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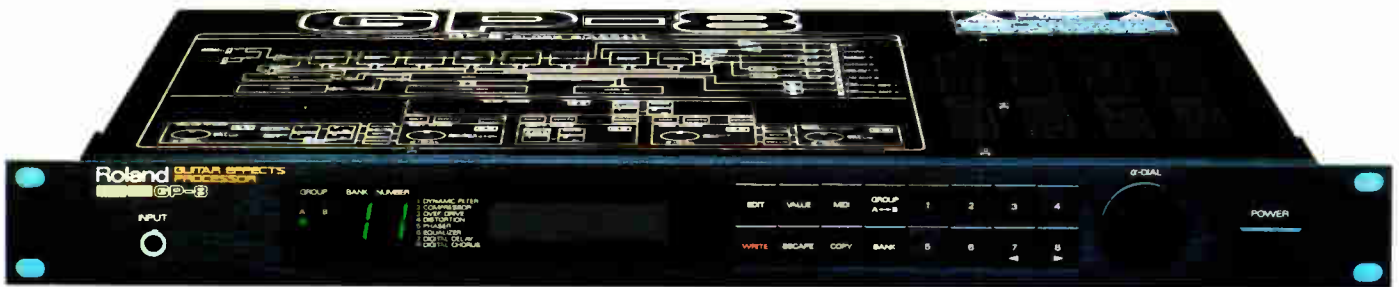
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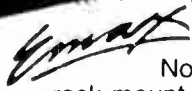
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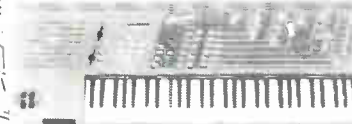
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# DIVERSE REPORTS

SOMETHING IN THE air - or more accurately, something on my feet - suggests it's showtime again. First, the APRS recording show, held at the end of June. This is a mild-mannered event, but as usual, the calm atmosphere of this year's show disguised the fact that there were a lot of innovations being displayed, and a lot of business deals being struck.

There would have been a full report on the proceedings in the issue you're holding now - had it not been for events 4000 miles away in Chicago just a day later. For this year, as in 1986, the American music industry gathered in the Windy City for its annual summer expo, a huge and moderately tasteless affair that is quite unlike any music trade show anywhere in the world.

Undeniably, the influence of summer NAMM is declining relative to that of its winter counterpart, usually held in Los Angeles around the end of January. Yet despite this, the Chicago event still seems capable of throwing up more surprises in the way of new musical innovations.

Hence, beginning on page 63, you'll find the biggest show report we've ever compiled. Over 8500 words from four on-the-spot contributors, together with our usual selection of colour snaps from around the exhibition halls, just to give you an idea of *why* we found ourselves able to write so much.

You'll get your own opportunity to see much of the new gear "in the metal" if you venture down to Olympia between July 31 and August 2. You've read the previews, you've seen the horrendous press ads, and now the only thing to do is hop on a train and make sure you don't miss out on this year's British Music Fair.

For while summer NAMM dwindles in importance and the rest of Europe's summer shows do little but bide time, the BMF goes from strength to strength. More exhibitors than ever this year, twice as much space to roam around in, and a predicted record-breaking attendance level.

What makes the BMF so attractive? Partly the fact that the London event makes such a clear distinction between the days when the public is not admitted (this year, July 28-30) and the days when they are. The trade can do their business unhindered for three days midweek, while exhibitors can get vital feedback from punters

over the weekend, without having to worry about business.

Another reason could simply be that - as we've mentioned before - London is a major capital of modern music. Which is more than you can say for Paris, Milan, or even Chicago. The record industry may be turning out its biggest heap of trash for 25 years, but there's more of that trash coming out of London than almost anywhere else on Earth.

Finally, I believe the timing of the BMF actually suits manufacturers and dealers better than NAMM's regular June slot. Barely four months of precious R&D time have passed since Frankfurt when the time comes to book the plane tickets to the Great Lakes, which is why there are always so many thrown-together prototypes on display in Chicago. At Olympia, the machines tend to be better finished, and as a result, trade visitors seem to be more willing to get out their cheque-books.

As for bad points, the only negative thing I can think of about the BMF is the catering. Perhaps we'll see more musicians bringing cucumber sandwiches this year.

Meanwhile, back across the fen in Cambridge, things are again proceeding apace in the Music Maker Publications empire. Result? A couple more slots to be filled on the staff of Music Technology, as the rest of us file on up the ladder of bureaucracy to reach our own levels of incompetence.

The gaps we have to fill are for an all-round production person to assist in sub-editing, proof-reading, and generally kicking the rest of the editorial team where it hurts; and for a young staff writer to research and write up features on the full range of topics covered by the magazine. Salary for both jobs is negotiable (read low), and we need to know you're interested by the second week of August.

The last time we needed staff, we received an Everest of applications, but don't let that put you off. If you think you can outshine the competition, pop a CV in the post to us.

Better still, hand it in to us in person at the BMF; we're on stand N4, right next to the National Hall entrance. Who knows? You may just take our minds off the catering. ■ Dg

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MUSIC TECHNOLOGY AUGUST 1987

# axe music

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Yamaha DX21 Synth	£799	£685	Fender 62 Custom Tele	£379	£379
Yamaha DX27 Synth	£575	£499	Fender USA Standard Strat.	£332	£229
Yamaha DX100 Synth	£419	£195		£290	£272
Yamaha QX7 Sequencer	£315	£199	Squier Standard Strat	£329	£279
Yamaha QX5 Sequencer	£329	£299	Squier Standard Tele	£329	£329
Yamaha QX21 Drum Machine	£799	£899	Squier Precision Bass	£399	£459
Yamaha RX17 Drum Machine	£999	£999	Charvel Model 1	£459	£479
Yamaha RX11 Drum Machine	£449	£279	Charvel Model 1A	£479	£579
Yamaha RX5 Drum Machine	£325	£449	Charvel Model 2	£579	£699
Yamaha TX81Z Sound Generator	£479	£725	Charvel Model 3A	£699	£799
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Yamaha CX5 II Music Computer	£1,155	£899	Charvel Model 5	£329	£379
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Yamaha SPX90 Digital Multi-Effect Processor	£1,999	£1,899	Charvel Model 3B Bass	£595	£459
Yamaha EMX150 6-2 Powered Mixer	£899	£899	Charvel Model 360 Guitar	£699	£635
Akai S900 Sampler	£1,999	£899	Rickenbacker 330 Guitar	£796	£335
Akai S700 Sampler	£899	£799	Rickenbacker 4003 Bass	£442	£219
Akai AX73 Synth	£599	£549	Jay Dee Mark King Bass	£292	£299
Akai MX73 Controller Keyboard	£1,099	£999	Ibanez RG140	£359	£259
Akai VX90 Synth Module	£499	£499	Ibanez RS530	£310	£179
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Akai EX100 MIDI Delay/Pitch Shifter	£139	£99	Aria Wildcat Copy	£359	£199
Akai ME15F MIDI Dynamics Controller	£139	£139	Hondo Explorer Copy	£269	£175
Akai ME20A MIDI Sequencer Arpeggiator	£159	£139	Kramer Pacer	£248	
Akai ME25S MIDI Programmable Note Separator	£159	£139	Kramer Barretta		
Akai ME30P MIDI Programmable Patch Bay	£1445	£1,350	Focus 2000		
Roland D50 Synth (New Model)	£2,325	£1,999	Striker 2000		
Roland JX10 Synth	£999	£899	Striker 100		
Roland Alpha Juno 1 Synth	£999	£899			
Roland Alpha Juno 2 Synth	£999	£899			
Roland S10 Sampler Keyboard	£519	£479			
Roland DEP3 Digital Effects Processor	£295	£259			
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Tascam 246 Porta Studio	£1,999	£1,999			
Tascam 388 8 Track	£1,999	£1,999			
Fostex 160	£299	£249			
Fostex Model 80	£799	£749			
Fostex X15					
Fostex 260					
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Yamaha RGX211	£219	£199			
Yamaha RGX312	£239	£215			
Yamaha RGX1212S	£659	£593			
Yamaha RBX300	£219	£195			
Yamaha RBX800	£399	£359			
Yamaha SG1300T	£659	£599			

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## Comment

2

With the British Music Fair upon us the musical equipment manufacturers are proving there's nothing like the hi-tech end of the music market for innovation - and no-one like MT to pass Comment on it.

## Newsdesk

7

News of new products is coming in thick and fast. Read about it all on MT's bulletin-board.

## Communique

10

Digital Audio Tape controversy, music store co-operation and sexism all came out of this month's bulging postbag - and the postman's put in for a raise.

## Interface

16

Questions and answers on topics as far-ranging as the Sample Dump Standard and books on old synths. Whatever the problem MT's experts have the answers.

## Mission Impossible

26

The competition - and the prizes - continue. This month there are no less than three of the latest products up for grabs - but you'll have to drop in on the BMF to get your entry in.

## Free Ads

93

Forget your local Thursday market, if it's hi-tech (or low-tech) musical equipment, sell it or buy it through Mi's own classified section.

## APPRAISAL

## IMS Dyaxis

23

An American 16-bit digital recording system designed to run with the Apple Mac Plus makes sampling direct-to-hard disk recording a powerful reality. Rick Davies gets his ear to the disk.

## Kawai K5

34

Expanding the "user waveform" approach of their K3 to almost full additive waveform proportions has given Kawai what they call a "multi-dimensional" synthesiser. Bob O'Donnell likes what he hears.



## Iconix Software

87

The first release from a British company called System Exclusive is a 128-track sequencer for the Atari ST. Simon 'ST' Trask (and his assistant, 'Mouse') find it both powerful and flexible.

## MUSIC

## Andrew Poppy

40

A successful composer of minimal music or would-be writer of pop instrumentals? Tim Goodyer isn't sure so he challenges the man himself for the answers.

## Living in a Box

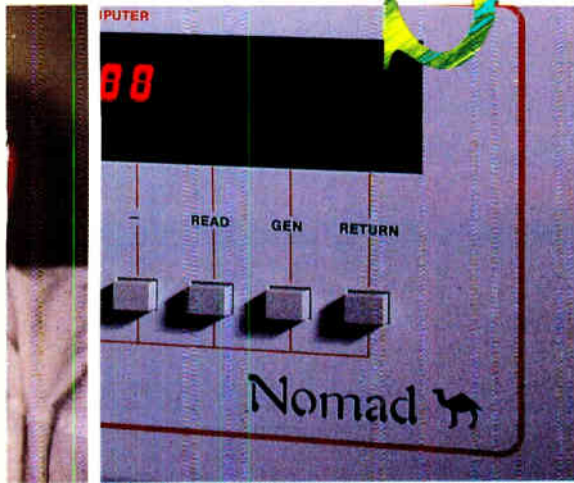
50

An eponymous debut single took Living in a Box high in the singles charts. In a rare interview with this publicity-shy band, Tim Goodyer found technology an essential part of their success.

MUSIC TECHNOLOGY AUGUST 1987

# EVENTS

R 10 AUGUST 1987



## Ryuichi Sakamoto

Japan's most respected technopop pioneer has recently finished an album that breaks new ground for him – it involves live musicians. He discusses his new LP and his other projects with Paul Tingen.

75

## OutTakes

A rare live performance by Peter Gabriel joins the usual selection of album and readers' demo reviews in MT's music reviews.

82

## Nomad SMC

As the price of SMPTE synchronising devices continues to fall, more and more home studios will be availed of their sophistication. Simon Trask checks out the latest breakthrough to find out it's not only cheap but British.

56

## TECHNOLOGY

### Sounds Natural

We begin a new series that looks at how to recreate the sound of acoustic instruments using various methods of synth programming and sampling. In the first part, Howard Massey turns his attention to the acoustic guitar.

28

### MIDI Basics

Confused by MIDI – or even been hiding from it in the hope it might go away? Your prayers are answered and your fears dispelled by Bob O'Donnell in the first of a series that takes MIDI from the top.

44

### We Can't Go On...

...Beating Like This. If conventional drum pads sound old hat, Matt Isaacson and Chris Meyer might have a few ideas for you as they check out the alternatives in our series on creative drum programming.

58

### NAMM Report

In case the current wave of BMF-madness has overtaken you completely, MT dropped in on the annual Chicago show to see how the Americans do it. Report: Dan Goldstein, Rick Davies, Paul White and Bob O'Donnell.

63

### A Deeper Wave

Many of today's popular digital synthesisers use variations on "wavetable synthesis". Chris Meyer explains what this mystical but powerful method is all about.

70

### Patchwork

Readers' patches galore... This month's cream of the crop includes patches for the Casio CZ101, Roland Alpha Juno 2, Korg DW8000, and Yamaha DX7.

80

### Tech Talk: Emmett Chapman

The inventor of the curious Electric Stick recently left his native America to promote the latest MIDI-equipped version of his brainchild. Tim Goodyer caught him Stick-in-hand for a talk about his invention and his vision of its future.

84

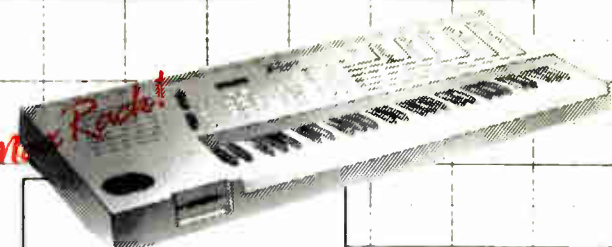
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## SEQUENTIAL

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ROLAND S10, S50,  
AKAI S7000, S700,  
S900, MIRAGE,  
MIRAGE RACK,  
SIMMONS

## SAMPLERS




## OBERHEIM

MATRIX 6R, MATRIX 12, EXPANDER



## ENSONIQ

SAMPLED PIANO  
ESQ-1,



TX 81Z, DX 7MK1, DX 7MK2,  
DX 100, DX 27, RX 5, RX 11,  
RX 21, RX 21L, PF 70, PF 80

## YAMAHA



## EFFECTS

SPX 90, MIDIVERB 2,  
MICRORACK REVERB,  
MICROVERB,

ALESIS  
MIDIVERB II



## ROLAND

JUNO 1, JUNO 2, JX 10, MKS 70,  
MKS 50, D 50, MKS 20, RD 1000,  
RD 300

## NEW RELEASES

EMAX RACK, D 50, PG1000



## AKAI

AX 73, MX 73, VX 90



## COMING SOON

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# FUTURE MUSIC

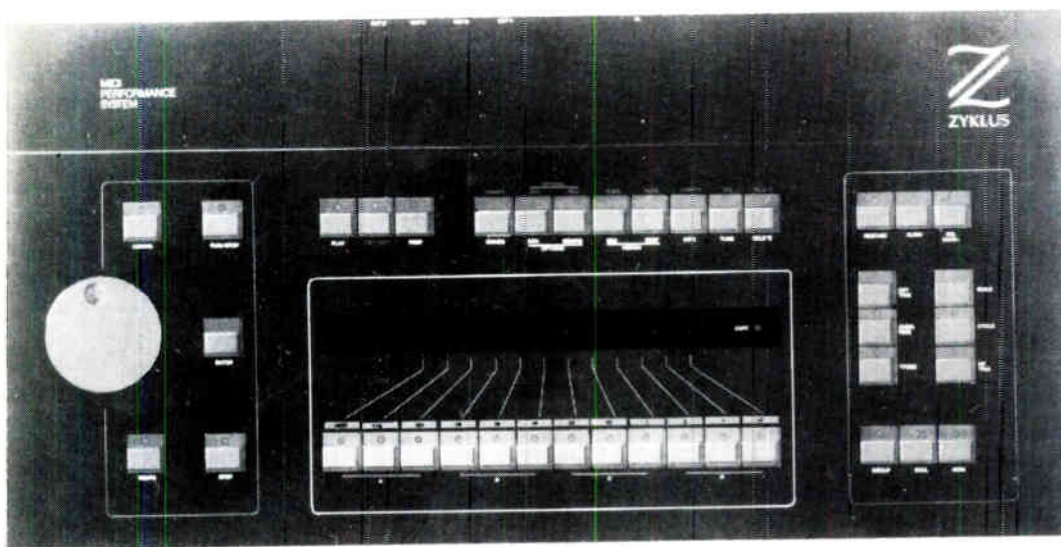
*Chelsea*

202 NEW KING'S RD · FULHAM, LONDON SW6 · 01 736 4771 · 01 731 5993



# NEWSDESK

## PERFORMING WITH MIDI



A new British company going by the name of Zyklus have developed what's claimed to be a new concept in MIDI control. The MIDI Performance System stores 100 sequences which can be triggered in a variety of ways: from a MIDI keyboard, front panel or external inputs. Any sequence or group of sequences can be played polyphonically from a MIDI keyboard as though they were single notes, and several transposed versions of any sequence or group of sequences can

run simultaneously.

The MIDI Performance System offers four MIDI Outs and one MIDI In with selectable MIDI Thru. Sequences may be recorded in real or in step time. Other sequences can be monitored whilst you're recording, and the Performance System allows keyboard zoning, storage of up to 12 complete performances, editing of stored performances, programmable gate output for use with pre-MIDI instruments, MIDI dump facilities and

MIDI Song Pointer capability.

The unit offers latch-type MIDI connectors and a 2x40-character backlit LCD with adjustable brightness and contrast, and comes as standard with extensive mains filtering and suppression. Battery backed-up RAM is inherent to the system.

Zyklus, together with their MIDI Performance System, may be found at the British Music Fair on Syndromic Music's stand N36. ■ **Sr**

### LIVE IN THE NEW AGE

If you should be passing London's Logan Hall on Saturday, August 8, you might like to drop in on AMP Records' New Age Concert. The event features synthesist Paul Nagle, Mainframe's John Molloy, ex-Tangerine Dreamer Steve Jolliffe, Ian Boddy, French outfit Lightwave, Wavestar, and the first live appearance since 1972 of David Vorhaus, together with AMP themselves: Ashok Prima, Mark Jenkins and Pete Beasley.

The music will be accompanied by slide shows, videos, live computer graphics and a laser show provided by Golden Light.

Many of the acts are appearing to promote their current activities. Jolliffe has recently released his third solo LP, as has Ian Boddy with *Phoenix*. Meanwhile, Wavestar will soon be releasing their debut album on Larry Fast's Audion label.

In order to fit all this music into one show, the doors will be open at 1pm, and there will be a bar to help revitalise any tiring senses. Tickets are £8.50 in advance (credit card sales on 01-240 0771 or from PO Box 387, London N22 6SF - cheques payable to AMP Records and SAE please) or £10 on the door.

A 24-hour information service is available on 01-885 5665. ■ **Tg**

## ARGENT'S UPDATE

London music shop Argent's have announced several new developments in their range of hi-tech goodies.

First up is the SuperMax. Nothing to do with Mr Headroom, this is an upgraded version of DX-Max, the add-on memory and function enhancement board for Yamaha's ubiquitous DX7.

SuperMax' features include 256 independent voice, function and Max RAM memories (expandable to 512 - 16 banks of 32 - with the addition of a further RAM chip on the SuperMax MUSIC TECHNOLOGY AUGUST 1987

board), 32 arpeggiator modes, a built-in delay (10ms to 9.9 seconds with feedback and pitch transpose), stack mode (8x2, 5x3 or 4x4) with fine tuning for rich sound chorusing, velocity cross-switching between two different sounds, variable temperament (user-defined tuning of the entire keyboard range), and key limits for three-area keyboard zoning.

Following the success of the MIDIbass sampled bass sound module (reviewed in E&MM April '86), designers 360 Systems have produced

a more comprehensive unit called the Professional MIDIbass.

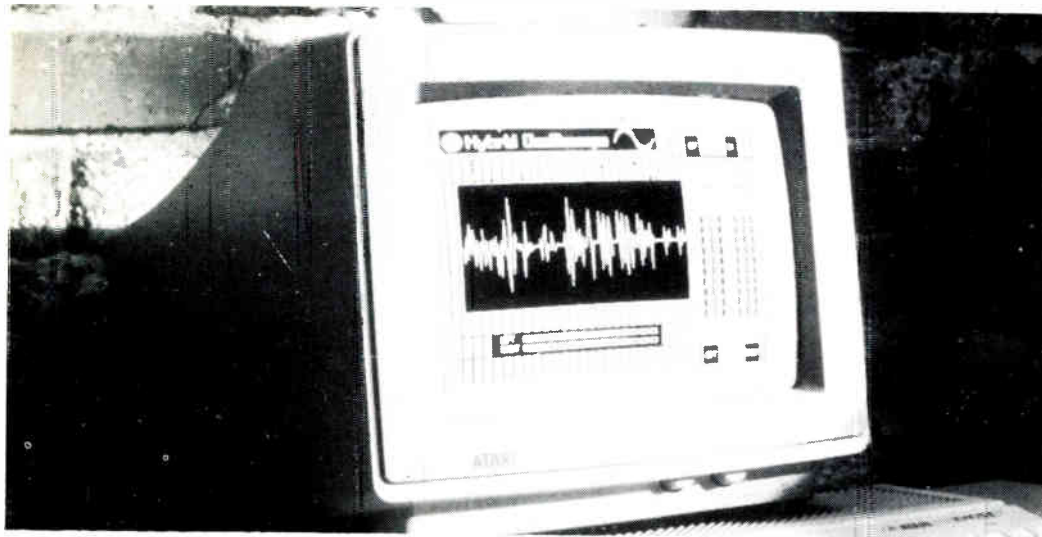
The new unit comes in a 19" rack-mounting format and features 16 onboard sounds, programmable filter and loudness, two programmable MIDI zones with two sounds in each, velocity crossover between any two samples, programmable decay and release, and a two-line LCD. Like its predecessor, the Professional MIDIbass can take over the bottom line of your music, freeing your sampler or synth for other duties.

Also available from Argent's are two new MIDI interfaces for the Macintosh: MIDI Communicator and

Mini MIDI Communicator. The MIDI Communicator sits neatly underneath the Apple Mac and uses the Apple's printer and modem ports for MIDI communication while the music hardware connects to extension ports on the side of the interface. The interface itself has two MIDI inputs (merged) and eight MIDI outputs. The Mini MIDI Communicator, meanwhile, is a budget model with one MIDI input and four MIDI outputs and an integral power supply.

More from Argent's, 20 Denmark Street, London WC2H 8NA. Tel: 01-379 6690. Or visit their stand at the British Music Fair. ■ **Sr**

# SYNDROMIC GO INTO SERVICE



Syndromic Music have just set up a service centre at their North London premises. SynService aims to undertake a wide range of servicing needs including synths, keyboards, retrofits, and Atari ST computers and disk drives, and will operate on a first come, first served basis. It is primarily intended to maintain a servicing facility for the range of hardware that Syndromic are distributing - including Atari computers and Hybrid Arts' ADAP, SMPTEmate and MIDI Plexer. However, SynService has been set up to handle any type of repair, and is able to service most major manufacturers' machinery.

**More from Paul, SynService, Syndromic Music, 24/26 Avenue Mews, London N10 3NP. Tel: 01-444 9126**  
■ Sr

## TAPE LEVY SHOCK HORROR

It's been a rumour for so long, it's become a bore. No, not the British summer, but the home taping royalty.

Well now it's a reality. The bad news for musicians is that a 10% levy on blank audio tape will be introduced during the 1987/88 session of Parliament.

Once collected, the royalty will be distributed among the performers,

composers and producers of recorded music. The IFPI (International Federation of Phonogram and Videogram Producers) are, of course, delighted - although they themselves admit it is an unsatisfactory solution to the problem. Now it's no longer a problem for the people who make money out of music, just a problem for those who make the music in the first place. ■ Tg

## NEW MOVE FROM JORETH

Commodore 64 MIDI software company Joreth Music have a new address. They can now be contacted at 25 Albert Park Road, Malvern, Worcs, WR14 1HW. This address should be used for all future orders and enquiries.

Joreth are now operating a personal demo service of their packages. Demos and hands-on experience in Malvern or at the new Demo Centre in Evesham can be arranged by appointment. Anyone wanting to book a demo or check out the latest details should ring (0386) 831615, or write to Joreth at the new address.  
■ Sr

## SOFTWARE SLIP-UP

Owners of Yamaha's CX5M who were paying attention to last month's news column will know all about Accessories Etc's Bit 2 software - except for the price. The cassette version is £20, not £15 as stated, and the disk version £25, not £20. MT and Yamaha have mutually agreed not to blame each other for this error, but offer joint apologies instead.

Further (good) news is that if you buy the Bit 2 software and filing software together from the X-Series Owners Club, you can save £7 on the retail price.

**More from Martin Tennant at the X-Series Owners Club, PO Box 494, Bletchley, Milton Keynes. MK1 1TS.**  
■ Tg

## CHEETAH MASTER THE ART

Encouraged by the success of their MK5 MIDI Master keyboard, Cheetah have announced additions to their series of budget equipment.

The MK5II MIDI Master keyboard features front-panel patch changing, footswitch-controlled program changing and sustain/hold - all at under £200. The MK5v adds velocity sensitivity and a modulation wheel to this for under £280. And we're not finished yet, as the MK7va is a weighted, seven-octave keyboard with velocity sensitivity, aftertouch and three split-points for under £400.

Designed to complement an FM synth setup, the MS6 MIDI synth module boasts two DCOs per voice and multi-timbrality - all in a box 19 inches wide and costing under £250.

Meanwhile the MD8 is a budget

(claimed to be the cheapest currently available) MIDI drum machine with provision for up to eight voices dependent on the size of the chosen sounds. Alternative voices are already available on tape. The MD8 can also be played live from the DP5 electronic drum kit, which has five full-sized pads and costs under £160.

On the sequencing front, the Spectrum MIDI Interface is an eight-track sequencer featuring step/real-time input and a built-in MIDI delay. The unit will record MIDI SysEx information as well as the more usual pitch-bend, velocity and so on. A mere £49.95 will buy you both the software and the interface.

**More from Cheetah Marketing Ltd, Norbury House, Norbury Road, Fairwater, Cardiff. CFS 3AS. Tel: (0222) 555525** ■ Tg

## BBC SOUNDS ON CD

The BBC has the largest and most comprehensive sound effects library in the world. So what better organisation to release a library of sound effects to cater for the demands of today's sample-hungry music world?

The BBC's sound effects LPs are well known, but in these days of digital samplers and digital production techniques, it's the Compact Disc which makes the ideal storage medium. Hence BBC Records are now releasing an initial set of 10 CDs containing a total of more than 450 sound effects. These provide everything from cars to aeroplanes, ships to planes - sounds domestic, urban, rural and international.

The majority of the effects are newly recorded direct to digital stereo - many of them using binaural techniques. The rest have been transferred from analogue to digital.

The 10 CDs are supplied in a stacking system which functions either vertically or horizontally and has room for a total of 18 discs. Each CD is

accompanied by a booklet with a comprehensive index which, together with the quick track selection capability of today's CD players, should allow for instant identification of effects. In addition, a chart with complete details of all 10 discs is included in the package.

The cost of the first 10 CDs including holder is £229 including VAT. To clear up any copyright arguments before they start, the Conditions of Sale allow virtually unlimited use of the 10 CDs in commercial, audio, video and film productions in perpetuity, and the subsequent broadcast, sale, hire and public exhibition of productions incorporating these effects without further charge.

Acknowledging that no effects library is ever complete, the BBC plan to make further discs available. These will automatically be offered to all current users.

**More from Sound FX CDs, BBC Records and Tapes, Room C231, Woodlands, 80 Wood Lane, London W12 0TT. Tel: 01-576 0602** ■ St

MUSIC TECHNOLOGY AUGUST 1987

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XR02 — MIDI merge.....£54.95  
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9 Volt power pack (if required).....£5.95

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# COMMUNIQUE

Write to: **Communique**, Music Technology, Alexander House, 1 Milton Road, Cambridge CB4 1UY. A free year's subscription if yours is the Letter of the Month.

## Dear MT

### More DX For Your Money

Having just read Howard Massey's article 'Decisions, Decisions' (MT, July '87) I would like to disagree with the basic premise that DX7 owners only have the choice of upgrading to a DX7II or staying with their old model. It's simply not so. There are a number of expansion boards available for the good ole DX7 - E! for example. I actually sell E! because I believe it to be the finest upgrade for the DX7 currently available.

E! expands the capabilities of the DX7 beyond even the DX7II spec. The only advantage of the DX7II over the DX7E! is its ability to produce two sounds at once with a bit less noise, otherwise E! is superior.

Consider this scenario: Believing it to be his only option, a DX7 owner wanders into a local music shop and enquires how much this new DX7 beastie costs. "£1499 to you, Squire", comes the reply. Hapless then enquires how much trade-in he would be allowed on his old '7. "£499 to £550, depending on condition", he is told. Hapless then withdraws deciding to sell privately. Looking through MT's free ads he discovers his pride and joy is only worth around £700, leaving £799 for him to find for his DX7II.

Alternatively: another DX7 owner wanders into his local music store with £350 cash in his pocket and haggles mercilessly with the unsuspecting salesperson. Twenty minutes later Hero walks out of the shop minus cash but with a box marked 'TX81Z'. He then toddles over to Balham. An hour or so later he leaves, £399 light but his DX7 now boasts a little sticker exclaiming E!. More importantly it also has some serious hardware tucked away inside it.

Hero now has a DX7 with 320 memories (including functions), microtonality (16

user-programmable scales), brilliant MIDI spec, master keyboard with the ability to control two MIDI output channels and so on. He also has a quieter eight-voice, multi-waveform FM box to give him the extra sounds - and with change from Hapless' £799. Easy.

■ Godric Wilkie  
Gozen Studios  
London

## Dear MT

### Hi-tech Cul-de-sac

*letter of the month*

Tomorrow's world is here today - it's official. We all know when something has crossed the threshold of acceptance when it permeates the thick skin of the popular media, the case in point: the recent 'Tomorrow's World at Large' television feature on the applications of new technology within the audio industry. So what did we see?

We saw a succession of trendy devices paraded in front of us like sports cars. For those of us 'in the know' it was an entertaining game of 'I-spy' - Akai S900, Steinberg Pro24, Atari 1040, D50 and even a DMP50. The problem with this sort of presentation lies with the implication that a low period in the industry is about to end because some of these examples of high technology are at street-level prices and, consequently, freely available to all. Yet it is the industry itself that dictates the acceptability and creative limitations of these new musical tools, so how can falling prices change the situation? Personalities like Steve Lipson are wheeled in to convince us that these toys are as limitless as your imagination but he himself has to work within the restrictions placed upon him by the record industry. Have they de-

veloped exactly where this limitless horizon stops?

If new technology was given a free hand to develop, the real advances would ultimately benefit a sick popular music. Obviously the prospect of making a few short-term sacrifices in order to ensure the survival of the popular market is too high a price for the record industry to pay.

Instead, in an effort to help all who would try their hand at making music, I am offering them the chance to use some of the hi-tech equipment that I own. All I would ask is my travelling expenses, which I must in order even to contemplate such a service. I feel that, only by individualistic actions from outside the merry-go-round such as this, can a revitalisation of popular music be encouraged.

■ Malcolm Read  
Tel. (0582) 38860

## Dear MT

### Talking More Shop . . .

Following your request for details of poor service from retailers of musical equipment, I felt obliged to relate my ordeal.

I live in Bristol and, around July last year, I decided to purchase a fairly comprehensive MIDI system comprising Emax sampler; Atari computer, monitor and Pro24 software; ESQ1; MIDlverb; ME30P and a drum machine. So, I duly contacted a number of major dealers to see who could give me the best deal.

Out of eight dealers contacted by letter (with a form enclosed to make replying less of a hassle) only three replied. Some dealers consented to quote prices over the phone but most wanted something in writing. One reply, returned within four days of my writing, seemed excellent value. I sent a cheque for the full amount - then the fun started.

First to arrive were the Atari/Steinberg system and the MIDlverb. The software ►  
MUSIC TECHNOLOGY AUGUST 1987

# YAMAHA MUSIC PULSE UNLEASH THE NEW DMP7 DIGITAL MIXER.

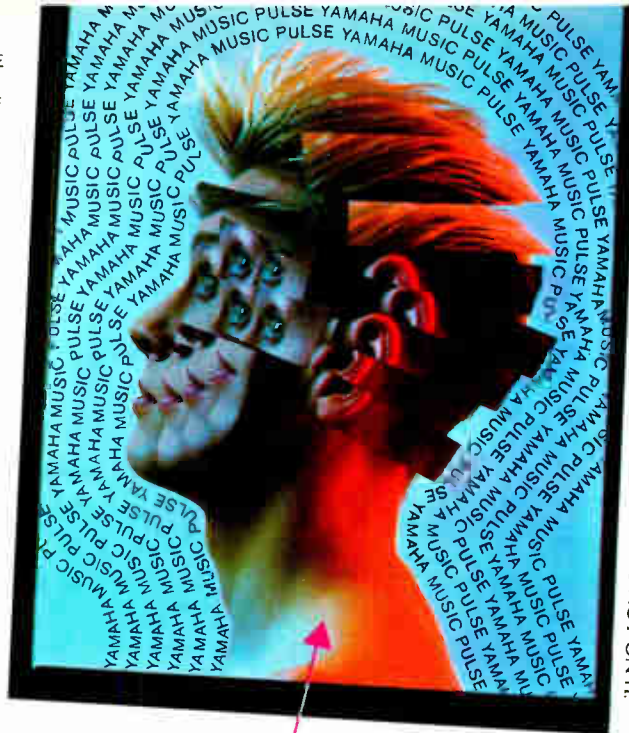
**N**OW YAMAHA MUSIC PULSE. THE SHOP WITH THE BIGGEST RANGE OF YAMAHA MUSIC-MAKING HARDWARE IN THE UK, ANNOUNCE THE NEWLY RELEASED DMP7 DIGITAL MIXING PROCESSOR. ITS QUALITY OF SOUND IS EXTRAORDINARILY ACCURATE, BUT THAT'S NOT ALL

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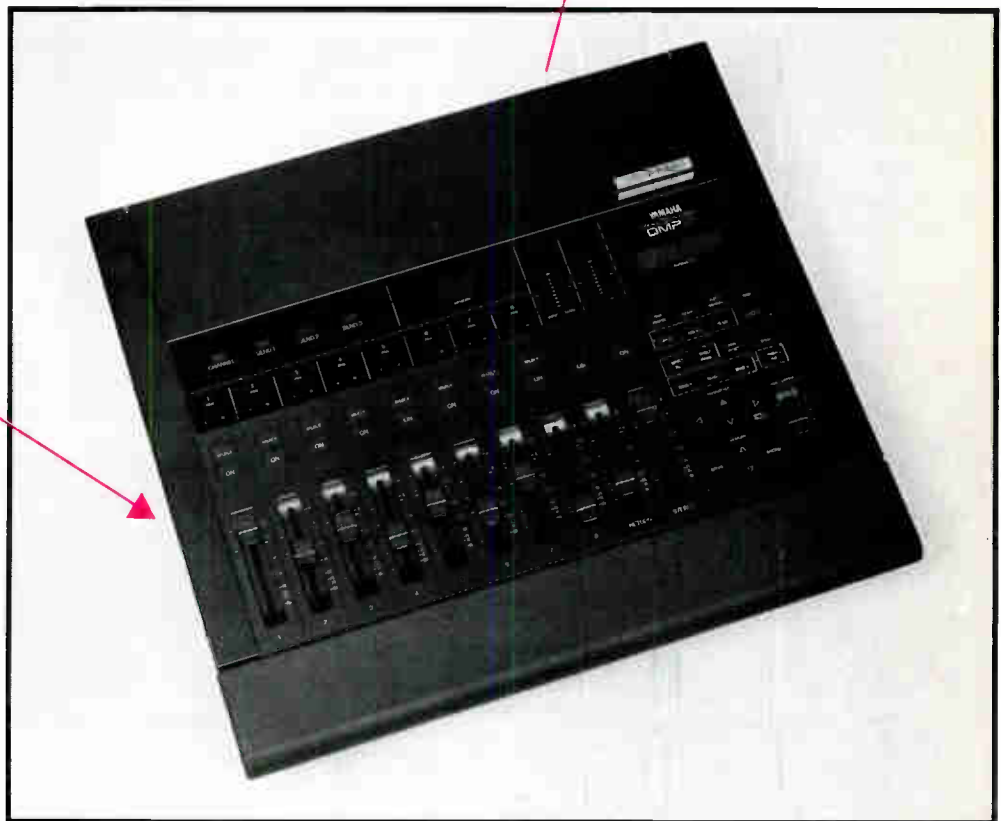
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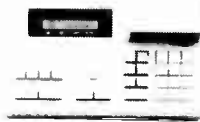
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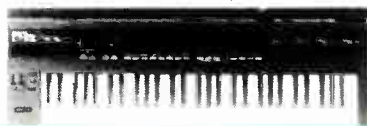
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**AND NOW THE AMAZING FZ1, 16 BIT SAMPLING KEYBOARD HAS ARRIVED, HURRY!!**

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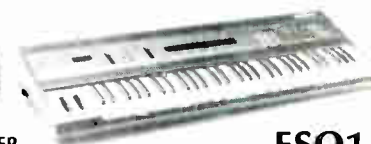
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 6 octave fully weighted keys, real piano sounds, touch sensitive, 10 voice + MIDI  
**DEMO £695**



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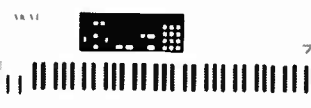
**MX73** brand new 6 octave mother keyboard touch sensitive, 4 split.

**X7000** 73 note touch sensitive version of S7000

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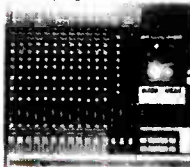
**VX90** Rack version of AX73



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**YAMAHA**

DX7 11D/DX7 IIFD



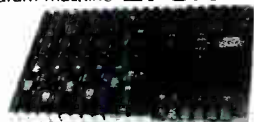
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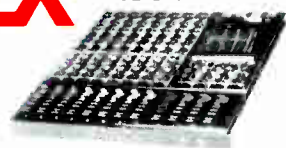
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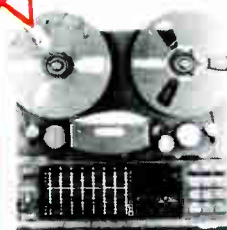
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► had lots of bugs and the computer kept crashing (black & white software, colour monitor). The MIDIverb PSU didn't work and had to be returned for replacement. I took the Pro24 back in person and plumped, instead, for a Roland MC500 and Korg DDDI drum machine (which I was assured would trigger my samples). Upon returning home I found the MC500 wouldn't work with my DX7 - Roland couldn't help, but Yamaha suggested a DX ROM update that would cost me "about a tenner". So I ordered one from my local music store. When it arrived I was handed a bill for £35. It did, however, cure the problem and, with the MIDIverb PSU replaced everything was OK again.

Then I got a phone call to say the Emax had gone up in price by £200. And where was the ESQI? "Shortages", I was told.

It was now almost November. "Don't worry, we'll have you sorted out by Christmas", I was assured. Meanwhile the price of the Emax had gone up to £2,100. So I ordered an S900 instead. Christmas came - and went.

The postman arrives in late January bringing my ESQI but no S900. "Ah, they've gone up in price from £1500 to £1900", I am told. You must be joking. When will they be arriving? "Soon".

So I wait. To keep me occupied in the meantime, the MC500 goes wrong twice, erasing the entire memory whilst I'm recording. Roland: "Haven't heard that one before, let us know if it happens again".

So far there's no sign of the ME30P. The dealer denies any knowledge of it, I assure him I ordered one . . .

Back to the S900. It arrives direct from Akai complete with two free disks to make amends for its late arrival. Both are useless, as are the disks usually supplied with it. Also it won't recognise the DDDI's MIDI messages since it sends MIDI Note Off commands directly after its Note Ons.

It had taken over nine months, 40 phone calls and countless letters but I'd finally got everything. Was it worth it? The ESQI developed a MIDI problem and had to be returned to London for repair - I paid the carriage - and the S900 is now back with Akai with another fault, although Akai did arrange collection and return free of charge.

So there you have it. If any manufacturer would like someone to ensure their products are user-friendly and well-documented, I'm quite happy to change my job . . .

■ I D Shepherd  
(No address supplied)

## Dear MT

### And More Shop

Having seen an advert in July's MT for a retailer 'up north' for Boss Micro-rack flangers at a very reasonable price I decided to call them to check it was correct. Sure enough, it was and, while I was at it, I checked out the prices of a few other pieces of equipment - they were very helpful.

Working on the assumption that I could probably get the same equipment just as cheaply in London and not have to pay postage, I headed for WC2. Today I walked MUSIC TECHNOLOGY AUGUST 1987

into a music shop in Denmark Street which had a sign in the window to the effect that they would beat any previously quoted price on Boss gear. I quoted the price I'd been given for the flanger: £79. The guy in the shop asked me who'd quoted it. I told him. "Who?" I told him where they were; his next comment came as something of a surprise. "Well, you'd better go and buy it from them because I'm not matching it", he said. So much for the sign in the window.

I tried a couple of other shops and ended up buying the flanger in Charing Cross Road, not 50 yards from the Denmark Street shop. It cost me £65. Of course, I went back to Denmark Street and told them. They weren't impressed.

■ Adrian Cavey  
Croydon

## Dear MT

### DAT's Life!

Much attention has been drawn to the DAT system of digital recording. In the June edition of MT an explanation of the system and comments were printed in the Interface pages. Having read this and other, similar, features I feel I must add some comments of my own.

The record companies are correct in saying that a copy protection system should be incorporated in the electronics of the recorder. The CBS Copycode system works by removing the frequency of 3838Hz from the recording. The designers claim that that this is inaudible as it falls outside the fundamental overtones of music. But, as far as my knowledge of electronics goes, there is no way to remove a specific frequency from a recording even if it is in digital form. The results of such an attempt would also result in a drop in volume of the surrounding frequencies, some of which are musically important.

Since the system is 16-bit digital it gives 65,536 discrete volume levels, would it not be possible to remove a specific level from the music rather than a frequency? Surely this could be done every x samples and, since there are in excess of 40,000 of these every second, one or two missing would make far less difference than the existing Copycode system. Alternatively, the system could be modified to remove a frequency, say 18kHz, which all but very young children are deaf to and harmonics are more widely spaced.

Another system I have heard about is a low frequency, low amplitude signal encoded on the CD which a DAT machine would detect and refuse to record. The low amplitude means your hi-fi speakers do not do too much work trying to reproduce the signal, while the frequency is basically too low for the human ear to detect.

But surely a far better solution would be for the manufacturers to make the prices of CDs low enough to make copying pointless - it could easily be done, just compare the price of a CD single and a CD album. This idea worked very well for the manufacturers of computer games, such as Mastertronic and Firebird, so why not for the record companies?

Personally, I'm looking forward to seeing the first DAT Portastudio at less than a

grand but not if the average CD user has to suffer for it.

■ Marcus Bainbridge  
Co Durham

## Dear MT

### Girls, Girls, Girls . . .

What about the women? Last month's interview with Laurie Anderson set me searching through my back issues of MT/E&MM for features on musicians that aren't men. The result? Not a sausage. What's going on here?

In fact, the last woman interviewed by your magazine was Laurie Anderson - back in February '85. Since then we've heard countless hits from Madonna and Mel & Kim; two hit albums from Suzanne Vega; and releases from the Cocteau Twins, Virginia Astley and Claire Hamill. Sadly, these artists seem to have passed you by. Why?

As far as I can see there's no shortage of female artists using new technology. For example, Claire Hamill's 'Voices' LP used her treated voice instead of conventional instruments. The making of this album encompassed sampling and digital signal processing - two subjects hardly ever off the lips of MT's writers. And what's more, the record was used by the BBC as background music for their 'Domesday' series.

While I do not believe that the male members of MT's staff are sexist, I must admit to being baffled as to why you do not talk to women more frequently.

■ Martin Hamilton  
Llandudno

I'm baffled too. I mean, they haven't spoken to me in weeks . . .

"Not a sausage", eh? (Could this be a Freudian slip, we ask ourselves!?) Well, Martin your letter sent me searching through back issues for features on musicians that were men . . . (grin)

Excuses, excuses coming up . . . Madonna is not the easiest person to collar for a friendly chat (whether we'd like to or not), and whether you like it or not, it seems that Mel & Kim's producers may have more to say about new music technology (see Stock, Aitken & Waterman interview, MT June '87) than the singing duo themselves. Suzanne Vega, though one of our favourite artists round these 'ere parts, doesn't strike us as yer typical hi-tech whizz-person, and the Cocteau Twins (last interviewed E&MM August '84 - doesn't time fly!) are only one third female (no prizes for guessing which third). As for Virginia Astley and Claire Hammill - the Music Ed is always open to suggestions (mind you, he takes none of my suggestions about what he should be doing with himself seriously . . .).

But top of the MT Ladies' Hit List is currently the multi-talented Kate Bush - and her low-profile in MT can't be blamed on our lack of trying (our Music Ed is very trying . . .). Patience, patience everyone. In the meantime, I guess we could interview Wendy Carlos .

As for the MT male staff being "sexist" Wot? You know, I never even noticed they were male. Right, who's making me a cuppa . . . ■ Tmcg

# INTERFACE

Your questions answered by MUSIC TECHNOLOGY's resident team of experts. If you have a query about any aspect of music technology, or some information that might be useful to other readers, write to Interface at the editorial address.

**A** I read with great interest Chris Meyer's article on MIDI delays in the MT June '87. Of particular interest to me were comments on the delays caused by insufficient processing power in MIDI equipment, and the problems caused by MIDI'd devices having to perform other tasks besides just sending and receiving MIDI data.

