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# MUSIC TECHNOLOGY

## ALLAN HOLDSWORTH

Guitar Synths in Jazz

## MAN OVER MACHINE

Kahler's Human Clock Reviewed

## FAIRLIGHT'S FATHER

Exclusive Kim Ryrie Interview

## EIGHTH WONDER

Jupiter 8 Retrospective

## HOLGER CZUKAY

Technology's Eccentric Talks

## STEREO SAMPLING

How To Do It Best

## ON TEST

Yamaha RX5 Drums; Alesis MIDVerb II; Roland MKS70  
Module; Texture Software; Casio SK2100  
Keyboard; and more...



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MAY 1987

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## NO SAMPLER IS AN ISLAND

OVER THE LAST FEW MONTHS, you've been reading about the various trade shows going on in one part of the world or another, and about all of the wonderful product displays, about the unbelievable specifications, the new prices, and whatever else caught our reporters' eyes and ears.

Well, the trade show season has almost cooled off now, and most new musical instruments have been unveiled already (for a couple of months, anyway), and MT's writers are now left to follow up on boxes full of business cards and product brochures, in the hope that we'll eventually get some more detailed information into these pages in the months ahead.

The latest round of trade shows has revealed 16-bit sampling as the latest word in the numbers game. Everyone is waiting to see this new breed of digital musical instruments reach our shores (and stores), and while some may let news of these and similar developments put a damper on their next purchase, others will realize that there will always be newer versions of today's instruments - they'll be capable of more, and they'll probably cost less.

We've been pleased to see an increasing public awareness of the Small Computer Systems Interface (SCSI) and by the amount of equipment using it for fast storage of samples. The 3.5" floppies have done a great job for the last few years, and there's good reason for them becoming pretty much standard gear on 12-bit samplers, but now that we're seeing sample resolution increasing by another four bits, it's time to look elsewhere for fast sample storage and retrieval. Short of actually building a hard disk into the sampler itself, the next best thing is to use a 'standard' hard disk interface.

Now news comes to us that joining the Sequential Studio 440's SCSI implementation are the PPG Hard Disk Unit (which will use SCSI for back-up or transfers to other digital systems) and Optical Media's CD-ROM (a SCSI update option which will prove particularly

useful in conjunction with their forthcoming Universal Voice Library CD).

The most recent wave of excitement to sweep through the MT editorial office, however, is not due to any technological breakthroughs. MT is very happy to welcome Bob O'Donnell as our new Associate Editor in the USA. Bob comes to MT after two-and-a-half years with Up Beat magazine in Chicago, where he left his mark in editorial and advertising sales. Bob is a home studio musician whose guitar and trombone playing has brought him into a variety of public performances around the country in the last few years.

We've been trying to get Bob to admit a few of his eccentricities so we can get them on file here, but it looks as though we're going to have to dig deep to find some dirt. Keep an eye out for an update in future issues.

And while you might be wondering what we're all about, whether we spike our hair, or go bowling or whatever, the big question of the day is 'What about you?' Based on the fact that you're reading MT, we have reason to believe that your interest in the stuff we write about goes beyond a passing curiosity, but we're still making a lot of assumptions about you and your involvement with music. So if we're going to continue to give you more of what you really want, we need you to tell us more about yourself.

We've included a reader survey insert in this issue of MT, and hope you'll take a few minutes of your time to fill it out and send it our way before June 22, 1987. You'll find there are quite a number of questions to answer, but the more detailed an impression we can get of you, the better tailored we can make the magazine to your tastes.

To make matters a bit more interesting, we'll be drawing names out of a hat and giving away subscriptions (or subscription extensions) to ten lucky readers who get their profiles to us by this date. How can you resist? ■

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# IN THIS ISSUE

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## Readers' Writes 43

In a special pullout feature, we give you, the readers, a chance to have your say in the way the magazine will look to the future. We value your views, so don't forget to write them down and post them to your favorite musicians' magazine!

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Members of the San Francisco Synth Ensemble have been busy sampling sounds made by the Golden Gate Bridge. When, why and how have they gone about doing it?

### Holger Czukay 26

This notorious eccentric and founder member of Can is also one of today's most influential composers and musicians. What does he have to say on the subject of modern technology?

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One of the most inventive guitar players in modern jazz also just happens to be one of the leading advocates of guitar synthesis. What is it about the new techniques that fascinates him most?

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We preview a machine that has the potential to bring real-time additive synthesis to a wider audience than could have been predicted even a year ago.

### Yamaha RX5 Drum Machine 31

Yamaha's first attempt at an all-singing, all-dancing beat box has a phenomenal spec — and a phenomenal range of features that could make it a new industry standard.

### Roland MKS70 Module 60

Put the electronics of a Roland Super JX synth into a rack-mount format, and you have what looks like a pretty formidable package. But does it still look good alongside more recent innovations in sound-creation?

### Kahler Human Clock 72

Any machine that promises humans the ability to finally tame their technology has to be taken seriously. We find out if this particular innovation stands up to close scrutiny — both human and technological.

### ClickTracks Software 80

Software aids for soundtrack composers are becoming more and more common — and this one for the Commodore 64 looks like it could be as cost-effective as any. Does it work well in practice?

### Casio SK2100 Keyboard 83

It may look like just another home keyboard that's strictly for home players, but when an instrument can sample, sequence, and record drum patterns, it deserves another look from the pro fraternity...

### Peavey ED300 Amplifier 86

Drummers with electronic drum sets demand that their amplification systems fulfil some fairly specialized requirements. We assess the merits of Peavey's solution to the problem.

### Texture Software 56

Roger Powell's successful sequencing program for the IBM PC continues to benefit from continuous updates. What improvements does the latest set of revisions bring?



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Continuing the reverb theme, we look at how Alesis has gone about improving the incredibly successful MIDVerb concept. It's still presets-only, but there's more of them per dollar than ever before.

**The New Macintosh** 15

Apple has unveiled two new Macintosh computers that dramatically increase the capabilities of an already sophisticated machine. We assess their importance to the music industry.

