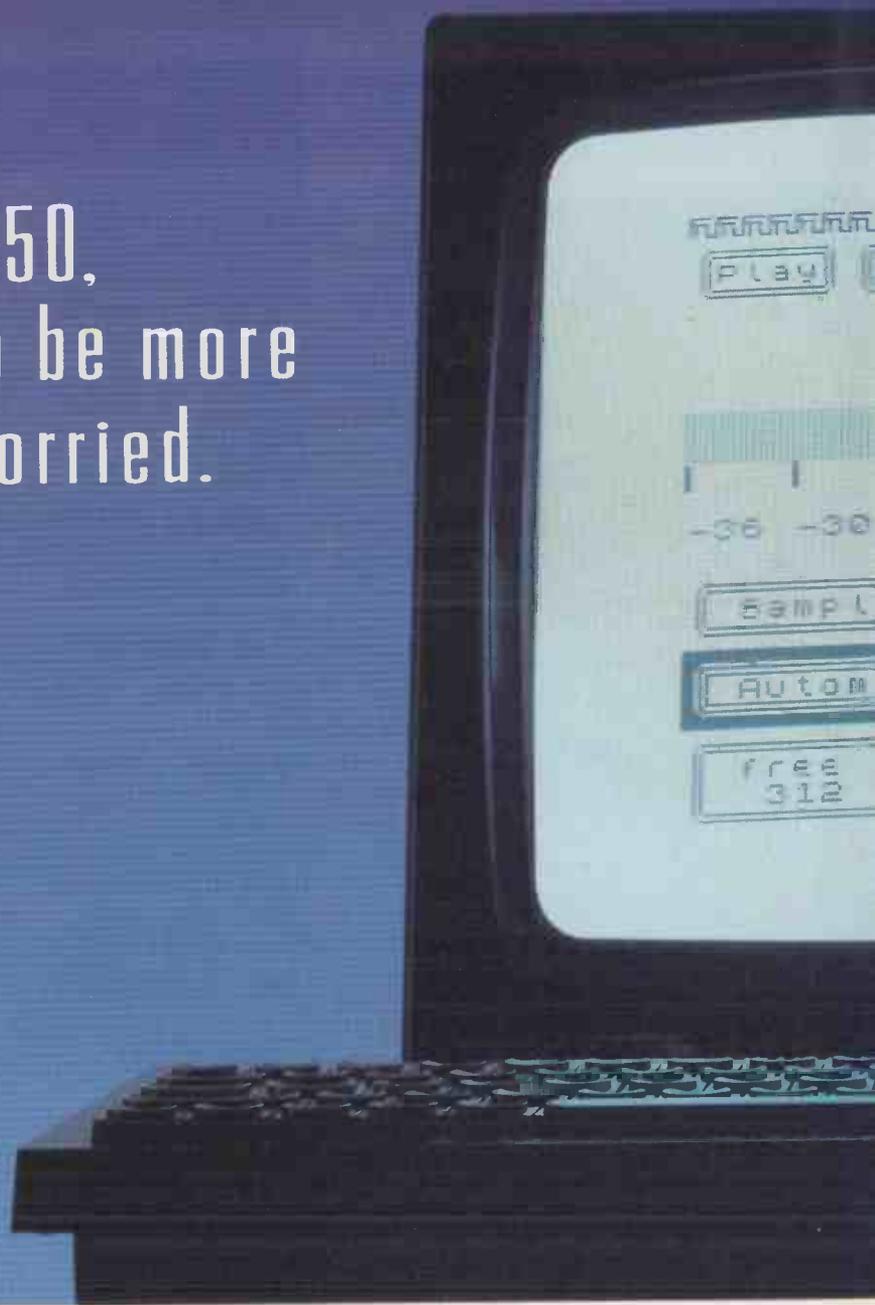
While the legendary Fairlight CMI may have to remain a dream for most of us, it's astonishing to see how much the rather more modest sum of £50† will buy.

Music Machine* from Ram is a remarkable new peripheral that transforms a home micro into a powerful computer music system. It provides most of the facilities you'd expect from a fully-fledged studio system.

With Music Machine you get sound sampling including sample editing facilities, reverb and echo effects.

Together with eight pre-sampled voices including drums and synthesiser, which you can add to with new sounds, a powerful drum section with sampled sounds and a complete rhythm editor. And, there are powerful composition features including note, bar and tune editing.

All the samples can be played either from the computer, or from a MIDI instrument.

NEWSDESK

HYBRID ARTS GOES SOFT ON THE ST

▶ Atari's ST looks like becoming the first 16-bit computer to generate extensive interest among musicians and recording studios on both sides of the Atlantic.

Now American software company Hybrid Arts, who have had a long-standing relationship with Atari through their musical support of pre-ST computers such as the 130XE, are taking up the ST cause with a

vengeance. In addition to the ADAP sampling system (reviewed in MT November '86), they are also offering DX and CZ patch librarian programs, a 60-track sequencer in Sync and SMPTE versions, an entry-level se-quencer, a MIDI Utilities program which reads MIDI data, and a generic librarian program which is designed to work with any MIDI instrument (stor-ing patches and sequences). GenPatch

ST (or so this last program is called) apparently contains the System Exclu-sive formats for many instruments, but in order to cope with all eventualities it also allows you to specify formats yourself (this is where the MIDI Utilities program comes in useful).

On a more serious front, Hybrid have also developed the first MIDI game, entitled MIDI Maze. The mind boggles.

Prices: SyncTrack ST £349.95, SMPTETrack Pro £539.95, DX Android ST £219.95, CZ Android ST £89.95, EZ-Track ST £59.95, Gen-Patch ST £139.95, MIDI Utilities £49.95, ADAP £2499, all prices include VAT.

More from *Syndromic Music, 24/26 Avenue Mews, London N10 3NP.* ☎ *01-444 9126* ■ **St**

TOA SHOWING OUT

▶ TOA are launching a new range of electronic music amplification systems at the Frankfurt Musik Messe. The KD1 (50 watts), KD2 (100 watts) and KD3 (150 watts) will also be joined by the new 310D digital effects unit and the D3 four-input keyboard mixer. All of these products will be launched in the UK immediately after Frankfurt.

The top-of-the-range KD3 is a complete electronic music ampli-fication system in a single, portable package consisting of a stereo mixer, spring reverberation unit, graphic equaliser, power amplifier and two-way speaker system.

Each of the four input channels on the D3 keyboard mixer contains two-band active EQ, independent effects send, clip LED indicator, direct output and channel level control with con-centric balance control.

Also on show at Frankfurt will be the D4 and D4E MIDI mixer and expander, and the 480SE and 380SE 360-watt three-way electronic loud-speaker systems.

More from *TOA Electronics, Tallon Road, Hutton Industrial Estate, Brentwood, Essex CM13 1TG.* ☎ *(0277) 233882* ■ **St**

MR-30

Why pay ten pounds per hour?
When you can get ten hours per pound...

Talent is a rare commodity – and capturing your creativity on tape can be an expensive business. The MR-30 design brief was to create the world's least expensive four-track recorder – without compromising the quality and reliability that has made Vestafire one of the leading names in music technology.

The MR-30 is simplicity itself – whether you're putting down an electronic demo with say, drum machine, bass and synths – or just writing songs with an acoustic guitar and a piano. Whatever music you're working on, you can layer sounds one by one until you have a fully professional multi-track recording.

Features such as Dolby type B noise reduction, graphic eq and electronic punch-in are standard and the machine also doubles as a high quality stereo cassette deck.

But let's get to the bottom line...

£225 SSP

Vesta FIRE

NEW
TECHNOLOGY
FOR
MUSIC
PRODUCTION

JORETH MUSIC SYSTEM 7

▶ Latest software from Joreth Music, who specialise in MIDI software for the Commodore 64, is a librarian and editing system for Yamaha's DX7 and TX7. System 7, which comes on two disks, consists of three main programs: Librarian, Voice Editor and Sequencer. The Librarian allows you to create new banks of sounds and reorganise existing ones, while the Editor accommodates all TX7 features and presents an all-parameter screen with an algorithm display window and a further envelope display screen.

The Sequencer allows you to compose riffs or chord sequences which can play in the "background" while you edit your sounds. In this way you can hear sounds within the context for which you intend them – a very sensible idea which Joreth introduced in their Casio CZ Editor.

An onscreen "notepad" is incorporated within all three programs, allowing you to write memos and work descriptions which can then be printed out or saved to disk. Joreth have also included HELP files, accessible through the notepad, which will guide you through the software.

The second disk provides a Bank Loader for operating within Joreth's MCS and a disk copying program for making backup copies of program and data disks. The Bank Loader allows banks of DX/TX sounds to be loaded within the MCS without disturbing the program, and can also be used as a stand-alone program if the full System 7 Librarian facilities aren't required.

Together with these programs you also get 320 FM sounds thrown in for free, which can't be bad, and the software comes complete with a "memory jogger" card and a Beginner's Guide with working examples.

System 7 will run on MIDI interfaces from JMS, Siel, Microvox and Steinberg (the "budget MIDI-card") as well as Joreth's own AL25 interface, and is priced at £79.99

More from *Joreth Music, PO Box 20, Evesham, Worcs WR11 5EG.* ☎ *(0386) 831615* ■ St
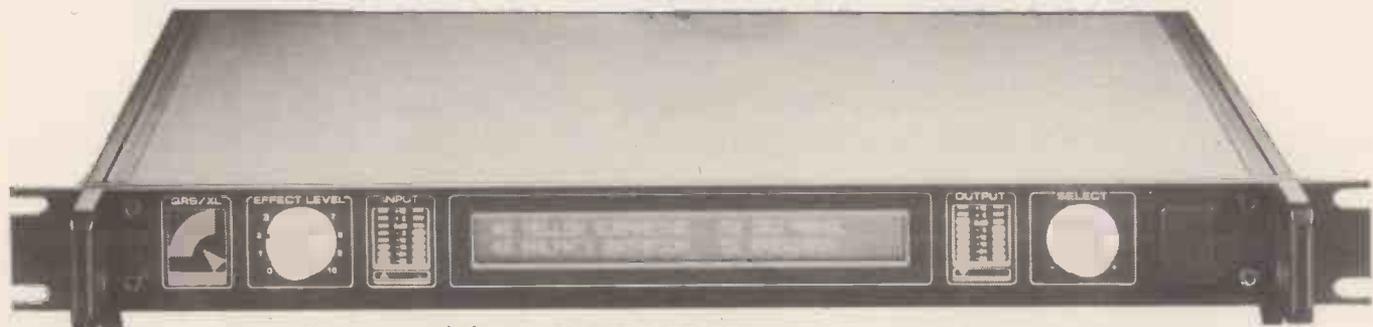
QUANTEC ON LINE

▶ With the last year having seen so much activity at the affordable end of the signal-processing market, it's easy to forget there's life in the more rarified reaches. New from Quantec is the QRS/XL Digital Effects Processor, offering delay, chorus, flanging, reverb, filtering and other effects – including QRS Room Simulation algorithms – in a 1U 19″ rack-mount.

The QRS/XL provides up to 120 pre-stored programs, but the inclusion of an RS232 interface on the unit makes possible the use of various personal computers for control of the XL's full processing power – for instance, changing parameters in real-time, creating custom programs, or controlling a multiple-XL system.

The XL has a 32-bit signal processor which is complemented by specially-designed 16-bit oversampling A/D converters, four oversampling 16-bit D/A's and linear phase filtering. All this processing power gives you two 15kHz-bandwidth output channels for stereo effect or fully independent processing of two separate inputs. And inevitably the XL also features MIDI control.

The company's Q.U.A.N.T.E.C. data network allows XL users to log in via modem to the Quantec VAX computer in Munich and access the latest Quantec-developed software, obtain technical assistance, and exchange interesting programs for distribution via a public "electronic mailbox".

More from *Syco, 20 Conduit Place, London W2.* ☎ *01-724 2451* ■ St

MIDI FOR AMIGA

▶ Supersoft, who have already made a name for themselves among musicians with the Commodore 64-based Microvox sampling system, have been appointed European distributor for the 'MIDI for Amiga' interface from Skyles Electric Works of Mountain View, California. Compatible with currently available MIDI-based software for the Amiga, the Skyles interface has two MIDI Outs, one MIDI In and a MIDI Thru.

Supersoft are also working on their own MIDI software for the Amiga. We await further news with bated breath.

'MIDI for Amiga' costs £49.95 including VAT and is available direct from Supersoft.

More from *Peter Calver, Supersoft,* ☎ *01-861 1166* ■ St

SIGNATURE TUNE CONTEST

▶ Ever heard a radio or TV signature tune and thought you could do better with your eyes (or ears) shut? Well, if you're an amateur musician and you'll be aged 21 or under on April 30th of this year, now's your chance to show just what you can do.

BBC Education Radio needs a signature tune for a new weekly teenage magazine program called *Wavelength Plus*, to be broadcast from next September. But instead of doing it themselves they're holding a signature tune competition. The prize is a session at a BBC studio to record the winning entry, together of course with the prestige, recognition and *royalties* which inevitably follow from having your masterpiece heard on radio each week.

Entries can be any kind of performance by any number of amateur performers, and only the person submitting the entry form has to conform to the age stipulation.

Now, competitions require judges, and in this case a cast of four has been assembled to pass sentence on your efforts: Radio One producer Malcolm Brown, Radiophonic Workshop composer Roger Limb, consultant in Composition Studies Derek Young, and "an expert from the music press". Now, I don't want to put you off, but said "expert" is none other than MT's rapidly ageing Editor – Mr Dan Goldstein.

The judges will be looking for something totally original (!) which must match the style of the program: upbeat, intelligent and forward-looking (just like our Editor). So start getting those creative urges into gear immediately.

The closing date for applications is April 30th. For an application form (which also includes full details of the requirements), send an sae to: WAVELENGTH, BBC Education, 1 Portland Place, London W1A 1AA. ■ St

CASIO AT FRANKFURT

▶ Among the new products that Casio will be exhibiting at Frankfurt are three sampling keyboards: the SK100, SK200 and SK2100. Now, seeing as the SK100 is the prize in this month's *Mission Impossible* competition (see page 36), and the idea is to "guess the spec" – we'll just tell you about the SK200 and SK2100 if that's alright with you!

The success of the company's SK1 sampler at the budget end of the market has shown sampling's broad-based appeal, so perhaps it's no surprise that these new offerings have a home keyboard flavour to them, with preset rhythms, auto-accompaniment and chord memories. The SK200 and SK2100 each include two melody memories, one holding up to 2024 notes using preset tones and the other up to 1024 notes using a sampled sound.

PCM sampling rate on both instruments is 10.113 kHz, and both offer four 0.810 (or 1.62) second samples. Sampling can be via built-in mic, external mic or line in, and once you have samples in memory you can subject them to looping, reversing, key transposition and envelope shaping. Both samplers sport 49-note keyboards, and include a keyboard split. Prices not yet available. (We hope that didn't give you any clues...)

Also showing at Frankfurt will be Casio's entry into the pads-to-MIDI arena: the DZ1 MIDI Drum Translator, together with snare/tom and bass drum pads. Up to eight pads can be connected to the DZ1, and each pad can be assigned its own MIDI channel, program and note number (collectively known as a "translator"), these settings being stored in up to four programs.

Pad eight has a choice of two channel/program/note settings which can be selected using a footswitch, allowing you to play open and closed hi-hats from a single pad. Pad strikes can be translated to a MIDI velocity range of 3-127, and the sensitivity of each translator can be adjusted individually. A system of four snare/tom pads, one bass pad and the DZ1 is expected to retail for around £500.

More from *Casio, Unit 6, 1000 Great West Road, North Circular Road, London NW2 7JD.* ☎ *01-450 9131* ■ **St**

JOIN THE ROLAND LIBRARY

▶ Every sampler must have its sample library, it seems, and Roland are following up the release of their S10 sampler with an 11-box library of pre-recorded samples. Each box contains 10 disks which are broken down into five "primary sound sets" which offer multi and individual samples.

In fact, the complete library offers no less than 118 samples, with each box organised into families of sounds. Thus box L101 is Piano and Keyboard Vol One, L102 is Brass and Wind Vol One, and L107 is Strings and Choir Vol One. The selection of samples apparently covers all(?) traditional instruments, kit and tuned percussion, orchestra and effects.

Each box of 10 disks retails for £95, while Roland-brand blank 2.8" Quick Disks are available in boxes of 10 for £30.

Also available by the time you read this are the first five boxes of 3.5" sample disks for the company's top-notch S50 sampler (no further details available on these at the time of going to press).

Disks for the S10 and S50 may of course be bought from any Roland Main dealer.

More from *Roland (UK), 983 Great West Road, Brentford, Middx TW8 9DN.* ☎ *01-568 4578* ■ **St**

INDIVIDUAL OUTS FOR AKAI SAMPLERS

▶ Good news for owners (and prospective owners) of Akai's X7000 and S700 samplers. The company are making available for a modest price (it says here) a lead which will provide individual sample outputs on jack sockets.

At present the six sample voices on these instruments are output individually on a 13-pin DIN connector, the idea being that you can further process samples using the synthesiser edit functions of an AX73 or VX90.

Akai market a 13-pin-to-13-pin DIN cable for this purpose.

But many users will be looking for a means of outputting individual samples to individual channels on a mixing desk, and this is where Akai's new lead comes in. This lead will plug into the X7000/S700's 13-pin DIN output at one end and offer six female jack sockets at the other (each one marked to show which sample is being output).

More from *Akai UK, Haslemere Heathrow Estate, Silver Jubilee Way, Parkway, Hounslow, Middx.* ☎ *01-897 6388* ■ **St**

STAR SAMPLES

▶ While sampling offers the possibility of capturing any sound you might want to use, getting access to the sources of these sounds is of course another matter. Now, you can buy the library disks which are commercially available for your sampler (and, with the right equipment, for other samplers), which might satisfy some of your requirements. But this can fast become an expensive option, especially with samplers which store a limited number of samples per disk.

Another option is to record samples onto tape, from which you can "resample" them when they're required, perhaps reserving your disks for samples currently in use. It could be a way of building up a large library for a relatively small cost.

The problem here is storing samples with enough audio fidelity to do the source justice – particularly where the

current generation of high-resolution samplers are concerned. This is where Star Samples' series of tapes comes in. Available on TDK MAR metal cassettes and Sony PCM F1 digital tape, the Star samples have been studio-recorded and digitally mastered, with the cassette versions benefitting from Dolby C noise reduction.

So far available are four tapes, with a fifth expected to be available in mid-February. These are:
Vol 1: Drums
Vol 2: Orchestral, tuned and latin percussion
Vol 3: Concert-tuned grand piano
Vol 4: Brass instruments
Vol 5: Saxophones

The number of samples ranges from 56 on the Drums tape to 150 on each of the Percussion and Brass tapes, with each sample being cued two or three times to aid in setting trigger levels.

The Star philosophy appears to be to offer a wide number of samples within a certain "family" of instruments. The Drums tape, for instance, offers seven kits each with different mikings, ambiences and effects, while the saxophone tape (which includes samples of all the sax family) offers samples recorded with different dynamics and tonguings.

And in case you're wondering how a whole tape can consist of samples from a single grand piano, each side of tape consists of a full 88 sampled notes (sampled at mf dynamic on one side, ff on the other). In this way you can choose what notes you want to sample, and how many. What's more, the inclusion of different dynamic levels allows you to take advantage of the sample crossfade and switching features that are available on many samplers nowadays.

Syndromic Music offer full listening facilities at their premises, so you can hear before you buy. Prices: Cassettes £25-35; F1 £179

More from *Syndromic Music, 24/26 Avenue Mews, London N10 3NP.* ☎ *01-444 9126* ■ **St**

ELECTROACOUSTIC MUSIC IN WORDS

▶ New from publishers Collier Macmillan is a book entitled *The Language of Electroacoustic Music*. Edited by Simon Emmerson, director of the Electroacoustic Studio at City University in London, the book aims to help listeners understand the musical as well as the technical problems that composers of electroacoustic music have to overcome.

Leading British and American composers write about the ideas behind their music: the way they use their technical resources at their disposal,

the way they structure their music, and the effects they aim to achieve.

Contributors to the book include Simon Emmerson, Jonathan Harvey, Denis Smalley, Trevor Wishart, Tod Machover and Pierre Boulez – the latter's essay 'Technology and the Composer' opening the collection.

Prices are: Hardcover £29.50 (ISBN 0 333 397592); Paperback £9.95 (ISBN 0 333 397606)

More from *The Macmillan Press, Houndsmills, Basingstoke, Hants RG21 2XS* ■ **St**

COMMUNIQUÉ

Write to: Communiqué, Music Technology, Alexander
House, 1 Milton Road, Cambridge CB4 1UY.

Dear MT
IRCAM Attacked

Your editorial in January's issue was quite
interesting. Also interesting was the article on
Morton Subotnick in the November issue. I'm
glad to see the magazine moving away from
that laboured pomp-rock style it was so
bogged down in.

There should be more articles on avant-
garde and experimental music – the
"academic" stuff, if you like. It's an area that
can be tackled and presented to a wider
audience in a magazine like MT; why should
the EMAS crowd have all the fun?

One point you miss: IRCAM is an incredibly
elitist institution and is definitely not the kind
of place where "...musicians could meet,
exchange ideas about new technology, under-
take various programming and composing
projects and experiment with new forms of
musical instrument". Only the chosen few, the
buddies of Boulez, have the chance to spend
millions doing that. It's a very cosy little club.
■ Robert Worby
The Music Technology Group
Leeds

Dear MT
School's In

I don't know whether or not I was surprised at
Alan Smith's account of electronic music in
schools (Communiqué, January '87). I go to an
ordinary comprehensive school of about 900
pupils, and feel proud but embarrassed to list
the music department's equipment.

We (sorry, they) have an ageing Yamaha
CS40M that would be wonderful with a
service, a Casio CT202 plus a number of VL-
Tones, a Yamaha RX21 drum machine and a
Yamaha MT1X multitracker.

These last two acquisitions came after hours
pleading with the headmaster to assist pupils
in the "modern music techniques" part of the

new GCSE exam. They've already proved
themselves worthwhile through their use in
the school's latest musical, 'Big Al'. The MT1X
was a dream come true for sound effects,
while the RX21 provided excellent machine-
gun sounds courtesy of its handclaps. The
toms also came in useful for "comedy thumps".

Obviously the equipment is new to the
pupils (and the music teacher – though he
used to demo Yamaha gear) but already, good
results are being achieved, and we're having
lots of fun – which is what it's all about really.

I suppose we're also very lucky to have a
music teacher who isn't scared to dip his
fingers into modern music and its technology,
with the added bonus of a great deal of
enthusiasm.

Is new, quality equipment breaking into
schools now that the computer frenzy has
died? I'd like to think my school isn't the only
one – but if it is, it ought to be the first of many.

One final point. Perhaps Mr Everett
(Communiqué, same issue) should start reading
your excellent magazine, rather than looking
at the photographs; since when has a Yamaha
electric grand been an organ?
■ Robin Arnold
Bude
Cornwall
PS. How the hell do you pronounce Tim
Goodyer's surname? (Any way you want to –
Ed)

Dear MT
Presets Out

It was with delight that I read R Davies' letter
(Communiqué, December '86) about the
preset mania that seems to rule the electronic
music world today.

I must say that I don't like presets at all. I'm
composing a lot of "classical" electronic
pieces for synthesisers, and I put just as much
effort into programming the sounds as I do
into writing the melodies.

I don't usually use much FM equipment

because I find it difficult to make the sounds I
want to, and it just doesn't feel right to use all
those presets I can hear on the radio every
day.

I own a Casio CZ5000, which is really an
excellent music machine – as long as you know
how to use it properly. I know a lot of people
say that the PD sounds of the CZ series synths
are dull, boring, squeaky and lack power. But
that's only because they don't know how to
get the good sounds.

Every synth has its own character, and
that's the point when using several different
synths on a recording – one synth is good at the
bass sounds, the other at the string sounds and
so on. But I can't understand people using two
JX8Ps, three DX7s and an Emulator just to
boast with them, when they can't even make
up their own sounds.

Recently I began to use sampling in my
music, and yet this is another area of
electronic music where presets and factory
disks are spoiling the individualism, creativity
and pioneering spirit. I know it can be difficult
to make your own good samples – but if you
can't do it, then don't use samplers! What's
the point of restricting yourself to a handful of
sounds when you have a tool to turn your
whole world into music with?

OK, some factory sounds like pianos,
harpsichords, violins and choirs are truly
wonderful, but what are all those gunshots,
door slams, breaking glass sounds, cat meows,
raindrops, explosions and vocal stutterings
good for, except selling the machines to
amazed customers in music shops?

I can spend hours sampling ordinary sounds
and editing them until they turn into wonderful
new and individual sounds – my very own
musical instruments.

The advice I'd like to give to anyone who's
only been using preset ROMs and disks is
simply this: try to spend some time learning
your synth(s) and sampler(s) from scratch. It
will be worth the effort.
■ Thomas R Kolb
Sweden

Technology Sound and Performance

No-one would disagree that Yamaha have revolutionised the Hi-Tec world of music with their development of digital FM synthesis. From the best selling DX7 to the DX and TX range Yamaha have continued to offer outstanding technology, sound and performance. However, as the worlds largest manufacturer they also make the worlds greatest pianos, drums, guitars and just about every musical instrument you can think of! As Yahama's consistent No.1 dealer Future Music has them all. Call us now and experience Yamaha's milestones in technology.
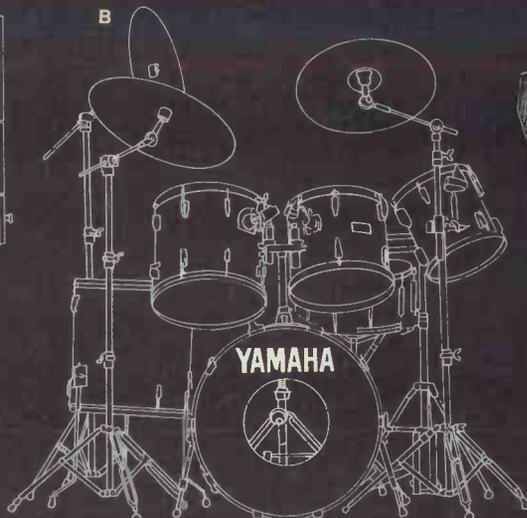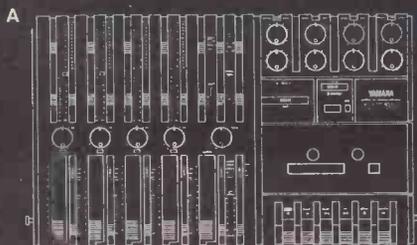
YAMAHA

A MT1X
4 track multitrack recorder. Normal tape speed, EQ, DBX. Noise reduction.

B Yamaha Drums
4000, 5000, 8000, 9000 Series now in stock at all our drum stores.

C RX21 Digital Rhythm Programmer
9 PCM sounds, MIDI, 40 preset patterns. 56 user programmable patterns.

D TX816
New reduced price. 8 TF1 modules, MIDI giving effectively 8 DX7's!!

E CX5 Mk11/128
With 128K of memory, the SFG05 sound generator built in. Now you can program the CX5 with any external MIDI keyboard.

F KX88 MIDI Master Keyboard
88 note weighted keyboard – the best! Breath control and foot control inputs, dual and split modes, 2 control wheels, many other features most sophisticated MIDI keyboard on the market and now at ridiculously low price.

G DX100 FM Digital Synthesiser
192 preset, Rom and 24 Ram voices, cassette dump. The perfect introduction to FM technology or as an expander to an existing MIDI set-up.

H S250X Compact PA Speaker System
250W power handling, 2 way bass reflex design, carbon fibre cones. Rugged and portable.

I FB01
FM Tone Generator 4 operators, 240 presets, 8 note polyphonic one voice, 4 note poly dual voice, mono with 8 voices and split modes, MIDI.

J SE Guitar Range
4 pickup configurations, lock vibrato, traditional no-nonsense styling, 6 colour choices.

K MEP4 MIDI Event Processor
60 MIDI set-ups, complete function control of 4 separate MIDI devices, unprecedented versatility.

L SPX90 Digital Multi-Effects Processor
30 Rom preset effects, 60 Ram memories, 9 control parameters, MIDI compatible, the complete processing device.
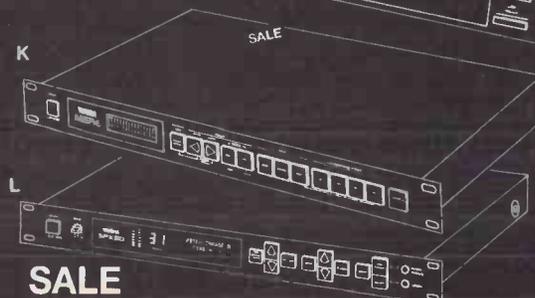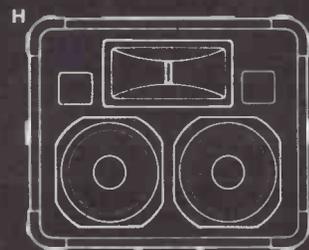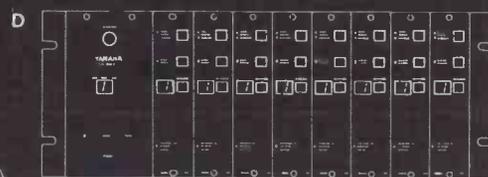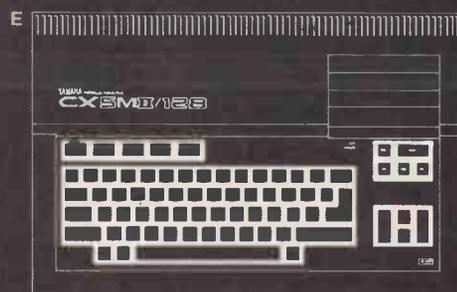
SALE

SYNTHS		S/H Mirage Rack Sampler	£999	Ex-demo MPC The Clap		£40
S/H Juno 6	£249	**ELECTRIC PIANOS**		**ELECTRIC KITS**		
S/H Roland Sh09	£175	Ex-demo Yamaha P780	£799	Now up K2X complete	£850	£599
S/H Moog Source	£199	Ex-demo Roland HP450 and		Ex demo Korg drum & stands		£399
S/H E&MM Spectrum	£99	free rhythm unit + MIDI sequencer	£695	S/H Simmons SDS9	£1199	£899
S/H Korg Micropreset	£50	Ex-demo Roland HP400 + free		**GUITARS**		
S/H Casio CZ101	£159	rhythm unit and MIDI sequencer	£595	**Ex-demo (slightly marked)**		
S/H Moog Taurus pedals	£299	S/H HP5600 digital piano	£1999	Yamaha SA-800 + case	£559	£395
S/H Sequential Prophet	£249	**DRUM MACHINES**		Yamaha SG1200S	£499	£375
		Yamaha RX11	£499	Ibanez Roadstar II	£425	£299
MIDI SYNTHS MODULES		Ex-demo Korg DDM220	£125	Fender contemporary strat	£449	£350
Ex-demo Roland HKS30	£399	S/H Roland TR606	£125	Washburn Force 3	£245	£175
S/H Moog Taurons pedals c/v	£399	S/H Roland TB303	£125	Kramer half-fretless	£495	£215
Ex-demo TX7	£399	Ex-demo Boss HC2	£39	Yamaha BX-1 headless	£669	£585
		Ex-demo Boss PC2	£39	Aria LEB bass	£255	£215
SAMPLERS		Ex-demo Digisound	£49	**SECOND-HAND AMPS**		
Ex-demo Roland S50	£1599	Ex-demo Yamaha MR10	£49	Marshall 50w head		£99
S/H Prophet 2002	£1795					

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125 ALBERT ROAD
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85 ST MARYS STREET
SOUTHAMPTON HAMPSHIRE
0703 226798/227683

44/46 PRESTON ROAD
BRIGHTON SUSSEX
0273 675983/675984

FUTURE MUSIC

INTERFACE

Q I recently bought a Sequential Prophet VS synthesiser which has been a disaster with respect to reliability.

My particular beast overheats and "freezes" whenever it is used in any reasonably warm environment, which limits its use considerably this side of Reykjavik.

The only place where a perfect performance has so far been guaranteed has been the workshop where it spends an inordinate length of time confusing technicians. Admittedly I haven't been charged for any of the (so far unsuccessful) repairs/modifications, and

models. The "freezing" you refer to is in fact the VS' audio signal cutting out. Pass on this information to your repair company and they should be able to sort out the details with Sequential. ■ **St**

Q Would you please help me with my dilemma concerning sequencing and synthesisers. I own a CZ1000 and intend to sell it in order to buy an SCI MultiTrak. Then I plan to get a CZ101 as an expander for the MultiTrak.

Could I sequence the CZ101 via MIDI using

are used in their multitimbral modes, the CZ is four-voice polyphonic and the MultiTrak is six-voice. If you only sequence four voices on the MultiTrak and CZ101, you are left with two MultiTrak voices to play with over your sequence. In fact, the less voices you sequence the more there are for you to play with in real time.

The MultiTrak was a relatively early attempt at combining synthesis, sequencing and MIDI control in one instrument. Nowadays enough time has passed for manufacturers to get a much clearer idea of what such an instrument should offer. Ensoniq's ESQ1 synth (reviewed E&MM August '86) has an eight-track onboard sequencer. Each track can be assigned to any
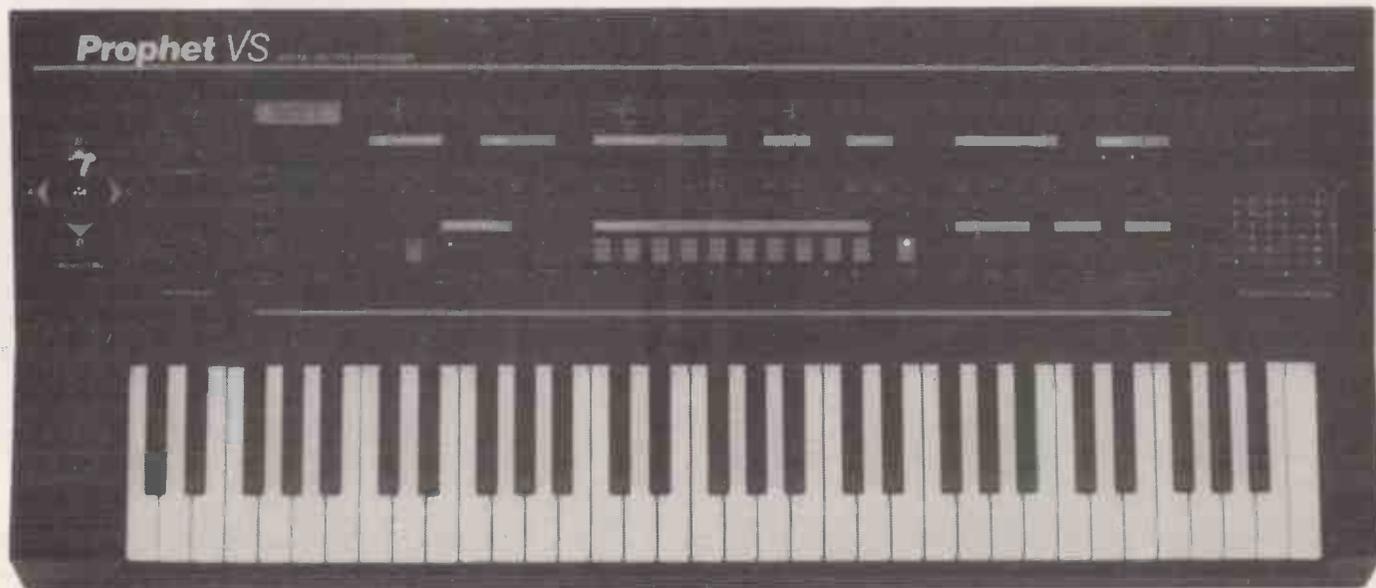
the company used by the manufacturer genuinely seem to be trying their utmost to rectify the fault.
■ **Vic Martin**
Cheam

A We've had words in some American ears, and it appears that the overheating and "freezing" on your VS is down to a capacitor being inserted the wrong way round in early

the MultiTrak's onboard sequencer, and still have the six-voice polyphony of the Multi-Trak's own synth section? If not, is there another keyboard with onboard sequencing which would allow me to do this?
■ **W J Hughes**
Welling

A The best you can hope for with the MultiTrak/CZ101 combination is a "half-way house" solution. When the two synths

MIDI channel and given its own onboard sound, and you can specify whether a track should play internal voices only, external voices only (ie. via MIDI) or internal and external voices together. In this way you can assign tracks to play on slave MIDI instruments while leaving the synths' own voices free. You aren't limited to a fixed polyphony per track, and what's more, because the synth can allocate its own voices dynamically you have greater freedom in making use of the ESQ1's own sounds.

Further information can be had from Ensoniq UK on ☎ 01-435 2434 ■ **St**

Q First of all, I would like to follow up on my letter to you in the September '86 issue, which concerned the traumas of buying my first synthesiser. I'm now glad to say that I am a proud owner of a brand new AX73, which has given me (and shall go on giving me) many hours of sheer delight.

Now on to my query. As you are no doubt aware, the AX73 has a "sampler in" jack. Please forgive me if I sound rather naive on this subject, but my knowledge of sampling is by no means extensive. What I would like to know is: would it be possible after editing a sample on the AX73 to save this edited sample from the AX73 to tape, for later use with the synthesiser? I know this is almost certainly too much to ask of a £600-700 synth, but maybe it's a good idea for future synths?
■ Paul Stevens
Wrexham

A To begin with, it's worth bearing in mind that this isn't an all-purpose sample input. Rather it's intended for use with Akai's S612, X7000 and S700 samplers.

This synth/sampler relationship provides you with a means of (a) expanding the sonic capability of the

manual, there are parameters for each sound which allow you to specify whether or not you want to use a sample input as part of your sound, and if so what balance you want between the sample and the 73's own waveform. Beyond that you would need to call up the relevant sample on your sampler each time you wanted to use it with an AX73 sound, and of course play from the sampler (or a keyboard controlling it). ■
St

Q A nice brief one for you guys. I have a Roland TR808 drum machine which I would like to use in conjunction with MIDI instruments. What I would like to know is: is there any way in which I could trigger the separate voices on my TR808 using MIDI note numbers?
■ Will
London

A This is a non-starter, I'm afraid. Crucially there's no way of externally triggering individual 808 voices, so you can't even hope to use some magical MIDI/pre-MIDI converter box to smooth away the incompatibility problems.

However, you can at least sync your 808 to a MIDI source as master or slave, as it has a Roland Sync 24

Unfortunately, since you ran this article we've had information from some of our Club members that the SFG05 won't run on the Pioneer PX7 MSX computer, and we also now know that it won't run on Panasonic's MSX computer. Annabel Scott also suggests that the Toshiba keyboard would work with the Yamaha SFG05, and we're not certain whether this is in fact the case or not.

As far as we know the SFG tone module will run on the Toshiba HX10, Canon, Sony HitBit and Mitsubishi MSX machines as well as of course the Yamaha CX5.

Details of how to make up a suitable interface board are given in the Christmas issue of Feedback (the club magazine), and the board is also available ready-built through the Owners' Club.
■ Martin Tennant
Manager, X-Series Owners' Club

A In the "everyday problems of using MIDI instruments" department I thought other readers might be interested in my troubles with a Technics PX7 Piano and Yamaha RX15 drum machine.

I connect my PX7 to the RX15 so that I can use the PX7's MIDI clock to sync the drum machine. This allows me to start, stop and adjust tempo from the piano. I also have to set the RX15 to "Receive

sampler, and (b) expanding the sonic capability of the synth. That is, the AX73's voice-editing features can be used to process samples in ways which can't be achieved using the sampler alone, while samples can be used as an additional sound source for mixing in with the synth's VCO waveforms.

What you end up with is a capability similar to Korg's DSS1 sampling synthesiser, but arrived at using two instruments instead of one. And there's the rub. The samples are integral to the sampler not the AX73, which stores sound parameters rather than sounds to tape. The AX73's internal basic sounds are limited to four waveforms, and a sound parameter selects which of these waveforms is to be used for that sound. The number of parameters that constitute the make-up of an AX73 sound are relatively few compared to the massive amounts of data which sampling generates, and tape is no medium for storing samples.

As you've probably noticed from your AX73's

input and output. There are sync/converter boxes such as the Korg KMS30 and Roland's own SBX10 which allow you to link up MIDI and Sync 24. It may not give you all the flexibility you're after, but at least it gives you the possibility of running your 808 alongside other MIDI equipment.