These comments put into perspective the problems I've encountered with my setup: a Roland TR707 drum machine and Yamaha QX21

and promote useful features like MIDI and sync-to-tape - both of which are good selling points - and yet don't provide enough processing power to make them usable without trade-offs with other useful functions. I bought the TR707 and QX21 partly because of these facilities, and wrongly assumed that because they were provided on paper they would actually work in practice. Well, this seemed a reasonable enough assumption at the time.

I eventually solved the problem of syncing to

records. One man actually laughed when I told him the group's name.

Please could you tell me where I can buy a Startled Insects record or provide me with an address to write to, as I found the article interesting and would like to hear the Insects' music for myself.

■ Peter Morton  
Liverpool

**A** Well, being signed to a company as big as Island, you shouldn't have too much trouble getting hold of the last Insects album 'Curse of the Pheromones' even if you have to order it from your local record shop. If this is the case you might find it easier if you have what the industry refer to as the "matrix number" of the album - AN8708 for the LP or ANC8708 for the cassette. No problem. ■ Tg



MIDI sequencer. After much experimentation checking the integrity and level of the Roland's sync-to-tape, and ensuring I was pressing all the right buttons, I have to conclude that it's impossible to sync the TR707 to tape and simultaneously send out MIDI clock data to the QX21 that stays in time - although a footnote in the TR707 manual states that this is possible. The QX21 synced up perfectly when the TR707 was running off its internal clock rather than tape sync code, so the problem is obviously not at the QX21 end.

However, there does appear to be a trade-off between the QX21's ability to run off an external clock and its memory being filled to more than a third of its capacity. At this point the QX begins to run hopelessly out of time. In the light of Chris Meyer's article, the only explanation I can come up with is a lack of sufficient processing power in both devices.

It occurs to me that manufacturers provide

tape but not without additional expense, and I still can't use more than a third of the QX21's RAM. When I bought the TR707 and QX21 it never occurred to me to ask whether they had enough processing power to make the facilities I bought them for work. I shall know better in future.

■ David Marsden  
Southport

**Q** In Music Technology June '87 you ran a feature on a group called the Startled Insects. In the interview they were referred to as "unsung" - I found this to be only too true when I went out to buy one of their records. I'm sure I've tried every record shop in existence (well, every record shop in Liverpool anyway), and none of them had even heard of the Startled Insects let alone stocked any of their

**Q** I have a Yamaha DX21 synth which I am using with a Yamaha TX81Z expander. I find that when the synth is in Dual mode I can only get four-note polyphony. Is there something wrong with my synth?

Also, I need to buy a MIDI patchbay which can be used easily in a live situation, but I'm having trouble even finding out what's available. Why do magazines seem to consider these pieces of equipment unimportant?

■ P Heath  
London

**A** Rest assured there's nothing wrong with your synth. The DX's Dual mode layers two voices (and two sounds) per note, so when you play four notes you are in fact playing eight voices - which happens to be the DX21's limit. Now if you are only playing four notes on the DX then only four MIDI note on messages will be sent to your TX81Z.

Now to MIDI patchbays. There are plenty about: Syco's Sycologic M14 MIDI Matrix (reviewed E&MM March '85), Quark's MIDLink 999 and 448 (E&MM June '85), 360 Systems' MIDI Patcher (E&MM July '86), Akai's ME30P (E&MM Sept '86), Philip Rees' 5x5 MIDI Switch (MT May '87)... Now what was that you were saying about magazines considering MIDI patchbays unimportant? Not MT, anyway. Gotta new subscription? ▶

MUSIC TECHNOLOGY AUGUST 1987

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2. ESQ1 Data dump and editor. Consisting of a package to transfer single patches or banks of 40 patches to and from the ESQ1 and Computer, also disc storage. The integral editor can take a patch from the ESQ1 or disc and display all these parameters on the computer screen. Allowing you to edit the sound on the screen and at the same time update the ESQ1 with this new sound automatically. Also included in this package are 160 new sounds for you to use and experiment with. RRP £75.

3. ESQ1 Sequencer dump. This package is ideal for stage or studio in allowing you to store your sequences and songs on disc to be loaded whenever you require. You can load and save a single sequence or the whole sequencer memory. This also works with the sequencer expansion cartridge. The loading and saving times for the data is a maximum of 20 seconds for the whole 32,000 events. Sequences can be named on disc for your reference and old sequences can be deleted. Using this package allows for up to 50 songs per side of a disc, e.g. 100 songs per disc. RRP £60.

4. DX7 Program dump. Using this package in conjunction with a DX7 allows you to save and load single sounds or complete banks of 32 sounds to and from the DX7 and AMSTRAD. Also you can look at single patches to see how they are formed. Visual displays of the six envelope generators is also included. 512 free sounds are also contained on the program disc for you to use and experiment with. RRP £40.

5. DW8000 Program dump. Graphic displays of the envelope generators is just one of the features of this package. Full bank or single load and save to disc. Visual display of all the parameters for each sound as on the DW8000 itself. RRP £25.

6. Patch Change co-ordinator. Using this programme on your Amstrad you can change the patches on up to four keyboards at the press of a single key. Up to 16 different changes can be stored in the computer and saved and loaded to and from the disc. RRP £15.

7. ESQ1 Sequencer ram expansion. We now have a fully compatible sequencer RAM expansion unit for the ESQ1, giving you just over 32,000 MIDI events for your sequencer. This unit simply plugs into the rear of your ESQ1 and becomes a permanent part of your machine. RRP £50.

Coming soon are a 16-track recorder, Korg EX800 dump and editor, Roland JUNO 1 and JUNO 2 dump and editors. Please ask for details. P.S. All Post Free.

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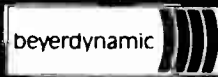


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I'll let everyone else promote the usual dynamic HOT, stupendous, electrifying, buy-it-quick-before-it-gets-replaced-by-a-mark IV suff ... it's enough to state that if it is WORTH having, it's usually in stock anyway.

Having said that, I don't think you'd find anyone in these offices who would choose to review a MIDI patchbay rather than the latest synth/sampler from Akai, Casio, Korg, Roland, Sequential, Yamaha... Let's get our priorities right, shall we?

Now let's return to the stage. If you're looking for a patchbay which is readily accessible, it might be best to go for one which lays its cards on the front panel, with highly visible knobs that you can twist with ease. Combining this with value-for-money, I'd suggest you check out Philip Rees' 5x5 (five In/five Out) at £86. They can be reached on (0869) 810830 or (0865) 250709. ■ **St**

**Q** I'm writing this letter out of sheer desperation - and I'm sure I'm not alone with my problem. I have recently completed a tape of electronic music which has been some two years in the making. Now I find myself at a complete loss as to who to approach with it. I'd like to break into the world of professional music but I don't even know the addresses of any of the record companies or how best to approach them.

Is there any publication available which provides this information? I've read your magazine for some years now and have acquired a good background of technical information from having done so. I hope you can assist me, and others, with this problem.

■ **Laurence M Pears**  
Chesterfield

**A** Tricky. As you must appreciate, there's no clearly-defined route to becoming a professional musician. You can do it by pestering record company A&R (Artists & Repertoire) offices with your demos, gigging round London 'til your fingers drop off so that the A&R men might come to you, watching the 'personnel' columns of the music press in the hope of joining some established band in search of a musician, get a job as a tape op in a studio and use the "down time" (when the studio is not being used by any paying artist) to make your demos and then accidentally playing them to big name producers when they're in, entering competitions in the hope of winning a chance at a recording contract... It's not easy and the list is literally endless.

A lot depends on the style of music you want to play. If it's 20-minute atmospheric instrumentals then

there's little point in chasing gigs at the Beat Route, or harrassing Morgan Khan for a deal. You can cut down on ineffective effort by researching the record companies before you hit them. Addresses can be gleaned from record sleeves and various industry publications - if you can get your hands on them. If you're lucky enough to have got a phone number or a name, use them - an interview is a lot more effective than just another Jiffy bag arriving on someone's desk. You can learn a lot about addresses from a quick walk around central London, you'd be surprised how close some of the major companies are to each other.

Ideally a demo should be short - three three-minute tracks (or a short excerpt from a longer piece) is plenty. Inventive and striking packaging are also an advantage as are photographs - and I don't mean a six-month-old Goldfinch on a rug or some blurred black and white Polaroid taken in your bedroom.

But before you start, try asking yourself if you'd really want to spend money on your music if you hadn't made it. There's an awful lot of rubbish about and you can save yourself, and others, a lot of grief if you've got something worth peddling to start with.

If you're desperate enough you could even submit a tape for MT's DemoTakes column but even then there's no guarantee it'll be included (we do our best).

■ **Tg**

**Q** I am thinking of buying a synth (or two) to add some variation to my home recordings. As these would be used mainly for bass parts and backing chords, the older analogue synths would seem to be more suitable. Looking through your Free Ads reveals a bewildering array of Korgs, Junos and their like up for grabs. But is there any publication that has a run-down of the basic specs and features, and maybe even shortcomings, of these older synths?

In particular, the Pro One and Moog Prodigy monosynths and Mono/Poly and Juno 6 polysynths look attractive to me. I would appreciate any advice you can offer me.

■ **G Goldfinch**  
Kent

**A** I've got just the book for you: Julian Colbeck's 'Keyfax 2'. Divided into sections covering everything from organs and monosynths to samplers and computers, 'Keyfax

2' gives a brief specification and a subjective assessment of each instrument - what it had going for it, what it had coming to it and why you might, or might not, like to own one. If you want a comprehensive appraisal of what's likely to appear in next month's Free Ads as well as what's already in this month's, you can't really go wrong with this book.

'Keyfax 2' is published by Virgin Books and costs £6.99. ■ **Tg**

**Q** I've recently added a Casio FZI sampler to my existing Emox. Having already built up quite a large sample library for the Emox I quite naturally want to transfer those samples across to the FZI using MIDI and the much-vaunted Sample Dump Standard. I know it should be possible, but I just can't find any way to make it happen. What gives?

■ **Colin Kiddy**  
London

**A** Not a lot, really. Quite simply, Casio haven't implemented the Sample Dump Standard on their sampler. Good, eh?

What they have done is allow samples to be MIDI-transferred behind their own System Exclusive code, using a different format to that of the SDS. Quite why this should be the case is beyond us. Nor have we been able to get any justification out of Casio themselves.

What seems ludicrous to us is that implementing the SDS would surely have required no more development effort than implementing sample transfer behind the company's own SysEx code - yet would have made the world of difference to the musicians who buy and use not only Casio's gear but also other manufacturers' gear.

What you and any other musicians in the same position are faced with is the extra expense of software which will accomplish a conversion which shouldn't be necessary in the first place. From what we can gather, Casio expect third-part software developers to write software which will take advantage of the FZI's 25-pin data port. If they feel that's a better way of going about things, fine. What we here at MT feel is that they shouldn't deliberately restrict the options available to musicians - particularly when the option is there to make musicians' lives a lot easier. ■ **St**

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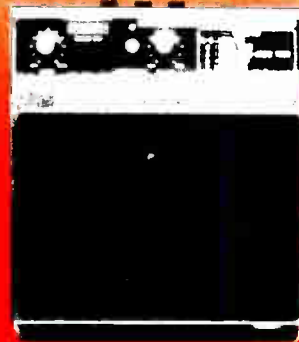
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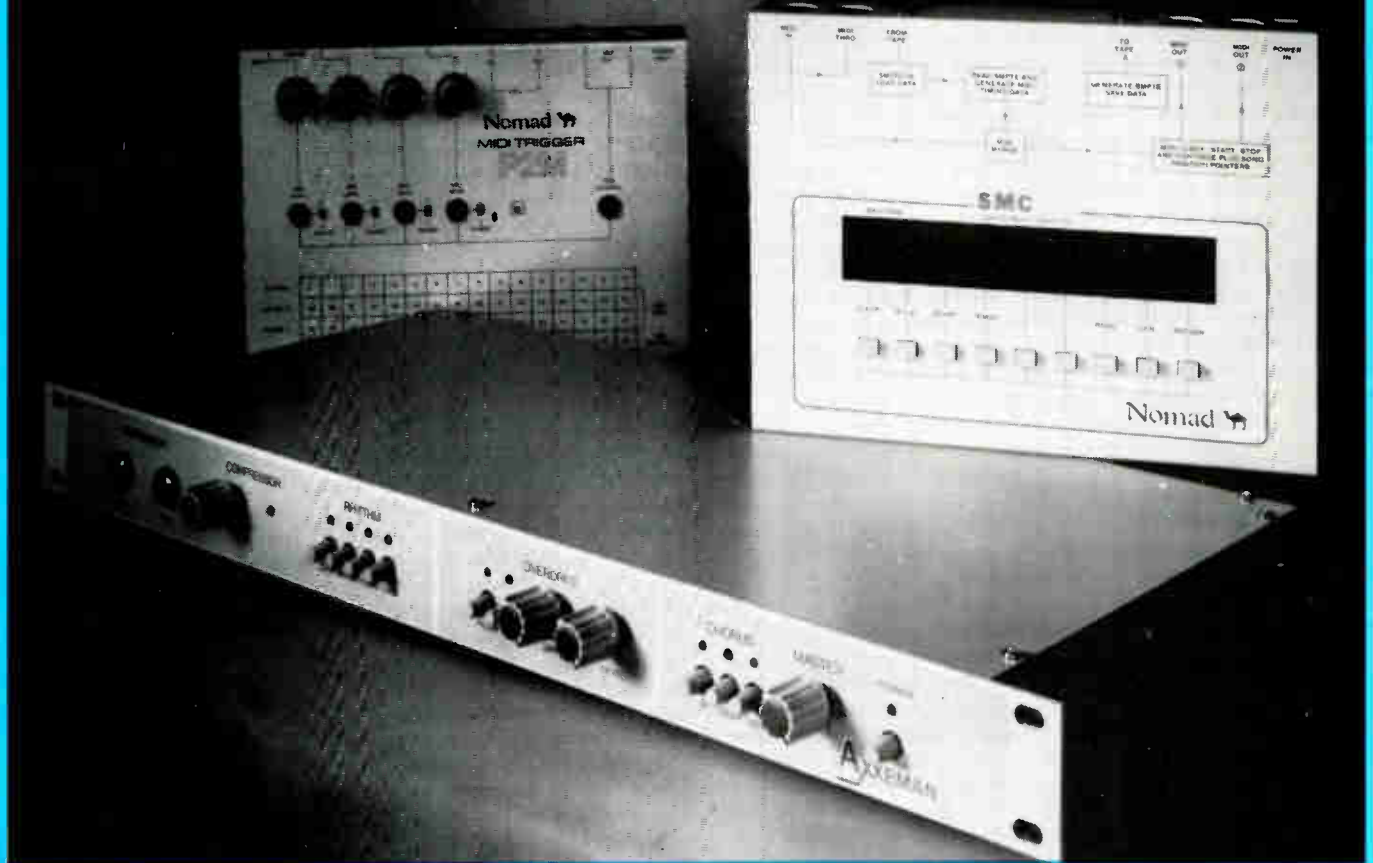


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SOUND ON SOUND, MAY '87

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The NOMAD SMC 1.0 is a stand alone device, so is not limited to use with only one type of computer, drum machine, software package or other MIDI device using 'Song Position Pointers', it will work with them all.

The NOMAD SMC 1.0 offers the same facilities previously only found on £1000+ devices, and will work with many of the following manufacturers products: Steinberg, Hybrid Arts, Dr. T. Southworth, C-Lab, Yamaha, Korg, Roland, Mark of the Unicorn etc.

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HOME STUDIO RECORDING, MAY '87

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The Axxeman is engineered to satisfy any type of guitar, from low output, single pick up guitars, such as 'Strats', to high output humbuckers as fitted to 'Gibson' style guitars. Four rhythm presets and an entirely separate remote foot switchable lead section are combined with the deep, wide bandwidth stereo chorus/ADT section. Front panel controls are arranged logically, making this the easiest to use, most professional processor around.

Axxeman is at home in the studio, in its 19" one unit high case, but such is its construction that it will withstand the rigorous treatment of flight cased travelling. Those musicians that practice at home or in the hotel room will be pleased to know that the Axxeman is fitted with a headphone socket for use with most types of high impedance headphones. Stereo output 1/4" jack sockets are ganged together to offer a mono output when a single line out is needed and a chorus footswitch plus insert points can be factory fitted if required.

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INTEGRATED MEDIA SYSTEMS may not be a name that springs to mind each time you think of digital audio – but that may not continue to be the case for long. The IMS Dyaxis is a 16-bit digital recorder that brings direct-to-hard disk recording down into a price range where more musicians can have a look at how this technology can benefit them.

As MT has been pointing out for a while, 16-bit sampling is becoming considerably less costly to implement, and the analogue side of the process is receiving more attention as well. But while many manufacturers are only now bringing 16-bit machines to production, IMS have been busy doing just that for several years. The difference is that IMS have designed custom equipment for clients like LucasFilm and Stanford University, rather than for the mass market.

So, having done the ground work for 16-bit digital audio instruments, all IMS needed to do to adapt their technology to the music industry was to find the right way of packaging it. Rather than commit themselves to any one assortment of front panel controls, IMS designed the Dyaxis as a high-quality digital audio port for the Apple Macintosh, and decided to implement features in software as time and demand allows, rather than trying to get everything into the package first time round.

The Dyaxis itself is housed in a 1U-high rack-mounting chassis which contains the analogue-to-digital and digital-to-analogue conversion hardware. Virtually no controls are provided on this module. The rear panel provides access to the audio world with two balanced lines in and two balanced lines out. Once basic connections are made, the rack is never dealt with directly – short of turning it on, that is.

Unlike so many sampling instruments, which store digitised audio in internal memory prior to saving it to disk, the Dyaxis contains no such buffer memory. Instead, the Macintosh co-ordinates the flow of digitised audio from the Dyaxis' conversion circuits to SCSI hard disks.

The fast access time of such hard disks makes it possible for the Dyaxis to pull digitised audio off the hard disk and convert it back into analogue form without having to load it into a buffer first, allowing it to behave as a digital tape recorder, where the maximum recording time corresponds to the amount of hard disk space available. Based on a 48kHz sample rate, rule of thumb is that each 10Mbyte of hard disk holds about one minute of stereo audio. So a 160Mbyte hard disk could hold one album side, for example.

IMS estimate that, in America, when such large hard disks are added to the Dyaxis system, each megabyte of hard disk costs approximately \$25. Yet even though

several commercially available hard disks work fine with Dyaxis, IMS also plan to provide their own hard disks, which will come formatted, tested, and guaranteed to present no compatibility problems.

Now, it might seem silly to use a hard disk-equipped computer for recording audio when there are digital tape recording systems costing significantly less – such as a Sony FI with a video recorder – were it not for the graphic editing that a Mac-based system lends itself to. In its first incarnation, the Dyaxis will allow visual editing (looping, enveloping, and so on) of digitised audio, right down to individual bytes – something which is already possible with systems like Digidesign's Sound Designer programs, but which has never been possible with such long sound files.

The Dyaxis also features a "mix" screen from which several stereo files can be opened (like any other file on the Macintosh) and mixed together. Each file can be scaled to the desired level, faded in or out, shifted around in time relative to other files, and panned to one channel or another, making the Dyaxis suitable for all sorts of audio work.

As IMS put it, "the hooks are there" for interfacing with MIDI or SMPTE using other Mac peripherals, though at the time I saw the Dyaxis, it was not yet synchronising to the outside world. IMS did provide a glimpse of how the Dyaxis deals with timecode, however: as you edit a file, a timecode is displayed corresponding to the current cursor position, using the file's starting point as the "zero" reference. From this point on, lining up digitised dialogue or music with external tapes (audio or video) becomes standard procedure. In fact, the Dyaxis features an RS422 connection, so that it can fit into video editing suites and be treated just like a real tape recorder.

Having based the Dyaxis' controls around the Mac, IMS have also opened the system up for third-party software developers, and therefore to many other applications – though there's no news so far of any UK or European distribution, let alone software development.

The Dyaxis has not really been designed as a musical instrument, in the way that samplers generally are. What its designers have done is skipped the lightweight applications, and gone straight into the deep end of digital audio, where keyboard samplers generally require a lot of supporting equipment just to keep afloat. ■ *Rick Davies*

**Price** \$3000, excluding Macintosh and hard disks  
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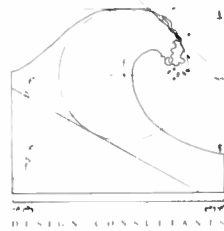
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In an ideal world, life would be simple. You would walk into your local newsagent, browse through the myriad of magazines on display, and settle inevitably on the latest issue of Music Technology. Cash in hand, you would cross to the counter, part with your paltry £1.40, and walk out, your attention already distracted by the wonders you have glimpsed between the covers.

Once indoors, you would leaf casually through the glossy pages, perhaps alighting on a particularly revealing interview, or focussing on a review of an incredibly sophisticated new instrument. And as the weeks went by, you would finally digest the entire contents of the magazine, in readiness for the next monthly trip to the newsagent.

Sadly, we do not live in an ideal world. The newsagent, well intentioned though they may be, have a nasty habit of selling-out of Music Technology, long before many musicians get a chance to go in and browse

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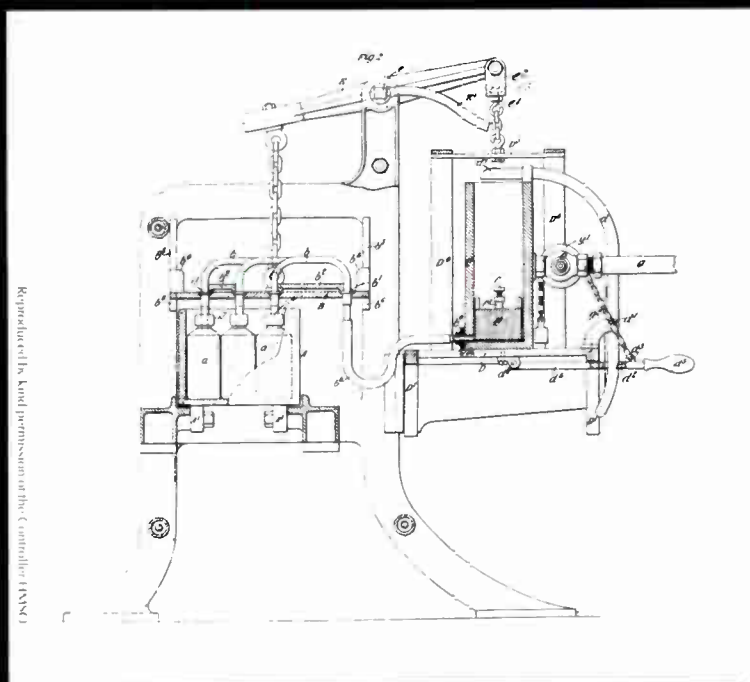
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MUSIC TECHNOLOGY AUGUST 1987

# What the hell's a MIDI PERFORMANCE SYSTEM?



STAND N36 BRITISH MUSIC FAIR

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# MISSION *impossible*

## Part 7: All's Fair . . .

The summer's here: off with the balaclava and on with the Raybans. And with it come all the Traditional Things To Do In Summer, of which the British are so proud. Visiting the British Music Fair is now one of those Things – along with Wimbledon, taking in a little cricket, whiling away the hours in a pleasant country pub...

Back to the BMF where, amongst all the other exhibitors, you'll find Music Technology (along with all its sister magazines on the Music Maker Publications stand) and its staff. And it is there that you'll be able to enter this month's thrilling instalment of our mammoth Mission Impossible competition. And mammoth it is as this month, we have no less than *three* prizes to give away: from **Roland** we've got a brand new MT32 voice expander, from **Yamaha** an RX17 drum machine and from **Nomad** an SMC1.0 MIDI/SMPTE Synchroniser. Not bad, eh?

Right, we've done our bit, now it's your turn. Three prizes, three questions:

1. How many user-programmable sound memories does the Roland MT32 have?
2. On the Yamaha RX17, which sound shares a pad with the bass drum?
3. What do the initials SMC stand for on Nomad's synchroniser?

You may well find a visit to the appropriate manufacturer's stand will help but, as Nomad won't be exhibiting at the BMF, the Nomad review elsewhere in this issue means you've already got one answer in your hands.

ANSWERS will *only* be accepted on the coupon at the bottom of this page and *must* be handed in at the Music Maker stand (N4, located on the left of the main entrance as you enter Olympia) sometime during the show itself. All entries must be in before 4pm on Sunday for the draw to take place at 4.30pm (the first name out of the hat has their choice of prize, and so on).

You'll also notice there's space provided for you to indicate the prizes you'd most like (in 1st, 2nd, 3rd format), should you be a winner. This is because there are no first, second and third prizes, there are three *first* prizes – so if you're not around when the draw takes place, we'll be happy to forward your prize to your home address.

As usual, employees of Music Maker Publications, Roland, Yamaha, Nomad and their relatives are ineligible for entry. The judges are only answerable to Lady Luck regarding their selection of the winners. ■



### A · N · S · W · E · R · S

- 1: The **Roland MT32** has .....user programmable sound memories.
- 2: On the **Yamaha RX17**, the ..... shares a pad with the bass drum.
- 3: SMC on the **Nomad SMC1.0** stands for .....

Name .....

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My choice of prize, in 1st/2nd/3rd order: Roland MT32  Yamaha RX17  Nomad SMC1.0



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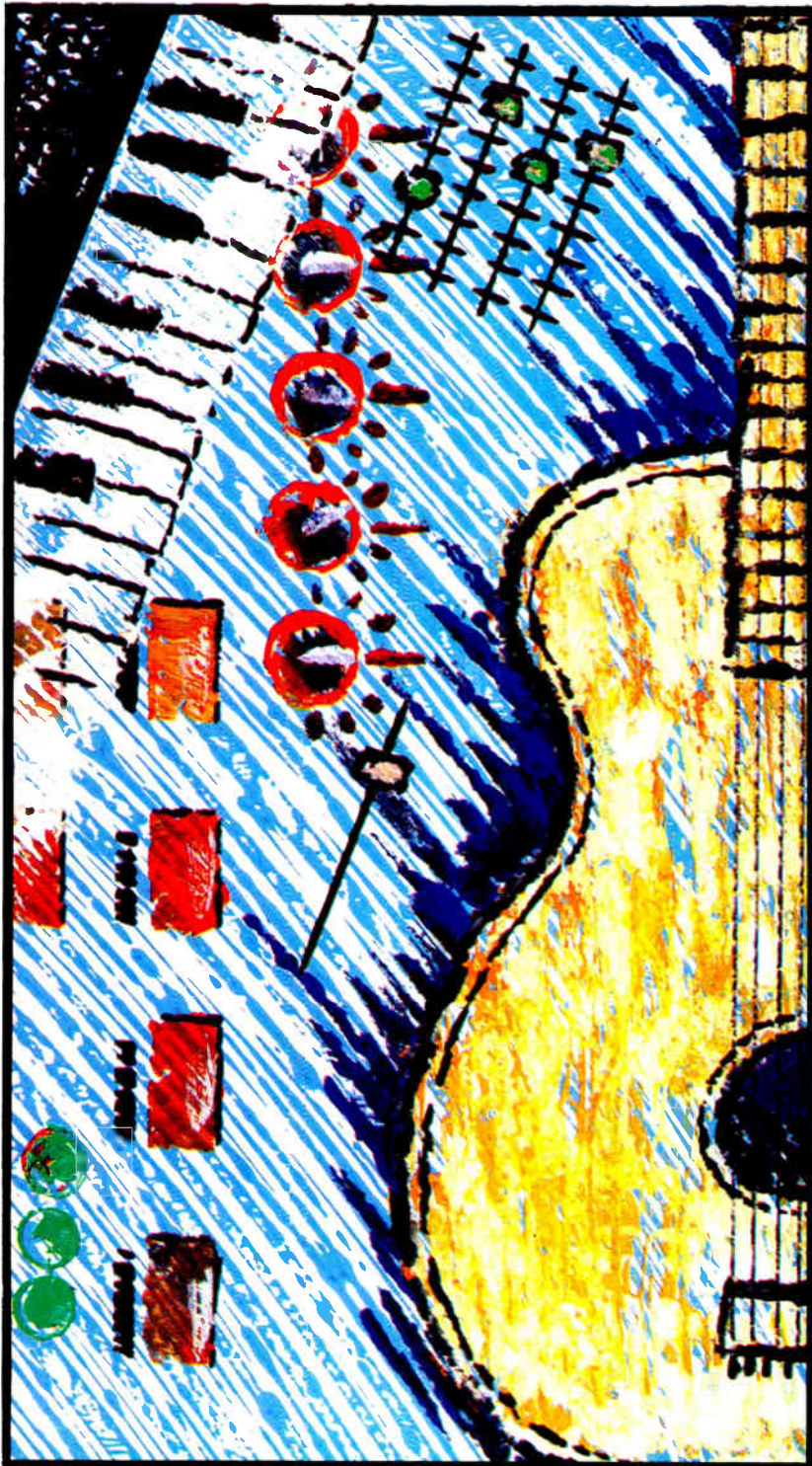
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# SOUNDS *natural*

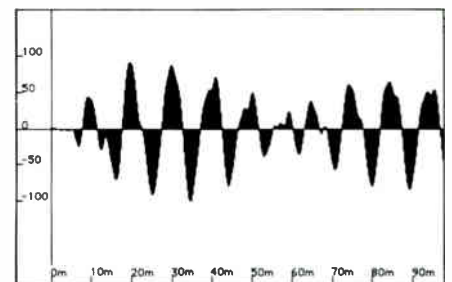
If you've ever tried to emulate the sound of an acoustic instrument with a synth or a sampler, this new series is for you. In the first of three parts, we focus on the acoustic guitar: what it sounds like, why it sounds that way, and how to duplicate it.

Text by Howard Massey with Alex Noyes and Daniel Shklair.

**T**HE ACOUSTIC GUITAR is a stringed instrument which consists of a hollow, hourglass-shaped body (usually made of wood) to which is attached a solid neck. The neck is usually made of wood, and is sometimes reinforced internally with a steel rod (although this is rarely the case with nylon-string guitars). The guitar has six (or occasionally twelve) strings, usually made of steel, bronze, nylon, gut, or combinations of these materials (such as bronze wrapped around a steel core). These stretch across both the body and the neck of the instrument and are attached to a bridge at one end, and pass over a metal, plastic, or ivory nut at the other end, where they are wound around a geared tuning peg. The front panel or face of the body usually has a sizeable sound hole in it to allow the vibrating air within the instrument to escape. In the so-called "f-hole" guitar, there are instead two small f-shaped holes for this purpose.

The neck of the guitar is fretted – that is, small pieces of metal (called, strangely enough, frets) are embedded in the fingerboard. The action of pressing down on a string behind a fret will, of course, alter the vibrating length of the string and thereby change the sound's pitch. If a string's effective length is halved, it will vibrate at twice the frequency, yielding a pitch exactly one octave higher than the sound produced by its vibrating over its full length.

Therefore, 12 frets are placed along one half-length of the string's length, with the 12th fret marking the string's mid-point. Frets 1-11 are situated so as to produce perfect semitone intervals within an octave. If this half-length of the string is halved yet again (resulting in a length equal to one-quarter of the total string length), the pitch will rise yet another octave.



**Start of nylon-string acoustic guitar sound:** Note the very rapid attack and tremolo effect (pulsation in amplitude), probably caused by phase cancellations in string vibrations.

Of course, shorter string lengths require that the fret spacing be closer together, which is why the frets at the top of the neck (the area closest to the bridge) are more narrowly spaced than those at the bottom. Many acoustic guitar necks, particularly those on steel-string guitars, are long enough to accommodate nearly two octaves of frets.

The strings themselves are tuned in consecutive fourths (that is, five semitones apart), except for the second and third strings (the first string being the highest pitched, and the one closest to the floor). The second and third strings are tuned to a major third (that is, four semitones apart). The actual pitches of the strings are usually – from lowest to highest – E, A, D, G, B, and E (two octaves higher). This tuning pattern may be altered at the player's discretion, yet remains the standard for both

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classical (nylon- or gut-string) and folk (steel-string) guitars.

In the case of the 12-string guitar (which always has metal strings), the four higher strings are actually the equivalent of two sets of the six-string guitar's two high strings (E and B). Each of these two sets of strings is tuned in unison. The lower eight strings comprise four sets of two each. Each set's pitch is equivalent to that of the six-string guitar's lower four strings (G, D, A and E), but with one string of each set tuned an octave higher than the other.

In all cases, the guitar is tuned by turning the tuning pegs. This has the effect of increasing or decreasing the string's tension, and thereby raising or lowering its pitch.

## How It's Played

YOU PROBABLY DON'T need reminding that the acoustic guitar is usually either rested on the knee or attached to a strap worn around the player's shoulder, with the neck normally at the player's left. Guitars are also made for left-handed players, with a neck designed to be held to the right of the player. These instruments feature strings in reversed order, so that the higher strings are still closest to the floor. For the purposes of this discussion, we will refer only to the standard right-handed guitar.

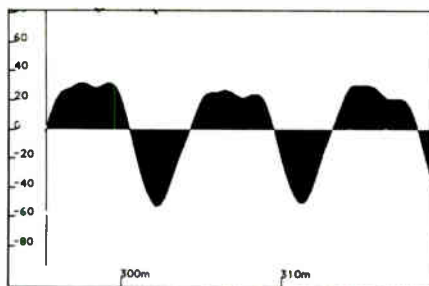
The player changes the vibrating lengths of the various strings by placing the fingers of the left hand on the neck of the instrument just behind the desired frets. This, of course, has the effect of altering the pitch of the guitar sound.

With the right hand, meanwhile, one or more strings may be sounded by plucking or strumming. Either or both of these techniques may be employed at any time, and are executed with the fingertips or fingernails – or with a small plastic or metal device (called a plectrum or, more commonly, a pick), that is held between the thumb and one or two fingers. The greater the force with which strings are strummed or plucked, the greater the amplitude of the resultant vibration, and the louder and brighter the sound.

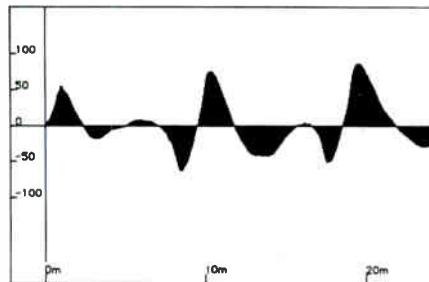
The particular point on a string at which it is excited has a clear effect on the timbre of the string's sound. The most common playing area is near the sound hole, about a quarter of the way from the bridge to the nut. When excited at this point, the strings yield sounds with the richest and warmest overtone content. When the strings are played nearer to the bridge, however, they tend to generate sounds with more high overtones than low ones – resulting in a brighter sound. Likewise, playing further from the bridge produces less bright tones.

There are also several specialised techniques associated with playing this instrument. The player can physically bend the string being played, thus increasing its tension, and resulting in a rise in pitch. This technique is called note or string bending, and is one that's been emulated by synthesists everywhere. The guitar player can also induce a vibrato effect by vibrating the finger that is placed behind the fret.

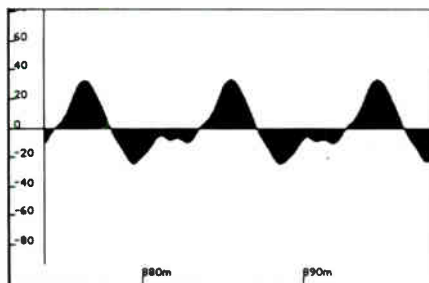
A pure harmonic overtone (with no fundamental) can be derived by placing the left finger gently at one of the nodal points of the string (that is, the half-length point, the third-length point, the quarter-length point, and so on) and at the same time, plucking the string



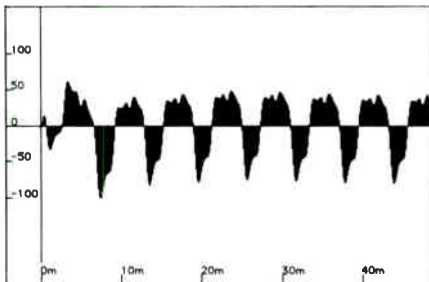
**Sustaining portion of nylon-string acoustic guitar sound:** At this point, the waveshape is extremely smooth and regular – very similar, in fact, to an acoustic bass waveshape.



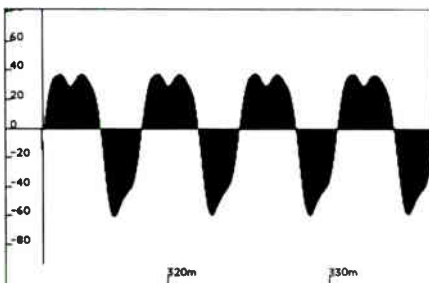
**Start of steel-string acoustic guitar sound:** In contrast to the almost sine-like shape of the nylon-string guitar, this instrument exhibits a very unusual and complex waveshape.



**Sustaining portion of steel-string acoustic guitar sound:** Note that the waveshape has changed only slightly since the initial attack, indicating that the sound is still harmonically rich, with little substantial timbral change since its onset.



**Start of subtractive patch:** Note the rapid attack and the complex waveshape resulting from the blend of pulse wave and high-pitched sawtooth wave.



**Sustaining portion of subtractive patch:** The striking similarity between this waveshape and that of the original acoustic nylon-string guitar sound is obvious (though a slightly higher pitch is displayed here).

with the right hand. Artificial harmonics can also be generated by playing the instrument with a pick held just beyond the fingertip, and simultaneously bringing the finger in brief contact with the string. This action effectively damps the fundamental vibration of the string.

A vibrating string can also be re-excited with the left hand through the use of hammer-ons and pulloffs. These techniques are used to produce legato notes. To perform a hammer-on, the player sounds a string, either fretted or open (unfretted), in the usual manner and then "hammers on" a left-hand finger at a higher fret. This naturally causes the string to sound a higher pitch, but with a gentler re-articulation than if the two pitches were sounded by plucking them independently.

A pulloff is simply a left-hand pluck: a fretted string is sounded in the normal manner, and then the fretting finger is "pulled off" to allow the open string, or a lower fretted note, to sound. Hammer-ons and pulloffs are often used in combination to produce trills and other effects consisting of notes in rapid succession. Strings can also be selectively damped either by decreasing the pressure of the fretting finger (see below) or by resting the heel of the right hand against the strings while plucking or strumming.

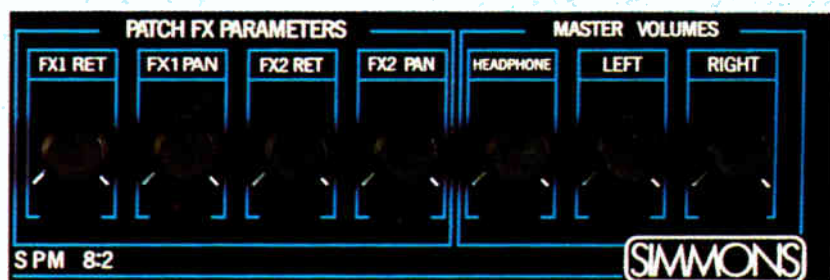
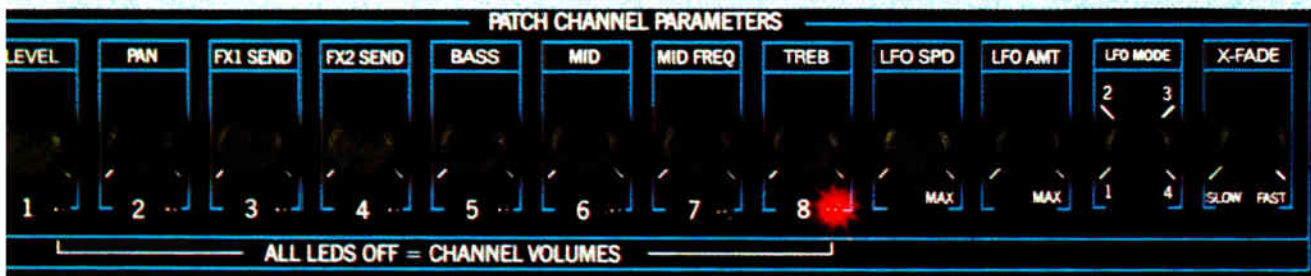
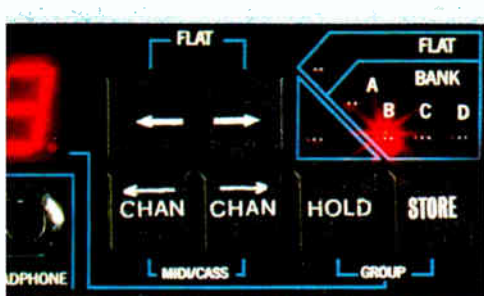
## Timbral Analysis

THE SOUND OF the acoustic guitar, like that of all plucked or percussive stringed instruments, is generated by the action of a string being moved from its resting point, and then being released. This, of course, results in the generation of vibrations. These vibrations are transmitted from the string (which in itself produces little sound) to the bridge. From there they are translated to the face of the instrument's body, causing the body itself to begin vibrating. These movements are finally transmitted to the air trapped inside the body. The bigger the body, the lower the frequencies it is able to resonate (or vibrate in sympathy with). This explains why a large guitar sounds warmer, or fuller, than a smaller one. In any event, the vibrating air within the body of the instrument eventually escapes through the sound hole – and combines with the air that has been set in motion by the body's own vibrations.

When this complex movement of air reaches our ears, we are able to perceive the guitar sound. Thus, the body of the acoustic guitar acts as a resonator, while the sound hole gives the sound directionality.

Again, in common with that of most other stringed instruments, the acoustic guitar sound displays a certain amount of inharmonicity. Its predominant overtones, therefore, are usually not simple harmonics, but multiples of the fundamental which are slightly sharp of the true whole-number harmonics. Thus, a fundamental frequency of 110Hz may well yield a second partial of 220.2Hz – not a large discrepancy, but a discrepancy nonetheless. This inharmonicity is more apparent with shorter string lengths (higher notes) than with longer ones (lower notes), and may well vary from string to string, according to the thickness of the string.

As with other wooden instruments, atmospheric conditions such as temperature and humidity affect the timbre of the guitar's sounds. Timbre is also affected by the physical



# SPM 8:2

*A Conventional Mixer?*

The SPM 8:2 from Simmons is anything but a conventional audio mixer. There are, however, some similarities: Eight channels, each with bass, treble and parametric mid-range equalization, two effects sends, pan and level controls. Two effects returns. A headphone/monitor output and left and right master outputs.

Here the similarities end because SPM 8:2 is a computer controlled device making duplication of channel controls unnecessary.

64 different mixes of eight channels, each comprising level, pan, eq and effects data can be stored in SPM 8:2's memory and individual mixes selected at will via MIDI, footswitch or the front panel. Cross-fade times between mixes are programmable for individual channels allowing fade outs and ins of different instruments simultaneously. Each channel also has a four function effects bank offering such features as variable rate auto-pan and phasing.

With a specification and price tag the envy of most "mixing desk" manufacturers SPM 8:2 has only one disadvantage . . . How do you fill a page with its picture?



Simmons Electronics Limited, Alban Park, Hatfield Road, St. Albans, Herts AL4 0JH. Tel: (0727) 36191 (5 lines).





► composition and condition of the strings. Steel strings produce more high overtones – and hence brighter sounds – than do nylon strings, while old or dirty strings of any type generate fewer high overtones, hence duller sounds.

Another factor which affects the timbre of the guitar sound is the manner in which its strings are excited. Strings which are plucked with greater force appear not only louder, but brighter as well. Guitar picks made of hard material “give” less than soft picks, and so generate shorter, quicker string excitations – again yielding a brighter sound.

As mentioned above, the point on the string at which it is excited is also a determining factor in the overtone makeup of the sound that’s generated. If a string of a well-constructed, nylon-string acoustic guitar is plucked at its usual quarter-length distance, partials 1-10 will be present in the sound. Here, the fundamental is little more than twice as loud as the second partial (which, remember, is just a bit sharper than the true second harmonic due to that inharmonicity). The second partial is little more than twice as loud as the third. Interestingly, both the fourth and eighth partials are virtually absent. The fifth and seventh partials are half as loud as the third, and the sixth partial is just a bit louder than both of these. Here, the ninth and tenth partials have negligible presence.

The steel-string acoustic guitar, as you might suspect, has a very different overtone makeup. First of all, overtones up to the 25th partial are present in the sound in substantial amounts. The second, third, and fourth partials are all present in significant strengths, with the second and third partials are actually stronger than the fundamental in the early stages of the sound. The third partial fades away somewhat more rapidly than the others, but all the lower overtones up to the 13th are substantially present – except for the sixth partial, which remains at a low level throughout the duration of the sound.

The relationship between the fundamental frequency and partials 2-9 remains pretty much the same throughout. Overtones above the ninth partial are gone completely by about half a second into the sound.

Clearly, then, the steel-string acoustic guitar generates a much brighter and harmonically richer sound than the nylon-string guitar.

## Changes in Sound

BEING A STRINGED instrument that is never bowed, the acoustic guitar is non-sustaining. The vibrations of its strings can last for quite a long time, however, if they are not damped by the player’s hand. The duration of these vibrations naturally increases in longer strings (that is, lower notes vibrate longer than higher ones). A plucked low note played on an open string on a good nylon-string guitar, for example, can vibrate audibly for a good 20 seconds after its initial excitation.

The attack time of a sound generated by the acoustic guitar is normally very fast, but it may be slowed down slightly by particularly gentle strumming – or when played with a soft plectrum that “gives” with the string.