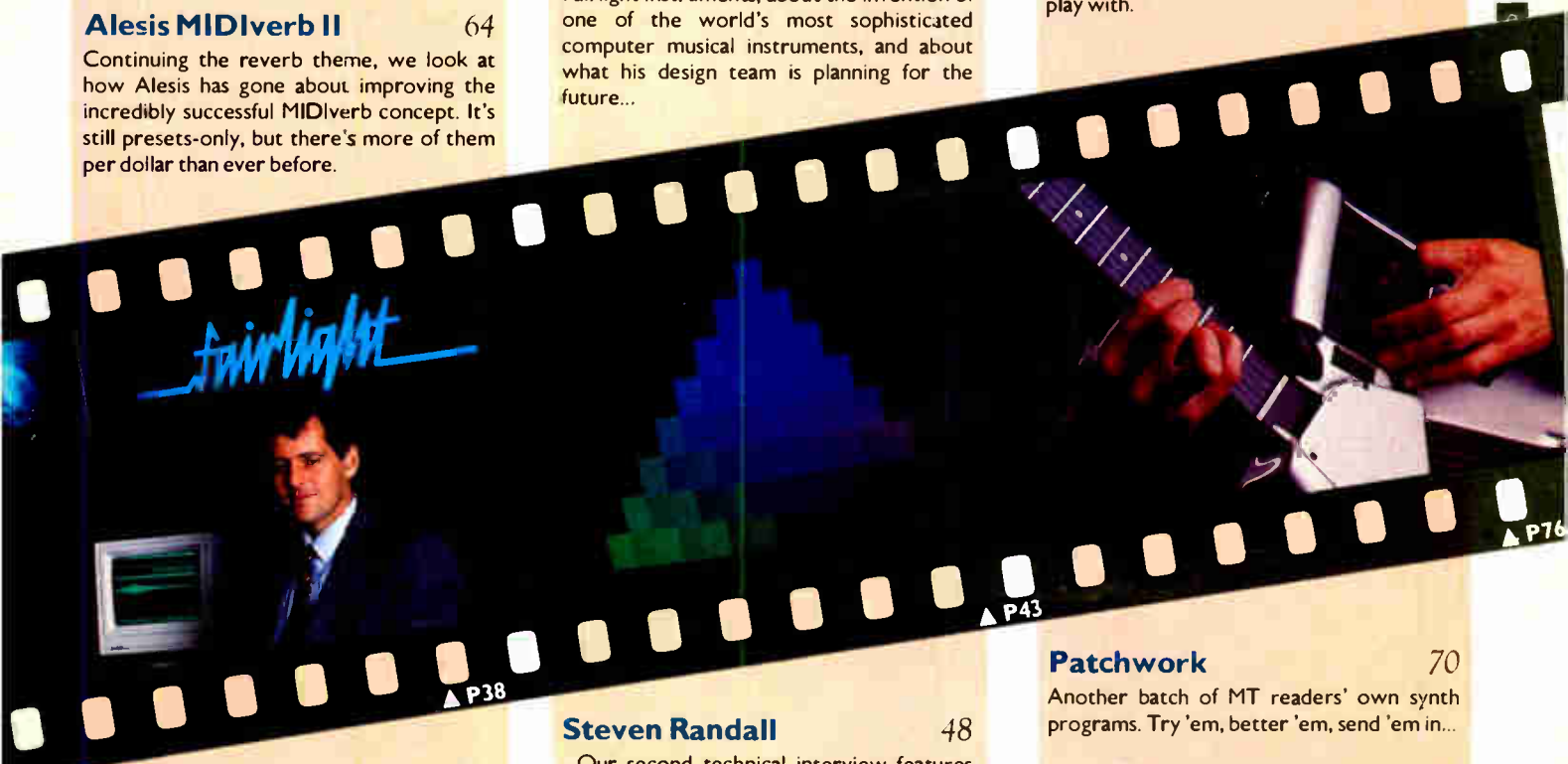
**Fairlight's Father** 38

We talk to Kim Ryrie, co-founder of Fairlight Instruments, about the invention of one of the world's most sophisticated computer musical instruments, and about what his design team is planning for the future...

**PROGRAMMING**

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...Beating like this. In the second part of our series on creative drum programming, we look at how you can go about making your drum sounds more exciting to listen to – and play with.



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We keep you in touch with the latest product developments – with the help of our extensive news coverage and our unique Software Page for computer music updates.

**Steven Randall** 48

...Our second technical interview features the man who invented the Stepp DGI guitar. What were his main design criteria, and what kind of guitar player does he see taking up his invention most easily?

**Eighth Wonder** 54

At a time when big, meaty analog synthesizers are few and far between, we look back at one of the most successful – and influential – of the breed, the Roland Jupiter 8. It's still usable today.

**Patchwork** 70

Another batch of MT readers' own synth programs. Try 'em, better 'em, send 'em in...

**SAMPLING**

**Sampling in Stereo** 22

Just because your sampling keyboard doesn't have a two-channel input, doesn't mean you can't make stereo samples. We guide you through a simple technique that can have a devastating effect.

# Are You A Slave To Your Machines?



## Free Yourself With The *Human* CLOCK™ T.M.



If you've ever tried playing live with a sequencer or a drum machine, you know what it's like to be a slave to your machines. The rigid tempo just doesn't feel right. Or, if you've ever tried adding sequenced material to a prerecorded track then you know what it's like to be the prisoner of your computer.

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# NEWS

## NEW SOUNDS FOR KAWAI R100

As musicians come to expect more and more from their equipment's capabilities, so do they expect more and more sounds with which to make use of those capabilities. Taking note of that fact, Kawai has announced that it is making a series of alternate sound ROMs available for its popular R100 drum machine. The first of these 4Mbit monsters, which should be available as you read this, contains 24 new sounds sampled at the same 32kHz rate and stored in the same 12-bit companded format as the instrument's original sounds.

The new ROM includes Atomic Kick and Snare, Room Kick and Snare, Acoustic Kick and Snare, Electronic Toms, Purple Rimshot, Click, Claps, Electric and Funk Bass Guitar, Electronic Snare, Tympani, Orchestral Hit, Brass Hit, Finger Snap and a few others.

The suggested retail price of the new ROM is approximately \$199, and this includes a ZIF (zero insertion force) socket, which greatly reduces the problems you can encounter when inserting and removing chips.

**MORE FROM** Kawai, PO Box 438, Harbor City, CA 90710. ☎ (213) 775-6030

## EMULATOR II MODIFICATION

EM owners who primarily use their instrument for percussive sounds and other drum machine-type applications take note: E-mu Systems has announced the availability of a hardware update for the Emulator II, Emulator II+ and Emulator II+HD. Known as the 'Attack Modification', the update significantly improves the Emulator II's transient response. This speeds up the attack time by up to five milliseconds (dependent upon the individual sound), giving percussive sounds more punch, and adding gain to most samples. This modification is available from E-mu service centers.

**MORE FROM** E-mu Systems, 1600 Green Hills Road, Scotts Valley, CA 95066. ☎ (408) 438-1921

## A PLUS FOR THE MAC PLUS

Are you a Macintosh Plus owner looking for a disk-based digital audio editing system? If you've got about \$15,000 to spare, Integrated Media Systems has a product for you. Dyaxis is the company's new disk-based recording system which uses the Mac Plus or Sun Microsystems Sun 3 computer for control. The Dyaxis system includes a true 16-bit linear phase audio processing system capable of real time direct-to-disk data transfer, a mass storage system capable of storing up to two hours of 48kHz sampled stereo audio information and a software package capable of recording, retrieving, editing and mixing stereo audio files.

As you might expect, Dyaxis performs  
MT MAY 1987

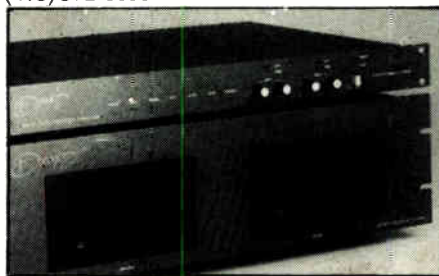


many of the processing functions required in audio post-production including: editing, multi-event stereo and mono mixing, panning, and special effects such as tape looping and digital enveloping. Sounds themselves can be controlled right down to the sample.

Some of the more advanced features of the system include three proprietary IMS innovations: PaL is a Psychoacoustic Linearization circuit which optimizes low level signals, AIMM is the company's Asynchronous Interactive Memory Management circuit, and two advanced filter circuits (one fixed at 20kHz for linear phase response and the other an active tracking filter network for variable sample frequencies) provide a frequency response of 5Hz to 20kHz.

The Dyaxis system can provide up to two hours of on-line Winchester hard disk storage for instant random access and can be backed up with an optical disk or a streaming tape drive.

**MORE FROM** Integrated Media Systems, 1552 Laurel St., San Carlos, CA 94070. ☎ (415) 592-8055



## STEINBERG KEEPS TIME

If you're ready to take the plunge into SMPTE (or are at least thinking about it), Steinberg is

now offering a multi-functional piece of gear which is well worth investigating. The SMP24 SMPTE-MIDI Processor reads and writes all four versions of SMPTE timecode (24, 25, drop frame and 30 frames/second), converts it to MIDI Song Position Pointer and functions as a two In, four Out MIDI Switcher. The unit also supports MIDI Time Code and can perform MIDI merging from its two inputs. The SMP24 is specifically intended for use with Steinberg's Pro24 sequencing program for the Atari ST computers, but it can also function with other MIDI sequencing programs.

Connections on the single space rack-mount SMP24 include two MIDI Ins and four MIDI Outs (the data transfer rates on MIDI In and Out 1 are programmable from 31.25 kbaud to 62.5 kbaud), Clock In and Out, FSK Sync In and Out, SMPTE In and Out, a Centronics port and a footswitch. The unit is capable of holding 32 sync programs, 128 master programs and 96 MIDI In/Out configurations in memory at once. Sync program parameters include SMPTE type, SMPTE start time, Clock in/out rate (from 1 to 192 ppq), MIDI clock routing, MIDI Song Pointer information and tempo. The 128 master programs each activate one of the 96 in/out configurations and can send up to 20 program change commands out of any MIDI output on any channel. The 96 configurations each offer 32 parameters including input number, input channel, eight status filters, two controller filters, output channel, transposition, velocity transposition and split points. The list price of the SMP-24 is \$1295.

**MORE FROM** Russ Jones Marketing Group, 17700 Raymer St., Suite 1001, Northridge, CA 91325. ☎ (818) 993-4091

# THE SOFTWARE PAGE

## SONUS SCORES

If you are a music reader who's been frustrated by the confusing displays found on many sequencing programs, then you should be happy to learn that Sonus has come out with a new program for the Atari ST and Macintosh computers which allows you to see your sequences in standard musical notation. SuperScore is a combination music scoring program/sequencer which both converts Super Sequencer, GlassTracks and Master-Piece data files into standard musical notation and also functions as a sequencer of its own. The score layout of the program allows you to use between one and 32 polyphonic staves and includes preset layouts for solo, duet, trio, quartet, piano, organ, leadsheet and choir. The built-in sequencer features the standard record and playback capabilities, quantization, transposition and a step-time record mode.