Of course you could always invest in a sampler, and bring your no-doubt treasured 808 sounds fully into the realms of MIDI... ■ Tg

A In the August '86 issue of E&MM you ran an article by Annabel Scott called 'Raising the Standard' on the subject of MSX home computers. In this article she mentions the Toshiba music package, which she says runs perfectly well on a Pioneer machine. She also suggests that the Yamaha SFG05 tone module would run with the Pioneer.

Unavailable" so that playing the piano doesn't trigger any drum sounds.

The problem arises when I "stop" the drum machine and am just playing the piano. If I play a chord of four notes or more the RX15 displays the message "MIDI Data Error" and I find that many of the drum patterns have been corrupted. On one occasion some of the instruments stopped working and no end of switching on and off or reloading data would bring them back. I eventually traced this problem to the pan settings for the drum voices being "0 Left 16 Right", which isn't physically possible from the front panel slider.

After much experimentation I found that these MIDI data errors could be avoided by setting the RX15 to "Receive Available" and then "Omni Off", and by ensuring that the RX's receive channel was not the same as the PX's transmit channel.
■ Richard Shipton
Billericay

Yamaha DMP7 Digital Mixer
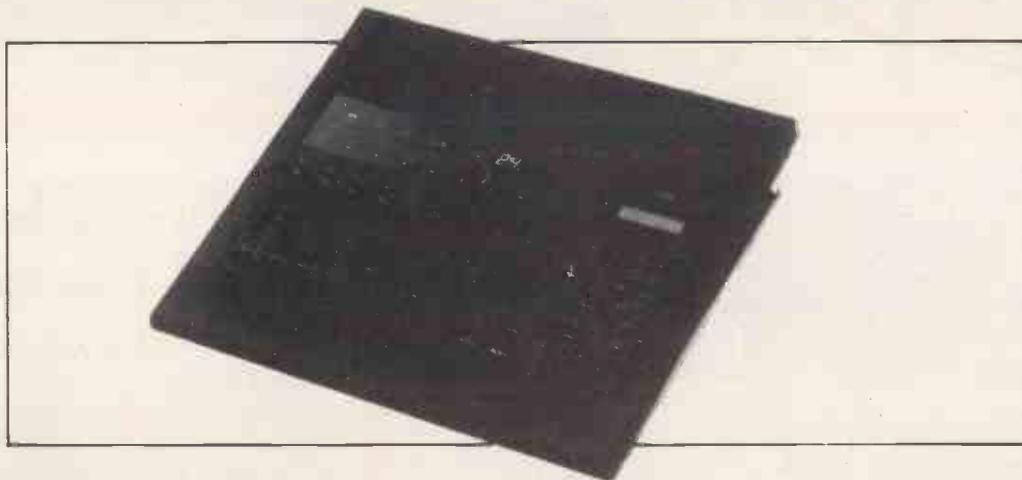
IN THE WORLD of big-league studio mixing desks, there have been two major "innovations" in the field of digital control which no self-respecting design team has been able to ignore with any safety.

The first is automated mixdown, where control settings and changes are stored in a computer's memory and then read out in real time as a mix takes place.

The second is processing of the audio signal within the digital domain, which ensures the mixing console is no longer the poor relation of the digital tape recorder in terms of signal-to-noise ratio or frequency response.

Incredibly, both these areas are features of a new small (eight-into-two) mixer. The mixer in question is the DMP7, the company that makes it is Yamaha, and the price-tag it carries should be under £4000.

The DMP7's eight input channels each begin with a 16-bit analogue-to-digital converter (ADC), since the mixer's design does not allow for any signal to be input in digital form. But since the DMP7 uses a sampling rate of 44.1kHz, Yamaha may yet supply an input stage for digital data from other machines (samplers, digital tape recorders and so forth) in the future.

Once a signal has been converted from analogue into digital, it goes through what appears initially to be a conventional arrangement of controllers: a three-band EQ section, three FX send controls (switchable pre- and post-fade), a channel on-off switch, a pan control and a level fader.

But these controllers differ from their counterparts on ordinary mixing desks in a number of ways. The first is that, in an extension of the digital parameter access principle found on synth control panels, Yamaha have made the DMP7 controllable using a system of remote parameter selection and value adjustment.

To boost the mid EQ frequency by 5dB, you can't just turn a rotary pot; you have to hit a dedicated button on the right of the console, and adjust it using a data entry slider similar to that found on DX synths, keeping an eye on an LCD as you go.

That's the bad news. The good news is that, again unlike most mixer controls, every single one of these parameter values can be stored per channel as part of what Yamaha term "scenes" – 32 memories onboard the DMP7, a further 67 on external RAM cartridge.

And what distinguishes the DMP7 even further from most mixers is that those FX send controls can be routed to three internal signal-processing units. Two of these units

have a similar specification to Yamaha's SPX90 outboard processor, and offer 15 basic effects, all of them with a selection of programmable parameters. The third processor offers only five basic treatments, but you can bypass this and route FX send 3 to an external unit of your own choice.

The level sliders for each of the eight inputs are controlled by servo motors, so that in an automated mixdown, they move up and down to their pre-programmed positions. The same is true of the FX return and stereo output sliders.

At the stereo output stage, digital signals are returned to their analogue state by twin digital-to-analogue converters (DACs). Before this, though, the DMP7's output is sent through a built-in (and user-controllable) digital stereo compressor system.

The last important string to the DMP7's bow is MIDI. The mixer can receive MIDI patch-change data from an external machine, and such events can be programmed to take place in real time from a MIDI sequencer. So you could have, for example, four channels of sequencer-controlled synths being linked to two channels of MIDI drum machine and two channels of stereo tape recorder (connected via a MIDI-SMPTE or tape sync converter), with all settings for all eight inputs changing at pre-programmed points in your piece of music.

In its current format, the DMP7 doesn't fit that neatly into the average small studio setup, despite the increasing use of MIDI-controlled events in modern music production. However, some studio owners may consider cascading two or more DMP7s in parallel (via MIDI System Exclusive data) to give mixing formats suitable for multitrack recording.

But the DMP7 should make an impact as a sub-mixer in studios (where its high sound quality will be of great benefit); as a control centre for video and A/V post-production applications (where its automation features will come in especially useful); and on-stage (where keyboard players will at last have control over their own sound system, without having to worry about making too many spontaneous alterations).

As a machine in its own right, the DMP7 is a step forward of awesome proportions. As an indicator of things to come, its impact could be phenomenal. ■ *Dan Goldstein*

Casio AZ1 Remote Keyboard

JUST AS NOT every guitarist is an extrovert, not every keyboard player wants to hide behind a stack of machines all the time. Cue the remote keyboard controller, of the sling-it-round-your-neck variety.

Like master keyboards (which you don't sling around your neck unless you're looking for a hernia), the strap-on kind don't make any sounds themselves. What they allow you to do is join your guitarist and singer stage-front and pose with the best of 'em. All you need is a MIDI cable stretching from controller back to keyboards and voice units – there's no need for any audio cable.

The latest sling-round-your-neck offering comes from Casio, and a stylish beast it is, too. As befits a strap-on instrument, the AZ1 has been designed as much along guitar lines as a keyboard controller can be. It's slightly heavier than the average guitar, but it shouldn't cause you any back strain. And crucially, it's a *balanced* instrument to carry around.

The AZ1's 41-note keyboard, which can transmit both attack velocity and channel aftertouch information, has a light action which suits the fact that your fingers don't so much fall on the keys as travel parallel to them. You can alter the range of the keyboard up or down an octave, so the total keyboard span is just over five octaves. The AZ1 turns off any existing notes whenever you change octave, so there's no danger of notes being left hanging; it also "retransmits" existing notes at the new pitch.

On the neck are a dedicated pitch-bend wheel, two assignable wheels, portamento and sustain buttons, two assignable switches and a Solo button, while there's an assignable slider on the main body of the instrument. All these controllers fall easily to the left hand, and a three-digit LED window displays values.

When powered up (either with six AA batteries or an external 9V power supply), the AZ1 automatically sends out various MIDI messages including Omni Off/Poly, Sustain Off, pitch-bend centre value, the last-set program number and the current settings of the assignable continuous controllers.

The effectiveness of the AZ1's controllers depends on which controls are implemented on your slaved instruments. For example, if none of your instruments can respond to the MIDI main volume control, there's not a lot you can do about it.

Initialised definable settings (which can be recalled at any time) are modulation for wheel 1, master volume for wheel 2, portamento time for the slider, modulation on/off for key

1 and glide on/off for key 2. The Solo on/off button changes the AZ1 over to monophonic performance, and sends out an Omni On/Mono instruction on the relevant channel(s) – so that something like a DX7 can be put into its mono performance mode. The portamento and sustain effects are on as long as the buttons are held down – which is no problem as you can only use one hand to play anyway.

As an alternative, the AZ1's definable controllers can be used to send System Exclusive messages. These are intended for Casio's CZ series of synths, where they can be used to control such features as tone mix, key transpose, mod wheel depth and amplitude aftertouch range.

So you're at the front of the stage, AZ1 hanging from your neck, MIDI cable snaking back to your stack of gear. Chances are you'll want to (a) use more than one sound, and (b) use more than one instrument.

The former is taken care of by front-panel buttons which allow you to select any of the total 128 program numbers allowed for by MIDI. This is done in a bank/sound format which allows selection to be carried out quickly and minimises the number of buttons required.

The second option is catered for by giving the AZ1 three MIDI transmit modes: A, B and A+B. A and B modes can each be given a separate MIDI transmit channel (1-16), while A+B acts as a sort of dual mode by transmitting on both channels at the same time. Sensibly, the AZ1 doesn't allow you to change transmit mode – and consequently MIDI channels – while any notes are being held down or are still sustaining.

In A and B modes the AZ1 can transmit a maximum of eight notes simultaneously, while in A+B mode, up to eight notes can be transmitted on each of the two channels (so you retain eight-note polyphony).

You could use A and B as a means of switching quickly from one instrument to another, or you could use A (or B) and A+B as a means of playing one instrument and then suddenly layering another on top. MIDI controller codes are sent on whichever channel(s) you've selected – so you can't, for example, route controllers to one of two instruments in A+B mode.

But the AZ1 is a well-designed, flexible and ergonomically efficient controller. If you're looking for a chance to step out into the limelight in style, Casio's offering could be just what you need. ■ *Simon Trask*

Cheetah MK5 Controller Keyboard

CHEETAH'S MK5 IS the latest in a long line of home computer peripherals which far exceed the power and quality of rival products. In this particular case, Cheetah have broken through into the serious music market with a stylish and economical MIDI master keyboard.

You may have read about Cheetah's new Spectrum Sound Sampler (reviewed last month) and forthcoming Spectrum MIDI interface. But the MK5 is a quantum leap ahead of these admittedly excellent budget products, providing many MIDI control functions. With the optional Spectrum mini (not MIDI) interface, you can also play the sound chip of a Spectrum 128K or Plus 2.

High Street chain Boots originally asked Cheetah to produce a dumb keyboard just to play the Spectrum's AY-3-8910 sound chip. But the hardware Cheetah actually came up with could justify a place in practically any MIDI'd home studio.

The MK5 is a full-size, five-octave MIDI controller keyboard with a tough, stylish all-metal case. The keyboard bit is made in Italy and is similar in quality and feel to that of many good non-velocity-responsive synths.

Controls and connections are cut to a bare minimum, mainly for reasons of economy. At the rear are the power connector for the 9V transformer supplied with the keyboard, and the standard five-pin DIN MIDI Out. Above the keys are a sprung horizontally-mounted pitch-bend wheel, a program/play selector switch, four LEDs indicating the current control option, and a large, bright three-segment LED display.

Where, you might ask, are all the other controls? Well, like the OSCar monosynth, the MK5 has many of its control options hidden on the music keys themselves. Once you've plugged in your synth modules and powered up, pressing the Program/Play button puts you into Program mode. You can then use the top octave of keys to select MIDI Channel 1-16, octave plus or minus one, and program number 1-128. As you hold down the control keys, the appropriate LED lights up. The display keeps incrementing or decrementing as long as you hold down the key, but you can't "wrap around", from 128 to 1 for instance. The last control key, Transmit, sends the new patch number to your synth when pressed.

The Program/Play button also serves as a Hold control; any keys held down when you press the button sustain indefinitely (according to your synth's sound program). All other keys are disabled in Control mode; pressing Program/Play again returns you to Play mode.

Cheetah's small but perfectly formed handbook suggests several possible uses for the MK5. For synths with a miniature keyboard, such as the Yamaha DX100 or Casio CZ101, it provides a longer and more playable master keyboard.

If the lack of velocity sensitivity doesn't bother you – you might have a non-velocity-responsive synth module such as a Korg EX800 – then the MK5 represents a good way of creating a complete synth at a bargain price.

Alternatively, you may just want a controller to program drum machines, or a movable keyboard to make life easier in small studios.

The MK5's final application lies in conjunction with the optional mini-interface and software package. This little black box plugs into your Sinclair Spectrum 128K or Plus 2, and has a trailing lead terminating in a MIDI plug for the MK5.

The software – which can be transferred to microdrive if you wish – allows you to program, edit and play sounds on the Spectrum's sound chip, using the MK5 keyboard. The software looks sophisticated, using a system of windows and menus to control all the functions.

Up to 64 sound patches can be stored in the Spectrum's memory simultaneously. Three voices can be played at once, with an optional split-point two octaves from the bottom of the keyboard. The software allows you to define a seven-stage ADSR, pitch envelope, repeat delay and rate, noise mix, tremolo speed, depth and delay, and pitch-bend wheel on/off. Sound settings can then be saved to tape or microdrive. From the File menu, selecting the Main Menu option clears the screen of all the overlayed windows.

The mini interface and software are great fun if your ambition stretches no further than making tinny noises, but it won't be of much use to serious musicians.

The MK5 keyboard, on the other hand, is a marvel of design and economy which should sell very well. Alternatives like the Yamaha KX5 feature velocity-sensitivity, modulation controls and easier patch selection, but not a full-size, five-octave keyboard.

Other master keyboards start at around £300, and many people would prefer to spend that money on a complete synth, or at least a voice module.

With further items such as the Spectrum MIDI interface on the way, the Cheetah MK5 could become the centre of a limited but still impressive budget music system. I didn't want to send it back. ■ *Chris Jenkins*

The Lean, Mean,

Introducing the STUDIO 440, the most versatile instrument we've ever produced. In fact, it's four instruments in one. The Studio 440 is a sophisticated and fully programmable twelve-bit linear digital sampler, a multi-track MIDI sequencer with a 50,000 note capacity, an audio-visual post-production tool that reads and writes SMPTE, and a powerful drum machine featuring velocity and pressure sensing pads. The Studio 440 is easy to use and provides more capability in a smaller package than any other system at any cost.

Real 12-bit Sampling

Based on Sequential's proprietary sampling technology, each of the Studio 440's eight voices delivers the superb clarity and transparent high-end which is the hallmark of *true* twelve-bit digital resolution. Additionally, the Studio 440 provides the user with *all* of the features required to produce professional audio products. Features like:

- Selectable sampling rates of up to 41.667 kHz so you can optimize memory and achieve full bandwidth on playback.

- Computer-assisted looping functions (including cross-fade looping) so that you can easily produce your own library of custom sounds.

- Multiple sample locations for storing up to 32 different samples in memory at one time.

- True stereo outputs (2) plus separate audio outputs per voice (8) for individual processing of each.

- 32 levels of programmable panning per voice.

- Separate analog and digital controls per voice, including fully sweepable filters and VCAs for modifying any sample.

- Lots of on-board memory (768K bytes) with instant access to hard disks or CD-ROMs via the built-in Small Computer Systems Interface (SCSI).

- A 3½ inch double-sided disk drive for storing all work quickly and reliably.

- *Real-time sample monitoring.* You hear exactly how your sample sounds at different sampling rates both prior to and during the actual sampling process.

The Studio 440 is an amazingly fully-featured sampler. We urge you to compare its sound quality with samplers priced to $15,000. We think you'll agree that the STUDIO 440 is in a class all by itself.

The Master of Controllers

MIDI Sequencing

The STUDIO 440 sequencer controls parallel the transport controls of a typical multi-track tape recorder, emphasizing ease of use. It operates in MIDI Modes 1, 3, and Multi-mode (an enhanced Mode 4), and records up to 50,000 notes with as many as 999 measures per sequence, 99 sequences, a song build function, manual tap or programmable tempo control, single-step and real-time recording. Its two independent MIDI outputs can control up to 32 channels of external MIDI equipment. Each of the sequencer's eight tracks can hold any combination of internal sound events and external MIDI events. And for ease of editing, all MIDI channel information is retained per track.

SMPTE Time Code

The STUDIO 440's audio-for-visual features are impressive, both as a master controller and as an audio slave. It reads *and* writes all four types of SMPTE time code, and can synchronize to five different sources: 1) internal clock, 2) slave to external SMPTE, 3) external MIDI clock, 4) external MIDI Time Code, and 5) external clicks of 96, 48, or 24 ppqn.

Production Machine

back direction, pitch-bend envelope, loop types, loop points, start-point modulation, and the familiar VCA/VCF controls.

The four programmable kits allow for infinite variations of the same sound by editing only the performance parameters. Performance parameters can be assigned to any pad and include sound number, pan, pitch, volume, and a choice of one of the two sound parameter sets. These performance parameters are easily edited in real-time, and settings for all eight pads can be stored and recalled instantaneously from any one of the kits. And since the alternate parameters can have individual start/end points for each sound, there are actually up to 64 "different sounds" available at one time.

Sequential's factory library includes over 300 sounds, and is immediately available. In addition, any Prophet 2000 or 2002 sample can be loaded directly into the 440, so the actual number of sounds now available is too numerous to list. The STUDIO 440 is the *ultimate* drum machine.

The Best Value

The STUDIO 440 is a complete, four-in-one professional audio production machine that is small enough to fit under an airline seat, light enough to carry under your arm, yet big enough for any job. The STUDIO 440 is now available through selected Authorized Sequential Dealers. Insist on a demonstration in stereo.

MIDI Time Code

In addition, the Studio 440 is the first sampler or sequencer to incorporate the new MIDI Time Code, a protocol that encodes SMPTE and sends it over MIDI for use in cue or event lists. Now it is possible to cue punch-in/punch-out recording by bar number, or with sub-frame resolution by programming to SMPTE Time Code. You can even selectively pre-trigger external synthesizers to compensate for their internal timing delays. The Studio 440's capabilities will be further enhanced when used in conjunction with forthcoming librarian, editing, and post-production software packages by companies such as Digidesign,

Hybrid Arts, Dr. T's Music Software, and Opcode.

The Ultimate Drum Machine

If you combine a high quality digital sampler featuring individual outputs with a 50,000 note SMPTE/MIDI-based sequencer, all you need to create a superior drum machine is velocity and pressure-sensitive pads. The 440 has eight, organizing its 32 sound samples into four kits and four banks over these eight sound pads. In addition, every sound has two sets of sound parameters that include sample play-

hands across
THE KEYBOARD

While most professional musicians just talk about applying MIDI to new situations, veteran songwriter Peter Hammill and programmer Paul Ridout are putting fresh ideas about computer music into striking practice. Interviews by Paul Tingen.

Photography *Matthew Vosburgh*

EVEN THE BIOGRAPHY supplied by his record company is unusual, but then, Peter Hammill is an unusual figure. What would ordinarily be superficial, pseudo-witty and ill-written, reads: "Hammill holds a unique position in the pantheon of modern music, with a sometimes bewildering array of writers acknowledging themselves to be in his debt. Unsung hero though he may be in the ears of the public at large, the echo of his voice reverberates through many of the alleyways of modern rock music."

In a strange sort of way, the lavishness of this piece of prose resembles Peter Hammill's colourful lyrics, in which he pursues an ongoing quest for the deeper meaning of the things in and around us. In fact, it's probably true to say that Peter Hammill is one of the best lyricists of our time.

But he has also been consistently way, way ahead of his time in music and in recording techniques since he started his career in 1968. At the beginning of the seventies he was a pioneer of the one-man recording style which is now so common. With Van Der Graaf Generator, the legendary avant-rock band which he founded and effectively led, he was a pioneer of the symphonic rock music that pervaded so much of that decade.

Later, in 1974, he recorded what this writer sees as probably the first punk album, *Nadir's Big Chance*, which John Lydon acknowledges to have been a huge influence on the Sex Pistols' *Never Mind The Bollocks*. Lydon is one of that "bewildering array of writers". Others are David Bowie, Bryan Ferry and Peter Gabriel.

At the end of 1986, Hammill released his *twenty-fifth* album, *And Close As This*, on which he has again taken a step into the unknown to present us with some new and unusual applications of computer technology. He has recorded single keyboard performances into a Macintosh computer, edited and split them, sending the result through various synths and samplers, and

layering sounds into a complete arrangement which still comes from only one performance.

In the dressing room of the Bloomsbury Theatre in London, shortly before playing a gig in which he is going to apply MIDI in an equally innovative way (more later), he explains why and how.

"The fundamental theory about it is that there is just one pair of hands and one voice to be heard at any one time.

"It was all a logical progression. I'd realised that I have been playing lots and lots of shows completely solo. So many people have asked me over the years why there hasn't been a completely solo record of me. Normally that would have been a live album, but I didn't want to do any more live albums after *Vital* with Van Der Graaf (1977) and *The Margin* with the K Group (1983).

"So I thought about doing a solo album with just guitar/vocal and piano/vocal in the studio. Then, when I started thinking this through, it became obvious that the technological possibilities were there to do it in the rather strange way that I've done it. You can now get just about seven minutes of continuous playing in computer memory. When you're doing that, you're effectively operating a completely different system than when you're recording unto tape.

"So me and Paul Ridout used a Macintosh computer with a sequencing package called Total Music. Once my playing — done on a DX7 – was in the Macintosh, we edited it. We would either split hands or extract melody lines, rhythms or basslines.

"Then, having got all that, we turned the tape machines on, put code on, and started sending the performance to different sound sources: a Roland MKS20 piano module, a PPG Wave 2.3 with Waveterm B, a DX7, and Super Jupiter and a Bit 01 analogue. We would record sounds one at a time onto separate tracks, using SMPTE code to keep it all in line. Sometimes we would add over ten different sounds.

"As we restrained ourselves to a lot of piano-like sounds, we were faced with the fact that an acoustic piano resonates with itself. The strings are beating against each other, producing lots of overtones. So we tried to create that in a different kind of way, which was done by layering up to eight slightly different piano sounds on top of each other, all coming from the Roland and the DX7. Together they created a similar kind of resonance effect to that of an acoustic piano. Apart from the piano-like sounds, we did send parts of the performance to more extreme sounds, like little bits of human voice, Burundi-type drums or what have you, like in the song 'Confidence'. But everything is still coming from this one pass of the hands across the keyboard.

"We did relatively little of the more extreme sounds because, by the whole nature of the project, we kept examining ourselves in terms of the theory and the philosophy of it. Technically you could go down one morning and just bash your hands across the keyboard and say: 'OK,

here are all the notes stored in computer memory, we can now spend 12 months recreating the 1812 Overture and say that it was done by touching the keys just once'."

And apart from anything else, if Hammill had chosen a wider range of synth textures, they would have provided an awkward contrast with the two tracks on his new album that feature just acoustic piano, and which sound convincingly "live".

Essential to the whole process was an integral, unedited performance of each song.

"We may have done a dozen takes of one song and chosen the best one, but everything was one performance. Obviously, a normal way of writing would have been to say: 'OK, here's a perfect verse, and there's a perfect chorus, let's stitch the two together.' The challenge, however, was to use computer-based technology in a performance kind of way, rather than in the normal fragmentaric, chopping-and-changing way."

Equally, Hammill's playing isn't quantised, although some velocity adjustments were necessary.

"Some of the sound sources reacted badly to full velocity, so we had to dampen it. But the performances were left intact in real time.

"We would run a metronome tick for two bars before I started playing, just so that I could lock into a tempo. Then we switched it off. So the playing shifted, as any live performance will, slightly in and out of tempo."

On another level, Hammill and Ridout were careful about what they considered permissible in terms of sampling.

"We didn't want to negate the principle of just one pass of the hands. I could go down and say: 'Oh we need a guitar', and play a chord, sample it and fire it. However, that would mean that there were two passes of the hands involved. I know this might sound like hair-splitting, but we talked about this a long time and decided to use only the existing library, regarding the sampled sounds as synth patches."

LISTENING TO *And Close As This*, the music does breathe; it has an organic-sounding quality. If you didn't know anything about the theory behind it, you'd never guess there was a lot of hi-tech chemistry involved in its construction. Yet that, as Hammill explains, is exactly what the record is about.

"I wouldn't go as far as to say that it humanised computer technology, but I

did try to really use it creatively and as a tool, rather than as an end in itself."

Perhaps because he adopted that attitude, Hammill has succeeded in creating a record that is good music, first and foremost. It doesn't shout "technology" at you, the way so much music that concerns itself with process or technique does.

So it's accessible to a wide audience of ▶

"If a song works, the music should be able to stand by itself, and so should the lyrics. But the real thing happens when the meaning and content of the words interacts with the meaning and content of the music."

musicians and music lovers who have no interest in technical theories at all. And because Hammill and Ridout limited themselves to piano-like sounds, the strikingly simple song arrangements throw an added emphasis to the vocals and lyrics.

This in itself is a contrast with some of Hammill's previous albums, which have been lavish, multi-layered affairs, the artist playing and recording most of the instruments in his home studio in Bath, Sofa Sound. Those recordings have stood the test of time rather well, but at the expense of Hammill's lyrical messages, which often get lost amid the mass of instruments and textures. As a poet (his lyrics do stand on their own well, and he's also published two books of poetry, short stories and lyrics), has Hammill made a deliberate move back to words and melody, to the essence of the song?

"Of course, there is more weight thrown on the lyrics when there's only one performance behind it. But the songs were already written before the idea came to me. Every song tends to demand a certain treatment, though sometimes a certain treatment is laid over a song like a matrix. If a song works, the music should be able to stand by itself, and the same for the lyrics. But the real thing happens when they are joined together. The meaning, content and emotional content of the words should interact with the meaning and the emotional content of the music – sometimes in harmony, sometimes in opposition."

HARMONIOUS IT MAY be, but *And Close As This* is hardly a commercial album, and this in itself reflects Hammill's uncompromising nature.

He did, however, once attempt to break through to a wider audience with the beautiful *The Love Songs*, a compilation of rerecorded and remixed love songs released by Virgin in 1984. As it didn't sell too well, Virgin dropped him again, and Hammill released his next work, *Skin*, last year on the independent Foundry label. According to many, *Skin* was his most accessible album to date. So now he's back on Virgin, with a record that is, as we've said, scarcely commercial at all.

Peter Hammill, it seems, isn't too concerned about his lack of commercial appeal...

"It's not at the forefront of my mind. I obviously think about it a bit, but I think the only reason I'm still doing this, and am still enjoying it after 18 years, and still have an audience, however small it may be, is that I've always only done what I wanted to do, rather than consider what would be a good career move.

"I mean, some of the songs of *Skin* could have been done in the *And Close As This* way and would probably have ended up sounding resolutely uncommercial. Similarly, the recent songs could have been done in a *Skin* way, and would have sounded what I'd laughingly call 'commercial'.

"But I don't apply value judgements on commerciality and lack of commerciality.

If you took my most commercial end, say the *In Camera* end (a solo album released back in 1974), you could work out a good commercial career series if it was said: 'Make the following three albums like this'. I'd probably have more success. Probably I'd also be bored out of my mind.

"The real problem in terms of commercial success – which I don't see as a problem – is the fact that I want to do different things with each record, often even with different songs on a given record. And that doesn't meet the required normality of consistency in your work. I do a song in the best way I can do it and according to whatever the original attitude has been, and I try to apply technology in a way which serves that.

"The danger with technology is that it can make everything sound like everything else. You can change your mind halfway through while recording a song by just changing the programming. In the early days, once you'd recorded a backing track you had to start from scratch again if you wanted to change the arrangement. That does mean that today, you have to have more mental discipline. A large part of technology is the thinking through, but I'm not aware of anybody else doing that."

Which is a rather bold statement. But, it has to be said, Peter Hammill's live performance showed as much evidence of that thinking through as his latest recorded work. Here again, he applies technology in a way which supports the humanity of his playing, rather than throwing that quality aside in a quest for computerised perfection. He is in total control, the machines serving him rather than vice versa.

During his current solo performances, he uses an Akai MX73 master keyboard, which is, apart from an acoustic guitar, the only instrument on stage. Again, like the songs, the stage appears starkly simple, focusing all the attention on Hammill himself. The MX73 is MIDI-linked to a Roland MKS20, a Super Jupiter and a Yamaha TX216 module, which are at the side of the stage.

From his master keyboard, Hammill can choose the different sounds he wants to use, and also, by means of volume faders, make his own mix of the keyboard sounds he has at his disposal as he plays. Once the basic balance is set during the soundcheck, the sound engineer doesn't touch it any more, leaving it up to Hammill to choose the specific mix he wants to hear. So Hammill is in complete control of the performance, having the power not only to play every song differently every night (as he used to do in his vocal/piano days), but also to make them sound differently, layering various textures on top of one another, organ-fashion.

WHILE MOST OF his contemporaries (Hammill is 38) have slided into the habit of repeating themselves over and over, Peter Hammill is at the forefront of modern music once again.

So after recording 25 albums and writing perhaps 350 songs, what keeps the man

going? What inspires him to keep renewing his ideas, time and time again?

Hammill laughs. "Because I still like doing it. It still makes sense. I don't mean that it's sensible or even that it makes logic, but it's a thing that still fulfils me. I don't feel any pressure in terms of: how many more do I have to do? Obviously there's the normal thing of: where do these songs come from, and how many more do I have?

"But I don't feel I'm close to the end. If anything, I'm more fired up about it than ever. Perhaps because I know more now. I see more possibilities. As evidenced by this record, there is room for a fundamentally new approach. So all these songs and ideas keep popping up, and I'm excited about it still."

He is indeed an unusual and inspiring man, this Peter Hammill. ∎

T HE ANSWER TO the question "do you consider yourself a musician?" comes back sharp and unexpected: "No! To be able to zap out a sequence is fair enough, but that's nothing to do with being a musician. I wouldn't even call myself a programmer. What I'm trying to do is fill that gap between the keyboard and the player.

"I got into this because a couple of years ago, it suddenly became obvious that very capable keyboard players were not getting involved in the new technology because it posed problems to them that they didn't want to deal with. All they were interested in was hitting those keys and getting a performance sound, rather than having to sit down for a week with the manual first; and rightly so.

"First there were the pianos and organs, and then suddenly there was this synth that could do all kind of things. And I thought: 'well, I like finding sounds and hopefully I understand the technical problems, so perhaps there is a position here for someone like me.'

"But as I say, I don't see myself as a programmer, that'd be too grand a word. I think I'm more a facilitator. A lubricant, rather than an irritant."

Paul Ridout laughs. He sees the joke in calling himself a lubricant. Apart from that, it might be that he is a very modest man. As we're sitting in his domain – a programming suite at The Wool Hall studio in Beckington, near Bath – he manipulates the machinery there with remarkable ease. As it turns out, he has every reason to be familiar with the hardware in the suite, since the existence of the whole place is the fruit of his own labours.

There's a Fairlight series II, a PPG Wave 2.3 and Waveterm B, a Prophet 5, an Emulator II, an E-mu SP12 percussion sampler, a Yamaha MIDI rack, the odd Synclavier and a Macintosh computer. It was the last item which Ridout used so innovatively on Peter Hammill's latest album *And Close As This* – though more of that later.

Modest he may be, but in his own way,

this experienced wielder of the hi-tech axe has a lot to say about applying machines in a sensitive and musical way – and most of its well worth listening to.

But to get back to where we were at the start, why his sudden fierceness when asked whether he's a musician? Ridout admits that his ill-starred attempts at mastering a musical instrument have left him with a slightly sour taste...

"I once tried to play the piano, but it didn't work. I couldn't physically do it and I didn't understand what the hell was going on. So I lost my faith in my ability to do it. I told myself I wasn't a musician. I had to come to terms with that."

Born 38 years ago in Bath, Paul Ridout is a relative newcomer to the music world. Once he went to Art College, did some sculpting and painting, and failed to make a living out of that. To survive, he did a post-graduate course in teaching art and set up an art department at University. In the seventies he got more and more involved in graphic design.

But nearly a decade ago, his interest in music was rekindled by two things. First, he began designing record sleeves, after Crescent Studios' David Lord asked him to make a sleeve for him. Second, he kept pace with developing musical technology by building his own EMS VCS3 synth, partly from burglar alarms and bleepers. He used the VCS3 to accompany the storyboards for videos which he was putting together with series of slides.

"I suddenly realised with a shock that I was making noises, something which I never wanted to do again", Ridout remembers with a smile.

His interest in computers and in applying computer technology to music then led him to work as a Roland MC4 programmer in his spare time, helping people out with their demos. Once he realised how big the communication barrier between musician and machine could be, he started buying his own equipment – an Emulator, the Wave and more – and learned to master the technology, hiring out his services along with his equipment. A couple of years ago, he realised he wanted to work in close connection with a studio.

"Everybody was – and is – setting up small programming suites independently, but I wanted a facility which was located in

a studio, because it works a lot faster and more directly. Here we can program and change and modify while the work in the control room goes on, and we have continuous feedback. And for me it's nice to be part of the whole process, and see what happens to my work."

L AST YEAR, RIDOUT'S vision materialised when he got an offer from Tears For Fears' Wool Hall studio to furnish and run a small programming suite on a freelance basis. Since then, though, things have gone well enough for The Wool Hall to put him on the payroll, and to offer Ridout and his programming room as an extra ▶

"We decided we were allowed to do on the computer anything which couldn't be done with a tape machine. So there was no taking the second verse and substituting it for the first verse."

▶ facility. Their aim is to make clients' projects go easier, faster and better.

"The studio is rented at a fixed price", explains Ridout. "This is an on-top extra, but it's so cheap that if you were a keyboard band which uses sequencers and computers, you'd be crazy not to take it on. It's a lot cheaper than renting equipment from London.

"Still, the real advantage is time. Things become more relaxed. It's nice to be able to take 15 minutes for a sound, rather than, say, 30 seconds, with the engineer and everybody else desperately waiting to get on with it.

"I work here with the keyboard player and we set the sounds and sequences up together. In the end this will probably take less time than if I was trying to sort it all out with the attendant pressures of the creative process in the control room."

On the equipment side, Ridout is pleased with the present collection (partly his and partly the studio's) which he has at his disposal, though he wants to add a few more peripheral things.

"There's a good selection of keyboards here, and there will be a few more yet by the time we've finished. I also want to get some inexpensive keyboards, because the tendency is that when you have a Fairlight, everybody thinks that that's the way to make good music. Of course that's nonsense. It's the notes which are played which are important, and if they're good it doesn't matter whether you're using a £100 Casio."

Still, there remains one slightly more expensive addition which Ridout wants to make, which will enable him to do the same kind of multi-tasking possible on a Fairlight Series III, but for a fraction of the price.

"I would rather buy another Macintosh, and dedicate one to sequencing and the other to manipulating sampling and synth sounds, as well as storing them. There are software programs for the Macintosh that can store virtually all the current synth patches and sounds.

"The two Macintoshes could use the same hard disk drive, running their own programs separately, if necessary interconnecting and running the other keyboards. Ideally we should have three Macintoshes: two here and one in the control room. I could write a sequencing program down here and then transfer it to the control room, and they could fire their synths from there. That would save a lot of running around, plugging and unplugging."

ALTHOUGH RIDOUT HASN'T been working at The Wool Hall for too long yet, he's already worked with some impressive names. Some of them he only wanted to mention off the record because, strangely enough, he didn't get credited on their albums. Names he could mention include Wang Chung, Martha and Mark (formerly Martha and the Muffins), Cars bass player Ben Orr, Larry Klein (Joni Mitchell's bassist and husband), and of course Peter Hammill.

It's while discussing his work with Peter Hammill that Ridout finally loosens up, and admits that his work involves a bit more than just being a "lubricant".

"I do give people feedback and ideas. I feel it's my role to do so. I might say: 'Look, this string part that you're playing, it's really no good to play chords with. If we record the whole thing separately, and then put it together again, it will sound much more believable.' In that sense I may function as catalyst for new ideas which people might get from certain sounds, or different ways of recording or sequencing."

More than that, though, Ridout admits that in working with Hammill on *And Close As This*, there was a continuous and positive dialogue between the two of them. The idea to record the whole album into a Macintosh, rather than onto tape, and firing MIDI sound sources from there emerged between the two of them, as did the idea of recreating the harmonics inducing resonance of the strings of a real piano with synth piano sounds.

"When you have two people working closely together", says Ridout, "there is no way of saying this was this or that person's idea, because things evolve in the middle of discussing and working."

Ridout sheds more light on the trick he and Hammill used to recreate the resonance effect of a real piano, In addition to layering slightly different piano sounds as already described by Hammill, the two of them got DX7 piano sounds to come in after the Roland voices.

"The DX7 sounds would sit in slightly detuned, slightly modulated against the Roland sounds, which gave a feeling of sustain. When you play a note on the Roland, the initial sound is very rich, but then it quickly becomes a rather simple, thin tone, so I added DX7 sounds there, which created an effect similar to putting a Roland through a reverb. The difference

was that I could make specific notes reverberate, and that I could suggest reverb without getting that thick wadge. Reverb tends to make things sort of washy. Instead I got a very gentle inter-modulation, which was a little more tuneful and specific."

As we've seen, *And Close As This* started from the idea of creating a complete, layered sound arrangement from only one performance on a keyboard. With this performance recorded into the Macintosh, Hammill and Ridout could go anywhere they wanted with their sounds, from piano to strings and back again, swapping textures within one song as much as they wanted. Which explains why they took the trouble to recreate such close piano-like timbres, rather than just recording a normal piano onto tape.

Ridout adds: "We eventually decided that we were allowed to do on the computer anything which couldn't be done with a tape machine. So there was no taking of the second verse and substituting it for the first verse. Instead we did everything else — changing notes, chang-ing dynamics, removing notes which weren't in the right place — apart from quantising. We tried quantising on a couple of tracks, but they immediately lost their feel and started sounding very rigid and staccato."

It all illustrates Ridout's efforts to "use computers without you becoming the slave to the machine. The machine, how-ever important, is just a manipulative tool. You can try this, edit that, mess around with things, slide it backwards and for-wards, try lots on variations of an idea without having to record anything. It's a springboard to work from, and it's very creative."

Part of Ridout's "manipulation" is "bending the rules", as he calls it.

"I don't accept the rules which a machine or a manual gives me. I remember working with the MC4, ending up writing the wrong numbers for crotchets. One bar has to add up to 192, and every crotchet is therefore instructed to be 48. I'd put in, say, 44,47,52 and 49 or something. That would make it a bit more human.

"My feeling is: a machine is only a machine because you approach it as a machine. When you approach it differently, you can get things out of it which don't sound like a machine."

In a similar vein, Ridout and Hammill started sequences on Hammill's previous album, *Skin*, by hand, rather than linking the starting point to SMPTE.

"Listen to the song 'Shell', we had a sequenced percussion part in the verse and SMPTE code on tape. Then we would run the tape 10 to 20 seconds before where we wanted the sequence to come in, and press the Go button manually when the time was there.

"From that moment onwards, the se-quence would be clocking through in sync. Now, the chances of the sequences actually coming in dead on time were remote. Probably it was one or more clicks out. We did that half-a-dozen times with different percussion sequences, layering them and

getting a kind of movement between them, a swing which almost sounded human."

Yet despite his quest for humanity in computer-based music, quantisation is not a dirty word in Ridout's vocabulary.

"There are obviously places to quantise and places not to quantise. Quantisation of everything gives you a particular kind of music, a particular tight feel. I think there's a lot to be said for doing both, quantising certain parts, like the snare and the bass drum, and not quantising other parts like the toms, because you can then get a nice bit of magic going on there."

RIDOUT FAVOURS AN ad hoc approach in the area of sound creation and manipulation. Though he records his own samples and stores an impressive catalogue of sampled and synth sounds, he prefers to create new sounds each time around.

"Working with Peter Hammill, we went as far as throwing most sounds out of the window after using them. We wouldn't even write down the combination that we'd done of, say, a DX sound with a slightly changed Wave program.

"It's nice to approach making sounds fresh each time, because otherwise there's a tendency to say: 'Ah, last week we had this fantastic string sound, so let's put this and this together, adjust a little bit and use it again.' But part of the joy of recording a new part is the spontaneity of trying to find a new sound and coming up with something even better than what you had.

"With Peter, the advantage was that we had the performance ready and complete in the computer, so we didn't have to keep a sound in case we suddenly decided that we had to redo bar 33.