Decay time can be quite substantial and, once again, will increase for lower pitches. There are actually several factors which affect the decay time. One important factor is whether or not the string is fretted (open strings have much longer decay times, since these do not come into contact with the energy-absorbing surfaces of the neck and the player’s finger). Another important factor here is the degree of pressure placed on the string by the finger behind the fret. Decreasing this pressure serves to damp the vibrations, as the string then has greater contact with the soft surface of the finger than with the metal fret. In every instance, however, the overtones of a guitar sound decay long before the fundamental, with the highest overtones diminishing first.

In a typical nylon-string guitar note, for example, most of the higher harmonics fade away within a second. The same general pattern is exhibited by the steel-string guitar, except that the higher overtones linger a bit longer.

Once again, as with all other stringed instrument sounds, here both the fundamental frequency and the amount of inharmonicity of a note are greatest at the note’s onset. This is due to the momentary stretching of the taut string as it is plucked or strummed. This causes the pitch to be a little bit sharp and creates increased inharmonic content in this first instant of the sound’s existence.

Both of these effects should be taken into consideration when synthesising an acoustic

guitar sound, whether it’s via digital means or using an analogue subtractive method we’ll discuss now.

## Subtractive Synthesis

ASSUMING YOUR ANALOGUE synthesiser has sufficient power, put both of your oscillators to work here, with each contributing a part of the overall sound of a nylon-string acoustic guitar.

Oscillator 1 is used to provide the body of the sound in our subtractive “patch”, so set it for a fairly narrow pulse wave (about 10-20%) tuned to its middle register (8’). Oscillator 2 contributes a bit of the initial “pluck” sound, so set it to a sawtooth wave, and tune it three octaves and a major seventh above oscillator 1. This tuning works well here because the seventh is an overtone found naturally in the vibrating string timbre – yet it is far enough from the fundamental to sound “separate” from the main tone. This creates the auditory illusion of a “pluck”.

At your synth’s mixer section, maximise the volume of the first oscillator while setting the second oscillator, responsible for the “pluck”, at about one-fifth volume.

The low-pass filter cutoff frequency should be set at a bit less than half, with no resonance. Route a keyboard controlling signal of about 75% to the filter in order to make higher pitches somewhat brighter than lower pitches. The filter EG serves to fade out the higher overtones rapidly, but the nylon-string guitar is not a particularly bright or timbrally complex sound, so we won’t need a great deal of EG depth. Set this at about 2 on a scale of 1-10.

The EG settings are pretty straightforward: set the attack at a bit longer than instantaneous, with a moderate decay, no sustain level, and a release time just a bit longer than the decay time. The amplifier EG should be given the same relative settings, with slightly longer decay and release times. With this kind of envelope setup, you can play legato or staccato notes to create slightly different sounds (the legato notes will fade away more rapidly and the staccato notes will ring out a bit longer).

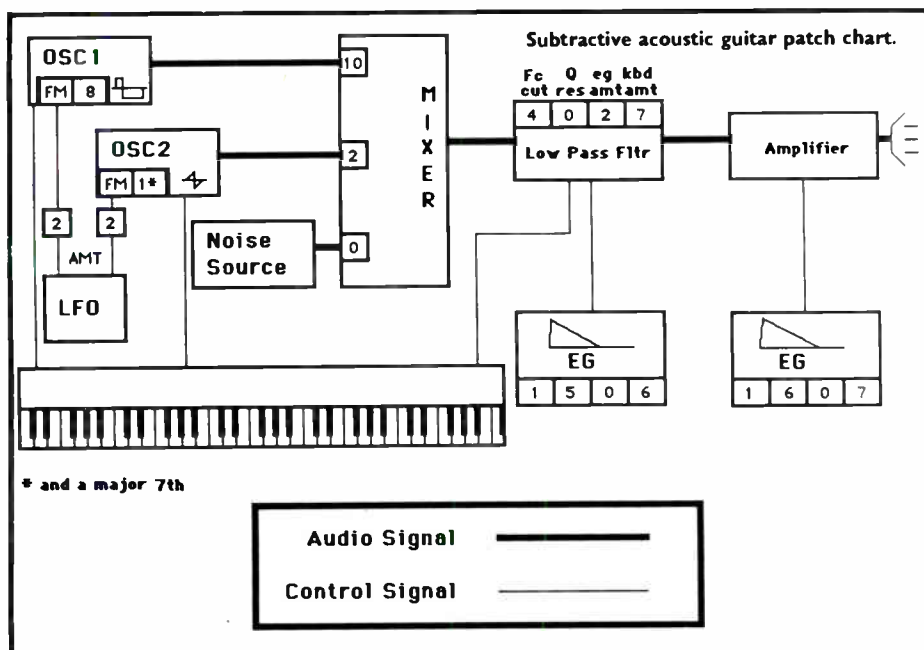
You’ll also want to route an LFO sine or triangle wave through a controller to give you the option of creating a broad vibrato effect at the end of held notes – a characteristic of the acoustic guitar sound. The key here, as with most other imitative patches, is to articulate the sound as a guitarist would – with arpeggiated and strummed chords of no more than six notes at a time.










Finally, if your synth has a velocity-sensitive keyboard, you’ll want to route equal amounts of that signal to both filter and amplifier, so that as notes are struck harder, they are both louder and brighter.

## PD Synthesis

IF YOU HAVE access to a digital synth that makes use of Phase Distortion synthesis (ie. a member of the Casio CZ range), this is the patch for you.

To start off with, use the 1 + 2’ line configuration. Select the double sine and pulse wave for DCO1, and the square and pulse wave for DCO2, to create a rich palette of overtones – one which (because of the double



<b>DCO 1</b>		<b>DCW 1</b>		<b>DCA 1</b>		LineSel 1+2'
99 12 0		99 98 53		99 85 99 34 50		
66 66 0		80 64 0	0	99 63 99 12 0	2	
<b>DCO 2</b>		<b>DCW 2</b>		<b>DCA 2</b>		Octave 0
99 0 0		96 99 53		99 99 29 62		Mod None
66 66 0		63 55 0	0	99 97 0 0	2	
KeyTP C		Vibrato Rate Del Depth				
Bend 6			45	54	0	
MIDI 1		Detune Oct Note Fine				
		+/-	-	0	0	2

Digital phase distortion patch chart.

▶ sine wave) also contains a great deal of fundamental frequency. Detune the two DCOs slightly to liven up the sound a bit, and set the DCO envelope to provide a sustained, steady pitch.

The DCW envelopes are each set for a percussive shape with a gradual decay. However, the DCW2 envelope has a slightly slower attack time, a faster decay, and a lower sustain level. Offsetting the envelopes like this helps create a more complex pattern of harmonic change in the total sound. You won't need any keyboard following for either DCW, since you want higher notes to be significantly brighter.

The two DCA envelopes are set quite differently from one another. DCA1 simulates the picking action of the guitarist (actually almost a double-picking effect), while DCA2 produces a short, percussive shape. Apply a bit of keyboard following to both DCAs, since this will shorten these envelope movements slightly as the pitch rises.

This patch should be articulated with a short, strumming pattern to achieve the most realistic sound.

slightly to avoid noise and distortion in the final sound.

The EG settings for the operators in this system are all pretty straightforward, with none having any sustain level (L3). All the EGs exhibit a fading pattern, with operator 5 dying away more rapidly than any of the others. This causes the overtones in this sound to fall away more quickly than the lower ones, induced by operator 4. Note that while the nominal output level of the carrier (operator 3) is at maximum, none of its EG levels is at maximum, meaning that its EG movements are somewhat accelerated. The EGs of the carrier and of modulators 4 and 5 should be scaled slightly, so that the higher the note, the more rapid the volume and timbral changes.

Use small amounts of velocity sensitivity in both the carrier and the modulators, so that as keys are struck harder, the sounds become brighter and a bit louder. Apply keyboard level scaling to the modulators, with operators 4 and 5 attenuated slightly from lowest note to highest, and operator 6 (the top operator in the stack) rolled off at both extremes of the keyboard range. Although this patch sounds

reasonably good over the full range of the keyboard, it sounds best in the middle registers as a result of these scalings.

The system creating the characteristic "thud" sound is set to a fixed frequency of 117.5Hz. The frequency ratio here should be 1:1, so that all the harmonic overtones will be heard, however briefly, in this extremely transient component of the sound. Add a slight amount of detuning to the carrier, and set the oscillator key sync off, so each key depression produces a slightly different set of overtones. Use a small amount of velocity sensitivity for the carrier, so that harder struck notes will have slightly more "thud".

The EGs in both carrier and modulator are set to yield a transient sound with a short release if notes are played staccato. You'll want to use keyboard level scaling for the modulator to keep this component from sounding overpowering in higher notes, but use no rate-scaling here to ensure that the length of this "thud" remains consistent throughout the keyboard range.

Finally, set the LFO for a slow vibrato effect, with a sma" amount of pitch modulation sensitivity. This should be routed through a con-

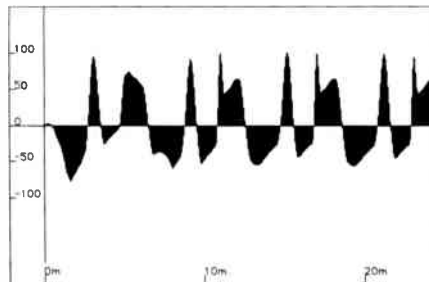
## FM Synthesis

THIS PATCH – FOR users of Yamaha DX synthesizers – simulates the sound of a strummed nylon-string guitar. Use two discrete systems, one for the body of the sound, and the other for the characteristic "thud" heard in the body when the finger makes contact with the string.

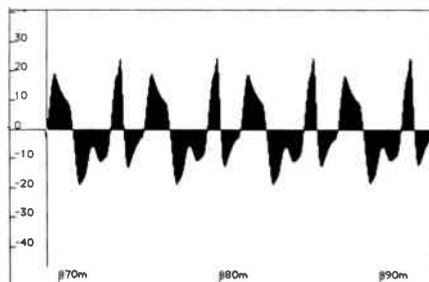
The carrier responsible for the body of the sound must generate a complex series of overtones – so a stack and a single modulator are required. The second carrier, which needs only a single modulator, produces the "thud" sound. This configuration is represented in algorithm 8 on the DX7 – so it is naturally the best choice for this particular patch.

Let's first examine the stack which produces the body of the sound (operators 3, 4, 5 and 6). Set up a frequency ratio of 3:1 between operators 4 and 3, and use a ratio of 12:3:1 (or 4:1:0.33) for the stack itself to induce high, even-numbered overtones. Detune the top operator to add a slight beating effect to the sound, and add a very small amount of LFO amplitude modulation with a slow-moving sine wave.

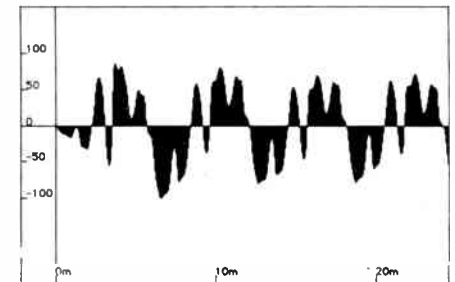
Operator 4, the single modulator in this system, has the feedback loop in this algorithm. Set the loop for maximum feedback, but attenuate the output level of that operator 32



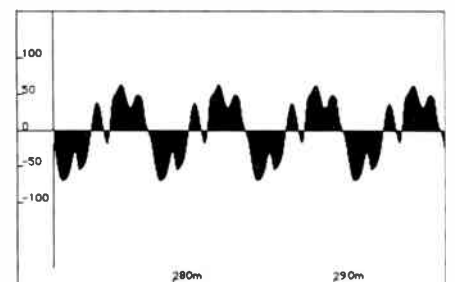
Start of Phase Distortion patch: Note the slight timbral instability at the outset, changing to regularly alternating waveshapes.



Sustaining portion of PD patch: The waveforms are still regularly alternating, but appear to have had their phase reversed since the initial attack portion of this sound.



Start of FM patch: Note the complex waveshape, not dissimilar to that of the nylon-string acoustic instrument's sound, but not exhibiting the phase cancellations caused by true string vibrations.

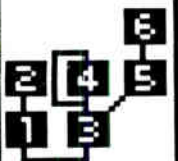


Sustaining portion of FM patch: There has been little timbral change since the attack portion of the sound, but the waveshape is quite similar to that of the real acoustic instrument sound – though a higher note is obviously being played.

On/Off	1 Car ☒	2 Mod ☒	3 Car ☒	4 Mod ☒	5 Mod ☒	6 Mod ☒
EGRate	74 71 99 50	74 88 99 17	78 87 22 54	81 87 22 15	81 93 22 75	99 60 99 75
EGLev	99 0 0 0	99 0 0 0	89 82 0 0	99 92 0 0	99 92 0 0	99 0 0 0
Scaling	0 A-1 0	0 A-1 65	0 A-1 0	0 A-1 8	0 A-1 17	70 F*3 20
Curve	-lin -lin	-lin -lin	-lin -lin	-lin -lin	-lin -lin	-lin -lin
Output Level	77 Vel RSc AM 2 0 0	99 Vel RSc AM 0 0 0	99 Vel RSc AM 2 3 0	89 Vel RSc AM 3 4 0	99 Vel RSc AM 2 4 0	56 Vel RSc AM 2 0 3
Freq	M Coar Fine Det f 11 7.5 0	M Coar Fine Det f 11 7.5 -1	M Coar Fine Det r 1. 00 0	M Coar Fine Det r 3. 00 0	M Coar Fine Det r 3. 00 0	M Coar Fine Det r 12. 00 +1
PEGRat	99 99 99 99	LFOWave Spd Del PMD AMD PMS Sync				
PEGLev	50 50 50 50	Sine	24	0	0	42 1 Off

Algorithm	8
KeyTP	C3
Feedback	7
KeySync	Off

Digital FM patch chart.



troller to allow for selective vibrato effects in your sound.

Articulate this patch accurately, and you've got a pretty convincing nylon-string guitar sound.

## Sampling

THE ACOUSTIC GUITAR is capable of producing very bright transient sounds, so it's always best to mic it with a condenser microphone like the Neumann U87 or AKG 414. Certain dynamic mics, such as the Beyer M60, will also yield good results. Occasionally, an acoustic guitarist may employ a contact pickup, although this is more commonly used for live performances rather than in recording situations. These should rarely be used for the purpose of sampling, as they deliver a very unnatural sound – unless you're used to listening to an acoustic guitar with your ear next to its body.

The microphone should be placed some 2-12 inches from the instrument, near the sound hole, but at an angle in order to prevent a

"booming" effect. You might also try positioning the mic closer to the bridge, which will result in a somewhat brighter sound. As always, spend some time finding the optimum mic placement for the type of sample you want to create. Naturally, the distance at which the mic is placed from the instrument has a considerable effect on the sample: greater distances will increase the amount of reflected sound and therefore make the sample more ambient. However, if ambience is what you're really after, it's often better to place the microphone in an omnidirectional or figure-eight configuration (as opposed to cardioid or hypercardioid) and leave it close to the strings.

Typical outboard signal processing techniques include the use of small amounts of EQ to reduce boominess (attenuate the 60-100Hz area) or boxiness (attenuate the 500-900Hz area) and occasionally the addition of brightness (boost the 10kHz area). Small amounts of compression (slopes of 3:1 or 2:1) can be helpful as well, to add "punch" to the strummed or plucked sound. Small amounts of short reverb may also be added to suggest ambience in a close-miked acoustic guitar sound that lacks any of the natural variety.

Depending on the capacity of your sampler's memory, you should take between two and four samples per octave. (The octave span of an acoustic guitar, incidentally, is equivalent to MIDI note values 40-83.) You'll also need to choose which string you want to sample when changing pitches, as a note on one string

can often sound different from the same note played on a string of a different gauge. In general, you should opt for the string on which that note would most often be played in the context of the musical piece you are planning to do. This, of course, may not always be possible, since you may be taking samples for archive purposes, with no particular composition in mind. In that case, your ear will have to be your guide.

Sampling different articulations of the acoustic guitar is usually not necessary, though if your sampler has sufficient memory, you may want to take samples of the same note played with different dynamics or on different strings. The sample length will, as ever, increase for lower notes, and it can be six seconds or more for the lowest notes, making looping necessary if you are working with limited memory. If you need to loop your guitar sample, short loops of just a few wave cycles usually work best, and these should begin well past the peak of the attack (at least a second into the sound). If you truncate after the loop point, you'll need to use your sampler's filter and amplifier envelopes to restore some of the natural decay and release portion of the looped sound. Often, judicious use of the filter envelope to decrease the upper harmonic content of the sample is helpful as well.

Next month, we'll be adopting the same approach (discussing the nature of the acoustic sound, programming three types of synth, and sampling) for another often-emulated instrument, the clarinet.

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# KAWAI K5 and K5m

## Multi-Dimensional Synthesisers



**A**t a stroke, Kawai has attempted to combine the power and complexity of real-time additive synthesis with flexible multi-timbral capabilities. Will the combination set a new standard? Review by Bob O'Donnell.

YOU, AND HUNDREDS like you, may not know it. But the lure of additive synthesis has always been strong for musicians interested in having complete control over the sounds they program – and aren't too bothered about how long it takes to exert that control.

Unlike their analogue brethren, whose "subtractive" control methods necessarily limit the type of timbres that can be created, digital additive synths give the programmer complete and utter control over the instruments' synthesised sounds. As a result, they can produce anything from realistic simulations of acoustic instruments to entirely synthetic timbres.

But this kind of power does not come without cost, and until recently, additive synthesisers have been prohibitively expensive to buy and incredibly tedious to program. In fact, very few of them have become readily available. Recently, a number of samplers have begun to include some basic "additive" options, but these have been very restricting and have required a significant amount of time to compute the resulting waveform.

Kawai's previous synth, the K3, also incorporates this basic type of additive synthesis. The machine's "user waveform" feature allows you to choose up to 32 of 128 possible harmonics, and set a relative amplitude level for each of them. But while you can create some interesting sounds with this method, you're limited to creating static waveforms, since there are no envelopes with which to change the level of harmonics over time.

With the new 16-voice K5, Kawai have made a quantum leap past the principle of the user waveform, and created an additive synthesiser. (Actually, the K5 does not conform exactly to the requirements for a truly additive synth, but we'll get to that later.) And in addition to being able to create its waveforms in real time, the K5 allows for very sophisticated control over them.

### Additive Synthesis

WORKING UNDER THE assumption that not everyone is familiar with this method of synthesis, it's worth spending some time examining how it works and the theory behind it. The owner's manual which comes with the K5 doesn't offer much help here. In general, its

explanations of what specific functions and the overall instrument can do seem incomplete, which is unfortunate, to say the least.

Additive synthesis is based on the principle that every sound imaginable can be broken down into (and hence recreated with) a group of sine waves. The sine wave is the simplest and purest waveform possible, containing no overtones besides the fundamental frequency. Each sine wave within a complex sound is referred to as a harmonic or a partial of the sound. Different partials occur at different frequencies, and the ratio of these frequencies to the first partial (the fundamental), as well as the relative amplitude and *change* in amplitude of each partial determines the harmonic structure and, consequently, the timbre of different sounds.

Additive synthesisers work by allowing the user to select the partials that are to be incorporated into the sound, and then to program their initial frequencies, their relative amplitudes and the envelopes which determine how these components change over time. The three-dimensional waveform displays, or FFT analyses, that many sample editing programs (such as Digidesign's Sound Designer) can produce are excellent examples of this principle. Each of the individual waveforms which make up the total display represents the amplitude envelope of a particular harmonic (or, in the case of Digidesign's SoftSynth, a particular overtone) is actually a sine wave at a particular frequency with a particular amplitude envelope.

The K5's implementation of additive synthesis is quite sophisticated but, as mentioned above, it does not fulfil all of the "classic" requirements for a truly additive synth. Specifically, there are no individual pitch envelopes for each partial, and there are only eight possible amplitude envelopes to choose from. In addition, only whole number partials – which make up the natural harmonic series – can be used, since inharmonic partials are not directly available. (Inharmonic partials are "out of tune" with the natural harmonic series and often provide the "noise" content of many sounds.)

While having so few envelopes may appear to be a serious limitation, this turns out not to be the case in practice. In fact, you'll probably find, as I did, that with the huge number of parameters already available on the K5, the limited number of envelopes reduces the tedium of programming sounds, without really reducing the flexibility of the instrument.

The first thing you notice about the K5 – or the modular version, the K5m – is its large, informative liquid crystal display. As we'll soon see, it's this display that really saves the instrument from being a programmer's nightmare.

Any of the machine's 48 internal single patches or 48 internal multi patches – or an equivalent number from the slim, external RAM or ROM cards – can be accessed by hitting one of the four bank groups and then one of the 12 individual buttons.

The LCD, which has an adjustable contrast control for easy viewing at nearly any angle, displays the patch's name and location and, for single patches, the assignments for the pedal controller and mod wheel. This last feature can be very handy if you're prone to forgetting what the controller assignments are for various patches.

Hitting the Edit button brings you to the basic edit page. From here, 12 individual buttons provide quick access to

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Photography Bob O'Donnell

various functions. Thankfully, Kawai have avoided multi-function editing controls for single patches, so you can easily keep track of where you are during the editing process.

To move around within any of the 13 pages available, you make use of the four cursor buttons, and to change the value of parameters you use the now familiar increment dial. The system is simple, logical and, once you get used to it, very fast.

---

## Voice Architecture

TWO TYPES OF patches are available on the K5, "single" and "multi". Multi patches (which will be discussed further on) are flexible combinations of single patches – much like performance memories on other synths. Single patches consist of two "sources," each of which contains a Digital Frequency Generator (DFG), a Digital Harmonic Generator (DHG), a Digital Dynamic Filter (DDF), and a Digital Dynamic Amplifier (DDA). In addition, each source can have its own Keyboard Scaling curve, and the combined sources share a programmable LFO and a Digital Formant Filter (DFT), which basically works as an 11-band – one band per octave – graphic equaliser.

The sources can be combined either in series, which Kawai call "full mode," or in parallel, which is termed "twin mode". In full mode, the K5 gives you control over a whopping 126 harmonics at once – that is, 126 sine wave oscillators. In twin mode, there are two sets of 63 which can be detuned against each other.

A quick run through the instrument's presets led to the discovery that nearly every one used twin mode because, except in a very low range, harmonics above the first 63 are inaudible.

Despite the "additive" title, Kawai's new synth maintains a sense of continuity with traditional analogue, subtractive synths. In fact, and this is strange, the best way of understanding the K5 voice architecture is to think of it in relation to a subtractive synth.

The "oscillator" of the K5 is a combination of the Digital Frequency Generator and the Digital Harmonic Generator. The DHG determines the harmonic spectrum – the basic "shape" of the initial waveform(s) – via the amplitudes and envelopes of the various harmonics, while the DFG controls their pitch. The DDF and DDA function as sophisticated versions of their analogue counterparts, and the DFT offers a final degree of control over the sound.

The real heart of the K5, and the only "additive" portion of the synth, is the DHG. To continue the analogy, think of each source in the DHG as a sophisticated, programmable "waveform select" portion of the "oscillator". Because you can create your own waveforms, however, the number of available choices is unlimited. You can program traditional analogue-type waveforms, very close imitations of acoustic instrument sample loops, or whatever it is that you desire.

The instrument's single patch presets give you a fairly good idea of the possibilities, though they're not as effective as they could be. Sample-quality pianos, warm strings, clanging chimes, drawbar organ and many other basic waveforms are present. The sounds are generally sharp and clear, with a touch of high-end digital bite.

The actual process of waveform creation requires that you set a basic level (0-99) for each of the 63 harmonics in a source, and then assign them to one of four six-stage amplitude envelopes.

In addition, each harmonic can be affected by two types of modulation. The first of these is a traditional LFO-type modulation which Kawai calls "effect". Each envelope group – that is, all the harmonics assigned to a particular envelope – can have a separate modulation rate for this

effect, which is the only control you have over it.

The other type of modulation, which can be turned on and off for each harmonic, is a composite modulation buss that determines how much effect the amplitude envelopes have on the various harmonics they are assigned to – in other words, the envelope modulation amount. Attack velocity, aftertouch, keyboard scaling and the LFO can all affect the amount to produce a complex variation of the basic envelope. With a bit of planning – working out which harmonics you want to be affected and how you want them to be affected – this modulation buss can effectively double the number of envelopes available.

The DFG sets the basic pitch of each source (tunable over four octaves) and has a dedicated six-stage pitch envelope that can be modified by velocity, aftertouch and the LFO. In addition to creating some nice detuned chorus effects, the wide tuning range of the DFG allows the K5 indirect access to inharmonic partials.

Probably the most unfortunate limitation of the entire instrument is the K5's inability to access inharmonic partials directly, because almost all natural sounds have at least a few non-harmonic or inharmonic partials. But by detuning one of the sources against the other in either twin mode or full mode, you can create partials which lie between the whole numbered partials of the harmonic series. It takes a good understanding of harmonic theory and a bit of arithmetic to figure out, but it is possible. And that's a statement that's pretty much true of the K5 in general.

---

## Editing

OK. LET'S TALK about how sounds are put together. The monotony of programming additive synthesisers has always been – and will continue to be – their greatest shortcoming.

The amount of information that needs to be entered is generally much greater than it is for any other synthesiser – simply because there are more variables to be chosen. Consequently, it's harder to keep track of where you are, and it also takes more time to achieve the desired result. To add further to the problem, most of these instruments require a certain amount of time to calculate the new waveform after each bit of editing.

Kawai are obviously aware of all this, and have taken it into consideration when designing the K5. For here, at last, is an additive synthesis machine that incorporates several functions which allow programming to be accomplished quickly, as well as effectively.

Greatly contributing to this efficiency is, as we've said, the large LCD, which is capable of displaying a great amount of information at once. Despite its potential benefits, however, the K5's display isn't used to its greatest advantage, simply because it shows only envelope parameter values, rather than resulting envelope shapes. This seems rather odd, especially when you consider that the response curve on the DFT (which can be displayed) is quite similar to an envelope.

In addition to the display, though, the real-time action of the K5's DHG is a great boon that hugely eases the programming process.

Another function which helps simplify programming is the Copy feature on the basic edit page. This function allows you to make a duplicate of any part of a source, or even an entire source, and then store the copy in any location. It is particularly handy if you want to make subtle alterations to one of the harmonic spectra (created by the DHG) that you've programmed for a patch.

The most well thought-out section of the whole machine, however, is the DHGI page. As mentioned above, the options offered by the digital harmonic ►

*"The process of waveform creation requires that you set a basic level for each of the 63 harmonics in a source, and then assign them to one of four six-stage amplitude envelopes."*

*"Despite the 'additive' title, Kawai's new synth maintains a sense of continuity with analogue synths; the voice architecture is best understood in relation to a subtractive synth."*

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► generator are what give the K5 its unique character, so it's encouraging to see that Kawai have taken the time to make it easy to understand and use.

The key to the success of this page lies in the grouping functions, which allow you to adjust the levels of an entire group of harmonics in a number of different ways at once. Most additive synths require you to set the level of each harmonic individually, which can be a horribly tedious process. With the K5, you can set the range of the harmonics you want to affect – signified on the LCD by a solid bar under the ones specified – and then choose whether you want to further affect harmonics that already have a non-zero amplitude (referred to as “live”) or ones within that range that don't have any amplitude yet (very oddly termed “die”), or finally, all the harmonics within that range. In addition, you can decide if you want to adjust only odd harmonics, even harmonics, octave-related harmonics or fifth-related harmonics.

Once you've chosen the harmonics you want to affect as a group, you can then select the angle at which the levels will increase. They can be increased evenly, with a high-end roll-off or a low-end roll-off. One option that isn't available is a logarithmic increase or decrease, which would have been helpful in producing sawtooth-type waves, but these grouping options are still an enormous improvement over most other systems.

One other point that deserves mention is that Kawai have included the ability to turn off various modulations and components of each patch (like the DDF and the DDA) so that you can determine the effect they have on the overall sound. This can be very handy – not to mention educational.

Yet even with these helpful features, the K5 is not an easy instrument to program. It's by no means impossible, but it definitely requires some effort and some homework on the theory of sound. Kawai are aware of the difficulty involved and plan to support the K5 with a number of ROM cards – though let's hope the advent of these doesn't begin another DXesque preset mania.

## Multi Patches

SINGLE PATCHES ON the K5 are capable of producing a wide variety of very big, impressive sounds on their own. But if you want an absolutely massive sound, up to 15 different single patches may be combined in one multi patch (check out the preset called “ALLOFEM”).

As mentioned above, multi patches are basically performance memories which allow you to create flexible splits (up to 15 at a time); layers (again, 15 at once across the entire length of the keyboard); velocity switches (up to eight different sounds per key); and combinations of all three.

That “multi-dimensional” subtitle at the start of this review stems from this useful voice assignment scheme. By the way, although the K5 is 16-voice multi-timbral, it can only play 15 different voices, apparently because of the limitations in the microprocessor.

As with the modulation facilities and grouping functions found in single patches, Kawai have managed to include some impressively flexible control options over the multi patches. They can be edited via five more dedicated software pages (Kawai use the term “windows” for multi patch editing) which allow you to set the zone of each single patch within a multi; its polyphony, which can be dynamically allocated; its mode – that is, whether it responds to the keyboard, MIDI or both; its MIDI channel, up to 15 MIDI channels at once for transmission and reception; its velocity switching range – in other words, at which velocity levels the patch will sound; its transposition, over a four-octave range; its fine tuning; its output level;

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and which of the four individual outputs its signal is to be routed to.

Most importantly, the K5 offers not only dynamic allocation of its voices, but also lets you choose either to give each patch a specific number of voices, or to set it to “variable” so that it can have access to as many voices as possible. This feature, combined with the ability to assign each patch to its own MIDI channel, makes the K5 a formidable new tool for sequencing, especially if you take advantage of the four individual audio outs.

Each single patch within a multi patch can also have various MIDI commands (such as pitch-bend, aftertouch and so on, emanating either from the keyboard itself or from other MIDI controllers) individually enabled or disabled.

This leads us on to the MIDI implementation on the K5, which turns out to be very impressive. The two pages set aside for MIDI functions allow you to program some of the same functions found in the multi patch programs for the overall instrument.

These include setting the basic send and receive channel – which is separate from the individual channels set with multi patches – and enabling or disabling the optional hold pedal, expression pedal and foot controller, as well as portamento, program change (which can be set to affect single patches or multi patches, but not both), bend range, and tuning. In addition, the K5 can be set to receive or ignore pitch-bend, modulation, MIDI volume and attack velocity. The K5 keyboard also generates release velocity, though this data cannot be disabled.

The MIDI “basic” page also allows you to initiate System Exclusive dumps from the front panel, and enables reception of SysEx data. You can choose to send a single patch or an entire bank of patches in one simple operation.

## Conclusions

WHAT'S THE SUM total of all this? Well, although the K5 and K5m are not truly additive synths, their hybrid additive/subtractive method of synthesis is a viable new alternative, and one that's capable of producing some impressive sounds. What's more, Kawai have included a number of features that offer you expressive control over those sounds. The complex modulation options and the ability to respond to release velocity, as well as other MIDI controllers, make the K5 and the corresponding module very playable instruments.

But for a synth to be a truly effective tool, you need to be able to create timbres of your own with it. Kawai have obviously spent a great deal of effort overcoming the problems normally associated with programming additive synths, yet although the friendly LCD makes the process as painless as possible, I suspect that, as with the DX7, a minority of dedicated programmers will produce most of the new patches.

Finally, though, it must be said that the multi patches turn the K5 and K5m from competent machines into absolute monsters. With a flexible dynamic allocation of 16 voices, four individual outputs and the ability to receive on up to 15 different MIDI channels at once, these instruments are a MIDI sequencer user's dream. The K5m, in particular, looks to be fine value for sequencing purposes, even in the light of competition from the likes of Ensoniq ESQ1 and Roland D50.

In the brief description at the beginning of this review, I questioned whether the K5 and K5m set a new standard. The obvious answer now is yes. ■

Prices K5, £1495; K5m, £1045, both including VAT  
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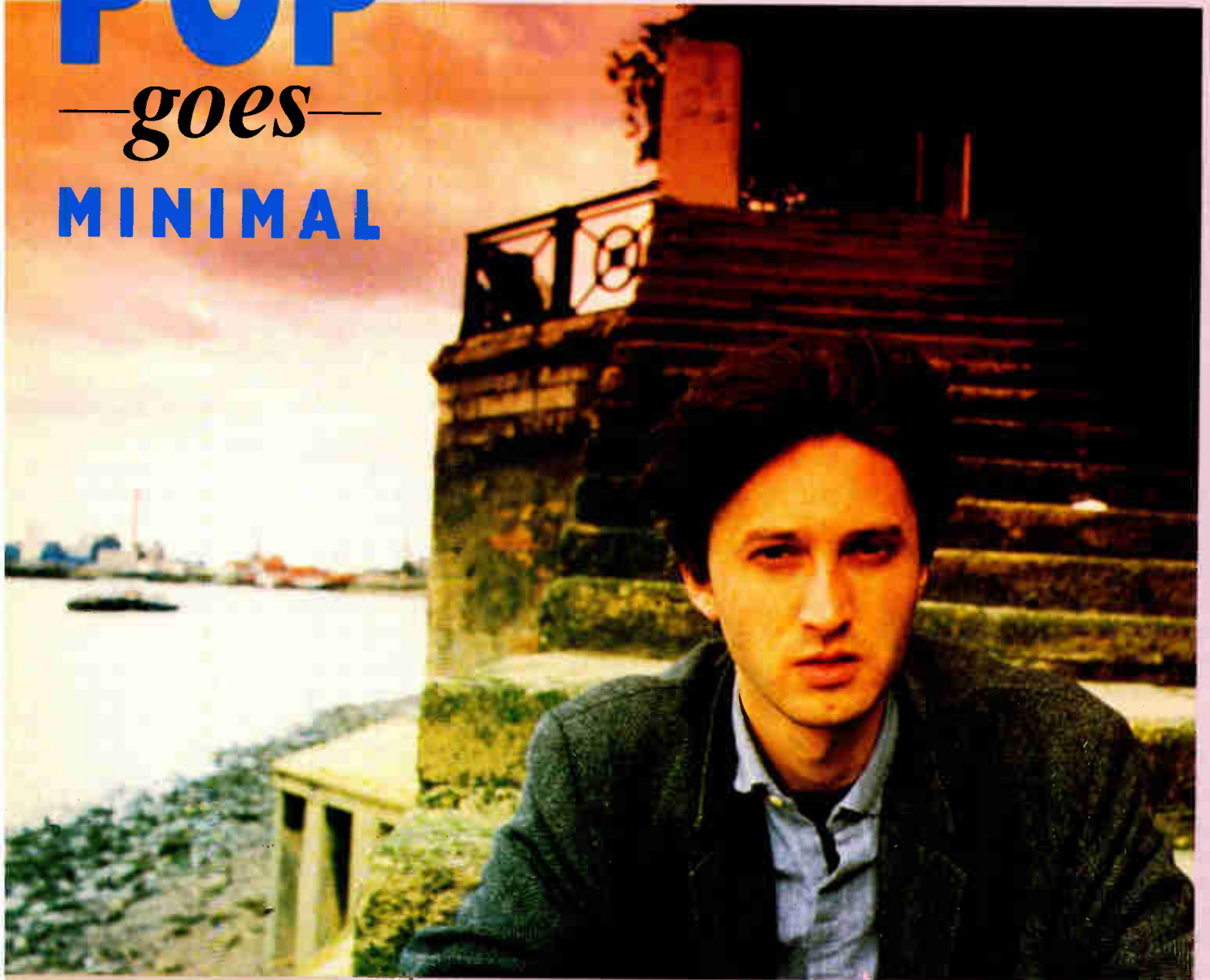
*“Even with some helpful grouping features, the K5 is not an easy instrument to program. It's not impossible, but it definitely requires some homework on the theory of sound.”*



# POP

—goes—

# MINIMAL



*Composer Andrew Poppy has written music for TV, arranged orchestras, and made a would-be hit single. Does his work fit into any of today's pigeon holes, and how does new technology come into the picture? Interview by Tim Goodyer.*

**A**NDREW POPPY RECEIVED his greatest public exposure to date through a television programme that no longer exists - Channel 4's recently deceased *Tube*. There, in among the closing credits, you'd discover it was his music that opened and closed the show twice a week. You remember the theme - lots of sampling and sequencing, brutal production, right up the *Tube's* street. Very nice, very hi-tech, but who the hell is Andrew Poppy?

Well, Andrew Poppy is currently one of ZTT's roster of artists, and ZTT are noted for specialising in two kinds of music: music that is Art, and music that is Money. Frankie Goes To Hollywood were the Money, the Art of Noise were a bit of both - which leaves Andrew Poppy looking after the Art

In the early days, though, Poppy's outlook was

decidedly rock 'n' roll. He followed in the fine tradition of abandoning piano lessons and playing guitar at school, only to rediscover the piano and enrol on a music course in order to study it. Then his fascination with the minimal music of John Cage, Philip Glass and Steve Reich led him to become one of the four founder members of Lost Jockey.

"It was very stimulating, but it also presented loads of problems", he recalls. "I suppose there was a core of five or six composers and performers, and on top of that there were performers that drifted in and out. It sounds quite idyllic, but it was actually very frustrating because you never knew where you were. Any music takes rehearsal and if you had one rehearsal a week, you'd get all the composers pushing for their piece to be the one.

"It was also a great forum for meeting people and exchanging ideas, but I wouldn't go back to that collective way of making music now. The problem with collectives is that they suggest there's no leader, no hierarchy; but they just cover up a hierarchy and makes it less approachable. You can't confront it. If you want a decision made you have to phone everybody in the group."

Poppy's dissatisfaction took him from Lost Jockey to...  
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Jockey to a series of one-off projects as diverse as orchestrating an LP for Psychic TV and writing dance scores and music for theatrical productions.

Eventually, he signed to ZTT in July 1984. An album, *The Beating of Wings*, resulted two years later as a declaration of Poppy's arrival as a composer of serious intent. Now he is continuing his crusade with a second LP, *Alphabed*.

Sitting quietly in Island Records' lavish boardroom, interview and composer take on the task of classifying the latter's music. It obviously owes much to both minimalism and systems music but, when challenged, Poppy is unhappy with both terms.

"I don't really like *any* of the terms. No musicians do unless they're squarely set in one style. I did an interview for *Blitz* recently and they were really interested in the whole idea of minimalism. They wanted a term to describe my music, so when they pushed me I accepted 'post-minimalist'. I accepted the term because I feel I've moved on from minimalism - I don't mean I've developed it, but I've mixed some of its ideas and technical processes with influences from European classical music, jazz and rock."

And the systems tag?

"Systems is not a universally held term, it doesn't define any unique area because any music that has compositional rigour can be termed systems music. Also it implies some particular sort of mathematical or mechanical process, and mathematical processes have been present in music since notation began. There are pre-renaissance motifs that are completely mechanical and structured. Similarly the techniques developed by Schoenberg at the beginning of the century - serial music - are rigorously mechanical.

"When you write a piece of music, you have to develop a system to work with. The ideas of tonality and harmony that classical composers from Haydn and Mozart through to the end of the 19th Century used were systems. Schoenberg wrote this thing called *The Structural Function of Harmony*, and what he was saying there was that harmony and tonality are systems, they work in a particular way and this is how you can use them.

"I'm quite happy to say I'm post-minimal because that gives me options. I'm not a systems composer like Reich or Glass - I'm much less pure - but I start from there. It's to do with following your own nose."

You could, of course, accuse Poppy of belonging to the New Age movement, though the accusation would be unwarranted. I haven't even brought the term into our conversation, yet the composer offered a reaction to it.

"I see a lot of energy going into New Age and I hope that there are elements of what I do which are interesting to that audience. But the idea of New Age is that you don't really listen to it, and I'm completely the other end of the spectrum - I'm not about turning off, I'm about trying to focus your listening.

"As a 'New Age Person', either you're into an acoustic sound or complete electronics, but I don't think music is really about sounds at all. There's this idea that you *have* to have the latest sounds. Yet if you listen to Fela Kuti you find all these tacky electronic organ sounds from the '70s that nobody would use here, and the way they're being used makes you accept them. There isn't the snobbery that exists here.

"The whole idea of quality is very debatable. Is

it a bad sound or a good sound? How do you decide? That, for me, is where minimalism comes in. It's to do with the perspective of the listener. You can see from the way somebody in London uses a particular drum machine and the way somebody in Soweto uses the same drum machine that they see them as being completely different. It's the way those two individuals think about the same machine that's interesting to me."

Regardless of Poppy's own perspective of his music and its relationship with minimalism, it is minimalism that has played a major role in shaping his music and his ideas. The fascination began at Kingston College in the mid-'70s . . .

"I'd never heard anything like it, and it wasn't until a bit later on that I could see its possibilities. At that time I was discovering 20th Century classical music, but as I went on to university, I listened to a lot of avant-garde classical music and I realised where minimalism fitted in - *after* the extreme complexities of the avant-garde.

"But I also like music to have a pulse. When I was at school in the late '60s I listened to a lot of rock and pop music; in the '70s I listened to a lot of jazz like Charlie Mingus and Thelonious Monk. I treat minimalism as a bag where you can collect together all those things and draw on them."

**S**O THINGS IN Andrew Poppy's musical world are complex, to say the least. And perhaps not surprisingly, each of the three pieces on *Alphabed* represents a different aspect of Poppy's character, from the chaotic repetition of '45 Is' through the slowly evolving textures of 'Goodbye Mr G' to the rock rhythms of the single, 'The Amusement'.

One element that is common throughout, however, is a sense of balance between modern technology and human performance. In the hi-tech corner we have a Fairlight, an Akai S900, a Juno 106, a DX7 and a Compaq (PC-compatible) computer running Octave Plateau's Sequencer Plus software. In the human corner, we have the trombone and sax of Loose Tubes' Ashley Slater and Jo Pretzel, and the voices of Annette Peacock, Sheila Smith and Udo Scheuerpflug. Over to you, Andrew.

"What makes *Alphabed* different from the first album is that all the pieces have voices on them in some way. On the first album 'The Object is a Hungry Wolf' uses voices very much as a texture that ghosts the instrumental line. On this album the voices are spoken because I wanted to use words more.

"I chose Sheila and Udo for '45 Is' because the text deals with the whole idea of sexuality

*"Pop music is computer controlled, but you're never aware of the computer. I try to make you aware that elements of my music aren't human."*

and gender, and I wanted the two roles to be confused to help bring that out. Udo is operatically trained but his voice is quite high and effeminate, while Sheila is a very strong contralto.

"On 'Goodbye Mr G' I wanted the voices to make you aware of how a voice influences what you feel about the words it's saying. Annette's speaking voice is very firm and resolute - I wanted that and a very insincere male voice ▶

► which Ashley has. I wanted those qualities so I used those people."

Moving on to 'The Amusement', Poppy has retained both the minimal and vocal elements of '45 Is' and 'Goodbye Mr G', but underpinned them with a conventional rock rhythm courtesy of drummer Maritz Oswald. Although this provides a level of accessibility missing from either of the other tracks, the operatic element alone has been enough to deter the average single buyer.

"I think it's commercial and Trevor (Horn) thought it was commercial", comments Poppy in his defence. "The trouble is the media are so tied up in this country. I'm hoping it'll do something in Europe instead."

Although *Alphabed* has only just made it into

becomes absurd, but I'm not trying to make you think you're listening to a guitarist or something.

"I was talking to the producer of *Tomorrow's World* about making a special programme about the technology there is in the modern recording studio. (Shown on BBC1, June 18.) He was saying 'isn't it wonderful, I've seen this guitar that you can play synthesiser sounds from and I've seen this video technology that makes different sounds when you move' - basically the whizz-bang side of technology. I was saying, well, in some ways, technology tends to sidetrack you. He was talking about the 'amazing possibilities' all this technology offers, but what's really happening is the playing out of a finite number of possibilities built into the machines.

"For me, the piece of electronic music *par excellence* which hasn't been surpassed in terms of creativity is a piece Stockhausen did in the '50s with tape and tone generators called 'Gesang der Jünglinge'. We've got all these computers today and nobody's making music as startling as that piece. You've got to ask yourself why."

**L**IKE MANY RECORDING artists tied - in one way or another - to a contract, Poppy is expected to make use of the in-house recording facilities. Only in his case. "in-house" means Trevor Horn's Sarm West...

"Before I came to ZTT I was used to manual mixes live, off tape, where every mix is a performance. You know it's going down to master tape, and the adrenalin's going and you do things spontaneously and make mistakes that can turn out to be good. At Sarm it's all SSL computerised desks, and never having worked with computer-controlled mixes before, I found the process completely different; It's much colder and methodical. I love the computer but the transition is a difficult one.

"I'm a big fan of Prince, and I think he's the opposite end of the spectrum. He's about going into the studio and saying 'let's get this one down'. I find it very exciting music to listen to, and at the same time you can see the perspectives are all wrong. There are bass saxophones really dry pouring out of the left speaker and somehow it still works. I think it's the mess of it."


But perhaps Poppy's most meaningful encounter with technology was where we came in - with the *Tube* theme, which relies on machines to the total exclusion of the musician. The music itself is the closing four sections of 'The Object is a Hungry Wolf', though considerably revised.

"I had my doubts about it initially, about it being a piece that nobody was playing on, but it was an interesting process nevertheless. Basically we used the Fairlight and the Synclavier. The programming was done on the Fairlight because it's very user-friendly, and then we went into the Studio and MIDI'd it to the Synclavier so that we could combine the sound libraries. The strings were Synclavier and most of the electronic effects were Fairlight.

"I'm not sure the version that they finally used was actually the best version we did, though. It never sounded as good on the television as it did in the studio, even though we had a television there to check it with."