The scoring section of the program takes full advantage of the high quality graphics available on the ST and the Mac and allows the user to display a variety of key signatures, meters (1/2 to 64/64), clefs, brackets, music symbols and chord symbols. Sonus has also included a title page facility, the capability for auto and manual page layout, a display of measure numbers and the ability to write text anywhere on the page.

The editing features of SuperScore include insert, delete, copy, move, and a 'musical typewriter' which allows the user to add or replace symbols anywhere on the score with the mouse or keyboard. MIDI data is altered by simply making changes on the score, a very friendly means of doing a very tedious task. Suggested retail for SuperScore is \$425.

**MORE FROM** Sonus, 21430 Strathern, Suite H, Canoga Park, CA 91304. ☎ (818) 702-0992

## MIDISOFT SEQUENCER

For the budget minded Atari ST owner, Passport has introduced MIDISOFT Studio, a full-featured sequencer with a retail price of only \$99. Supporting 32 polyphonic tracks, MIDISOFT Studio features familiar tape transport-style controls and allows for both real-time and step-time recording. The main screen displays all the information that the user needs to record and playback multi-tracked sequences, including the name of each track, its status, MIDI channel and length in measures. The program also includes the capability for punch-in recording and allows

individual tracks to be combined, moved, copied and erased. Regional editing lets the user insert, delete, erase, transpose, paste and quantize specific user defined 'regions' within tracks. Finally, the program allows the user to select the time signature, tempo and metronome click, all of which can be controlled by MIDI sync or an internal clock.

**MORE FROM** Passport Designs, 625 Miramontes St., Half Moon Bay, CA 94019. ☎ (415) 726-0280

## SOUND ADVICE FROM ENSONIQ

The Ensoniq ESQ1 has proven to be one of the most popular synths introduced in the last few years; thanks to its excellent sound quality and impressive on-board sequencer, it has found its way into many a musician's home. And further proof of this comes from the fact that a number of companies are now developing software programs to support it. Two such programs, Sound File for the Commodore 64/128 and Macintosh, and ESQ Manager for IBM PC's, are actually being distributed by Ensoniq. Both programs, which are librarians for sounds and sequences from the ESQ1, have been produced by companies who have previously created programs in support of Ensoniq's Mirage sampler: Sound File was developed by Blank Software, who wrote the Sound Lab program, while ESQ Manager was created by Turtle Beach Software, who wrote Vision.

Sound File enables the player to create and edit unlimited numbers of banks and libraries for ESQ1 programs. In fact, more than 1700 programs can be stored on a single floppy disk. Sound File also has a 'song merging' feature which allows song files to be loaded and saved individually. On stage, Sound Bank's multi-bank memory storage more than doubles the number of available sounds, with up to four banks transferring in only three seconds each.

The Commodore version of Sound File requires a Passport- or Sequential-compatible MIDI interface and a Commodore compatible joystick. The Mac version simply needs a MIDI interface.

ESQ Manager allows copying and cataloging of sounds. Banks of programs and sequences can be saved using the PC's disk storage for virtually unlimited storage capacity. ESQ Manager uses Ensoniq standard file formats for its disk files, thus making it possible for users of

all Ensoniq librarians to share sounds and sequences easily. An ESQ1 program page is provided which shows all parameters of a sound on one screen. ESQ Manager also provides a live performance 'loader' for moving program banks or sequences into the ESQ1 during performances.

ESQ Manager requires an IBM PC or compatible with DOS 2.0 or greater, 256K memory and a MIDI interface. Both Sound File and ESQ Manager retail for \$99.95.

**MORE FROM** Ensoniq, 263 Great Valley Parkway, Malvern, PA 19355. ☎ (215) 647-3930

## PICK A CARD (32)

For those of you who are clinging to your Commodore 64's with great pride and satisfaction, Steinberg has released a very interesting new package they call Card 32. The unit combines a MIDI interface for the Commodore with EPROM versions of their Pro16+ sequencer with graphic editor and TNS Scorewriter notation program. Card 32 slides into the Commodore's user port and on power up presents the user with the main screen from Pro16+. No longer do you need to waste time waiting for the disk to load. Switching over to TNS Scorewriter, which is only available with Card 32, requires the touch of a single button. Both programs can also be turned off and the Card can function as a standard MIDI interface with one MIDI In, three MIDI Outs, Tape Sync In and Out, and Drum Sync Out.

Pro16+ is an improved version of Steinberg's Pro16 sequencer with two different graphic editors, one specifically for keyboard-oriented music. They constitute a new kind of aid for real-time editing of music.

TNS Scorewriter takes the music recorded on Pro16+ and transcribes it into standard music notation. The program can handle complex music accurately, including chords containing multiple note durations, overlapping groups of notes, ties, flags, beams, rests and any time signature. TNS supports a music editor that allows you to set, insert or delete notes and rests at any place in the music. Card 32 has a suggested retail price of \$399.

**MORE FROM** Russ Jones Marketing Group, 1700 Raymer St., Northridge, CA 91325. ☎ (818) 993-4091

## CORRECTION

In the March 1987 issue of MT, we indicated that the Public Access Synthesizer Studio (PASS) was no longer in operation. To say the absolute least, this is far from being the case. Slightly astonished staff member Brenda Hutchinson assures us that PASS is alive and well and still operating in New York City. They have in fact moved to a new location at 596 Broadway, Suite 602, NYC 10012, and in the process have improved and updated their equipment. Our apologies to all parties for the error and any unforeseen side effects. Anyone interested in finding out more information about the organization should call Executive Director Carol Parkinson, ☎ (212) 431-1130



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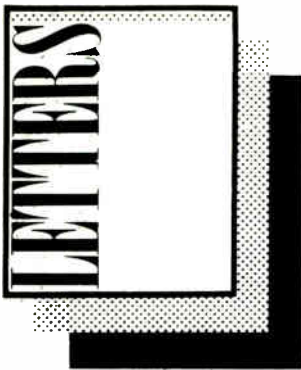
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SMALLER QUANTITIES AVAILABLE



### Dear Music Technology,

I first encountered the 'Great Sampling Debate' a while ago when I first heard a sampling machine. I agree with most of the comments made since the instigation of this debate by John Charlillo in the November issue. It seems that there is a big emphasis put on imitative sampling, and, for that matter, imitative synthesis, too. There should be more emphasis on new 'creative' sounds, rather than the imitating of the old Piano-Strings-Brass song and dance. When Mr Charlillo said that we need to '...become virtuosos on our instruments ...', he was right. The only way for anyone to become virtuosos of any instrument is to learn about that instrument.

It would be in the best interests of anyone who wants to learn how to use a sampling instrument to learn the Techniques of Sampling, and not just the technique of sampling a piano. It is the same as in synthesis: you have to learn how the different parameters affect the sound. A person should learn how each parameter works, rather than just what parameters go into making a specific type of sound.

I am very pleased to see articles in MT on such people as Morton Subotnick. For a real taste of 'creative' synthesis, I advise everyone to listen to this man. I look forward to hearing some of his work in sampling. I would like to see more articles on the avant-garde, and other people not involved in the mainstream.

Music is subjective, no matter where you find it, or what instruments are playing it. It is still music. You just need a true desire to play.

**Michael J. McGonagle**  
Plymouth, MI

### Dear Music Technology,

In response to Douglas Adams' observations about left-handed MIDI guitar controllers, there is a system that accommodates the southpaw with ease. The K-Muse Photon MIDI Converter, in addition to being the fastest, most accurate and flexible guitar-to-MIDI system on the market, works equally well on both right and left-handed instruments. No modification is necessary to either the Photon pickup or the operation of the system as a whole. And yes, many of our customers are left-handed.

**Brad Cox**  
Customer Service Manager, K-Muse

### Dear Music Technology,

I have been enjoying my new subscription to Music Technology; the reviews are refreshing in their candid approach. Whether the product is advertised in your magazine or not, you give both good and bad points of the product and as a mag I find it useful - I have received the feeling from other magazine reviews that the writer simply read the specifications and never touched the system.

Your technical articles go into enough depth to keep the 'techy' side of us busy (please don't be afraid to get really technical now and then), while the interviews give the right side of our brain a perspective on the issues in music and technology.

I recently found myself recommending several articles from back issues of MT to my brother, a fellow musician. I have realized that I will continue to find interesting articles in MT, and the best way to make sure my brother gets to see all these articles is to get him a subscription. Please find the enclosed check. Cheers!

**Roger Meike**  
Morrison, CO

### Dear Music Technology,

I have enjoyed your magazine very much. I am a working musician who buys a considerable amount of equipment, so I find your technology reviews and application articles most helpful. Although I have seen advertisements for composition software, I have not seen any objective review articles on MIDI music composition software. If you have not done such an article yet, I feel it would be very useful.