"Obviously when I'm working with a band which might want to re-record parts, I will write the sounds down. But a great sound doesn't exist by itself. It's always a combination of things, and on top of that it's a very subjective thing. Personally I prefer to combine different machines to make sounds. A single Emu-lator strings sound can be really recognis-able. It's therefore much more interesting to take an Emulator strings sound, a Wave and a DX7 strings sound and layer them. Each time you do that, you get a totally different combination of string-like sounds, unique in itself.

"I know the purist synth programmers criticise that. They say: 'Oh, the art and

"A great sound doesn't exist by itself; it's always a combination of things, and on top of that it's a very subjective thing. Personally I prefer to combine different machines to make sounds."

the technique of synth programming is going, because all you need to get now is a lot of different synths, put them all together and you don't have to write any new patches.' I see their point, but I also think there's nothing wrong with putting sounds together. If anything, it's a much more creative way of working, because you still end up having to program new sounds when you realise the shortfall of the original single sound. So each time you try to polish it a bit further, you make it a bit better — and that's what's exciting and interesting." ∎

MISSION
impossible

Part 4: Sampler Delights

The downward price-trend of the "affordable" sampler hit rock bottom last year with Yamaha's VSS100 and Casio's SK1 weighing in at around £100. Now, a ton ain't gonna get you a Fairlight, but it does throw the door to the wonderful world of sampling open to musicians of lesser means – either as a first keyboard or as a neat supplement to a multi-keyboard setup.

But that was last year and there's nothing like music technology for continual development. So what have Casio done now? Well, the "MT Mole" (as he's known to safeguard his identity) discovered they've got not one, but *three* new sampling keyboards in the pipeline for release at the Frankfurt Music Fair (see this month's Newsdesk). By name these are the SK100, SK200 and the SK2100, and they're so new that not even all the MT staff know their full specification. The best of it is that those awfully nice Casio people have seen fit to give us an SK100 to give away as this month's competition prize.

So now you'll want to know what you've got to do to win one. Well, as the specification of the SK100 is still pretty much a closely-guarded secret, we thought we'd see how many of you could accurately predict the requirements for the successor to the SK1. All you have to do is answer four multiple-choice questions concerning its performance – easy. And here they are:

1. The SK100's keyboard will be:
a) Three octaves, full-size keys
b) Four octaves, mini-size keys
c) Five octaves, mini-size keys
d) Four octaves, full-size keys

2. The SK100 will hold:
a) One onboard sample
b) Two onboard samples

c) Three onboard samples
d) Four onboard samples

3. The maximum sample length will be:
a) 0.810 seconds
b) 0.912 seconds
c) 1.224 seconds
d) 1.620 seconds

4. The sampling rate will be:
a) 8.512kHz
b) 9.484kHz
c) 10.113kHz
d) 11.159kHz

It can't be that difficult if you could win with a pin, a blindfold and a little luck now can it? Answers should be sent *on a postcard* please to arrive no later than second post, **Tuesday, February 10**, and multiple entries will not be accepted. So simply jot your answers down in, say, 1.a, 2.b fashion – and don't forget to include your full name, address, and daytime phone number.

You're not going to have as much time as usual to get your entries in, because the cat will be out of the bag once the Frankfurt Fair opens on February 6, so hurry, hurry. ■

Send your postcard to: **Mission Impossible (Sample Delights), MUSIC TECHNOLOGY, Alexander House, 1 Milton Road, Cambridge CB4 1UY**, to arrive no later than second post, **Tuesday, February 10, 1987.** Employees of Music Maker Publications, Casio Electronics, and their relatives, are ineligible for entry. The judges' decision is final, and no correspondence will be entered into.
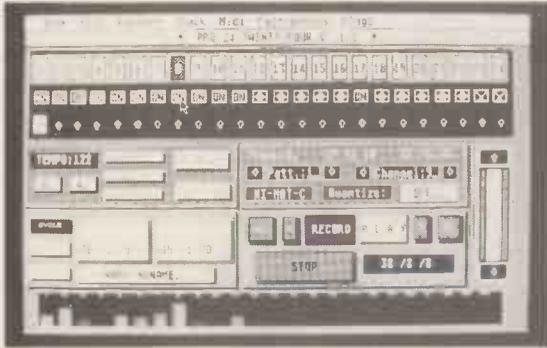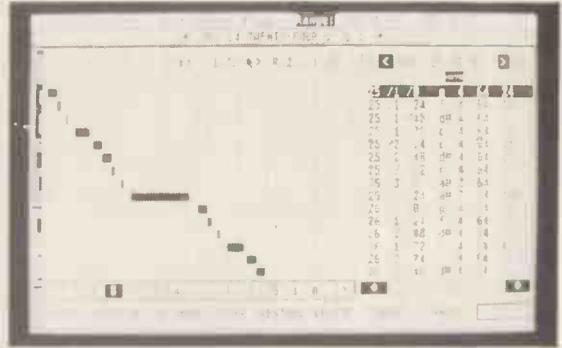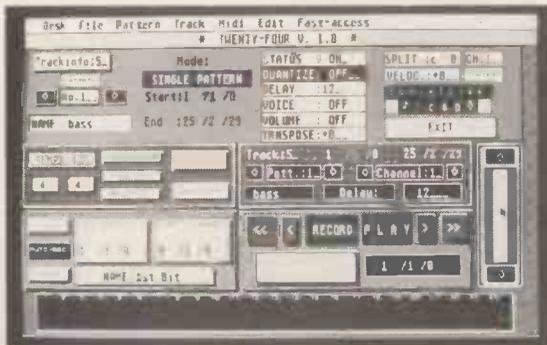
USER REPORT: *ROLAND MC500 MICROCOMPOSER*

In the half-year that it's been available, Roland's newest digital sequencer has become as much an industry standard as previous MicroComposers. Which points are users likely to be happy with, and which might form the subject of software updates? *Report by Steve Howell.*

"IT NEVER RAINS but it pours", runs the old adage. As far as new music technology is concerned this is certainly true, as practically every week brings us a new pile of gear that we feel we simply *must* have. Recent new additions to this ever-growing (pre-Frankfurt) list of musical hardware come in the form of two sequencers from Japanese big-guns Yamaha and Roland, the QX5 and MC500. Strangely, the QX5 has crept in almost unannounced, while the MC500 was heralded by much pre-release information. We published a review of the former in MT December '86, while an all-too-brief "In Brief" preview of the MC500 appeared in E&MM August '86. Since then there's been no "review" of the Roland machine as such, principally because it's one of those devices that has to be *used* before it can be reported on accurately. A simple list of features and options is just not enough.

Similarities between the QX5 and the MC500 are obvious, so this user's report (written by a QX5 owner, by the way) will sometimes be comparative; I hope you find that useful if you're planning on buying either of these machines.

The MC500 is a disk-based MIDI sequencer. Many would applaud the fact that it is disk-based, since disks not only provide a fast and reliable storage medium for song data, they also allow for future expansion of the machine for no more than the cost of a single disk. I can't quite share their enthusiasm, though. If you're out on a session or a gig and you forget your disks (easily done, especially if you're in a rush) then your MC500 has no operating system and is rendered useless. And even if you remember to take your disks, it only takes one idiot to plonk them on the guitarist's 4×12 speaker cabinet or format them accidentally for, say, an Akai S900 sampler, and you're finished. With some form of dedicated software this would not happen

and I, for one, would like to have seen some form of operating system blown into the MC500's hardware.

Aesthetically speaking, the MC500 is a good-looking beast in a greyish creamy blue case, and yes, it does look a lot like a cash register. For those of you who want to make room for one, it measures 12"×3¾"×11".

The unit's front (top?) panel splits into three main sections. On the far left are all the controls concerned with stopping, playing, recording and rewinding the MC500's digital equivalent of a tape transport mechanism, and above these is a large, easily-read backlit LCD (another nice shade of blue). To the right of these controls is Roland's familiar Alpha dial, under which are the two cursor controls, while to the right of these are the seven keys with which you select the working mode of the unit. To the right of these is the numeric keypad.

The machine has a stated memory capacity of 25,000 notes (or MIDI events), but in practice, if you record in step time with no velocity, aftertouch or pitch-bend data, you can push this up to over 30,000 events. Internal memory is 512K RAM, and each disk can store 2Mbytes of data, which allows you to store a lot of information (about eight songs' worth, in fact).

There are five tracks on which you can record – four for music and one for tempo information and rhythm tracks. Having gotten used to using eight tracks on my

trusty old MSQ700 and newly acquired QX5, I found that a bit limiting. Anyone who's spent a significant amount of time working in eight-track recording studios would probably feel the same way.

On the rear of the MC500 are the MIDI ins and outs, a metronome audio output and two sockets for Tape Sync In and Out.

All in all, a nice, ergonomically efficient layout that is easy to get round, and certainly a lot less fiddly than the QX5's small and overly sparse control panel.

Operation

THE MC500 HAS five main operational modes – Mode, Function, MIDI, Edit and Microscope – each with as many as 10 "pages" which each perform a specific job. Once any mode is selected, you can scroll through the various sub-modes with the Alpha dial that is now being incorporated into almost every Roland synth and sampler; alternatively, you can type in a page number from the keypad. The latter method is generally preferable in practice, as although the dial is quicker, it's sometimes too quick for its own good: it's all too easy to miss a page accidentally when scrolling.

Let's look at the facilities each of the five modes offers.

Mode – Four pages which select record status (real, step or punch in), playback modes, various disk operations, a chain play facility (more later) and a utility option.

Function – Nine pages which, among other things, allow you to select the clock type (Internal, MIDI or Tape Sync – no Sync 24 despite the claim from Roland that it wouldn't be dispensed with), metronome resolution (a simple, possibly inadequate eighth or 16th note selection), song title, rhythm track parameters, a block repeat feature, auto-stop and tempo control.

MIDI – Not surprisingly, this allows control over MIDI reception and transmission: you can select MIDI channels and filter out certain types of MIDI events such as velocity, pitch-bend, aftertouch and so on. You can also select which of the MIDI sockets the clock will appear at, a software

Thru option where the MIDI Outs (there are two) double as MIDI Thrus – a MIDI merge facility of sorts.

Edit – Ten pages which allow you to apply options such as erase, delete, copy, insert and transpose to one or more measures. You can also change MIDI channels as well as extract, merge and change velocity.

Microscope – This mode allows you to scan through your music event-by-event, to insert, delete, and/or change individual note data.

Now, all these features would be useless if the MC500 were difficult to use. I'm happy to say that this is not the case. A unit as powerful as this is going to be fairly complicated, but so long as you sit down with it and the (very) comprehensive manual for a few days before you attempt any serious work, you should be fairly comfortable working with it.

Once the MC500's operating system is booted up from disk, you can begin work. Sadly, a few things have to be done before you can really get started.

First, the default system setting for the MIDI Clock Out is "Off", which means that if you intend to use a drum machine as a metronome during real-time recording, you need to go into "MIDI" and set one of the MIDI outputs to send out clock information. While you're in this mode, you have to make sure that memory-intensive features such as aftertouch, velocity and the like are off if you don't intend using them in the piece. And if you're using a mother keyboard of some form to drive a MIDI synth or sampling module, you need to turn "Software Thru" to "On".

This is where the QX5 scores in that its default settings are a lot more sensible, while any changes you make to them are remembered when you switch the machine off, and you can, in fact, store a total of four different setups for instant recall at any time. If, like me, you use a sequencer as a musical sketchpad for those three-in-the-morning bursts of inspiration, the last thing you want to do is to spend ten minutes (plenty of time to forget that great idea you had) setting the thing up...

Once you've set up the MC500 according to your needs, you're ready to record. The first option is Real-Time, where anything you play is faithfully captured in

memory, mistakes and all. You can initiate recording by pressing Rec/Load and then Play, whereupon you get a two-bar count-in and you're away. Alternatively, you can use a footswitch to set the wheels in motion.

The other method of starting the recording process is in Auto mode, where the MC500 waits until you play a note before going into record. I can't find a great deal of use for the latter method, but I'm sure someone will, so it's nice to have around.

Step-Time recording is selected by moving the cursor to the appropriate part of the display and scrolling through the recording options with the Alpha dial. Having done that, Rec/Load and Play starts the procedure, and the MC500 waits for notes to be played on the keyboard. Naturally, timing in this mode is not important, as all you're loading is pitch data. Resolution is selectable between minims and hemidemisemiquavers (or between half-notes and 64th-notes if you speak American) and includes triplet times. Rests and tied notes are input by pressing Shift and either of the cursor controls, which is a bit of a pain until you get used to it (which doesn't take too long).

Chords and velocity information can be input in step time, but other MIDI information must be overdubbed in real-time. Your MIDI keyboard, the Alpha dial and the keypad can all be used simultaneously for data input, which gives you a lot of control over your music.

Punch-in recording is another real-time entry method which allows you to specify where recording will begin. Unfortunately (and unlike the QX5), the MC500 doesn't offer a punch-out point, so anything you record after the punch-in point erases anything that was there before. This precludes using this mode of entry for repairing a single naff bar. Shame.

Rhythms

IN ALL THESE modes, the MC500's rhythm track fills up with measure information. You can think of the Rhythm Track as an internal sync code for the four music ▶

tracks – without it the tracks won't play, and as soon as it stops short, so will the music.

Normally this is not a problem, but it can be in Edit mode. Say, for example, you record a simple four-bar bassline. As the tune is a simple one, you need only to copy it a few times (maybe with some transposition) and your bassline will be complete. So off you go and do this, only to find that it hasn't worked. The reason is that unless there is measure information in the rhythm track, you can't copy any music data on another track. In this case, because you have only four bars of information, all your copying and transposition hasn't registered.

The way around this is to write an arbitrary number of bars into the rhythm track (say 200), so you know you'll have enough measure information to accommodate any editing. A bit like going via Edinburgh to get from London to Oxford.

The MC500's rhythm track is much more than a simple sync code, though. In it, you can actually program drum patterns for each song, and as these patterns are then chained together just as though they were written on a drum machine, you don't use up much memory.

This is a neat idea, not least because it allows you to store music and rhythmic accompaniment on one disk. The rhythm track is unquestionably a powerful and expressive method of running a drum machine, as it allows you to play up to 32 drum voices, each with eight levels of definable dynamics. You can assign any of the drum voices to be on any MIDI note number and channel. And because the whole thing is being run from one clock, you eliminate the MIDI clock delays that spring up on occasions.

It has to be said, though, that the method of rhythm programming the MC500 forces you to adopt is far and away the most cumbersome I've ever encountered. You can work on only one drum at a time and only one bar at a time, and you have to enter each drum beat by typing in a number from 1-8 on the keypad at the step that you want to hear it. You can't hear drum parts until you've actually written them in, so you can't hear drums in combination until that time, either.

True, you have variable resolution, a wide range of expressive dynamics plus a flam facility. But those options aren't enough to disguise a method of inputting drum tracks that is simply too tedious to be viable. Couple this with the fact that you need a drum machine as a source of drum sounds (unless you're using a sampler) and the usefulness of it all starts to become a little obscure. Personally, I'd rather just sync up a drum machine and take advantage of its real-time input features. Driving drum voices from a well-programmed track from the MC500 is very, very impressive, but...

Anyway, once you've got something into your MC500, then providing you have sufficient information in your tempo track, you can enter Edit and copy, insert, delete and otherwise mess around with data. It's in this mode that you can merge two tracks onto one to make room for further overdubs. If you do this and suddenly feel

that the bassline you recorded on MIDI channel 1 isn't right, you can use a command called "Extract MIDI Channel", which allows you to remove a specified MIDI channel from a merged track and plonk it on another track (where it can be edited or replaced) and then merge it back again.

But if your bassline is on the same MIDI channel as your chordal part (easy enough in complex poly sequences), you're stuck. By contrast, the QX5 has a useful feature that allows you to remove notes that fall within a specified range.

In Edit mode you can also reassign MIDI channels, change velocity (a very powerful form of digital compression) and quantise. Eleven out of ten for the last option, which simply moves notes to the nearest resolution point and leaves timings intact – unlike any other sequencer (QX5 included) that I know of.

The Microscope mode allows you to scan through notes as individual events and then change, delete, insert and otherwise modify single events such as pitch, step time, note length, and gate time (ie. if it's staccatto, "normal", legato or anywhere in between). Because data in the MC500 is usually polyphonic, rotating the dial to scroll through the piece actually arpeggiates the notes, so you have to have a good idea of where you are. But this is standard for all such sequencers and you soon get used to it.

Microscope mode also enables you to insert program changes, poly and mono aftertouch, pitch-bends, System Exclusive requests and so forth.

Interfacing

ALL IN ALL, then, some very powerful editing features – though again, one missing feature that can be found on the QX5 is Clock Move, which allows you to shift tracks back and forth in time against other tracks. This is useful not only for Steve Reich impersonations and echo effects, but also for affecting the feel of any piece (giving lazy-sounding music an extra edge, for example).

Back on the Roland, we find tempo changes can be easily inserted into a piece in either step or real time on the tempo track, and can be altered at any time. Any tempo changes you may enter into the MC500 are output through the Tape Sync Out, and any overdubs onto tape follow the programmed tempo changes.

The MC500 also implements MIDI song pointers, so that if you sync it to tape via SMPTE, you can start the tape at any point and the MC500 will know exactly where it is in the song and will start up from that point. To be honest, though, the FSK Tape Sync is very reliable, so I wouldn't rush out and buy a whole lot of SMPTE gear unless your situation demands it.

Other features I've alluded to include Block Repeat, which allows you to cycle over a pre-determined number of bars over which you can rehearse or work out new parts – but you can't actually record in this mode and build up complex sequencers as you could on the old Linn 9000. The

Auto-Stop facility, when switched in, won't allow you to record further than the data on another track, which is very handy.

And finally, we have the disk drive. This is a bog standard, 3.5-inch job and can hold a lot of data. Songs can be stored, verified and loaded very quickly, though the exact time it takes depends on the length and complexity of your tune.

There are some points to watch out for, though. Before you can save your latest composition to disk, that disk must be formatted. To do this, you must enter "Utility", which (crazily) wipes out the MC500's entire memory. The moral? Be sure to format your disk(s) before you start work. This state of affairs is thoroughly ridiculous and totally inexcusable: if Akai can let you format disks on their S900 sampler without destroying the internal memory, then I see no reason why Roland can't do the same on the MC500.

And in a similar vein, it's a good idea to keep saving data onto disk every 10 minutes or so while you're working, as the MC500 won't keep memory intact in the event of an accidental power loss.

There's a Chain Play facility in Disk mode, but this is not a chaining option in the tradition of drum machines (or indeed the old Roland MSQ700) with which verses, choruses, middle eights, intros and so on can be assembled into any order to form a song. It is, in fact, a way of arranging up to eight whole songs in a running order for live work. Useful enough, but open to misinterpretation by many users, I'd have thought.

Verdict

YET DESPITE THE criticisms I've levelled at the MC500 in the course of this report, I'm actually very impressed with it. It's an incredibly powerful piece of technology, and should satisfy the demands of pro and semi-pro users for years to come, particularly if the promised software updates come cheap enough and flexible enough.

My criticisms are aimed at stupid little things which, had they been given a bit more thought, would have made the Roland MC500 even better than it already is. It's simply that the implementation of some MC500 features is a bit too long-winded to make them really straightforward to use.

For my own purposes, Yamaha's QX5 has the edge over the MC500 in terms of sheer flexibility. Yet the Roland is more likely to become the industry standard (correction: it's already well on the way towards attaining that status). Why? Because its layout is more logical, the feel of its switches and controls more positive (though I could live without the Alpha dial), and its display more informative.

And because, even though it costs significantly more than the QX5, the Roland's open-ended design is worth a lot in these days of planned obsolescence and ever-expanding technological horizons. ∎

FATHER
of
INVENTION

Twenty-two years and fifty-odd albums into his musical career, Frank Zappa still finds new ways to astonish with his unique brand of music. Now he takes a break to discuss exactly what he's been up to all these years. Interview by Rick Davies.

WHEN THE FIRST MOTHERS of Invention album, *Freak Out*, came out in 1966, it was so unlike anything ever to appear on vinyl before, reactions to it – and the band, led by Frank Zappa – were polarised. People either loved it or hated it. Still, the reaction to the album was strong enough to lead to more MOI albums on the Verve label, including *Absolutely Free* and *We're Only In It For the Money*, and led eventually to dozens of albums bearing the mark of Frank Zappa.

The two aforementioned albums exhibited Zappa's ability to rip his songs' targets apart with uncompromising, satirical lyrics and biting delivery which many listeners found hard to take. Zappa pulled no punches, and everyone, from politicians to high-school drop-outs and hippies (many of whom formed part of the MOI audience), was fair game. In that sense, little has changed in Zappa's music in nearly 22 years.

Much later, an album called *Frank Zappa Meets the Mothers of Prevention*, marked the beginning of Zappa's public opposition to the Parents Music Resource Center (PMRC – a US organisation whose members want to "clean up" rock music, among other things) and their goals. The 'Porn Wars' track was 12 minutes of digitally generated music concrète, using recordings of PMRC senate hearings as source material which Zappa twisted, stretched, and otherwise mutilated using his Synclavier. Since the time of the PMRC hearings, Zappa's face has appeared in American television interviews concerning the PMRC, and other topics such as proposed mandatory drug testing of federal government employees.

Frank Zappa's concern with what is going on in the world was made very clear as soon as we met at his home in Hollywood. No sooner had we been introduced, than he asked that we hold off on the interview until a news report on the Contra arms deals was over.

"I did another interview this morning for *USA Today*, or somebody who was doing a wrap-up. Every time somebody wants an opposing point of view, they call me up. Unfortunately, they do call to get an opposing point of view, because before I started doing it, there was no opposition. The record companies didn't oppose it at all. I do at least one interview a week on the PMRC, and some weeks five."

One thing is for certain: Frank Zappa's ▶

SYNTHMASTER

music has not weakened. Perhaps the eighties' flood of fashion and sound production has made some of his music stand out less than it used to, but his latest album, *Jazz From Hell*, shows that even his sequencer chops are beyond the range of most synth programmers, and recordings such as 'Massaggio Galore' feature some of the most challenging music to emerge from his home-based recording studio. Considering the PMRC's warnings of satanic messages in rock music, the album's title seems a bit ironic. Is that, in fact, the case?

"No. You know the expression: If there's somebody in show-business and he's an asshole, he can be referred to as an Entertainer from Hell. It arrived from that type of concept. This is it. If this is Jazz, then it's *Jazz From Hell*."

A good album it is, and though the cover notes (of the cassette, at least) do little to explain what's going on, it becomes apparent that Zappa is getting impressive mileage out of his Synclavier. Melodies are scattered about, often stuttering as timbre changes occur in midphrase. Words alone can't do this music justice. It has to be heard to be believed.

Many names appear in the band credits which most Zappa show-goers will recognise: Steve Vai, Ray White, Tommy Mars, Bobby Martin, Chad Wackerman, to name but a few. But with sampling and sequencing available on his Synclavier (or 'Barking Pumpkin Digital Gratification Consort' as it is credited on *Francesco Zappa*), it becomes hard to tell where impeccable musicianship ends and technology steps in.

"There's only one song that's got a band and a guitar solo", Zappa reveals. "Everything else is on the Synclavier. This is my third Synclavier album. The first was the *Francesco* album, the second was the *Mothers of Prevention*, last year, and this is the third."

The new album's live track, 'St Etienne', is the only evidence of Zappa's guitar playing on the entire album. What has he been doing with his guitar?

"Nothing. I haven't touched it since December 23, 1984. I don't have any reason to play it; I have more guitar solos on tape than anybody could ever stand to listen to, and I figure I did it. There it is, it's done, it's a good solo. How many times do you have to do the same thing?"

Not even for entering music into the Synclavier?

"The linkage between the Synclavier guitar controller and the system doesn't work for me. Other people use it and are happy with it. I wasn't and so I didn't buy it. There are several ways of inputting information: you can play it on a keyboard, play it in on a Roland Octapad, and you can type it in on the G-page in the music printing mode or a computer line called Script. So there are a lot of different ways to put it in.

"My preferences depend on the piece. If I've got something in my catalogue sitting in the other room that I wrote years and years ago and I now decide I want to listen to it, I would take the sheet music, go into

the music-printing mode on the Synclavier and type it in note for note right there. Or, I'd give it to my assistant who types script, and who would type it in. It doesn't make any difference. And then you can edit it in different modes too."

Is there an instrument Zappa actually enjoys *playing* now, just for ideas?

"No, I just go in there and go to work. Sit down and start typing. I like it."

As ever, Frank Zappa continues to be one of the most prolific and hard-working composers around. So much so, in fact, that even he seems to have a little trouble calling to mind his current and future plans.

"I did some wind quintet pieces for the Aspen Wind Quintet, and there was a bunch of material that preceded that. It's been sitting around for years, and I pulled out one of those disks a couple of days ago, put it in and listened to it, got fixated on it, and decided to go back to work on it. That's what I was working on this morning.

"There's tons of stuff planned for future recordings. *You Can't Do That On Stage Anymore* is a ten-record box – a live collection that I've been working on for the last 22 years. I have a huge collection of tapes and stuff, and I've been going through the final examples of strange stuff that happened on stage with all the different bands.

"And there is the sequel to *Lumpy Gravy*, which is done. That's an amazing piece. It's all the missing dialogue that will help you understand. If there is anything to understand about *Lumpy Gravy*, this is all the missing components: a single album containing the missing dialogue plus new music.

"Then there's another guitar box coming out, there's a three-record box called the Helsinki Concert, which was done in 1974 with George Duke. The London Symphony Volume II will be out shortly. There's plenty of stuff to come out. I've got three albums of Synclavier chamber music. It's done, it's just sitting there. I have to schedule when it's coming out."

INTERESTINGLY ENOUGH, EVEN as new recordings are being released, Zappa is releasing the second boxed set of re-mastered albums, Box 2 of *The Old Masters*. Together with Box 1, *The Old Masters* contains all of the Mothers of Invention and Zappa albums from *Freak Out* to *Just Another Band from LA*.

The original releases have become increasingly difficult to locate in record shops – an unfortunate situation, considering Zappa's music does not reach its public as quickly as, say, rock music crafted to please a designated audience. Instead, the early Zappa and Mothers recordings take time to settle in, and the Old Masters present a great opportunity either to become familiar with albums like *We're Only In It For The Money* and *Weasels Ripped My Flesh*, or to replace old, played-to-death pressings. Word has it that new parts have been added to the originals. Is that the case on all of the albums?

"*Ruben and the Jets* and *We're Only In It* ▶

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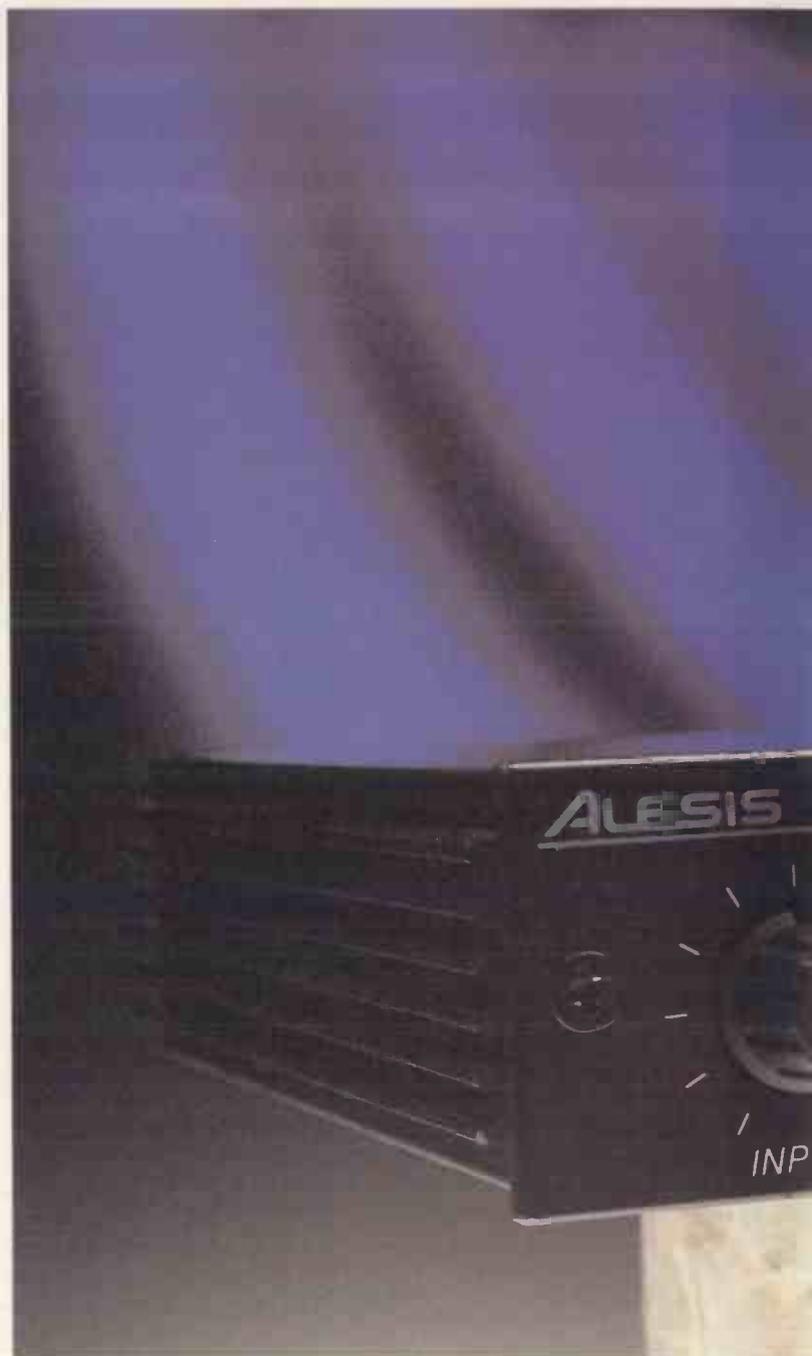
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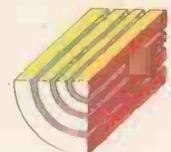
► *For The Money*, from Box 1. Those are not only overdubbed, they are remixed."

And what are the Mystery Discs that are included in the Old Masters sets?

"The Mystery Discs are items of interest from the era from which the other masters are drawn. For example, the Mystery Disc in Box 2 is really fantastic. It's got one side, about 22 minutes, of an unreleased, never before heard, live concert with the original Mothers of Invention and the members of the BBC Orchestra recorded in London in 1968. The members of the band are doing a play, and the orchestra is backing them up. And the play is about why everybody wants to quit the group. It's really funny. On the other side there are odd little things like the origin of the story of Willie the Pimp. There's a cassette recording of an interview that I did with these girls from Coney Island; they're talking about one of the girls' father, calling him Willie the Pimp, from the Lido Hotel. You can see where the song came from."

YET ALTHOUGH THERE'S plenty of live Zappa recordings shortly to be made available for the first time, it's been a while since the man actually toured. As it turns out, this is mainly because of the way his compositions have changed since he began recording with the Synclavier...

"Let's suppose you go out on the road right this minute to support the album that's out there right now. No human being can play it, while I can take this computer out, hit the start button, and stand back."

And since Zappa's compositions are now greatly influenced by the Synclavier's recording and playback facilities, it seems that composing for musicians becomes more of a hassle than before. Does this mean that the Synclavier is his preferred means of generating new music?

"Yes, because if you look at the ordinary process to write music, you write the dots on a piece of paper, then they have to be inked by somebody to make your hand-writing look neat, then that is given to a copyist who copies out the parts for all the instruments. At every stage in the data process, mistakes can be perpetuated.

"Then the musician takes his part and under the baton of the conductor attempts to interpret what you dreamed up in the first place. And this interpretation is subject to such questions as how much time they have for rehearsal, which is based on how much money they have to lose, and the acoustics of the hall in which the thing is going to be played.

"So basically your chances, as a composer writing for human beings, of getting your idea accurately performed are really not too good. Not good at all, unless you write very simple music, which I do not. So I said, well, I'll just go on using the Synclavier.

"If you have a band, you can't ask the band to do something it can't do. For example, if you've got a band like the one with Flo and Eddy, you can't get them to do something like 'The Black Page'. It's not their style. So whatever you write for that particular band has to be engineered

for their assets and liabilities. You design the show around them as people, and the show is a product of who's available to be in the band at the time, and what their level of competence is at the time the tour takes place. Because the longer the guys stay in the band, the better they get musically, and I doubt there's any question that the people in the band have benefitted from it."

Faced with a choice between musicians and a machine, Zappa shows no hesitation when he states which he prefers to work with.

"With a machine. No question. No contest. The problem with doing anything with live musicians is that they're entitled to earn a living, so you have to pay them. And it gets expensive. When a tour is over, the band is free to go out and do whatever other things they can get in their spare time. I don't keep them on salary all the time – I can't afford them. So the best way to do music is by typing it in, pushing the button and listening to it play back correctly."

And there's the fact that, if he replaces musicians with a piece of modern technology, Frank Zappa has a door to a completely new world of sound – a door he's opened wide in recent years. A listen to *Jazz From Hell* and *Frank Zappa Meets the Mothers of Prevention* exposes listeners to sounds they have probably never come across before.

"I use it all. There are all different techniques on my records. There are some other things that have come along since that time. I've got one that I was working on just before you got here. It's not very much like rock 'n' roll, but it's still music."

Production techniques have always set Frank Zappa's music apart from the rest, and although it's not really fair to lump his music in with rock music, this is precisely what has happened in the past, and will probably continue to happen as well. On one hand this has worked to Zappa's advantage in that his music has been made visible to a lot of young, often open-minded listeners. On the other hand, much of the music-buying public doesn't understand what he's doing because they're viewing it as a particular style of music.

This is a pity, for the techniques Zappa has employed throughout his career have always been far beyond those used in the mainstream. The last track on *We're Only In It For The Money*, for example, showcased electronic sound effects in rapid-fire succession as you're not likely to hear anywhere else.

"Oh, 'The Chrome-plated Megaphone of Destiny'? The percussive-type noises, the thing that sounds like little squirts and explosions, was done by using a box that we built at a studio called the Apostolic Vlorch Injector. It was a little box this big", (Zappa holds an imaginary small box with both hands) "with three buttons on it. The console at the studio in New York where we used to work, Apostolic, was unique. In the sixties the audio science was growing, and people were trying all kinds of different things, and there was a lot of

non-standard equipment around. This particular console didn't have a stereo fader; it had three master faders – a separate fader for the left, the centre and the right, so you could fade out the centre and leave the left and right, or whatever. So these three buttons on this box corresponded to inputs to the three master faders, and you could play it rhythmically.

"The input to the box would be any sound source cranked up to the level of gross square-wave distortion. Any noise. You'd crank it up so that if it was printed non-stop on a piece of tape, you couldn't stand to listen to it. It would be trashed distortion. But as short little bits you'd get very complex, technicolor noise. When you hit the button and open up a little window of time, the structure of the distortion was a complex waveform, and that's where the bumpy, crunchy stuff comes from.

"Then we had some backwards tape and tape slowed down and speeded up with the VSO, and were using parts of recordings of ethnic instruments. There's a tambora in there, a koto in there someplace. Some filtered tapes of industrial noises, horses, all collaged together.

"I started doing that in 1962, before I had a record contract. I just experimented in this little studio they had, so I was well into music concrète techniques before I made a record."

MANY OF THE sound textures which appear on *Jazz From Hell*, such as harpsichords and woodwind, bring Mothers albums like *Burnt Weeny Sandwich* to mind. Are there specific sounds that Zappa finds appealing?

"It depends on the information. When you listen to a sound, there are a lot of different ways to perceive it. You can perceive it in terms of its physics, which is: What is the waveform? What is the amplitude? The scientific methods of sound. The other way to listen to it is: What does it feel like? What does it smell like? What does it mean?

"There's one rule of thumb I use in terms of all compositions, whether it's rock 'n' roll or chamber music. It's that timbre rules. The timbre of the piece is the most important thing people hear. The timbre will tell you how to hear the rest of the data, and the best example of that theory is this: You can take Jimi Hendrix playing 'Purple Haze', and take the guitar part. If you listen to the guitar, it's 'Purple Haze'. But if you take exactly that guitar part, note for note, and have it played on an accordion, it's still the same data, but it's not the same information. So the timbre is the thing that tells you what it is you're listening to."

Zappa applies the same thinking to his own work today, playing back his compositions on the Synclavier with various timbres for each part, then adjusting the parts or timbres as he sees fit.

"The things undergo constant modification, like there's a floppy that had a piece that was typed in five years ago that I hadn't listened to in a long time. It was typed in before I even had the qualifying
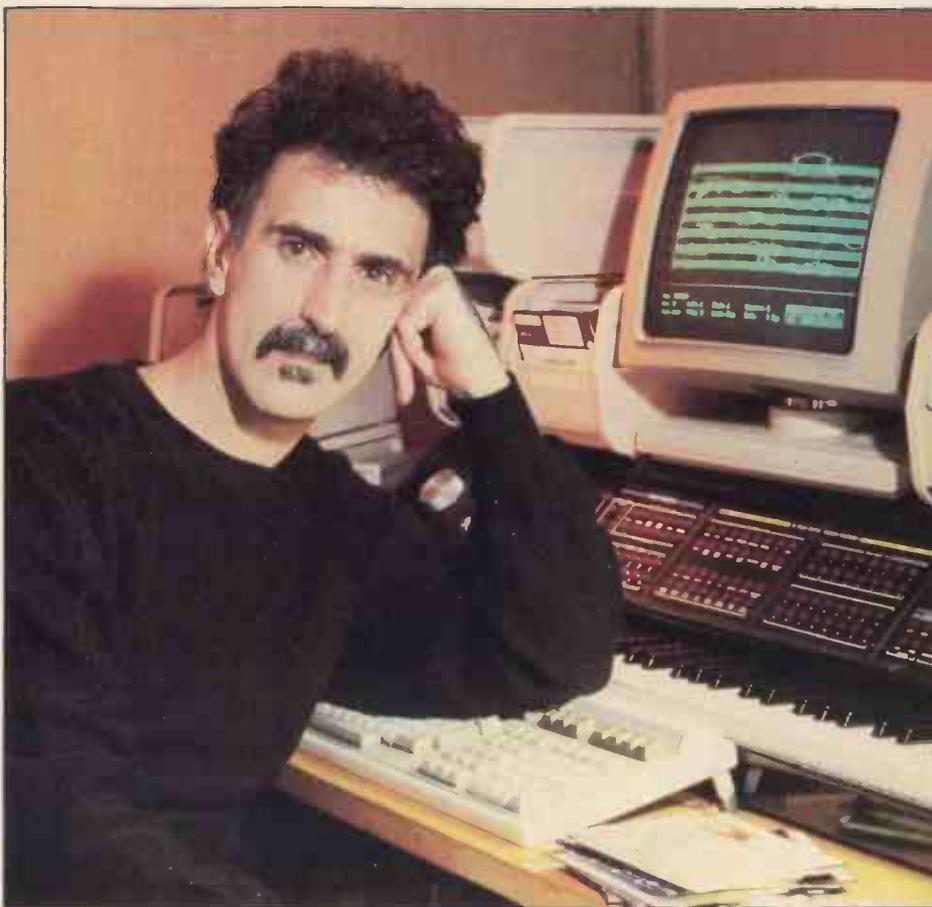
sampling system, so I put it in and the original timbres were those depressing old FM timbres. Pretty bland-sounding. I replaced all those with samples, and I've virtually got a new piece of music on my hands.

"Every season I buy new stuff for the Synclavier, and reach the RAM capacity, get extra doodads for it as the budget will allow, and every time there's a new module added on, I go back through all my collection of compositions and update them. There are probably 250, maybe 300 compositions on floppies right now, with not more than ten of them completed. They're all in varying stages of being worked on, and I've had them since I got the machine, four or five years ago."

As synth players with their own sound library already know, keeping track of sounds on floppy disk is just as important as storing them in the first place. And just as synth players find the keeping of patch charts for all sounds in their libraries an unnecessary and time-consuming endeavour, so Frank Zappa finds keeping printouts of all his compositions, even with the score-printing option on the Synclavier.

"It takes too long to print them out. I had that commission by the Aspen Wind Quintet to write something for them, and I put it on the Synclavier, so I printed out the score and the parts on the Synclavier. I just have a graphics printer. Without a laser printer, it's an interminable, tedious job to print out a score.

"I got a call today from a group in Boston. They wanted me to supply them with something, but I can't do it. I just don't have the time. There is plenty of music I've already written that's sitting on the shelf and has never been played. I ▶

▶really don't have any intention of going back to manual labour, after I've been used to this stuff.

"It's always a depressing experience to write something and know what it should sound like, and then give it to some human beings and then start hearing all the mistakes, and the audience doesn't know. In the last year there have been a lot of times where people have played various chamber pieces of mine, in different places all over the country... 'Oh, won't you come to the concert...?' No, no way, I don't want to hear it. I already know what it sounds like, I don't want to know what you do to it."