So, not even Fairlight and a Synclavier can guarantee perfection. Which, according to Andrew Poppy, is just the way it should be. ■

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the record shops, Poppy has another album in mind - though mention of it comes as a surprise to him. Apparently I'm not supposed to know about it, but as the cat's already out of the bag, he agrees to talk about it - cautiously.

"This album and the next album are two parts of a kind of opera idea... It's not opera, it's music that has a large-scale structure over a period of time. There will be an hour-and-a-half of music that will all be interconnected - individual pieces that are part of a greater whole. I'll be interested to see what people make of it." And a closer inspection of *Alphabed's* sleeve notes suggest the project, if not the forthcoming album, will be called *The Songs of the Clay People*.

But irrespective of the sales of either single or long-player, Poppy has successfully brought together elements of classical and popular music, and created a credible role for computer technology to fill. It's been done before, agreed, but in Poppy's case, the technology seems to enhance his individuality, rather than threaten or stifle it.

"There's a difference between the way I use technology and the way pop producers like Steve Lipson use technology. The majority of pop music you hear is computer controlled, but the idea is that you're never aware of the computer. I always try to make you aware that elements of my music aren't human, that they are controlled by a computer. I don't push it so far that it

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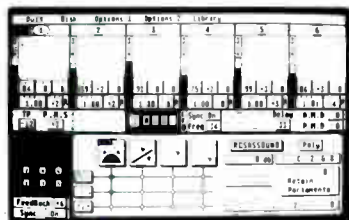
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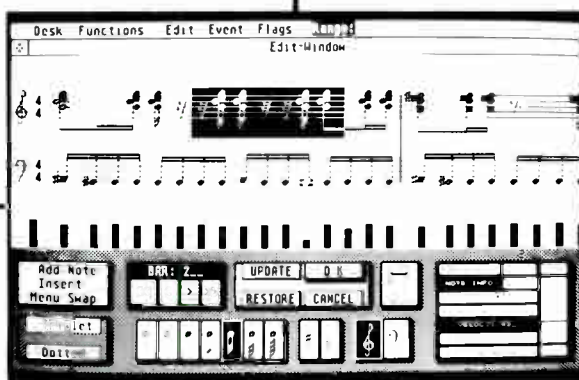
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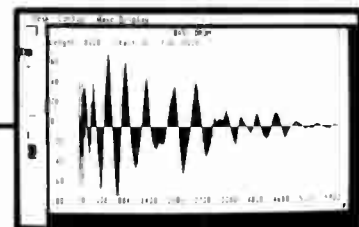
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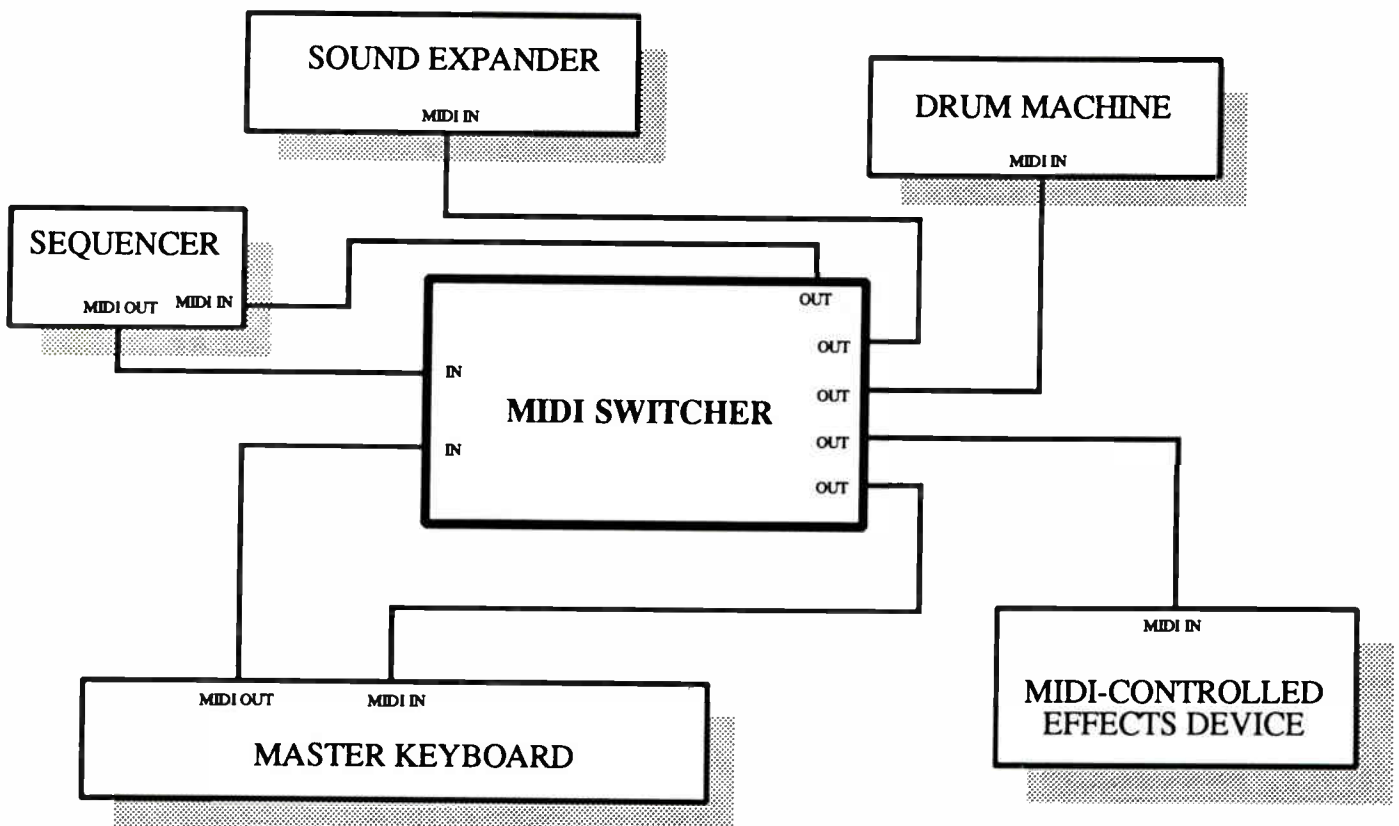
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# MIDI

## Basics

Four years since its arrival, MIDI is being used by more musicians in more situations than ever before – yet many users remain mystified by it. In the first part of a major new series, we explain what MIDI is, why it came about, and the sort of information it can convey. *Text by Bob O'Donnell.*



MIDI, OR MUSICAL Instrument Digital Interface, has brought about a revolution in the performance, composition and even understanding of modern music. Really it has. If you don't believe me, just ask any of the other 3.41 million writers who have used minor variations on that sentence in one of their articles . . .

I'm not just talking about pop or avant-garde electronic music. Everybody wants to jump onto the MIDI bandwagon – and rightfully so, because we all know that in so doing, we can use the opportunities presented by what is an industry standard

specification for the serial transmission and reception of musical data – which is what MIDI basically is – to our own benefit.

Well, actually, what we all want to do is write, record and perform music. But as a very powerful tool, MIDI can certainly help.

To make the most of a tool you obviously have to understand it, though, and if you're relatively new to the wonders of modern musical instruments, MIDI may be a bit confusing.

If you have spent any time at all with

modern musical instruments, you'll know that most of them have a couple of sockets on the back of them that say "MIDI". You may also know that if two keyboards are connected together via this connection, one will be able to control the other remotely. In other words, if you play a C chord and move the pitch wheel on one, a similar effect will occur on the other. The reason for this is that the first keyboard is sending out messages over MIDI – that is, through the cable – which tell the other keyboard exactly what to do.

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This is the basic premise of MIDI: sending out messages, or data, which allow two or more musical instruments to communicate with each other. Most of the confusion surrounding MIDI stems from a misunderstanding of how instruments send this information, and exactly what this information comprises.

Part of the problem is that along with the enormous growth in the popularity of MIDI-equipped instruments, has come a corresponding increase in the amount of information and *misinformation* available on what MIDI is, what it does, what it's for and how it works.

That's where this series of articles comes in. Its goal is to provide you with useful information that will allow you to make the most of the equipment you currently have and, just as importantly, help you make buying decisions in the future. The articles will address some of the important details of what MIDI can do (particularly this first segment), but the primary emphasis will be on practical applications.

The world of MIDI is a strange and exciting place for many musicians, and it's well worth further exploration. If you haven't made the plunge yet and you're one of those people who thinks our magazine occasionally reads like a foreign mystery novel – believe me, you're not alone – or if you're a little unsure about why that System Exclusive information is included in the back of your synth's owner's manual, then sit back, pop open a can of your favourite beverage, and read. You'll be amazed at what a simple, informative pleasure that can be.

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## MIDI Explained

SOME OF YOU probably expect a fast, easy answer to the question "What is MIDI?", so I won't disappoint you. MIDI is a hardware and software communications standard that allows various pieces of equipment to share information with one another (regardless of their manufacturer) and operate as a system. The information is divided into a number of different types of messages, which are carried over special cables that end in five-pin DIN plugs at a rate of 31.25Kbaud, or 31,250 bits per second. These cables plug into the MIDI In, Out and Thru jacks on the back of the various pieces of equipment, or properly equipped personal computers.

Like most simple answers, however, the above paragraph is nowhere near the whole story.

First of all, to understand how a computer-type interface standard can exist between musical instruments, you need to know that most MIDI-equipped devices are basically computers with the dedicated function(s) of producing or somehow manipulating sounds and musical data. They all contain a

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microprocessor of some sort to generate and/or respond to MIDI data.

Second, the most important thing to remember about MIDI is not the technical data itself, but the fact that it's a *communication* standard. Communication is inherently a process that is accomplished by more than one person – or, in this case, by more than one box. Which means that if you only have one MIDI-equipped machine, the MIDI part of it isn't going to do you any good. In other words, as in life, it takes two (or more) to tango in the land of MIDI.

Now, this doesn't mean you have to connect two musical *instruments* together; it could mean that you use a single MIDI keyboard and a computer equipped with a MIDI connection, or perhaps a keyboard connected to a signal processor of some description. But whatever the combination, you must have at least two devices to take advantage of MIDI.

Finally, another point to be aware of is that even though MIDI is a standard for the entire music industry, that doesn't mean every unit implements it the same way – that is, they don't necessarily share *all* of the same MIDI features. As you will see in forthcoming articles, different types of MIDI-equipped machines (synths, drum boxes, and so on) generate and respond to a variety of MIDI messages according to their capabilities.

Consequently, certain machines will have one type of MIDI implementation, while others may have a completely different one – though generally, a bit of overlap does occur. Even units within the same category can have different implementations of MIDI, because manufacturers and designers have different ideas about what they feel is important, so they'll include some features and not others.

This can be a source of confusion and frustration even among experienced MIDI users, and it's particularly important for MIDI newcomers to be aware of what the capabilities are for each of the devices being connected, or MIDI'd together. (Part of the confusion about MIDI, believe it or not, actually has to do with grammar, because MIDI is an acronym that's used as a noun, an adjective and a verb, sometimes all within the same sentence. Of course, you won't catch *me* doing that.) Manufacturers usually provide this information in the form of a MIDI implementation chart at the end of a machine's user manual.

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## Why MIDI?

THE PERENNIAL PHILOSOPHICAL question acts as a double-edged sword in reference to MIDI, as its meaning changes depending on which word you choose to emphasise. If you choose "why", then the answer is to take full advantage of the

facilities of the equipment you use and own. Until we see the day of inexpensive music workstations that include everything we could possibly want for the performance and composition of music – and I'm not holding my breath – different pieces of equipment will continue to perform the specific, individual functions that they were designed to do. MIDI, in turn, will allow these various components to work together as a coherent whole, a system.

If, on the other hand, you choose to emphasise "MIDI", the question takes on an entirely different character, and the answer has more to do with history than philosophy.

The history runs something like this. Prior to the adoption of MIDI as an industry standard, a number of manufacturers had started to develop their own communication interfaces, but many of these were rather clumsy and each one worked only with that particular manufacturer's products. In other words, trying to connect a Yamaha synth to a Roland sequencer was a no-no.

Most of these early communication systems were based on the same kind of analogue control voltages that

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*"Part of the confusion about MIDI actually has to do with grammar, because MIDI is an acronym that's used as a noun, an adjective and a verb."*

synthesisers of the time (pre-1983) used to create and manipulate their sounds. Others, like Roland's Digital Communication Buss (DCB) and the Oberheim System, used digital signals. But they all shared in the fact that their scope was rather limited.

MIDI, on the other hand, has grown into a wide-ranging means of communicating a great deal and a great variety of information. Though it started as a relatively simple proposition from Sequential's Dave Smith for a Universal Synthesiser Interface (USI), the collective knowledge of many American and Japanese engineers has transformed MIDI into a flexible, powerful tool.

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## MIDI Messages

SO NOW THE question is, what exactly is this "wide-ranging" information that MIDI data consists of? Well, as mentioned above, MIDI data is divided into different types of messages – all of which are sent from the instrument's microprocessor through the MIDI cables as a "stream" of information. The two basic types are Channel messages and System messages, and these are further broken down into five categories: Channel messages can be either "Voice" messages or "Mode"

messages, while System messages are referred to as "System Common", "System Real Time", or "System Exclusive". Each of these serves a different purpose, and each allows various components of a connected MIDI system to communicate with one another.

But before I start going into the dirty details, I need to explain what this Channel and System rubbish means. MIDI data serves two purposes: one is to provide specific information to specific machines within a system, the other is to provide general information for the entire system. Channel and System messages, respectively – surprise, surprise – perform these functions.

Channels are necessary, in case you're wondering, because most systems have several things going on at once, and if you've got different units performing these different functions, you need to send them different messages. When I start explaining specific MIDI applications, the usefulness of these channels will become obvious. Trust me.

So now, you ask, how does MIDI separate the two? Magic? Well, not really. What actually happens is that Channel messages are assigned to one of the 16 specific channels that are included in MIDI, while System messages are not assigned to any channel at all. As a result, up to 16 independent "conversations" involving Channel messages, but only one using System messages can occur at the same time. Amazingly enough, all of this information can be sent over a single MIDI cable.

To give you a better idea of how this works, I'll use the traditional analogy of a television that everyone else uses. Just as a TV receives all the channels that are broadcast but only displays the one you've selected, so all the MIDI devices connected into a system receive every

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*"Each of the five MIDI messages serves a different purpose, and allows various components of a system to communicate with one another."*

Channel message that is sent over a MIDI cable, but only respond to the ones on the MIDI channel they've been set to (as long as the instrument is operating in the proper mode, which I'll explain shortly).

If you've got one of those fancy new TVs that can display more than one channel at a time, MIDI has an equivalent too; some synths can respond to more than one channel at a time, though we'll worry about them later. System messages can be thought of as Party Political Broadcasts; they're always on every channel, no matter what you try to do about them.

Now back to the details. Most Channel messages actually consist of Voice data, which describe the notes or voices being played. These descriptions are not of the

particular patches used, but instead what notes are being played, how hard they're played (velocity), whether or not they've been affected by pitch-bend or the mod wheel, and so on. Channel Mode messages, on the other hand, instruct the connected instruments to operate in one of four possible MIDI Modes, and these modes determine how the instrument will respond to the Voice messages. Remember that last statement, because this mode business can get confusing.

Not all instruments can operate in all Modes, however; again, it depends on the MIDI implementation of the particular instrument. If an instrument receives a Mode message that it can't respond to – or, for that matter, any MIDI message that relates to a function it does not have – it will simply ignore it.

The four modes are determined by the various combinations possible with two important variables, "Omni" and "Poly/Mono". Omni refers to the ability to receive on all MIDI channels at once (which isn't really as great as it sounds) and Poly/Mono refers to whether or not the notes on each channel will be responded to polyphonically or monophonically (this is independent of whether or not the synth is monophonic or polyphonic). If Omni is turned off, a state of affairs that is termed "Omni Off", the instrument will only receive on the one basic channel it is set to, and will ignore any other Channel messages (though it'll still receive all System messages). If the instrument is set to Omni On, then it will receive any Voice messages sent on any channel.

Now, as you might be able to gather, Omni On does not always serve a very useful purpose nowadays – particularly if you have a lot of pieces connected in your MIDI system – but when MIDI was created it was thought that some instruments wouldn't be able to change MIDI channels and thus, they needed a mode that worked with any other instrument regardless of which channel the other instrument was set to transmit on.

The four possible modes are:

- Omni On/Poly, which is also called Omni Mode or Mode 1;
- Omni On/Mono, or Mode 2;
- Omni Off/Poly, which is referred to as Poly Mode or Mode 3;
- and Omni Off/Mono, which is Mono Mode or Mode 4.

Each of these interprets the incoming Voice Messages in a slightly different way, and affects how the connected instrument will respond to those messages.

System messages, as mentioned above, provide general information for all of the connected devices in a MIDI system, regardless of their MIDI channel. System Common messages consist of basic, overall status information such as tune request, song select and song position. System Real Time messages contain timing data for drum machines,

sequencers and other devices which depend on a common clock source to remain in sync with one another. Finally, System Exclusive messages cover a wide variety of information that is specific to each instrument. Specific patch parameters, sample dumps, and other kinds of data that are relevant only to a similar unit (or a computer with the appropriate software) are sent via System Exclusive, or SysEx, messages.

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## MIDI Applications

WELL, NOW THAT we've got the theory out of the way – I know it's not practical on its own and perhaps a bit confusing, but you have to understand a bit of it to make sense of real-world applications – we can move on to the fun stuff.

Let's start with a fairly obvious fact. The reason MIDI has made such a tremendous impact is that you can do so many incredible things with it. The benefits of having a MIDI system range from the ability to play many synths from a single keyboard and thus easily produce huge walls of sound, to automating the control of a number of devices in a sophisticated studio setup. In between are things like using personal computers to simplify the process of programming synths, playing synthesizers from controllers that aren't keyboards, and perhaps most importantly, the ability to edit minute sections of your music via a MIDI sequencer. Best of all, each of these applications can be achieved with a single type of interface and a simple MIDI connection.

The rest of the articles in this series will go into specific applications, and relate how the various types of MIDI messages are actually used in the real world. (I know I said I was going to talk about real world applications in this part, but I'm not going to. I lied.)

To understand them, though, you need to have a point of reference, so the accompanying diagram shows the basic MIDI system upon which all of our "real world" applications will be based. Each of the main components of a typical electronic music studio is included: a keyboard synthesiser which acts as the master controller, a "keyboard-less" synth expander, a MIDI sequencer, a drum machine, a MIDI-controlled effects device (like a reverb), and a MIDI Thru box to make sure everything is hooked together. You don't have to own one of each of these to work with MIDI (you may own more of some and less of others), but with a system like this, you have the tools to produce some incredible music – though a bit of talent always helps, too.

Next month we'll start putting the system together by explaining how a keyboard and an expander work together via MIDI. Until then, read your owner's manuals, and make some music. ■

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# Jean-Michel Jarre

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The musician with the boyish grin is Marcus Vere, the man behind the music behind *Living in a Box*. How does a band that's topped the charts with its first single live up to its reputation, and how dependent are they on Vere's own little black boxes?

Interview by  
Tim Goodyer.



**L**IES, LIES, LIES. Living in a Box have *not* just been working in LA with some company whose name they can't divulge. They are *not* playing with some new series computer whose name they can't reveal because it's still a prototype. And they *did* write their own songs, rather than leave it to this mystery computer armed only with their personality imprints. They *do*, however, have a nice line in humour, a high-charting debut single and an excellent album of electronic pop to their name.

The man currently feeding me these untruths

is one Marcus Vere, keyboard player, songwriter, comedian and one third of Living in a Box. Throughout the photo session he's promised me the interview won't be serious, yet mention MIDI or songwriting and he's right on the ball – though there's still room for a little of what he refers to as "sport".

"Normally when we do interviews I make up these stories about what we were doing before Living in a Box. In Holland, Tich was president of the Ben Hur Society, Richard headed a parachute display team in Bridlington, and I was a marine biologist studying the Loch Ness  
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Monster. Over there they take you dead seriously every time. *That's good sport.*"

Living in a Box became *Living in a Box* in August 1985. Prior to that, vocalist Richard Darbyshire had been involved with a band called Zu Zu Sharks, while drummer Anthony 'Tich' Critchlow and Vere were already writing material together and looking for a singer.

Vere continues: "I'd heard about Richard from various sources and, as he was doing some of his solo stuff in the same studio as we were recording 'Living in a Box', we tried it out. That was the first song we did. Then we did two more, 'Love is the Art' and 'Generate the Wave', which we took round the record companies.

"While we were playing 'Living in a Box' in one A&R man's office, Richard was playing his solo stuff in another office at the same company. It was hugely embarrassing at the time but then, when it all came together, we managed to merge our abilities and our material. We were lucky that we all got on so well as friends, because we were forced into the situation where one minute Richard was singing on a couple of our tracks as a session singer, and the next he was signing a contract with two guys he hardly knew."

Things moved quickly after that: a five-year deal with Chrysalis, a storming dance single making the top five, and an album following hard on its heels - the stuff of which dreams are made. Too often, though, the promise of a first single turns out unfulfillable. Vere accepts the challenge.

"The impact of the first single was so enormous; it came from nowhere and shot straight up the charts. The vice-president of marketing in the States said it's the fastest single they've had in four years. It's established the name - obviously because it's eponymous - but we've also got longevity, we've got a quality to the music. We didn't release the album with any big splash, and we're not relying on a huge sales campaign and photos in all the right pop magazines. It's selling really well by word of mouth, and that's nice. It's a real album and it makes the point we're a real band. It's not like somebody has decided to do a Stock, Aitken and Waterman on us and manufactured our success but said 'for God's sake don't start talking about music'.

"You're just as likely to see me leaping around in a video as you are to see me here talking about Emulators and MIDI. I think it's important that people realise we have that dimension. There's more to *Living in a Box* than 'Living in a Box', but that will only be proven when we're sitting round this table in a year or two's time, and I'm sure we will be."

Vere's faith in his project is borne out by soul legend Bobby Womack, who's recorded his own version of 'Living in a Box' - though half of the lyrics have been translated into Spanish for his "street people". And not content with that, he may also be appearing on the band's next single.

"It's not definite yet, but he may be duetting with Richard on 'So the Story Goes'", confirms Vere. "It's either him or Al Green."

**T**HE BAND'S FIRST album was recorded at Galaxy Studios in Hollywood and produced by ex-Landscaper Richard James Burgess. "Bill Burgess", corrects Vere, and we're off on another *Living in a Box* 'Strange But True' anecdote.

"The studio looked like the inside of a pimp's  
MUSIC TECHNOLOGY AUGUST 1987

car", he recalls, "all purple velvet and mirrors. And while we were there, Burgess managed to blow up the monitoring system. He was mucking about with the Lexicon and suddenly this huge electronic feedback started to build up. It gathered so quickly that he didn't have time to do anything about it, and the speakers actually exploded. All the computers went down and there was smoke coming out of the cabinets. I was shit scared.

"Eventually a guy in an Indiana Jones hat came in to repair it all, and four hours of studio time later, we were ready to go. Then Burgess did it again.

"After that we called him Wild Bill Burgess, but he won't take kindly to me telling you all this..."

With luck, he won't read it. But Burgess' participation in the recording of *Living in a Box*

has helped produce an album of *serious* pop songs - from the insistent dance beat of 'Living in a Box', through the R&B of 'Human Story', to the token ballad 'From Beginning to End'.

"Bill's a good guy to work with because he doesn't drag your ideas off in any strange direction - he listens to your demo and goes with the feeling of that."

Evidence of Burgess' influence over the sound of the album, however, is easily found in the disc's rhythm tracks. For although Critchlow's drumming skills are held in near reverence by Vere, the groove of *Living in a Box* is almost exclusively electronically generated.

"Burgess is a Linn 9000 man and we're SP12 men", Vere comments. "He was lucky enough to have his 9000 working throughout, because if it had broken down, we'd never have let him forget it. It was a bit unfortunate, though, because Tich normally programs the SP12 and it took him a few days to get into the 9000. Once you've got a song in the SP12 you can't just change the tomtom pattern in just the third verse, whereas you can on the 9000. I don't know why they never got that together on the SP12. The clocking is good on the 9000 as well - it's got a good feel to it. But I still prefer the SP12, not only for its reliability, but for its sound."

The rest of the album's sound textures are the products of Vere's hi-tech keyboards - tempered with the talents of carefully chosen guest musicians. Paul Jackson Jr supplied the tasteful guitar, Paulinho Da Costa the percussion, Mark Isham the trumpet, and Freddy Washington the bass where the Minimoog couldn't cut it.

"We used various other keyboard players as well. I got all the ideas and the basic programs together, and then I wanted someone with more of an oversight on the whole record to come in and say 'I see this, this and this' that I couldn't see. And it worked; they saw directions I didn't see because I'd been living with some of the tracks for nearly two years."

Vere's hardware rundown for the album reads like just about any modern equipment listing - Emulator, Super Jupiter, DX7, TX816, Akai S900 and so on - but stops short of Fairlight or Synclavier indulgence. Technology has been a good and loyal friend of *Living in a Box*, but Vere ▶

*"I programmed 'Living in a Box' on a Roland MC202. Then I got into the QX1, now I'm on the Steinberg Pro24 and whatever comes out next week."*

► is cautious about letting it get the upper hand.

"If you get the right gear, the whole of the Top 20 will flash before you. I'd be the first to admit I haven't got the deepest knowledge of knob-twiddling, but I think that's to my advantage at this point. If you get too stuck in your equipment, you're not going to write a good song. And that's when you should employ somebody else to write your songs for you.

"I get nervously excited when I get new

tracks and swapping things around - so I turned to the Pro24. It's very flexible and a lot quicker. But if you haven't got a groove and you haven't got a tune, then it's all a waste of time."

That said, Vere has taken full advantage of technology to enable him to produce his music.

"I first programmed 'Living in a Box' on a Roland MC202. Remember them? Then I got into the QX1, now I'm on to the Steinberg Pro24 and whatever comes out next week. The Steinberg's my new toy at the moment, though it's been out a while. It's taken me until now to get round to it because I've been so busy.

"Working with the QX1, I found I was using the TX816 for almost the complete song - bass on one; piano split across two and three; sequences on four and five; brass on six, seven and eight; then link up the Super Jupiter to put that little bit of analogue on the top. Now I'm getting a patchbay organised where I can use all eight modules to get much bigger sounds. I used it like that when we were recording the album, but for writing, I got a bit sick of sticking my hands down the back of the TX rack every five minutes switching leads.

"I'm going to transfer all the programs from the QX1 to the Steinberg in real time and take it from there. I'd been saving all my sounds on it, too, but I found that, if I got a new idea for a song, I had to dump all my sounds back into the QX on the particular song bank I was using before I could start. Either that, or I was going to tie myself to all the sounds I'd just been using. Then I was spending more time doing that than I was writing new songs.

"It took me about an hour, I suppose, to get the SP12 pattern organised in Song mode, ►

*"With the music 90% keyboard-based and only three in the band, I might end up with tape, sequencers and not much live playing."*

equipment because I wonder just how close to the edge I am. When I'm sitting around at two o'clock in the morning not being able to write something because I can't work the equipment, that's energy lost. I want to be able to do something quickly and make it sound real, loud and hard. That's what excites me."

**W**ITH THE INITIAL excitement of the album out of the way, Vere is concentrating on improving his home recording facilities. As we speak, two Syco engineers are burrowing around the back of an Akai 1412 recorder, an Atari computer is running a new Steinberg Pro24 sequencing package, and a Roland D50 is due to show up at any moment.

"I've got a few hundred quid involved here, but it's nothing to what you get into when you listen to Syco about what's coming up. I'd gone as far as I wanted to go, and I would have hung on with the QX1 even longer had it not been for the shortage of tracks. Eight just wasn't enough; I was getting into such a mess running out of



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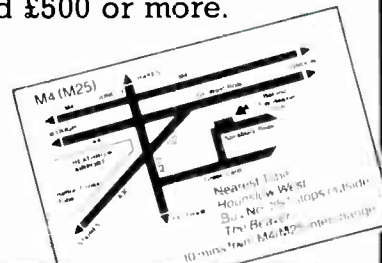
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► changing all the sounds in the TX rack and linking it all up. By the time I'd done all that, I'd forgotten what I was trying to do in the first place. I'm going to hang on to the QX1, though, partly because it's not worth anything, and partly because we might need it for live work."

there to get the song together and throw in some good sounds.

"Prince amuses me. He's supposed to be taking music into new areas, the leading light of a new musical direction. But what he's got out at the moment is an album of demos."

Although their second single, 'Scales of Justice', hasn't climbed the charts with the same vigour as its predecessor, *Living in a Box* now have their first live dates on their minds - though mention of live playing isn't met with the enthusiasm I might have expected.

"Don't terrify me", says a startled Vere. "We haven't done anything yet so we don't really know how it's going to work out. We're going to start with eight club dates in the States at the beginning of October. In America there's quite an 'anti' attitude to being a studio band and having a one-off catchy little ditty. Unless people realise there's more to the band than that, we might get a bad reaction. So the idea is to go over there, do a few dates and get a bit of a live presence.

"It involves making a decision on live playing, sequencing, sampling and tapes, and we haven't quite made up our minds how to get around it yet. With the music being 90% keyboard-based and only three of us in the band, it's difficult to cover everything unless I end up with lots of tape and sequencers and not very much live playing to do. I'll probably be getting another keyboard player in and working it all out with him.

"I want to get down to the raw edge of the songs: bass, drums, guitar, vocals, and top-line keyboards. When you're playing in a club it wants to be loud and thrashy, with Richard singing his heart out. Somebody sitting behind a

*"Prince amuses me. He's supposed to be taking music into new areas, but what he's got out at the moment is an album of demos."*

An overdue addition to Vere's equipment is an E-mu Systems Emax.

"We never got into too much serious sampling on the album, so I bought the Emax to investigate that. I've also got the Emax with HD organised - that's coming out in about two or three months. Plus there's the Compact Disc (CD ROM) sound-loading situation coming out about three or four months after that.

"Until now, I've only been taking stuff off CD or 12-inchers into the SP12 on a drum basis - drum sounds, short vocal sounds, things like that. One example I can give away to everybody that wants a *huge* snare drum is a record called 'Artificial Heart' by Cherelle. After about 15 seconds of the 12-inch, there's a gap before this huge snare and you can get at it really easily. That's a Jam and Lewis snare, so it's a belter. We used it on 'Living in a Box' and we're going to carry on using it."

**U**NLIKE MANY MUSICIANS, Marcus Vere prefers to start again from scratch in the studio, rather than use his demos as the basis for a final recording.

"I don't like to produce anything too much, because then you find you can't take it on anywhere", he explains. "The demos are just

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mixing desk pulling faders up and down really only detracts from the essence of a song."

The live shows will also mark the return of Anthony Critchlow as the band's drummer, although the details have still to be ironed out.

"We'll try keeping the bass drum on tape with the toms and snare live around it. We thought about taking a percussionist out, but we'll either use sequencers or triggers from Tich. He'll be using a couple of Simmons pads, so he'll have quite a high profile triggering samples. There are certain songs where it's all hands to the deck, like 'So the Story Goes' that took ages to get together in the studio, and we can only do that live if we use samples. We were thinking of using an Octapad, but they're so bloody small that if there's anything that needs playing as opposed to just triggering, it's a bit impractical. We'll see."

Yet while the Americans look set for a treat, any live work in the UK will be further delayed by the writing and recording of a second album.

"We've already written four tracks which we're really pleased with, but I've now got to transfer them to all this new gear. The second album is going to be a lot harder than the first one: we're going to tear down a lot of the scaffolding in terms of the sequencers and subtleties and go more into the bass, drums and vocals right in your face approach. I'm looking forward to it."

And as if that weren't enough to keep three young men off the streets, their overactive sense of humour has already lined up another project for them.

"Is there a heavy metal band called Axis?," Vere enquires anxiously. "If there isn't, we're going to call our heavy metal alter-ego Axis. It's



such an awful name, it's brilliant. We've written a track called 'Powerdive' - In the heat of the night/in the dark of the city/I'm dragging your love around baby/How could something so wrong seem so right - brilliant. We're going to send it to our American A&R department and see if they'll sign us - again."

Nothing if not versatile, this Living in a Box. ■

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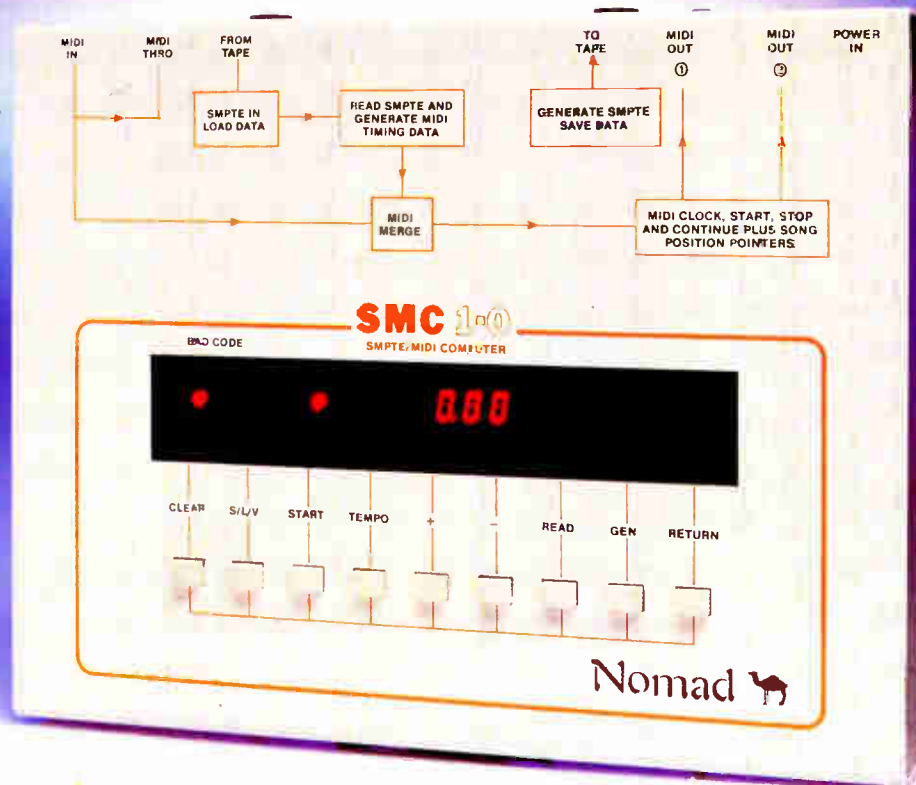
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# NOMAD SMC 1.0

## MIDI-SMPTE Converter

*The two worlds of MIDI and SMPTE have been united for three years, but only now has the union been made accessible to the musician in the street – thanks to a new British company. Review by Simon Trask.*

ALTHOUGH SMPTE TIMECODE was developed back in the late '60s to facilitate precision editing of video tape, its use has developed far beyond this initial brief to encompass the audio and video worlds – individually and together.

With the increasingly high profile of MIDI sequencing in the recording world, SMPTE timecode (or SMPTE/EBU timecode, to be exact) is now becoming the de facto standard for synchronising audio and MIDI, too. This requires a device that not only reads and writes SMPTE timecode, but also converts from SMPTE to MIDI.

Roland's SBX80 (reviewed in E&MM February '85) is one of the earliest examples of a SMPTE/MIDI converter, but since that time, an increasing number of such devices have been finding their way onto the market. And it's a trend which shows no sign of abating.

But until now, this facility has been outside the reach of many musicians, who have had to make do with the less satisfactory sync-to-tape methods such as FSK, which are quite capable of keeping everything in time, but provide no information on position in time. While these inferior methods simply record a constant timing reference onto tape, SMPTE timecode is a much more sophisticated concept altogether, in that each frame (remember timecode's video origins) has its own unique 80-byte digital code "word" which records hour, minute, second and frame-count values.

When transplanted into the purely audio domain, SMPTE's importance is that it provides an absolute timing and position reference which is accurate to 1/30th of a second (at the maximum frame rate of 30fps). MIDI's equivalent when it comes to defining sequence position is the Song Position Pointer, which is essentially a count of 16th notes (six MIDI clocks) elapsed since the start of a sequence. An SPP value of 128 would indicate that you were eight 4/4 bars into a sequence. MIDI's Song Position Pointer can store a value up to 16,383. Bearing in mind that these are 16th notes, this means that at a tempo of

120BPM, you can locate a MIDI position up to 34 minutes into a composition.

A SMPTE/MIDI converter has to do two things once a tape has been striped with timecode. When the tape is running, it has to translate received SMPTE code into MIDI clocks which are sent at a tempo rate that you select on the converter; when you shuttle the tape to a new position, it has to translate the SMPTE time at that position to a MIDI SPP value which will define an equivalent position in a MIDI sequencer. For instance, a SMPTE time of 00:02:00:00 would translate to a MIDI SPP of 960 for a 120BPM tempo. One word of advice: make sure your sequencer can actually respond to the Song Position Pointer code – if not, you can forget SMPTE.

Once the above-mentioned basic functions are in place, there are all manner of extra features which can be added to make a SMPTE/MIDI device more flexible in operation, and until now, manufacturers have gone for this approach in preference to a scaled-down, budget unit – sometimes at the expense of user-friendliness.

### Format

NOMAD'S SMC1.0 (the initials stand for SMPTE MIDI Computer) has the distinction of being the first stand-alone SMPTE/MIDI converter to be made available for less than £500.

It's a compact, lightweight unit which you should have no trouble finding shelf space for. On the top panel is a helpful block diagram which illustrates in an uncomplicated fashion what the SMC gets up to. A sizeable LED window handles the unit's display requirements, while below this are nine buttons which take care of the SMC's operation.

The rear panel provides Tape In and Out jack sockets, MIDI In, MIDI Thru and two MIDI Outs. The MIDI In is particularly valuable, since performance data received at MUSIC TECHNOLOGY AUGUST 1987

this port is merged internally with MIDI timing data before being sent via the MIDI Outs – a task which the SMC handles unflinchingly, even when presented with the most manic of MIDI performances. The significance of this is that you can record sequenced and taped parts together, or in any order you want – though in practice the true usefulness of this feature will depend on how your sequencer deals with recording and playback in external sync mode.

Nomad have provided the four standard SMPTE frame rates: 30 drop-frame, 25 and 24 frames per second. Thirty fps is used for monochrome TV signals, thirty drop-frame is the American NTSC colour system for TV and video, and 24fps is the standard for film. Twenty-five fps is the EBU (European Broadcasting Union) TV and video standard, which adheres to the same 80-byte "word" format as SMPTE with a few small differences in coding.

For audio-only applications, it doesn't matter which frame rate you use – though Nomad recommend 25fps, which is the default rate on the SMC and (as mentioned above) the European rather than American standard.

Once you've connected the SMC's tape out to a track on your tape machine (ordinarily an outside track) and set a suitable recording level (somewhere between -3 and -7dB), start the tape and then press the Gen button on the SMC. This stripes the tape track with SMPTE code, beginning from zero time.

Next, rewind the tape and hit the SMC's Read button. When generating and reading timecode, the SMC's display shows time advancing, but for reasons of economy Nomad have only provided three digits – which means the display counts through 10 minutes (9:59) before wrapping round to zero again. Of course, this doesn't affect the timecode on tape, and for songwriting applications (which is really what the SMC is intended for) the limitation shouldn't be too much of a problem.

The manual states emphatically that noise reduction shouldn't be used on the timecode track, which could be bad news if you own a personal multitrack machine that doesn't allow NR to be switched out. But one such machine (the Tascam 244) which I used with the Nomad synced up perfectly first time and every time, which suggests Nomad's manual writers are erring on the side of caution. SMC chases the tape perfectly, and the sequencer (I tried both Pro24 and Iconix) locks to tape within 1-2 seconds. The SMC also tracks consistently through tape dropouts – so all in all, a very robust unit.

A "Bad Code" LED lights whenever the unit can't read timecode off tape properly – which, disconcertingly, includes occasions when it's reading no code at all.

Also disconcertingly, the SMC sends out a stream of MIDI Stop codes when it's reading nothing, which caused problems with both my sequencers when I wanted to record into them while they were in external sync mode. With Pro24 I was able to sidestep the problem (after a fashion), but not with the Iconix. Fortunately System Exclusive, Iconix' designers, have now ironed out the problem from their end.

After you've striped the tape with SMPTE code, you have to define both the sequencer start point and the tempo. The task of a SMPTE/MIDI converter is essentially to keep a MIDI sequencer in a steady relationship with the timecode (a bit like marriage guidance, really), which means that it must begin the sequencer at the same SMPTE time every time for each recording, and that it must bridge the gap between absolute time (SMPTE timecode, expressed as hours, minutes, seconds and frames) and relative time (sequencer tempo, expressed as beats per minute).

Nomad's unit fulfils both these requirements successfully, if in a rather unsophisticated fashion. In order to select your sequencer start point on the SMC, you have  
MUSIC TECHNOLOGY AUGUST 1987

to hit the unit's Start button "on the fly" when playing back (reading) the SMPTE-striped tape. The SMC then stores the SMPTE time at which you hit the button internally, and from then on sends a MIDI Start code whenever this time is read.

Once you start laying down tape parts in sync with sequenced parts, it's crucial that the sequence start point remains unaltered – otherwise tape and sequencer will run in a constant relationship to one another, but will be out of step.

Pressing the SMC's Tempo button allows you to specify a tempo within a range of 30-255 BPM using the unit's +/- buttons. But a critical consideration for anyone thinking of buying the SMC1 is that it only allows you to set a single, initial tempo – you can't arrange for tempo changes to occur during the course of a song. Bear in mind that even if your sequencer allows you to specify extensive tempo changes internally, they'll go to the wall when the sequencer is running off an external sync. This is because MIDI synchronisation also defines tempo, through the rate at which MIDI timing bytes are received referenced to the MIDI standard of 24 timing bytes per quarter-note.

*"The unit only allows you to set an initial tempo – you can't arrange for tempo changes to occur during the course of a song."*

Finally, the SMC has no battery backup, so start and tempo settings have to be saved to tape before you turn the unit off. There is, however, a Verify facility for inveterate paranoids (or perhaps just the sensibly cautious) among you. When you return to the session later on, the first thing you'll need to do is load the start and tempo settings back in. Laborious, but under the circumstances, essential.

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## Verdict

ONE THING IS clear. If you're looking for full-blown SMPTE/MIDI sophistication, you'll need to look to such devices as Steinberg's SMP24, the Bokse SM9, the Fostex 4050, Real Time Logic's Event or Yamaha's new MSSI. Sadly, that also means looking at a price tag of between £800 and £1000.

Nomad's SMC, on the other hand, may be short on sophistication, but its strength lies in its very simplicity (it's incredibly easy to use) as well as in its budget price. The unit is ideal for musicians and budget studio owners who are looking to upgrade from sync-to-tape to SMPTE, but can't afford the sort of financial outlay this has previously entailed.

But Nomad aren't having it all their own way, as Bokse are about to bring out the SMI SMPTE/MIDI converter, which retails for £449; that's just over £100 more than the SMC1, but then it does add 16 tempo changes, an offset facility, a full time display, six MIDI Outs (really), and optional battery backup.

With the possible exception of the SMC's single tempo setting, the compromises that have been made in the name of cost-cutting shouldn't cause you any lost sleep – just remember to save that start point.

What really matters is that the SMC allows your sequencer and tape recorder to be locked together wherever you shuttle the tape, and that sequencing and tape recording methods suddenly become interactive.

In short, Nomad are to be congratulated for making SMPTE both affordable and accessible to musicians. ■

Price £344 including VAT

More from Nomad, North Road Farm, North Road, Wendy, nr Royston, Herts. SG8 0AB. Tel: (0223) 20770

# *we can't go on* **BEATING LIKE THIS**

Our series on creative drum programming reaches its fifth instalment, as we begin a look at alternatives to conventional drum pads, and the possibilities they open up.

*Text by Matt Isaacson & Chris Meyer.*



TIME TO CROSS over into strange, new territory – namely, things to beat that don't look like drums. Some of the specimens we'll be covering over the next couple of months will be electronic versions of acoustic instruments such as xylophones – things that allow those proficient on one class of percussion instruments to cross over into the Land of MIDI. Others will be unlike anything seen before – things you shake, twist, tap, and slap, and which do other unheard of things, too.

The original premise of this series was to interest non-drummers in creating

more interesting percussion lines. We have been taking two approaches – educating both non-drummers and drummers in how to coerce more expressive sounds from MIDI'd instruments, and encouraging non-drummers to start thinking and acting like drummers. For the latter, we advocated swinging at things other than a keyboard – drum pads – to get more into the feel of being a percussionist.

But some of the more unusual instruments we'll be looking at have not been seen or used before by any species of musician. This raises some age-old

debates. Is it valid to use “gimmicks” as compositional crutches? Or should we actively seek out and experiment with unusual playing techniques to get us out of our artistic ruts? And if we can't come to grips with a new, alien way of playing, is the fault in us, or in the instrument?

Difficult questions, and ones which we don't really have answers for – though they're certainly going to make the next couple of months tricky for us, as well as a lot of fun. All we can do is thrash away, give some in-battle reports, and sum it up in a clever epitaph – not on stone tablets from above, but in our opinions.

## **Barcus-Berry** *Krash Pad*

OUR FIRST STEP over the edge this month is a tentative one, with something that doesn't look all that far removed from a drum pad. As a matter of fact, Barcus-Berry suggest you mount this thing (in spec lingo referred to as a “BBE Model 2020”) on an acoustic drum rim or “standard L-arm”.