I am getting rid of my tape recording system and going to a computer-based recording system. I have an IBM AT and a Mac Plus, and I would like to know what is the easiest, yet most comprehensive software package available for each.

Again, thanks for producing a great magazine.  
**Gwyneth B. Churchill**  
Radford, VA

### Dear Music Technology,

In response to Tim King's letter in the March 1987 issue of MT:

'Reviewers should keep their opinions to themselves and give us the facts', states Tim King in the March letters page. Tim, I congratulate you on your ability to deduce sound quality and artistic potential from just reading a spec sheet, but at least I write for those poor downtrodden readers who perhaps haven't thought of everything yet (artistically or functionally), or are curious to hear subjective opinions.

Now, I am being unfairly hard on you, but my first questions after asking a friend for the specs

on a new piece of equipment are 'What did you think of it? Did you like it?'. True, not everybody has the same opinion (wonderful world, isn't it?), and this means readers have to get a little bit of experience on whether or not they tend to agree with a particular reviewer (just as for movies, food, or beer). For you to mention that David Ellis missed some 'neat' stuff shows some sort of value judgement of your own. True, if a reviewer missed something (and we often do, in our headlong rush to do things quicker than possible), s/he should be berated - reviewers do influence whether or not a certain piece of equipment or software gets purchased (or even looked at), and being wrong directly hurts the user, the manufacturer, or both.

If, in your opinion, or by fact, you see us as wrong, help your fellow users and call us out on the carpet - but I for one want spec sheets and advice - not to protect myself as a writer, but to protect myself as a user.

**Chris Meyer**

### Dear Music Technology,

Thank God! Finally, a magazine that cuts through the bullshit and gets to what matters to musicians: Equipment, how it works, and how to apply it, if it's any good.

Keep up the good work. And as far as I am concerned, your magazine is the only one I want!

**Jeff Byers**  
Pella, IA

### Dear Music Technology,

Today I picked up my first copy of Music Technology (March 1987) and was very pleased. I was, however, rather disturbed by your editorial, 'Showing Out'. From the marketing attitudes described it should have been titled 'Showing Off'. I can't believe that manufacturers would make as foolish a business move as ignoring or slopping off the music press.

It's no wonder their sales are so low. How else do they think that non-technical musicians will become exposed to their products? I recently spent some time with a rep from a particular music technology company, and he and his colleagues were very frustrated because they couldn't get any 'actual musicians' to attend their seminars and shows. But the company never approaches musicians on a street level. With no ads in the 'rock rags', no simplified explanations, and \$30 instruction manuals (that should be free) - it's no wonder they're desperate for sales.

Get with it manufacturers - musicians want to learn and expand - but if you continue to speak in your technical hieroglyphs, you will all go unnoticed.

Keep up the good work, MT, and keep it simple.

**M. I. Guerriere**  
New York, NY

MT MAY 1987

# Truly Professional

In the short time they have been available, Kawai's K3 and K3M synthesizers have been recognized by musicians and computer enthusiasts alike as truly professional musical instruments with

sophisticated capabilities and warm, rich sounds.

The K3 keyboard and its companion K3M synthesizer module have been accepted by leading professional musicians such as Jan Hammer and Tom Coster. They find the K3's unique sound a perfect compliment to their existing electronic music systems.

Computer software companies such as Opcode, Dr. T's, Hybrid Arts, and Compumates also support the K3 with sound editing software for the Atari ST and 130 XE, Apple II and Macintosh, IBM PC, and Commodore 64 computers. These software packages allow graphic editing of the K3's unique programmable

user-wave. They also have advanced voice editing and librarian functions that allow patches and user-waves to be easily accessed from disk and via modem.

So take a listen to the surprising Kawai K3 on the "Miami Vice" television show, on tour with Tom Coster and "Vital Information," or at your local authorized Kawai electronic musical instrument dealer.

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## Jan Hammer

*"When you think you've exhausted all possibilities of creating new sounds, Kawai brings out the K3M which enables me to use a whole range of sounds that compliment both my FM and analog instruments."*

**KAWAI**  
The Master Builder

## Tom Coster

*"The Kawai K3 and K3M combination is a powerful combination: analog punch and digital sounds of the 80's...a welcome addition to my keyboard setup. Thanks, Kawai!"*

*Tom Coster can be heard on two new CBS releases: "Global Beat" and "Vital Information" featuring Steve Smith and "Songs of Freedom" by Diana.*

# While you were playi

## INTRODUCING THE NEXT GENERATION DX7.

You said you wanted a DX7 with more voice memory. And function memory. A split and dual tone system. More extensive MIDI implementation. Micro-tuning and a larger backlit LCD. We heard you.

We also did some listening on our own and came up with improvements like random pitch shift, real-time parameter changes, digital pan, two-channel design. And two models, the DX7IIFD with built-in 3.5" floppy disk drive. And the DX7IID.

Both have dual and split play modes to give you the power and sound of two DX7s. Any two voices can be combined and played as one in the dual mode. Split mode lets you assign different voices to the right and left sides of the keyboard.

The dual FM tone generators in the II

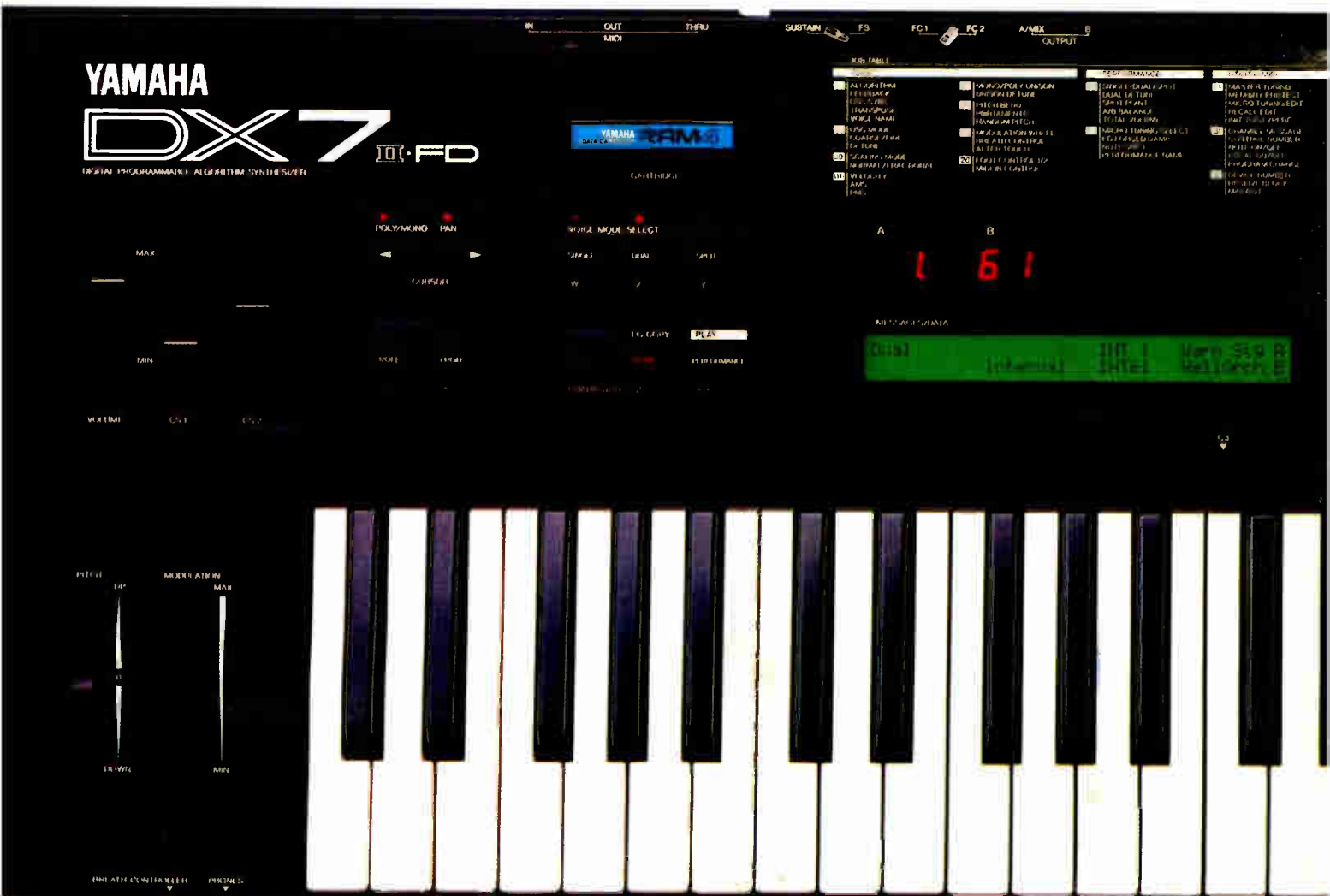
give true stereo output. They also open up some exciting new digital pan possibilities. And you can determine the position of the voices in the stereo field according to velocity, LFO and key number.