IT'S HARD TO think of a time when Zappa has performed with musicians who were *not* extraordinary improvisors, but how does he combine improvisation with set compositions?

"It fits into a hole. There's the arrangement, and then there's a blank space in the arrangement and it says, 'solo goes here'. That's where the improvisation goes, and the arrangements are absolutely nailed down. They have to play them exactly the way they're supposed to be played.

"We had this thing called meltdown, where, depending on what's in the news that day, or what happened in the audience during the show, I'd start talking in a singsong tone of voice and then Tommy Mars would chop changes behind it. Now that's very freeform, kind of like the 'Dangerous Kitchen' or 'Jazz Discharge Party Hats'; those are both meltdown events. In the case of 'Dangerous Kitchen', it's a fixed set of lyrics that has variable pitches and variable rhythms. In the case of the 'Jazz Discharge Party Hats', it was completely spontaneous, 100% improvised by me and the band. It ended up right on the spot in this concert in Illinois.

"So that type of rampant behaviour is good as a contrast, but I think that for today's audience you can't go out and do a whole evening of random behaviour. They're not going to tolerate it; they want to see a structured show. It's been my experience that most people want to have *any* band go on stage as a human jukebox and just puke out whatever it was they put on a record.

"Which in a way is good, and in a way is bad. If you can actually play it, then you've accomplished something monumental, considering how complex today's record production techniques are. And some groups' people go to a great deal of time and trouble to make their stage performance sound just like a record. But on the other hand, those same groups that have drilled themselves to sound just like a record often have psychological problems in the band and the crew because they have to do exactly the same thing night after night. We avoid that by having some random elements in the show and by having a book that is large enough that you can vary the show every night.

"The other thing it works against is the ideas of ten years ago, when I would go out and do a whole tour based on new material, and throw in a few songs off albums. I would develop the material on the road. I stopped doing that because people usually bootlegged it, and they'd have it out in the market before I'd even have an album out. Now if I do it, there is very little unreleased material included in the show. It takes the fun out of it for me, but I'm not going to make life any easier for bootleggers.

"I've had an independent label since 1968. First it was called Bizarre, then it was Discrete, then Zappa Records, then Barking Pumpkin. Each one had a different major label as a distributor. Capitol is the current distributor."

WHILE DISCUSSING USE of the Synclavier on *Mothers of Prevention*, I mention 'Revolution 9'.

"What's 'Revolution 9'?" responds Zappa. "I never heard it. I didn't like the Beatles. They sang about love and stuff—not my *style*."

So what does Frank Zappa listen to, other than his own compositions?

"I have little or no recreational listening time. Given the choice between listening to a record and watching the news, I'm going to watch the news.

"I've got a good record collection, and sometimes I miss listening to it, but if I've got a spare minute, it seems I'd feel guilty if I didn't pay attention to what's going on in the news. Because next day, somebody's going to call me on the phone and ask my opinion on something.

"...I won't say I've heard it all, but I've heard all the stuff I like. There may be some other little surprises lurking out there, but I haven't been too assiduous in tracking them down.

"I like Bulgarian music, I like Indian music, I like Arab and Tibetan and French Renaissance dance music. I like recordings of lute music, and most of the early 20th Century composers, until economics took over and we wound up with minimalism. I'm not too fond of that. I'm not enthusiastic about cowboy music. Early heavy metal I like – early Black Sabbath and rhythm 'n' blues. I even like some disco music, when it's clever and the production is fantastic. I'm not crazy about the stuff they have on MTV; it's not much to listen to. But some of the pictures are nice."

Well, if Frank Zappa's plans to put out a clay animation video for one of the tracks from *Jazz From Hell* materialise, there will be *plenty* to listen to. ∎

IT TOOK THEM AGES

AND LOOK WHAT IT DID TO ME!

Two years ago ENSONIQ shocked the music industry with the introduction of a new Digital Sampling Keyboard, the MIRAGE DSK-8.

Unfortunately, like many of my musician friends, I thought that it would be only a matter of months before the Japanese competitors would hit the market hard with their answer to the MIRAGE. Without a shadow of a doubt those machines would be better and cheaper. Hadn't it always been like that? So I decided to sit back and wait a little. After all, my budget is limited too, right? So what did we get? Nothing.

Now, TWO YEARS LATER, we see the first and not too cheap Japanese sampling keyboards, almost timidly trying to tell us that it has been worth the wait. Two years! Just to find out that it could be done? Big deal!

In the meantime, waiting for them to prove their assumed absolute power, I could have played the ENSONIQ MIRAGE, with its hundreds of hottest sounds from the world's biggest and most powerful library.

And now ENSONIQ has made a second surprise attack with the ESQ-1, the coolest synth ever. And their latest stunt is a new, even cheaper version of the MIRAGE, the DSK-1.

Some people say that I have aged over the past two years. They may be right. In this industry two years can be like ages. If you're not on top of things you get old before your time. Look at me. Finally I understand the word "Future" in competitors' slogans. Future, don't make me laugh. From now on I will choose for facts the way ENSONIQ presents them. They make me sound great. Now, not tomorrow of in two years!

ensoniq
WE MAKE YOU
SOUND Great!

HISTORY BY NUMBERS

A RE-REVIEW OF THE ROLAND MC4 MICROCOMPOSER

As Roland's current MC500 makes its way toward the status of industry standard, we look back at the machine that introduced the world to recording music on a calculator keypad. *Text by Steve Howell.*

CURIOUSER AND CURIOUSER. Here I am, taking a nostalgic look at an old trusted friend of mine, the Roland MC4 Micro-Composer, while elsewhere in this issue you'll find me waxing profound over the same company's wunderkind, the MC500.

What's the connection? Simple, really. Both machines are sophisticated digital sequencers controlled by microprocessors, and both allow their users to program complex music.

The difference is that the MC4 is designed to control monophonic, CV/Gate synths while the MC500 is designed to be used with MIDI synths. Apart from that, these two machines are *essentially* the same beast. What is curious, though, is that to my knowledge, this is the first review of the MC4 to appear in a magazine.

But the MC4 is old technology, no doubt about it. So why write a piece on it

now? Well, just in case you didn't already know it, there's still a lot of life left in monophonic CV/Gate synths, especially modular synthesisers which have no contemporary equivalent. And because the secondhand market for this generation of machine is hardly buoyant, it might be worth your while to hang on to that trusty old monosynth rather than lose a lot of money selling it.

So the MC4 becomes an attractive ▶

proposition – more so when you consider its current market value. When it first appeared at the start of the decade, you wouldn't have got much change from £3000 for the whole system; nowadays, you can buy one brand-new for £300. Secondhand, I've seen them for as little as £100.

History. In the beginning there was the first MicroComposer, the MC8. It was a powerful if overly complex eight-channel sequencer designed primarily for Roland's mega modular synth system, the System 700.

The MC8 begat the MC4, a slightly scaled-down but much friendlier four-channel version which, in turn, spawned a more compact machine called the MC202 back in 1983. Strangely enough, the MC4 is far simpler to use than the MC202, as it is not endowed with vast numbers of multi-

▶ *"A second CV is used to open and close a synth's VCF and/or VCA for dynamics, breathing life into music in a way unmatched by any more recent system."*

function switches. On the MC4, each switch has its own purpose depending on the mode you are in.

While the MC202 – with its built-in, SH101-derived synth section and low (£350) asking price – soon became popular with home studio owners, it was the MC4 that caught the imagination of the serious synth programmer and composer. For most of its production life, it reigned supreme in the facilities it offered for digital sequence recording, and in the ease with which they could be used.

Operation

BEFORE WE GO on to see what the MC4 has to offer, let's see how it works.

Basically, the MC4 has three modes of operation, selected by a sprung toggle switch located above the rotary tempo control. These modes are Play, Edit/Data Entry and CMT. The first two are fairly self-explanatory, while CMT mode is for data transfer to and from cassette. The MC4's calculator-style keypad (also a feature of the MC8 and MC500) performs a different set of functions for each mode.

When you turn the thing on, a large fluorescent display shows the timebase, the quarter-note step and gate time. The default values are 120,30,15, but these can be changed by entering new numbers on the keypad; in practice, readings of 96,48,24 or 96,24,12 are the most useful. The next display "page" shows the default tempo of 100 BPM, and this can be changed from the keypad or by using the rotary tempo control.

The next page brings you on to the data entry side of things. You can choose from a number of different methods of data entry, these are selected using the shift button and simultaneously pressing a number on the keypad – the 'shift map' to the left of the keypad shows you where you are, as a little LED lights up to indicate which

method you've selected.

The first option involves entering data in real-time using a suitable keyboard. This "records" your performance, warts and all. Linked to this method is a "Gate Rewrite" function that allows you to input timing data by simply tapping any note on your connected keyboard. This can be useful for correcting timing discrepancies entered in real time, but alternatively, you can enter pitch data in step time and then input the timing data manually.

You can also enter data totally in step-time by inputting pitch data, which can be done either from an external music keyboard or by typing in numeric data from the MC4's keypad. You can then type in note length (gate time) equivalent to the previous note plus the length of the rest, and give that note a short or normal step-time value (see Figure 1). Alternatively, you can enter a dummy note and turn it off by giving it a step time of zero.

One of the real beauties of the MC4, though, is that you can switch from one mode of data entry to another at any point. You could enter four bars in real-time, the next eight in step-time, the next two in real-time and the last two by entering the pitch data in step-time and the timing data in Gate Rewrite.

In other areas, though, the MC4 shows -signs of age. For example, it doesn't have a quantise feature (common to most modern-day sequencers) to auto-correct any inaccuracies in your recorded music. But you *can* tidy up timing errors either in Gate Rewrite or by typing in new data on the keypad.

The MC4 is essentially a four-channel sequencer that enables you to play up to four synths at once, each playing a separate part. But each channel has two CV (Control Voltage) outputs. Normally, the second CV is used to open and close a synth's VCF and/or VCA for dynamics. This can breathe life into an otherwise dull piece of music, and the degree of direct

control you have over synth parameters remains unmatched by any more recent system.

The second set of CVs can also be used to "play" another VCO for eight-voice capability, but for true eight-voice polyphony, these need to be used in conjunction with the MC4's one-shot trigger connections (one for each channel), which masquerade under the title MPX. The

one-shot pulse outputs can be used anywhere in your composition, and unless you're after the eight-voice polyphony, you can connect them to just about any external drum source equipped with a suitable trigger input.

So, a comprehensive system of ins, outs, and data entry. In some respects it leaves modern equivalents standing. In others, it shows its age – though the time it takes to familiarise yourself with this aspect of the MC4's operation is no longer than it would take to adopt the same process on, say, a Yamaha QX1.

Editing

ONCE YOU'VE GOT your data in, you can copy, insert, delete, transpose, repeat and otherwise edit that data at will. One particularly powerful (and useful) option is the ability to copy data from anywhere in your piece to some other point; this includes copying data from late on in a tune to a position much earlier. In other words, bars 25-32 can be slotted in between bars 4 and 5 with little fuss. Total control over the structure of your composition is what this feature effectively provides – though it's as well to have a piece of paper handy to make notes so that you don't get confused, as the MC4 is not over-endowed with helpful display messages.

As I've already begun to indicate, the MC4 offers some powerful (if hardly up-to-date) interfacing facilities. As well as the

CV and MPX connections, there's the usual Roland DIN Sync 24, plus Tape Sync (efficient FSK code) input and output. Inputs and outputs for external clocks – in conjunction with the variable timebase – allow you to sync the MC4 to practically *any* older drum machine or sequencer.

There's also a CV input for the tempo which, if controlled by a spare CV2, allows very precise control over tempo variations. Ins and outs for the external keyboard come complete with calibration controls and a Total Tune control.

Three years stood between the MC4's introduction and the arrival of MIDI, so you're not going to find any MIDI-equipped examples lurking on dealers' shelves. Roland, however, did come up with a couple of interfacing boxes that can prevent the MC4 from being made redundant by a MIDI system. Their OP8M, for instance, is a CV-to-MIDI converter that enables the MC4 to "play" MIDI synths, while the later MPU101 allows you to program the MC4 from a MIDI keyboard.

I've missed out some other useful features. Like the Tune routine that gives out a CV equivalent to A440 (assuming the VCOs are tuned to 8'), though you can type in any other note you wish to tune to. And like the MC4's ability to calculate the playing time of either your whole piece or just a few bars. This can be wonderfully useful if you're writing something for TV or film, as you can set precise timings simply by moving the rotary tempo control until the display shows the appropriate time. Interestingly, if you're using CV2 to control tempo, the MC4 will take any speeding up or slowing down into consideration and calculate the total playing time accordingly.

The MC4 has an unbreakable habit of losing recorded data when you switch it off, so it's necessary to save the machine's contents onto tape. Roland made the MTR101 tape machine to allow this, and since it was a custom device, it could be controlled direct from the MC4 keypad.

The MTR101 offers a number of other useful little refinements over and above what you'd get from a standard audio tape deck. For example, you can give a tune a file number for later retrieval and, should you give a tune a file number that is the same as one already on tape, the MC4 will ask you whether you want to overwrite the original, so you're unlikely to erase anything precious by accident. When loading data from tape into the MC4, the MTR101 will search for a specified file number. Data transfer takes just a few seconds and is actually foolproof.

Not quite a disk drive, but certainly the next best thing. You'd be mad to buy an MC4 and not invest in an MTR101. You *can* save data onto a standard audio cassette machine, but it takes in the region of five minutes and is not always reliable.

Verdict

THERE'S LITTLE POINT delving much deeper into what you can and cannot do with a Roland MC4. Basically, if you can

think of a tune, you can record it with the MC4, in the knowledge that the only serious limitation you're likely to come up against will be that of polyphony.

At street level, the MC4 could hardly be less fashionable than it is at the start of 1987, seven years after its introduction. But the music industry is filled with professional players and programmers who still swear by the things, people whose MicroComposers sit uncomfortably (but still usefully) among Fairlights, Synclaviers, and sophisticated MIDI production systems. At the time of writing, I have five MIDI voice units (synths, samplers, expander modules), a MIDI drum machine and a new Yamaha QX5 MIDI sequencer; but very often I'll do a whole piece on my MC4 and an ancient ARP 2600 modular system, simply because there are so many things possible using that combination which just can't be done using the modern gear.

Tomita, Hans Zimmer, Daniel Miller, Tim Souster, Steve Porcaro and Dave Paich of Toto would probably agree with me on that.

At the time it came out, the MC4 was a major innovation, but (like so many major

▶ *"Its ability to calculate the playing time of your piece can be useful...you set precise timings by moving the tempo control until the display shows the appropriate time."*

innovations) it was also a bit expensive. At its current price level, you'd be out of your brain to ignore it if you still have a CV/Gate synth.

And alongside the featureless hi-tech black visage presented by today's new instruments, it also *looks* extraordinary. ■

OBERHEIM
DPX1
Sample Replay Unit

Photography Samuel Barksdale

When so much of our music is dominated by factory sounds, does it make sense to buy a machine like the DPX1, which simply replays samples? Review by Paul Wiffen.

IT WAS BOUND to happen sooner or later. With so many musicians these days just using their samplers to play library disks, and so much of today's music using the same old tired sounds, some manufacturer was bound to come up with a machine which would do just that. What wasn't expected, though, was a machine which was able to handle disks made on other samplers.

At the time of its release, the Oberheim DPX1 is able to load and play back Ensoniq Mirage, Prophet 2000 and Emulator II disks, and Oberheim are already planning software updates to make it compatible with other libraries. Now, you'll probably realise that the DPX1 has to be able to cope with both 3½" and 5¼" disks and sure enough, there is one of each type of drive on the unit.

But as anyone who has tried to load a Mirage disk into a Prophet 2000 will tell you, you need more than mere physical compatability – you need a device which is able to understand the different "languages" that the various machines employ to achieve their respective ends.

The DPX1 is able to do this by having a larger than average operating system which adapts itself to the different data formats used by Ensoniq, Sequential and E-mu. What's more, it does this automatically without you having to tell it which type of disk you're using. When you place a disk in either the 3½" or the 5¼" drive, the DPX1 looks at it, decides which type it is and then displays either "En" (Mirage disk), "P2" (Prophet 2000) or "E2" in the dual seven-segment display.

But being able to load sample data is not the end of the story. Achieving good representations of a complete disk, including all the presets and multisamples (jargon for the way samples are edited and laid out across the keyboard), means that you need to interpret all the program data which holds all the filter, envelope and velocity settings. You also need to have the hardware filters available, and when the DPX1 was first announced, this was the one aspect which aroused suspicions in my cynic reviewer's mind.

It seemed to me that the most difficult thing would be matching analogue parameters (as the Ensoniq, Prophet and E-mu all do things differently), and especially tailoring the filtering on the samples. Because if you're at all familiar with analogue synths, you'll know how much difference the filters can make to the sound of an instrument. In fact, I was almost ready to hear that the DPX1 could only play samples one at a time, with limited filtering and enveloping.

Imagine my surprise, then, when I turned up at Oberheim's factory in Los Angeles and heard EII factory disks being played back on the DPX1 with exactly the same keyboard assignment and analogue parameters as on the original instrument.

This was immediately followed by a demo of K-Muse disks for the Mirage. Instantly, the DPX1 was behaving just like an Ensoniq, even down to a flickering display (some joker must have spent a while programming that in). To ▶

▶ complete the effect, I saw a Sequential factory disk load in slightly less time than it would have taken on a Prophet 2000.

Listening

AS FAR AS the sound quality and character of the DPX1 are concerned, the sounds were immediately identifiable as the original disks, and while neither a Mirage nor an EII was available for direct comparison, I've worked fairly extensively with both machines and the DPX1 sounded pretty faithful to my ears.

Later on, I was able to conduct an A/B test on the same disk played back through a Prophet 2000 and through the DPX1. They sounded identical. (And as it turned out, the

▶ *"The DPX1's operating system adapts itself to the different data formats used by Ensoniq, Sequential and E-mu – without your having to tell it which type of disk you're using."*

first time I loaded the disk into the Prophet, one of the samples wasn't read properly from the disk, a problem I couldn't get the DPX1 to imitate.) Still, I wasn't prepared to be convinced just on the evidence of a few factory disks, so I checked out the results with some of my own disks, too.

First off, I tried out some disks made on the Mirage, and only one didn't sound the same as what I'd originally set up. It was pointed out to me that I'd used Oscillator Detune on the Mirage to fatten up the sound. Now, the DPX1 doesn't have two oscillators per voice; instead, there's a mode called Dual Oscillator which allows you to play Mirage sounds which use two oscillators by halving the polyphony to four voices (which, funnily enough, is how the EII and the Prophet go about doubling or detuning voices). So you can play any Mirage sound with all the originally set-up parameters, even if you only get four-note polyphony on some.

To my ears, the DPX1 may even sound better than the Mirage, as there's a perceptible smoothing out of the harshness and phase distortion that are present in the original instrument. Then again, some people like the quality the Mirage imparts, especially on sounds like guitar. Oh, well.

Another feature of the DPX1 is clearly different from the Mirage. When you put a Mirage disk into the DPX1, it loads all three banks of sounds at once – something the Mirage

▶ *"Oberheim's engineering department are getting their hands on as many disks as possible, to make sure you can load any disk made on a Mirage, EII or Prophet 2000."*

cannot do because it doesn't have enough sample memory. You can then switch between these three banks of sounds from the front panel or via MIDI program change numbers 1, 2 and 3 from your master keyboard. So while the load time for Mirage disks is approximately three times as long as on the original machine (18 seconds as opposed to six), once you've loaded your disk you can simply switch between sounds instead of having to wait for additional loading.

The future might see an option allowing you to specify which bank you want to load, even though the current thinking behind the new Oberheim is that it should be as simple as possible to use. I can confirm that it certainly is just that: you put in a suitable disk, press Load, and the DPX1 does the rest.

When I came to try out some Prophet disks, I thought I'd

found the DPX1's Achilles heel. At the top end of the range of one of the samples, the DPX1 wasn't able to manage the full octave transposition up from the original pitch (C2) and so was playing the major seventh pitch (B2) when I hit C3. But my triumph was short-lived. It seems Oberheim's engineering division has already come up with a software revision, and the problem has now been fixed.

Similarly, when I tried to load a disk made on a 512K Prophet, the DPX1 got confused and put some of the samples in the wrong place on the keyboard. It seems the software on the review model was only capable of dealing with disks from a 256K Prophet, though the latest DPX1 software should load all 512K disks perfectly.

Currently, Oberheim's engineering department is trying to get its hands on as many disks as possible from all three machines before DPX1s start to become generally available, to make sure you can load literally any disk made on a Mirage, EII or Prophet 2000/2002 (with or without expanded memory).

The only thing the DPX1 won't do on Prophet disks is turn on the Stack Mode, which is a performance parameter. However, with the newer software on the 2000 making it possible to store Stack settings as part of a preset, it wouldn't be surprising if that feature is soon included on the DPX1, too.

As a general rule, the DPX1 doesn't implement original machines' performance features, like sequencers and arpeggiators, and hardware things like individual outputs and computer interfaces.

If you've read my comments in the past about arpeggiators, you'll know just how little I shall miss them. And the sequencers in the Mirage and EII are so inflexible that you'd probably be better off with a computer software package or a dedicated sequencer anyhow.

Some users may justifiably bemoan the lack of separate audio outputs – a blessing both in the studio *and* on stage – regardless of the DPX1's new low price-tag. But then again, bear in mind that by the very nature of the DPX, if you had separate outputs you'd be stuck with the assignments set up on the host samplers. Which means that as most factory disks don't come with outputs assigned, you wouldn't be able to have those expensive outputs do anything unless you had the original machine pertaining to each disk...which, in turn, would rather defeat the whole object of the exercise.

Using

AS I'VE SAID, using the DPX1 really is incredibly easy, though when you think about it, there's no real reason why a playback machine should be anything but straightforward to use.

Apart from the Load button mentioned previously, there are very few other parameters to confuse yourself with. These are cycled through with the Parameter Select button. First is Patch Select: you can use the Up and Down buttons to step through patches 00 to 99, pressing Enter when you get the number you want (though it's quicker to select this via a MIDI program change number).

Next comes MIDI Channel, which you select from "On" (for Omni On) or Channel 1 to 16. After this is a fine-tune range of a quarter-tone up and down, represented by a range of 00-99 with 50 as A440 – always assuming your original samples are in tune, of course.

Things start to get more interesting with the Data Dump feature, which uses the MIDI Universal Sample Dump Standard (another of Chris Meyer's lunchtime brainwaves), though there is talk of implementing other formats in future software revisions.

Then comes MIDI Controllers On/Off, which globally enables or disables the recognition of MIDI pitch-bend,

modulation and pressure data, plus any other parameters sent via continuous controllers such as volume, sustain and so forth.

The final option on the cycle is Extended Functions, which currently boasts Filter Limit and Dual Oscillator modes. The former refers to a default setting on the DPX1 where the filters are capped (limited) to just below half the sample rate. This prevents a lot of the problems with imaging which result from aliasing showing up in the samples. But on some machines it's possible to open up the filter above this point, and seeing as some people seem to like the sound of aliasing, Oberheim have made it possible to open up the filters to let all that horrible noise through if you really want to. Maybe this filter limiting is why some of the Mirage disks sounded cleaner on the DPX1...

We've already seen the application of the Dual Oscillator mode in enabling you to get the oscillator detune effect available on the Mirage. Now, this is currently its only application, but as the operating system is increased to allow the DPX1 to read disks from other samplers, it should have more and more applications, since several of the samplers now available have two oscillators per voice.

On the subject of enlarging the operating system, it currently resides in 128K of memory. This is a little on the large side, but there is room to add another 128K, so there'll be plenty of space for implementing compatibility with other manufacturers' formats.

Sample memory is also generous, with 768K built in. This is more than enough to cover the disks of just about any sampling machine currently on the market, so it won't be in that area that the DPX1 finds it limitations. By the way, this is probably as good a point as any to mention that the 30 megabytes of memory quoted in our original news feature (MT December '86) was the result of a little misunderstanding, so any of you who were thinking of using the

DPX1 as a hard disk substitute are going to be disappointed. Sorry.

The back panel of the DPX1 is as minimalist as its front panel, only more so. The audio out, MIDI In, Out and Thru, and that's that.

Verdict

ALL IN ALL, I see the DPX1 having uses outside the most obvious one of a "one size fits all" sample replay machine. For example, it represents a cheaper way of upgrading a Prophet sampler to a 16-voice system (via MIDI Overflow Mode) and yet also offers the ability to play sounds from other machines. And a second (or third) "EII in a rack" might well please bands who up to now have had to take four Emulator IIs on tour with them to get live access to the sounds on the album all at the same time.

But the overwhelming demand for the DPX1 is going to come from musicians who know little about sampling, and who don't want to waste music composition and performance time learning any more. For them, this machine represents an excellent way to get the sounds they want without all the hassle that goes with sampling.

It won't please the purists who think nobody should be allowed to use a sampled sound or synth patch they haven't created themselves, and it may not please the manufacturers whose libraries are compatible with it. But the DPX1 may just be what the majority of musicians really want, and there's no arguing with that.　　　　　　　　　　　■

Price £1495
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L A T E S T
in the line

Photography *Trevor Gilchrist*

Following in the footsteps of Herbie Hancock, Chick Corea and Joe Zawinul is no easy task. But a young musician by the name of Robert Irving III is doing exactly that – playing keyboards to Miles Davis' trumpet. Interview by Tim Goodyer.

THE NAME MILES Davis is really its own introduction. A black jazz trumpeter born in Illinois back in 1926, quoted by many and various musicians as being a seminal influence – and still active and contentious 60 years on.

Davis began to establish himself as a fairly average trumpet player during the forties. Like many of his contemporaries, he found himself having to develop an individual playing style to overcome his musical limitations.

In 1948 an album, *Birth of the Cool*,

resulted, and featured a nine-strong band and the complex arrangements of Gerry Mulligan and Lee Konitz.

The mid-fifties saw Davis in the ascendant. He assembled a classic quintet with John Coltrane on tenor sax, Red Garland on piano, bassist Paul Chambers, and drummer Philly Joe Jones. It was with this line-up that Davis began to consolidate his position within the jazz world. The combination went on to produce five albums, originally released on the Prestige label with the endearing titles *Round About Midnight*, *Cookin'*, *Relaxin'*, *Workin'* and *Steamin'*.

Excellent as they were, these proved to be only a foretaste of *Milestones*, on which the quintet was augmented by alto saxophonist Cannonball Adderly. The album's title-track became the blueprint for a new development in jazz playing – modal improvisation. Drawing heavily on a book by George Russell called *The Lydian Chromatic Concept of Tonal Organisation* (1953), 'Milestones' and the following LP, *Kind of Blue*, demonstrated a new freedom for the soloist. Liberating musicians from the restrictions of conventional chord structure, the new doctrine adopted notes within scales as its grounding.

Later in the fifties, Davis collaborated with another arranger – Gil Evans. The fruits of these labours were *Miles Ahead*, *Big Stuff* and a version of Gershwin's *Porgy and Bess*, all of which used Evans' arrangements for a big band to complement Davis' solo flugelhorn.

By the late sixties Davis had expanded his activities beyond jazz into the sphere of rock with *Miles in the Sky*, *In a Silent Way* and the classic *Bitches Brew*.

Under the influence of Zawinul's use of the electric piano with Cannonball Adderly, Davis first adopted the instrument himself on 1968's *Miles in the Sky*. This marked the beginning of an association with electronic instruments that was to lead him (eventually) towards synthesisers, but which was initially confined to an electric piano treated by effects such as the Echoplex.

In a Silent Way also marked the beginning of a series of collaborations with keyboard players whose names have since become commonplace. Names like Herbie Hancock, Keith Jarrett, Chick Corea and Joe Zawinul, all of whom found their careers very much the more rewarding (both financially and artistically) for working with the great man.

Hancock played acoustic piano with Davis during the mid-sixties and was joined on *In a Silent Way* by Corea and Zawinul. Jarrett made his appearance on the subsequent live albums *Live Evil* and *Live at the Filmore*.

So Miles Davis, in addition to continuously reaffirming his position as perhaps *the* solo modern jazz musician, has also promoted and nurtured the careers of a good many other musicians who might

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otherwise still be playing local high-school gigs.

INTO THE REVERED position of Davis' keyboardsman steps Robert Irving III, a young player, composer and arranger with an emerging talent that somehow attracted Davis' attention – though Irving is unsure of the reason.

"He must have heard somethin' special", Irving concedes the morning after a recent sell-out concert in London. At the time of his meeting with Davis, Irving was an aspiring player and writer looking to further his education at music college.

"I wanted to go back to school", he says. "But my relationship with Miles has been more than that for me. It's a great relationship, rather like a father and son. He's been so encouraging and I've learned so much from him. At first I felt I wasn't developed enough as a player so composition was my main involvement, but it's developed from there."

The first fruit of the Davis-Irving collaboration was *The Man with the Horn* in 1981. The disc featured some of Irving's writing and showcased his unorthodox harmonic approach to great effect. On its release, one critic was overheard to comment: "Heard the new Robert Irving LP? It's got Miles Davis on it."

A live album, *We Want Miles*, followed a year later, and another studio album, *Star People*, emerged in 1983. The latter marked Davis' successful reunion with Gil Evans, Irving did not contribute to either. However, 1984 saw the release of what is generally considered to be the best example of Davis' current musical direction – *Decoy*. Produced by Davis, the album saw

"Miles is still playing some of the same licks he was playing 30 years ago. He's aware of that, and it's important he has a diverse background to work off or it becomes very limiting for him."

Irving back on team, playing, writing and especially arranging in his own style. In fact, it's on *Decoy* that Irving makes his presence most felt, sharing the production, programming of rhythm patterns, and writing and co-arranging a number of the pieces.

A year later, *You're Under Arrest* also benefitted from Irving's contributions, though the LP made greater concessions to commerciality and lacked the definitive feel of *Decoy*.

Davis' most recent vinyl output is *Tutu*, released last year to great acclaim from critics the world over. But Irving's name was once again absent from the credits on the sleeve. The reason for his absence on this occasion was his involvement in a film project – scoring and recording the soundtrack to a new film called *Street Smart*. The

feature stars Christopher Reeve, is directed by Jerry Salzberg, and is set for February release.

"It was all recorded in two weeks", recalls a bewildered Irving. "Miles played on about two-thirds of it but he hadn't heard any of it until he came in to put down his tracks. Musically it embraces quite a wide variety of influences – pop and classical – but mainly it's good old New York jazz. There's a little bit of technology involved in it but mostly it's acoustic stuff: bass and piano work.

"I really wanted it to follow the direction we had set with *Decoy*. That's my personal favourite album and I hoped the next Miles album might go on from there, but instead he changed direction again. This filmscore has allowed me to expand on what we started with *Decoy*. I would have liked to spend more time on it, but then the European tour came up."

Yet the circumstances surrounding the direction taken by *Tutu* are curious in themselves, as Irving explains.

"Originally Miles wanted to go off in a completely different direction to *You're Under Arrest* – some serious pop and R&B stuff. He'd got Prince, Chaka Khan and Al Jarreau involved but he had second thoughts that it might be too drastic a change.

"George Duke had already submitted one track, 'Backyard Ritual', and everybody liked that so he asked Marcus (Miller) to write some more along the same lines. He ended up with 'Tomaas' and that set the pitch for the rest of the LP. After that he added 'Perfect Way' and 'Full Nelson' and canned the rest.

"The last piece to be cut was Prince's number. He'd recorded all the backing himself and Miles had just done his overdubs. It was in there 'til the last minute, then Prince himself pulled it because it didn't fit in with the rest of the album any longer."

The sleeve notes put the production of

"Things we think are perfect for Miles he doesn't like. Other things you might work on for yourself he'll happen to overhear and want to work on. You can't write for Miles – you just do what you do."

Tutu down to a collaboration between Tommy LiPuma and bass player Miller, but Irving throws a little new light on the situation.

"I think Miles wanted to take control of some of the production too, so Tommy became a bit of an executive producer", he reveals.

Davis' touring band currently features drummer Vince Wilburn jnr, percussionist Steve Thornton, bass player Darryl Jones, guitarist Garth Webber, sax player Bob Berg and keyboardist Adam Holzman. Add Davis' own occasional excursions onto the ivories, and you've got three separate stacks of keyboards on stage. Davis uses a DX7 and a well-worn Oberheim OBXa; Holzman a DX7, PPG Wave 2.2, a Minimoog and an Oberheim Xpander; and Irving a third DX7, Roland Jupiter 6, Korg Polysix, TX816 rack and Akai S612 sampler.

UNQUESTIONABLY, DAVIS' ACUTE and tireless objectivity has allowed him to accept technology more easily than many of his jazz contemporaries, and has resulted in extensive use of synthesisers on the later studio albums.

"Technology has really advanced since I joined the band back in '81", says Robert Irving. "Then it was just starting to develop. I had a very basic setup then but I started using a lot more synthesiser for *Decoy* and *You're Under Arrest* because Miles wanted to try to duplicate the studio sound live. Because of that I started using a sequencer live, too. I've found it allows you to stretch your imagination and realise things that are at the back of your mind."

The sequencer in question is a Yamaha QX1, which provides the backing to 'Tomaas', 'Human Nature' and 'Perfect Way'. A Yamaha RX11 drum box is also called in to provide a hi-hat pattern for the band to keep time to onstage.

"I use both the Jupiter and the DX7 for controlling the Akai and the TX816 with a MIDI switch box", Irving explains. "The Polysix I use mainly for arpeggiator effects".

While Irving's association with Davis has been established over the last five years, Holzman is a comparative newcomer to the family, appearing only on *Tutu* where synth textures play a greater role than on any of the preceding albums. On-stage, Irving appears more relaxed than Holzman, though the workload is split evenly between them. The former explains the concert chemistry.

"My role in the band is to ensure there's a balance between the instrumentation and to provide the major textures, colour and mood. Adam's role is a lot more angular; he tends to double up on the bass and sax parts. It works nicely between us.

"Miles is still playing some of the same licks he was playing 20, 30 years ago. He's aware of that, of course, and it's important he has a diverse background to work off or it becomes very limiting for him. He's got this great library of things to draw from; possibly some of it's subconscious but it's still the basis of his work."

One of the many aspects of Davis' character that has brought him such

consistent acclaim is, ironically, his inconsistency and unpredictability. In the past this has involved turning his back on his audience – a trick that has now become a trademark – and complete public silences. Is this behaviour reflected in a difficulty in writing material for him?

"Miles has to hear something he likes", says Irving. "A lot of the things we write and think are perfect for him he doesn't like. Other things you might have been working on for yourself he'll happen to overhear and want to work on. You can't write for Miles – you just do what you do.

"When he writes himself or collaborates with anyone, it's usually as a result of an improvisation in a concert. Every time we perform live it's different, so we record it on a Sony 8mm digital recorder. Miles has a copy of that and listens to it after the gig, and the band get a copy between them to listen to.

"Once he finds something he likes he'll have me transcribe it and expand on it. The tunes develop that way. A

good example is 'Robot 415' from *Decoy*. That came from a solo Miles played. I transcribed it and he asked me to add a melody in a different key. The original solo was in 6/8 and we superimposed a 4/4 drum beat over the top of it."

And that's jazz.

It remains to be seen if the name of Robert Irving III will acquire the status of those of Hancock, Jarrett, Zawinul and Corea. Will Irving move on and away from Davis' guidance, and clear the way for the next protegé to take his place? Well, it seems Irving is already working on a solo project.

"I've been writing for about two years for it, but I want to lock in on the direction and instrumentation before I start to record", he says.

The cynics would assert that commercial pressures have closed the avenues that were once open to musicians wishing to pursue pure forms of their art. But if the cynics are wrong, Miles Davis may just have spawned yet another keyboard-playing legend. ∎

live T·A·K·E·S

Human League/ Drum Theatre
Birmingham Odeon

It was a new-look Drum Theatre that opened the first official gig of the Human League tour in Birmingham. Gone were the colourful excesses of costume and make-up. In their place, a determination to be accepted on musical merit alone.

The music is essentially unchanged since the band's support slot on King's 1985 tour – powerful and melodic – but now Kent B has abandoned his keyboards to take Myles Benedict's place behind the drum kit. An effective combination of DX7, JX10 and Emulator II substitute for the gloss of studio arrangements, and the plethora of ethnic percussion instruments that help characterise Drum Theatre's recordings comes under the control of guest player Ben Barson.

The performance was tight and impressive from the outset, despite a poor front-of-house sound. Singer Gari Tarn took command of the stage, enticing the audience to participate in the Theatre's brand of happy, percussive, pop.

"I want people to remember good music and drums", Tarn was heard to comment after the performance. Given an impressive break in 'Eldorado', where all but one member of the band moved to the front of

the stage with some form of percussion instrument, this seems all but inevitable.

Entertaining as Drum Theatre's set was, there was no doubt the majority of the audience only had ears for the Human League. And after a prolonged absence from the public eye, they were back with a vengeance.

The opening strains of 'It's Too Hard' saw the new line-up take their places onstage. They proceeded to tear through a 'Best of the Human League' set that included 'Do or Die', 'Love Action' and 'The Lebanon'.

Mysteriously, the sound had improved to give the 'League the clarity Drum Theatre had badly needed, permitting Jim Russell's Roland electronic kit and Octapad to thunder out an uninterrupted string of powerful drum samples. "We don't need drum machines any more", boasted singer Philip Oakey; "Yes you do", came the response from one dissenting fan.

Over these rhythms, the twin keyboards of Neil Sutton and Meyrick Sainsbury wove the deceptively simple melodies that made the Human League the kings of electro-pop a few years back. Two DX5s, a JX10, an unidentified Oberheim, an Akai sampler and, of course, the old Yamaha CS15 that characterised 'Love Action' between them now performed the duties originally allocated to an MC4 Microcomposer, Jupiter 8 and Fairlight.

The new album, Crash was adequately represented in the form of 'Human' and 'I Need Your Loving' amongst others. But the highlight of the show was 'Jam', which proved the 'League have lost none of their performing touch, even if they've allowed some of their fans to drift away during their absence.

Oakey appeared in his famed high heels and put in a commendable performance, while most of the floor show was provided by Joanne Catherall and Susan Sulley, provoking – and receiving – the response they sought, if only from the male element of the audience.

The set closed with 'Don't You Want Me' before being promptly reopened with an encore of 'Louise' and 'Fascination', complete with a quick change of costume (very professional...). Still not satiated, the crowd demanded a second encore. A cover of Gary Glitter's 'Rock 'n' Roll' ensued, and everyone departed into the night contented. ■ T*g*

video T·A·K·E·S

Kate Bush
The Whole Story

Picture Music International

The Whole Story – the video – is a concurrent release with the album of the same title, so it comes as no surprise to find an identical track listing on all three – though, obviously, in the case of the video you get pictures to accompany the music.

Dwelling for a moment on the soundtrack, we find a full stereo, digital recording that is only just short of the standard of its vinyl counterpart – and devoid of the vinyl curse: surface noise. This pleasure, though, is reserved for those with the necessary equipment to reproduce it; if you haven't, you're stuck with TV-fi, which is about as low as you can get.

Moving on to the videos themselves, there are 13 of them, beginning with 'Wuthering Heights' and coming right up to date with 'Experiment IV'.

The tracks are not ordered chronologically. Instead, they're positioned to give a good

visual running sequence, with first on the playlist being the sultry solo performance of 'Wuthering Heights'. On its way to the party depicted in the closing scenes of 'The Big Sky', Ms Bush treats us to a short story of the inventor (Donald Sutherland) of a strange 'Cloudbusting' machine who is subsequently arrested by the authorities, the sterile environments of 'Breathing', the social comment of 'Army Dreamers' and the amorous intrigue of 'Babooshka'. There's even a little live footage to accompany 'Wow', but the cut is well below the standard of the remainder of The Whole Story, which is a shame.

The common elements throughout are the unfailing power of this artist's visual imagery, and the physical elegance of our Kate. And not all of it is choreographed dance, as the romantic grace of 'Running Up That Hill' and the staccato antics of 'Sat in your Lap' show. But it all complements that voice and that songwriting style. As a result, it's one of the most complete (in many senses of the word) video packages you'll find.

Really, an object lesson in how to do it. ■ T*g*

demoT·A·K·E·S

STRIKING A BLOW for women is a solo demo from **Mo**. This six-track cassette showcasing her quite original and distinctive songwriting and singing is longer than recommended for demo tapes and this is reflected in the fact that it all could have been said in half the number of tracks.

The music falls to the experimental side of pop and the melodic side of experimentation. But not all the vocal work is in the charming vein of the opening cut 'Alone Again' – some tracks venture into a punk narrative allowing a more avant garde side of the synth work to come through.