Manufacturers of drum accessories seem to have a greater sense of humour than any other niche of this industry, and Barcus-Berry are no exception. Their advertising mentions applications for the Krash Pad that include triggering light controllers (“now you can flash up to 1000 watts of light in sync with your beat”) and firing “non-toxic smoke bombs from your drumset” – complete with the names of the American companies (Design Specialty and Tri Ess) that will help you do just that.

What we have here is a 5½” by 7½” sandwich of milky plexiglass, black foam, and an aluminium plate covered on top with a thin layer of black rubber. It has a ¼” jack coming out of one side (moulded into the plexiglass) and a mounting bracket on the bottom. It immediately looks roguish in its minimalism – which, of course, instantly appealed to a pair of renegades like us.

This is a trigger pad stripped down to its essence. It is small enough to put in virtually any nook or cranny of a setup, or to arrange a large number of them around you. As the ad that comes with it claims, the whole surface is hot (including the underside, we found to our amusement) and responds evenly, and it does indeed put out a very fast, high-level trigger. We tried feeding it into the Trigger In on a MUSIC TECHNOLOGY AUGUST 1987

Sequential Studio 440 and a Simmons TMI. We were required to cut the hold-off time (how long a trigger translator waits for a dirty trigger pulse to settle down before looking for another one) on the 440 down to just 2 or 3 milliseconds not to miss beats – one of the fastest playing triggers we've found. The Simmons also married up just fine.

Rejection of accidental triggering (eg. from hitting another drum on the same stand very hard) was also good. The signal out of the Krash Pad was also the hottest of any pad we've tried – it'll drive anything, with a good deal of dynamic range.

Minus points? After searches through a couple of drummers' hardware collections and a safari to a local music shop, we came up with only a couple of weird unknown attachments that the bracket underneath the Krash Pad would fit. Some 2020s come with metal mounting screws and



some with nylon; a drummer would only dare use the latter on the rim of a prized drum.

Although the Krash Pads look really cool at first glance, closer inspection gives the impression that they were slapped together by a garage operation. And even though they are a little cheaper (15-25% less) in the US than the average drum pad, the price versus quality difference is not enough to consider them a replacement for normal pads in a kit.

Nonetheless, they are a good first step into getting something to swing at or to augment an existing kit. They'll certainly reside in our setups until BBE try to wrest them back from us.

## Dynacord Rhythm Stick

ALONG WITH HAVING a greater sense of humour, manufacturers aiming for the percussion market also seem to assume that drummers have egos larger than those of your average musician. Certainly, they reason, drummers have the short end of the rock-star stick being trapped behind all that hardware and wood. Don't they deserve some attention, too?

Barcus-Berry's approach, as mentioned above, is to allow drummers to fire lights and smoke bombs to grab attention. Dynacord's is to let them step out front with the rest of the band – with the guitar-shaped Rhythm Stick.

As Nigel Lord discussed in our review of the Rhythm Stick (E&MM September '86), it consists of a lightweight, black plastic, BC Rich guitar-shaped body and a floor unit with power and MIDI connections. The two are linked with a multicore cable slightly thicker – and a lot stiffer – than a standard guitar lead.

On the Stick itself are eight membrane switches for selecting which sound to



trigger, two rubber pads just above where the neck pickup on a guitar would be (one on the front, one on the floor side of the neck), a few switches for editing and selecting presets, an LED display, and an overall sensitivity control.

Besides the obvious analogy of playing an electric bass slap-style, an angle on this instrument that intrigued us is that no electronic percussion device we've covered to date is designed to be played conga-style – namely, with bare hands as opposed to sticks or mallets. Bare-hand playing seems to be more intuitive for non-drummers, and definitely requires a different feel and technique from playing with sticks.

Several playing modes are available on the Rhythm Stick: one where a sound (ie. MIDI key) is selected and latched with the left hand and then triggered with the right hand; one where the sound's switch must be held to be triggered by the pads; variations on those two where the sound is also triggered when first selected by the left hand (called "drum" mode, but closer to hammering on with a guitar); and further variations where one sound (such as a hi-hat or bass drum – whatever is assigned to sound 5) is latched and always played while the others may be selected. All sounds held down – from one to four – are simultaneously triggered by hitting the rubber pads.

The Stick has an astounding 170 programs – though only 16 of these are user-programmable. The rest are a wide variety of presets designed at the factory to work with a variety of drum machines and brains in a variety of modes. These are all documented in the back of the manual. Of the 16 user programs, a MIDI key may be picked for each pad, and a MIDI channel and velocity scale for each program – no multi-channel splits, unfortunately.

The manual suffers from the translated-to-English-without-checking (in this case, from German) malaise that afflicts so many other manuals. It uses the plainest, simplest terms possible to explain things and contains many illustrations (laudable), but you quickly get the feeling that things are presented out of order. For example, the first few sections go from line voltage to Rhythm Stick "theory" to transcribing drum parts to MIDI to programming functions – true, one possible path, but the feeling is disjointed. Explanation of the different playback modes does not take

them in 1, 2, 3 order, and programming functions are given the same name – "modes" – as the playing styles. Misspellings provide comic relief, such as referring to drum kits throughout the last several pages as "kids" – factory kids, user kids, programmable kids (shades of our analogy a few months back of hitting your kid brother to get a better feel for dynamics).

Perhaps we come down a bit heavily on manuals, but we all know how rarely we bother to learn a new instrument or synth before trying to use it, and an expensive recording studio is not the place in which to be confronted with a confusing manual.

The construction quality of the Rhythm Stick continually got in our way. The two strike pads are not isolated from each other – or from the body – very well at all. A hit on a pad sends the whole body into a sympathetic vibration, which then, in turn, retriggers one of the pads if you are not holding onto it firmly with the other hand. Dynacord themselves even warn about possible acoustic feedback from a sound finding the resonant frequency of the body (being handed Santana-like sustain is intriguing for a moment, but ultimately frightening).

The membrane switches for the left hand also have an uncertain feel. We could feel a "click" when they were depressed lightly, but they needed to be pushed further to actually trigger a sound – very uncertain for touch playing. A lack of other tactile feedback – such as perhaps ridges between the eight switches – further heightened uncertainty. After all, who wants to stare at their left hand just to be able to get the right note? The switches also responded differently between themselves – either poor matching, or the unit we had was worn out.

Beyond all of this is that the instrument is just plain hard to play. We're much more used to hitting different strings, keys, or pads to get different sounds, as opposed to having to select them first with the left hand and then hit a common pair of pads with the right. It would have been much better if there were several isolated pads along the length of the body that could play different sounds.

The current playing methods sacrifice too much in favour of merely *looking* like you're playing a guitar instead of drums. Maybe practised pop-and-slap bass players will feel more at home on certain licks, ►

▶ but despite both of us being bassists (admittedly not of the pop-and-slap variety), we could not come to terms with it.

## Kat Percussion Controller

XYLOPHONES, MARIMBAS, AND vibes represent the crossover point between keyboard and percussive instruments – things you strike with mallets, but which are divided in semi- or quarter-tones and arranged in a black-and-white key format. Even though you won't see them very often on *any* musical stage, they are inevitable targets for MIDling.

The KAT comes as a one-octave master unit with up to three one-octave expanders each in a battleship grey metal case. The keypads are thick black foam pads with excellent feel and very little playing noise. An LCD (without backlight – naughty, naughty) shows the programming options. There are jacks on the back for the expander units, three MIDI Outs (eases cabling a bit), a MIDI In (for a future merge function, we're told), and three footswitches.

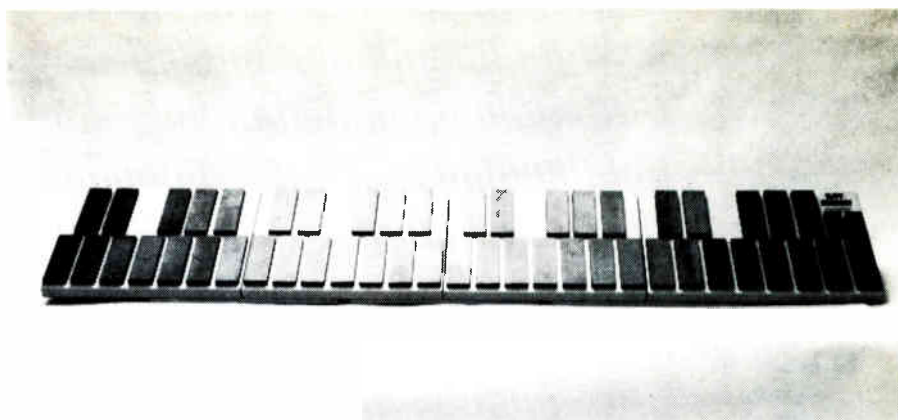
All programming is done by selecting modes, screens, and options with pads on the master octave. Even though there are help screens, it is best to have the manual nearby (and open) while learning the KAT; we resorted to taping labels on the pads to remind us where we were. Fortunately, the slave octaves retain normal function during programming, so you can quickly check out your latest changes.

In general, things weren't too bad until we started getting into the complex functions. At a stroke, the KAT went from being simple to downright confusing. It's worth going through the manual with the instrument by your side for a couple of evenings to learn the beast.

Notes can be sustained in three ways – by a preset "hold" time, by a sustain footswitch, or by actually holding a pad down the way you would in normal keyboard operation. It doesn't take much force to do this, which lends itself to some interesting playing techniques, such as holding and phrasing a bass note while playing a melody over the top. The unit claims to put out only nine distinct velocity levels, which is a bit on the thin side – at least 16 would have been preferable. There are 16 selectable velocity scales, with a warning/promise that the others could/would change with user feedback. That's encouraging – the dynamic range felt just a bit lacking.

The instrument does indeed seem to be in a state of evolution – along with the manual came a multi-page addendum that listed several interesting new features (which still didn't quite reach the level of promises in the glossy brochure – further development, we guess). Still, since KAT are a small company actively seeking feedback with this as their main product (and their level of dedication seems pretty high), we feel much better about actually seeing the promised updates from them than we might from other organisations.

The existing features are truly impressive. There are 256 programmable presets which can be arranged into 32



"songs". Two of the three footswitches can be programmed to function as sustain pedals, stepping through programs, starting and stopping sequencers (though the KAT does not seem to actually clock them), and triggering an additional note over MIDI (such as a bass drum or hi-hat). One of the new features, described as "hi-hat mode", allows you to send one note when the footpedal is depressed and another when it's released – not exactly like a hi-hat, but interesting nonetheless.

The KAT's playing surface may be split at an octave point, and each side can have a different MIDI channel, sustain time, program it sends out over MIDI, transposition, and so forth. There is also an auxiliary program change that is sent over channel 16 whenever a new song is selected, allowing changing of an external effects program or the like.

Beyond that, three programmable "assignments" may be created, where each pad can have its own MIDI key number *and* channel. On top of this is a double mode where a pad can be sent over two MIDI channels at once. With the velocity scale on one of the layers inverted, velocity crossfading becomes possible.

Complaints? A couple of things would have made programming far easier – such as a backlight on the LCD, an overlay showing which pad does what in edit mode, and a real "underline" style cursor. Currently, the parameter being edited blinks slowly, which can cause momentary confusion as to just what you *are* editing when you change screens or fields.

But in general, the instrument was a joy – it kept us at it late into the night, if you'll forgive the expression. Every now and then we consider actually *buying* one of the toys we get to test in this series; the KAT is one such instrument.

## Simmons Silicon Mallet

SIMMONS ESSENTIALLY REINVENTED electronic drumming several years ago (after the stillbirths of the Synare, Syndrum, et al). Now that the market is saturated with electronic drums (and the sound has become almost passé in favour of monster reverbed samples), they are going to have to forge out new territory to survive.

This is exactly what they're doing. After programmable mixers and FM voice units, we now have the SDX (a comprehensive sampling/playing/performing workstation) and their shot at a

keyboard/percussive instrument – the Silicon Mallet.

Simmons have always had a good sense of style. The Mallet continues this – it looks cool. Its three-octave playing surface (with expanders available) is a black wedge with red ribbing around the strike zones. The voice and control panel mounts on the back of the playing surface at a very accessible angle. And the stand – although a royal pain to put together (virtually all of the bolts require a drum key; the unit also happens to weigh just short of 100 pounds) – also looks great, is sturdy, and is very adjustable.

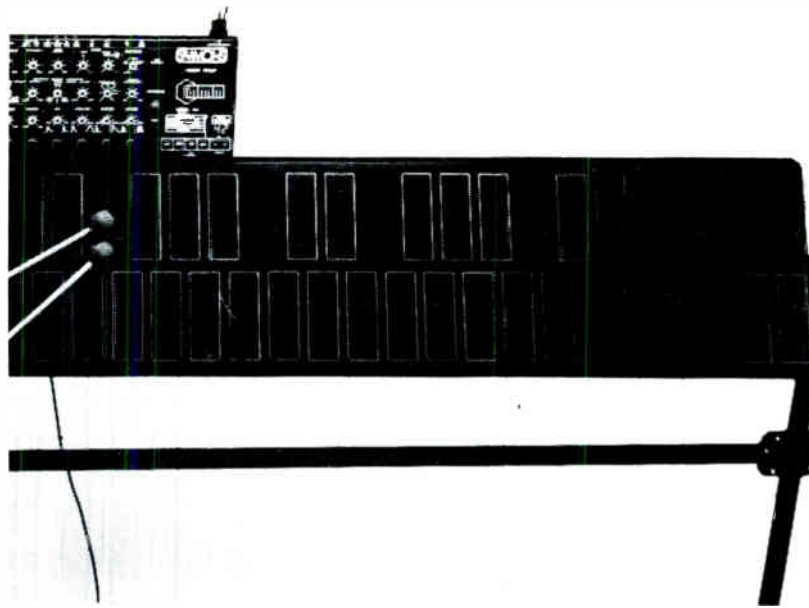
A bundle of cables connect the brain with two footpedals (one for pitch-bend; the other for vibrato and tremolo depth), a sustain footswitch, and a program advance/backtrack unit. The brain also has MIDI In/Out/Thru and stereo audio outs.

The Mallet plays its own six-voice, four-operator FM voicing. Variable parameters are reduced to dynamic sensitivity, brightness, harmonic, bite, and attack, decay, and hold times. Simmons must be complimented on making FM programming so accessible – we found it *extremely* easy to get a wide variety of usable vibe/marimba-type patches, and quickly, too. There are three rows of voicing controls – system, performance, and voice – with six real knobs underneath, making tweaking easy. Altering other parameters (such as split, MIDI channel, program chain, and so on) is not quite as easy, since these functions are relegated to just four other switches and a two-digit display. Still, life is not made unduly hard.

A couple of months back we were forced to take some major swipes at the lack of quality of Simmons' manuals. Much to our pleasure and surprise, the Mallet's manual is one of the easiest to read and digest that we've run across so far – illustrations, good step-by-step instructions, and clear bite-sized sentences and paragraphs. Very high marks on this score.

The playing surface uses the new Force Sensing Resistor technology that Simmons have been making so much noise about lately. This gives a very low playing profile – no thick raised pads like the KAT. Unfortunately, the playing surface seems a throwback to Simmons' earlier pads – not exactly hard hats, but hard rubber with a lot of noise and not much bounce-back. True, we were using hard mallets, and the manual does suggest soft ones to cut down on "mechanical" noise, but the monitors had to be cranked up considerably to overcome it. There was also a problem with hard hits triggering adjacent

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couple of approaches to MIDI mallet playing. We can only see more exotic beasts ahead. We promise to send postcards. ■

**Price** BBE Model 2020 Krash Pad, £69.95 including VAT

**More from** Strings and Things, Unit 2, Chapel Road, Portslade, Brighton BN4 1PE. Tel: (0273) 420704. (Barcus Berry wholesaler; Krash Pad available by special order only from retailers.)

**Price** Dynacord Rhythm Stick, £499 including VAT

**More from** Washburn, Unit 7, Boulder Business Centre, London Road, Baldoak, Herts SG7 6NG. Tel: (0460) 896262

**Price** KAT MIDI Percussion Controller, £1199 for master, £599 per slave, including VAT

**More from** Argents, 20 Denmark Street, London WC2. Tel: 01-379 6690

**Price** Simmons Silicon Mallet, £2599 including VAT

**More from** Simmons Electronics, Alban Park, Hatfield Road, St Albans, Herts AL4 0JL. Tel: (0727) 36191

**Stop Press:** If you'd like to see how the KAT controller performs in a live situation, check out London Brass (featuring Man Jumping's percussionist Simon Limbrick) who are due to perform a piece, titled 'Hoquetues David', as part of the South Bank Festival Summer Scope. The piece, described by Simon as "an arrangement of very early classical music", makes use of two KAT percussion controllers as well as acoustic brass instruments. The performance is scheduled to take place at 7pm, Saturday, 29 August, at the Queen Elizabeth Hall.

keys - particularly if you missed a particular key's zone altogether.

In these days of MIDI and voice expansion units, the need for an onboard voice unit easily comes under question. The six-voice capacity of the Mallet is a little short for sustained passages, and retriggering the same key selects new voices instead of retriggering the old one - a boo-boo that results in stolen voices if you double trigger.

Still, it's nice to have everything you need in one place and within easy reach, and one gets the impression that Simmons intended to present a complete, self-contained, easy-to-use instrument to

mallet players making their first foray into electronics. And anyway, there are MIDI In and Out jacks along with a work-manlike, if not particularly fancy, MIDI implementation.

Distadvantage? Only that the price (\$2599) is a bit hard to swallow. Such is life.

### Some Territories Charted . . .

OUR FIRST EXCURSIONS into non-pad Beating have turned up a cheap, useful kind-of-pad, an unsuccessful attempt to marry bass playing with drumming, and a

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# S · H · O · W S T O P P E R S

The Summer NAMM show may have lost the lead in major launches to America's Winter exhibition in LA, but there were still plenty of introductions at Chicago this year to keep our four reporters occupied.

## MAKING NOISES

"HEY MISTER, WHERE did all the big stuff go?" That was the question I found myself asking of exhibitors halfway through this year's summer NAMM show. Each MT writer had assumed responsibility to report on a certain category of new musical technology, and I'd been assigned the traditional "big guns" of synthesisers, drum machines, hardware sequencers and samplers. Yet after a day-and-a-half searching the aisles of Chicago's McCormick Place convention centre, I hadn't run across too much of any note in any of those groupings.

Let's begin with synthesisers. The Winter NAMM show at Anaheim, six months earlier, signalled the revival of the synthesiser, with several notable new machines (Yamaha DX7II, Roland D50, Korg DS8, and so forth) being unveiled. At Chicago, the revival stopped dead in its tracks.

The Kawai K5, with its additive synthesis and high degree of programming flexibility, wasn't exactly news – though a certain MT reviewer with an Irish surname was obviously surprised to find one of his own programs installed in all the keyboards displayed on the Kawai stand.

Elsewhere, a new Canadian synthesiser called the Lyre presented, at least in specification terms, slightly more of what a "true" additive synth should offer (for a specific description of what this means, turn to Chris Meyer's 'Deeper Wave' piece, elsewhere this issue). The Lyre offers significantly more programming flexibility than the Kawai, and is neatly packaged in a black, sexy-looking rackable unit. But it's due to cost \$5000 in the States.

The Keytek CTS2000, with its innovative (and great-sounding) cross-table synthesis technology, was on display again – this time under the auspices of Gibson/Phi-Tech. The first shipment's arrival from Italy to the US is imminent – as is a comprehensive review in this magazine – but there's still no news on a UK distributor.

To the surprise of no-one, Yamaha are starting to do for the DX7II what they did for the earlier model – use it to spawn numerous other instruments for different applications. The first of these is the DX7S (£1239), a six-operator machine that essentially revives the



Their show stands used to contain huge models of the Omnicord, a "fun" instrument for the home and the school. Now Suzuki have got serious with an excellent MIDI guitar . . .



First machine to result from the collaboration between Akai and Roger Linn is the ADR15, a sampling percussion system in the Linn 9000 mould. A MIDI sequencer, the ASQ10, is to follow.

► specification of the old DX7 – though it has the advantage of retaining a number of DX7II refinements, such as increased sound quality, random pitch shift and a multiple LFO system.

The other variation on the DX7II theme on show at NAMM was a rack-mounting module, the TX802 (£1329). This is essentially a DX7II in a box: 128 preset FM voices, a RAM cartridge port, all the DX7II's programming features, and so forth. But there's a twist. The TX802 is multi-timbral, enabling you to assign voices to different MIDI channels in the now time-honoured tradition. And unlike (too) many multi-timbral instruments, the 802 offers eight individual *audio* outputs, making it a fine partner for a MIDI sequencer (such as Yamaha's impressive new QX3) in demanding multitrack recording situations.

But if Yamaha are sticking to FM like chewing-gum sticks to a bed-post, Casio seems to be moving away from its established method, Phase Distortion synthesis. The company's newest synth, the HZ600 (price to be announced), features a new technique known as SD (for Spectrum Distortion) synthesis – though there was little technical information available at the show to enlighten us on what this system is or how it works.

With its list of front panel presets and fairly uncommunicative LCD, the HZ600 seems to be aimed as much at the home player as the pro keyboardist. Then again, the HZ sounds competent enough, and does offer an Alpha dial-type continuous rotary control for parameter value adjustment – so there's plenty of potential, particularly if Casio intend using SD synthesis on some more sophisticated instruments in the near future.

Next-door to Casio, Kurzweil were unveiling four new synthesiser expanders, under the umbrella title of the KI000 series (prices to be announced). The four modules are the PX (for "Professional Expander"), the SX ("String Expander"), the HX ("Horn Expander") and the GX ("Guitar Expander").

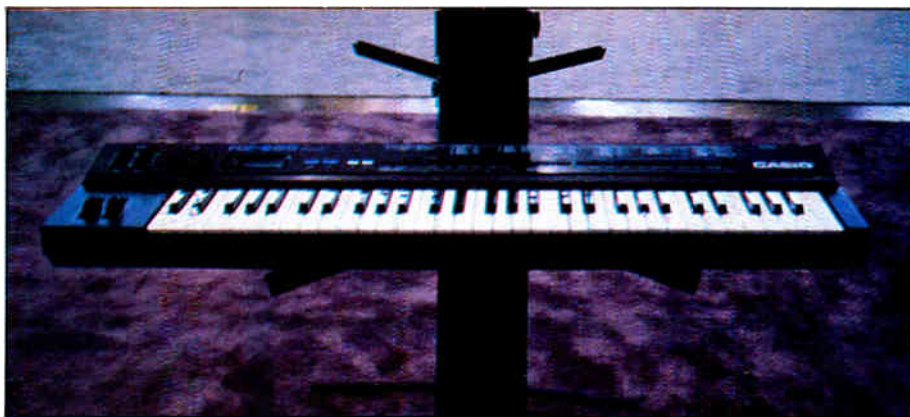
Each module offers 128 preset sounds (similar in quality to those featured on the Kurzweil 250) that all belong to a specific "family", along with space for 64 user programs. The PX, for instance, offers such sounds as grand piano, vibes, choir, and Hammond organ, plus 11 digital waveforms.

The idea behind the series is to provide relatively affordable, multi-timbral expanders for keyboardists who require the power of the Kurzweil 250, but not the variety of sounds that instrument offers.

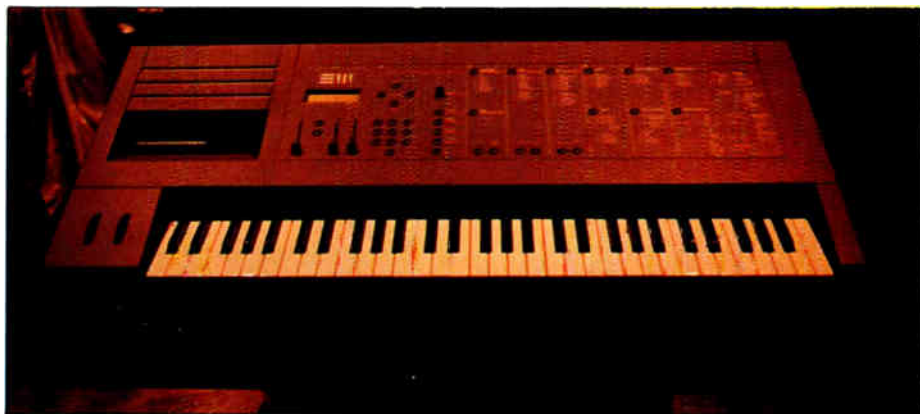
And that just about wraps it up for new synthesisers on show at Chicago – though a last mention must go to **Roland**, who were showing a D50-in-a-rack unit known as the D550 (£1250). This is a fine example of the sort of unobtrusive, seemingly unglamorous machine that got few people talking at the show, yet will probably sell in large quantities.

All the programming features of the D50 are there, though the simple mechanics of hi-tech engineering (there's a limit to just how many controls you can fit onto the front of a two-space rack unit, and a joystick is an obvious casualty) mean that accessing parameters on the D550 isn't quite as simple as it is on the D50. Result? The option of buying the PG1000 programmer becomes more attractive than ever.

The 12-bit sampling arena saw the unveiling of a number of new modules. Roland were



Casio's HZ600 looks like just another home keyboard – until you discover it features a programmable synth section based on a new principle: Spectrum Distortion synthesis.



Pride of place in the E-mu room was given to the Emulator III – not just a 16-bit sampling keyboard with a sequencer, but soon to be the centre of a complete sound-production workstation.



The percussion-sampling war heats up, as E-mu announce the SPI200 – essentially an SPI2 with a built-in disk drive, some handy programming refinements, and no increase in price.

showing the S220, a down-to-earth module that costs only £975, yet offers 16-voice polyphony and four-channel multi-timbral control – though the bad news is that the 2.8" Quick Disks of the S10 sampling keyboard have been retained.

Roland also showed the S550, the long-awaited rack version of their upmarket S50 sampling keyboard. The S550 will retail at a hefty-sounding £2300, but bear in mind that for your money, you get a machine that expands significantly on the S50's capabilities. There's a bigger memory (1.5Mbyte of it), eight-channel multi-timbral control, eight individual audio outputs (again, good news for multitrack users), new editing features such as crossfade looping and "previous sampling", and a CPU output bus for connection to a CD ROM unit.

The S550 also offers connection to a CRT monitor for waveform editing and compatibility with Roland's DT100 digitiser tablet. And both the module and its keyboard equivalent are compatible with the SYS503, a new disk-based software package that turns either sampler into a neat sketchpad sequencer, with note information displayed in graphic form on the monitor if you have one.

**Korg** were also showing a new rack-mounting sampler, the DSM1 (£2500). This is essentially a DSSI in a box, but like Roland, Korg have used the benefit of user feedback and increased R&D time to add a number of refinements to their rackable version. Those refinements include an expanded 1Mbyte memory, a streamlined and more sophisticated synthesiser section that allows even more detailed programming than before, and

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(you guessed it) separate audio outputs – 16 of them this time.

Korg USA have also developed their own updates for the DSSI. These include a 2Mbyte memory, and a SCSI port for connection to a hard disk. Aside from any other considerations, it's good to see a Japanese manufacturer giving its blessing to a US importer's innovations – and equally gratifying to see those innovations being made available quickly and cheaply to existing users (British musicians shouldn't have to wait much beyond September).

**Oberheim** are also going ahead with updates for their DPXI sample replay unit. The big news at NAMM was that the DPX is now compatible with Akai S900 files – in addition to the Emulator II, Ensoniq Mirage and Prophet 2000 already supported. Oberheim were also showing their own hard disk unit, the HDXI – a neat way of sidestepping the myriad of floppy disk formats the DPXI uses to retain compatibility with storage systems used by different manufacturers, and more than ever, an irresistible aid to playing samples during live performance.

Hard disks are now also an option for the **E-mu Systems** Emax. The new Emax HD (£2949) and Emax HD Rack (£2799) both offer an internal 20Mbyte hard drive capable of storing no fewer than 36 banks of sounds, and of loading a sound into the instrument in an astonishing three seconds. (Existing Emax owners can obtain a HD retrofit – price to be announced.)

But the biggest news in the E-mu room was in the 16-bit arena, the sector of modern music technology that aroused the most controversy at Chicago this year. The passion for 16-bit sampling seems to have reached fever pitch, and with it, the quest for that elusive property known as "CD quality". Now, that phrase has always struck this writer as mildly redundant, since some CDs sound great and others sound terrible; the same, of course, goes for CD players. If 16-bit sampling resolution doesn't guarantee high sound quality in hi-fi, there's no reason why it should guarantee it in musical instruments.

So, regardless of any arguments that may go on between rival manufacturers as to whether their machines are "true 16-bit", it's obvious that too many other factors (A-to-D and D-to-A converters, filtering and anti-aliasing circuitry, and so on) have too big an influence over the final sound quality for those arguments to really resolve anything.

In the end, you should just let your ears decide (a) if 16-bit sampling is worth the investment in your application, and (b) if you can tell the difference between the various 16-bit samplers available.

For the record, I was no more impressed by the grand piano sample demonstrated on the new Emulator III (price to be announced) than I was by the Casio FZ1's efforts at this year's Frankfurt show (see MT March '87). For my money, a system that employs computer interpolation of waveforms and takes into account the changes of timbre that occur at different velocities of keystroke (such as Roland's SAS) will win out over conventional sampling every time.

That said, E-mu's lively and (as ever) witty demo did get across the concept of the EIII (16 voices, true stereo sampling, 8Mbyte RAM, built-in 40Mbyte hard disk, plus a memory expansion option) as the centre of a "Digital Sound Production System." The MUSIC TECHNOLOGY AUGUST 1987

latest keyboard to carry the now near-immortal name Emulator has a whole slew of connections (MIDI, SCSI, CPU, SMPTE, and any other acronym you can think of) for future expansion of the system. And perhaps most significant of all, Mac software specialists Digidesign will be collaborating with E-mu to provide custom-written packages offering waveform editing, digital signal processing, digital synthesis, and more.

But the EIII has a rival, and it comes – perhaps not surprisingly – from another part of Northern California. As usual, **Sequential** stayed away from the summer NAMM show itself, choosing to exhibit instead at a nearby hotel suite. The star of their show was the Prophet 3000 (£3500 approximately), a stereo 16-bit sampler with a maximum sample rate of 48kHz, another plethora of connections (SCSI and SMPTE included), and a neat line in automatic pitch-detection and mapping during the sampling process.

Unlike the new Emulator, the new Prophet (strange how the old names seem to be the best) comes in a 2U-high rack unit, with a remote control module whose six "soft" control switches and large LCD remind one of the PPG HDU remote.

It remains to be seen whether E-mu's "all-in-one" approach or Sequential's "another-goodie-for-the-rack" angle will win out in the marketplace. Both systems had their admirers in Chicago.

On the beatbox front, E-mu again impressed with their new SPI200 (£2199), the replacement for the SPI2 sampling percussion system. The SPI200 adds a built-in 3.5" disk drive (no more messing around with the Commodore 1541), some new programming options and MIDI song pointers, without sacrificing compatibility with SPI2 sounds, and without any increase in price.

Also unveiling a 12-bit sampling percussion system were **Akai**, whose new ADR15 (£2999) is the first fruit of their collaboration with Roger Linn of LinnDrum fame. The ADR15 is a 12-bit sampler with a maximum 40kHz sampling rate, up to 26 seconds of sampling at that rate, and 32 voices of which 16 can sound simultaneously.

The Akai's sequencer section has a 60,000-note capacity (velocity permitting), no fewer than seven sync modes (SMPTE and MTC included), four independent MIDI Outs and two MIDI Ins, and offers step-time recording as well as the traditional Linn method of real-time input.

The ADR15 is a big machine, with large velocity- and pressure-sensitive buttons that make it slightly reminiscent of the Linn 9000. But the Akai is an altogether more sophisticated beast, and one that shouldn't be too difficult to control; a huge 320-character LCD provides a series of "Help" paragraph messages that explain the function of the feature currently being used. The screen also comes in useful for graphically displaying relative voice levels as part of the ADR's built-in 32-channel stereo drum mixer. Price in the UK should be under £3500.

For just a sixth of that, however, you could have a new 16-bit drum machine. Yes, you did read that right. There is a 16-bit drum machine available for just £449. It's made by Alesis, and it's called the HRI6. And if there was one machine that got more tongues wagging at Chicago than any other, this was it.

The HRI6 offers no fewer than 48 16-bit drum sounds that are assignable to 16

velocity-sensitive programming pads. The sounds offer a variety of acoustic and electronic kit samples, but more impressive than the breadth of the selection is the attention to detail with which the sounds are presented.

For example, you aren't limited to just an open and closed hi-hat; there's also a half-closed hi-hat and a hi-hat closing, so if your programming is up to scratch, authentic patterns are no problem. And the ride cymbals comprise two overlapping samples for a more natural sound, while a 20kHz bandwidth and a 47kHz sampling rate gives them outstanding clarity.

The one gripe that I have with the HRI6 is its lack of separate audio outputs. I know there are two stereo pairs of stereo outs, and I know that level, panning and pitch are all programmable for each voice and for each pattern. But if you can't treat sounds individually in a multitrack recording environment, the machine is of limited use – less use than, for instance, Roland's new TR626, which doesn't sound as nice, offers only 30 drum sounds, and costs significantly more. If the addition of say, eight audio outs would cost £100, or even £250, then that addition should be made to a second, more expensive Alesis machine. Now.

Matching (both electronically and aesthetically) the HRI6 is Alesis' first MIDI sequencer, the MMT8 (£299). This is an eight-track machine that can record on several MIDI channels simultaneously, and can also store MIDI System Exclusive information.

Its most attractive aspect, though, is its ease of use. It's designed to operate like a tape recorder with play, record and fast wind controls, and the provision of dedicated buttons for auxiliary editing features (and the corresponding lack of multi-function controls) should make the MMT8 one of the most intuitive hardware sequencers to use. ■

Dan Goldstein

## A SOFTER TOUCH

LIKE THE OTHER categories at this year's NAMM show, music software did not offer a lot of surprises. A large contingent of companies showed updates to existing packages, newly ported versions of current programs or extensions to similar lines. But, for the most part, there were no major innovations.

The biggest software-related news that came out of Chicago was the announcement that **Atari** are investing more effort (read: money) in the musical applications of their computers. They're making their ST machines available directly to music dealers in the States (in the UK, Syndromic Music are now ST distributors), and they took the trouble to take stand space of their own at NAMM, to promote both their own machines (the STs and their new budget PC-compatible) and the software companies who are developing music packages for them.

The fact that a major hardware company is willing to show strong support for this market segment is definitely good news for the music software industry in general – and it should prove particularly encouraging for developers of ST software.

In fact, there was a lot of ST software on display in Chicago. The Mac is still doing well and support for the IBM grows with every show, but the ST seems to be getting the ▶

▶ most attention and interest at this point. (The venerable Commodore 64 was conspicuous only by its nearly complete absence at this show.)

Even Mac holdouts **Digidesign** introduced a version of their impressive SoftSynth additive synthesis program for the ST (£295). The program looks and runs almost identically to the original Mac version, and carries the same list price.

**Steinberg Research** also displayed a number of impressive programs for the ST. Their Synthworks DX/TX (£150) – compatible with the DX7II family – has excellent graphic displays as well as a very slick 3D harmonic analysis feature, similar to the FFT displays in sample editing programs. While not essential to the programming process, the harmonic analysis is educational and it looks cool. The program can only run on the I040ST because of memory requirements, but as an added bonus, it comes loaded with over 2000 sounds. Synthworks ESQ (£150), which works on a normal 520ST, combines friendly graphic displays with a number of interesting patch creation functions for Ensoniq's ESQ1. (Meanwhile, Steinberg UK report that both Synthworks FB01 and Synthworks TX8Z are also both available for £99 each.)

Soundworks S900 (£285) and Soundworks Mirage (£150) are sophisticated visual editing programs which in addition to the normal wave-editing functions, include a built-in software synthesiser with a voice architecture similar to that of a four-oscillator Minimoog. By producing "samples" for the connected instrument, this portion of the program allows you to play complex analogue sounds from your sampler.

**Hybrid Arts**, who shared stand space with Atari, showed updated versions of their sequencing programs. SMPTETrack and SyncTrack ST's next release will include grid-style graphic displays of MIDI note and controller data, and will allow you to enter and edit information in this format. The update will be free to all registered owners.

EZ Score Plus (£84.95), an inexpensive notation program, was also on display. The first in a new series of programs, EZ Score Plus can convert files from any of Hybrid's sequencing programs into traditional notation, as well as providing the ability to enter notes from a connected MIDI keyboard, the computer keyboard or the mouse. Music input into the program can be played back over MIDI or with the ST's internal sound system.

New from **Compu-Mates** (available now from their new European distributor, 'Z') is the DSSI Synthdroid (£130), a wavetable editor for Korg's sampling synth which also includes a helpful screen for editing waves created with the instrument's harmonic synthesis utility. In a similar vein is the K5 Spectrum Synthdroid (£130) for Kawai's new additive synth reviewed elsewhere this issue. The program can convert samples into the K5's additive synthesis format, thus providing a basic form of resynthesis.

Final Trak ST and Final Score are sequencing and notation programs respectively (prices to be announced), which can work together or on their own. Up to 128 tracks are available on Final Trak, and the program also includes SysEx dump utilities for all of Compu-Mates' Synthdroid patch files.

The good doctor at **Dr T's** had a number

of new programs for the ST, including the first editor/librarian program for Roland's D50. Other new voice-editing programs on display were for the Kawai K3, Korg's DP2000 and 3000 – their FM synths for the domestic market – and M6 Tricks for the Matrix 6.

Taking off from the company's Algorithmic Composer and Intelligent Music's M and Jam Factory, the PVG, or Programmable Variations Generator, is a music-creation program (for lack of a better phrase) which generates variations from previously recorded MIDI data according to a number of user-defined parameters. Certain parameters within a variation – such as pitch, rhythm, dynamics and expression – can be set within a specific range, and others can change randomly. The PVG will be incorporated within Dr T's KCS program, and will also be available as a cheap update for existing users.

Dr. T's also displayed a basic version of Fingers – a more "professional" version is slated for autumn release – which is a similar type of program. Fingers generates up to four simultaneous lines of music which can be saved as a sequence and edited by the KCS program. The user defines values for pitch, rhythm, dynamics and note length for each line, and the computer generates the music.

Other companies who displayed ST software included **Beam Team**, who announced that the D50 would be supported in their XSyn series of editor/librarian modules. And **Animated Music**, a new company who displayed a colourful sequencing program called Animated Studio which features basic notation capabilities; no news on a UK distributor, though.

The big news on the **IBM** front was the new PC Music Feature plug-in card from Big Blue itself, which combines a MIDI interface and an eight-voice FM synth (basically an FB01) for under \$500 in the States.

A number of manufacturers demonstrated systems which are compatible with the new card, and Passport actually had a voice editor for it. Appropriately titled the Passport MIDI Voice Editor, the program works with multiple cards as well as external FB01s. The company also announced the September release of MIDISoft Studio, an inexpensive 32-track sequencer designed for use with the new card that includes real time, step time and overdubbing capabilities. Score, Passport's desktop music publishing program for the IBM, will also work with the Music Feature.

New from **Bacchus** is an editor/librarian program for the DX7II and Yamaha's new TX802. Making use of a mouse and pull-down menus, the program has the feel and look of a Mac or ST editor. The original DX/TX instruments are supported as well, and the package can also be used with IBM's interface.

The biggest news for Mac owners comes, once again, from **Digidesign**. Their sophisticated Q-Sheet program (available in the UK from Argents at £495) was impressively demonstrated, and offers SMPTE-based automation for all MIDI devices. While specifically intended for film and video work, the program can be used to control any large MIDI system. Taking advantage of the new MIDI Time Code standard, Q-Sheet allows you to create a list of cues which are performed by the computer at the appropriate SMPTE time. Cues can consist of single note-ons, entire sequences, continuous controller changes,

fader adjustments – for MIDI-controlled mixers – and other MIDI information.

Across the aisle at **Opcode** was version 1.5 of Cue (price to be announced), with MIDI features, as well as new librarians – which all include Patch Factory, a random patch generation utility – for the ESQ1, Lexicon PCM70, Prophet VS and DX7II. The company also displayed editor/librarians for the FB01, Matrix 6, K3 and Akai's MPX820 programmable mixer.

**Mark of the Unicorn** announced version 2.0 of Performer, their high-level sequencing program, which is due to retail at just under the £400 mark. The update includes a number of new editing commands, more sophisticated control over tempo changes, independent looping for each track, multiple metre changes, regional editing, real-time SMPTE display, SMPTE lockup, and some attractive new graphics.

In a somewhat different vein, **Sonus** displayed a basic MIDI package entitled Personal Musician, which includes a MIDI interface, MIDI cables, and a basic four-track sequencer and MIDI player with a number of pre-programmed songs. The package will be available (for under £100) for the Commodore 64/128, Apple IIe, II+, IIGS, Atari 520/I040ST and IBM compatibles, and like all Sonus programs, will be handled in this country by the newly set up Sonus UK. ■ *Bob O'Donnell*

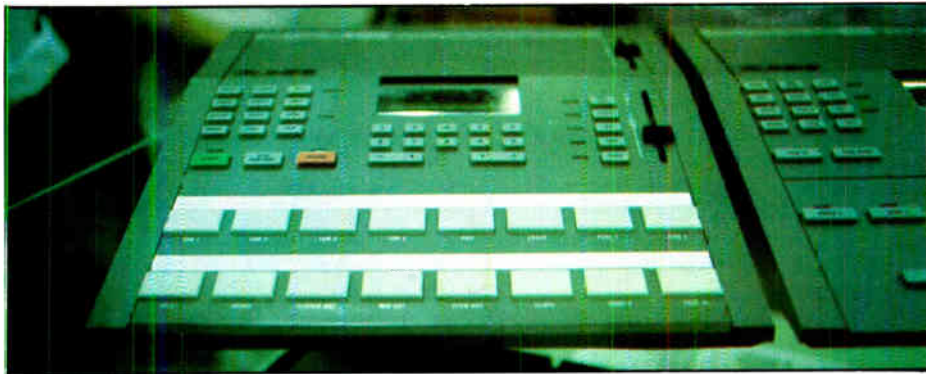
## CONTROLLING THE PROCESS

SIMPLY PUT, MIDI has come of age. Not only have manufacturers recognised its significance, but a good number of companies are looking into useful ways of generating and manipulating MIDI data by way of new controllers, processors and software updates for existing instruments.

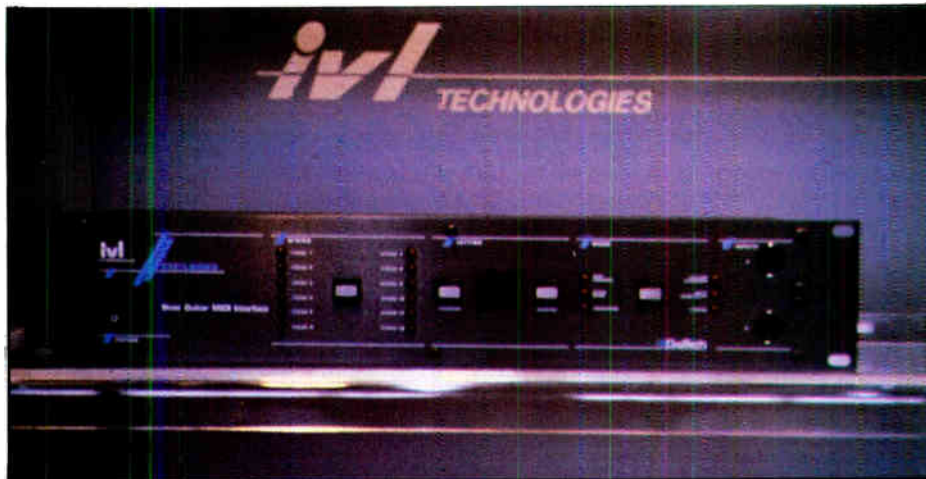
Until recently, if one were to look for innovations in synthesisers and MIDI, the obvious place to look first was in the keyboard section of your local music shop. But this year's Chicago show demonstrated that music technology is now reaching a more varied group of musicians than ever.

The **Akai** EWI (£699) and EVI (£699) wind controllers are, as many may be aware of already, the result of the company's recent dealing with Nyle Steiner, who was on hand for demonstrations. The EWI and EVI are designed to play in the manner of a clarinet and trumpet, respectively. Both models need the EWW 2000 Sound Module (£599), an analogue synthesiser along the lines of previous Akai designs, but completely re-programmed by Steiner. And both sport MIDI sockets, so that players have access to the whole range of MIDI synths and samplers. Several EWI and EVI stations were set up on the Akai stand so showgoers could have a go at playing these instruments for themselves – though the temptation to try them out was quenched by what appeared to be no replacement mouthpieces on each instrument...

The **Yamaha** WX7 Wind MIDI Controller (price to be announced) also looked tempting, though the only model actually on the floor was on display inside a glass case, away from the possible danger of human hands. Never mind that. The WX7 and its potential were superbly shown off by  
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Star of the show was arguably Alesis' new HRI6 drum machine, which offers 48 16-bit drum sounds in a neat package for under £450. Next to it is the easy-to-use MMT8 sequencer (under £300).



MIDI comes to Country & Western, as DOD/IVL unveil the Steelrider, a steel-guitar-to-MIDI converter which – as we reveal elsewhere – may also be used with the Chapman Stick.

demonstrator Sal Gallina, who made it perfectly clear that regardless of the type of controller, a musician is what makes music – technology merely expands the possibilities. Gallina succeeded in making the WX7 sound like a huge string ensemble and a screaming lead guitar – with lots of other impressions in between. Unlike the EWI, though, the WX7 features no built-in synthesiser voices, relying instead on MIDI-connected units to make noise.