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First, with the new RAM4 cartridges. One of these will store the DX7II's total memory including 64 voices and 32 performance combinations, or 63 micro-tunings.

Second, with the DX7IIFD's built-in 3.5" disk drive. One 3.5" disk equals the storage capacity of 40 RAM4 cartridges. So you can



# ng, we were listening.

have a massive voice, performance, micro-tuning and fractional scaling library ready for virtually instant use and access. And a MIDI data recorder for recording and storing external MIDI equipment information.

A new larger 40-character by 2-line backlit LCD and two alpha-numeric LEDs make operating and programming the II a lot easier.

The II's new micro-tuning feature has 10 preset alternate tunings besides the standard. And two on-board memories let you create and store your own.

The all-new fractional level scaling function lets you precisely adjust the output level of each operator in three-key groups.

The new Unison Poly mode combines four tone generators for each key so you can detune to achieve a fatter sound. Aftertouch can also now control EG bias and pitch bend.

And an all-new FM tone generator system gives the DX7IIFD and DX7IID greatly improved fidelity.

So FM is sounding better than ever. Especially when you hear the new DX7IIs' very reasonable prices. Just visit your Yamaha Digital Musical Instrument dealer. And listen.

Or write to Yamaha International Corporation, Digital Musical Instrument Division, P.O. Box 6600, Buena Park, California 90622. In Canada: Yamaha Canada Music Ltd., 135 Milner Avenue, Scarborough, Ontario, M1S 3R1.

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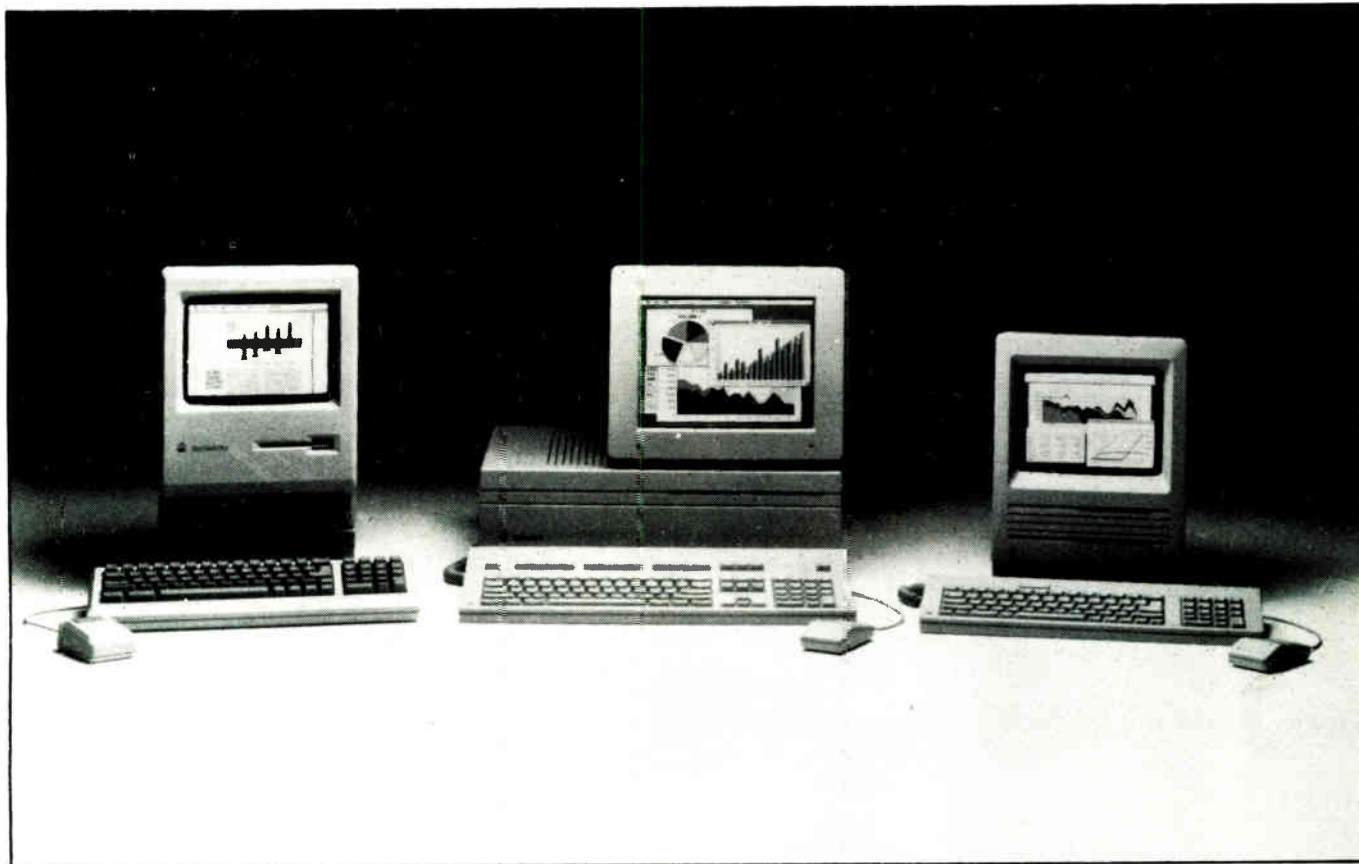
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# THE NEW MACINTOSH



**Apple have unveiled two powerful new computers in the Mac family. How do their specifications compare with those of the existing machines, and what could the new systems mean to musicians, engineers and producers in the long-term?**

*Text by Jim Burgess.*

**T**HE SCENE: a smoky auditorium. Guys in suits. The Apple logo everywhere. Dry ice fills the stage. Then, rising slowly and tantalizingly out of the fog: an IBM PC? No, it's the new Macintosh II. It just looks kinda like a PC.

With much pomp and pageantry, Apple has finally let the cat out of the bag. The end result of all those rumors we've been hearing since last year is indeed worth the wait: two powerful new Macintosh computers have been introduced, the Macintosh SE and the Macintosh II.

The SE is essentially a souped-up Mac Plus. It has the same basic appearance but offers some significant speed and performance improvements, along with expandability and a large complement of powerful new features.

The Macintosh II, on the other hand, leaves

Mac tradition behind. It boasts stunning color, six expandable slots for add-on cards, blinding speed, and enough computing horsepower to leave its ancestors in the dust.

Of course, both computers are compatible with existing Mac software. In addition, Apple's new Interfile system is designed to offer either computer compatibility with MS-DOS (read IBM) software applications, a move that should help Apple's efforts to establish the Mac with Big Business. Further to this end, both computers offer a choice of keyboards, including one that looks suspiciously like a PC keyboard, complete with function keys.

Both the SE and the Mac II feature ADB (the Apple Desktop Bus), the low-speed serial communications bus Apple introduced on the IIxS which permits up to 16 input devices to

be connected at once. Look for an assortment of special-purpose keyboards/keypads, graphics tablets, trackballs, and who knows what coming soon from third-party developers...

## **The Macintosh SE**

THINK OF THE SE as an expandable, high-performance Mac Plus. Although it looks like a Plus from the outside, the SE has a totally new internal design. For example, a single new gate chip array replaces 19 Mac Plus chips. And SE owners will be coasting along with a new, larger 75-watt power supply with its own built-in fan. Like the Mac Plus, the SE comes with 1MByte of RAM and can be expanded up to 4MByte on the logic board. It comes with twice as much onboard ROM (256K) as the Mac Plus, presumably to accommodate AppleShare (Apple's new file server) and a few new

surprises. Users may choose between two 800K floppy drives or a single 800K drive plus an internal 20MByte SCSI hard disk. The IWM (Integrated Woz Machine) floppy disk controller operates twice as fast as the Mac Plus, making it suitable for future applications such as accommodating 1.6MByte floppy drives when they become available.

Since the SE uses the same Motorola 68000 CPU as the Mac Plus, you might be wondering how Apple managed to make it perform 15-20% faster. Part of the answer is a change in the ratio of video accesses by the CPU, which effectively makes it available for computing about twice as often as its predecessor. Hard-disk users will be pleased to note a doubling of the SCSI transfer rate, partly thanks to a newer, faster version of the SCSI driver on the SE's ROMs.