In addition to the writing and singing, all the synth playing and programming (JX3P & PG200, Juno 6, CZ101), and drum programming (TR707), are Mo's own work. So too is the engineering of the recording in her own eight-track studio. All the synth programs are refreshingly different if not all of them comfortable. Another interesting percussive element is the use of triggered vocal samples from a Boss DE200 delay – a particularly fresh touch with the clarity of a female voice. The only disconcerting element is a woolly spring reverb that occasionally rears its head in the mix, not too high a price to pay for such an individual demo.

A good move with any demo is to package it well. Given a desk piled high with cassettes, which would you opt to listen to – an anonymous C60 with illegible scrawlings all over it or a professional looking package giving some indication the band are serious about their music? London three-piece **Siberian for Cowboys** have got that much sussed.

And to prove the theory works, the enclosed cassette contains three well written, played and recorded songs. 'A Man in the Know' rises from chic radio interference to betray electronic funk influences drawn from the likes of Chakk, Shriekback and Heaven 17. There's no information on the actual equipment in use, but David Palmer backs his lead vocal up with some guitar and keyboard work whilst Peter Chapman and Chris Hubert back him and their keyboards and guitar with their own backing vocals.

Drum machines and sequencers lock together to provide a solid groove behind razor sharp rhythm guitars and keyboard textures. The drum programs are tightly integrated with the dynamics of the vocal performance and, while the lead vocals themselves are lazy, their intimacy adds to an atmosphere already charged by found-source samples and synth interjections.

On a completely different track, **Robert Torre** claims to draw on the likes of Didier Bocquet, Tangerine Dream and Klaus Schulze for his inspiration. No surprise, then, to discover that he's also an analogue addict – an ARP Odyssey, Arp Axxe, Korg 700 and Logan String synth bear witness to that.

The reason these five tracks will fail to entertain anyone other than their composer is old-fashioned self-indulgence. Whilst the originators of this sequence-based textural style of ambient music had originality and current technology on their side, the approach adopted by today's imitators has neither. Current FM technology is great for atmospheric tinklings but hopeless when it comes to the essential filter-swept strings and resonant brass. Not only that, but it's all been done. Let's see how – step one: arrange between four and eight notes in a simple sequence. Step two: sort out a handful of string chords that can be interchanged at will and have textural rather than any musical value (start with modal chords, then chuck in the odd minor third and seventh after the first five minutes). Step three: a simple melody to occupy the right hand when not engaged in knob twiddling will help make the piece feel more valid. Finally, start the cassette recorder and sequencer and you're away.

The point is that there's no creativity involved. Turning Tangerine Dream's audience into a collection of similar sounding bands only means there's no longer an audience. ■ **T**g
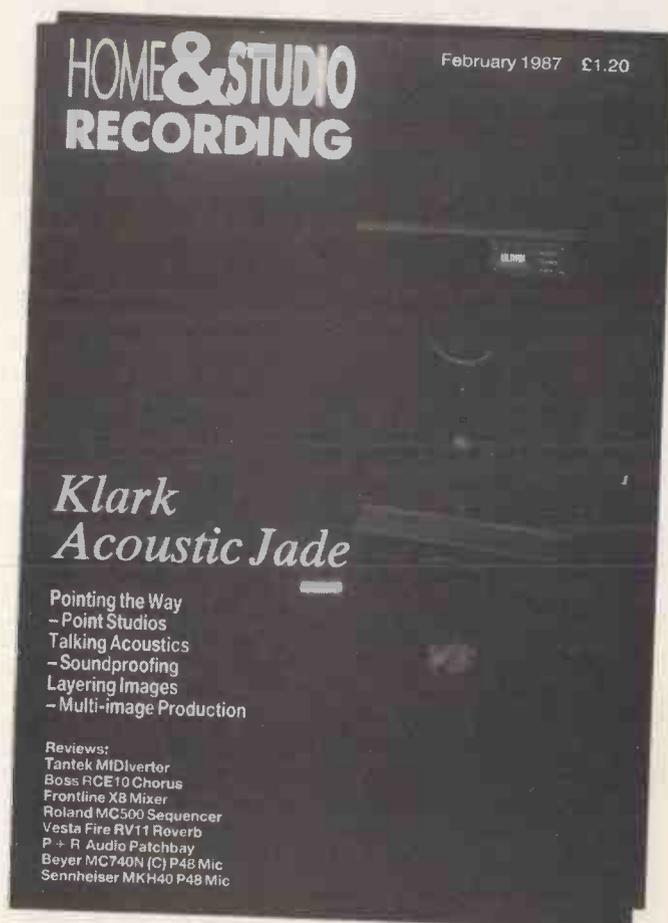
CONFERENCE
blues

Last year's International Computer Music Conference showcased some striking concerts and the usual crop of new technological developments. But are academic composers devoting too much time to the process, and not enough to the result? *Report by Ron Briefel.*

'**Empty Chair**' *was the title of a piece by George Lewis that used an "orchestra" of 10 Yamaha CX5 computers, live wind playing and interactive video*

AFTER A PEACEFUL and none too demanding couple of days at the Steim symposium (see report in last month's MT), I braced myself for what I knew would be an intensive and relentless onslaught of heavy-duty music research and even heavier-duty music at the International Computer Music Conference in The Hague.

Faced with an awesome schedule of double and triple paralleled sessions, I would surely get weighed down just trying to decide which ones to go to. After all, I knew I daren't miss anything worthwhile – I had to write a review of this whole thing!

So, armed with Walkman, thick notepad and camera, I took my place in the conference arena.

One of the first sessions at the Conference was devoted to notation and the graphical representation of music by computer. Some impressive traditional notation software was outlined by Dan Timis of IRCAM, and also by Donald Byrd.

But most interest centred around new interactive graphical notation and representation software. Peter Desain, for example, gave a paper outlining an ingenious graphics-based configuration and editing facility for driving a digital signal/event processor hardware device.

Most impressive though was MacMix, a software package for the Macintosh written by Adrian Freed for graphically representing, editing, mixing and processing digital audio and sampled data sound files. It can be used with a wide variety of hardware, so long as the correct communications protocol is set up. The software sends out storage and retrieval messages such as Record, Play and Edit commands and, of course, mix and amplitude control information.

Slices of sounds are stacked vertically on the screen as layered sound blocks, each of which has its own amplitude envelope, gain setting and "in" and "out" times.

All these parameters are graphically represented and can be varied by using the mouse. Sound blocks can also be shifted back and forth in time simply by dragging the mouse sideways. The blocks themselves can represent anything from a microsound to a long period of continuous sound.

You can audition the sounds as you are working on them for immediate aural feedback, and facilities also exist for incorporating spectral analysis and modification of sound blocks – though you need some external hardware to do this.

All in all, a rather impressive piece of software. It's currently being used extensively at IRCAM in Paris to edit and mix large sound files, while a company in the States has manufactured a CD quality storage/retrieval hardware device for use with the software. It should also be available suitably formatted for use with various commercial sampler units, and with luck, it will also get ported to run on the Atari ST.

Discussions after the papers centred around the need to develop more integrated multiple-notation systems that incorporate the best traditional notation software with the new graphical representation systems such as those by Adrian Freed and Peter Desain.

As much information as possible available on screen or instantaneously switchable is what is called for. Standards for porting and cross-compiling different software were therefore also discussed.

There were a number of papers on the synthesis of complex audio spectra. The most impressive of these was presented by Joseph Mark and Jolin Polito from Stanford. Using data reduction/analysis techniques on recorded piano tones, they have derived a synthesis model which is a complex combination of FM, additive synthesis and filtering.

They played examples of their model realised on a large computer system at Stanford, and I must say that down to the finest detail (such as hammer noise) it was

the best synthesised piano sound I've ever heard – and better than most samplers, too. All it needs now is for Yamaha or somebody to put it onto a chip and...yep, I want one.

Undoubtedly, there were representatives from commercial companies present at the ICMC this year, but unfortunately the presentations by them that I attended were a bit disappointing.

Roland, for example, laid on just about the most spectacular display of hardware seen at the whole conference. They installed huge rack units filled with every available rack-mounting Roland device, plus all the keyboards and a full complement of IBM composing and performing software. But alas, it was all more like a showroom than a conference presentation.

Just part *of the equipment line-up used by Roland as part of their computer music seminar. IBM-based systems formed the basis of the demo, but it could have been more informative*

Floris Kolvenbach, the man responsible for the showroom, spent most of the available time dishing out superlatives. Very little technical description and evaluation (of the sort that have made past ICMC presentations by commercial companies so successful) took place at all.

An afternoon session on networking at ICMC was to provide lots of proposals, but not very many concrete decisions. Proposals for combining MIDI, SMPTE software downloading and sound file porting were all discussed, as well as possible ways of incorporating them into a Local Area Network (LAN) for musicians to communicate with each other. (See end of feature for contact address).

Present at the conference from Britain was a contingent of composers from York Unversity, who are developing an interesting music workstation and networking system for the Atari ST. It'll include a lot of digital audio processing and editing facilities, as well as interactive composition and performance programs. They are already in close consultation with British Telecom over their networking proposals, and with

luck, we'll be able to bring you more details about the project shortly.

Other Brits present at the conference were Chris Jordan and Dr Kevin Jones, who both gave impressive demonstrations on the Music 5000 system for the BBC micro (see review in last month's MT). There were several rivals to the 5000 at the conference – like a rather clever system from New Yorker David Rayna – but it was a good opportunity to compare notes.

A large chunk of the conference (and its music) was to deal with new input languages and interactive input controllers for composition and performance. MIDI-Lisp and M-LOGO are two closely related languages that have been used in this area and were described at the conference. They can be used for both real and non-real time processing and manipulation of sound files, including MIDI data files. Graphical icons, windows and menus as well as actual physical objects such as MIDI keyboards and custom-built input devices are used to activate processes and access

pre-programmed functions.

David Wessel of IRCAM's small systems development team outlined the way he uses MIDI-Lisp in a piece that was to be performed at the conference. A Fairlight Voicetracker is used to extract pitch, rhythmic and dynamic information from a live saxophone played by Roscoe Mitchell. The information is converted to MIDI and fed to a Macintosh running MIDI-Lisp. A Yamaha KX76 keyboard manned by Wessel himself is connected to the computer and acts as a performance controller.

The system is programmed so that the lower half of the keyboard activates MIDI data Record commands. So whenever a key in this region is pressed, whatever MIDI data is coming in gets recorded until the key is released. The block of MIDI data associated with that key can then be transformed, augmented or processed in some way and is accessed at corresponding "play" keys on the upper part of the keyboard. The actual sounds are produced via a bank of MIDI instruments including Yamaha TX816, Akai S900 and Yamaha SPX90.

So the transformed/manipulated MIDI data is re-injected into the performance by the "keyboard player". MIDI-Lisp provides enormous possibilities for this interaction between live instrumentalist and "live event processor".

However, the concert itself showed that while the system is fascinating in its process capabilities, its aural results are less impressive. Most of the interest seemed to be in the relationship between what was controlling and what was being controlled, and with the identification and appreciation of processes for their own sake.

This certainly wasn't the case for Michel Waisviz from Steim, whose piece 'Touch Monkeys' made brilliant use of a set of input controllers called (imaginatively) The Hands. This system was first described in a paper at the 1985 ICMC in Vancouver, and outlined in my report in E&MM December '85.

The Hands are literally attachments to a musician's hands. They consist of plates containing a complex network of switches ▶

David Wessel *used sophisticated arrangement of two Macintosh computers, a Yamaha TX816 rack and an Akai MPX820 MIDI mixer as part of his ICMC concert performance*

▶ and touch-sensitive surfaces. They also incorporate a sonar transmitter/receiver pair so that when the performer (Waisviz) moves his arms apart, a varying "hand displacement" signal is generated.

All the signals generated by The Hands are converted into stipulated MIDI codes, which are then inputted to a computer-driven MIDI playback system – in this case two TX816 racks. The incoming data can trigger pre-programmed sequences or be subjected to event processing and trans-formation, just like David Wessel's MIDI-Lisp system. And via System Exclusive programming, the input signals can access voicing and function control parameters on the TX816s.

So in performance, the sonar "hand displacement" signal for example is mapped to the "data slide" controls of the TX816, which in turn access different parameters of the internal voices of each module. When Waisviz opens out his arms, he activates a massive layered cluster of sound which is dramatically distributed over a surround-sound loudspeaker system – each TX816 module (TF1) seemingly having its own speaker.

There were powerful moments aplenty in the performance. The DX voices used were the richest and most un-DX7-like I've ever heard, and this, together with the visual drama of seeing the sounds being generated, processed and distributed from the performer's movements on stage, helped to make 'Touch Monkeys' the musical high point of the whole conference.

It was also the best piece of music I've heard for a very, very long time.

There were several other systems that worked along similar lines, though. For example, Phillipe Menard's Synchronos made use of light-beam sensing and movement as input control. This system was quite pretty, and even dramatic when performed upon, but didn't approach The Hands for sheer impact.

Another system called Formula runs on the Atari ST, and was demonstrated at the conference by its developer, Ron Knivela. It's basically a versatile FORTH language-based program for generating and manipu-lating MIDI data. Incoming MIDI data can also be processed and can interact with internally generated MIDI data. The soft-ware is available on request (a small outlay to cover expenses might be required) from Ron Kuivela Music Dept, Wesleyan University, Middletown, CT 06457, USA – but you'll need to learn FORTH to use it.

FORTH was also the language used by Joel Ryan from Steim to program an orchestra of ten Yamaha CX5 computers for a performance of a piece by George Lewis called 'Empty Chair'.

Once again, music being played by a live musician (this time Douglas Ewart on clarinet, sax and bamboo flutes) is MIDI converted into a Macintosh that then sends out control data to the CX5 orchestra – which duly responds. I wasn't too impressed with the CX5 "orchestra sound". Maybe it wasn't quite working as well as it should have been, but it sounded just like a single DX7 most of the time.

Luckily, the piece was saved by a good light show and by a strange concurrent and interactive video performance from Steve Potts.

Finally on the musical front, there were some interesting pieces that made use of mechanically played instruments.

To start with, there were Dan Carney and Alex Bersten. These are the men responsible for convincing Bosendorfer to wire up one of their pianos to a computer – hence the system described in last month's MT. They are also responsible for several other wired-up efforts, including vibraphone and percussion instruments. At the ICMC they "performed" a rather frenetic series of pieces that made full use of their instruments – all playing together at virtuoso speeds. But in the end it came over as being a bit flashy and inconsequen-tial – another case of the system being more interesting than the music, really.

Clarence Barlow, on the other hand, performed a piece on the mechanical piano that was more subtle and musically rewarding. He started off by playing some mellow and romantic classical music, but gradually, pre-programmed mechanical outbursts started to take over, until finally Barlow was forced to retire while the piano rejoiced with a beautifully quirky and rhythmic variety of systems music.

There were a number of other musically enjoyable moments at the conference, but mostly I found myself dulled and disappointed.

I was hoping to find out some of the reasons for this by attending one of the last panel discussions of the conference. This was about Education in Computer Music, and the subheading "adjusting to the changing definition of computer music" sounded promising. However, I was dis-mayed when (for instance) the panel – responding to a question on the problem of the enormous "knowledge explosion" in computer music – all immediately assumed that the more you know, the better a composer/performer you'll be. In their eyes, the problem has more to do with "efficiency and clarity of instruction" than anything else.

Maybe if the discussion had centred on the very nature of the "knowledge explosion" in computer music and especially its existence within a social (and political/economic) musical framework, it would have been more interesting. As the performances at ICMC showed, a lot of computer music being produced today is bound up with research and academic concerns, rather than purely musical ones. If the discussions had been angled more acutely, they might have done something to change that.

One way out might be through the establishment of new forms of research, together with educational centres that are not so strongly linked to the traditional music college approach. Give these centres stronger links with equipment manu-facturers, not to mention radio stations, record and film companies, and they could give equal encouragement to all musical approaches – not just the western classical one.

Holland itself is making promising head-way in this direction. Both Steim Studios and a new facility set up in Utrecht by Johan den Biggelaar (an ex-Steim man, no less), who gave a talk at ICMC, are well on the way to presenting viable alternatives to many of the existing computer music structures, approaches and "knowledge bases" – whatever that may mean. ∎

Software writer Adrian Freed demonstrating his MacMix program, one of many music systems based on Apple Macintosh computer demonstrated at ICMC

songs from
FOUR STRINGS

His meandering fretless playing inspired a generation of bass guitarists. Now Mick Karn is back in the limelight with a new album and an impending live jazz tour. What lessons has he learned in all this time? Interview by Tim Goodyer.

"**B**Y THE TIME I got a proper bass I could already play – my enthusiasm enabled me to play. I really think that if your enthusiasm is strong enough it will carry you through. If you start with the worst, then you can only go up."

So says Mick Karn, once the enigmatic bass player with Japan, veteran of a long series of collaborative projects, and now eager to talk about his impending second solo venture – an album entitled *Dreams of Reason Produce Monsters*, after an etching by Goya. The record marks Karn's reunion with Japan frontman David Sylvian in the form of the LP's two vocal cuts, one of

which, 'Buoy', is currently on single release.

But let's go back to 1982, when the record-buying public was waiting patiently for an indication of Sylvian's post-Japan intentions. Oddly, it was Karn who first struck out on his own, with a solo single and accompanying LP – respectively 'Sensitive' and *Titles*. *Titles* also featured Japan's drummer and keyboard player – Steve Jansen and Richard Barbieri– and guitarist David Rhodes (who had previously toured with Japan), while 'Sensitive' found Karn taking the role of singer as well as keyboard player and bass guitarist.

As it turned out, neither the single nor the album attracted much attention from the public at large, but became popular with musicians – a situation that had arisen from Japan's own twilight existence between those of teen idols and innovative musicians. Which does Karn consider himself to have been?

"I think a bit of both. I thought of myself as a pop star because of my role in the band. We agreed when we started that there had to be a frontman at concerts and that fell to me, so it was very difficult to think of myself as just a musician when I was doing all the prancing around on ▶

stage. But then, when people first start to take you seriously as musicians, you get this real grudge – 'well, what's been wrong with us all the other years?'

"I think Virgin originally focused on me because it looked as if I was ready to carry on after Japan", he continues. "But there was a lot of pressure from them and from my management steering me toward being a pop idol, a singer and frontman. I went along with it for a couple of months before I realised what I was getting myself into. I don't enjoy singing. That wasn't what I wanted to do, so I spent about two years trying to break away from my contracts with Virgin and my management. That was probably the worst time in my life."

A collaboration with Bauhaus singer Pete Murphy followed in 1984. The project was christened Dali's Car, but it was a promising combination of talents that

"There was a lot of pressure, steering me toward being a pop idol. I went along with it for a couple of months before I realised what I was getting into: I don't enjoy singing."

never attained the success intended by the artists and predicted by the critics. A year earlier, a single with Midge Ure titled 'After a Fashion' had been met with greater enthusiasm all round.

"'After a Fashion' was made because I got on really well with Midge", Karn recalls. "But we intended Dali's Car to be a long-term project. I wanted to tour and hopefully be successful because we'd been around for a few years and people had got used to our names. Pete didn't want to tour and it seemed to defeat the object and, as time went on, we found that we both wanted to do completely different things with the project. Eventually it seemed

more sensible for us to go our separate ways – it was really very disappointing so I thought I'd take a break and concentrate on what I wanted to do.

"I didn't realise it at the time, but my attitude was quite an angry one at not having been accepted before. I suppose half the blame for its failure must rest on my shoulders because I wouldn't compromise – it had to be exactly how I wanted it to be – and that's why there are no solos, no highs and lows: it flows in a steady stream. That was intentional – I wanted it to be completely different to the format people found acceptable in a record. As it happens I find it quite unacceptable myself now, but I can still listen to *Titles* quite easily."

SO MICK KARN went through a period of self-study, and his name remained notably absent from record-release listings, concert programmes and even studio schedules for some time. Last year, though, Karn decided the time was right for another solo LP, only to find himself without a recording contract for the home market.

"I had talks with Virgin and offered to finance the album myself as long as they reimbursed me once I gave them the finished product. I think they saw I was serious when I said I was ready to put the money up myself, so they put the money up instead.

"It's been a long haul but here I am. It wasn't until I went around and looked at what the other record companies had to offer that I realised what a lot Virgin had – there really are some bad ones out there."

With the exception of 'Buoy' and 'When Love Walks In', *Dreams of Reason...* is an entirely instrumental album. It employs the percussive talents of Steve Jansen alongside the harmonica of Paul Jones, the brass playing of Derek Willen and the vocal input of *two* choirs.

"The first step I took was to get together with David on one of the tracks. We were both incredibly nervous when we got to the studio because we hadn't been in a studio for longer than we hadn't seen each other! But it went incredibly smoothly and turned out really well, because we both *wanted* to work together again.

"Then I found the recording wasn't going the way I wanted and I didn't know what to do, so I decided to ask Steve to help me out with the production."

The eight tracks that make up the LP vary wildly in style. 'Land' is moody and introspective, harking back to the indefinable oriental synth patches and whining fretless bass guitar that characterised Japan post-*Obscure Alternatives*, while 'Answer' is overtly classical in feel, with the Bury Church Classical Choir and the John Williams Music Ensemble being layered over a heavy rhythm track.

Mick Karn pleads ignorance when faced

with the finer points of technology, yet all the synth programming and playing on the new album is his own work – even if he's had a little help from a friend...

"If I'm having real trouble Rich (Barbieri) will help me out", Karn admits. "He's very good at getting the sounds that I need. I usually work from a sound that I have in my head, something that will create an atmosphere or a feeling.

"I hate things that are all synthesisers: they're great when they're sparse and they're doing their job properly, but for filling in holes I find it much easier to use a clarinet or saxophone. Then if they don't work I may turn to something else.

"I find programming most difficult in the studio, where it seems to degenerate into another language. I often choose the engineer I work with to be somebody I know will understand what I'm trying to say when I'm explaining a sound, because I usually use terms that aren't very technical, but more atmospheric."

FOLLOWING JAPAN TRADITION, Karn's main synthesiser is an ageing Oberheim OBX poly, which he has supplemented with Akai samplers for this album.

"I used an Akai S900 sampler which I found very good, and also an Akai X7000 that Steve had just brought back from Japan. If I need any other keyboards in the studio I usually just hire them in."

And the trusted Oberheim also plays an essential part in Karn's current approach to songwriting...

"Mostly I write on a keyboard or the bass: I find those form the most stable base. If the keyboard's not a piano then it'll be the OBX, which I've had for a long, long time and which I'm very attached to. I find that very nice to write with.

"I've got a Fostex eight-track setup at home that I first put my ideas on to, then I start all over again when I get into the studio – my demos are usually such bad quality there's no choice anyway – but it's the idea that's the important part. I've made that mistake before, where you spend so much time making it right at home that it's impossible to recreate in the studio.

"The way I work is to get the basis of the track down with bass, drums and keyboards, and then to use them in little sections. I like to think my approach to composition is quite classical, but maybe that's overstating the case. I approached the first album from a spontaneous point of view because playing was all I was used to within the framework of Japan. But to write something in that way doesn't necessarily work. My writing now is very much a process of discarding things that don't quite make it. Because of that, this album has taken about two years – on and off – to write.

"If I look back on the way I used to

record I realise I was always in a hurry; I hated spending too long on any one thing. With the first album I gave myself a deadline of a month to record and mix it because I couldn't bear being in the studio for too long. That's the way I felt I wanted to work.

"I suppose I've changed in that respect. Now I'm willing to give things as much time as they actually need. Looking back, I used to work like a stab in the eye – this is what I'm about, this is the way I play bass. Now it's a little more relaxed; I'm not so

> "I hate things that are all synthesisers: they're great when they're doing their job properly, but for filling in holes I find it easier to use a clarinet or saxophone."

much interested in writing and playing for other people. I'm not trying to do anything spectacular with the bass anymore. It's a lot less self-indulgent, even though it sounds as if it should be more self-indulgent.

"One of the things I've done over the last two years is teach myself to write music. I wanted to change the way that I write, and I thought that was the best way to go about it. Now I find it actually helps me with chord structures when I'm writing.

"I wrote the words for 'Answer', then scored them out. I didn't know if it was going to work until the choir were there with their sheet music. It was so good to find out I could do it, so I went on to write out some more parts for a trumpet. That's about as far as I've got with it at the moment but I'd like to take it further – I suppose the ultimate is to score for a whole orchestra. I still feel I approach the writing in an experimental way, so this is really only a beginning.

"I find it quite time-consuming to write ideas out, so while the ideas are flowing, I find it's better to get them onto tape. I also find that the instrument I'm writing on dictates what the track will sound like,

> "If I look back on the way I used to record, I realise I was always in a hurry; I hated spending too long on any one thing... Now I'm willing to give things as much time as they need."

even though I often don't want it to. I might write on a piano, hoping to change it to an electric instrument later on, but often I get so used to the sound of the piano that the rest of the track will build around it."

IDIOSYNCRATIC HE MAY have been, but outside of his own projects, Mick Karn has also found himself in demand for playing sessions – not because he has the usual session player's virtues of speed and versatility, but because producers reckoned his individual, moaning fretless bass playing would sell records...

"I will always remember a session I did ▶

▶ with Robert Palmer", he recalls. "It was for a French singer but the tracks had been recorded in America, so I went over there and laid my tracks down. But I'd played a little bit out of tune here and there – I wasn't really following their structure, but playing against it. Robert liked it so much that rather than have me do it again, he made the others change their parts. I'm afraid I wasn't very popular with the other musicians."

Yet far from increasing his confidence as a musician, Karn's session experience has been of dubious value – partly because it makes him nervous, and partly because it's resulted in a host of bandwagon-hoppers imitating his style.

"I find sessions nerve-racking. I'm quite a nervous person when it comes to working with strange people, I prefer to know that I get on well enough with them before I'm able to go in and play.

"And I hate to sound pompous but, when I listen to bass sounds now, I can hear my style on TV, on records, everywhere. It really pleases me, but it makes it difficult for me to know where to go now with *my* bass. A lot of the playing I hear is so good it would sound almost as if I was trying to copy it. I'd rather not compete, so my playing has taken a turn towards simpler things.

"On the new album I've tried to simplify everything and, to me, it sounds more confident. I'm not trying to prove anything to anyone any more, but I do miss the bass being completely up front. I hope the next album will be more of a compromise between this and the old Japan style.

"One of my biggest regrets, listening to old Japan material, is that because I was a 'known' bass player people would say: 'right, bass, let's see what we can do!', and did all sorts of things to it. Now I wish I'd

"Drum patterns are the most important thing in the world. Even when I'm writing on keyboards, the rhythm tells me how the track's going to turn out."

kept it dead straight. The bass is like the drums: they sound best as a basis sounding just as they should sound.

"I think what really changed my attitude was working with Steve Nye (producer). He once spent two days doing the bassline for one track, which I hated, but it really made me listen to things differently."

LONG, LONG BEFORE that, a young Mick Karn began his musical career...playing mouth organ in school assembly.

"Yeah, there were three of us", he grins. "We'd be given the music to take home and learn but I could never read it, so I'd rush in the next morning and ask one of the others to play me the piece, then I'd learn it by ear. When it came to the bassoon later on, I found that I still had the same approach – I honestly couldn't do

it until I heard someone else play it for me. After six months of playing the bassoon I auditioned for the London Schools Symphony Orchestra – and got in!

"The way I think all that has surfaced in my bass playing is to show me you don't have to read music, it can all be done with a tune in your head."

That approach stood Karn in good stead – he went on to learn saxophone, which still makes the odd appearance on his solo material – until Japan was formed, and he found himself without a standard "rock" instrument that he could play properly. Then again, maybe that was simply a blessing in disguise...

"When we first started Japan we did it in such a naïve way. We said: 'OK, we need a keyboard player – Mick, you play keyboards'. So I tried it for a couple of weeks but I couldn't handle it. I even tried being a vocalist for a couple of days, but in the end I found the bass. To start with I was quite upset that I'd ended up playing an instrument that's usually put in the background and forgotten, so I wanted to make it different and make it stand out. I feel pleased that I achieved that with it."

Yet as a bass guitarist Karn's first playing responsibility was (and continues to be) to the creation of the rhythm track. And in the absence of the co-operation of a live drummer for writing material, a drum machine would seem the obvious alternative – it's an area Karn agrees is overdue for an update.

"Drum patterns are the most important thing in the world. Even when I'm writing on keyboards, the rhythm tells me how the track's going to turn out. I've got a very old Roland TR606 that I use at the moment but I've got to get something else. Part of the reason I still stick to that and the OBX is that I can't afford to go out and buy the things I'd like to be able to break away from the old ways. Maybe next year when the album goes well..."

Looking back on his time with Japan Karn regrets there wasn't a further studio album, "to find out the direction we'd have taken after *Tin Drum*".

Looking forward, there's an exhibition of his sculpture (a parallel and sometimes all-consuming interest) set for Turin later in the year. But before that, it should be back to music and a tour of Germany with David Torn, Mark Isham and Bill Bruford playing modern jazz. Karn turned down the opportunity of recording with the same outfit due to his reservations about session work, and was subsequently replaced by Chapman Stick virtuoso Tony Levin. Now, however, he has decided to make his first live appearance in four years with them.

"It's the first time Mick's played jazz", confided one Virgin press officer over a glass of wine. "We're very excited about it".

And so you should be. ∎

STEPP DG1
Electronic Guitar

After five years of development, the Stepp guitar has been fined-tuned into a production version. Is this the best way of controlling synth sounds using a guitar style? Review by Rick Davies and Paul White.

The History

FOR YEARS, GUITARISTS have been looking for a way to play synthesisers without having to resort to learning keyboards. MIDI connections looked as though they'd be the answer to guitar players' prayers, yet many of today's MIDI guitar controllers have yet to overcome the tracking delay problems which prevent most players from diving in head-first into a guitar synth system.

Making life no easier is the confusion which every guitarist faces when trying to figure out which synth to use with a specific controller. The Roland GR700 system took care of the synth-matching problem by incorporating a JX3P synth into the pedalboard, but this still left the tracking problem unresolved. Yet there is little doubt that many more guitarists would get involved with guitar synths if only these matters could be worked out somehow.

The basic problem is that guitars are not naturally suited to controlling synthesisers. The easiest way to control a synth is via a simple bank of switches – the sort of thing that can be incorporated into a piano-style keyboard with no real trouble. The guitar, on the other hand, uses strings which not only

produce the fundamental pitch of the note being played but also generate a host of complex harmonics which shift in phase and vary in amount according to picking intensity, picking style and picking position. The harmonic content also changes as the note decays, and with some guitar styles it's even difficult to determine a note-on and a note-off time.

The first attempt at guitar control of synth sounds (adopted by a variety of manufacturers) was to use a more or less conventionally built guitar fitted with a separate pickup for each of the strings. Ingenious circuitry was then added to separate the fundamental pitch from the harmonics – no easy task, as the second harmonic often exceeds the fundamental in amplitude. Once the fundamental has been extracted, the pitch has to be analysed and then used to drive a built-in synth circuit or to derive MIDI codes to control an external synth.

But there is a limit to how successful this method can be, as there is an inevitable delay in measuring the string frequency before it can be converted into a control signal. This is usually at least two cycles at the fundamental frequency, which can add up to tens of milliseconds on the lower notes...clearly an unacceptable state of affairs for accurately timed percussive sounds.

Currently available pitch-to-MIDI converters all suffer from this limitation to some degree, and often mistrack when the player's picking style generates a high level of harmonics.

But to this system's credit, it can be applied to a standard guitar, and the guitar's own sound can be utilised alongside that of the synth. It can also be made inexpensively and in some cases, added to the musician's own instrument.

The SynthAxe worked around the tracking delay problem by eliminating it. Rather than attempt to decipher each string's fundamental pitch, the SynthAxe uses two sets of strings: one set works as part of a switching matrix which determines the notes fingered by the left hand, while the other set senses the strings being picked, strummed, or damped.

The SynthAxe also has other unique controls, but with a retail price at £6,995 excluding any synthesisers (a must), it has been within reach of only a small number of professional musicians.

The DG1

WHEN IT CAME to designing the DG1, the people at Stepp adopted a similar approach to SynthAxe; their instrument would not be a guitar as we know it, but a device to tell the synth what the guitarist was doing with his or her fingers. They then decided to build a synthesiser into the unit so that what the player gets is a ready-to-go package that only needs an amp before it can be used to make music.

So the Stepp is futuristic in design, but it does resemble a guitar in many ways – it even has a whammy bar. The body incorporates master volume and tune controls to bring it into line with any external synths, but there is no control over the level of such synths on the Stepp body itself.

What is not instantly obvious from a photograph is that, like the SynthAxe, the Stepp has two sets of strings, one for the left hand and one for the right. The strings are not tuned, and there are no pickups for sensing string vibration in the traditional sense. The string system is the heart of the Stepp player/synth interface and will be covered in detail shortly.

In terms of engineering, the Stepp guitar is made from plastic with a steel skeleton, and uses few (no, make that none) of the traditional guitar-making approaches. A removable knee rest makes playing easy in a sitting position, and the instrument is no heavier than a conventional guitar, so it can be played comfortably in a standing position for long periods. The quality of the engineering can't be stressed too highly, and the styling is obviously the result of a lot of thought and design expertise.

The floor stand, or Life Support Unit (LSU) as it's affectionately known, houses the power supply, the voicing electronics, the MIDI hardware and one of the three microprocessors that run the system. There are balanced and unbalanced line outputs, as well as MIDI In, Out and Thru.

The Left Hand

THE LEFT-HAND SET of strings form switch contacts with the frets, which are not metal but a specially designed semiconductor material. In fact, the inside of the neck is a sophisticated piece of electronic circuitry of which the frets are only a part, and which uses over 400 surface-mounted components.

▶ "The inside of the neck is a piece of sophisticated electronic circuitry of which the frets are only a part, and which uses over 400 components."

Once the string is in contact with the fret, the electronic circuitry monitoring the string/fret system can detect which strings are depressed and on what frets, and can also measure the string position on the fret. The initial string contact position is interpreted by the system as being the unbent note, so sloppy playing doesn't result in notes being bent slightly. On a guitar this hardly matters, but with synth sounds, any slight tuning errors are very noticeable. If the string is subsequently bent or if vibrato is applied, this information is transmitted to the onboard computer where it is turned into digital control signals for the internal synth and the external MIDI link. And to make the left-hand action simulate that of a conventional guitar, fast pull-offs or hammer-ons allow the note to carry on as it would on a regular guitar, but lifting the finger slowly damps the string.

Thanks to the unusual string geometry, the string-bending action does not follow the same proportions as a full-length single string, so correction is applied within the software to give bending more natural characteristics. Yet even with this refinement, it can still be difficult to get enough pitch-bend at the low end of the fingerboard, while it is easy near the centre. As the bend function is software controlled, the amount of pitch-bend can be widely varied and even made negative. The result of bending a string and hearing the pitch drop is odd at first, but can be used to great effect.

The strings themselves may be set at any tension that feels right, but they are all of the same gauge and must not be wound. Rotosound make the special strings needed for the Stepp, and the review model was fitted with .016" strings. This feels strange at first, but you soon get accustomed to it.

The fingerboard is dead flat rather than cambered, and this too is made of a specially developed plastic into which the frets are set. Red LEDs take the place of the more usual dot markers, and of course there are no tuning pegs.

▶ "The right-hand strings detect plucking and muting, but the electronics require that you play with an electrically conductive pick or with your fingers."

The Right Hand

THESE STRINGS DETECT plucking and muting, but due to the requirements of the electronics, you must either play with an electrically conductive pick or with your fingers; fingernails or plastic picks just don't work. This is because the action of making an electrical contact with the string opens a gate which measures the picking intensity via a series of capacitive transducers.

If you mute the string with the heel of your hand, the gate is again opened, but the new picking intensity will be zero so the note dies away at whatever rate is set up in the synth. As

the inbuilt synth has been designed specifically for use with the Stepp system, it uses an ADSM envelope rather than the more common ADSR, M standing for mute.

A metal pick is provided with the guitar, but as this might not be to every player's taste, Stepp are now considering offering a full range of conductive plastic picks. How about conductive nail varnish for Flamenco players, folks?

There are actually two playing modes. The first mode, Normal, is the conventional pick-with-the-right, finger-with-the-left method. The dynamic control of the right hand combined with the pitch control of the left (string bending, hammer-ons, and so on) pave the way for some pretty expressive playing.

The second, Keyboard mode ignores the right hand altogether and simply goes by the left hand fingering. This could be useful if your left hand technique is very clean, or if you happen to be Stanley Jordan. But introduce a bit of slop, and the resulting "incidentals" which occur can be annoying. Still, if you do watch your playing carefully, you can successfully pull off some hammer-ons and retrigger the DG1.

The Synth

UNUSUALLY (FOR THIS day and age), the Stepp uses an analogue synthesiser based on the popular Curtis chips – though these are under digital control. In fact, there are six independent synthesiser voices, each dedicated to one string. Thus each string produces only one note at a time, just like on a guitar. On the DG1, however, each string can play a completely different sound, which is completely unlike a guitar.

To ensure stability of tuning, the onboard computer continually retunes the synth oscillators when they are not in use. Two oscillators are provided for each note, giving a choice of square, triangle and pulse waveforms with the usual pulse width modulation and oscillator sync features that you would find on a sophisticated analogue synth.

As you would expect, the synth is programmable and there are 100 programs in all – 10 preset, 70 user-programmable, and a further 20 user-programmable Split programs which allow each string to play any of the 80 non-split programs. So, the first three strings could produce brass sounds; the fourth string, a bass synth sound; and the remaining two strings, a Clavinet patch. Similarly, each string can be routed to different MIDI channels if extra synths are to be added to the system.

Programs are selected with a rotary encoder, and an LED display shows the currently selected program number. At first it feels odd to select programs in this manner, since in order to get from, say, program 14 to program 72, you have to pass through 58 programs. But once you've used the DG1 for a while, using the system becomes second nature, and the sacrificing of random access to any program for a simpler control panel makes more sense. If you still insist on random access to programs, then any of the MIDI foot controllers (such as the new Yamaha model) would solve this by connecting to the LSU's MIDI In.

Because the DG1 guitar itself interfaces with the LSU only, and since MIDI isn't necessarily the ideal synth control language where guitars are concerned, the internal synth uses a specially developed digital control system running three times as fast as MIDI. This accepts independent bend and vibrato information from each string and causes no perceptible delays.

MIDI signals are generated for driving external synths but the choice of synth dictates just how successful this union will be. For example, many synths accept only common pitch-bend information, so that when you bend one string, all the other notes playing at the same time go with it.

The built-in synth can also be controlled via the whammy bar, which is in reality a sprung bar connected to a ceramic pot to form an assignable modulation controller. Any of the modulation facilities can be addressed via the bar, either singly or in combination, and the system supports six different modulation sources which may be routed to up to 13 destinations. The sources are the bar as just mentioned, the strm action, the fret position (individual string bend), the LFO and the two ADSM envelopes. The modulation destinations are amplitude, pitch, pulse width for both oscillators, sync, LFO rate, both oscillator waveforms, oscillator balance, oscillator detune, noise level, filter resonance and filter frequency. As you might imagine, that gives you a lot of scope both in the sounds that can be generated and the way in which you can control them.

Normally the Stepp is in Play mode. But press the Edit switch, and several of the parameter switch LEDs begin flashing to indicate which parameters may be selected. Press any of the flashing parameter switches, and that parameter LED stays lit, while others may start flashing. All this is a bit confusing at first, but in fact, this is the Stepp's own way of presenting parameter menus. The lit LED indicates the menu you have entered, while the flashing LEDs indicate what your options are. When you want to edit any parameter, press the Range switch, and adjust the displayed value with the rotary encoder. Any time you wish to go back a step, press either the '*' switch or the switch corresponding to the menu you're in. Considering the simplicity of the front panel, Stepp have done an admirable job of providing programming controls for such a sophisticated synthesiser.

How does it sound? Were this synthesiser to be controlled by a standard velocity-sensitive keyboard, it would impress with its extensive modulation facilities, two oscillators, and dynamic control. Sync patches, strings, brass, and Minimoog-type sounds abound in the factory presets, and even just in the brief time we spent with the DG1, we came up with some impressive sounds you'd be hard pressed to find on most analogue synths, DCO'd or not, these days.

Other external interfaces include a tape dump of programs, and there is talk of a customising system whereby users can have the bend scaling and other internal factors modified to their specific requirements. This would be done by the dealer, and new information entered into the system via MIDI where it would be permanently stored on battery backed-up RAM.