What NAMM show would be complete without a few more tries at bringing guitarists into MIDI? This time there were more than ever. Roland's GM70 (£755) continued to draw the attention of those who had not yet seen it, and joined by the GP8 MIDI guitar effects rack, it looks like a tidy package.

DOD had their Pitchrider series on display, including the 4000 (£645.95) and 5000 (price to be announced) models for wind instruments, the 7000 MkII (£699) for guitar, and the new Steelrider for steel guitar (well, it should go down well in its home country).

Stick Enterprises have introduced a variation on the Pitchrider with IVL's Stick-to-MIDI Interface, which goes for \$900 in the US, including pickup, preamp box and installation. The Stick people also announced the MIDiface, a MIDI port for the Commodore 64 which includes special performance software for the Yamaha TX7 synth module. In Emmett Chapman's newsletter, he offers the MIDiface as a performance aid for MIDI Stick players by providing transposition, note sustain and an optional video display. It's hard to say whether this is up everyone's street, but Chapman's intention seems to be to make a more performance-oriented MIDI controller out of the Stick. Other software options will

become available for MIDI echoes and the like.

Beetle have made significant changes to their guitar-to-MIDI conversion system. The new system, the Quantar, still uses ultrasonic technology to scan each string, but is not being offered as a retrofit for Stratocasters like the original package, nor is it intended as a guitar-to-MIDI converter. Instead, the Quantar works with a set of .016-gauge strings for an even response, and features a whammy bar-type controller assignable to the usual assortment of MIDI continuous controllers. The Quantar can transmit on two sets of six MIDI channels, which can be switched between with a momentary footswitch, making it easy to lock in a chord, then solo over it with other synthesiser voices if desired.

A newcomer to the guitar synth market is Australia's Passac with their Sentient Six conversion system. This model raised several eyebrows in the MT ensemble with a "delay neutralisation" system, which appears to work – though we shall have to wait until its release to figure out precisely how it works. Besides this clever psychoacoustic effect, the Sentient also detects pick direction as well as the distance of the pick from the bridge. Passac's demonstrator David Becker (ex-Chick Corea, now a solo artist on MCA) showed off these parameters with a Prophet VS, using pick position and direction parameters to control the pan position and the two axes of the mix envelope.

From the guitarist's point of view, this system is attractive because the individual string sensors are integrated into a Kahler 2520 tremolo bridge system (the MPX1 pickup assembly comes standard with the Sentient Six), so whammy bars are welcome. At the same time, the guitar communicates

all its individual string information to the rack-mount controller via a stereo lead.

Perhaps the most unexpected move in the MIDI guitar market came from Casio, who introduced an all-in-one MIDI guitar, the MG500 (£549). This is an ordinary electric guitar which sports a MIDI output in addition to the usual audio output. All conversion electronics are contained within the guitar itself, and controls have been kept to a bare minimum to avoid confusion – though at the cost of flexibility. The MG's base MIDI channel is adjusted by DIP switches on the back of the guitar, and a poly/mono switch sets the MG up for operation with whatever synth happens to be on hand.

Casio also showed their DG10 and DG20 digital guitars (prices to be announced), introduced only weeks earlier at the Chicago Consumer Electronics Show (CES). The DGs are futuristic-looking devices which play like guitars, but feature rubber fretboards under which switches detect your fingering. The strings are there mainly to detect when a string is picked, and make no usable sound on their own. The DG10 (the cheaper of the two) features built-in synth sounds and a drum box, but no MIDI, while the DG20 does feature MIDI.

But Casio were not alone at NAMM. Suzuki introduced two Unisynth electronic guitars, both to retail at an astonishing \$299 in the States. The XGI features built-in preset synth voices and drum box but no MIDI, while the XGIM features MIDI but keeps its price down by not incorporating the synth and drum sounds. The XGs provide one set of strings for picking and a fretboard consisting of rubber switches formed to simulate the look and feel of strings. An unusual idea, but more unusual is the fact that the XG doesn't feel too strange to play. In fact, it works pretty well.

Moving away from stringed things, we find Grey Matter Response, who introduced a new E! board for the DX7II (price to be announced) which makes the synth capable of playing eight different voices simultaneously. The new E! also provides "-ism", a new performance-oriented rhythmic pattern generating facility. Grey Matter also announced an E! board for the Kawai K3.

Forte Music, best known for their MIDI modifications to acoustic pianos, introduced the Mentor MIDI Network Controller, a two-in, four-out MIDI processing system incorporating eight individual MIDI processors in a 1U-high chassis, with a remote control unit complete with LCD readout and four sliders for simultaneous access to several parameters.

But of all the MIDI manufacturers at NAMM, the greatest surprise came from Peavey, who have jumped head-first into the market with a huge assortment of MIDI-based devices.

On the audio side of things, Peavey's PKM 8128 programmable keyboard mixer offers eight-into-two mixing, MIDI control and generous portions of front panel controls, including eight "soft switches", a rotary encoder, and a large LCD readout. Peavey also offer the unit as an eight-channel expander for a maximum of 32 inputs.

The company has also joined the low-cost 16-bit digital reverb race with the Univerb (\$299 in America) and Addverb (\$389), both housed in 1U rack-mounting chassis. The Univerb is a 30-preset device offering 20-30sec reverb decay times and a 20Hz-20kHz

▶ response. The Adverb is a step up, with a 15kHz bandwidth, 50 reverb presets and 50 delay effect presets covering such things as echo, flange and chorus. Ten program selection switches allow random access to all presets, each of which can be mapped to one of 128 MIDI program numbers. This last feature is characteristic of all Peavey MIDI-based devices.

The RMC4512 programmable footswitch (£249) is probably the most impressive MIDI foot controller I've seen. The 4512 does far more than send multiple program changes on different MIDI channels - it also contains a 7.5K memory which allows storage of System Exclusive information (for synth programs, MIDI setup, and so on), and has 512 memory locations for storing such MIDI data.

And as it happens, the 4512 makes a fine complement to Peavey's MFP2128 (£249) effects pedal routing system. The MFP controls the routing of any five stomp boxes (mono or stereo) and stores the effects configurations in 128 programs which may be selected over MIDI.

Meanwhile, Peavey's AMR (Audio Media Research) division has produced the SyncController, which not only generates MIDI timing information from SMPTE timecode (which the unit reads and writes), but also synchronises two tape recorders and offers control over punch-in/out for machines with rehearse functions. Normally this range of control requires at least two pieces of equipment - and certainly a good deal more money.

To accompany the SyncController, AMR have added sync and control facilities to their MCR4 four-track cassette machine, and

come up with the new MCR4/S. ■ Rick Davies

## GETTING IT TAPED

THERE'S NO DOUBT that home recording is at last making a big impression on the American market - so much so that, with local musicians possessing fatter wallets than most of their British counterparts, the scene is in some ways becoming more sophisticated than it is across the water.

Yet although there was no shortage of new and worthwhile machinery, no single innovation from the recording arena was destined to be a real show-stopper - even if the new Alesis drum box and sequencer already mentioned got a lot of attention.

But Alesis also showed three new signal processors that were remarkable for their sound quality and price: the Micro Enhancer, the Micro Limiter and the Micro Gate. These are all stereo units aimed at the home recording market, and packaged similarly to the Microverb so you can fit all three into one unit of rack space. The limiter and gate are fairly self-explanatory, but the enhancer is a little more unusual. It sounds a bit like an exciter but works on the principle of dynamic equalisation, rather than harmonic generation, to add brightness and clarity either to a mix or to individual instruments. All three Micro units retail at just £129, including power supply.

One of the first companies to introduce downsized rack-mount effects processors, Roland's Boss division, made yet another addition to their Micro Rack, in the form of the RPD10 Digital Panning delay (£175), which has up to 2000ms of delay.

In the pedal market, Boss introduced the inevitable digital reverb pedal, the RV2 (£175), offering six reverb modes and variable decay time. They are also offering a new noise gate pedal, the NS2 (£80).

Digitech also entered the reverb pedal market with the Pedalverb, a digital processor capable of generating two rooms effects, gated and reversed reverb. The decay time is variable, and damping may be switched in and out.

In the rack-mounting department, the company unveiled the DSP128 multi-effects processor, which enables the user to call up 128 modifiable presets which may be used up to three at one time to create reverb, equalisation and complex delay effects.

Of course, Yamaha haven't just sat back and watched other manufacturers develop their signal-processing ranges. Their new REX50 (£365) digital effects unit offers reverb, delay, chorus and distortion. Some of the 30 possible patches feature combinations of effects, while the digital distortion system makes the REX50 the world's first digital fuzzbox - and it's got MIDI, too.

Moving upmarket a little, we find the new REV5 (£1349) digital reverb, which is similar in appearance to the older REV7 but features a 20kHz bandwidth and includes reverb, delay and pitch-shifting effects - rather like a more sophisticated SPX90. MIDI program selection and MIDI dump capabilities are included.

Physically, the biggest recording innovation Yamaha unveiled was their new MSS1 MIDI synchroniser (£789). As well as syncing a MIDI clock to any of the four SMPTE formats and generating SMPTE timecode on its own,

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Oberheim Matrix 6R - Warm & Rich Synth Module	RRP £ 949 00 Inc VAT	Hybrid Arts EZ-Track - 20 Track Entry Level Sequencer	RRP £ 59 95 Inc VAT
Akai MX73 - 73 Key Touch Sensitive Master Keyboard	RRP £ 649 00 Inc VAT	<b>ALL YOURS FOR £779.00 Inc VAT</b>	
Korg SQ8 - Micro 8 Track Sequencer. 6500 Steps	RRP £ 225 00 Inc VAT	Elka EK44 - 18 voice. 8 MIDI Channel Multi-Timbral FM Synth	RRP £1299 00 Inc VAT
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The bass speaker system to beat them all? Bose's new Acoustic Cannon turned a lot of heads - and moved a lot of air - at the NAMM show. Just think what two could do . . .

the MSS1 has a massive 7168 memory locations capable of storing tempo data, and a MIDI Event Mode which allows selected MIDI messages to be transmitted at precisely timed points in a sequence.

Still on the timecode front, Fostex had a new 4010 SMPTE generator/reader (£949), which features a serial data port that enables it to be linked to a computer. Two built-in event controllers allow sets of contacts to be closed at user-defined times for the activation of external equipment, and the high-speed reader will even track at search speeds on video machines with timecode address tracks.

But you can do all the processing and synchronising you like: the end result still has to go onto good old-fashioned magnetic tape,

at least for the time being. Fostex were exhibiting their brand new 460 cassette multitracker (£1725 approximately), a high-quality, synchroniser-ready four-track cassette machine with a built-in eight-channel mixer styled along the same lines as the smaller 260.

A little less ambitious, but still sophisticated, is the new X30 (£350 approximately), an entry-level cassette multitracker which is radically different in styling from any other Fostex products. It is more sophisticated than the X15, but is still inexpensive enough for the first-time buyer.

Tascam also came in with their lowest cost entry-level multitracker ever: the Porta 05 (price to be announced). This too has

brand-new packaging, and is similar in features to the company's Porta One.

The only other new multitrack cassette system came from Yamaha, whose MT2X (£675) integrates a six-channel mixer with a dual-speed four-track cassette section. Other features are switchable dbx noise reduction, auxiliary sends on all six input channels, and foot-controlled punch-in/out using the optional FSI footswitch.

The sound all this equipment helps create is inevitably monitored on loudspeakers, but curiously, there wasn't much activity on the monitor front at NAMM.

However, Bose has what is unquestionably the most macho-looking bass speaker enclosure available: the Acoustic Wave Cannon (£439.95). This is built in a plastic tube almost four metres long, and powered by a single 12" driver. The columns of air, both in front of and behind the driver, match the driver to the air in the room, allowing very small cone excursions to generate significant air movement. The result is a sub-bass sound that can be felt as well as heard. Several Cannons can be bolted together to form an array for large installations, but they're also light enough to be used in portable systems.

JBL announced a new performance series of live sound speakers for both instrument and PA use. Of greater interest to the recording world, though, is the new Control 5 (price to be announced) - a mid-sized, two-way monitor suitable for installations, consumer sound systems and home monitoring. No details have yet been finalised, but we'll keep you informed as soon as more facts come to light. ■ Paul White

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# A DEEPER wave THAN THIS

Despite their various titles, many of today's synths are based on a commonly misunderstood sound-generation method called **Wavetable Synthesis**. We explain what the system is, how it works, and how it's implemented on different instruments. *Text by Chris Meyer.*

OVER THE LAST couple of years, we have seen a rash of "new synthesis techniques" pop up on various instruments. Some – such as FM, phase distortion, and sampling – are indeed very different from the old subtractive analogue beasts we know and love. Virtually all others, however, are variations on what are known as Wavetable Synthesizers.

Wavetable synths are, in fact, very similar to the aforementioned analogue machines. They have essentially the same "patch" or voice structure as a Minimoog, and differ merely in the fact that they have different kinds of oscillators, and some additional tricks thrown in between the oscillators and the filter. True, to say "merely" is understating things a bit – sonically, a lot of new ground has been opened up by this new breed. But it's surprising how conventional some of the new "vector", "crosstable", "linear arithmetic", "structured adaptive", and "additive" voices really are at the level of pure voice structure. And on the other side of the coin, many of these new synths, in all their digital glory, don't

possess some of the capabilities of older analogue instruments.

The goal of this article is to explain what really goes on inside a wavetable synth, particularly with regard to why they sound different, and why they have some strange distortions that we're not used to hearing from their analogue predecessors. I'll also attempt to demystify some of the Technogibberish that has been used to describe these instruments lately.

With luck, conquering these problems will also help conquer some of our fears of whether or not we could ever learn to program them – let alone get a good patch out of them.

## Oscillators

ANALOGUE OSCILLATORS ARE strange, primitive beasts. An infinitely varying voltage, as opposed to the safe step-by-step world of digital 1s and 0s, tells them what pitch to play. This "pitch"

voltage, in turn, controls how long it takes a separate internal voltage to build up (or drain down) to a certain threshold. When the voltage hits this end limit, it starts the process over again.

The result is a raw sawtooth wave that has to be processed by yet more analogue electronics to come up with our typical (in increasing order of difficulty to generate) square, modulated pulse, triangle, and sine waves.

How does a wavetable oscillator mimic the same function? Well, the varying voltage of the analogue version is replaced with a table of values. The values in this table consist of the individual words of a sample of that wave – in other words, the values of these words represent the level of the wave to be output at various points in time.

A wavetable oscillator produces a wave by reading the values (words) out of this table in order and passing the result on to a DAC (digital/analogue converter) to create an audio signal. In our sawtooth example, the table would start with very high values, which would go down as the table progresses. Other tables with more complex waves are no harder to play than the sawtooth, making a variety of waveforms easily available – including ones with more interesting spectra than sawtooths and square waves.

The harmonic spectra (read: "timbre" or "tone") of analogue waves tend to be rather limited, and follow a predictable pattern of having a strong fundamental ("root" or "base" pitch) followed by successively weaker overtones, or harmonics. Square waves – the "buzziest" – have harmonic amplitudes that die away at the pace of one over the harmonic number. In other words, the second harmonic – the octave – is half as strong as the fundamental, the third is one third as strong as the fundamental, and so on.

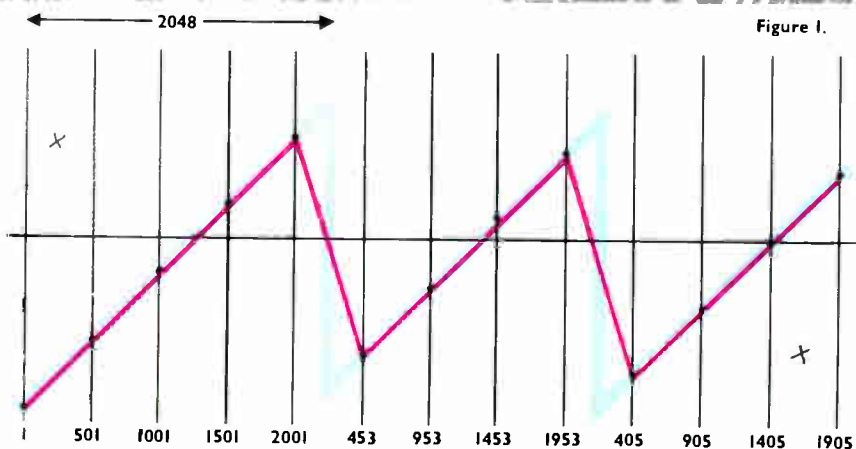


Figure 1.



as strong, and so on. Pulse waves have "brighter" harmonics, but at the cost of having a weakened fundamental. All the others have even less energetic spectra – that is, fewer overtones – than these two.

Waves developed for wavetable synths, on the other hand, tend to have a bias towards the high end and more upper harmonics – they don't have to follow "natural" progressions. For example, one set of factory waves I developed for a certain wavetable synth were started by taking the 12th harmonic, ramming the level all the way up, and then building the sound from there. Only later did I bother adding some low end. The result was a very bright set of waves with an unusual harmonic series.

Apply this principle many times over, and you can see why wavetable synths sound so bright and seem to have so much more bandwidth than typical analogue synths. I remember comparing a Prophet 10 and a Prophet VS – both synths I love very much – side by side, and wondering why the tweeters seemed to disappear only when I played the older 10.

There seem to be two different ways of creating wavetable oscillators in hardware. The first involves taking a single cycle of a wave, and transposing it all over the place – I call this the single cycle method. Changes in pitch are achieved with this method by reading out the data at faster and slower rates. The waves in question here tend to be between 64 and 256 sample words long. In theory, the highest harmonic contained in one of these waves is half the number of sample words, and its frequency is the harmonic number times the fundamental frequency. For example, if a 64-word wave is played at a pitch of A440, the highest harmonic included in the wave would be the 32nd, and its frequency would be slightly over 14kHz (440kHz×32). Kawai, PPG, and Sequential, among others, use this method, which is exactly like playing a one-cycle loop on the end of a sample.

The second way – which I call the long table method – requires the equivalent of taking a very high-resolution sample of a single wave – say, several thousand sample words per cycle. Unlike the previous method, the wave data is always played back at a constant rate. The pitch is determined in this case by deciding how many sample words to skip every time you play a new note. If you want a very low pitch, the oscillator will skip very few or no sample words; for a high pitch, it will skip a lot of sample words. This

method gets the oscillator through the table of the wave cycle faster, which restarts the process sooner, and results in a higher pitch. Korg's DW series instruments take this approach.

## Comparisons

NOW IT'S TIME to weigh up the relative advantages and disadvantages of each method – which, I freely admit, are in many cases subjective preferences. The biggest factual difference between the two is the amount of memory each takes up – the long table method eats up much more memory. Synths employing the single cycle method, therefore, can have more waves for the same cost (memory being directly related to cost, as it is). And, because of the size required for each wave, the first method lends itself to allowing samples to replace the waves (if, like the VS, the instrument can receive sample dumps via MIDI). This is not possible with long table instruments because their "sampling rate" is so high that the waves must be generated by a computer. The smaller size of the waves in single cycle instruments also makes it easier to store them in RAM, edit them, and so forth.

Other differences have to do with the artifacts each process creates. The nature of the single cycle method is such that the "sample" rate is an exact multiple of the playback rate – in other words, there is an integer number of sample words for each wave. This means that the clock noise (an unavoidable aspect of the playback process for wavetable synths as well as samplers) of a wave played low is in tune with the note itself, which is more musically pleasing.

Audibly, clock noise is sort of (but not quite) like a square wave with a frequency of half the playback sample rate. So if you take a sample at 30kHz and transpose it down two octaves, you'll hear a buzz with a 7.5kHz fundamental. Now, let's say the sound you sampled had a fundamental frequency of 880Hz – an octave above tuning A. In the above example, it has been transposed down to 220Hz, but 7.5kHz is not an integer harmonic of 220Hz, so the result would be an inharmonic frequency component – which is rather nasty.

Now let's take a look at the single cycle wavetable synth. The "sample rate", such as it is, is a precise integer multiple of the wave's fundamental. For example, on

instruments which have 128 sample words per wave, like the VS, the output of the wave is just like a continuous sound with a fundamental at 234.375Hz sampled at 30kHz, so the result is clock noise in tune with the note – a bit like a square wave as a really high, in-tune harmonic. I personally find this effect pleasing (or at least interesting) on many sounds, because it gives a hollow, digital sound, like a "PPG-ish" bass.

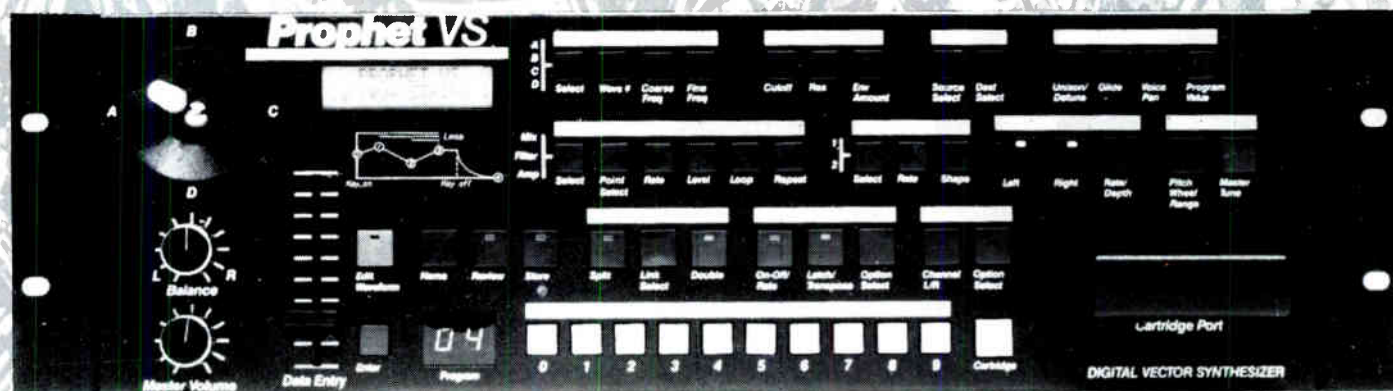
Unfortunately, there is a negative side to this method. If you take a 128-word wave and transpose its fundamental down to 40Hz, its highest "legal" – not counting the clock noise – harmonic will have a frequency of 2560Hz (64×40Hz),

*"The tables for more complex waves are no harder to play than a sawtooth, so a variety of waveforms are easily available on most wavetable synths."*

which is not a terribly high bandwidth for those low notes. With a fundamental of 300Hz, (very roughly middle C), however, the highest harmonic is above audibility. So the single cycle method only has a bandwidth problem in the low range.

The long table method presents the opposite set of characteristics. The "sample rate" of the stored waves is so high that you tend not to hear the clock noise. I personally think this robs the Korg DWs from having the same "bassy" sound in the bass region as the others. I admit, however, to preferring grungier things in life than many other computer-types – for you cleaner individuals, that annoying clock noise isn't there if you don't want it. And the bandwidth on the bass notes is much higher.

There are disadvantages to this method as well, though. For while the "sample rate" is so high that we don't have our clock noise problems, the fact that the sample rate relates unevenly to the playback frequency introduces other distortions. For example, let's say our wave is 2048 sample words long, and our playback pitch is such that we have to skip 500 samples every time we want to play one. Starting with "1", we'll use samples 1, 501, 1001, 1501, 2001. Then, since there are only 2048 sample words, the wave consists of 453 (which is 2001+500–2048), 953, 1453, 1953, 405, and so on – in other words, the wave we're playing back is changing from wave to wave, until our counting series repeats. One might ▶





► be tempted to say, "Ah, since the wave does not repeat as often, those changes must sound more acoustic." But in reality, they're distortions which show up as subharmonics (not related to the playback pitch, unless you're very lucky).

If this is still hard to picture, imagine our "wave" is a sawtooth, and the sample number also happens to be the amplitude of that sample. When you draw the series of numbers out on graph paper you'll end up with a pretty weird-looking sawtooth wave (see Figure 1). There's a low-frequency modulation that appears as a pattern of fluctuations over many waves, almost as if an LFO had been applied. It's

*"A PPG 'wavetable' actually consists of a series of single-cycle waves. The patch decides which of these single waves plays at any given time."*

even worse if the wave has "squiggles" over its period, unlike the perfectly straight sawtooth.

And by the way, the same things show up on samplers where the sample rate is not neatly related to the fundamental pitch, though it tends to be masked by the fact that the sound itself is busy changing.

## Other Weaknesses

EVEN MORE GREMLINS and realities threaten to wreak minor havoc with our wavetable oscillators. For example, these oscillators have to run at a frequency much higher than the note we're playing (the number of samples per wave times the fundamental), which is difficult to maintain in hardware. And since the oscillators are digital, they don't take well to being modulated – frequency modulation, for example, is a royal pain to calculate for these oscillators (although Yamaha are breaking some ground with their TX8Iz here). As a result, you don't see as many tricks – FM, sync, and the like as often as you did on the old analogue synths.

The "gremlin" fallout of this is that these frequencies get too high to work with in realistically priced hardware – so the hardware has to cheat. For higher pitches, some (such as Korg and

Sequential) switch to using a smaller wavetable (ie. fewer sample words per cycle).

To hear the effects of this, take a wavetable synth and do the following: set up a patch that uses just one oscillator, with filters and so on wide open. Play it at the lowest note, and then in monophonic mode play the highest note with glide at its slowest. You can hear the sound change as the synth switches wavetables – you can also see it quite well if you have access to an oscilloscope.

Some instruments can be quite offensive in this respect. Others try to perform this switch only when the highest harmonic is beyond audibility, but some people can still hear it. The effect is not unlike the "seams" between multi-samples on a sampler. Oddly (but thankfully) enough, this is rarely audible in the context of playing chords on a "real" patch with detuning, chorusing, and all.

On now to another problem related to the digital technology employed in wavetable synths. With analogue oscillators, we had to put up with tuning drift, and pitches that wouldn't track each other over the entire length of the keyboard. Digital oscillators have a different set of problems in trying to play the correct pitch. Building oscillators that can play back at a very high frequency and still hit all of the equally tempered notes properly is very difficult. A "master clock" of some sort has to be divided down by an integer to try to hit the pitches of the equally tempered scale – which, unfortunately, are not nicely spaced.

As a result, some compromises or decisions have to be made. One involves spending the money necessary for very high-speed clocks and custom chips. Another requires accepting the difficulty and not hitting the notes exactly in tune – this method ends up with a rock-solid pitch, but poor intonation (the intervals can end up more out of tune than even normal equal temperament saddles us with). A third is to "jitter" about the correct pitch – this provides good intonation, but creates all sorts of weird sidebands and warbles on the higher notes of some wavetable synths, because the waves end up alternating pitches to create an average for the correct one.

As I hinted above, these "problems" certainly do not render wavetable synths useless, they just help to explain the

occasional head-scratcher of "Why is the bloody thing doing *this*?" These answers should help you find solutions to any difficulties you may have been having with them (such as using bright waves for higher notes instead of ones that are transposed way up).

But enough explaining the mysteries of engineering – now on to explaining the terms of marketing and what each wavetable-based synthesis algorithm is really about.

## "Normal" Wavetable Synthesis

Instruments in this category include the **Kawai K3**, **Ensoniq ESQ1**, and samplers that have a wavetable synth mode (**Korg DSSI**, **Casio FZ1** and, to a lesser degree, the **Sequential Prophet 2000/2002**). They all feature the normal voice structure of single-wave oscillators (from one to three of them) routed to a typical VCF and VCA. The ESQ1 throws in the additional trick of placing VCAs between the oscillators and the filter in the manner of the Roland JX8P, to allow fading in and out of different timbres.

In essence, you can view all of the above as very similar to analogue synths, but with a fantastic VCO section.

## Wavetable Switching

This method brings us to the original commercial wavetable synth – the **PPG Wave**. Here, a "wavetable" actually consists of a series of single-cycle waves. The patch decides which of these single waves plays at any given time.

The PPG Waveterm allows you to build these wavetables by selecting certain waves to be at certain points in the table – a sine at point 1, a square at 12, a vocal at 13, something bizarre at 32, and so on. It then calculates the intermediate waves, and fills out the holes in the table with them.

The PPG gets its timbral variety by switching dynamically between the waves it's playing at any given moment in time. An envelope, the LFO, pressure, velocity, and so on can be routed to this parameter, so that for example, soft hits may play our sine wave of above, while digging into the pressure eventually moves us up to our square wave.

The catch in all of this is that the switch is a hard jump to a different table. So what happens if the envelope decides to switch waves in the middle of a cycle, and the amplitudes of the two waves at that point do not match up? You get a click – a bit like a bad loop – which gives the PPG its characteristic tumbling/clicking sound. Incidentally, a friend of mine was able to simulate this sound with a sampler by taking several samples of a wave and splicing them together without concern for zero crossings. I don't know about you, but I find it rather interesting that we can learn to make strengths out of weaknesses, and imitate them in instruments that don't have those weaknesses.

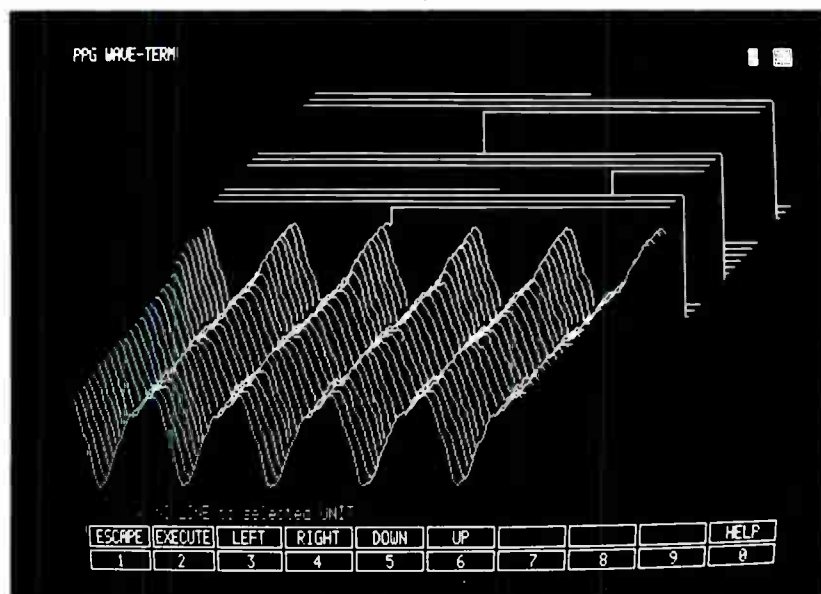
## Cross Table Sampling

Appearing at February's Frankfurt show was a new machine – the **Keytek CTS2000** – that takes a smoother approach to the above. It's like a PPG MUSIC TECHNOLOGY AUGUST 1987

with three waves defining the points in the wavetable, but instead of calculating the individual waves in between the points, it fades from one to another. The

### Vector Synthesis

Stretching the crosstable method into two dimensions a bit differently from SAS is the **Sequential Prophet VS**. Here,



company calls this process "crossfading". Referring to our above example, the Keytek would perform a crossfade from one wave (say, our sine) to a second (say, our square), and then from that second to a third (such as our bizarre wave). This is a one-dimensional progression, like the PPG's, except the Keytek fades the samples, as opposed to hard-switching them, so there is no clicking in the final sound. This effect can be simulated with the amplitude envelopes on the ESQ1.

The one area where this method is lacking (compared to that of a PPG) is that it is not possible, to the best of my knowledge, to go back to the earlier waves after a note has been triggered, in case you might want to. Still, it provides for and is capable of producing many excellent sounds.

### Structured Adaptive Synthesis

Roland use this phrase to describe the sound-generation method used in their RD line of digital pianos, such as the **RD1000**. It is very similar to cross table sampling, with two expansions and a twist. The twist is that instead of a normal crossfade from one wave to another, there is some mathematical equation describing how to proceed from one wave to another (such as natural exponential decay, as opposed to a linear fade).

One of the expansions is that SAS uses a few more waves as points to describe a sound. For example, a couple may be used to describe the hammer tone and attack of a piano, and several more to chart its decay.

The other expansion is that different waves (and therefore paths) exist to describe different velocity levels - hitting an acoustic or electric piano key harder results in quite a different sound from hitting it softly. Roland have used this to great effect in reproducing natural percussive instruments, even though the SAS technique itself more closely resembles a wavetable synthesiser than a sampler.

four waves define the four corners of a square (or diamond, if you prefer). Any point in the square is a mix of the four waves, the various levels being proportionate to how close you are to any one corner. As opposed to just proceeding from one wave to the next (as you do with all of the above methods), you may proceed to any other point in the square under control of an envelope, the LFO, velocity, or whatever. A good analogy is somebody standing in a room with a speaker in each corner and wandering around it to hear the different mix.

In reality, the hardware is essentially four single-wave oscillators fed into a quad panner (remember quadrasonic sound?), followed by a typical VCF/VCA/panning stage. Four waves tend not to be enough to describe instruments such as a piano, but they do lend themselves towards radically shifting and changing sounds. And like the PPG, the VS also allows you to retrace your steps through the timbral-change path.

### Additive Synthesis

One new machine that touts additive synthesis - the **Kawai K5** reviewed elsewhere this issue - is actually just a variation on a crosstable synthesiser. On the K5, the user gets to choose the harmonic spectra of two oscillator "groups", and then arrange the pitch and loudness envelopes of these groups. In reality, these harmonic spectra get converted into a couple of waves played back by our typical wavetable oscillators, and then fed into a voice structure very similar to that of an ESQ1 or CTS2000. While not being a true additive synthesis machine (a "true" one, in my book, allows definition of the pitch and amplitude envelopes of each harmonic, which big American machines like the Synergy and MuLogix Slave 32 allowed), it does present additive synthesis in a more

accessible way - because defining all of those envelopes on a real additive machine gets to be a real pain, real fast.

### Linear Arithmetic Synthesis

Roland's newest synthesis method, employed on their already popular **D50**, most closely resembles sampling compared to all of the above techniques. There are two sets of oscillators - a set of digital oscillators that play back the waves we're most used to seeing on our analogue friends (namely, sawtooth and square), and a set that play back the sampled attack of a sound (going quite often into a looped portion of that sound). This latter method was actually employed on the PPG 2.3 factory wavetables, where two of them were the beginnings of a sax and a piano, leading into a one-cycle loop of each sound.

The LA approach represents an effective new method because the attack

*"Demystifying the fancy terms used to describe these instruments doesn't detract from the sound of any of them - it just shows how similar they are."*

of a natural sound tends to be its most complex moment, and a sample (as opposed to several waves and a bit of envelope trickery) is the best way to recreate it. Completing the sounds with standard waves means that normal synthesis techniques may be employed to fill out the rest of the sound without chewing up the memory that a normal full-length sample would require. The D50 includes the extra bonus of permitting one of these waves to ring-modulate the other (ring modulation, in hardware, essentially allows one wave to vary the amplitude of another at audible frequencies - as opposed to FM, which varies the pitch). Again, the ESQ1 also allows some of this cross-modulation.

## Future Directions

DEMYSTIFYING THE FANCY terms used to describe these instruments doesn't detract from the sound of any of them - it just shows how similar many of them are. I believe we can only expect that future variations on the theme will include more of the features that some of these instruments have - more analogue-style modulation, more waves to fade between, sampled attack transients, and perhaps even longer-than-one-cycle waves to give more real-life variation and motion to the raw material.

From there, the machines will probably continue to employ normal "analogue" processing that many of us are familiar with to add any other timbral, spatial, and amplitude variations.

Even though it doesn't look like it - and the methods may have different names - it's very much the same game. There's just a variety of available equipment and packaging - and we're certainly no worse off for having that variety. ■

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# Stranger in a Strange World

*As musicians try to find new ways of injecting feel into new technology, Yellow Magic Orchestra founder Ryuichi Sakamoto raises a new question: does electronic music really need to sound human?*

*Interview by Paul Tingen.*



**H**ALFWAY THROUGH MY conversation with Ryuichi Sakamoto, I suddenly make a near fatal mistake. We're talking about the equipment Sakamoto is using, and my Japanese host has just explained to me that a NEC computer and a DX7 synthesiser are the main things he's working with at the moment. So I ask whether the NEC computer is the "brains" of his music system - with "brains" meaning "nerve centre", the device off of which he runs all his other keyboards and assorted machinery. Yet on hearing the word "brains", Sakamoto suddenly jerks and shouts: "No, no, no. Just tool, not brains", and pointing at the side of his head he continues: "That's the brains".

It's the only time during the interview that he's fierce, almost angry, about what he probably saw as an all too common misunderstanding. But

that example also serves to illustrate the kind of uphill struggle an interview with Sakamoto can be.

First of all, there's his English. His limited vocabulary and obvious problems with grammar hamper a lot of the communication between us - more, in fact, than I had expected from the short telephone conversation I'd previously had with him to arrange the interview.

Second, there's his almost complete lack of interest in discussing the finer points of musical technology. For, in common with several other contemporary innovators, he seems to regard his technology as no more than a tool. He has no studio of his own, and his "tools" are remarkably simple for someone this highly regarded. At his home in Tokyo he works only with that NEC computer, running an eight-track sequencing package called Come On Music, with the DX7 ►

► as his only MIDI keyboard, a small mixing console, and a Yamaha SPX90 effects rack – the last moving him to one of his only spontaneous remarks about equipment: “It is very good, the SPX.”

On top of all this, Sakamoto also seems to be one of those artists who doesn't reflect on what he is doing, but just follows his intuition. It might be a Japanese trait, or it might be a result of our language problems, but every time I ask Sakamoto *why* he has done something, he answers with “I don't know”, or, if I'm lucky, a two-line answer which partly repeats the question. And when I put an observation of my own to him, he often seems genuinely surprised about the point I make, chews it over for a while, and then mutters something which boils down to: “It might be like that, but it might also not be like that.”

In short, Ryuichi Sakamoto is a bit of an interviewer's nightmare. Yet he is extremely polite and does everything to ensure that I'm OK, pouring me tea and coffee and dashing over to the bathroom to get a towel when I spill some of the latter on the table.

I'm talking to the Japanese composer, actor, producer and keyboard wizard in a room in the small yet stylish surroundings of the Blakes Hotel in West London, just after he's finished some string sessions for David Sylvian's forthcoming album. The hotel has a distinctly oriental feel, with its cane benches, bamboo ornamentation, plethora of mirrors and plants, and its gigantic wood and paper umbrella in the entrance hall. The homely atmosphere of the place obviously suits Sakamoto who, in real life, has nothing of the hard image which he portrays in a lot of photographs, and as Captain Yonio in the film *Merry Christmas, Mr Lawrence*. He is small, wears dark glasses and a long black jacket, and has a shy, modest demeanour. He listens attentively to my questions, often answering with a chuckle, smoking almost continuously, and occasionally apologising for his bad English.

And while “why” and “how” questions are met with stumbling blocks, “what” questions seem to go down a bit easier, since Sakamoto obviously enjoys elaborating about what he has

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*“Usually I use a lot of computerised sequences. But this time, the album has more acoustic instruments: real drums, real guitar and real bass.”*

been doing over the last year, during which relatively little has been heard from him here in the West.

It appears that he's spent a lot of time on projects in his native Japan . . . “At the beginning of last year I made a new album called *Futurist*, which was released only in Japan. The album title was inspired by the Futurist movement, prominent in Milan around 1909, in which I was very interested. Side A was very American pop-oriented, whereas Side B was more aggressive, featuring a mixture of hip-hop rhythms and Italian opera. The sound of the album was also influenced by the movie *Dune*, which has a lot of low sounds.”

Following the release of the album, Sakamoto went on a lengthy Japanese tour, and then released – again only in Japan – a live album of that tour called *Mediabahn*. Last August he went to Bath to produce Virginia Astley's album *Hope*



in a *Darkened Heart*. Then it was back to the East.

“In September I made a soundtrack for a Japanese animation movie, my third. After that I went to China for the shooting of *The Last Emperor*, a movie directed by Bertolucci, in which I acted with John Long and Peter O'Toole.” It was only the second time Sakamoto had acted in a movie, and as with *Merry Christmas, Mr Lawrence*, he was also commissioned to write the score for the film – a project which he had still to finish at the time of our interview.

After the shooting of *The Last Emperor*, Sakamoto finally began work on a venture of greater significance to the western music-lover.

“In December I made the demo tapes for a new album, which I recorded in New York. The album, called *Neo Geo*, was produced by Bill Laswell and me, and will be released worldwide during the summer.”

This is good news, because Sakamoto's output to western record shops over the last few years has been modest, to say the least. His last western release was a compilation of some of his Japanese solo albums called *Illustrated Musical Encyclopedia*, on 10 Records. The record was largely a solo venture, though it featured a collaboration with Thomas Dolby (the song 'Fieldwork') and some contributions by, for example, percussionist David Van Tieghem and Simon Jeffes of the Penguin Cafe Orchestra. By and large, though, the album was dominated by Sakamoto's approach to keyboard and computer music: fresh, delicately textured sounds, captured in strict, precise, even cold rhythms. And, of course, the usual potpourri of influences: Tibetan and Japanese sounding tunes, big band jazz, a rap in Thai, and “technopop” – the category Sakamoto helped create when he was playing with the now almost legendary Yellow Magic Orchestra.

Yet there's no doubt this artist has come a long way since YMO stunned the world with their hard-edged rhythms and inventive use of synthesiser timbre and melody. After a classical



Photography Matthew Yoshburgh

training (he studied composition at Tokyo's University of Arts), Sakamoto founded YMO with drummer Yukihiro Takahashi and producer, bass player and keyboard programmer Harumi Hosono in 1978.

Throughout the band's career, YMO remained an anomaly in Japan's conservative music scene. Musically they were way ahead of their time, taking the formal, all-electronic style instigated by Kraftwerk in Germany into new areas. Yet like Kraftwerk, their ability to laugh at themselves gave them an acceptability that many electronic acts have failed to find, both before and since.

YMO disbanded in late 1983, having pioneered the techniques of sampling and computer music programming to a degree which took musicians in the West quite some time to catch up with. Sakamoto started work on what turned out to be a prolific solo career. He released a number of albums, and began a collaboration with ex-Japan frontman David Sylvian which has lasted until this day. He also produced several albums for his wife and fellow songwriter and pianist Akiko Yano.

But it was Sakamoto's leading role in *Merry Christmas, Mr Lawrence*, which largely made his name in the West. His acting showed a stunning confidence and attention to detail, and the soundtrack he wrote for the film - featuring a vocal version of the main theme, 'Forbidden Colours', sung by Sylvian - won him a British Academy Award.

**N**OW WE ARE about to hear *Neo Geo* (it means New Geography), an album that marks a turning point in Sakamoto's musical career. As we're still in the "what" area, he's happy to elaborate.

"*Neo Geo* is a new way for me. Usually I use a lot of computerised sequences. But this time, the album has more acoustic instruments, meaning real drums, real guitar and real bass. For other people that kind of real music is normal, but for me it's a pretty new thing."

MUSIC TECHNOLOGY AUGUST 1987

The artist laughs. The new album features Tony Williams and Sly Dunbar on drums, Bootsy Collins (Parliament, Funkadelic) and Bill Laswell on bass, Harry Kubota and Eddie Martinez on guitar, David Van Tieghem on percussion and, surprisingly, Iggy Pop, who sang and wrote the lyrics for one song.

When I ask Sakamoto about other vocals on the album, he initially comes up with a very eastern way of expressing himself: "There are some more voices on it, but it's not the same." Then he continues: "The rest is sampled and there's some talking. As far as making the record goes, I prepared every tempo, every sequence and every part on my computer in Tokyo and then brought the tapes over to New York, where I overdubbed the other instruments, keeping part of the computer sequences."

Apart from the use of real guitars, bass and drums, there's another thing which makes *Neo Geo* stand out from Sakamoto's previous work . . .

"I used two traditional Okinawa songs. Okinawa is a Southern Japanese island. It's new for me to use traditional music directly like this." Very true: in the past, Sakamoto has used elements of traditional Far Eastern music, but has never quoted melodies or songs directly.

The combination of using a whole set of American musicians, who then have to play Japanese traditional tunes, raises an interesting point. But, sadly, this is a "why" question, and one that meets with a reply that is as confusing as it is enigmatic. "The music itself answers the question. For example, I used the traditional Okinawa songs with a go-go beat from Washington DC, using Bootsy Collins on bass. It's hard to tell what kind of music it is. But I think this is my new way."

It could also be argued, however, that this is just another chapter in Sakamoto's ongoing experimentation with Western and Eastern music styles, something that's taken place without the artist committing himself to either side - though he once remarked that he considers himself more Western in approach, because he uses melody, harmony and rhythm.

"I've called myself a world musician before, because I don't feel as if I belong to one specific

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*"I've called myself a world musician before, because I don't feel I belong to one specific culture. I feel a stranger everywhere, even in Japan".*

culture. This means that I feel a stranger everywhere, slightly remote from everything, even in Japan . . . But don't take that word 'stranger' too seriously. It sounds so pessimistic. It's just that I like mixing ethnic music with a black beat and technopop. I take my influences from everywhere, and when I'm deciding on a treatment, I don't care whether a song is traditional Japanese or not."

And why (sorry) did Sakamoto decide to use real players for his new album?

"The idea came from Bill Laswell. Yet even now I prefer an electronic beat." Sakamoto laughs. This sentiment seems to negate his earlier statement that using real instruments is his new direction. But the artist can explain the apparent contradiction. Because for Ryuichi Sakamoto, the electronic beat is part of a self-created heritage - and unlike a lot of Western musicians, he's not afraid of the coldness which ▶

► immaculate computer performances so often invoke. He wouldn't dream of endeavouring, as so many of today's programmers do, to instill a "human feel" into the electronic elements of his music.