Most important of all, SE stands for System Expansion. The SE-Bus is a 96-pin connector that provides direct access to the 68000 (and the rest of the logic board). Custom third-party expansion cards can be installed easily, and, if necessary, connect to outside peripherals via the Accessory Access Port on the back panel. Speaking of the back panel, it looks pretty much the same as the back of a Mac Plus: you'll find the same Modem and Printer ports, a disk drive port and a SCSI connector. About the only difference is two ADB connectors (they look like the Modem/Printer ports) that replace the mouse port and keyboard jack.

Because of the major internal design changes mentioned previously, Apple cannot provide an upgrade policy for existing Mac 128, 512 or Plus owners. Since just about all of the boards are different, I suppose Apple thinks it makes more sense to sell your Mac and buy an SE if you're so inclined.

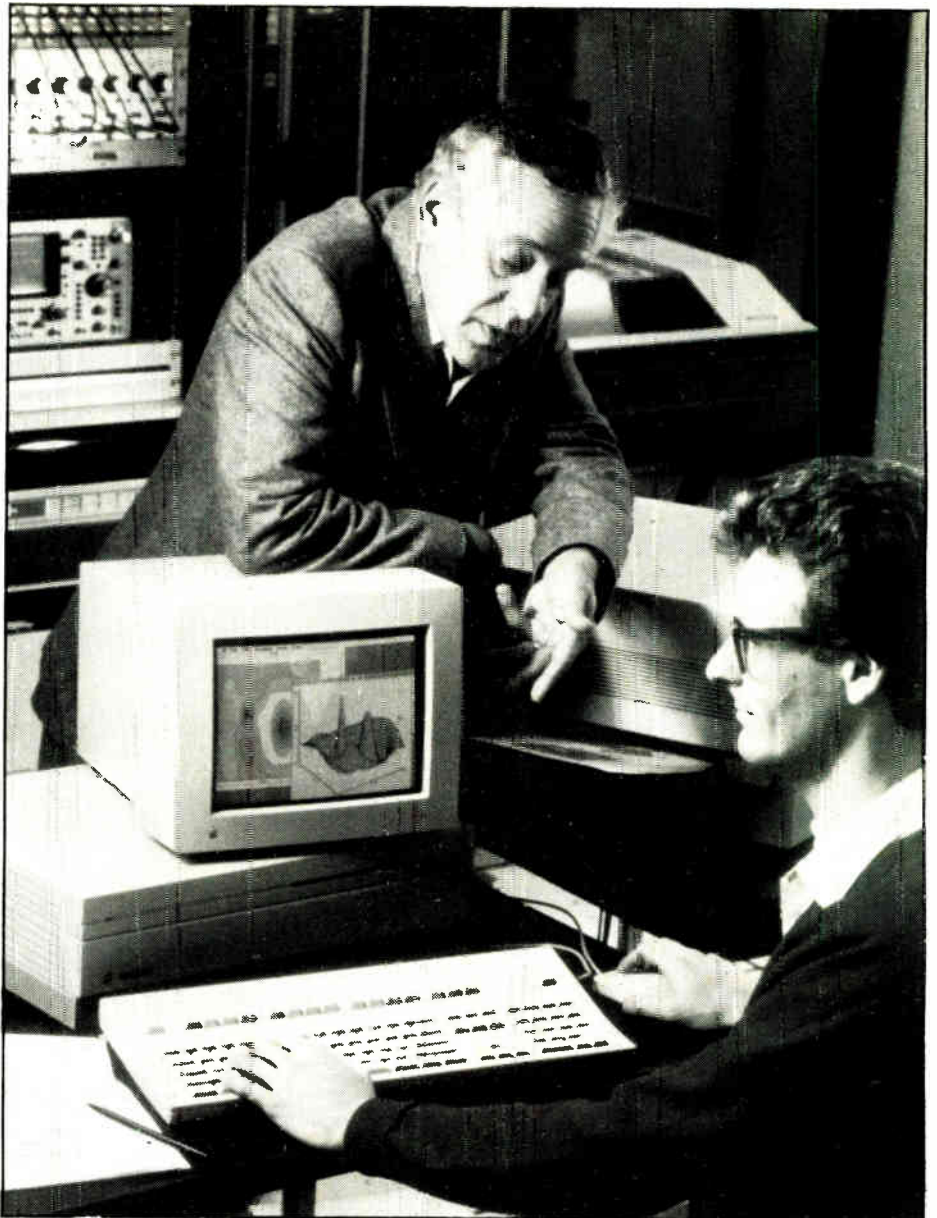
## The Macintosh II

NOW IT'S TIME to get serious: this is one very powerful computer. MIDI users are in for a constant series of treats from third-party hardware and software manufacturers over the next few years. From far away, it really does look like an IBM PC. Not for long, mind you; as soon as you get close enough to see the screen, you know you're looking at something new — brilliant color with amazing resolution. Prospective Mac II owners have a choice of either a 12" monochrome or a 13" RGB monitor. Those of us who have been squinting at those puny 9" screen for years can take heart.

The standard Mac II video card offers 640×480 pixel resolution and supports either monitor. It offers a palette of over 16 million colors, of which it can simultaneously display 16. An optional eight-bit Video Expansion Kit permits the video card to generate up to 256 colors or shades of gray at once.

Unlike the IBM PC, the Mac II's software never needs to know which video card is installed. That means you'll never have to buy a special video card to use a certain program. High-performance, third-party video cards are already on the way. SuperMac Technology has shown a prototype eight-bit video card with 1024×768 pixel resolution, enough to provide a huge high-resolution display. And

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AST Research has announced an eight-bit per pixel video digitizer for grabbing real images in color! Computer animation may never be the same.

Perhaps the best news of all is the six expansion slots that conform to the NuBus specification, a bus protocol originally developed at the Massachusetts Institute of Technology and already in use by Western Digital and Texas Instruments. NuBus offers card developers unparalleled flexibility in direct, 32-bit interfacing with the Mac II's CPU and logic board. Unlike IBM expansion cards, which require setting up DIP switches or using complex software install procedures, NuBus features geographical addressing. The cards contain configuration ROMs to identify themselves and their purpose in life to the Mac II's CPU on power-up. Nice.

Some specs to drool over. The Mac II is based on Motorola's new 68020 32-bit processor, which operates at 16MHz. It also comes standard with Motorola's 68881 floating-point arithmetic chip, a co-processor that can perform math operations up to 200 times faster than the 68020 can on its own. This enables the Mac II to process data at a rate of

over 2 million instructions per second. The Mac II's SCSI port transfers data at a rate of over 1MByte per second. That's over three times as fast as the Mac Plus!

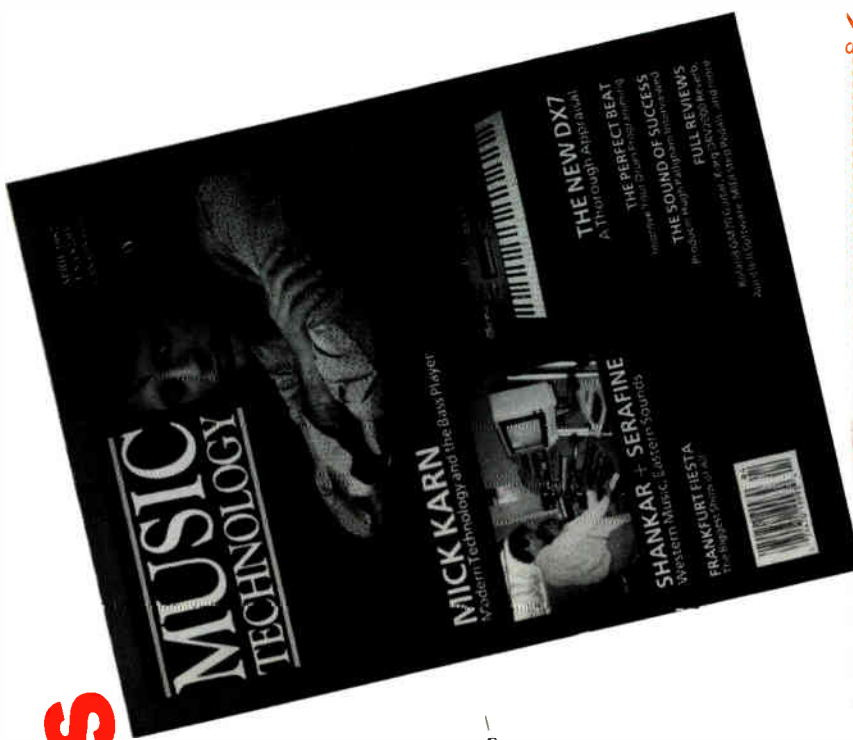
The unit is available with a number of different drive configurations. All Mac IIs come with at least one internal 800K floppy drive. The second drive can be either another 800K floppy, or your choice of 20, 40 or 80MByte internal SCSI hard drives. As with the Mac SE, a revised IWM floppy controller chip capable of supporting the soon-to-come 1.6MByte floppy drives comes standard.