One last but rather neat touch on the DG1 is the Chord function, which enables you to program open tunings into each patch. Each string can be detuned either one at a time, or by simply selecting the Chord function, fingering a chord, strumming the right set of strings, then pressing the Chord switch. These open tunings are reflected in the MIDI data sent out to other instruments, so that the slave synths play the same notes as the DG1. And since the DG1's strings aren't meant to be heard, there is no annoying conflict between the DG1's programmed tunings and what you'd expect to hear from the guitar itself. A limitation in the design's favour, perhaps?

The Comments – PW

SO YES, THE Stepp system avoids most of the problems found in pitch-to-MIDI guitar systems. But it would be wrong to think that a guitarist could just pick it up and play it without making some concessions; it is, after all, a new instrument that just happens to make use of the guitarist's way of playing.

Let's start with the fact that the Stepp can sound very different from any normal guitar. Because you can set up sounds with very long decay times, for instance, you may find that when you remove your finger from a string too quickly, the note continues to sound at the pitch of the open string. This is because the internal system is interpreting your action as a pull-off, rather than as a damping action. This is a particular nuisance when trying to make quick chord changes.

And when you do successfully damp a note by taking your finger off more slowly, some sounds end in a discernible thump which is difficult to avoid. I heard this effect on an Alan Murphy demo, so it isn't just my sloppy playing.

Another limitation is that pull-offs (and hammer-ons) don't work with short percussive sounds, because the action of doing a pull-off or hammer-on doesn't retrigger the sound, but merely prevents the release phase of the sound from executing. If you want to make extensive use of this technique, you need to choose a sound that has a high sustain level.

In other respects, though, I have to say that the Stepp tracks accurately and consistently, with none of that random yodelling that you occasionally get with pitch-tracking systems. But there are occasions on which insufficient string pressure results in the note jumping between the one fretted and the open string note.

The lack of any delay makes a refreshing change, especially when using short percussive sounds, and the response to playing dynamics is excellent.

I found that choppy playing styles didn't translate very well, though, even if you set up the right sort of sound with fast attack – yet slower, more melodic passages sounded quite superb.

What I couldn't do, in the short time that I had the instrument for review, was come to terms with the way the string-bending effort produced little result at the low end of the fingerboard, yet behaved normally in the middle. Perhaps the user customisation option will get around this.

From my personal viewpoint, the Stepp will never be the ideal instrument because I like to be able to switch between my natural guitar sound and the synth, or even to use them together. If I had a DG1, I could do things with it that I couldn't do with any other guitar synth, but I would feel forced to divide my music into songs that used synth and songs that used guitar. For that reason and that reason alone, I would still use a pitch-tracking system for gigs and live with its limitations. In the studio, though, it's a completely different story. Here you can overdub both real and synth guitar parts where they are needed, and the Stepp's superior performance can be utilised to the full.

The Stepp isn't going to be everything to everyone, but then, I can't imagine any guitar-controlled system will ever be that. As stated earlier, the guitar is probabably not the first choice as an instrument to use as a synth controller, but Stepp have come up with a self-contained instrument that most guitarists could come to terms with, and which can be used to produce music previously impossible on either guitar- or keyboard-controlled synths.

Stepp would have us believe that playing their instrument is a bit like changing from a family saloon to a racing car, but I see it differently, certainly from the playing point of view. If you can imagine moving from a comfortable modern car to a classic vintage car, you would be nearer the mark. You have to learn to handle the non-synchro gear box, you have to adapt your driving technique to its peculiar little ways, and even then, you'll still be greeted by the occasional crash of gears when you least expect it.

The Comments – RD

YOU CAN'T ALWAYS judge a synth by its voices alone, and the Stepp especially is no exception. The DG1's synthesiser makes some impressive sounds, and even though I'm a bit surprised that Stepp chose analogue oscillators over digital for the DG1, I'm happy to hear those Prophet-like sync sounds again.

But what really impresses me is how the expressive control of the DG1 makes these sounds appear that much more distinctive. And one of the reasons for this is that the Stepp is one of the few electronic instruments which allow polyphonic pitch-bend or modulation, thanks to the fret modulation source. Routing the fret source to the filter cutoff or to the oscillator 2 tuning offset (while sync'd to oscillator 1) produces some amazing inflections, yet the DG1 still sounds like a guitar, simply because of the phrasing guitarists are accustomed to using.

As a MIDI controller, the Stepp is flexible enough to drive several synths independently, and the enabling of MIDI controllers, program changes and so forth make it as powerful as any keyboard controller I've played. The DG1 may not be intended as a controller for external voices, but it'll probably get a lot of use as one. And it'll be interesting to hear some of the sounds players will make when the DG1's analogue voices start blending with samplers and other digital synths.

Programming the Stepp may be a challenge for many guitarists, but if independent programmers take to the DG1 as they have with the synths that came before it, there should be plenty of sounds available before long. And since the DG1's programming controls are a bit cryptic, I won't be surprised if some editor/librarian programs start popping up for the usual computers.

Since the DG1 requires a conductive pick to trigger properly, I can foresee that many guitarists may have a hard time initially. Similarly, there are many left-hand techniques which do not translate perfectly from normal guitar to the DG1. It would be nice if hammer-ons retriggered the synth voices, and bending strings in the lower frets could be easier. Since fingernails aren't very good conductors (no excuse for sticking them into power outlets, though), fingerpickers will need conductive finger picks, or shorter nails so they can use their fingertips. That aside, I couldn't perceive any trigger delays, and this alone makes the Stepp a joy to play.

Keyboard players have been changing their techniques to get the most out of their instruments for years now, and will probably continue to do so as long as new instruments emerge. Nobody would consider playing a strings sample the way they would an acoustic grand piano, for example.

Of course, guitarists will have to alter their playing technique to get the most out of the DG1, but considering the advantages, I think plenty of guitarists will be prepared to do just that.

The DG1 is a very expressive instrument, and though its retail tag keeps it beyond the budget of the majority of guitarists, I can see it making its way into the hands of many guitar players who are really serious about marrying their technique with new sounds. ∎

Price £3,500 excluding VAT
More from Stepp, 8 Primrose Mews, Sharpleshall Street, London NW1 8YT. ☎ 01-722 5448.

*sight*R·E·A·D·I·N·G

'Synthesizer Basics'
by Dean Friedman
Music Sales, £11.95

A newcomer to any subject is faced with the daunting question: "where do I start?". Let's face it, try as we might to make Music Technology an interesting and understandable magazine, there are those seeing it for the first time who will take a little convincing that it *is* all written in English and not some little-known Catalonian variant. Enter Dean Friedman's 'Synthesizer Basics'.

Before starting his technical revelations, Friedman has allowed himself a brief look at the history of the synthesiser. Too brief really as it's far more interesting than this little appetite whetter would have you believe. But, formalities over, 'Synthesizer Basics' begins with sound waves and pursues the electronic generation and modification of sound through its many analogue stages before starting all over again with FM synthesis. There's even a section devoted to analogue versus digital...

The text is accompanied by photographs and informative line diagrams throughout that help make it more friendly to the underconfident reader. It is also littered with humorous cartoon illustrations either for explanation or to lighten what would otherwise make heavy reading for the novice.

But one of the best pieces of advice Friedman offers is to be found in the Preface: "...in synthesis, as in sex, it is very important that you get as much 'hands on' experience as possible." I couldn't agree more.

One problem with a book of this sort is that the technology is advancing at such a rate the text quickly becomes dated. Unfortunately the writing is already on the wall for 'Synthesizer Basics' as it quotes the Prophet T8 as the only synthesiser equipped with release velocity sensitivity. But at least this doesn't devalue the information given on the nature of sound and the basics of synthesis.

As with many other American publications there are also minor differences between their terminology and ours that only serve to further complicate the situation. A case in point: "Before there were digital circuits, there were electronic circuits". So a digital circuit isn't an electronic circuit? Fortunately these discrepancies are few and far between and shouldn't rob the book of its value. Before investing your 12 quid though, it may be prudent to shop around as there are one or two other similar books available – and they may not cost you quite as much. ■ **T**g

'The New Complete Synthesiser'
by David Crombie
Omnibus Press, £7.95

Dave Crombie's original 'Complete Synthesiser' first saw the light of day in 1982. Now, a lot can happen in four years (has happened, in fact), and Crombie has quite rightly seen fit to update his book to take account of the major developments. Thus
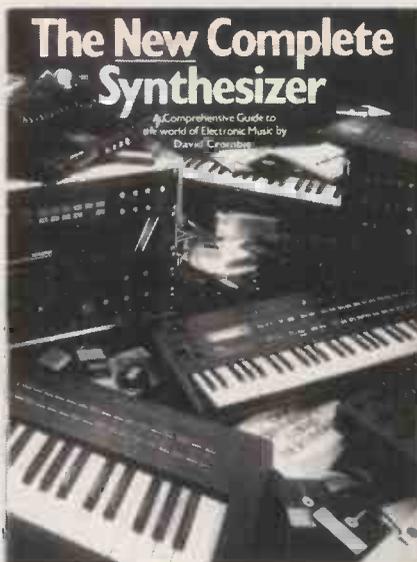
alongside the familiar subtractive synthesis there are chapters on Yamaha's FM synthesis, Casio's Phase Distortion synthesis, and on additive synthesis and sampling in general. 'The New Complete Synthesiser' isn't a history of synths and synthesis, but a practically-oriented guide to the possibilities of using synths and the various major methods of synthesis available.

Crombie begins his book with a lengthy chapter on the basics of acoustics and electrical circuitry before going on to discuss the concept of synthesiser voices and the various generic types of synthesiser available. There then follow the chapters on synthesis and sampling, after which Crombie covers controls and controller techniques, interfacing and accessories, and computers and music.

Crombie rounds off his book with a thoughtful chapter on 'the art of synthesis', which he divides into four categories (imitative, impressionistic, abstract/imaginative and effects), and a brief consideration of MIDI, and provides a very handy six-page glossary of technical terms.

The strength of Crombie's book lies in its providing a concise overview of synths, synthesis and sampling. The writing style is lucid throughout, and the text is always broken up into easily manageable segments. Credit must also go to the book's designers, who have given it an uncluttered layout and marvellously clear diagrams (I particularly like the pseudo-3D ones), which make it a pleasure to read.

If you're a newcomer to synthesisers and are looking for a practically-oriented introduction to the subject, look no further than Crombie's book. More experienced synthesists will find the book handy as a ready reference. ■ **S**t

'The Casio CZ Book'
by David Crombie & Paul Wiffen
Music Sales, £5.95

The current tendency of the larger synth manufacturers for developing entire families of synths has been partly responsible for the spate of dedicated user guides coming onto the market recently. Though written independently of the manufacturers, these books are usually designed to complement existing operation manuals, sometimes taking over where manufacturers' data leaves off, sometimes providing a different approach to explaining programming techniques.

'The Casio CZ Book' by David Crombie and Paul Wiffen (the latter name already familiar to MT readers), goes some way to serving both functions – and providing quite a bit more besides.

With early chapters explaining the basic physics of sound, and introducing the fundamentals of synthesis, Dave and Paul certainly can't be accused of jumping in over anyone's head. And with well-structured (though by necessity, rather concise) chapters on the principles of Phase Distortion and MIDI, the reader is well-prepared to take onboard the complexities of programming Casio's current family of digital instruments.

The members of that family, the CZ101, CZ1000, CZ3000, CZ5000, and CZ230S keyboards, the RZ1 drum machine and SZ1 sequencer all have their own sections complete with the technical specs reprinted here, which will come in handy for comparing specifications if you're thinking about buying into this range or upgrading your CZ.

I have to say that I wouldn't want to try and familiarise myself with a Casio instrument armed only with 'The Casio CZ Book', but it certainly makes a worthwhile accompaniment to the manufacturer's info which you get with the instruments. In fact, given the dryness of the average Japanese instruction manual, this book could prove essential bed-time reading for all Casio synth owners. ■ *Nigel Lord*

S P A C E

As interest in digital reverberation continues to grow, how can we compare the machines available, and how do digital approximations relate to the real thing? *Text by Paul White.*

TO MANY MUSICIANS – especially those without huge salaries for whom the likes of AMS, Yamaha REV1 and Quantec Room Simulator systems have been nothing but a far-off dream these last few years – digital reverb is something of a new consideration. But now that budget digital reverb systems are here (and in growing numbers), the whole subject of what makes them tick – and what separates one model from another – is receiving a lot of attention for the first time.

Before embarking on a detailed discussion of the intricacies of digital reverb, though, you have to know something about its natural equivalent.

To begin with, imagine that somebody suspended above the ground – and well away from any walls or other solid boundaries – claps their hands. When this happens, the sound waves (usually screams, in this case) travel outwards in a spherical fashion and never return. But seeing as being suspended in mid-air is not normally a tenable position for the human form (due to the intrusion of gravity, among other things), we tend to spend most of our time close to the ground and, when in buildings, close to walls, floors and ceilings.

These walls, floors and ceilings interact with soundwaves, absorbing some of the sound energy and reflecting some, with the reflections being subject to re-reflection when they encounter new boundaries. In a typical room, our handclap would bounce from the walls, causing multiple, closely spaced echoes. And within a very short space of time, the number of echoes would be so great that individual echoes became indistinguishable.

Because of the absorptive qualities of walls and other boundaries, these echoes tend to die away fairly rapidly as the sound energy is converted into heat. And seeing as high frequencies tend to be absorbed more readily than low ones, the high-frequency part of the sound decays more rapidly than the low frequency part. Then there's the fact that because the air itself absorbs high frequencies due to the viscosity of the molecules, it's clear that the further the sound travels, the lower its high frequency content will be.

In a large hall – where the reverberant sound reflections travel hundreds or even thousands of feet before being completely absorbed – the tail end of the decay may contain little or nothing above a couple of kHz. In a smaller room, the reverberation time may well be so short as to be unnoticeable. But a trip to an acoustically dead, soundproofed room will soon convince you that a substantial part of the sound you hear in everyday life is in fact reflected, not direct.

Our brains make use of this reflected information to locate sound sources, and also to make judgements about the size and nature of the environment we're listening in – especially in the dark, where information from our eyes gives no clues as to the nature of the room.

But because we do all this quite subconsciously, every day of our lives, any *artificially* generated reverberation must be very convincing if our brains aren't going to reject it as an imperfect fraud.

From this short analysis, we can break the characteristics of reverberation down into more manageable sections which give us a clue what we need to do to synthesise it.

Going back to the handclap-in-a-room situation, the first thing that happens is that after a short delay (caused by the time it takes for the sound to travel to the nearest boundary and back), the sound starts to bounce from wall to wall. And because sound travels at around 1100ft per second, these early reflections can be discerned as separate echoes in a large room or hall.

The spacing and magnitude of early reflections depend on the physical characteristics of the room, but they decay in amplitude and lose high frequencies as time goes on. These reflections then build up into a dense clutter, which is what distinguishes reverb from simple echo. The high-frequency content decays further and the overall level decays, ideally in an exponential manner. The rate at which the clutter builds up and decays depends on several things: the size of the room, the materials from which it's built, its geometry, and objects within the room such as soft furnishings and people, which cause the decay to be more rapid than when the room is empty.

Research has shown that the brain needs a minimum density of between 1000 and 3000 individual echoes per second before it will accept a sound as true, natural reverb. So an unaided multi-tapped delay is hardly a practical method of generating the effect artificially, especially as you need a different tap arrangement for each different reverb type.

Early Research

BACK IN THE 60s, an incredibly clever man by the name of Schroeder delivered an AES paper on artificial reverberation. He suggested that certain building blocks could be combined to simulate the effect, and that these building blocks could be generated by computer. This work was remarkable, not least because the computers then available were a good deal too slow to generate reverb in real time.

Later on, somebody equally clever called Moorer built on Schroeder's work, and the combined outcome was the definition of a series of different kinds of filter, which could all be used as building blocks to help simulate natural reverberation.

The first of these blocks is called an all-pass filter, used singly or in cascade to generate repeats of a signal without modifying the frequency response, an

1. Sound reflections within a room.

LOUDSPEAKER

DIRECT SOUND

LISTENER

Sound energy lost at each reflection (frequency dependent)
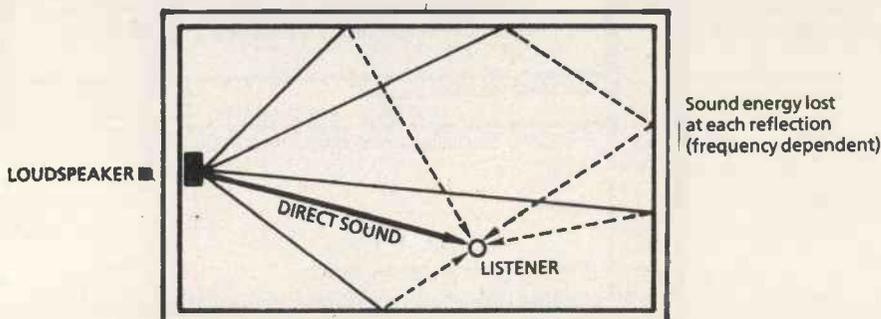
the final frontier?

important factor in creating reverb that is free from unwanted colouration. This is simply a delay block with feedback, plus a feedforward path which makes the block different from a simple comb filter. Comb filters are used in parallel banks to create the clutter of reflections, while all-pass filters diffuse them further.

Other building blocks include the digital filter, to simulate the more rapid decay of high frequencies; and a multi-tapped delay or finite impulse response (FIR) filter, to simulate the early reflection part of the sound.

Exactly how these blocks are interconnected is a closely guarded secret of all digital reverb manufacturers, but most use Schroeder's and Moorer's research as a starting point. Many designers vary the arrangement and parameters of their building blocks in the left and right channels, so that a mono input can still give a convincing stereo output.

In the case of digital reverb, each of these building blocks exists only in software, so a new program will give a new reverb effect using exactly the same hardware.

The main problem is that to create the density of reflections needed while retaining a respectable audio bandwidth, the digital reverb's computing system needs to be capable of performing very fast calculations.

Top-end digital reverb systems generally offer good bandwidth, well-designed reverb algorithms, user variability of parameters, and user programmability. MIDI patch control is also fast becoming a standard, as are special effects such as gated and reverse reverb.

Let's take a closer look at the kind of variable parameters you can expect these machines to offer. First, the early reflection pattern and spacing is variable because this creates the basic character of the synthetic room or space. A variable pre-delay is also common, as this separates the reverb from the initial sound, to create a sense of space.

Next we come to the clutter section comprising dense reverb, and here we need to be able to vary the decay time and the high frequency decay characteristics. If we can vary these basic parameters, we can simulate anything from a small room to a vast hall. By increasing the high-frequency decay time we can make a room sound brighter to simulate, say, a tiled washroom. Conversely, we can damp the high frequencies heavily to simulate rooms filled with soft furnishings.

It shouldn't come as a surprise to learn that as soon as you get below state-of-the-art price levels, you come up against machines that offer slightly less than state-of-the-art performance – though as with everything else, each different design team

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has its own set of compromises which it chooses to adopt.

Now, *all* these compromises incur penalties of one sort or another, and don't let any salesman talk you into believing otherwise. It's really just a question of which compromise makes the smallest impact on your personal requirements.

Current Options

FIRST, YOU CAN opt to use less than 16-bit sampling resolution. This worsens signal quality and noise performance, but you'll find that many low-end reverb units do in fact utilise 12-bit sampling, or less.

Second, you can opt for a machine with a

2. Build up of reverberation.

DIRECT SOUND   EARLY REFLECTIONS   REVERBERATION
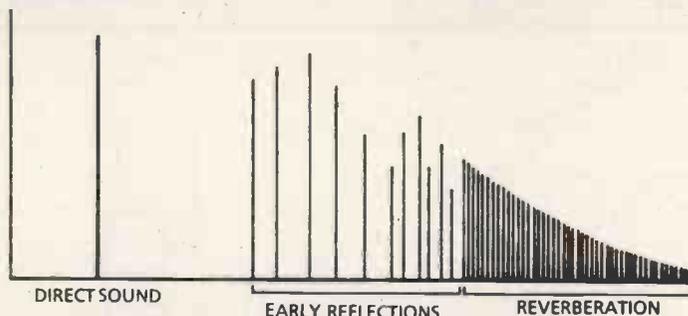
slower built-in computer and consequently reduced bandwidth – though in this case, you should look for at least 10kHz bandwidth for serious work so that you can create reverb brighter than you'd find in nature if you want to.

If the machine you're interested in does offer a decent bandwidth, chances are its designers will have ditched all unnecessary demands on the computer's time, such as programmability, fancy parameter adjustment and flashy displays. Alternatively, they may have kept all these but tried to simulate reverb using fewer building blocks, giving a less sophisticated reverb algorithm. Let's look at the consequences of these two main alternatives.

First off, if you decide to keep all the programmable functions and compromise the reverb algorithms to keep the cost down, reverb density is likely to suffer. Instead of a smooth decay, the widely-spaced coarse reflections give a grainy texture to the reverb, and the treatment
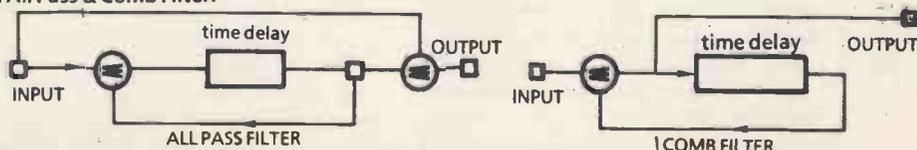
of percussion sounds can produce a sound like ripping cloth as the individual reflections appear.

Using an insufficient number of building blocks or poorly designed algorithms can also lead to unnatural colouration of the sound, which usually takes on a ringing or metallic characteristic. You may also notice that the final decay of the reverb isn't too smooth.

On vocals these problems may not be too noticeable, but on percussion, their effect is quite a bit less pleasing – more than likely, your ears and brain won't be convinced by what's being fed to them, and you'll perceive the result as crude and artificial.

Now, this trashy, metallic sound is used to good effect by producers and remix

engineers on modern dance records, but it's worth remembering that while a good reverb unit can be made to give you trashy sounds, a poor one can never give you good, natural sounds.

The other approach – limiting the flexibility of the effect by offering only a set number of presets – gives the system's computer a chance to concentrate only on a few specific tasks, so the preset treatments stand a good chance of being high-quality.

On the other hand, losing programmability prevents you from utilising reverb treatments that are subtly different from everybody else's – and that, in this era of preset digital synth sounds and factory samples, could be important. And if you're a studio *owner* and some clients ask if their reverb can have "just a little bit more" of something, you could well be stuck.

Then again, it wasn't so long ago that top studios used plate reverbs, where the only things you could alter were the ▶

3. All Pass & Comb Filter.

INPUT   time delay   OUTPUT   ALL PASS FILTER   INPUT   time delay   OUTPUT   COMB FILTER

overall damping and the EQ. Nobody complained. A reverb offering as few as a dozen presets could give you a set of treatments ranging from a tight live room to a massive hall, in small enough steps so as not to leave you wanting a sound you couldn't get. And you can always add further EQ or experiment with gates to alter the decay shape.

Remember that if the basic sounds are good, you'll be able to live with them more easily than you would with a machine that lets you program 10,000 permutations of

hard-pushed to find a current model of digital reverb that didn't offer them. But the variation in quality of these effects is incredibly wide.

A gated reverb should be dense, solid and exciting...and I've heard some truly awful ones that sound more like dried peas being dropped on a steel plate than true gated reverb.

Reverse reverb is less commonplace but still important. It should be clean and capable of leaving vocals intelligible, and of giving the impression of a sound played in

live, you'll probably get away with something that sounds a little less sophisticated.

If you go for an all-singing, all-dancing unit at a bargain price, listen carefully for the sonic problems mentioned above. And don't be fooled by the infinite number of parameter variations you can program; if the basic sound isn't good, there's nothing you can do about it, no matter how many permutations you try.

Remember too that within a mix, the difference between one reverb program and the next one may appear negligible,

4. Finite impulse response filter.
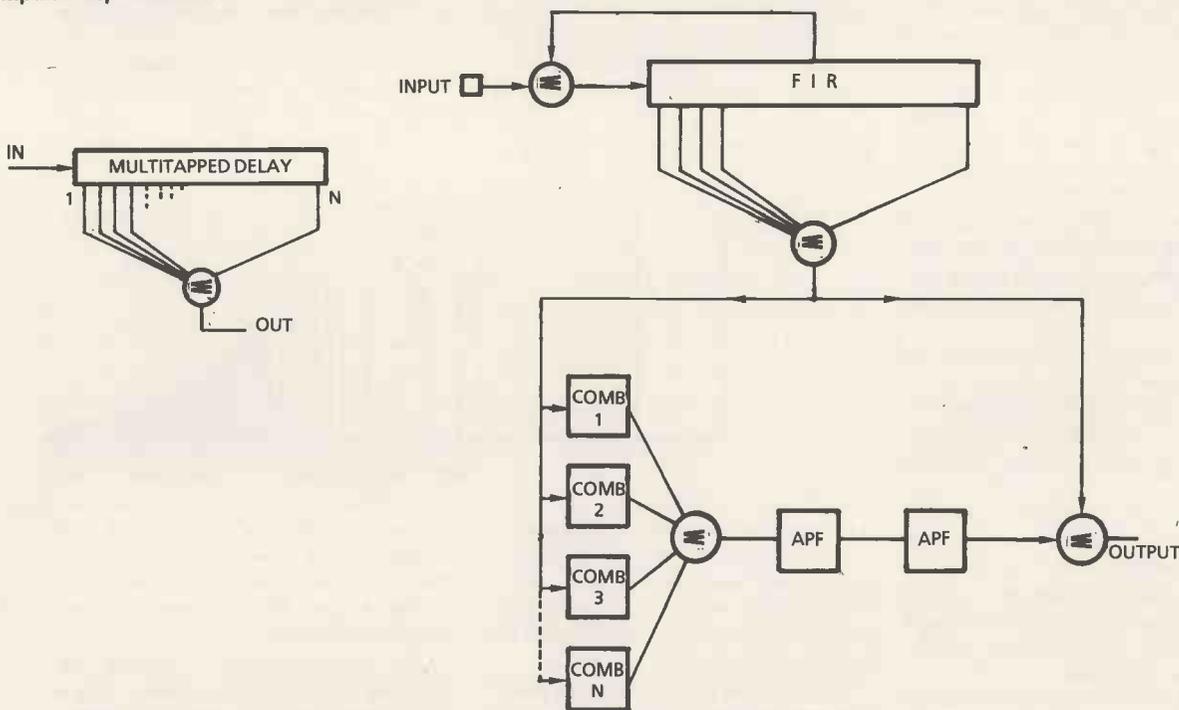
reverb, all of which sound unnatural.

So how do you know what is good digital reverb and what isn't? Simply, use your head. Reverb can't be judged on spec alone, and things like naturalness and stereo spread are totally subjective. Choosing a digital reverb is more akin to wine tasting, and the more models you listen to, the more differences you learn to recognise. Rather than using cheese to take the taste away, try washing your ears out with a burst of white noise between models.

If you listen to any good reverb in a darkened room, you should be able to visualise the environment in which the music is being played. A snare drum or handclap sound from a drum machine will soon show up ringing, coarseness and other vices that prevent the reverb from sounding natural.

Gated and reverse sounds are so much a part of modern recording that you'd be

reverse with the start of the sound clearly audible at the end. Of course the sound isn't *really* played backwards – it's just an electronic conjuring trick. But if it doesn't sound authentic, there's no point using it.

Summary

YOU CAN HAVE a digital reverb unit that is flexible and that sounds good – if you're prepared to pay for it. But if you're looking at the very bottom end of the market, you're going to have to lose out in one area or another. The most natural-sounding budget reverbs I've used have offered only a range of presets adequate for live use and for small studio applications.

As a general rule, you need to place sound quality above all else if you're going to be processing drum sounds in the studio. For vocals and keyboards, especially

even though they may sound totally different when tested in isolation with just a single snare-drum beat.

Don't be conned by long reverb times, either; you're unlikely to use anything longer than five seconds in normal music work, and the most widely-used settings are shorter than two seconds.

Alternatively, you may be tempted by a unit that offers other treatments such as delay, chorus and flanging. This is fine if the reverb is good to begin with (some units show compromises in all areas), but bear in mind that unless your chosen system allows you access to several effects simultaneously, you'll be stuck if you need to use reverb and flanging together at a gig, say. In the studio this limitation isn't so serious: you can use one effect when you're recording and another when mixing.

Finally, get what you need, not what you think you want. Close your eyes and let your ears decide. ■

INTELLIGENT MUSIC
JAM FACTORY
Software for Apple Macintosh

 File   Edit   Options

```
P1                100%        C1      P2              100%
Silences: Orig Durs: 50%     Movie  Silences: Orig Durs: 50%
10 Pct   2 Cycle   0%               20 Pct   3 Cycle   0%
   Skip     Lead  Order 1 2 3 4  Rec Ctrl   Skip     Lead  Order 1 2 3 4
   Sus      Follow      Pitch Dur  1            Sus      Follow      Pitch Dur
Time:      >/4               2   Time:     >/12
2 Base                      3   1 Base
+1 Phase                    4   +1 Phase
73 Swing                    *   75 Swing

* Jam Factory File: Blue Moon        Record Play TransP Ctrl Echo OutCh InCh Pgm
                                   P1                                 1    1   22
Go  Stop  Pause  Sync  Clear       P2                                 5   All  20
                                   P3                                 8    1    6
Tempo |||||||||||| |||||  4 /click P4                                 4    1   32

P3                100%        a  b   P4              100%
Silences: Orig Durs: 50%     c  d   Silences: Orig Durs: 50%
0 Pct    4 Cycle   0%               0 Pct    1 Cycle   0%
   Skip     Lead  Order 1 2 3 4  e  f    Skip     Lead  Order 1 2 3 4
   Sus      Follow      Pitch Dur           Sus      Follow    Pitch  Dur
Time:      >/12              g  h   Time:    >/12
1 Base                      i  j   2 Base
+3 Phase                    0 Phase
50 Swing                    53 Swing
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Once upon a time, computer software simply recorded music and played it back, but now it can improvise music of its own. Are the results listenable? Review by Jim Burgess.

IN A CROWDED music software market where hundreds of companies compete for the consumer's cheque-book, sheer originality scores big points. After all, how much does the world *need* yet another sequencer program? The chances of a new program's success are that much better if it offers something so revolutionary that it simply cannot be compared to anything else in existence.

Case in point. Intelligent Music of Albany, New York, USA. A fitting name indeed for a company that produces a new breed of music software: composition programs designed not only to record musical performances, but to permit the user to manipulate, control and interact with the performance of a composition in real time.

Intelligent Music's first two offerings are formidable. Jam Factory, reviewed here, is an improvisation-oriented performance program. Next month we'll take a look at their second program, M, which is a music processor that accepts input from a variety of sources and permits the real-time manipulation of a performance by means of controlling a wide range of musical variables.

Both programs are written exclusively for the Apple Macintosh, and take advantage of the type of graphic control capabilities that have made the Mac such a favourite among well-heeled music software users.

Jam Factory uses four "Players" to analyse what you play and then creates "intelligent improvisations" consisting of

likely variations on what you originally played. While Jam Factory is playing, you can alter the performance of each individual Player in a number of ways.

You "teach" Jam Factory's four Players how and what to play by recording MIDI data into them from any MIDI source. Their improvisations are based on the musical material you give them to work with; so the less you give them, the more predictable the results.

The basic musical material you give the Players is placed in what are known as Transition Tables. These are designed to keep track of the transitions between notes in such a way that each Player can perform intelligent improvisations based on the data that's entered into it.

Precise real-time control is offered over the performance nuances of each Player with a range of control functions that includes the ability to alter the timebase, accent and duration patterns, the swing factor and even the percentage of silence.

All performance parameters may be altered while Jam Factory is playing, either directly on the screen or with the program's unique Input Control System that lets you use any MIDI controller to access Jam Factory's functions via MIDI note commands.

Combinations of Player settings may be stored as a Preset, and you can switch from one Preset to another without stopping the program. This way you can create

Map	1	2	3	4	5	6	7	8	Transpose	
C	C	C	C	C	C#	C	C	C	C	None
C#	C#	C	C#	C	C#	C#	C#	C·	C#	Map1
D	D	D	D#	D	D#	D	C#	F#	D	None
D#	D#	D	D#	D#	D#	D#	D#	A	D#	Map3
E	E	E	E	F	F	D#	E	G	E	Map4
F	F	E	F#	F	F	F	F	G	F	None
F#	F#	G	F#	F#	F#	F#	F#	F#	F#	Map5
G	G	G	F#	G#	F#	G	F#	A#	G	None
G#	G#	A	A	G#	G#	G#	G#	C#	G#	Map6
A	A	A	A#	A#	G#	A	G#	C	A	Map7
A#	A#	B	A#	A#	A#	A#	A#	C·	A#	Map8
B	B	C·	B	C·	A#	B	B	C·	B	Map2

countless performance variations for the Players and switch between them to "arrange" a Jam Factory performance.

Finally, you can store an entire Jam Factory performance as a "Movie" and recall it later, or convert it into a MIDI file compatible with other music software.

Factory Features

THE MAIN SCREEN consists of the four Players; a master Control Strip where most of the overall functions of the program are located; a Preset window that is used to store settings for the Players to enable quick changes during performance; and a Conductor window that's used to store Movies of Jam Factory performances. In addition, there are a number of other windows that are accessed from pull-down menus when you need them.

Getting around Jam Factory's screen is easy, thanks to some great graphics and the use of familiar Mac-type controls like buttons and toggles. Users of Opcode's DX Editor (also written by Jam Factory author David Zicarelli) may recognise the familiar Up and Down arrows that can be used to increase or decrease numerical values with the mouse.

The Control Strip is where most of Jam Factory's master controls are located. Tape recorder-style buttons are provided for functions like Go, Stop, Pause, Sync and Clear. Below these are overall tempo and metronome click values.

The Assignment Matrix is where the general state of each Player is defined. Here the functions Record, Play, Transpose, Control and Echo are available for each of the four Players, and you can alter the status of a particular Player at any time during its performance.

The Record function on the Control Strip window is used to record incoming MIDI notes or program changes into that particular Player. Any combination of Players may be set to Record at the same time, and you can switch Players in and out of Record while Jam Factory is playing.

Entering Record on a Player that has already been recorded on allows you to add new musical information to that Player. If you want to start all over again, you can clear a Player's memory and start from scratch.

Jam Factory has an Input Note Limit feature which you can use to tell a Player not to record incoming notes that do not fall within a specified range. This is a great feature if you're using a synth or sampler with multi-split capability, because it lets you set each of Jam Factory's Players to

respond only to a specific range that matches a certain sound.

By the way, each of Jam Factory's Players can be set to recognise incoming MIDI data on a specific MIDI channel

▶ *"Getting around Jam Factory's screen is easy, thanks to some great graphics and the use of familiar Mac-type controls like buttons and toggles."*

only (the default is "All"). That way, you can have several people "jam" at once, each with their own MIDI controller. Another handy application of this feature is "bouncing" MIDI data from an external sequencer into Jam Factory – so you can record separate sequencer tracks into the four Players simultaneously.

Now, you can record one Player while you play others, but one unusual effect is using a Player in both Record and Play modes at the same time. As you record new notes and chords to the Player's existing data, you can hear the effect of doing so immediately in the playback of that Player.

If you make a mistake when you're entering musical information into a Player, you can correct it with Jam Factory's Input Editor. This is a pop-out window that lets you step backwards and forwards through the musical data relevant to the selected Player. The Input Editor can also be used as a step-time entry system.

Parameters can be copied from one Player to another using standard Mac editing commands like Cut, Copy and Paste. It's possible to edit specific Pitches, Durations and Player Settings independently, so you can combine the pitches of one Player with the durations of another.

Each Player can be assigned a specific MIDI output channel, and you can change the output channel as Jam Factory plays, to allow any Player's performance to be routed to different sound sources. Jam Factory can also send program changes for each Player.

There's an Echo function available for each Player, designed to send incoming MIDI data to the appropriate output channel – a welcome feature for those using systems with a master controller and a number of slave sound sources. And the Echo function works whether or not Jam Factory is playing.

The Transpose feature is designed to permit real-time transposing of any combination of Players during a performance. Middle C represents the original pitch you recorded at, and selecting any other note on your MIDI ▶

Pitches

Contents:

Total 11

Edit Counter 4

Durations

G#3	C#3	A#2	E3				
1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16

Total 11

Edit Counter 4

Duration 2

Sustain entry

MIDI In: Insert Mode   Replace Mode

Rewind ◀◀	Step Back ◀1	Delete ✂	Step Ahead 1▶	Fast Fwd ▶▶	RePlay ▶	Cancel Edit ⊘	OK ✓

controller causes that Player to transpose by the appropriate amount. One interesting use of this feature is to transpose a Player assigned to a sampler using some percussive sounds; the rhythm remains intact but the samples being triggered change, often creating an unexpected and usable variation in a performance.

Finally, the Input Control System may be enabled for each individual Player, permitting the user to access Jam Factory's various controls and functions from any MIDI source. This unique interactive feature lets you do things like start and stop the program, turn Players on and off, set the tempo and even change Presets – all without leaving your MIDI controller.

Playing Players

EACH JAM FACTORY Player can have its own unique identity if you utilise the many graphic control functions available in the Player's Control Window. Here the nuances of any Player's performance may be altered by the user, permitting some sophisticated ways of interacting with a performance.

The Player's relationship to overall tempo may be controlled by changing the Time Base value. Changing from 1 to 2 causes a particular Player to play in half time relative to the other Players, for example. You can also change the phase of a Player's timing, to offset a Player's performance by a certain amount of ticks or clock pulses. Experimenting with both of these parameters can yield some highly unusual rhythmic patterns.

There's also a Swing parameter available to set up shuffle-type rhythms in much the same way as a drum machine does. The Swing factor is a variable percentage from 50 to 90, with 50% (or no swing) being the default.

Jam Factory uses a unique graphic display to allow you to alter the dynamic accents and phrasing of a performance. An Accent Pattern can contain anything between one and 16 steps. You can use the mouse to set up five different Accent Levels, where zero equals no value and five equals full value. The Accent Pattern can be assigned to either Velocity or Legato/Staccato (phrasing).

Exactly how much of an effect the Accent Pattern has on these two parameters is determined by the Range Bar settings. By dragging the mouse over the desired range, you set the high and low values for both velocity and phrasing. You may also choose to use a random value rather than the Accent Pattern to determine actual range values.

This is a pretty powerful system. By assigning Accent Patterns to velocity you can dramatically alter the "feel" of a Player's performance. A value of zero can be used to create a "rest" in the Accent Pattern that will result in no note being played at that point in the cycle. And by setting up several Players with Accent Patterns of different lengths, you can create rhythmic cycles that play off each other in a constantly changing manner.

Jam Factory's Silence Algorithm provides the user with total control over the amount of randomly inserted silence in a Player's performance. You may vary the percentage of Silence anywhere between 1 and 100. The Skip control is used to determine whether a silent section will cause the notes that Player would otherwise be playing to be skipped over during the silent section. If Skip is off, those notes will simply be delayed and the Player will carry on playing from where it stopped after the silence is over.

You can also enable Sustain, which causes the note immediately preceding the silent section to be sustained over it. Otherwise, all notes are silenced at the beginning of the silent section.

The bar graph located in the upper right-hand corner of each Player's window is used to control the improvisational ability of each Player. The "bars" control the Transition Tables discussed earlier, and allow the user to specify a percentage of mix between first, second, third and fourth order. Essentially, the Transition Tables control the degree to which the program will mimic the original musical input. Using the principles of statistic probability, you control how much previously played musical information the program takes into account when deciding which note to play next. First Order will take a lesser amount of events in context than Fourth Order, for example. By the way, you can defeat the Transition Tables altogether and have the program play back exactly what you played into it, if that's what you require.

You can also use the Transition Tables to calculate the durations of the notes Jam Factory plays. Cyclic duration patterns may be created, and you can instruct the Player to either Lead or Follow pitch-changes to decide whether the rhythm determines the melody or the melody creates the rhythm.

Another unique feature of Jam Factory is known as Scale Distortion. It's designed to let you create unusual transposition patterns of a diatonic nature. By setting up a series of Scale Distortion Maps, you can define certain keys to trigger specific Maps, and thereby create a melodic variation for any combination of Players.

Jam Factory's Player controls are really designed to let you give each Player a unique identity and style. However, you may want to create quick changes in those parameters during a performance. That's what the Presets are for.

Storing a Preset is just like taking a picture of Jam Factory's screen. You recall a stored Preset just by clicking

on it. Selecting a Preset during a performance can initiate a total re-configuration of all Jam Factory's settings, creating dramatic musical changes if desired.

And you can use Jam Factory's Movie feature to store a complete Jam Factory performance, including Preset changes.

Applications

THOSE ONE-IN-A-MILLION JAMS that go down wouldn't be much use if you couldn't save them. Fortunately, Jam Factory lets you save your files so you can repeat them and work on them at a later date.

By the way, Jam Factory can be synced to MIDI Clock either as a master or as a slave, so running it in sync with a sequencer, drum machine or other sync device is no problem.

If you set up some of the Players to respond to the Input Control System described previously, you can use an external MIDI sequencer to "automate" Jam Factory's controls, turning Players on and off, controlling the Step Advance feature, changing Presets, and just about anything else you might want to do. This way, Jam Factory can be "cued" in and out of a sequence when desired.

Furthermore, Jam Factory provides a means of converting a jam into a sequence file with the inclusion of the new (American) MIDI File format. When you save a Movie, Jam Factory creates a MIDI File. You can open a MIDI File directly into another program such as M or Opcode's Sequencer 2.5, allowing you to take improvisations created on Jam Factory and edit or manipulate them with other software.

That means you can combine a Jam Factory improvisation with a pre-defined MIDI sequence. Or you can use a sequencer to provide a more advanced means of structuring and arranging music generated by Jam Factory. You can even go the other way, taking an existing sequence and feeding it into Jam Factory for some jammin' fun.

I've had lots of time to get to know this program, having used a copy for several months and created over 30 pieces of music. Each piece is unique and has its own identity. Generally speaking, I've found that the program works best

▶ *"The purists may claim that what this program produces is not real music, but if they do, they'll be missing the point: using Jam Factory is fun."*

when you give each Player a rather limited amount of musical input. But as with most things, the more you use Jam Factory, the more you understand how to get what you want out of it quickly.

The purists may claim that what Jam Factory produces is "not real music", but if they do, they'll be missing the point. Using Jam Factory is fun. F-U-N. It makes it easier than ever for non-players to create music, but equally, the program is only capable of manipulating the input you provide it with, so some people will get great results while others simply create noise.

Programs like Jam Factory move the MIDI revolution forward in leaps and bounds. It's a musical tool more powerful than anything we've had in the past, and it's capable of adding new inspiration to the music-making process. ∎

Price *$120*
More from *Intelligent Music, PO Box 8748, Albany, NY 12208, USA.* ☎ *(518) 434-4110*

*patch*W·O·R·K

Now that Patchwork is bigger than ever, you've an even better chance of seeing your favourite sound in print, not to mention your favourite magazine on your doorstep free of charge. And if you're still waiting to see *your* particular synth featured in these pages, then why not be the first to submit some sounds for it?

Many readers are now supplementing their patch charts with a short demo cassette of the sounds in question, and this is *really good news* for our over-worked (and generally hungover) editorial team. Don't worry too much about classic performances and impeccable recording quality; just present your sounds simply and concisely – and convince us you're the best of the bunch.

If you can't lay your hands on a cassette player, don't let that put you off submitting some patches – an interesting description is a good substitute.

Don't forget that if your patch gets published, you'll receive a **free year's subscription** to MUSIC TECHNOLOGY with our compliments. So send us your favourite sounds on a photocopy of an owner's manual chart (coupled with a blank one for artwork purposes) accompanied, if possible, by a short demo-tape. Include a decent-length description of your sound and its musical purpose in life, and write your full name and address on each chart. And remember, edited presets are all very well, but an original masterpiece is *always* preferable. OK?

The address to send sounds to: Patchwork, MUSIC TECHNOLOGY, Alexander House, I Milton Road, Cambridge, CB4 IUY. ■

CASIO CZ5000
Ultrabass
David Kosten, London N3

Quite a straightforward sound, this, but useful for those sequenced electro-bass lines à la early Ultravox. If you haven't a sequencer, don't worry – 'Ultrabass' suits manual playing just as well. ■

TONE NAME	CARTRIDGE NO.	TONE NO.
ULTRABASS		

PARAMETER

LINE SELECT	MODULATION		DETUNE				VIBRATO				OCTAVE	
	RING	NOISE	+/–	OCTAVE	NOTE	FINE	WAVE	DELAY	RATE	DEPTH	+/–	RANGE
1+1'	OFF	OFF	+	0	0	01	1	0	50	2	+	0
(1,2,1+2,1+1')	(ON/OFF)		(+/–)	(0–3)	(0–11)	(0–60)	(1–4)	(0–99)	(0–99)	(0–99)	(+/–)	(0–1)

1

DCO 1

WAVE FORM	
FIRST	SECOND
2	3
(1–8)	(0–8)

E N V (PITCH)									
STEP	1	2	3	4	5	6	7	8	
RATE	99	99							(0–99)
LEVEL	99	00							(0–99)
SUS/END		END							

DCW 1

KEY FOLLOW	
0	(0–9)

E N V (WAVE)									
STEP	1	2	3	4	5	6	7	8	
RATE	99	56	43						(0–99)
LEVEL	99	49	00						(0–99)
SUS/END		SUS	END						

DCA 1

KEY FOLLOW	
0	(0–9)

E N V (AMP)									
STEP	1	2	3	4	5	6	7	8	
RATE	89	99	50						(0–99)
LEVEL	99	99	00						(0–99)
SUS/END		SUS	END						

BIT ONE
Doubling Up
Thomas Bjornemark, Sweden

The first couple of patches for the Bit One, 'Harp/Classic Guitar' (A) and 'String Pluck' (B), should be layered in Double mode; the former takes care of the basic sound while the latter deals with the "pluck" sound when the string is hit.

'Modulation Madness' (C) uses both VCOs to modulate the output to make complex sequencer-type sounds. Its creator suggests experimenting with parameter 60 to obtain different modulation rhythms, and advises playing in Unison mode and adding a touch of noise. ■

KORG POLY 800
Select Sound
David Flattery, Liverpool

Another oldie but goodie...somehow, the Poly 800 always manages to get a look in. The accompanying prose describes 'Symphony' as being suitable for both melodies and basslines, but particularly for winding chord progressions; though it's best suited to slow pieces as its attack is rather long. Reminiscent of the organs found in seaside picture palaces of the early 20th Century (!) is the aptly named 'Picture Palace', and is best suited to lead work. 'FM Bass' has that harsh, edgy characteristic

of FM synthesis, and is intended purely for bass and sequencing purposes. If you're unsure of your fingering, then watch out for 'Carnival', as any bum notes can sound some pretty off-putting dischords. 'Chime Strings', meanwhile, is a good all-rounder suitable for melody or chordal lines. ■

PROGRAM NAME	DCO 1								MODE	DCO 2									NOISE	VCF						CHORUS	DEG 1						DEG 2						DEG 3						MG				MIDI		
	OCTAVE	WAVEFORM	16'	8'	4'	2'	LEVEL	DCO		OCTAVE	WAVEFORM	16'	8'	4'	2'	LEVEL	INTERVAL	DETUNE	LEVEL	CUTOFF	RESONANCE	KBD TRACK	EG INT	POLARITY	TRIGGER	ON/OFF	ATTACK	DECAY	BREAK P	SLOPE	SUSTAIN	RELEASE	ATTACK	DECAY	BREAK P	SLOPE	SUSTAIN	RELEASE	ATTACK	DECAY	BREAK P	SLOPE	SUSTAIN	RELEASE	FREQ	DELAY	DCO	VCF	RCV CH	PROG CHANGE	SEQ CLK
SYMPHONY	3	2	1	1	1	1	31	1								0	1	3	91	0	0	2	0	1	1	21	18	23	15	31	24			19	0	13	14	21	0	6	0	4	0
PICTURE PALACE	2	1	1	1	1	1	31	2	3	1	1	1	1	31	0	0	0	99	0	1	2	15	2	0	0	31	31	31	31	19	0	22	31	29	31	23	24	26	5	28	31	16	7	0	2	0
FM BASS	1	2	1	0	1	0	17	2	1	2	1	2	0	1	1	1	31	0	0	0	84	2	0	1	11	2	0	9	23	17	3	0	22	7	23	18	2	0	11	22	0	5	2	0	31	9	14	0	0
CARNIVAL	3	2	1	0	1	0	21	1							12	0	0	37	0	2	2	7	1	1	3	17	27	12	18	26			0	17	31	0	28	25	8	0	0	0
CHIME STRINGS	3	1	1	1	0	1	12	2	3	2	1	1	1	1	12	0	2	0	50	2	1	2	9	2	1	2	28	0	25	9	25	5	7	16	0	30	23	1	11	18	0	18	18	7	3	1	0

ROLAND JUNO 106
Astra
Andy McGuigan, Ballymena, NI

Andy comments that "'Astra' was created by causing the VCF to oscillate via the resonance parameter being put up to maximum. This is a very rich sound around the middle octaves, but the top end is a bit on the thin side. (Twiddling the keyboard CV amount in the VCF section may alleviate this.) 'Astra' is best used for slower pieces, and also sounds good playing lead lines over rich, analogue string sounds. If extra bass depth is required, then simply increase the sub-oscillator amount." ■

	(A)	(B)	(C)		(A)	(B)	(C)		(A)	(B)	(C)		(A)	(B)	(C)
LFO1				16	24	14	0	32	0	0	2	46	54	19	0
1	0	0	1	17	0	0	0	33	0	0	0	47	0	0	0
2	0	0	0	18	24	0	24	**DCO2**				48	32	7	0
3	0	0	0	19	6	0	34	34	0	1	1	49	4	0	63
4	0	0	0	20	21	39	21	35	1	0	0	50	28	0	34
5	0	0	0	21	17	0	0	36	0	0	0	**LFO2**			
6	0	0	1	22	0	0	0	37	0	0	0	51	0	0	0
7	0	0	1	**DCO1**				38	1	1	0	52	0	0	0
8	0	0	63	23	0	0	1	39	0	0	1	53	0	0	1
9	0	0	0	24	1	0	0	40	1	0	1	54	0	0	0
10	0	0	19	25	0	0	0	41	0	0	0	55	0	0	0
11	0	0	0	26	0	0	0	42	0	0	0	56	0	0	1
VCF				27	1	0	0	43	16	0	22	57	0	0	1
12	0	0	0	28	0	0	1	44	0	0	0	58	0	0	63
13	28	43	25	29	0	0	1	**VCA**				59	0	0	0
14	0	41	32	30	0	0	0	45	0	0	0	60	0	0	32
15	33	27	39	31	0	0	0					61	0	0	0

YAMAHA DX21
Leslie
Peter Watt, Bristol

										AME			OP
										0	0	0	4
										0	0	0	3
5	0	TRI	29	25	0	7	OFF	0	0	0	0	0	2
										0	0	0	1
ALGO-RITHM	FEED-BACK	WAVE	SPEED	DELAY	PMD	AMD	SYNC	PITCH	AMPLI-TUDE	EG BIAS		KEY VELOCITY
			LFO					MODULATION SENSITIVITY					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

OP	FREQ RATIO	DETUNE	AR	DIR	DIL	D2R	RR	OUT LEVEL	RATE	LEVEL	PR1	PL1	PR2	PL2	PR3	PL3
4	2.00	+3	21	15	15	0	5	54	0	0						
3	8.00	-3	31	0	15	0	7	88	0	0	99	50	99	50	99	50
2	2.00	+3	26	31	15	0	3	74	0	0						
1	2.00	-3	17	29	15	0	11	99	0	0						
	OSCILLATOR		ENVELOPE GENERATOR					OPERATOR	KEYBOARD SCALING		PITCH ENVELOPE GENERATOR					
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32

POLY/MONO	PITCH BEND	MODE	TIME	FOOT SW	VOLUME	SUSTAIN	PITCH	AMP	PITCH	AMP	PITCH BIAS	EG BIAS	CHORUS	TRAMS-POSE	VOICE NAME
		PORTAMENTO			FOOT CONTROL		WHEEL RANGE		BREATH RANGE						
POLY	7	FULL TIME	0	ON	99	ON	99	0	0	0	50	0	ON	C=C1	LESLIE

YAMAHA CX5M
Mystery
Robert Algeuer, Austria

Yamaha's music computer has been somewhat neglected in Patchwork, so here's an interesting one to make amends. Titled 'Mystery', the sound is more of an effect than anything else, but is still eminently usable for melodic work. Play mono-phonically for best results. ■