"Basically", he says, "I like that coldness. It's also a kind of private history. In my opinion, YMO and Kraftwerk invented technopop, and I will not move away from that direction. It's my roots."

**O**N A MORE practical level, we discuss the equipment which Sakamoto uses to shape his ideas. I've already mentioned the equipment he uses to demo his ideas at home. From there, it's on to nearby Lentil Studios to complete recording. It's there that he stores his Fairlight II, along with a PPG Wave 2.3, an Emulator II and a Prophet 5 - the last only for its ability to provide a guide click.

"Poor old Prophet 5", Sakamoto reminisces. "I don't use it anymore for anything else, because I'm tired of the sound. I've used it too

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*"I find it easier to compose for film than for solo albums. When I do a soundtrack there's an object in front of me, and I just adapt to that."*

much, I think. Before, I didn't care which keyboard I used, because I felt that it was me who created the sound, not the keyboard. But I have to admit that my taste now gears towards the digitals and the sampling machines. I use the DX7 a lot, for which I have a programming package which I can run on the NEC, and I usually bring in a whole lot of CDs, records and a Sony PCM F1 recorder to sample with."

Does he still play the acoustic piano? "Very little. There were two solo piano pieces of mine on a compilation album called *Piano Music*, which appeared on Peter Baumann's Private Music label, but now I have to admit that I play the DX7 too much. It's my main keyboard. I'm not a good piano player anymore, if I ever was one. On the *Mediabahn* tour I used Yamaha's new MIDI acoustic piano, because I need an acoustic piano sound, but I didn't like it. The touch is too heavy for me."

On an inspirational level, Sakamoto relates that "the chords and the melody usually come together. Sometimes I write it down on paper, sometimes I play it on the DX7 and store it in the NEC.

"There are a lot of ways in which music comes to me. Sometimes I just play and improvise. Sometimes, before playing, I might have been thinking about words and concepts or the image of a landscape. I'm usually seeing something visual, and I work that into a piece or into sound."

So how does he go about composing music for film?

"I find it easier to compose for film than for my solo albums. Making a solo album is a very conscious thing for me. When I'm doing a soundtrack there's an object already in front of me, and I just adapt to that."

Sakamoto agrees with the suggestion that his music has become mellower over the years.

"It's not a conscious thing, but it seems to be where my natural musical taste is leading me. With YMO there were a lot of very hard, rigid beats. On the other hand, my favourite composer is Debussy. I love that kind of delicate, ambient music. I also like Eno's music a lot, and earlier Steve Reich and Philip Glass. But I didn't want to bring my 'important' musical taste into YMO. I wouldn't, because YMO was just a pop band."

On another level, Sakamoto's reluctance to let too much of his musical taste influence YMO refers back to a personal philosophy about balance which lies at the root of his musical work.

"When I write music, I'm caring about the balance. I'm not sure what the balance means, but it's a kind of concept. I try to find the balance between my personal thing and a more public thing, so I wouldn't impose my taste on YMO. Or I try to hold a balance between artistic and commercial. And also, it shouldn't become too emotional.

"Another example would be the balance between sound itself and the structure of music. Or between technology and human feeling, or between the old world and the new world. In Japan there are a lot of traditional things in society, and also modern things coming up very drastically. So I'm always caring about the balance of two opposite things. If you say that my music isn't always that emotional, then you're right. But it is very personal. This concept of balance is my personal thing."

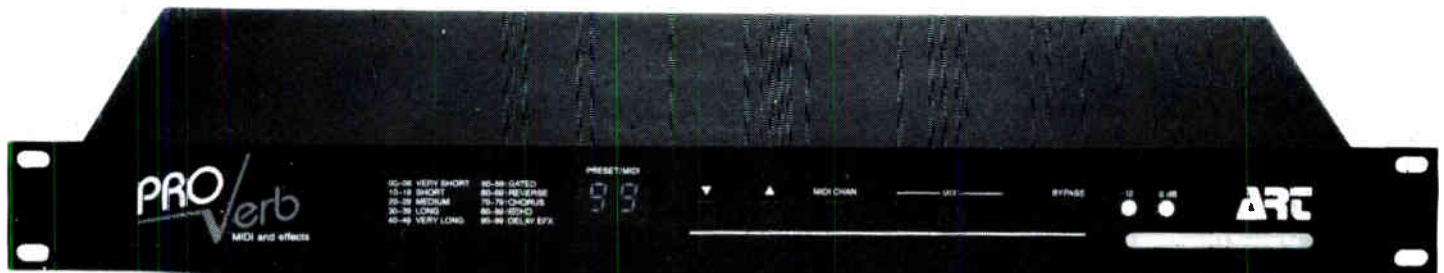
Later, while Ryuichi Sakamoto guides me to the hotel exit, I become more and more impressed with the personal warmth which he displays, and his natural, unaffected behaviour, something so rare in the glamour-soaked world of fame, money and music. Somehow, Sakamoto doesn't quite fit in.

I look at this small, unassuming character and wonder who he really is. A stranger? Really, a stranger in a strange world. ■





# 99 OF THE BEST REVERBERANT EFFECTS WITH A 'FIDDLE FACTOR' OF ZERO.



Reverb is changing. A decade ago, a studio's echo chamber or plate was as important an asset, as its console or multitrack.

Now 'blanket' echo is out. The recording industry has discovered that sounds are enhanced not only by different levels, but also various 'textures' of effect.

An individual signal's requirement can be just as particular as its EQ setting.

Today's buzz word is 'reverberant fields'. The technique is to build the mix using two, three or more separate reverb systems.

## REVERB BY NUMBERS

Consider a typical music session. Whilst you have to find time to fine tune the decay, pre-delays and response of say the lead vocal effect, setting up the reverb for individual instruments, should be more rapid.

A 'tight plate' sounds good on certain kits. A 'bright room' will wake up the brass. And a 'warm open hall' will do wonders for strings. You probably know these specific 'textures' of reverb you're after, off by heart. Given time, you could probably give them numbers as well as names. ART has.

## 'ONE TOUCH' RECALL

The ART Proverb is pre-programmed with a total of 99 time related effects. The first 59 are all natural reverberation.

Reverb times from 0.2 to 25 seconds are included and there's a wide variety of textures which include 'piano' rooms, 'tight' plates, 'back of hall' and 'gated' effects.

In fact, encompassed within this reverb selection are 99% of all the most commonly used effects.

These presets, arranged in logical order of increasing 'decay', are rapidly accessed by a pair of 'nudge' switches.

There are 'bright' and 'warm' and 'dull' versions. 'Small' and 'large' sizes. Stepping through them is the instinctive way to sample, compare and select suitable effects from Proverb's carefully constructed library of reverb algorithms.

## BOUNCING BALLS

Presets 60 through 98 include many of the most useful, 'post-Itchycoo-Park' studio effects.

*Reverse* - normal and swelling reverse reverb.

*Flange* - slow, fast, percussive and with regen.

*Chorus* - and choir, with variations.

*Echo* - classic slap, Echorec and various double reflections.

*Specials* - plus a group of effects, like the bouncing ball, for special occasions.

These are all, individual programmes, not just bigger or smaller versions of the same effect. Some of them, would normally take multiple pieces of equipment and laborious setting to create.

And as one reviewer recently said, "they have all been programmed with a musical ear".

## SOUND QUALITY

In the way that Proverb's effect 'textures' live up to any experienced engineer's expectations, so does the signal quality.

A typical, 80dB dynamic range ensures silence from any effect. Wide bandwidth introduces high frequency subtleties into the sound.

The Proverb is a stereo digital signal processor designed specifically for fast, high quality audio signal processing.

It's internal architecture enables more powerful, more complex processes per instruction, at a 6MHz rate.

## PROPER MIDI

Presets accessed from the front panel may also be selected by external MIDI triggering. Effects may be allocated to any external programme change and to any of MIDI channels 1-16. There's full MIDI mapping.

These are all benefits of instant effect change for musicians and studio engineers alike.

## STUDIO TRIAL

Proverb is built by ART, an American company with a reputation for innovative studio effects. As well as dedicated reverbs, they manufacture professional delays, graphics and a unique pitch transposer.

ART products are distributed and fully guaranteed by Turnkey in the UK.

For well under four hundred pounds, Proverb offers a truly unbeatable selection of high quality stereo effects, without fuss or fiddle.

Evaluate it for yourself.

Arrange to hear it in your studio by calling us now on 01-202 4366.

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Brent View Rd. London NW9 7EL

# patchW·O·R·K

If you're still waiting to see your particular synth featured in these pages, then why not be the first to submit some sounds?

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 by a short demo-tape (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). 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, 1 Milton Road, Cambridge, CB4 1UY.

## CASIO CZ101

### Sad Smiles

Nicholas Maher, Clwyd, Wales

#### PARAMETER

TONE NAME				CARTRIDGE NO.				TONE NO.			
SAD SMILES											

LINE SELECT	MODULATION		DETUNE				VIBRATO				OCTAVE	
	RING	NOISE	+/-	OCTAVE	NOTE	FINE	WAVE	DELAY	RATE	DEPTH	+/-	RANGE
1+1'	On	Off	+	0	00	07	1	49	54	08		0

(1,2,1+2,1+1) (ON/OFF) (+/-) (0-3) (0-11) (0-80) (1-4) (0-99) (0-99) (0-99) (+/-) (0-1)

The ubiquitous CZ101, in conjunction with Nicholas Maher, presents another in a long list of musical goodies. 'Sad Smiles' is a deep, rich, emotive string-like sound that'll find a few new homes in other CZ memories. Its creator suggests varying the Fine Detune (7-13), and even trying the sound an octave higher.

#### 1

#### DCO 1

WAVE FORM	
FIRST	SECOND
3	2

(1-8) (0-8)

STEP	E N V (PITCH)							
	1	2	3	4	5	6	7	8
RATE	00							
LEVEL	00							
SUS/END	END							

(0-99) (0-99)

#### DCW 1

KEY FOLLOW
0

(0-9)

STEP	E N V (WAVE)							
	1	2	3	4	5	6	7	8
RATE	35	65	30					
LEVEL	59	60	00					
SUS/END	SUS	END						

(0-99) (0-99)

#### DCA 1

KEY FOLLOW
0

(0-9)

STEP	E N V (AMP)							
	1	2	3	4	5	6	7	8
RATE	70	50	25					
LEVEL	55	90	00					
SUS/END	SUS	END						

(0-99) (0-99)

## KORG DW8000

### Sounds Acoustic

Michael Vickerage, Devon

A superb selection of sounds for the DW8000, which were most ably demo'd by their creator. The theme is simulating acoustic sounds, while emphasising the need to play them sympathetically - yes folks, it's the way you play 'em time again. So without much further ado, we'll pass the mic to Michael:

**Acoustic Piano (A):** Very effective around the middle, though the top end suffers from lack of a scaling facility; great for general accompaniment.

**Nylon Guitar (B):** Benefits from sympathetic playing, arpeggios and repeated notes and so on. Very beautiful (with strings) as a melodic instrument.

**Saxophone (C):** good for solos and polyphony, so it's excellent as an ensemble sound for beefing up rhythm sections.

**Strings (D):** the old reliable. Tonally, this sort of sound is perennial because of its homogeneity through all registers. The real-time parameter I've programmed is a bowing one, taking it from legato, through detache, to hammered with one slide of a finger. ■

Parameter	(A)	(B)	(C)	(D)
<b>Osc 1:</b>				
11 Octave	16	8	8	16
12 Waveform	3	11	12	1
13 Level	31	31	24	31
<b>Auto-bend:</b>				
14 Select	0	3	2	1
15 Mode	-	2	1	1
16 Time	-	3	1	1
17 Intensity	-	1	7	10
<b>Osc 2:</b>				
21 Octave	16	8	8	16
22 Waveform	10	2	9	8
23 Level	21	31	31	31
24 Interval	1	1	1	1
25 Detune	1	0	1	3
<b>Noise:</b>				
26 Level	0	0	6	4
<b>VCF:</b>				
31 Cutoff	14	7	24	29
32 Resonance	3	7	3	3
33 Kbd Track	2	0	2	3
34 Polarity	1	1	1	1
35 EG Int	22	28	19	31

<b>VCF EG:</b>									
41 Attack	0	0	3	2					
42 Decay	4	24	27	0					
43 Break P	29	11	16	10					
44 Slope	29	31	25	0					
45 Sustain	45	0	29	9					
46 Release	11	7	6	8					
47 Vel Sensing	3	3	4	2					
<b>VCA EG:</b>									
51 Attack	0	0	3	11					
52 Decay	15	0	19	21					
53 Break P	16	31	21	19					
54 Slope	30	26	24	24					
55 Sustain	0	0	13	16					
56 Release	6	15	6	9					
57 Vel Sensing	4	4	4	4					
<b>MG:</b>									
61 Waveform	0	0	0	0					
62 Frequency	21	19	17	22					
63 Delay		2	0	15	3				
64 Osc		0	0	0	5				
65 VCF		0	0	0	0				
<b>Bend:</b>									
66 Osc		0	1	2	2				
67 VCF		0	0	0	0				
<b>Digital Delay:</b>									
71 Time		1	0	5	2				
72 Factor		12	1	6	13				
73 Feedback		11	9	14	11				
74 Mod Frequency		3	0	8	21				
75 Mod Intensity		31	31	1	11				
76 Effect Level		11	8	13	15				
<b>Portamento:</b>									
77 Time		0	0	0	0				
<b>Aftertouch:</b>									
81 Osc MG		0	-	-	0				
82 VCF		0	-	-	0				
82 VCA		0	-	-	-				

# patchW·O·R·K



## ROLAND ALPHA JUNO 2 Four for All Lee Baldwin, Cinderford, Glos

From a selection of patches from sixteen-year-old Lee, we've chosen our favourite four - which Lee describes as:

**Guitars 2 (A):** a melodic chorus guitar sound that suits complex chordal structures. (Key transpose is very effective for this patch.)

**Bass Riff (B):** a funky bass guitar sound which can sound even sharper if slapped, so this patch is quite responsive to keyboard dynamics.

**Juno 60 (C):** an attempt to recreate the Juno 60 string chordal ensemble sound used by Howard Jones on his *Humans Lib* album.

**Digital (D):** programmed to demonstrate the delay effects that could be obtained by judicious use of the envelope settings; very responsive also to dynamics and aftertouch. ■

Parameter	(A)	(B)	(C)	(D)	VCF Env Mode	D <sub>1</sub>	D <sub>2</sub>	Dyn	D <sub>4</sub>
DCO Range	16	16	8	8	VCF LFO Depth	01	00	02	00
DCO LFO Depth	01	00	08	00	VCF Keyboard Follow	00	01	04	14
DCO Env Depth	01	01	00	00	VCF Aftertouch	08	00	03	15
DCO Env Mode	D <sub>1</sub>	D <sub>2</sub>	h	h	VCA Level	111	125	117	114
DCO Aftertouch	07	07	00	00	VCA Envelope	h	h	D <sub>1</sub>	D <sub>2</sub>
DCO Bend	12	12	12	12	VCA Aftertouch	00	00	05	00
Waveforms:					Chorus	On	On	On	On
Pulse	03	03	03	00	Chorus Rate	73	72	80	77
Sawtooth	00	00	00	01	LFO Rate	70	90	87	81
Sub Osc	00	00	01	00	LFO Delay	51	51	58	00
Sub Level	00	00	00	02	Env Time 1	00	00	69	00
Noise Level	00	00	00	00	Env Level 1	127	127	88	127
PW/PWM Depth	100	97	77	00	Env Time 2	20	20	106	55
PWM Rate	00	00	92	00	Env Level 2	83	83	127	00
HPF Freq	00	00	00	00	Env Time 3	74	66	118	00
VCF Freq	81	50	83	32	Env Level 3	00	00	95	127
VCF Resonance	25	00	06	44	Env Time 4	76	00	78	69
VCF Env Depth	100	97	30	121	Env Keyboard	01	01	03	00

## YAMAHA DX7 Soft Strings Mark Granger, Crawley, Sussex

From a variety of admirable sounds from Mark, we chose this emotive string patch as we felt it may surprise some people who consider FM strings to be similar to the British summer - cold, in other words. Mark attempted to create an analogue-sounding string sound for the DX7, and we hope you agree with us that the result, 'Soft Strings' is pretty impressive - and begging to be put to good use ■

2	6	SINK	25	∅	∅	∅	OFF	1	2
ALGG RITHM	FEED-BACK	WAVE	SPEED	DELAY	PMD	AMD	SYNC	PITCH	AMPLITUDE
LFO							MOD. SENSITIVITY		

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----

POLY/MONO	PITCH BEND		PORTAMENTO		
	RANGE	STEP	MODE	GLISS-ANDO	TIME

OP	6	R	1	00	+7	77 14 13 27	99 97 96 0	A4	-L -L	28 33	0	89	0						
	5	R	1	00	+7	92 31 25 27	99 98 97 0	D#4	+E -L	56 23	0	74	0						
	4	R	1	00	-2	99 34 0 26	99 97 96 0	C3	+E +E	42 22	0	79	1						
	3	F	Hz 1	479	+4	44 24 20 39	99 90 90 0	C4	-L -L	0 17	0	99	2						C3
	2	R	1	01	-7	86 12 17 26	98 98 97 0	C4	+E -L	47 12	0	80	1						
	1	F	Hz 1	00	-3	62 24 24 41	99 99 99 0	C5	-L -L	0 27	0	99	2						

MODE/ SYNC	FREQ. COARSE	FREQ. FINE	DETUNE	1	2	3	4	BREAK POINT	L R	L R	K. BOARD RATE	OUTPUT LEVEL	VELOC. SENS.	1	2	3	4	1	2	3	4	KEY TRANSPOSE	VOICE NAME
OSCILLATOR				EG				KEYBOARD LEVEL SCALING				OPERATOR				PITCH EG							
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32								
MODULATION WHEEL				FOOT CONTROL				BREATH CONTROL				AFTER TOUCH											
RANGE	PITCH	AMPLITUDE	EG BIAS	RANGE	PITCH	AMPLITUDE	EG BIAS	RANGE	PITCH	AMPLITUDE	EG BIAS	RANGE	PITCH	AMPLITUDE	EG BIAS								

# live T·A·K·E·S

## Peter Gabriel

NEC, Birmingham

When Peter Gabriel personally introduced his support act at the NEC, it was a first for me in more years of concert-going than I care to admit to. But, as usual, the man had his reasons. His involvement with WOMAD and his aggressive use of ethnic rhythms made the choice of Senegalese singer Youssou N'Dour and his nine-strong band an appropriate choice of support - and well worth the introduction. And so the evening begins, with African drums, African chants and African dance.

Gabriel makes his second entrance of the evening to the gentle polyrhythmic sequence of 'San Jacinto'. The extended introduction builds a level of tension not possible on vinyl and creating, for the first time, the intense atmosphere that is to be one of the highlights of the concert.

Despite the overwhelming size of the concert hall, the rapport Gabriel quickly establishes with his audience is more intimate than many performers manage in a small club - a product of his own stage persona and the other highlight of the

performance: lighting. Absent are the excessive rigs of Genesis, in their place four modest towers manoeuvred by four men. By the end of the performance, you're convinced the towers are alive.

Through 'San Jacinto' Gabriel caresses beams of light, the lights themselves often only inches from his face. 'Red Rain' and 'Shock the Monkey' follow, raising the pace, relaxing the atmosphere and displaying the other side of Gabriel's music. The sinister 'Family Snapshot' and 'The Family and the Fishing Net' return us to intimacy, as the lights move slowly from the back to the front of the stage. They look on during 'Shock the Monkey' as Gabriel, guitarist David Rhodes and Stickman Tony Levin present a (too) literal interpretation of the lyric.

By the time we've reached 'No Self Control', the lights have moved in on the vulnerable singer: intimidating him, assaulting him and finally leaving him lying on the stage. The audience is shocked. Eventually Gabriel rises for the delicate 'Mercy Street', nursing his audience as if they had been lying there with him.

Another long intro, this time to 'Excellent Birds'. The lights retreat and the band line up at the front of the stage to be introduced. Alongside Gabriel, Rhodes and Levin are Manu Katche (a Rhythm Stick

substituted for his drum kit) and David Sancious (a portable remote keyboard taking the place of his KX88 master).

Apart from Gabriel's Yamaha electric grand and Prophet 5, the only clue to the identity of the keyboards in use lies in the sounds themselves: analogue, digital and samples, some familiar from record, others fresh. But all exciting, all played with ease and with pleasure.

More classics bring us towards the close of the show - 'Big Time', 'Don't Give Up' (the crowd whispered 'Kate' but it was performed solo) and 'Solsbury Hill'. The finale, 'Lay Your Hands on Me', finds Gabriel floating on a sea of hands, putting his faith in them as they had in him.

That would have been enough, but the calls for an encore are a formality. The band return for an energetic romp through 'Sledgehammer' before retiring again. Encore number 2 elicits a solo piano rendition of 'Here Comes the Flood' from Gabriel, who is then rejoined by both his band and the support act for 'In Your Eyes'. Encore number 3 is 'Biko', rededicated to those who prompted its writing. Having totally involved the audience, the band leave the stage one at a time. "What happens now is up to you", calls Gabriel, as the lights dim for the last time. ■ Tg

# vinyl T·A·K·E·S

## Nigel Kennedy

Let Loose

EMI LP

What do you get when you mix Vladimir Ashkenazy, Andre Previn, Edward Elgar, Duke Ellington and Kate Bush? Theoretically, a headache. Realistically, Nigel Kennedy. Kennedy is a violinist, the names above are a selection of the people with whom he's worked and whose work he has performed - and it gives a healthy indication of the variety of his interests. *Let Loose* successfully represents all these interests in its eclectic outlook.

Opening with some aggressively *avant-garde* violin playing, the title track progresses through a series of uncomfortable orchestral manoeuvres before settling into a tight funk groove for its close. Disjointed? Somewhat, but once Kennedy's made this declaration of intent, the album becomes a lot more coherent.

'Zigane' is heavily laden with classical drums, piano dischords and awesome violin acrobatics, while 'Emotion' mixes classical drama with jazz swing - to pleasant effect. The vibrance of the phased electric violin is set against slow analogue string synth washes, showing the imitation up for what it is, yet using it as the perfect counterpoint to project itself from the mix. Finally, the piece breaks down to solo violin, treated with a gaggle of echo units to give a true indication of Kennedy's greatest influence.

'The Way We Were' is out and out jazz. Take a pinch of Miles Davis' *Tutu* and substitute Kennedy's violin for the muted trumpet, add a dash of Brand X, and you're almost there - loose structure, big drums, tight funk bass, orchestral keyboard stabs. All in all, rather nice.

Trouble is, Jean Luc Ponty did most of this on *Imaginary Voyage*, *Enigmatic Ocean* and *Cosmic Messenger* in the late '70s. He may not be listed among the influences on the sleeve, but in Nigel Kennedy's world, he's bigger than any of them.

■ Tg

## Yasuaki Shimizu

Music for Commercials

Made to Measure LP

The pirating of pop tunes for TV commercials is hardly a new practice: Frankie Goes To Hollywood and Ben E King may be two of the most recent contributors, but the New Seekers were singing 'I'd Like to Teach the World to Sing' for Coca-Cola over 15 years ago.

Now Japanese keyboardman Yasuaki Shimizu is striking back by releasing his commercials as an LP - Japanese commercials at that. The result is an album of no fewer than 24 short pieces of music, the longest being a little over two minutes. Each is attributed to a manufacturer - Seiko, Honda, Tachikawa and so on.

Under any other circumstances, these sketches would be deemed undeveloped. But the demands of advertising are very different from those of more traditional music writing: like the ad it serves, the piece must be short, sharp, and to the point, getting its message across with minimum fuss and maximum impact.

Short sketches these may be, but the ideas are immediate and perfectly executed. The bad news is that, having done their job of catching and holding your attention, they leave you hanging in mid-air without so much as a graceful fade to lessen the discomfort - there are no visuals to fill the void.

Yet paradoxically, what *Music for Commercials* offers is an insight into advertising music without the distraction of images, voice-overs and sound effects. Both music and sounds lend themselves to being plagiarised - developing Shimizu's catchy ideas into songs, if you like.

*Music for Commercials* is not a stunning album, but if you've got ambitions and an imagination, it could teach you more than the rest of this year's releases put together. ■ Tg

MUSIC TECHNOLOGY AUGUST 1987



# demoT·A·K·E·S

Epic, that's what it is - lots of ambitious lyrics, big brass chords, overdriven guitar solos and flanger finger-picked passages. These two tracks from **Deja Vu** show 'em up for the good old-fashioned progressive rockers they are. Not that there's anything wrong with that if your passion is for collecting old and new synthesisers - as keyboardman Gordon Reid's is.

Although the distinctive tones of Reid's Mellotron aren't featured on either 'Stagestruck' or 'Twilight', an ARP Pro Soloist, Hohner Planet T and Logan String Ensemble are. And alongside them are the more modern tones of a Roland JX8P, HP5600 and Akai X7000.

It's surprising just what a happy marriage it all is. Especially the melancholy 'Twilight' where pianos and multi-layered string washes and samples support Debbie Jayne's breathy vocals in a way that would have been a credit to Renaissance in their heyday. Yes, I remember 1974.

You'd have thought forming Britain's first all-synthesiser band (Zorch) would be enough of a claim-to-fame for Norfolk's Neil Mazda. Not so. Three tracks from **The Trance Formation** are the result of his 12-year "voyage of discovery". And these are only a stepping-stone to the "Circle of Sound, a new age sound and image extravaganza featuring five synthesiser players, three female vocalists/dancers and stunning new visual concepts".

Ahem. To the music. 'Isle of Forever' opens with filter-swept, phase-shifted string chords subsequently overlaid with Emax vocal samples and David Duhig's distorted guitar. The textures are slowly built up, but with no particular place to go. Rhythmic passages come and go, and at one point there's even some old-fashioned geetar strummin'... still there's no direction in the music, and no profit from listening to it.

The same sounds recur throughout, as does the atmospheric/textural approach to music-making. If there are going to be any "pretty big shake-ups over the next 13 years", as Mazda predicts, I doubt that The Trance Formation will see any of the action. Maybe Neil Mazda is just a slow learner: 12 years is a lot of time to invest in so little.

**David S Pearson's** excerpts from *A Life* (a double album) open with a theatre organ that would have done Reginald Dixon proud. From there 'Admiration' treats us to some sub-Toto lyrics sung with all the sincerity of a door-to-door salesman, before the sequencers take over and add a little life to the proceedings. Next it's the turn of Wakeman-style buzzing lead synths and appropriate changes of key - though still with Reg Dixon underneath.

As the demo continues through 'England at Home' and 'The Nail', the sounds of yesteryear - honky-tonk electric pianos, and more Wakeman Moog lead sounds complete with the man's chops - follow.

The ideas are old, the music tacky, the recording average, the singing utterly awful. But there's something entertaining about these excerpts - in much the same way as trying to answer the questions on Mike Read's Sunday morning radio show is entertaining. ■ Tg



Send your demo-tape, along with some biography/equipment details and a recent photo if you have one, to: **DemoTakes, Music Technology, Alexander House, 1 Milton Road, Cambridge CB4 1UY.**  
MUSIC TECHNOLOGY AUGUST 1987



## SDX SIMMONS at CHROMATIX

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Two system expansion packages will be released in 1987. Firstly a digital recording package, which allows sounds to be recorded in real time, then edited/processed/manipulated/multi-tracked etc. with SMPTE syncing etc. - the ultimate sequencer. Secondly an advanced waveform/sample analysis package will be available allowing complete control over every fine element that makes up your sample, using the on-board screen.

### THE SDX AT CHROMATIX

CHROMATIX are main London agents for the new SDX. We have just finished building a special demonstration studio solely for the SDX at our Holland Park premises, enabling us to demonstrate the unit under ideal circumstances. We hope that you can take the time to visit us and to check out this remarkable new musical development (it would be helpful if you could telephone first for an appointment). Alternatively please phone or write for further information.

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# STiCK To THiS

As the number of new, unlikely looking musical instruments increases, we look at the development of one such device that's been around for a while – the Chapman Stick – and talk to the man who invented it. *Interview by Tim Goodyer.*

IT'S A RARE event, the birth of a new instrument. And it's an odd one, too; historically, developments intended to broaden music's horizons have been repeatedly met with apathy or, worse, outright hostility. Doubtful? Check out the reception that awaited Adolphe Sax's saxophone, Les Paul's electric guitar, and Robert Moog's synthesiser when they were first announced to a sceptical world.

Yet all those instruments have since done more than just make their initial critics eat their words: they've become three of the most commonly played musical instruments in the world, and none of them shows any sign of losing popularity. And in achieving that, they've brought great rewards to those musicians who've had the imagination, the foresight, and the adaptability to risk everything and take them up.

Sadly, the same can't be said of a slightly more recent – though no less intriguing – innovation, the Chapman Stick. Not so

long ago, I was listening to one Jim Lampi talk about his experiences trying to get gigs and session work playing the Stick. Lampi is the European representative for Stick Enterprises, manufacturers of the Stick. He's a salesman and a demonstrator but, first and foremost, he's a Stick player.

We're awaiting the arrival of Emmett Chapman, the American inventor of the Stick, who's visiting England to give a talk and demonstration of his latest development – a MIDI-equipped Stick – at Argent's in London. But Chapman is late, so the stories continue in the afternoon sun.

"It's difficult to explain exactly what the Stick is over the phone", says Lampi ruefully. "They want to call it a bass or they want to call it a guitar, but it's a Stick. Most people think you're trying to sell them something, rather than play them a concert."

Chapman finally appears, having survived his first encounter with the chaos of

the afternoon London traffic. My chat with Lampi comes to a close. Now it's time to find out more about the Stick from the designer himself.

Emmett Chapman began his musical career as a guitarist, so even if the Stick isn't a guitar now, it was once.

"I played guitar for ten years from 1959 to 1969", he recalls, "and in 1969 I built myself a guitar. It was a solid-body electric guitar, and the body was shaped like a spoon. It had a longer, wider neck than the guitar, and it had nine strings on it.

"One evening, inspired by the playing of Jimi Hendrix, I started tapping on it. Tapping with my right hand, I found I could immediately do things that were faster and more fluent than I could after ten years of practice with my left hand. Then I played along with some chords from my left hand, but I squeezed them instead of picking them. Of course, they were already familiar from my guitar playing so that was quite easy. And from MUSIC TECHNOLOGY AUGUST 1987

that point. I never looked back – from one split-second to the next I'd made the decision to play this technique, and the technique is what this instrument is.

"For the first year-and-a-half I played the technique on my guitar. I played with Barney Kessel and Tim Buckley, and around Hollywood generally. After that year-and-a-half I built an abbreviated version of the guitar out of ebony, and called it the Electric Stick.

"By 1974 it had gone through some phases of development. It had ten strings instead of nine. I'd reversed the fourths tuning to a fifths tuning, and had the extra string tuned way down to the C below bass E. Oh, and somewhere along the line it became stereo, too."

Before going any further, it might be useful to take a closer look at the Stick. Its sound can be heard on *Peter Gabriel 4* (notably 'I Have the Touch'), and King Crimson's *Discipline*. It's the latter that more ably demonstrates the flexibility of the instrument, with 'Elephant Talk' built around the Stick's stunningly sharp, percussive attack, while in contrast, 'Frame by Frame' showcases the innovation's subtlety in a melodic role. In both cases, the virtuoso player is one Tony Levin.

Physically, some of you will recognise the Stick as the strange headless, bodyless "guitar" nursed in something not altogether dissimilar to a baby harness that Levin can frequently be seen strutting the stage with (the rest of you will have to settle for the picture at the top of this page).

The Stick has ten strings divided into two groups of five: five melody strings and five bass strings. The bass strings are tuned from C below bass E up in fifths to the E two octaves above it. The melody strings run in fourths from the D above middle C down through A, E, and B to F#. To quote from the brochure, "the uniform intervals of fourths and reciprocal fifths make this fretboard a neutral grid of strings and frets ideal for creating music by shapes, distances and patterns. All chords and lines have permanent shapes which transpose across the strings, along the frets, diagonally and from one string to another."

As already mentioned, the playing technique developed by Chapman is utterly different from any conventional guitar style. It bears some similarity to the hammer-on style of playing used by rock guitarists like Eddie Van Halen, and has also been compared with Stanley Jordan's two-handed bass technique – to the point where Jordan has been accused of stealing the idea. Chapman isn't about to go along with any such suggestion, though he does feel Jordan's success has given him problems. Apparently, the two first met a little over ten years ago.

"It seemed to us like he always wanted to get a Stick, but then we didn't hear from him, and it turned out he'd decided to do it on his guitar. You can't criticise a musician for doing what he's doing; I do MUSIC TECHNOLOGY AUGUST 1987

what I do and the Stick is how I do it. As far back as I've been teaching and lecturing, I've always said I developed my idea on the guitar, and it's a technique anyone can use on their guitar. I told people about the fourths tuning and I let people know that it's applicable to all stringed instruments – the Stick just optimises certain things.

"What I would criticise is that the media were ready to give the technique over to the guitar and not admit that I was the one carrying the ball. I was the one that pioneered the technique and got it going, then all the guitar magazines hand the credit to Stanley Jordan. That is unfortunate because it means that my work, which is already difficult, is going to get a lot harder in the future."

Chapman has been marketing his Stick commercially since 1974. Now, over a decade on, the developments are still coming thick and fast. Yet although he has one eye fixed resolutely on the future, Chapman can still accommodate individual musicians' present needs, as he is eager to explain.

"I make custom tunings for people if they don't like the fifths in the bass or the fourths in the melody, and if they want a single sequencer string or if they want two bass groupings, I can provide those, too. I've made some fretless instruments, a lot of lefties . . .", he pauses for breath. "Allan Holdsworth even has a guitar and violin grouping because he didn't want to play any bass strings at all."

On the production side, one of the latest moves is away from Brazilian iron wood as a basic material, in favour of a hi-tech, polycarbonate construction.

"I'm about to make a polycarbonate fretless model for Tony Levin", Chapman confirms. "I'm thinking of putting a stainless steel layer on the fretless half of the fingerboard because the frets on the polycarbonate instrument are stainless steel rods, and they stand up quite high. The idea is they'll stick up as high as the stainless steel layer on the other side. I think it should play very well, and give some unusual sonic techniques that I have yet to experience myself. Previously I've made all the fretless instruments out of iron wood, so I think this will sound rather different."

The other main advance in Stick technology is the one that has brought me here: the arrival of the MIDI Stick. At the moment MIDI information is only derived from half the strings and, as yet, there is just one prototype, the one that Chapman is shortly to play for the swiftly swelling audience of Stick enthusiasts. Typically, Chapman has endless enthusiasm for the project.

"There's a whole new future in MIDI for me that I will be recommending to all Stick players. In two weeks I'm going to start installing 'Melody MIDI' – that involves fitting a pickup on the five melody strings of the Stick. I've already got 30 people waiting to have their instruments upgraded, and they'll go under the trade

name of The Grid, which will apply to all Stick touchboard synthesisers in the future."

The system Chapman is presently using is a modified IVL Pitchrider 7000 pitch-to-voltage converter, designed by IVL in Canada and manufactured by DOD/Digitech in the US.

"The software has already been adapted for my own needs, and the sensitivity settings have been increased. Eventually the front panel will have one switch for each of the five melody strings instead of the six it has now. It works quite well, but pitch-to-voltage conver-

*"Eventually we'll go to a stringless, fretless grid, a Stick that's a total synthesiser – but everything a fingerboard player loves."*

sion is a frustration; it works well in some ways for accompaniment but it doesn't really respond fast enough for melody playing. In the future we'll go beyond five strings, and eventually we'll go to a stringless, fretless grid, a Stick that is a total synthesiser – no frets, but everything that a fingerboard player loves."

But there's an intermediate step already in the pipeline. This involves an IVL Steelrider pitch-to-voltage converter, a system originally designed for the steel guitar, and consequently capable of handling ten, as opposed to just six, channels.

Beyond that, we'll have to settle for Chapman's vision of how the Stick will evolve, and what the future might have in store for musicians brave enough to accept the challenge of a genuinely new instrument.

"The fingerboard instrument will be a wonderful controller for synthesisers. The guitar section alone is like five monophonic synthesisers, but it could very easily become five polyphonic synthesisers – then you could play several notes off each string. That does depend on getting away from pitch-to-voltage conversion, but I'm sure we'll get around it sooner or later."

And the wait may only be a short one, since as the latest NAMM show proved (see report elsewhere this issue), there are already guitar-to-MIDI systems under development that involve infra-red light and sonar as alternatives to pitch-to-voltage conversion.

"The future is wonderful for fingerboard players", says Chapman, his enthusiasm undiminished. "I just want to be in on it. It'll be the ultimate synthesiser controller – as ultimate as I can think of, anyway. I'm already playing the synthesiser in my head every time I play my Stick, even though it still has conventional strings."

Like I said, all it takes is imagination, foresight, and adaptability. Qualities Emmett Chapman has in abundance – and will continue to use as time goes on. ■

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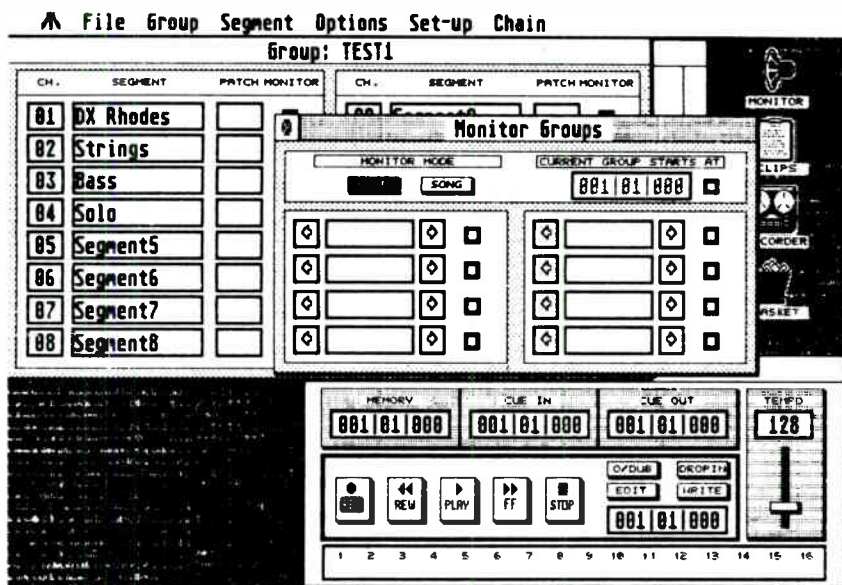
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# ICONIX

## MIDI Sequencer for Atari ST



**C**ompetition for the hearts of ST-owning musicians may be fierce, but this new package aims to be open-ended without being too complex.

Does it succeed?

Review by

Simon Trask.

AS MUSICIANS MOVE increasingly from a hardware to a software way of doing things, it is clear that what is most important is good design. Nowhere is this more necessary than in the increasingly sophisticated MIDI sequencing programs that are coming onto the market. Iconix, written for the Atari ST by a British company called System Exclusive, soon marks itself out as being different from the pack, through avoiding both a fixed display format and a fixed track format.

System Exclusive (yes, I think we're talking MIDI here) have chosen to make extensive use of the ST's GEM graphics environment of pull-down menus, windows, icons and dialogue boxes. So, instead of being presented with fixed screen displays, you start with a "desktop" (ie. screen) which is blank except for four icons and seven pull-down menu headers. You then open windows onto the desktop (a maximum of four at any one time) which fulfill specific functions. These can be placed anywhere on the screen, and some windows can be sized (for a description of the ST's graphics environment, see our article "Hard Facts/Soft Options" in E&MM January '86). Incidentally, the current version of Iconix has been designed for the hires monochrome monitor only, though System Exclusive are planning on adapting it for colour monitors.

### Group Mode

ICONIX HAS THREE main sections: Group mode, Step Edit mode and Song mode. To start recording, you need to open the Group window, which involves selecting the New Group command on the File pull-down menu and giving the Group a name. A Group consists of 16 Segments (ie. tracks) and can be as short or as long as you want, up to 999 bars. Iconix allows you to choose a global time signature of 1-99 beats (with a beat division of 4, 8 or 16).

Each segment can be assigned to a single MIDI channel, and given an initial MIDI patch number and a 12-character name.

To select a segment for recording, you must double-click on it with the ST mouse. If you want data received on MIDI In to be passed on to slaved instruments, then you must tick MIDI Thru on the Options menu; the data will be sent on the MIDI channel of the current segment.

The next step is to open the Recorder Controls window by double-clicking on the tape machine icon. This is where you'll find the usual array of tape transport controls - Rec, Rew, Play, FF and Stop - together with drop-in and overdub mode buttons and four bar/beat/step counters (Iconix has an internal resolution of 144 steps per quarter-note). A MIDI activity bar across the bottom of the Recorder window shows when MIDI data is being transmitted on each of the 16 MIDI channels.

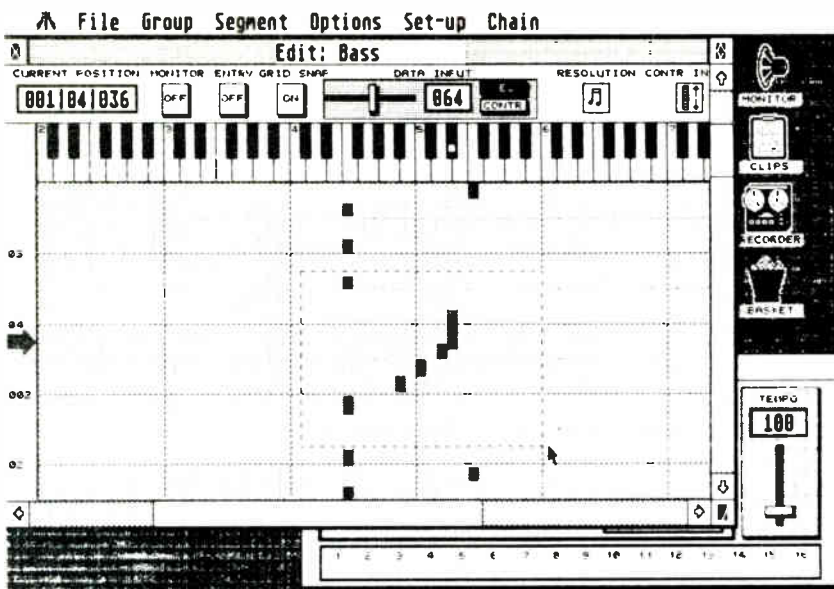
The main counter to the right of the Recorder's transport controls indicates your current position within the group. The memory counter allows you to set a location in the group which you can jump to at any time by double-clicking on the Rew or FF buttons, while the cue in/out counters allow you to set the drop-in/out locations, or to select what is known as a Cue Block.

Counter locations can be typed in from the ST's keyboard, or set by dragging from one of the other counters. For instance, although Iconix doesn't have a zero return option, you can drag a memory counter position of zero into the main counter. You can also select drop-in/out or cue block positions on the fly (to step resolution) by dragging the main counter to the relevant cue counter while Iconix is playing.

A tempo slider allows you to set a tempo of 4-400 BPM. At present you can only set a single global tempo, but System Exclusive are planning to introduce a master tempo and time-signature track, together with accelerandi and decelerandi, in the upcoming 1.1 version of Iconix. Just remember, though, that if you're locking Iconix to a SMPTE timecode tape track via a SMPTE/MIDI converter, tempo-change sophistication is down to the converter, not the sequencer.

In addition to providing on-screen Recorder controls, the program's authors have assigned Iconix' recorder functions to the ST's function keys, while an option called "Set Soft Keys" allows you to assign these functions to keys or controllers on your MIDI keyboard. This has the considerable advantage of placing such functions as record, rewind, fast forward and overdub literally under your fingers. These soft key assignments - together with other parameters such as count-in period, time signature, metronome click rate, sync mode and the arrangement of windows and icons on the desktop - can all be saved in a Setup file which will automatically be loaded each time you load the sequencer program (providing you remember to save it on the same disk).

When you're recording in real time, the length of a group is set by the length of the first segment you record, in which case you're best off using the Set Soft Keys option to allocate Stop to a key or controller on your MIDI keyboard. Personally, I'd prefer the option of being able to ▶



▶ set the length before recording; as it is, you have to enter Step Edit mode to do this, which seems a rather unnecessary detour. On the other hand, you can record a segment from scratch in Step Edit mode if that's the way you prefer to work. I'll come to this aspect of Iconix later.

Once you've set the length of your current group, in whatever way you choose, you can start and stop recording at any point within a segment. When you reach the end of the group, it will start looping in playback mode.

Recording, dropping-in and overdubbing all function in the same way they would on a tape recorder, except that you can record two versions of the current segment; so if, for instance, you don't like the result of a drop-in or an overdub (OK, so you messed up), you won't have lost the original version. Once you have two versions, however, you must commit one of them before proceeding any further.

Quantisation and MIDI data filtering are both after the event. Quantisation can be to any value from a quarter-note to triplet 32nds. You can try different values without losing the unquantised version, until you finally decide to commit one or the other. Quantisation moves note-ons and note-offs to the nearest quantisation boundaries, which might not always give you the result you want - in which case you'll have to either re-record the offending passage or go into Step Edit mode for some fine-tuning.

Filtering allows you globally to remove such things as

note-on/off, channel or polyphonic aftertouch, patch change, pitch-bend or controller data from a segment. If you want more discriminating editing, you have to go into Step Edit mode.