The Mac II ships with 1MByte of RAM on the logic board in the form of four 256K SIMMs; you can expand to 2MByte simply by adding four more in the empty sockets provided. Towards the end of the year, Apple expects 1MByte SIMMs to be available in quantity. By that time you'll be able to buy the Mac II with 4MByte of RAM onboard and expand to 8MByte if necessary.

If that's not enough for your memory requirements, don't worry — external NuBus memory cards can be added at will. The back panel of the Mac II features the very same type of Modem and Printer ports as those on the

MT MAY 1987

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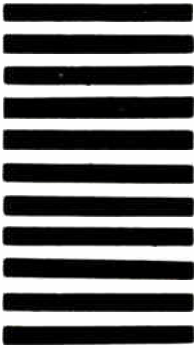
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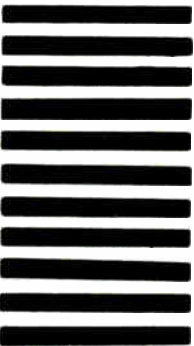
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Plus and SE, assuring compatibility with most existing peripheral devices.

Appletalk (Apple's own networking communications system) comes standard, but the Mac II will also be able to take advantage of more powerful networking protocols such as Ethernet (boasting a 10 MByte/second transfer rate) simply by adding the appropriate card.

On the subject of communication, Apple plans to break with tradition by giving Mac II users the option to use someone else's operating system. In addition to the aforementioned IBM MS-DOS compatible products available for both the SE and the Mac II, Apple will provide a version of the UNIX operating system known as A/UX. Furthermore, the Mac's User Interface Toolbox will be available to UNIX-based software.

What about the sound? Well, at last Apple have seen fit to improve the Mac's sound capabilities, much to the benefit of MIDI fans. The Mac II features four-voice stereo sound generation featuring a new custom sound chip. The ASC (Apple Sound Chip - what else?) offers two 1K sound buffers, permitting the computer to play wavetables or samples. Sony chips handle audio functions like filtering and amplification. Best of all, the Mac II can generate sound without tying up its CPU in the process.

### The New Potential

WHAT ALL THESE specification details mean is this. The expandable, high-speed Mac II opens the door to more advanced computer

music applications than have ever been available. The upward software compatibility offers an existing library of the most powerful music software currently available. And many new music-related products are already well under development.

The first thing we'll probably see is cheap Mac II MIDI interfaces on a NuBus card. How about a SMPTE/MIDI/MTC card? It's a natural.

But that's only the beginning. It shouldn't be long before a number of companies introduce high-quality 16-bit A/D and D/A converters that will open the door to making the Mac II what everyone really needs: a self-contained digital audio workstation.

Synthesizers may look very strange when they first start showing up in the form of PC cards, but we'll get used to it soon enough. Why not? Everyone's already got enough plastic ivories around, and the idea of a software-controlled card containing high-quality components like D/As, VCFs and VCAs has got to catch on quick. After all, it's been done successfully in the past on much more primitive systems.

I spoke to Peter Gotcher at Digidesign about the new Mac II and how it related to his company...

'Obviously we're very pleased with Apple's new machine. Existing versions of Sound Designer and SoftSynth are running four to five times as fast on the Mac II - without being modified to take advantage of any of the new features it offers.

'At last it's possible to do some of the things

in the digital signal processing field that we've been unable to before. We're in the process of developing several new software applications specifically designed to take advantage of the Mac II's power. We feel the Mac II has the potential to become a complete, cost-effective digital audio workstation.'

After those words, a couple of closing thoughts. I can't help but think that somebody's going to figure out how to take advantage of the UNIX operating system for musical applications. UNIX's multitasking capabilities must be able to play a role in the studio of the future, especially if that studio contains a number of Mac IIs assigned to different real-time control functions.

The availability of color and much more powerful graphics will undoubtedly have many positive effects on music software. Besides making the programs look nicer and perhaps more convenient to operate, color offers a whole range of useful new ways to display certain types of data more effectively. Fourier displays, multiple envelope shapes, sequencer note event-editing grids and other types of crowded graphic displays will reap the benefits of color to make them more informative.

I hope to see programs that use the Mac II's great graphics and high speed to bring the creative elements of music and graphic art closer together.

Animation driven by music; music created by animation. It's on its way - the sooner, the better. ■

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play  
BRIDGE

The San Francisco Synth Ensemble, a group dedicated to musical experimentation through new technology, are helping the city celebrate 50 years of the Golden Gate Bridge by sampling its sounds and using them to make music. How have they gone about accomplishing their task?

*Interview by Susan Alvaro; text by Bob O'Donnell.*

**S**AMPLING THE SOUNDS of the Golden Gate Bridge is probably not on your list of things to do in the near future, but members of the San Francisco Synthesizer Ensemble have undertaken the rather formidable task with the sort of enthusiasm that typifies their approach to electronic music-making.

The group recently made a successful proposition to compose and perform a piece at a celebration marking the 50th anniversary of the famous bridge, using sounds created by the bridge itself. Taking advantage of equipment provided for the occasion by Bay Area instrument manufacturers, E-mu Systems, Digidesign, Opcode Systems and TOA Electronics, they intend to do just that.

But who or what, you're probably asking yourself, is the San Francisco Synthesizer Ensemble? Well, the four individuals who make up the group, Paul de Benedictis, John Lewis, Doug McKechnie and Scott Singer, are well-established composers and performers from the Bay Area whose common goal is to create musical art with the hi-tech music tools that are now available. They also collaborate with visual artists to produce multi-media performances.

Group spokesman Paul de Benedictis explains how the SFSE came to be.

'Doug McKechnie and I had done multi-media performances/concerts as New Logic around the area, and Doug got the idea to rent a theater and draw on the rest of our friends to put together an even larger group. We talked to people like Sherman Kennedy, who did a week with us before going on the road with Stevie Wonder; Wernher Krutein, who does slides for us; John Lewis, Doug's partner in Soundtracks; and Scott Singer, a very talented musician, and then we got things going.'

De Benedictis adds that the group shares in the organizational responsibilities as well as the musical ones.

'Scott's our musical director, Doug's the producer, meaning he's the one who gathered the funds and put together all the technical

people, and as computer designer, I handle the Macintosh.'

De Benedictis' comment about the Mac is an important one because, as he points out, the computer plays an important role in the group's composition and performance.

'Aside from the piano solos we do, all the songs we perform use the Opcode sequencer, in conjunction with a Studio Plus Mac-to-MIDI interface, for most of the bass parts and all of the drum parts. The sequencer allows you to have up to 26 songs at the touch of a letter on the Macintosh, so all the parts we would have to overdub onto tape are played back by the Mac. We would be a huge ensemble if we played it all live.

'We also used the Mac and the sequencer program when we composed the music, because we decided we wanted it printed out, and with the Opcode's link to the Deluxe Music Construction Set we could get printed copy very easily.'

De Benedictis enthuses easily over the Opcode equipment because – in addition to his work with the SFSE – he is a product specialist for them. He is quick to point out, however, that his interest in computers for music applications began soon after he bought his first synth, a Rhodes Chroma.

'I bought the Apple II+ and the Chroma interface and software and then learned how to use the computer. Prior to this Doug McKechnie had been teaching me about synthesis, but after I got the computer we switched roles and I taught him about how the computer and software worked.'

Since that time, de Benedictis has added a Yamaha TX216, two TX7s, a 360 Systems MIDI Bass, a Roland TR727 drum machine, a MIDI'd E-mu Drumulator, the Macintosh, a Yamaha REV7 reverb, and a Polaris to his equipment arsenal. But he has still also held onto the Chroma...

'The FM synthesis sound is the opposite polarity of the Chroma sound, which is warm and rich and has fluctuating harmonics. The FM sound is clean and sharp and has nice metallic sounds, whereas the analog world is un-

controlled and random. It just wouldn't sound right without the Chroma – it's a nice complement to the FM.'

Apparently other members of the Ensemble have similar feelings, because both Doug McKechnie and John Lewis include Chromas in their setups. In addition, McKechnie uses a DX7, a TX7 and a REV7 reverb, and Lewis plays guitar through a Rockman and an SPX90. Music director Scott Singer has a Yamaha KX5 remote keyboard, a DX7, two TX7s, an SPX90 and a Lexicon PCM70.

The visual aspects of an SFSE performance are also achieved with the help of hi-tech equipment. According to de Benedictis, 'Our lighting designer, Clint Gilbert, lays out all the lighting cues on the Macintosh, and he uses a database to sort out all the cues and wiring for hundreds of lights. He also prints out all the layout sheets from the Mac to give to his people. So, as you can see, the Macintosh plays a big part in our shows.'