```
Voice                                             LFO   1
Code            <      MYSTERY      >             Syc   0
Tr   0                                            Spd 200
LR  11        Ne  0                    Nf  0       Wf    2
Ams  0        A1  8                    Fb  0       Amd   5
Pms  4                                            Pmd 127

[1]         F 4      IF  0    [2]         F 4      IF  0
A   22               Dt -3    A   22               Dt  3
D   12               Ks  0    D   12               Ks  0
S    0               Kd  0    S    0               Kd  0
D    0               Rk  0    D    0               Rk  3
R    6               Vs  0    R    6               Vs  4
O  127               Aj  0    O  127               Aj

[3]         F 1      IF  0    [4]         F 1      IF  0
A   22               Dt  3    A   22               Dt -3
D   12               Ks  0    D   12               Ks  0
S    0               Kd  0    S    0               Kd  0
D    0               Rk  0    D    0               Rk  0
R    6               Vs  3    R    6               Vs  3
O  127               Aj  4    O  127               Aj  4
```

Compufex Voice Tapes
Yamaha DX21/27/100 & CX5M

BEFORE DELVING INTO the sounds presented on the banks, perhaps I could indulge in some moments of thought.

Firstly, it's amazing how the cognitive process works. The labelling of a sound does miraculously clarify its successfulness. When I sat down to review, I played the sounds to a panel who initially didn't know the name of the patch. I got their verdict, then revealed the patch name – suddenly, they found it easier to re-evaluate and give a clear thumbs up/down. Subjectivity and pre-conceived valuations then, are ever present in a review of sounds, and one man's "Beefy" is another man's "Organ 2".

Second, the use of the voices, ie. CX5M or DX is another factor. The DX 21/27/100 series carry 120+ internal sounds of excellent quality, so any new sounds must clearly augment these to be of any use, especially as the on-board storage space (for live work in particular) is limited. As a DX owner, I was primarily interested in the supplementing of my own work, and so the CX5M user may find proportionally more of the sounds useful.

Finally, in a lot of cases, the more sounds you have around you, the easier it is to write and the broader the scope of the end pieces. Sound suggest their own space and new sound always opens up new possibilities and ideas. DX programming can be tricky and "tweaking" voices requires time, patience, dedication and a lot of bottle, even presuming that you know the type of sound you want in the first place!

So, to the Voices themselves, presented in 10 banks of 24 voices for the DX user and 4 banks of 48 for the CX5 user.

On the whole, with some exceptions, most of the sounds here were judged reasonable, generally OK, but not many would make you jump for joy. Either the voices were lacklustre or the "roots" patches could quickly be recognised, relegating them to interesting variations rather than original ideas. Too many times we thought that we'd heard it all before.

The Instrumental Banks (1 and 2) had some good voices including the excellent 'Hand Bell' and the 'El Grande' piano (should have been called 'Beatles Piano Sound' – very authentic). But the strings sounds were unconvincing and the guitar patches never do sound like guitars. 'Doublebass' is very real (around middle C) and the 'Whistle' à la Roger Whittaker is very usable.

The Synth Banks (3, 4 and 5) are a real eye opener. If you've been missing that 70's ELP/Yes feeling for some time, then there are some here for you. Look no further than 'Mild Synth', 'Delicasyn', 'Woof' and 'Beefy'. Now, I always look forward to the Sound Effects Banks (6 and 7) and on the whole, these were delightful if a little useless (unless driving the rest of the band mad is an objective).

Some of the sounds, and in particular the Drum Kit (Bank 8), I found quite poor. Certainly if you had recourse to a drum machine or drummer, then you'd probably erase this bank from the tape (DX owners). The other percussion effects are so-so and would not take up space on my DX.

Bank 10 is labelled Breath Controller Patches and as I had no such BC I feel it's not fair to say too much, other than in passing they sounded pleasant

(although the BC qualities can be tweaked without too much trouble).

Let me say that the programming here is good, even if the naming of the Voices is a little erratic (I suppose though that 240 new voice names can be a little wearing...). Special patch name of the year must go to 'Wawaoo', the first patch I've ever heard that actually sounds exactly like the name suggests (phonetically).

So, the sounds themselves are quite good, but I was looking for something to add to my collection. At £19.95 the price is good (in relation to hardware costs) but as the listening and programming requirements in such case are so subjective, it's a pity that prospective buyers have no way of hearing what they are buying in advance and so can make a qualified decision rather than a "suck it and see" attitude.

In the end, it comes down to your purse and ears.
■ *Guy Manning*

More from Compufex, 39 Coventry Close, Corfe Mullen, Wimborne, Dorset, BH21 3UW. ☎ *(0202) 690740*

For years, keyboard players have had the benefit of split keyboards to take advantage of a synthesiser's ability to play more than one sound at a time. We look at how guitar synth players can use MIDI Mode 4 to do the same, and more.

Text by Rick Davies.

WHETHER THE GUITAR controller you use is of the pitch-to-MIDI variety (such as the Shadow system), or a guitar-like instrument (such as the SynthAxe or Stepp), when it comes to MIDI, all controllers speak the same language. Some just happen to be more conversant than others, that's all.

Still, the quality of sound you derive from your system depends not only on the capabilities of each component in your system, but also on how well you can establish a link between your controller and your synths.

The guitar controller presents new opportunities to get more out of a synthesiser than may be obvious. Although each string has only a 20-odd note range, it generates the same type of MIDI data as a MIDI keyboard. But since a guitar uses six strings to cover its full range of MIDI notes, it can be dealt with as six independent controllers in one. This is where Mode 4 comes in handy.

Patches, presets, programs, voices. Each manufacturer seems to use a different term for the same thing. For simplicity, we'll use the term "program" since it is used in the MIDI spec. With that matter out of the way, let's consider some of the complication involved in assigning different programs to each string of a guitar controller.

First, we'll consider the ideal situation, in which there are plenty of synths to go around (say six), and each one is to be played by an individual string. Later, we'll consider other, more modest setups. Keep in mind that multi-timbral synths can usually be regarded as several synths

housed in one package. Fortunately, most guitar controllers allow notes played on each string to be transmitted on different MIDI channels, so we'll work with this capability assumed implemented in whichever guitar controller is being used.

If we were to set each guitar string to its own MIDI channel, then we'd only need to set each synth to the desired MIDI channel, set each synth to Mode 3, and each string would play the corresponding synth. Although the controller is transmitting over several channels, each synth needs only to receive on one channel for the current setup.

All we'd need to do next is select the desired program on each synth, and we could have, for example, three distinct string synth sounds on the first three strings, and brass, clav, and bass guitar sounds on the last three strings.

The advantage of doing things this way is that you can play the same note on different strings and get a different timbre each time, just as you would on a real guitar – though in this case the differences in timbre may be a bit more drastic than they can ever be on an acoustic guitar.

But the above arrangement involves a fair deal of setup time. Now, suppose you need a different synth arrangement for another tune. If you were to repeat the process described above very often, you'd eventually get pretty fed up. So the idea is to use MIDI program-change messages to set up all of the synths simultaneously, under the control of the guitar.

There are a couple of ways of doing this. Obviously, you'll want to change programs on all six synths, but since each synth is set

to a different MIDI channel, you'll need to send out six distinct MIDI program-change messages, one over each of the six MIDI channels in use.

The Shadow (or Ovation, or Charvel, or Takamine) GTM6 guitar controller gets you going in the right direction by allowing you to transmit three program-changes in one go, using a "parallel chain" feature which lets you build up three series of program changes which can be stepped through with a footswitch. Since each of the three chains can operate over a different MIDI channel, the GTM6 system will take care of three synths.

So if three synths are enough to keep you busy, you could assign pairs of strings to the same MIDI channel, and the GTM6 could control the program changes from there. For example, the first two strings could be assigned to channel 3, the third and fourth strings to channel 4, and the fifth and sixth strings to channel 5. Although this is a compromise of sorts, it's certainly a step in the right direction.

Not all guitar controllers have such a multi-channel program-change capability, however. For example, if you happen to use the Ibanez MC1, you can send program changes over any one channel at a time, but you'll need external assistance to get the message across to more than one synth.

Fortunately, there are devices designed to do this for you. For example, the JL Cooper MIDI Link has one MIDI input and six MIDI outputs. The MIDI Link connects between the guitar controller and the synths, so the controller can be the origin of all program changes. In fact, since the MIDI Link has six MIDI outputs, you can

MONO MODE

connect each synth directly to one output, rather than rely on chaining the synths together with their MIDI Thru sockets.

When the MIDI Link receives a program-change message over MIDI, it transmits any combination of MIDI program changes over any combination of MIDI channels, out of any combination of the six MIDI outputs. All you need to do is program your desired program combinations into the MIDI Link, and it'll take care of the channel and program assignments. The MIDI Link does this without affecting any other MIDI messages. And with its six MIDI output ports, it's a machine that's well suited to solve the kind of problems you might come across.

Another American company, Voyce, have a couple of MIDI accessories which can be used to help rearrange several synth programs simultaneously. Their LX4 and LX9 can handle four and nine channels of MIDI data respectively, so you would have to take into consideration how many synths you are going to use before selecting one of these models. In addition to transmitting multiple MIDI program-changes upon receiving one, the Voyce units also handle note transposition and other handy data manipulation.

K-Muse (American again, I'm afraid) have a MIDI foot controller coming out in early 1987 which connects to the Photon guitar-to-MIDI converter's MIDI input. When you select a program on the foot controller, several program-change messages are transmitted over individual MIDI channels. Since this foot controller will also contain other special controls for the Photon, it should be a desirable addition to the system. Still, it won't help other guitar controllers to deal with multiple program-changes.

So far we have assumed that each synth requires a *distinct* program change. But if you're prepared to do a bit of planning, you can arrange your synth programs so that when each synth receives the same program-change message, the desired sounds are selected. For example, program 00 could be a brass patch on one synth, strings on another, bass on yet another synth, and so on. The only thing you'd have to do then is find a way to send program changes over six individual MIDI channels.

An economic solution to this problem is the Alesis MPX MIDI Transmitter, a battery-operated program selector which, thankfully, is available in the UK through Sound Technology. This device normally transmits program changes over only one channel at a time, but thanks to Alesis' decision to include a "Channel 0", a single program selection on the MPX can cause that program change to be transmitted over all 16 channels.

If you choose to use this method, be careful you don't have any other MIDI instruments connected to the MPX which you do not want to respond to program changes. And even though this method

works, and it may appear simpler to have all synths playing the same program numbers at all times, arranging your synth programs into the appropriate memory locations requires some planning, and will probably require you to store copies of some programs in several memory locations, which is not terribly efficient.

On the other hand, if you happen to be using an Oberheim Matrix 6R synth module, you'll find a special "patch mapping" facility which enables the synth to change to any program upon receiving a different program number over MIDI, so there's no need to copy programs into other memory locations.

At the top end of the guitar controller market, the SynthAxe takes care of all of your worries. Whether you choose to select a program from the controller or step through a series of program changes, multiple program-changes are transmitted over as many MIDI channels as is required by your system.

We've assumed that we're dealing with synths capable of playing only one sound at a time so far, whereas there are a large number of instruments with keyboard split, layering, or even multi-sampling capabilities.

If you control a split synth from one string, then the split-point becomes a fret

on the corresponding string rather than a key, and each string can play as many programs as the corresponding synth has to offer. On the other hand, if you play your cards right, you can use one synth to take the place of several.

Take the example of a synth with a split capability. The Matrix 6R has a handy Mode 4 implementation which allows its left and right programs to be played over separate MIDI channels. Since the left and right programs also have programmable zones (note ranges to which they are assigned), a guitar controller can use the Matrix to cover two strings separately, or more strings if having only two sounds is acceptable.

As you might have noticed by now, there are still some differences to be sorted out between guitar controllers and the synths they drive, even though several manufacturers have MIDI accessories to fill the gaps.

More recent entries into the guitar controller market appear to have corrected some of the limitations of earlier models, which indicates that designers are doing their best to eliminate the need for additional MIDI accessories.

The possibilities are many, and with a bit of planning and patience, a guitar *can* earn its keep as a master MIDI controller. ■

SEQUENTIAL
STUDIO 440
Sampling Drum Machine/Sequencer

Photography Matthew Vosburgh

The Studio 440 aims to be the all-in-one MIDI recorder for drum programming, sampling and sequencing. But is it sophisticated enough to restore the market's faith in combination machines? Review by Paul Wiffen.

RAISE THE SUBJECT of the Linn 9000 among top musicians and programmers, and you can bet that whatever their reaction, it will be a strong one. People either love its sound, the convenience of combined rhythms and sequences that it offers, and its way of approaching the tasks it performs; or they hate the grittiness of its eight-bit sampling, its glaring omissions in the areas of programmable tuning, panning and MIDI, and the fact that nearly all revisions of hardware and software seem to crash every time a gnat hiccups 300 miles away. Even its strongest critics have to concede its good points, and its staunchest defenders are left speechless by some of the more testing moments in its operation (like when you discover that it doesn't understand the MIDI clock, or that the song you've been working on for days goes down the tubes when it locks up).

Yet as a dedicated drum machine, MIDI recorder and sampler, the Linn 9000 has filled a gap which no other machine could. Until now, that is.

Preliminary specs on Sequential's Studio 440 which began to filter through unofficial channels last summer – and their subsequent confirmation by Sequential in the autumn – made it clear that the machine would be addressing itself to pretty much the same market as the Linn, but with some major improvements.

The sounds would all use 12-bit resolution, with a sample rate of up to 42kHz, and a 32-sound user-sampling option. Pitch, Level and Pan would be programmable for every note as on previous Sequential drum machines, but now there would be eight separate outputs. Sequencing memory was to be 50,000 notes with floppy disk storage, and synchronisation would not be limited to unmusical SMPTE or prehistoric pulses-per-quarter note, but would push MIDI to its limits and introduce a new standard, MTC.

Storage

LET'S GET THE major complaint out of the way first. I can sum it up in one word. Amnesia. Let me explain. Much of this review was written aboard a TWA 747 flying over the Atlantic. This was made possible by a revolutionary arrival in my life, a Tandy 600 portable computer. For me, the Tandy machine has one huge advantage over every other computer ever made: when you turn it off (or the power gets accidentally disconnected), it doesn't forget everything it ever knew. Thanks, I ought to point out, to a battery back-up on its memory.

And it's a wonderful thing, battery back-up. Of course we've been spoilt by it on synths. We think nothing of it when we turn the cheapest polysynth off and back on again to find the sounds are still there. In fact, we only notice it when it doesn't work. Then suddenly, it's as if the synth itself has been taken away. If we're lucky, we may still have the factory sounds stored on data cassette somewhere, and we can spend many happy hours trying to get them to load back in. If we're lucky...

Sampling keyboards have brought us face to face with the harsh reality of computer memory, because with the sole exception of the Kurzweil, they all lose their sounds (many forget their operating system as well) when disconnected from the mains.

But the Studio 440 is the first drum machine to lose everything (sounds, sequences, programming setups, et al) when it is switched off. In making what is probably the cleverest drum machine in history, Sequential have also produced the stupidest.

The 440 gets around this by saving everything to 3½-inch floppy disks. But I'm still not sure that the average musician will take kindly to a drum machine that won't make a sound until you've loaded a disk (which takes 40 seconds), won't play back any pre-recorded patterns until you've loaded another one, and resets some of the most crucial parameters every time you do.

The memory of the 440 is many times larger than that of any other drum machine, especially in terms of that available for holding drum samples. The 512K allocated for this is four times the size of its nearest rival (the E-mu SP12), as are the 32 user sample locations available. All this memory and speed on the 440 is truly wonderful, but why couldn't Sequential have fitted a battery to retain those sounds when the machine is turned off?

But perhaps we should be thankful for small mercies, in that at least the 440 has its operating system on ROM. This automatically boots up when you turn the power on...

Sampling

THE 440 IS an expensive beast, partly because it boasts a good selection of clever software tricks (more later), and partly because, as already stated, it is well endowed with memory.

The most immediate result of the latter feature is that the sound quality of samples made on the Studio 440 is exceptionally high. As it turns out, many of the factory samples are not even made at the best available bandwidth, yet they sound brighter than anything I've ever heard on a drum machine before.

Now, for the first time on a drum machine, you can reproduce the sound of a cymbal right up to the final dying

whisper of vibrating metal (thanks to the 42K sample rate, and the long sample times the huge memory makes possible). As most percussion sounds last well under half-a-second, you can afford to squander up to ten seconds at full bandwidth on capturing a complete cymbal, and still accompany it with a full drum kit (bass drum, snare, toms and hi-hat).

You're also given the ability to "audition" the results of the 440's three available sample rates (42kHz, 31kHz and 16kHz) before you actually make your samples, and to recover any portions of memory not required in the final sound.

The former is a particularly clever trick, achieved by feeding the audio signal through the 440's ADC (analogue-to-digital converter) and then straight back out through its DAC (digital-to-analogue, would you believe) stage without storing it in memory along the way. You simply choose which sample rate you want to hear, play your drum sound into the 440, and the way you hear it is the way it will sound when it has been stored in the machine. So, you can find out if you really need to use the fastest rate (42kHz) to capture that snare sound, or if you can get away with 31kHz and save memory for other sounds.

The sampling procedure is very similar to that on the Prophet 2000, with the three sample rates, length, sample and trigger level all programmable. However, the whole process is made considerably easier by the sort of help that only a 32-character backlit LCD and hardwired pots can give you. No longer do you have to set length in blocks of data and have your trigger threshold altered when you change another parameter.

Once a sound has been sampled, you can play it back instantly from one of the eight 440's pads by selecting the bank in whose row that sample location appears. And from that pad, you can immediately put your sound into a new pattern. Alternatively, by sampling or copying into the particular location used before, you are able to replace a sound in a pattern which has already been created. Much, much easier than replacing sounds by triggering an AMS off-tape.

Editing

IF YOU HAVE a bit more patience and can wait to use your drum sound, you have the ability to truncate it, loop it, adjust its envelope, append it to another sample, name it, recover any unused memory, and so on.

Let's look at these capabilities a bit more closely. The first thing we should point out is that each sample on the 440 can exist in two separate forms, based on the same sample data, but with a complete set of independent parameters. These two versions are referred to as the Normal and Alternate versions. In the usual run of things, the Normal sample will be used unless you hit the Alternate Parameters button. If you do this (and there's an LED that tells you), the sound always plays with those alternative parameters, and this fact is remembered even after you go on to play other sounds and saved to disk. When you return you will find the Alternate version, until you hit the Alternate Parameters buttons to toggle back to the Normal version.

On most of the factory sounds, the alternative version is used to call up reversed samples just like those available on the Sequential Tom. Except, that is, for the open hi-hat sound, which uses different Start and End Points in its Alternate version to give a "closed" sound. This can then be selected via footswitches (the 440 has two inputs for fully assignable switching and triggering functions), so that hi-hat parts can be programmed in exactly the same way as real hi-hat lines – by opening and closing with your foot.

But these two uses of Alternate Parameter mode, good though they are, are really just the tip of the iceberg. Any of the parameters we are going to look at can be set up independently for the Normal and Alternate versions. So you can have different loops, different analogue parameters, and so on and then just switch between them at will.

Start and End points for your sample loops on the 440 are shown as five- or six-figure addresses, which is certainly an improvement on the nearest 1000 bytes shown in the Prophet 2000's two-digit display.

And you can still step between zero crossings by selecting Auto, which is the fastest way to get rid of clicks. Loop points can be set in the same way, but it's when you get into computer-assisted looping that the 440 really comes into its own. First, the Auto facility looks for zero crossings or zero slopes depending on whether you are using forward or forwards/backwards loops to get the smoothest possible transitions. But when you can't go any further with that, you can turn to that innovation of Northern California, the crossfade loop, the first of its kind on a dedicated percussion sampler.

Now, looping is not normally associated with sampled percussion sounds (though a rudimentary form of it is featured on the SP12). However, the sort of looping facilities offered on the 440 (a choice of sustain and release loops, zero crossings and crossfade looping), are more flexible than those of just about any keyboard sampler.

The digital editing on the 440 is also the sort of thing you'd normally expect from the most flexible keyboard samplers, with splicing (again with crossfade), reversing and gain boosting all available.

And in the enveloping field, the 440 gives you programmable Attack, Sustain and Release times on both Amplifier (loudness) and Filter (brightness) envelopes, with velocity control (the 440's pads are velocity-sensitive) of attack, release and envelope amount and pitch-tracking for attack, sustain and release. This sort of envelope is much better suited to dealing with samples in general than the conventional ADSR. Sampled sounds are recorded with their own decay characteristic built-in, so rarely do you have any use for envelope decay. On the other hand, programmable sustain time (as opposed to level, as on ADSRs) is a much better idea, especially on percussion sounds, as you can achieve the sort of effects you would normally need external gating for.

However, for the kind of longer looped samples you would make on a keyboard sampler, you may well want to be able to sustain the sound for as long as you hold the pad (or key on a connected MIDI keyboard). The 440 allows for this eventuality as well, by making sustain time controllable by the Gate. This is the only way you can control sustain time on ADSRs, so here you have the best of both worlds.

The fact that all three envelope times can be altered by pitch-tracking is particularly appropriate to samples, as they are so obviously pitch-time related. In other words, the higher the replay pitch, the shorter the time the sample lasts. So it's handy to be able to adjust your envelope times to match the time your sample lasts.

On the 440, each sound can be replayed over a two-and-a-half octave range. But tuning can also be controlled during sample replay via what are known as Bend parameters. This allows you to offset a sample's pitch and then control the speed at which the pitch returns to the original pitch. This can be further modified by the velocity and pitch-tracking, and you can also decide whether the bend starts as soon as you trigger a note, or when you release it. This allows a variety of syn-drum effects to be applied to acoustic samples.

The obvious conclusion to be drawn from the degree of flexibility and control available in the field of sample editing is that the 440 should under no circumstances be seen as just a percussion sampler. There is no doubt, in my mind, that the 440 is as good as any keyboard sampler for making, editing and looping sound samples of any description. ▶
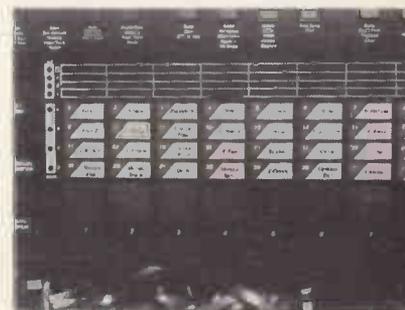
►Playback

BUT HOW DO you go about replaying those samples and recording them in a sequence? Well, you can of course simply access the 32 sounds via four banks, which each allow you to trigger eight sounds at a time from the machine's onboard pads. These pads are a big improvement on the standard half-inch square buttons that most cheaper drum machines use, but not quite the size of the two-inch square pads on the Linn. They are made of rubber, a material well suited to the velocity- and pressure-sensitivity which they implement.

Next to these pads are three knobs which control level, pitch and pan position. You simply hold down the pad which triggers the sound you want to alter, move the appropriate knob, and the pitch, level or pan position of that sound is changed. There are 32 possible volume levels, 32 pitches (in semitones) and 32 pan positions across the stereo image. These are all memorised, too, so if you move to alter another sound's pitch or level, when you come back to the first sound, its values haven't changed.

Any recordings you make on the internal sequencer retain the volume, level and pan values they were recorded with, even if you overdub the same sound with different values afterwards. This means that you can achieve rolls around the toms or melody lines by overdubbing pitched sounds at different tunings.

But wouldn't it be good if you could set up the pads to put the sounds exactly where you wanted them? Funnily enough, this is just what you're able to do with the Kits on the 440. The best way to consider a Kit is to think of it as being akin to a preset on a synthesiser. In each of the four Kits available, you can assign any of the 32 sounds to each of the eight pads (the same sound to each pad, if required) and then assign each pad its own tuning, level and pan position. This could be a standard drum kit setup, say (left-to-right) bass drum, snare, hi tom, mid tom, lo tom, hi-hat, cymbal. Or it could be one sound, the snare for example, with a different volume as you go across.

But Kits don't have to be used just for drum sounds. The bass samples which Sequential give you (Slap, Picked, Analog and Digital synth) can also be spread across all eight pads with different pitches to allow you to play basslines. And programming basslines from pads turns out to be a great way of getting the same feel in the bass as you have in the drum pattern (which is the way all good rhythm sections should be).

Any other pitched sounds (Orchestra hits, piano lines, guitar samples, anything) can also be programmed from a multi-pitch Kit, and you may well find this beneficial if the part you're playing is very rhythmic.

What's more, you can play the pads polyphonically, so you can input chords this way, either by hitting more than one pad simultaneously, or by building up harmonies in several takes.

However, my feeling is that most people will still feel more comfortable playing pitched sounds from a keyboard, and by routing the 440's MIDI In to "Sounds", you can do just that. The bottom two octaves (of a five-octave keyboard) can access two Kits simultaneously via MIDI. So you can put the same sound with different pitches and pan positions over two Kits, giving you 16 different versions of the same sample available at the same time, or assign 16 different drum sounds to play from the keyboard. If you hold any of these keys down, the sound it triggers can be played over its full range of 32 semitones, using the two-and-a-half octaves above Middle C (F3 to B5) with Alternate Parameters being toggled by C#3.

In the real world, however, there are plenty of instruments that require a good bit more than a 32-semitone range to be reproduced properly. On a keyboard

sampler we use multi-samples to do this, but you may be surprised to learn that the 440 can operate in this way, too. Here it's called Mapped Mode, and it allows you total freedom in the way you assign samples to certain ranges. In fact, all 32 sounds in the 440 can be assigned a range on the keyboard, to achieve realistic recreations of something with as wide a range as a piano. And up to two sounds per key can be assigned, so you could double up strings and brass, for example.

For those of you who have ever tried mapping on a Prophet 2000, there is no need to be frightened by the term on the 440. Thanks to the much larger display and simplified procedure, mapping on the 440 is considerably easier than on its keyboard-based predecessor. You simply select the original pitch and highest pitch for each sample, along with the MIDI channel you want to trigger it. This allows not only smooth recreations of one instrument over its whole range, but also multi-timbral keyboard layouts with access on different MIDI channels if required.

Sequencing

ONCE YOU HAVE all your sounds in the machine and set up to be played either from the pads or from an external MIDI keyboard, you can immediately start sequencing them. The Studio 440's format draws no distinction between drum patterns and sequences as such, but any internal sounds sequenced (drums or pitched instruments) are not tied to MIDI channels, so there are 16 MIDI channels available to sequence external sounds.

In order to start recording, you need to specify the time signature and length of your sequence in bars. Here the open-endedness of the 440's sequencer immediately becomes apparent, as you can specify a four-bar cycling sequence or 999-bar linear recording, to suit the way you prefer to work. Time signature can be anything from 1 to 64 over 2, 4, 6, 8, 12, 16, 24 or 32, but it defaults to 4/4, you'll be pleased to hear. Still, it's nice to know that if the urge to record in 59/12 becomes too much to resist, the 440 can handle it.

Auto-correct (or quantisation) is given a similarly flexible range, from quarter-notes (for the most tragically unmusical) to thirty-second note triplets (for the fussy). This section also contains a Shift parameter, so that auto-correction can be shifted ahead or behind the beat.

The auto-correct parameters (you can switch them off completely if you want to) also govern the positioning of notes during auto-repeat, and the size of the steps in step-time recording.

A Metronome click is available for real-time recording, and this can also be set to sound over the quarter-note to 32nd-note triplet range. Metronome pitch can also be adjusted, so that it can be heard in a different register to whatever sounds are coming out of the machine. No more inaudible clicks here.

The Swing feature is a record function, and gives added weight to the first of each pair of two beats. It's a versatile beast, because being based on the auto-correct value, it allows you to swing at any level you like from (you guessed it) quarter-notes down to 32nd-notes.

Usefully, Auto-correct, Swing and Metronome settings can all be altered while a sequence is running, and the changes made take effect at the beginning of the next bar.

My principal criticism of this part of the 440 is that there is no way to Auto-correct or Swing parts already recorded "after the event", and nor is there any way of removing these effects if they produce undesired results without erasing and re-recording.

Some people may be used to working like this, but in the interests of having as open-ended a system as possible, there really should be ways to "audition" the results of

Auto-correct or Swing without committing yourself to keeping them or re-doing the part...

For those who like to work in tape-recorder fashion, the 440's sequencer also features programmable Punch In and Punch Out points in the sequence. These can be set up in terms of bar, beat and click (24 per quarter-note) numbers or SMPTE time.

And those who think that the drum machine approach is best can use the Work Loop, which cycles round and round a set number of bars.

The sequencer has eight tracks, which some might regard as a limitation, but is not restricted to "one MIDI channel per channel" format. You can merge as much data onto one track as you like, with all the internal sounds plus 32 channels of MIDI sequencing (16 from each of the two MIDI outputs) held on one track.

The only problem is that, unlike the Roland MC500, the Studio 440 doesn't allow you to extract the data on one MIDI channel out of a track for further editing. I trust this is something Sequential haven't had time to implement yet, as it can be a lifesaver, but the manual does seem a bit final when it says "once data is bounced together, it can't be unbounced". So there.

While you are working, you can Mute any or all of your previously recorded tracks so they don't distract you, and then Unmute them at will.

In fact, one of Sequential's demo sequences uses Mute/Unmute very effectively to change the parts in one cycling sequence, continuously changing the sections you are hearing.

Tempo and timing options on the 440 are also extremely flexible. The internal clock can be set in Beats Per Minute (40 to 250) or in Frames Per Beat (45.0 to 5.8) for the SMPTE-minded. The Initial Tempo for each sequence can be set, and then changed by up to +/−99.9 BPM or +/−18.0 FPB in each bar. This change can take place within the space of one beat, or over a maximum 99 beats. Alternatively, the timing throughout can be varied by tapping in the tempo, so you can add a more human feel to your sequences, or sync your sequences to music already recorded.

The amount of beats over which tempo changes are averaged out is variable between 2 and 8, and the process can be carried out at eighth- or quarter-note levels. The timing of data being sent out of each of the MIDI Outs can be offset to cope with MIDI devices which respond late to MIDI data. The offset can be anything from +15 to −14 milliseconds, and is independent for each MIDI Out. This is all very fine, but I can't help feeling that certain machines I know could do with a bit more help than 15 milliseconds. And seeing as it may be only one device which is late, or that different devices need different offsets, it would be better if this feature were independent for each track or MIDI channel.

Still on the sequencing front, there are a whole host of standard editing features on the Studio 440, plus a few which are not so usual. Erase, Bounce, Copy, Delete, Insert, Transpose and MIDI Channelise are fairly commonplace, but Replace (which substitutes one of the internal sounds for another in a sequence) and Velocity Scale (which allows overall MIDI mixing) are as interesting as they are unusual.