Other useful segment features include Replicate and Transpose. The former allows you to, for instance, record a two-bar bassline and copy it any number of times up to the end of the group, while the latter allows you individually to shift the pitch, timing and velocity of the current segment. A more unusual feature is the ability to tie notes across two groups - a great way of breaking down barriers, so to speak.

Individual segments can be copied, swapped and merged within the current group. If you decide that a particular segment is beyond redemption, you can drag it to the wastepaper basket, in which case you're politely asked (these dialogue boxes are nothing if not polite) whether you want to erase the entire segment or just the portion between the cue points. On the other hand, if you decide that the whole group is beyond redemption, then you can summon forth the appropriately-named Junk Current Group function from the Group menu.

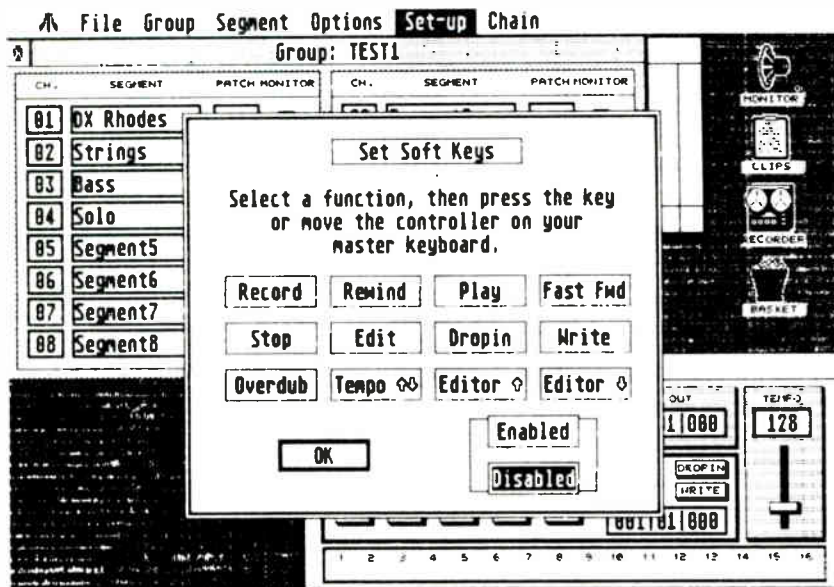
More constructively, you can drag a segment to another icon known as the Clipboard, which acts as a temporary store. Another of those polite dialogues asks whether you want to store the complete segment or just the portion between the cue points. The latter option comes in useful when you want to save a few promising bars from an otherwise uninspired half-hour's doodling at the keyboard. Isolate the relevant bars with the cue points, drag them onto the clipboard, and from there drag them back into another segment - when you'll be asked by another dialogue box whether you want to load your clipboard segment to the start of the group or to the location set by the memory counter. You can repeat this process as many times as you want - if there are any other moments of inspiration you'd like to preserve, for instance.

If you want to delete or extract portions of a whole group (ie. all 16 segments), you can use the Cue Block Delete and Cue Block Extract functions from the Group menu. The Cue Block is defined by the cue points, and can be any part of the current group you want it to be. Deleting a cue block shortens the length of the group accordingly, while extracting a cue block deletes all the surrounding data and sets the length of the group to that of the cue block. Sadly, you can't drag cue blocks to and from the clipboard.

A further cue block feature is Cue Block Repeat. When this is selected, Iconix loops around the section defined by the cue points. I can't help feeling System Exclusive have missed an opportunity here, by not providing the option to loop in record/overdub mode, drum-machine style.

In fact, the cue block principle could usefully be expanded by allowing multiple blocks (ie. pairs of cue in/out locations) to be arranged. That way, with a bit of planning you could switch between different blocks quite easily, for those segments you wanted to approach in a pattern-based manner.

Before you can start recording another group, you have to junk or store the current one. Iconix maintains an onboard Group Directory in which you can store as many groups as you want. Individual groups can be saved to disk, or you can wait until you save a Song - this also saves all the groups in the Group Directory.



## Step Editing

LIKE GROUP MODE, Step Edit mode allows you to work on a single segment at a time. System Exclusive have adopted a grid format, with pitch on the horizontal axis and

duration on the vertical axis. Notes are represented on the grid by black bars, with the length of the bar representing the duration of the note. The overall concept and effect is not unlike the old player piano rolls.

You can scroll the grid window forwards and backwards through the segment by using the vertical scroll bars ("coarse" scrolling) or the vertical scroll arrows (single-step scrolling), or set a specific location by editing the window's position counter or dragging a counter from another window. But please, Exclusive people, when I transfer from real-time mode into the step editor, I want to pick up at the same position. At the moment, the editor reverts to zero position each time it's called up, which is none too logical.

Sideways scrolling of the step edit window allows you to look at the entire MIDI note range (the window itself displays between five and six octaves' worth). A keyboard display across the top of the grid provides a ready reference for determining what the pitches are.

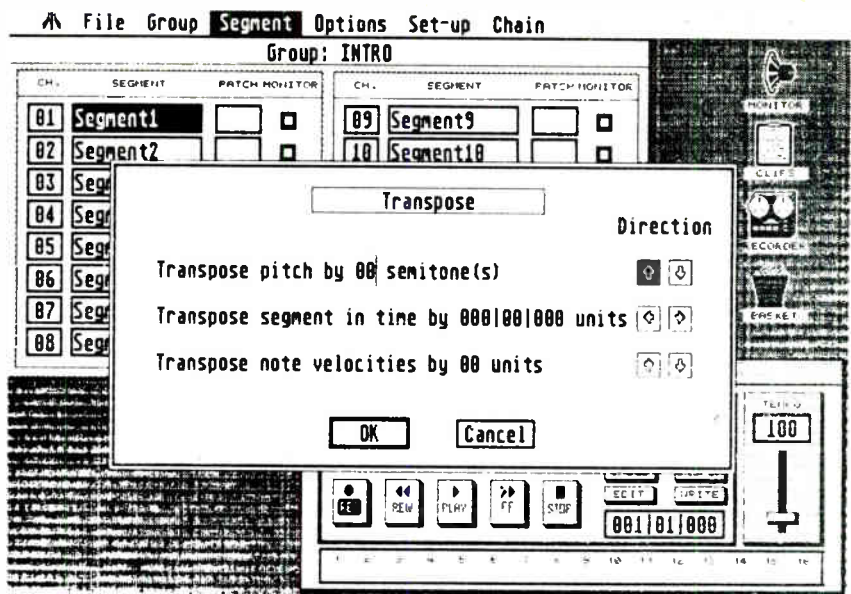
Current position is represented by the horizontal "Now" line halfway down the display, and as notes pass through this line, they are indicated on the keyboard display so that it's easier to see which notes and chords are being played. You can also enter new notes by clicking on the relevant notes of the keyboard display. Highlighting the Monitor button allows you to hear what the notes are at the current position, as they are sent out on the segment's MIDI channel.

The quickest means of editing is to use the mouse. You can click on any position in the grid display to enter a new note, while deleting individual notes or groups of notes is easily accomplished by dragging them to the basket icon (groups of notes must first be "lassoed"). You can also move or copy groups of notes to another position on the grid (up or down an octave, for instance) or to the clipboard. Using the clipboard allows you to move or copy notes to another location in the segment, to another segment, or even to another group. Each mode has its own clipboard, so for example, dragging notes to the clipboard in Step Edit mode doesn't affect anything stored on the clipboard in Group or Song mode.

You can change the length of a note by clicking and holding on it, and either pulling or pushing the resulting note outline, while an easy way to tighten up the timing of a part is to use something called Grid Snap. When this is on, clicking on a note will snap it into the nearest grid position. Incidentally, you can alter the resolution of the grid, ranging from a quarter-note (for lassoing large groups of notes) to a 32nd-note triplet (for making very fine timing alterations or entering rapid runs).

Iconix also allows you to edit and enter MIDI controller, pitch-bend and patch information, which is displayed graphically (apart from patch changes) down the right-hand side of the Step Edit window when you click on the Controller button. To delete controller information, you lasso the relevant section of data and drag it to the basket. New data is entered by clicking in the controller window at any point, or by setting the data slider and clicking on the Controller button (which sets a value at the Now line). Perhaps System Exclusive could introduce a draw function in the next update, while the ability to "thin out" continuous controller data successively would also be a useful addition. And despite the thoroughness of System Exclusive's step editing system, I'd still like to have access to the raw MIDI data through an Event Editor, together with the ability to read what's coming in on the MIDI In port; if you really need to play detective, it's the only way.

The best method of step-time recording with Iconix is to use MIDI keyboard entry, which enters notes at the current position. You can use the Set Soft Keys option mentioned earlier to assign, say, two notes on your MUSIC TECHNOLOGY AUGUST 1987



keyboard to scroll the Editor in either direction (notes are preferable because they give you aural cues to reinforce the visual cues of the screen display). But it would be nice if notes could be deleted as well as input from the keyboard, perhaps by playing the offending note(s) twice in rapid succession.

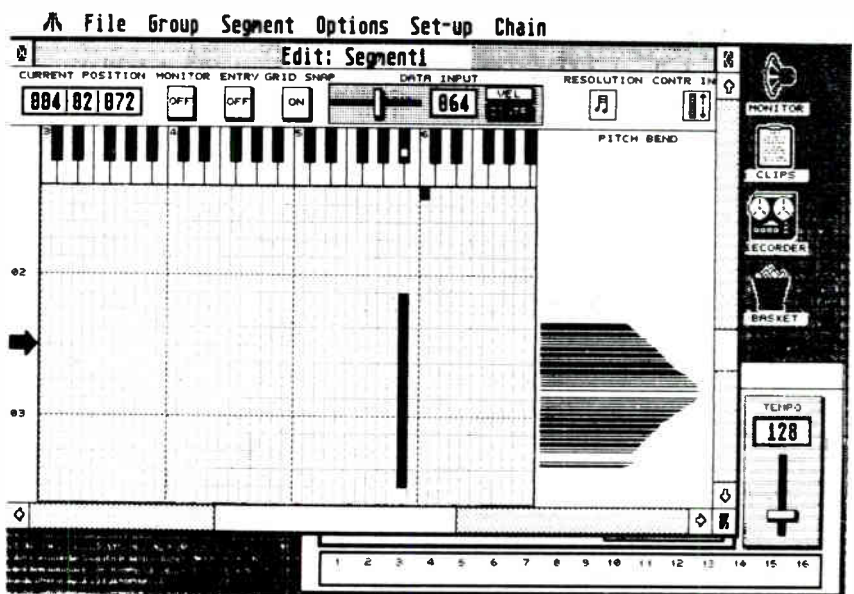
Yet even without that refinement, the Iconix approach to step-time keyboard input is extremely effective.

## Song Mode

ESSENTIALLY, THIS MODE allows you to chain individual groups together by dragging the relevant icons from the Group Directory window across to the Song window.

Iconix includes all the usual functions of inserting, copying, moving and deleting groups within the chain. You can also create and name subchains (chains within chains), which can be useful if you have a number of groups that you want to use elsewhere in your song. For instance, you could create Verse and Chorus subchains for a song, each of which could contain a number of groups. You can also create subchains within subchains, the depth of subchaining being up to you - so your song structure can be as simple or as complex as you want.

System Exclusive have gone one better than a single song chain - seven better, in fact, because you can create up to eight parallel song chains. Suddenly you've got an ►



- ▶ eight-track recorder, except that each "track" contains 16 segments – and yes, that does make 128 segments in all, which must be some kind of record.

What this adds up to is a very flexible way of combining pattern and continuous modes of recording. For instance, chain zero could consist of repeating four-bar groups, while chain 1 could be one 128-bar group, and so forth.

You may find it best to allocate each chain to a different function within your song. For instance, chain zero could handle all the rhythm parts, chain 1 could handle synth string backing parts, chain 2 could handle brass parts, and chain 3 could handle patch and controller changes on any MIDI signal processors. Anyway, you get the general idea.

Seeing as you can mute individual chains, it's also possible to store alternative arrangements in different chains. And although Iconix only allows you to store a single Song in memory, you can in effect have up to eight songs by recording a different song in each chain.

What I would really like to have is the ability to save individual song chains to disk and subsequently reload them into any chain number, which would make for all sorts of interesting possibilities – in the field of remixing, for example.

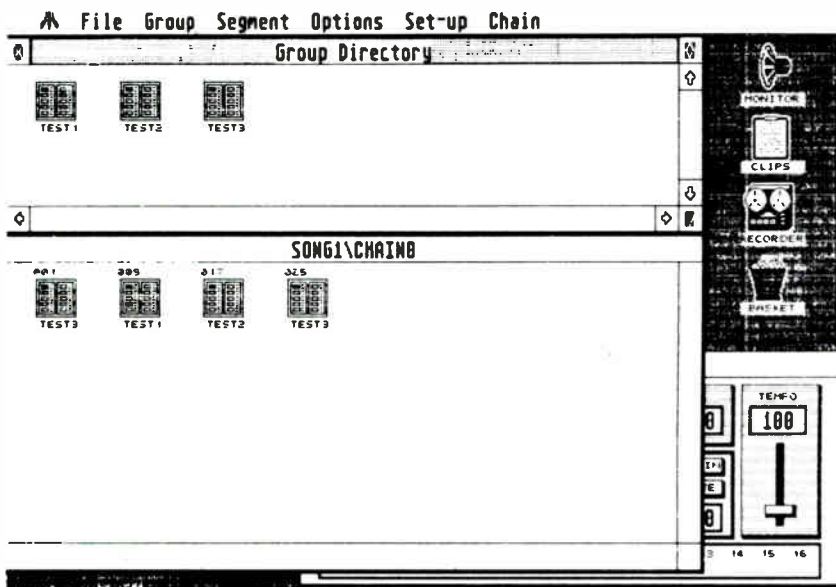
To make the most of Song mode, you obviously need a way of recording a group while listening to other groups. Iconix provides several ways of doing this. You can record a new group in the context of a song by selecting the Monitor window while in group mode and highlighting the Song button. This new group can be positioned anywhere in the song simply by setting the Monitor window counter to the appropriate location, while the Monitor tells you

in the song structure, you may decide that you want to add something to a particular group. To open the relevant group for editing, you must double-click on it in the Song window, upon which a dialogue is displayed asking you whether you want to change all occurrences of the group in the current song chain, or just the occurrence you've selected. If it's the latter, you have to rename the group, which means that when you store it in the Group Directory it will be stored as a new group. Again, when recording you can use the Monitor window to tell you which other groups are playing at the same time, and you can begin playback of the song before the location of the group you've selected for editing.

One important feature of Iconix which I haven't mentioned yet is its ability to record on multiple MIDI channels within a group. When you open a new group, you are presented with the option of single- or multi-channel recording. The latter method assigns each incoming MIDI channel to the corresponding segment, regardless of the segment's own channel allocation. You can only use multi-channel recording once per group, but with the program's ability to run groups in parallel, you've effectively got eight-track, multi-channel recording. If you see what I mean.

This should be good news not only for MIDI guitarists, who can now indulge in "mono mode" recording, but also for any musician tired of recording in isolation. With the addition of a MIDI merge box, you can now get together with another musician and indulge in a spot of duet MIDI sequencing.

But let's not get carried away. You're still limited to 16 MIDI channels, as Iconix uses the ST's single MIDI Out. This is where a new company like System Exclusive is at a disadvantage compared to the big boys, since both Steinberg Research and Hybrid Arts bypass the ST's own MIDI ports in favour of its parallel data ports. Steinberg's SMP24 SMPTE/MIDI converter and Hybrid's new MIDIplexer both connect to the ST in this way, and the benefits are significant: not only can MIDI data be transferred much more quickly between computer and interface box (advantageous if hefty amounts of data are going to be shifted), but both boxes provide two merged MIDI inputs and four individually addressable MIDI outputs, making a total of 64 – rather than 16 – MIDI channels.



what other groups are playing at any given moment. And you can mute or solo individual chains from this window – so you could, for instance, drop out the brass parts recorded in chain two.

Segment recording and editing can be carried out as normal within the new group while the rest of the song plays along, and by beginning playback before the group start location you can "get into the groove" before dropping into record mode.

If you haven't already set up a song structure but want to record a new group in the context of other groups, highlight the Group mode button in the Monitor window. You can now select up to eight other groups from the Group Directory to run in parallel with your new group, and once again, you can solo/mute individual groups. Each group will loop according to its own length, which can make for some interesting polyrhythms.

Once you've recorded all your groups and placed them

## Verdict

IT'S NO EXAGGERATION to say that Iconix allows you to record your music pretty much any way you want to. At the same time, it maintains a coherent framework for you to work within – a triumph of intelligent design. In fact, it could be said that Iconix provides the tools for you to work with, but doesn't tie you up in preconceptions about how you want to work.

Sometimes that means you have to think carefully about how to achieve a particular task, but Iconix is never actually difficult to use. And the attention to detail is nothing if not impressive – the sequencer is full of musician-friendly features, things you can't help not liking regardless of how "computer literate" you may be.

Provided it gets the right exposure and the right support, Iconix should win a place up there with the most established names – and deservedly so. ■

**Price** £250 including VAT  
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MUSIC TECHNOLOGY AUGUST 1987

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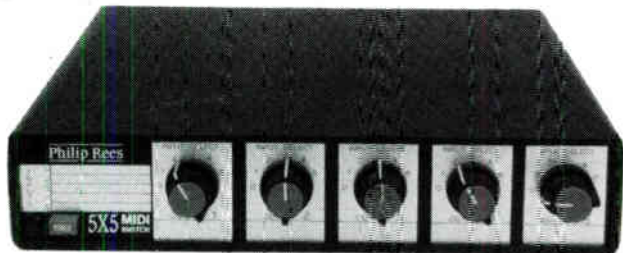
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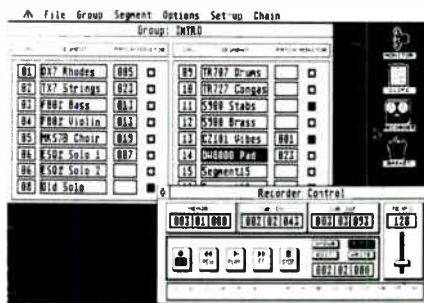
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**KORG MS20** monosynth, only £60. Casio CZ3000, boxed, only £320. Gerard, Tel: 01-720 3540.

**KORG MSS0**, £200. Korg MS20 modified for IV/Oct control voltage, £200. Tel: Nottingham (0602) 609433.

**KORG POLY 800**, £250. TR505 £190 or swap p/x for good drum m/c. Tel: 051-653 4207.

**KORG POLY 800** white on black keys, £200 or p/x for digital drums. Paul, Tel: 01-889 5975.

**KORG POLY 800 MkII**, home use only, £350. Tel: Andover (0264) 55231.

**KORG POLY 800 MkII** + hardcase, manual, extra patches, mint, £450, or p/x CZ1000 + £250? Tel: Batley (0924) 442486.

**KORG 7005** monosynth, plus f/case, exc cond, £80. Tel: (0942) 884370 (Manchester area).

**KORG VOCODER**, £200. Barry, Tel: 01-807 6041, eves.

**MOOG MINIMOOG** with f/case, £345 ono. Tel: (0993) 73819 (nr Oxford).

**MOOG MINIMOOG** mint cond, £550 ovo. Tel: 01-722 4679.

**MOOG PRODIGY** good cond, £80. Tel: Colchester (0206) 867863, after 6pm.

**MOOG ROGUE**, Casiotone 202, both perfect, offers? Or exchange acoustic guitar. Grant, Tel: 041-427 3297.

**MOOG ROGUE** boxed with manuals, superb cond, West Midlands area, £60 ono. Mike, Tel: (0299) 250006.

**OSBERHEIM MATRIX 6** immac, latest software, serious offers or swaps invited. Can deliver reasonably distance. Jason, Tel: (0706) 217260 (Lancs).

**OSBERHEIM OBXa** synth. £900 ono. Osberheim Stretch DX drums, £500 ono. Eventide H949 harmoniser, £450 ono. Tel: Dorking (0306) 880903.

**ROLAND ALPHA JUNO I**, £400 ono. SH09 synth, £75 ono. DR110 £60 ono. Glen, 01-595 6245.

**ROLAND ALPHA JUNO I** boxed, mint, £380, quality analogue sounds. Tel: 051-677 3691.

**ROLAND ALPHA JUNO 2** boxed, manuals, £595. TX81Z, used twice, boxed,

manual, etc. £320. Tel: Preston (0772) 323303.

**ROLAND ALPHA JUNO 2**. £600. Sequential Prophet VS, £1495. Yamaha DX7, £795. Tel: 01-467 4603.

**ROLAND JUNO 106**, £450. Yamaha RX15, £250. Carlsbro Cobra 90 amp, £190. £850 the lot. Tel: 01-863 8728.

**ROLAND JUNO 106** perfect cond, boxed with case, £450, need the cash. Phil, Tel: Rugby 815442.

**ROLAND JUNO 106** vgc, + f/case, £475. SZ1 sequencer £150 ono. DR110 £65. Never gigged. Barry, Tel: (0703) 435842.

**ROLAND JUNO 6**, £250. Mint cond, will swap for any MIDI synth. Tel: (0602) 202717, weekends.

**ROLAND JUNO 6** stereo polyphonic synth, fully programmable, superb sound, immac, £290 ono. Jerome, Tel: (0472) 682027.

**ROLAND JUNO 6**, SH101, MC202, TR606, Yamaha CS5, Fostex X15, Dynamic 6:2 mixer, etc. £750. Kevin, Tel: 01-643 3141.

**ROLAND JUNO 60** MIDI, JSQ60, £400. MPC Sync Track, £10. Tel: 01-237 0837.

**ROLAND JUNO 60** classic Roland sounds, infinite creativeness, reliable, only £350. Tel: (0429) 276301.

**ROLAND JX3P** MIDI, £400. Casio CZ101, MIDI, £200. Tel: Wigan (0942) 495582.

**ROLAND JX3P**, amp, stand, mint, £385 ono. I25W kbd amp, £190 ono. Mirage, etc. C64 editors, details. Matt, Tel: (0252) 721264.

**ROLAND JX3P** MIDI, 2DCO per voice, exc, boxed, £350. Double X-stand, £25. Tel: Newcastle 091-273 6687.

**ROLAND JX8P** with programmer, f/case, absolutely mint cond, boxed, manuals, £995 ono. Gordon, Tel: (0223) 323309, work; (0638) 720090, eves.

**ROLAND JUPITER 6** home use only, immac cond, £650. Tel: 01-318 2429.

**ROLAND JUPITER 6** boxed, manual, pristine cond, £650 ono. Grahame, Tel: 01-644 6782, after 5pm.

**ROLAND JUNO 6** exc cond, inc extras, £600 ovo. Ian, Tel: (0491) 576207, days; (0734) 595801, eves.

**ROLAND SH101** monosynth, lovely analogue bass and lead sounds. Ian, Tel: (0326) 270914.

**ROLAND SH101** CV/gate bass, pedals, mod grip, psu, £130. 19inch rack, f/case, 18 units, wheels, £150. Tel: (0533) 559777, X302, 9-5 weekdays.

**ROLAND SH101**, £90 with grip and psu. Barry, Tel: 01-807 6041.

**ROLAND SH101**, £70. MC202 £65. Yamaha CS50 £100. £200 the lot! Tel: 01-856 6541.

**ROLAND SH101** home use only, psu and leads, £100. Tel: (0424) 713041, eves.

**ROLAND SH101** boxed with manual, exc cond, £90 ono. David, Tel: (0734) 345824, eves.

**ROLAND SH101** grip, boxed, home use, £110. Graham, Tel: 041-887 3176.

**ROLAND SH101** + MG51, Roland TR909, both exc cond, must sell, £360 ovo. Neil, Tel: Southampton 268523.

**ROLAND SH101** perfect cond, £120 ono. Robin, Tel: (0272) 678221.

**ROLAND SYSTEM 100M** + kbd, 5 mods, rack, £450 ono. DE200 £175. Eventide HM80, £100. Tel: (0279) 419480.

**SCI MULTITRAK** classic modern sounds, onboard 6-tr sequencer, touch sens, devastating layers + splits, £450. Tel: (0429) 276301.

**SCI PRO ONE** exc cond, never gigged, £100. No offers. Tel: Ipswich (0473) 685573, eves.

**SCI PRO ONE** monosynth, home use only, boxed, good cond, £150. Jerry, Tel: Fareham 283833, eves.

**SCI PROPHET 600** boxed and as new, £545. Tel: Blackburn (0254) 47199.

**SCI PROPHET 600** with MIDI upgrade, hard case, £500 ono. Tel: Tyneside 091-271 6403, anytime.

**SCI PROPHET T8** immac, home use only, manual, £1470. Tel: 01-866 2491, eves.

**SCI PROPHET VS** digital vector synth, unbelievable sounds, easy programming, immac. Julian, Tel: (0773) 712664.

**SOLINA STRINGS** tatty, hence £90. Barry, Tel: 01-807 6041.

**SWAP CASIO CZ1000**, 1mth old, and £50 for Juno 60 or JX3P. Tel: (0429) 273855.

**SWAP AKAI AX80**, QX7 sequencer, Casio CZ101, for PPG Wave 2.2/2.3. Vwrite: Lee, 67 Milner Rd, Brighton, Sussex.

**WURLITZER** piano, £180. Barry, Tel: 01-807 6041, eves.

**YAMAHA CS15** analogue monosynth, £150. Also Yamaha PS5170, 100 voice mini-kbd, £50. Tel: Milton Keynes 568704, eves.

**YAMAHA CS60**, £195. Yamaha CS70M, £375. Paul Todd or Ian Watson, Tel: Scarborough (0723) 370540/2.

**YAMAHA CS80** megasynth with wheeled f/case and stand, £650 ono. May consider swap, p/x. Tel: (0257) 452303.

**YAMAHA CS80** with wheeled f/case, big analogue sounds, reluctant sale, £650 ono. Swap, p/x? Tel: (0257) 452303.

**YAMAHA CP80** f/cased, £1250 ono. Yamaha PF15, £499 ono. Roland Jupiter 8 Mk1, f/cased, £695 ono. RE501 £250 ono. Mr Parson, Tel: (0472) 812984, w/ends pref.

**YAMAHA DX100** as new, manuals, and box, £240. Bob, Tel: (0284) 64007, eves.

**YAMAHA DX100** immac, leads, manuals, full set of professional patches, boxed, guaranteed, £270, bargain. Tel: Cambridge (0223) 329156.

**YAMAHA DX100** mint cond, home use, £245. Fostex X15, cased, £175. Greg, Tel: Hull (0482) 632443.

**YAMAHA DX100** perfect cond, boxed, home use only, £210. Neil, Tel: Wishaw 357933.

**YAMAHA DX100** boxed, immac, manuals, psu, pedal, voice tapes, £250. Tel: Portsmouth (0705) 598347.

**YAMAHA DX100** +FB01, Roland PA80 stereo amp, 2X Roland SST60 speakers, UMI-2B sequencer for BBC, Roland TR707. Call for offers. Tel: (0932) 58065.

**YAMAHA DX21** vgc, many extra sounds, £445. Dynamix 6:2, £110. Accessit reverb, £65. Tel: (0753) 40243.

**YAMAHA DX21** 8mths old, hardly used, stand and extension, manuals, £440 ono. Tel: 021-705 8088.

**YAMAHA DX21** vgc, £435 plus carriage. Les, Tel: (0245) 72572, after 6pm.

**YAMAHA DX21** guaranteed, £485 ono. RX21 drums, £135. Seiko MIDI sequencer, £85. Tel: (0325) 891871.

**YAMAHA DX21** perfect cond, with tapes, lead, manuals, £450 or swap for RX11 & £180. Craig, Tel: 01-348 4761.

**YAMAHA DX21** immac, boxed, manuals, £490, realistic 6:2 mixer, beautiful, £90. Peavey Century bass amp, £100. Chris, Tel: Harpenden (058 27) 62233.

**YAMAHA DX27** and FL10M II Flanger, £340. Both boxed with manuals, Pro One £125. Tel: (0475) 673545.

**YAMAHA DX27** f/case, stand amp, speakers, full working kit, value £875, wants £600 ono. Karl, Tel: (0203) 374728.

**YAMAHA DXS** boxed and as new, £1495. Tel: Blackburn (0254) 47199.

**YAMAHA DXS**, £1450. Juno 106 £450. Moog Source £150. SZ1 + data recorder £130. Glenn, Tel: Northampton 716920.

**YAMAHA DX7** exc cond, f/case, pedals, breath controller, stand, as new, £895 ono. John, Tel: (0625) 75707, eves.

**YAMAHA DX7**, TX7, RAM, 4 ROMS, home use, offers? Tel: 01-609 3083, after 7pm.

**YAMAHA DX7** boxed, as new, home use only, ROMs, manual, bible, may deliver, £950. Tel: (0787) 277913.

**YAMAHA DX7** boxed, as new, three mths guarantee, £950. PSR31 £299, full guarantee. Tel: (0625) 619013, after 4pm.

**YAMAHA DX7**, £750. Yamaha TX7, £300. Both in perfect cond. Tel: Bloxwich (0922) 479414.

**YAMAHA DX7** 2ROMs, exc cond, boxed, £930. Wanted: Casio CZ101, £130. QX7 £125. Immediate cash & collect. Tel: Wells (0749) 76896.

**YAMAHA DX7** with two ROMs, vgc. £795. Jeff, Tel: (0223) 242553.

**YAMAHA DX7** good cond, + 2ROMs, £750. Phil, Tel: 01-328 2985.

**YAMAHA DX7** plus ROMs, manuals, £850. CX5 computer, three software cartridges, kbd. Mark, Tel: Brighton 695252.

**YAMAHA FB01** as new, boxed, £220. Richard, Tel: Romford 49565 home; Basildon 403514 work.

**YAMAHA MK100** built-in synth, drum m/c, bassline, sequencer, £175 ono. Tel: Dymchurch (0303) 874603.

**YAMAHA MK100** fully programmable, 49 notes, stereo chorus/tremolo built-in speakers, vgc. £110. Tel: High Wycombe (0494) 26960.

**YAMAHA MP1** mini keyboard that prints music, £150. Len, Tel: Faringdon (0367) 20732.

**YAMAHA PIANO** upright acoustic, cost £2300, six mths old, offers? Adam, Tel: (0698) 749375 eves.

**YAMAHA PSS5** polyphonic stereo kbd, vgc, PCM drums, real-time sequencer, case, stand, £200. Tel: (035 387) 586.

**YAMAHA PSR31** still guaranteed, immac, RRP £400, quick sale at £215 ono. Tel: 01-642 9131 (Surrey). pm.

**YAMAHA PSR40** keyboard, extensive auto accomp, as new with carry case. Tel: 061-980 6140.

**YAMAHA PSS 560** electronic kbd/synth, hardly used, guarantee, £150, good for busking. Tel: 01-651 2017, eves.

**YAMAHA SS30** string m/c, with f/case, the best analogue strings, £195. Tel: Bristol (0272) 561855.

**YAMAHA TX7** leads, manual, etc, mint, £325 or p/x DX21. Tel: 01-977 9531, days.

**YAMAHA TX81Z** programmable DX in a box, £345. Tel: Henley (Oxon) (0491) 573980.

## Sampling

**AKAI X7000** sampler with disks, £850 ono. Andy, Tel: Portsmouth (0705) 665179.

**AKAI X7000** sampler, plus 16-voice xpansion board and disks, £795. Brian, Tel: (0703) 442886.

**AKAI X7000** swap for S612/MD280, plus Juno 106. Martin, Tel: (0229) 29981 (Furness area).

**BOSS MICRORACK** RSD10 sampling delay, boxed, immac, £120. Chris, Tel: 01-684 2853, after 6pm.

**BOSS RSD10** sampler £140; RPS10 harmoniser £140; DSD2 sampler £100; RX100 reverb £65. Tel: Slough 76406.

**CASIO SK1** sampler, £60. Barry, Tel: 01-807 6041, eves.

**CASIO SK1** sampling kbd, brand new, swap for CBM64 or other computer, consider drum m/c. Tel: (0745) 582180.

**E-MU EMAX** kbd and 40 extra sound disks, guaranteed, £1895. Tel: (0304) 365692.

**E-MU EMAX** boxed, as new, home use only, £2300 or offers. Tel: Guildford (0483) 571281, X2318.

**E-MU EMULATOR II**, £3000. Selection of disks available, private use only, good condition. Tel: 01-994 6094.

**ENSONIQ MIRAGE** full library, + MASOS, £850. Poly 800 MkII, £225. Julian, (0792) 299699, after 6pm.

**GREENGATE DS:3** sampler, sequencer, Apple II+, colour monitor kbd, and software, £599. Graham, Tel: Leicester (0533) 884123.

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**GREENGATE DS:3** complete system, all software, exc sounds, Apple software, printer, days free instruction, £600. Tel: 01-883 6753.

**GREENGATE DS:3** sampler, Apple IIe, d/drives, MIDI create all drums/kbd now! Mint, £700. Tel: (0602) 411185.

**GREENGATE DS:3D** sampler/sequencer, Apple IIe, twin drives, monitor, MIDI, performance kbd, sound library, looping, DDL etc, £850 ono. Steve, Tel: 061-336 0366.

**GREENGATE DS:3** wanted with keyboard for use with Apple IIe, Mark, 2 Turton Drive, Chorley, Lancashire PR6 0ER.

**KORG DSSI** sampling synth with hard case, 5mths old, £1499. Mike, Tel: 01-470 7612.

**SCI PROPHET 2000**, 512K memory, double sided disk drive, guaranteed. Cost £2300, will accept £1900. Craig, Tel: 01-348 4761.

**SCI PROPHET 2000** perfect, offers £1000+. DX7 MkI, Sycos memory expansion, £850. Polymoog £350. Offers? 3-Tier stand, £50. Tel: 01-885 5665.

**OVERHEIM DPX1** sample player, plays Emulator, Prophet, Mirage disks, unused, perfect, £1200. Tel: 01-788 5687.

**ROLAND MKS100** plus 26 disks, less than 1mth old, fully guaranteed, £450 ono. Tel: Preston (0772) 861368.

**ROLAND S10** sampler, immaculate, professional disks (EII, S10, DX7 etc), HUO, £839 ono. Jel, (053 759) 2222.

**ROLAND S10/MKS100** owners: let's swap samples! I have approx 25 disks. Korg EX800 module £120 ono. Swaps? Paul, Tel: (0772) 315638.

## Sequencers

**CASIO SZ1** MIDI sequencer, 4-ch as new with power supply, £99. Tel: Folkestone (0303) 41880.

**CASIO SZ1** 4-tr MIDI sequencer, £165. Roland PR800 digital piano recorder, £80. Chris, Tel: Chester 44657, after 6pm.

**KORG SQDI** amazing spec, £350 or swap AX73/106/DW6000/DX21. Possible delivery. Jerry, Tel: (0727) 31761, office hrs.

**KORG SQDI** MIDI sequencer, boxed, manuals, as new, £300. Tel: (0922) 07967.

**ROLAND CSQ600**, £70 ono. Moog Prodigy, £75 ono. MC202 £60 ono. Two X-type stands £60. Glen, Tel: 01-595 6245.

**ROLAND MC202** MicroComposer, boxed, with manuals and Boss psu, £80 ono. Mike, Tel: (0299) 250006 (West Midlands).

**ROLAND MSQ700**, £335 ono. Korg EX800 £115. Roland CR8000 drums £80. Swap QX5? Paul, Tel: (0772) 315638.

**YAMAHA QX21** sequencer, as new, boxed, instructions, £220. Tel: (0483) 502225.

**YAMAHA QX21** sequencer, unmarked, boxed, bomb-proof cassette interface (field tested!), £200. Bude, Tel: (0288) 3049.

**YAMAHA QX21**, £175. Yamaha RM602 mixer £160, both unused. Drew, Tel: (0272) 40440.

**YAMAHA QX21** MIDI sequencer, manual, vgc, £180. Tel: Nottingham (0602) 286543.

**YAMAHA QX7** 6mths old, only used once, £110. Tel: 01-699 5857.

## Drums

**KORG DDD1** plus two ROM cards, £500. A real bargain. James, Tel: Swansea 202027.

**KORG DDD1** perfect cond, £500. Ben, Tel: Cardiff (0222) 706976.

**KORG DDM100** and DDM220 and Sync Track tape sync unit, £250. Tel: (0424) 713041, eves.

**OVERHEIM DX** drum machine, with synco-MIDI interface, originally £1400. For quick sale, £375. Tony, Tel: 061-434 0369.

**ROLAND TR606**, £75. TR303 £65. MC202 £85. SH101 £95. Boss DR220 A/E, £120ea. Tel: Slough 76406.

**ROLAND TR707** plus cartridge for triple memory, exc cond, only £350 together! Mark, Tel: (0272) 655474.

**ROLAND TR707**, £300. Roland MC202 £75. Korg DDM220 £75. Home studio use only. Tel: (0532) 775507.

**ROLAND TR707**, £280. Tel: 051-625 5141.

**ROLAND TR909** new, unused, boxed, manual, £2650 ono. Tel: (0443) 400362/404017 (S. Wales).

**ROLAND TR909** MIDI, tape sync, tunable sounds, vast memory, boxed, new cond, £275. Tel: 01-891 1591.

**ROLAND TR909** individual outs, tunable sounds, MIDI etc, home use as new, £220. Tel: (0484) 602193.

**SIMMONS SDS5** brain, £250 ovno. Patrick, Tel: (0733) 45868, anytime.

**SIMMONS SDS800** brain, unrigged, immac, fab, groovy, etc, best offer secures. Matt, Tel: (0442) 68198 (Herts).

**SIMMONS SDS9** brain, £650. E-mu Drumulator £200. Greengate DS3:D system, £850. OSCar (MIDI), £275. Steve, Tel: 061-336 0366.

**YAMAHA RXII** home use only, boxed, manuals, £350. Tel: 01-568 1761, eves.

**YAMAHA RXII** vgc, £320. CX5, all software, small kbd, £220. Both ono. Tel: (0602) 586004.

**YAMAHA RXII** digital rhythm programmer, absolutely mint, under guarantee, only £380 ono. Tel: Dean (0865) 722804, eves.

**YAMAHA RXIS** boxed as new, hardly used, c/w MIDI cable, output lead, £299 ono. Nigel, Tel: (0625) 75707.

**YAMAHA RXIS** boxed, with manuals, perfect cond, a bargain at £195. Tel: (0952) 883756.

**YAMAHA RXIS** as new, boxed with manuals, bargain £230. Tel: (0977) 42659, after 6pm.

**YAMAHA RXIS** powerful sampled drums, excellent cond, £250 or swap for SPX90. Andy, Tel: 01-748 6744.

**YAMAHA RXI7** dynamic drums, immac, virtually unused, £270. Yamaha TX7, vgc, £400-ish offers invited. Jason, Tel: (0706) 217260 (Lancs).

**YAMAHA RX21** boxed, manuals, bedroom use only, £130. MTR 6:4:2 mixer £180. Richard, Tel: (0384) 78794.

**YAMAHA RX21** still guaranteed, vgc, £140. SFG05 sound module £70. Tim, Tel: 254141, after 6pm.

## Computing

**AMSTRAD CPC464** games, books, £200 ono. Kevin, Tel: 021-783 7696.

**APPLE IIc** two disk drives, monitor, ex-Greengate, £250. Tel: 01-237 0837.

**APPLE IIe** system, two drives, printer, Apple screen, 80/col, Z80/CPM clr VHF-card, Wordstar, Multiplan + 90 disks, £549. Tel: 01-435 8249.

**APPLE DISK** copier: make back-up copies of protected software, DS:3 loop etc, £25. Tel: (0533) 884123.

**BBC B DSDD** disk, Music 5000, EMR MIDI system, sideways R\*M, lots of software, £500. Tel: 01-764 4583.

**COMMODORE 64** disk drive interface, Steinberg Pro 16 software, sold together or separate, sensible offers. Mike, Tel: 01-631 5168.

**COMMODORE 64** plus disk drive, Steinberg Pro 16, sync interface, note editor, CZ editor, £310. Tel: 051-625 5141.

**COMMODORE 64** data cassette, joystick and games, £100. Chris, Tel: (0803) 863959.

**EMR software** for BBC computer: composer, £21. Performer £22. Apple Writer II software, £30. Tel: (0226) 756512.

**EMR MIDI** interface for BBC B, performer, editor software, £80. Dynamix 6:2, £95. Steve, 01-930 2313, X2020.

**RAM MUSIC MACHINE**, Amstrad (sampling, drums, echo), disk, £35. Cassette, £30. Simon, Tel: 01-300 0644.

**SPECTRUM SYSTEMS 10** MIDIsync interface and 10-tr software, Ver. 2.3, £100. Simon, Tel: 051-526 2178.

**SPECTRUM** and XRI interface, 8-tr sequencer software, boxed, all manuals, leads, power supplies. Tel: (0429) 223906.

**SPECTRUM**, Interface I, Microdrive, cartridges, XRI Micon, sampler, I/F007, joystick, printer, much software, £320. Tel: (0622) 26861.

**STEINBERG PRO 16**, Pro interface, £180. CZ101 £150. 200W 4X10, £99. All vgc. Tel: 01-639 4956.

**STEINBERG PRO-CREATOR** for Atari ST, create 1000s of Yamaha DX patches instantly, £85 ono. Tel: 01-733 2126.

**SWAP SPECTRUM+**, Music Machine, SpecDrum, microdrive, printer etc for good sequencer (QX21). Giles, Tel: (0526) 20175.

**SWAP SPECTRUM+**, joysticks, loads of games and £60 for CZ101 or similar. Tel: (0325) 465812.

**SWAP YAMAHA CXSM**, large keyboard, software, voices, sequencer for Roland Octapad or £250. Tel: 01-367 1720.

**SWAP YAMAHA CXSM** accessories, mint + cash for your Roland guitar synth. Huw, Tel: (0792) 401533.

**TOTAL MUSIC** sequencing software for the Apple Macintosh, + MIDI interface, unused, £325 ono. Tel: 01-254 3020, eves.

**U-MUSIC UMI 3S** sequencer for BBC micro, fully guaranteed, £160. Tel: Grantham (0476) 65395.

**YAMAHA CXSM**, large keyboard, voicing, composer, DX7 voicing and RAM cartridges, offers around £200. Tel: (0272) 264560.

**YAMAHA CXSM**, kbd, sequencer/voicing cartridges, TV, 400+ voices, mags etc, £270 the lot. Tel: Middlesbrough (0642) 817369.

**YAMAHA CXSM**, large kbd, voicing, DMSI 8-tr sequencer, ROMs, £250. Tel: (0424) 713041, eves.

**YAMAHA CXSM**, large kbd, composer, voicing, sequencer, cartridges, boxed, extra books, £225 ono. Jon, Tel: (0702) 332323.

**YAMAHA CXSM**, large keyboard, voicing and composer cartridges, mint cond, £210. Bill, Tel: (0702) 557813.

**YAMAHA CXSM**, 2ROMs, 100s voices, Roland SH09 monosynth, £340 or split, lan, Tel: Truro (0326) 270914.

**YAMAHA CXSM**, large kbd, cartridges, software, manuals, magazines, £250. Tel: Brentwood (0277) 215552.

**YAMAHA CXSM MkII**, SFG05, kbd, composer and MIDI programs, £275 ono. Tel: Hinckley (0455) 611479.

**YAMAHA SFG05**, £50 ono. DMSIB, £30 ono. Tel: (0286) 77205, eves.

## Recording

**AKAI GX6350** open-reel 505 GX heads, ideal for home studio, many features, £275 ono. Tel: (0424) 425240.

**BOSS BX800** mixer, 8-ch, £230. Fostex 4-tr X15 Mk2, inc psu and MN15, £230. Both mint. Tel: 051-677 3691.

**BOSS RX100** 3-spring stereo reverb, mint, £100. Pearl analogue delay with Duplex and chorus, £50. Gordon Reid, Tel: (0638) 720090, eves.

**FOSTEX 160** unused, boxed, manual, etc, must be sold quickly, £480 ono. Jez, Tel: (0706) 73555, after 7pm.

**FOSTEX 160** 4-tr recorder, 5mths old, exc cond, boxed, £400. Sim, Tel: (0703) 792296, eves.

**FOSTEX 250** 4-tr/mixer + accessories, as new, £399 ono. Ewan, Tel: 031-334 6570, eves.

**FOSTEX M80** guaranteed, hardly used, £1500 ono. Paul, Tel: Swindon (0793) 613339 days; Newbury (0635) 254503 eves.

**FOSTEX XIS** boxed, manual, psu, remote, £200 ono or swap CZ1000/101, DX100, TR505, OSCar (MIDI), Midiverb/fex, TX81Z. Tel: (0387) 65276.

**G.B.S.** plus xlr cables and psu, £95. Fisher graphic £65 ono. Mark, Tel: 01-698 5662.

**H/H DIGITAL FX** unit, suitable SM200 or similar H/H mixer, £65 ono. Frank, Tel: Rainham (Essex) 53873.

**MIDIFEX**, £250. Slapback Scintillator £130. Big discount together, both new, unused, offers considered. Matt, Tel: (0252) 721264.



**MIDIVERB**, £240. Bass Microrack DDL £100. Flanger £70. 3-tiered kbd stand, £100. Pete, Tel: (0438) 723192.

**MR30** 4-track recorder, £200 ono. Boss 8:2 mixer, £200 ono. ISW amp, £30. Glen, Tel: 01-595 6245.

**PHILLIPS KAROOK** 50W amp, twin cassettes, echo, vgc, £100 or swap video. Tel: Sheffield (0909) 567151.

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