Rotate is even more off-the-wall, sliding a track forwards or backwards against the others by a specified number of clicks (for a subtle effect) or beats (for more experimental stuff). I found it best for advancing the snare in a track to "push" a whole piece along.

The 99 sequences can be joined together into 12 songs, but if this doesn't give you the required complexity, you can Dub Songs back to Sequences and then recombine these until you get where you're going. For example, you might combine several sequences together into Song 1, to make your verse, Dub it back to a sequence, do the same to

create the chorus and middle eight, and then combine these into another Song to produce the finished form.

The only limit I found to the number of times you could go round this "Sequence to Song and back to Sequence" cycle was when I got to the stage where memory was full of the various components cleared along the way – but if you delete these as soon as they are no longer required, you could have a new hi-tech way of building up your first symphony.

And don't forget that you can save individual sequences at any time in case you need them later.

Synchronisation facilities on the 440 are nothing if not complete. For those antique bits of gear you have lying around, there are triggers and 24, 48 or 96 ppqn connections. And studio engineers will be pleased to see SMPTE (24, 25 or 30 frames/sec dropframe and non-dropframe varieties) which can only tell the time, not set tempo. Modern musicians will be glad to see the MIDI clock, together with those wonderful song pointers which allow synchronised playback from any point in your track.

Now, the problem normally is that systems like those described above are not directly compatible without some sort of interface, but by having them all on the 440, you can use one machine to act as a master interface device, running off-tape SMPTE in the recording studio and dispensing MIDI, clicks and triggers to its humble slaves. But Chris Meyer (software writer and MT contributor) hasn't contented himself with this lot. Single-handedly (or so it seems), he has developed the MIDI Time Code standard (originally referred to as MSMPTE) to facilitate communication between us (musicians) and them (engineers). It combines the absolute timing information accuracy of SMPTE with the cues for MIDI devices to trigger from. Needless to say, the Studio 440 both generates and receives MIDI Time Code.

Verdict

TO BEGIN WITH, comparisons with the Linn 9000 are bound to occur. But as far as I'm concerned, there is no comparison. The increased sample fidelity and the fact that all the 440's sounds can be user samples is enough for me to declare it a clear winner. I prefer the 440's more sensitive pads (though this is a very personal thing) and the way you can assign sounds, tuning, level and pan position to whichever pads you want. The sequencing side of things is more open-ended as well, though there's no doubt some users will still prefer the immediacy of the Linn. Finally, the Studio 440 is a new machine, available now; the Linn 9000 is an old machine made by a company that no longer exists, and is no longer available.

To sum up the 440 is as difficult as it is to categorise it. As a digital drum machine, it is the highest-fidelity device there has ever been, and provides some excellent drum pads for you to trigger those high-fidelity sounds from.

As a sampler, it is equal to the best 12-bit keyboard or rack-mount samplers, and a lot more besides in some areas. As a sequencer it is a very powerful device, with extensive and innovative editing features, but without the ability to undo auto-corrected and merged tracks if the results are unsatisfactory. As a master controller, it does just about all the interfacing you are ever likely to need, whether in conjunction with MIDI or pre-MIDI devices.

But the real beauty of the Studio 440 is that it is all of these things in one box. The few omissions in the operating system may well be added in system updates, but the features already present make it the most comprehensive combination machine currently available on the market.

Shame it's so forgetful.   ■

KORG SG1
Digital Piano

Latest entry into the booming electronic piano market uses "traditional" sampling techniques, but has some novel features, too. How does it compare with the rest of them? Review by Simon Trask.

OF ALL THE tests that modern music technology is put to, the most consistently difficult is its ability to recreate the sound of an acoustic piano. It's still a sound that the majority of keyboard players want·from their technology, and for studios who have to keep calling in the piano tuner or for touring musicians who never know what acoustic horror they'll be presented with next, the availability of an electronic instrument of consistent quality is a strong attraction.

Nowadays there's the added attraction of incorporating a "piano" with all the other goodies that technology has to offer, courtesy of MIDI. The latest wave of electronic pianos to attempt the magic feat has brought us offerings from Yamaha, Roland, Ensoniq and now Korg. The last company on that list has an offering called the SG1, with the letters standing for Sampling Grand – though curiously, the instrument can't actually sample sounds the way Korg's DSS1 can, for instance.

As seems to be common practice among manufacturers of electronic pianos, Korg have made their instrument available in 76-note (the SG1) and 88-note (the SG1D, which we had for review) versions. While the keyboard span is the most noticeable difference, it's also worth bearing in mind that only the 88-note version is pressure-sensitive for MIDI transmission, while the 76-note version goes some way towards compensating for its smaller number of notes by including key transposition over a one-octave range. Apart from these differences, the two SG1s offer the same facilities.

In keeping with current electronic piano aesthetics, the SG1 is rigorously constructed and has a sparsely designed front panel. As with Roland's RD300, the SG1 has no central LED window display, which fortunately doesn't prove to be too much of a problem.

Received wisdom dictates that electronic pianos need only provide a small number of sounds onboard – they are essentially *pianos* rather than all-purpose synthesisers or samplers. So, the SG1 has four piano sounds (two acoustic and two electric), which turns out to be several less than other electronic pianos currently on the market.

However, Korg have provided the option of a much broader sound palette by giving the SG1 a slot for ROM cards. None were available with the review instrument, but apparently harpsichord, clavinet, guitar/bass and harp cards are in existence.

Elsewhere, the SG1 provides you with three-band equalisation (bass, mid and treble) together with an additional brilliance control for modifying the overall character of its sounds. These are implemented on front-panel sliders, allowing modifications to be made very quickly.

Also provided is a digital chorus unit, with on/off control (not storable) and depth and speed parameters adjustable via front-panel sliders. Subjectively this chorus lacks the warmth and fullness that Roland are able to bring to their chorusing, though it's usable enough.

Sounds

WHILE YAMAHA HAVE chosen to use FM for their PF pianos and Roland have used Structured/Adaptive Synthesis

for their expanding RD range, Korg (like Ensoniq) have opted for sampling – in this case 12-bit sampling. As you'll probably know, for sampling to be effective over a wide range, you need to take a number of samples; in other words, you need to embark on what's known as multi-sampling. Korg have provided about 12 samples for each sound, some crossover points being more noticeable than others; it's a point worth bearing in mind, and of course a consideration which doesn't arise with the Roland and Yamaha offerings.

But the actual sound *quality* of the acoustic pianos is superb: clear and rich right across the range, and bright without being thin in the upper regions (where the hammer strike is also caught very well). The first acoustic piano sound represents the "standard" acoustic grand, while the second has more of a honky-tonk sound to it – though less noticeably at each pitch extreme.

The electric pianos which Korg have opted for both have a hard-edged sound, though the second has more warmth to it. Neither are representative of a Fender Rhodes sound, for those of you who want such a thing.

If there is a weakness to the SG1 sounds, it appears when they are sustained; depending on the range, there is either an unnatural buzzing or a ringing, which perhaps arises from the looping of sounds (though if there is some looping taking place, it's incredibly smooth on all four sounds). These characteristics also tend to make the decay sound a little too long to be realistic.

One aspect of piano sounds which computer hardware and software have yet to touch upon is the *interaction* between notes within the resonant body of an acoustic piano; this is particularly evident when using the damper pedal, which on a real piano releases the dampers from all the strings. Technology has some way to go before it is able to recreate all this complexity, and comparing *any* digital equivalent with the real thing, the difference can be quite striking – though in the case of a digital instrument in isolation, this is perhaps a consideration which will concern only perfectionists.

The SG1 keyboard conforms to the normal requirements for a piano-style action, being weighted and consequently firm to the touch; if anything, this one was a mite too firm to these fingers.

Korg have also provided a choice of eight velocity scales, which effectively control the touch-responsiveness of the SG1 and of any slaved MIDI instruments. With the piano on

its own, this is a genuinely useful range which allows you to fine-tune the response to your taste. And when used in conjunction with slaved MIDI instruments – which themselves have varying responses to MIDI velocity data – it's more useful still.

What is annoying, though, is that Korg have used a small knob on the piano's rear panel for selecting the scale. The same approach has been adopted for selecting the MIDI transmit and receive channels, and for adjusting the master tuning of the instrument (+/− nearly a semitone). Not exactly what I'd call ready access.

Interfacing

THE PROVISION OF MIDI on today's electronic pianos (and what manufacturer in their right mind *wouldn't* provide it?) obviously has implications for the ways in which these instruments will be used. The simplest application is to record and play back solo piano performances using a MIDI

▶ *"Unusually, there's a slot for ROM sound cards. None were available with the review instrument, but apparently harpsichord, clavinet, guitar/bass and harp cards are in existence."*

sequencer, but your piano can also become prime candidate for the role of master keyboard in a larger MIDI setup.

Korg's offering gives you some flexibility in determining how you want to organise your piano sounds and MIDI'd slave sounds. Essentially this involves a single split-point which can be set anywhere on the keyboard, giving you two sections which together can be set to various combinations of internal and MIDI performance.

Switch the SG1 on, and the default arrangement involves both sections playing internal sounds and transmitting to external MIDI devices. You can also set the upper section to play only internal sounds while the lower section only transmits to external MIDI devices; set the lower section to play only internal sounds while the upper section transmits only to external MIDI devices; or set both sections to transmit only to external MIDI devices. When internal sounds are off, they can still be played from external instruments (this is known as MIDI Local Off), so you can be recording into a MIDI sequencer using only an external ▶

▶ sound, while the sequencer is playing back an SG1 piano part.

The other point to bear in mind is that, as you can only set a single MIDI transmit channel on the Korg, it's not possible to route each section of the SG1 to a different instrument.

Now, while this MIDI implementation doesn't cover every possibility you might want to make use of, it's

▶ *"You're given a choice of eight velocity scales to control the touch-responsiveness of the SG1 and of any slaved MIDI instruments...which themselves have varying responses to MIDI velocity data."*

certainly flexible. And what's more, switching from one mode to another can be accomplished with little fuss.

Unlike some manufacturers, Korg seem to appreciate the role of an electronic piano as MIDI controller to the extent that they've provided pitch-bend and mod wheels for use with other MIDI equipment, despite the fact that acoustic pianos obviously don't possess such things. They may appear odd at first, but they're small enough to be fairly inconspicuous, and they certainly come in useful when you start connecting MIDI synth voice units to the SG1.

Korg have also provided their mod wheel (which is centre-sprung) with two functions, labelled vibrato and filter tremolo and allocated to MIDI controllers 1 and 2 respectively.

The only other MIDI controller which can be transmitted is Sustain On/Off, but the SG1 can also respond to master volume, sostenuto and soft pedal commands from an external instrument or sequencer. The instrument's inability to generate these last three itself raises the ironic

possibility of using a Yamaha MCS2 to provide them, but that's another story.

Finally, other MIDI facilities allow you to enable and disable Omni reception, program-change reception and sustain (damper) pedal transmission. These are implemented by pressing the patch selector buttons in conjunction with the MIDI button; as each switch has its own LED, you can see at a glance what the current settings are.

Overall, the SG1 is a fine instrument which should satisfy a lot of musicians looking for an electronic alternative to the acoustic and/or electric piano. Its sound may not be the most realistic overall, but it has a number of other advantages over its rivals, most important of which is its ability to play back sounds from additional ROM cards. I look forward to those with relish. ■

Price *SG1D, £1499; SG1, £1349; ROM memory cards £TBA; all including VAT*
More from *Korg UK, 32-34 Gordon House Road, London NW5.* ☎ *01-267 5151*

Instant Pictures

Thanks to a Canadian invention called Mandala, digitised video images can now be used to control MIDI events, and vice versa. It could have far-reaching implications for all areas of performing art. *Report by Jim Burgess.*

IT'S A JUNGLE SCENE, complete with heavy foliage. A digitised body is in the centre of it all. Suddenly, two large birds appear, flying lazily overhead. The body leaps up and grabs them, causing a synthesised squeal to emanate forth as the birds turn into glowing balls. The balls seem to attach themselves like leeches to the hands of the body, following their movement until, in one final motion, the hands wrench themselves away in a snap. The balls promptly explode, sounding a combination of sound samples. As the fragments of the exploded balls fall to the ground, each one emits a dreamlike,

▶ *"Creating your own videos has never been this easy, and the idea of composing music and visuals at the same time will become a reality."*

harmonic note as it comes into contact with the jungle floor.

Sound like a scene out of a film you'd like to see? It's just one of the limitless range of interactive video/music environments you can create with a revolutionary new video-based real-time performance instrument known as Mandala. Very Vivid of Toronto, Mandala's inventors, may very well have created a new artistic medium in its own right.

Mandala is a totally open-ended computer-based instrument that you can use to integrate video images and music together in a single performance system. The performer plays any combination of MIDI instruments by moving or dancing around a "musical environment" that can consist of literally any type of video image or "scene" you can imagine.

The Mandala system revolves around a customised Commodore Amiga computer and Very Vivid's own video camera/

digitiser. Using the Genlock capability of the Amiga, graphic images can be combined with the live video output of the camera. The result is that by moving around in front of the camera, you cause a digitised silhouette of your body to move around "inside" the graphic images on the screen. By watching the monitor as you move, it's easy to get a feel for the position of your body inside each graphic scene.

You can create your own video scenes using one of the painting programs supplied with the package or Mandala's own custom image digitiser, which is capable of "photo-graphing" any existing image from a book, painting, photograph, whatever. The final image will be the backdrop of your musical environment. It might be a landscape, a space scene, or whatever you can imagine.

Once you've got a visual backdrop or scene, the next step is to create a variety of icons for your image. These are graphic objects that could look like just about

anything – musical instruments, buildings, projectiles, and so on. When you're satisfied with the icons or objects you've created, you can place them into various positions around the original scene you created. Icons can be moved around the screen at will, so you can adjust their positioning within the scene as much as you want.

The next step is to decide what sort of an effect you want those icons to have when you "play" them by allowing your body image to come into contact with them. By double-clicking on any icon, you can access a menu that is designed to permit any combination of events to occur when that icon is played. These can include instructions for literally any type of MIDI event (including System Exclusive changes), a paint or animation effect, a scene change, a transposition or a total reconfiguration

of the other icons on the screen.

This open-ended programming technique is referred to as "nexting" by Mandala's R&D Director Frank MacDonald, the man responsible for designing the instrument's comprehensive user interface. Mandala even lets you create complex animation events. For example, you could say: "move this object in a straight line from this point to this other point in five seconds. If the object hits something on the way, trigger a colour change and send out a program change and the following notes on MIDI channel 13."

Possibilities

NOW THE ENDLESS creative possibilities of this instrument should be apparent.

Literally any combination of events can be set up and triggered from a specific body movement. The performance environment of your creation can be set up to cause any combination of actions to happen, depending on where you move your body in relation to the screen.

Here are some examples of some of the performance environments Vincent John Vincent (Very Vivid's Creative Director) has already created for Mandala:
1) An image of the Toronto skyscape forms the backdrop, complete with sky-scraper icons. The performer appears as a Godzilla-like figure towering over them. As he smashes the tops of the buildings, a variety of drum sounds are triggered via MIDI note events.
2) A wall of sound is created over an Egyptian backdrop that consists of a solid horizontal row of small circles. As the ▶
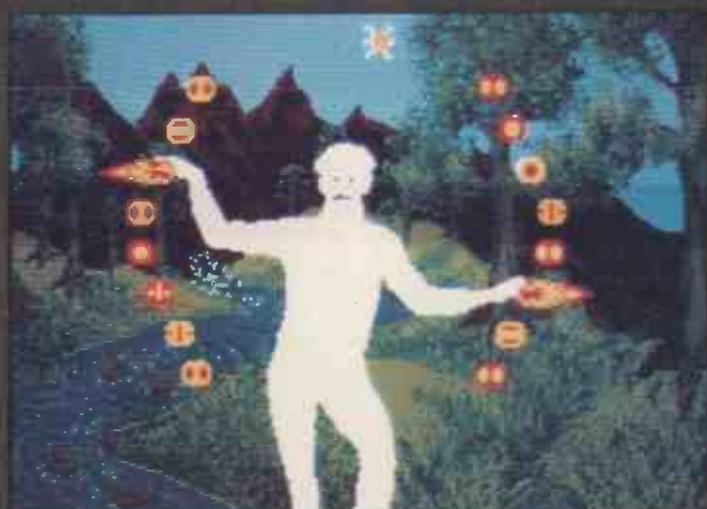
▶ performer moves left and right within the screen, complex harmonic scales emanate from the MIDI instruments connected to Mandala. One lone icon overhead is triggered occasionally to transpose the instrument to a new scale.

3) The performer is in the middle of an interplanetary space scene. Suddenly, some meteorite projectiles come hurling at him in three dimensions. Those that strike him change colours and create a series of complex sound-effects on contact.

4) A series of musical instruments appear on the screen: a vertical keyboard on one side, a harp on the other, two tympani drums in the middle. Each one is pre-configured to a specific scale or series of notes and is sent out on a different MIDI channel. Naturally, each of the connected sound sources is set up with the sound that corresponds to its icon.

As these examples might indicate, the applications for live performance are countless. With the advanced types of MIDI control functions Mandala lets you define, you could trigger notes or sound effects, start and stop sequences, control a lighting system or stage effects, control a mixer or signal-processing equipment – all with pre-determined body movements.

Furthermore, custom scenes could be projected to the audience with one of the arena-type large-screen projection systems now available. For the first time, performance artists can literally interact live with their own video.

This is clearly the market Very Vivid are positioning the Mandala for. As David Bray (the company's Marketing Director), puts

it: "We want to put Mandala into the hands of creative performance artists. With a system that's this open-ended, no two artists will use it in the same way. Everyone we've showed it to has come up with a new idea of what they could do with it."

To help artists put the system to work in their show, Very Vivid offer a consulting service on a per project basis. That way, their assistance is available to help program Mandala for the application it's intended for. Naturally a certain amount of customisation might be necessary for certain applications, but if anything, that's a challenge that seems to excite the people responsible for creating Mandala.

Opposites

ALL THE APPLICATIONS discussed so far have used video images to control various MIDI events. But the system is also capable of working the other way – where specific MIDI events can be used to create complex animation changes.

For example, different keyboard velocities might be used to specify colour changes on the screen. A certain note might trigger an animation event. Or perhaps aftertouch might be used to move an object back and forth across the screen.

This opens up a whole new world for Mandala. After all, ever since computer animation became popular, musicians have looked for ways of tying music and video closer together. Now video animation

effects may be generated directly from the composition itself. Already, Very Vivid are talking about an animated drummer that is controlled by a MIDI drum sequence...

MIDI users can now generate advanced computer animation effects for their compositions, using the wide variety of sequencing and MIDI control software available to edit the types of effects that Mandala creates.

Imagine the interactive control you could access with a Mandala and the new breed of interactive MIDI software. Creating your own videos has never been this easy, and the idea of composing music and visuals at the same time will become a reality at last. And maybe soon, no self-respecting MIDI studio will be complete without its own in-house animation system.

Mandala is available now – though as far as we know, no UK distributor has yet been appointed. The package consists of a modified Amiga with a Genlock board, a RAM expander, a custom camera/digitiser, the Mandala software, several Paint programs and Very Vivid's own custom MIDI interface. Price on the other side of the Atlantic is around $30,000, but the manufacturers intend to market a MIDI-to-visuals-only version of the instrument as well, at a significantly lower price.

Only one question remains: Which major performance artists will be the first to put this revolutionary new instrument to work in their show? ∎

More from *Very Vivid, 1499 Queen St., West Studio 302, Toronto ONT., Canada, M6R-1A3.* ☎ *(416) 537-7222*

MOOG ROGUE mint, £100, or swap for EX800, a DDL, or any Boss effect. Mark ☎ (0656) 50820.

MOOG SOURCE 16 memories, seq & arp, brilliant lead & bass sounds, immac cond, £210. Jez ☎ (0602) 700908.

OBERHEIM OB1 superb bass/lead sounds, like a programmable Minimoog, rare, f/case, £425. ☎ 01-281 1918.

OBERHEIM OB8 plus f/case, £1200 ono. ☎ (0268) 697023, eves.

OBERHEIM 6R, Roland MKS10, Yamaha FB01 expanders; Yamaha SPX90 FX; Firstman sequencer. Boxed, guaranteed. Gerry ☎ (0442) 63282.

OSCAR full MIDI, latest model, onboard sequencer etc, new, boxed, manual, £320. Jupiter 6 wanted. ☎ 01-674 1799.

PPG WAVE 2.3 plus Waveterm B, latest software, large library, ungigged, immac, £7000. Bath ☎ 319662.

ROLAND ALPHA JUNO 1 two mths old, mint cond, under warranty £400. DR110 drum m/c, £65. ☎ (Chatham) Medway 47210.

ROLAND ALPHA JUNO 2 boxed, as new, £650 or swap 8-voice MIDI synth + cash either way. Chris ☎ Leeds (0532) 646856.

ROLAND ALPHA JUNO 2 unwanted gift, home use only, hardly used, original box, manual, leads, £630. David ☎ Bristol 296768.

ROLAND JUNO 106 stand, £400. SH101, MGS1, adaptor, £130. Boss DR110 £70. FAL 50W cab, £50. ☎ (089 286) 2824.

ROLAND JUNO 106 with box and manuals, vgc, £500. Dave ☎ 061-225 7142.

ROLAND JUNO 106, £450 ono. SH101 £100. TR606 £75. All boxed, with manuals. Also guitars, amps. ☎ (0908) 607001.

ROLAND JUNO 6, Synsonics drum m/c, 10W birdie speaker, all exc cond, £300 ono. ☎ Bradford (0274) 817153.

ROALND JUNO 6 immac cond, £299, or will p/ex for similar programmable model. Pat ☎ (0527) 44782.

ROLAND JUNO 60 plus stand, £400. Jason ☎ (0734) 341789, eves.

ROLAND JUNO 60 mint, £450. Carlsbro pro amp top+rev+chorus, £275. 2×2×12 speakers, £50. Simon ☎ 01-397 5034.

ROLAND JUNO 60 boxed, home use only, £325 ono. ☎ Northampton (0604) 27644, eves.

ROLAND JUNO 60, £380. TR606 £80. Both exc cond, home use only. ☎ Wokingham (0734) 786832.

ROLAND JUPITER 60 good cond, +case, £350. Peavey Renown 160W combo, immac, £200. Quick sales. Winston ☎ (0733) 45868

ROLAND JUPITER 6 vgc, home use only, £650. SH101 £100. MC202 £125, manuals, leads, etc. ☎ Cardiff (0222) 42329.

ROLAND JUPITER 8 vgc, £980 ono, or swap for sampler. Marc ☎ Plymouth (0752) 550401.

ROLAND JUPITER 8 MIDI, £999. ☎ 01-575 0292.

ROLAND JUPITER 8 home use only, £850. Also Crumar DP80 piano, £250. Frank ☎ (0305) 820100.

ROLAND JX3P with PG200 programmer, aluminium f/case and stand, vgc, £495. Dave ☎ (04024) 44352.

ROLAND JX3P with adaptor, £395 inc professional f/case. Swap synth for TX7, as JX3P, full working order. ☎ (0424) 218711.

ROLAND JX3P, PG200, f/case, £350. Or swap for Roland MKS30 or similar. Paul ☎ (077 478) 3811, Lancs (leave message).

ROLAND JX3P, £375. Juno 106, £400. Korg Poly 800, £220. All boxed as new. ☎ Cardiff (0446) 746626, **6-7pm**.

ROLAND MKB300 MIDI keyboard controller, Planet-P piano module, 6mths old, perfect, £800. Simon ☎ (0760) 21419.

ROLAND MKS10 analogue MIDI piano module, perfect cond, £250 ovno. Jon ☎ 01-734 4257/8 days, 01-603 4907 eves.

ROLAND SAS PIANO MKS20, £1050 ono. MKB1000 mother, £650 ono. Mint. Better than RD1000! Home use. Steve ☎ Tyson, Lancaster 65201 x377, 6pm.

ROLAND SH09 plus MPU101 MIDI to CV/Gate interface, £200. Bath ☎ (0225) 319662.

ROLAND SH101 as new, box, manual,

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psu, MGS1, £130. Casio SK1 sampler, as new, psu, £70. ☎ 021-558 0486.

ROLAND SH101 MGS1, PSA220, boxed, hardly used, perfect, £95. Casio SK1, 3mths old, £65. ☎ (07462) 2971 (Shropshire).

ROLAND SH101 MGS1+case, £120 or swap MC202. ES&CM MIDI/sync diagram wanted. Tony ☎ (0205) 61173.

ROLAND SH101 monosynth, Boss psu, manual, boxed, vgc, £110 ono. ☎ Hornchurch (04024) 54418.

ROLAND SH101 psu, boxed, with manual, immac cond, £110 ono. Roland Cube 60, keyboard combo, £170. Grahame ☎ 051-644 6782.

ROLAND SH101 plus adaptor, exc, £110. ☎ East Grinstead 313360, eves.

ROLAND SH101 with case, adaptor, drum m/c, costs £290. Sell for £100 ono. Steve ☎ 01-504 3718.

ROLAND SPU35S pitch-to-voltage synth for guitar synthesising, £150. Thirty 8" floppy disks+locking cases, offers? ☎ 01-286 0642, 01-289 9224.

ROLAND SUPER JX10 immac cond, boxed, guaranteed, sell for £1500 ovno, or swap DX5. Jon ☎ Lewes (0273) 478582, after 6pm.

SCI MAX, £200. Crumar Trilogy £200. Yamaha MT10 preset drum m/c, £40. Brian ☎ 021-455 9848 day, 021-777 9349 eves.

SCI PRO ONE monosynth with sequencer, bargin due to Xmas sale £100. Mark ☎ (0530) 37427, Leicester area (ish).

SCI PRO ONE home use, vgc, £150 ono. Also 12W combo £40 ono. Both £170. Dave ☎ M/bro 311727.

SCI PRO ONE synth, £150. Roland MC202 sequencer, £100. Korg KPR77 drum m/c, £100. Denis ☎ 041-637 9491.

SCI PROPHET 5 Rev 3, sell £700 or swap something interesting, offers? ☎ Brierly Hill 79820 (Midlands).

SCI PROPHET 600 with f/case and updated MIDI spec, £600 ono. ☎ Colin 370 1651.

SCI SIXTRAK, £300. Roland TR909, £250. Both as new. ☎ Doncaster (0302) 61672.

SIEL DK80 unwanted gift, still boxed with garr card, going abroad, hence £400 with ROM cartridge. ☎ (0909) 566695.

SWAP MY PRO ONE for Korg EX800 or £130. Moog Multimoog, filter needs attention, bargain, £60. Mark ☎ (0663) 43388.

SWAP YAMAHA DX100 immac, few weeks old, for Korg Poly 800. ☎ 021-705 0652.

TECHNICS SXK250 PCM keyboard, stunning solo presets, vgc, £275. ☎ (0255) 433300, after 6pm.

URGENT! SWAP immaculate Roland JX8P plus £300 cash for Ensoniq ESQ1. Chris ☎ 01-675 7415.

VISCOUNT BAHIA dual manual organ, including stool and music, vgc, bargain at only £350 ono. ☎ (0992) 466612.

YAMAHA DX100 under 1mth old, 1 years guarantee, mains adaptor, hardly used, £310. ☎ (093 287) 4405 (Surrey).

YAMAHA DX21 one year old, immac cond, home use only, £525. Paul ☎ Ashburton (0364) 53429.

YAMAHA DX21 mint cond, home use only, boxed with all manuals, £520. Gary ☎ 021-357 5777, eves.

YAMAHA DX21 with breath controller, home use only, £475. Dave ☎ 021-443 4441, eves.

YAMAHA DX27 synth, home use only, never gigged, £395. ☎ 021-353 1849.

YAMAHA DX27 exc cond, home use only, £375. ☎ Harlow (0279) 413030.

YAMAHA DX7, QX7, Roland MC202, TR606, TB303, Carlsbro amp plus speakers, all as new, £1700! ☎ (0252) 724414.

YAMAHA DX7, £870. Ohm Tramp keyboard combo, £55. Home use only. ☎ High Wycombe (0494) 26960.

YAMAHA DX7 boxed, vgc, ROM and 32 great internal sounds, £800 ono. ☎ Leeds (0532) 780954.

YAMAHA DX7 boxed, breath controller, foot pedal, 1000 voices, perfect, home use only, £895 ono. ☎ Cheltenham (0242) 30689.

YAMAHA DX7, new voices, ROMs and

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manuals, home use only, £800. Gary ☎ Portsmouth (0705) 732146.

YAMAHA FE30 multikeyboard, as new, complete with dust cover, home use only, £595 ovno. ☎ Crayford (0322) 529723.

YAMAHA HX1 plus disk recorder, £2500 off list price, would take FS70, FX20 p/ex. Reeves ☎ (0354) 53063 (Cambs).

YAMAHA KX5 perfect cond, boxed, manual and leads, £140, offers? Chris ☎ (058 27) 62233.

YAMAHA PF15 stand+full f/case, £585. Polymoog synth+case, vgc, £475 ono. Steve ☎ 01-241 1585 or (0727) 66897.

YAMAHA PS20 home keyboard, auto accompaniment etc, plus expression pedal, only £100. Jeremy ☎ Chichester (0243) 512418.

YAMAHA PS6100 as new, + stand + footswitch, 124,415 FM sound variations, over 1,500,000 PCM sound variations, £673.49. ☎ 01-304 4941.

YAMAHA SK20 organ/string polysynth, beautiful sounds, immac cond, case, £225 or exchange FB01. ☎ Guildford (0483) 576680.

Sampling

AKAI S900, £1549. Alesis MIDIverb/fex £279. Roland Jupiter 8+f/c, £899. Ensoniq ESQ1, £999. Steinberg Pro24 £199. DEP5 £559. ☎ 051-722 6084.

CASIO SK1 sampler keyboard with psu, £75. Boss RDD10 digital delay £100. ☎ Lowestoft (0502) 516170.

ENSONIQ MIRAGE, f/case, extensive library, £999. SCI Drumtraks, f/case, new chips, £599. Adrian ☎ (044 46) 41708.

ENSONIQ MIRAGE keyboard, mint boxed, MASOS Advanced Sampling Guide, disks, etc, £875 ono. Matt ☎ (0252) 721264, eves.

GREENGATE DS:3, Apple II+, MIDI board, looping synth software, two drives, monitor, £695 or consider swap. ☎ (04574) 2156 (Manchester).

PROPHET 2000 sample swaps wanted. 256 or 512K. Also instructions for BBC EMR 8-track real-time software. Gordon ☎ 091-271 6403.

ROLAND S10 + disks, £800 or ESQ1. CX5M, YK10, DMS, 2 ROMs, £200 or TR727 or TR505. Both boxed and mint. Manchester 061-205 7904.

SAMPLES hundreds, cheapest and best. Emulator II, Mirage, S50 etc. £14.95 cheque to Gareth Thomas, 22 Fairoak, Newport, Shropshire.

SCI PROPHET 2000 perfect cond, £1300. ☎ 01-203 5155.

YAMAHA VSS100 sampling keyboard + psu, boxed and in perfect cond, £120 ono. Deliver locally free. Jeremy ☎ 061-860 4071.

Sequencers

CASIO SZ1 four-track sequencer, boxed with manual, psu, vgc, £165. Neil ☎ Durham (0385) 700142, after 6pm.

KORG SQD1 sequencer, £410. Steinberg Pro 16 Plus edit kit and interface, £85. Roland TR505 drum m/c, £200. Roland Alpha Juno 1 synth, £500. ☎ (0270) 666154.

KORG SQD1, £399. CZ101 £195. Fostex reverb £135. Cutec graphic £145. Fostex A8 remote £25. JSQ60 £35. ☎ (0268) 742082.

ROLAND MC4B MicroComposer, c/w data recorder; Sycologic AMI, converts to MIDI; Linn LM1; a beautifully maintained classic package! £1200. ☎ (0252) 725800.

ROLAND MC4B MicroComposer; MTR100 high-speed tape recorder; OP8 DCB interface; epoch-making computer sequencer, £350. ☎ 01-703 9309.

ROLAND MC202 + SH09. MC202 boxed + manuals, excellent 2-channel sequencing combination, £210. Ben ☎ Bridgwater 423495, eves.

ROLAND MC202, £90 or swap for DDM110. Korg Micro Preset synth, £65. HC2 handclapper, offers? Jon ☎ (0449) 675472.

ROLAND MC202 MicroComposer,

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boxed, working, £100. Ibanez AD80 analogue delay, £35. Maestro wah/vol, £20. ☎ 01-223 1857.

ROLAND MSQ700 perfect cond, boxed, £350 ono for quick sale. ☎ 01-954 2025.

Drums

BOSS DR110 drum m/c, £70. Vyv ☎ 888 1976.

E-MU DRUMULATOR, £300. Korg Percussion, psu, £125. (Swap Tom cartridges). Casio CZ101, boxed, £250. Swaps? Nick ☎ Southport (0704) 67478.

KORG DDM110 mint, boxed, home use only, low mileage, manual and tranformer inc, £99. ☎ 01-641 6808 (Sutton), eves/ weekends.

KORG DDM110 digital drum m/c, mint cond, stereo outputs, tape interface, quick sale hence £90. Julian ☎ (0773) 765061.

KORG DDM110 boxed, as new, psu, manuals, £95 ono. ☎ 01-226 2919.

KORG DDM110 digital drums, boxed, as new, £110 ono. ☎ 01-776 1823 (Croydon) eves, 01-587 1367 day.

KORG KPR77 drum m/c, boxed, mains adaptor, immac. Mark ☎ 01-461 0247, eves.

MPC PERCUSSION COMPUTER Spectrum interface and software, £100 ono. P/ex MIDI drums considered. Scott ☎ (0832) 88345.

OBERHEIM DMX vgc, f/case extra cards, £850. Roland Cube 60W, £100.

OBERHEIM DMX drum m/c, good cond, updated, quick sale, £850. Roland Juno 60, £350. Winston ☎ (0733) 45868, anytime.

OBERHEIM DX separate outputs, tuning, £595. Roland TR505, £225. Korg DDM220 Latin, £75. Pair electronic pads, £30. ☎ (0342) 23094.

OBERHEIM DX drum m/c, home use only, as new, £450. ☎ 01-435 6319.

ROLAND CR78 CompuRhythm: John Foxx Methmatic, Japan Polaroids, Numan, Anderson, Phil Collins. Quick sale £80. Jon ☎ (0507) 602251.

ROLAND TR505, £220 ono. ☎ Rugby (0788) 70251.

ROLAND TR505, £225 ono. Alpha Juno 2, £625 ono or swap TR707, DX21 plus cash, home use only. Chris ☎ Leeds (0532) 646856.

ROLAND TR606 Drumatix, boxed with soft case and manual, home use only, £85 ono. ☎ Thatcham (0635) 68903.

ROLAND TR606 Drumatix, original packaging, soft case, psu, manuals, as new £85 ono. Steve ☎ 01-690 8174, eves.

ROLAND TR606 Drumatix, separate outputs, excellent condition, carrying case and manual, £100 ono. Mike ☎ Rickmansworth (0923) 720083, anytime.

ROLAND TR707, £325 + Pad 8 Octapad, £250. Peavey KB100 combo, £150. Cardiff ☎ (0446) 746626, 6-7pm.

ROLAND TR707 boxed, two hours home studio use only, immac, £400 ono. Paul ☎ 021-445 5571.

ROLAND TR909 drum m/c, MIDI, tunable drums, separate outputs. Also Yamaha 8:2 mixer, stereo jack input. £260, £140 ono. ☎ (0926) 36668.

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YAMAHA RX15 home use only, immac, £285. ☎ (0702) 586847.

YAMAHA RX21 drum m/c, hardly used, boxed with manuals, as new, £175 ono.

Andy ☎ Liverpool 051-733 4677, eves.
YAMAHA RX21 never used, exc cond, £175 ono. Mark ☎ (0446) 742702.
YAMAHA RX21 four mths old, still under guarantee, £200, or swap for Roland TR505. Andy ☎ Peterborough (0733) 73184.

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APPLE II Euro Plus with twin disk drives, monitor, and printer, £300 ono. Simon ☎ (0386) 830473, after 6pm.
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CX5M SOUND-PACK: 144 excellent sounds (cassette), free data sheets. Ch/PO £10. N Fawcett, 10 Cressex Road, High Wycombe, Bucks, HP12 4TY.
CX5M SOFTWARE: Composer 1, £15. Voice 1 £15. DMS1 real-time sequencer cartridge, £30. All three £50. David ☎ 041-959 0802.
CX5M (32) SPARES: large keyboard, power supply, ROMs, manuals, leads, no computer. Offers? Dave ☎ Gravesend (0474) 65247, anytime.
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FOSTEX 250 multitracker, one dirty switch on channel four needs cleaning, but otherwise perfect, £295 ono. John ☎ 01-699 4979.
FOSTEX 350 mixer plus meter bridge, £300 ono. Ibanez DM1000 digital delay, £175 ono. ☎ 01-385 6690.
FOSTEX A8 + remote £850. Boss CE300 £135. Roland SBX10 £230. MSQ100 £200. Simmons SDS5 £475. Delivery. ☎ (0532) 743012.
FOSTEX A80 8-track recorder, £1200 ono, 8mths old, immac cond, hardly used. ☎ 061-445 7250.
FOSTEX X15, £175. Yamaha mixer £40. Roland SH101, MC202, £120 each ono. Wanted: Fostex 350 mixer. ☎ (0256) 87294.
FOSTEX X15 in mint cond, boxed, power supply, manuals, etc, £199 ono. Can deliver. Charles (0635) 200295, after 8pm.
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TASCAM 244 hardly used, £475. Ian ☎ (0962) 55543, eves.
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TASCAM 22:4 four-track, 22:2 two-track, System 20 mixers, tapes, boxed, vgc, £990 ono. ☎ (0722) 330061, eves.
TASCAM 234 Syn-cassette, 4-track recorder, offers? Andy Wilson ☎ 01-659 6440, eves.
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TEAC 144 Portastudio, £300, good cond. Wanted CS80 manual: buy, borrow, loan. ☎ (0257) 452303.
TEAC 2A MIXER home studio only, immac, £120 ono. Paul ☎ 021-445 5571.
TEAC A3440 four-track, hardly used, exc cond, £530, no offers. Securicor delivery can be arranged. David ☎ (0327) 857456.
TEAC A3440 four-track, exc cond, £550 ono. Steve ☎ Luton (0582) 581975.
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YAMAHA MT1X four-track, £300 ono. ☎ (0736) 66516.
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Amps

BADGER KEYBOARD Coda 15 amp, £30. Dave ☎ Harrogate (0423) 524092.
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CARLSBRO STINGRAY multichorus 150W amp, chorus, reverb, vibrato, and link facility, vgc, £250 ono. ☎ 01-504 3718.
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Personnel

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Misc

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