The Mac will also play an important role in the bridge celebration, an event which the Ensemble members are eagerly awaiting.

'This event represents an extraordinary opportunity for the Ensemble,' according to McKechnie, 'because it allows us to engage in some innovative experimentation with sounds and technology. The Ensemble was really created with the idea of exploring music outside of ordinary genres, and the idea of creating music from the sounds of the Golden Gate Bridge is something we feel to be very exciting.'

De Benedictis adds that the grand scale of the event is another enticing aspect of it.

'We're not the kind of group that plays gigs in bars. We like to participate in events that have a large-scale impact, and we obviously feel that this celebration is perfect for us. It should be very interesting.'

Indeed, that it shall; so if you are in the San Francisco area on May 24, head over to the bridge and give a listen. It may just sound like a giant harp after all! ■

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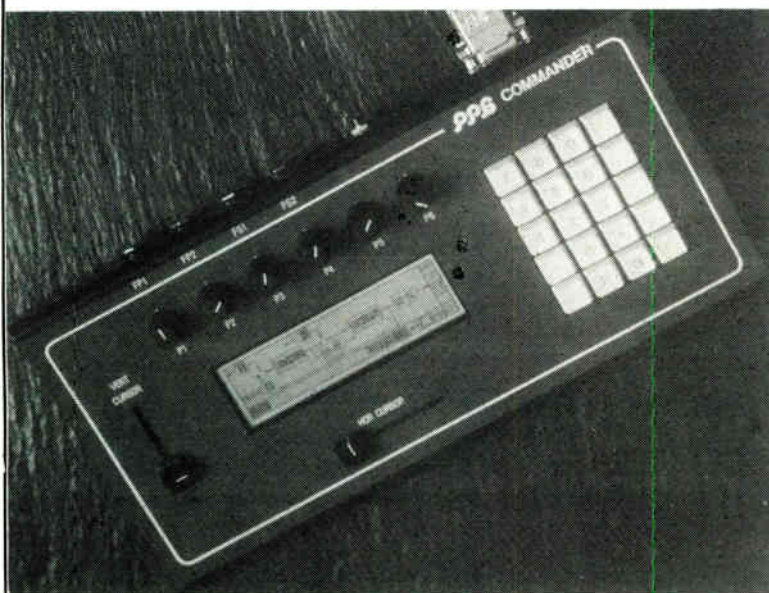
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# Kawai K5 Synthesizer



With sampling more popular than ever, the synthesizer fights back with new programming technologies – like Kawai's implementation of real-time additive synthesis. It's an exciting idea.

*Preview by Rick Davies.*

IF THERE IS one thing that this year's NAMM and Frankfurt shows made unmistakably clear, it is that static waveform-based keyboards are on the way out. Samplers are more popular than ever. Yamaha's FM and Casio's PD-based synths continue to offer impressively wide selections of dynamic timbres. Roland's D50 uses short PCM samples to spice up digital waveforms. And Kawai's new K5 uses real-time additive synthesis – and does so for under \$2000.

The K5 is a 16-voice instrument which features 48 'single', and 48 'multi' programs. In Single mode, the K5 plays one sound across the entire keyboard. In Multi mode, it assigns up to 16 'single' programs to individual key ranges which may overlap one another. When more than one sound is assigned to the same key, key velocity can switch from one sound to another, allowing the K5 to maintain its 16-note polyphony.

It's tempting to say that the K5 combines digital waveforms with conventional VCFs and VCAs, because that is *almost* the case. The fact of the matter, though, is that the Kawai's waveforms are generated using real-time additive synthesis, and all filtering takes place in the digital domain. So the K3 and K5 have *much* less in common than their appearances suggest.

Each 'single' program consists of two 'sources' which, by most synthesizers' standards, are complete voices on their own. Each source combines 64 harmonics to provide a raw (though by no means static) waveform, whose pitch may be modulated by any of four modulation sections. The resulting waveform is then processed by an 11-stage digital formant filter (DFF – good for vocal sounds), a digital dynamic filter (DDF), and a digital dynamic amplifier (DDA). In effect, the K5 provides control over its sounds at a similar level to most analog synthesizers, though the terms and controls used differ considerably.

The real key to the K5 is its digital harmonics generator (DHG), which controls the dynamics of each source's set of 64 harmonics. A high-resolution LCD gives a graphic representation of the basic harmonic structure, and with its help, you can adjust the level either of each harmonic individually, or of groups of harmonics. A 'trend' function allows groups of harmonics to be scaled either uniformly or with a tapering effect on higher harmonics for more natural-sounding timbres.

To add motion to the basic timbres, the level of each harmonic can be modulated by the four modulation sections mentioned above. Each of these combines the effects of key velocity, monophonic aftertouch, key number, LFO, and a six-stage envelope. This provides a selection of four complex dynamic modulation sources, which will certainly be easier to deal with than individual envelopes on each harmonic.

The K5 also provides individual keyboard scalings and LFOs for each source. The overall pitch of each source is then set by the digital frequency generator (DFG), which also provides a six-stage envelope for pitch modulation.

Although additive synthesis has come out of the shadows in the last year or so, the K5 is certainly the first affordable *real-time* additive synthesizer. What this means is that when you adjust the level of a harmonic, or group of harmonics, you hear the change instantly. On other additive systems (eg. Digidesign's Soft-Synth and Kawai's own K3) there is a pause while the computer calculates the new waveform.

The K5 also brings release velocity back to keyboard players. The DDA has a dedicated seven-stage envelope, and any of those stages may be modulated by attack (note  $\uparrow$ ) or release (note-off) velocity, so that the manner in which you release keys can be as crucial as how you strike them.

This wraps up the structure of the basic source: Remember, there are *two* sources in each single voice. Although the two sources are most likely to be used in parallel, with two different timbres, they can also be used together as a single 128-harmonic source (just in case 64 harmonics aren't enough). Add the K5's 'multi' programs to all of this, and the potential is there for a superbly flexible and musical keyboard instrument.

Programs may be stored in any of the internal 'single' or 'multi' program locations, or on RAM cards inserted into a front-panel slot.

To do justice to the K5's multi-timbral capability, four assignable audio outputs accompany the main summed output on the back panel, making this instrument well-suited to recording applications.

And the K5 is also available as a rack-mounting module, the K5m, in case you already have all the keyboards you need. Note, however, that not many keyboards generate release velocity, so not all controllers will take full advantage of the K5's DDA section if you opt for the module.

The K5's success will depend mainly on the range of sounds provided as factory programs, especially since many synthesists – unfamiliar with additive synthesis programming – will require some reference points to get going quickly. On the other hand, this is the first time additive synthesis has been so accessible, so there is likely to be a lot of interest in this instrument one way or the other.

In the meantime, you can look forward to a full review of the K5 in a forthcoming issue. I know I am. ■

**PRICES** \$1995; K5m \$1495

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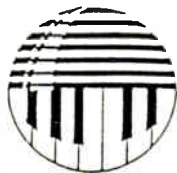
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**T**HAT SAMPLING INSTRUMENTS are growing increasingly popular these days is inarguable. Whether this upswing is a result of, or a cause of, their rapidly dropping prices is open to conjecture, but the fact remains that more and more musicians are getting into using these devices in order to augment their arsenal of sounds.

### Problems

THE AMOUNT OF available memory in these instruments is largely a function of the price of the instrument, though as raw computer memory gets cheaper and cheaper, we will undoubtedly start to see more and more powerful samplers available for less and less cost. The real expensive samplers like the Fairlight Series III and Synclavier offer not only higher fidelity samples, but allow you to sample literally minutes (if not hours!) of signal. Because their hefty price tag implies mammoth amounts of onboard memory, you can not only sample monophonically in these instruments, but you can actually feed a stereo signal in and sample in stereo – though this quite naturally halves the total amount of sampling time available to you. Smaller, more consumer-oriented samplers like the Emulator II, Emax, Prophet 2000, Akai S900, Korg DSS, and Ensoniq Mirage, having much less available onboard memory (generally well less than a minute of sampling at any kind of decent fidelity) don't offer such an option.

But recording engineers everywhere know the value of working in stereo. Recording two simultaneous audio signals instead of one (monophonic recording) allows for a great deal of spatial placement in the sound and generally makes for an audio experience that is far closer to 'reality' – after all, those of us not named Van Gogh have two ears, not one. Synthesizers with stereo outputs generally produce sounds of a richer quality, largely because of the inherent phase cancellations and reinforcements caused by this spatiality.

Furthermore, virtually all final recordings these days are stereophonic. Samplers are today increasingly becoming an extension of the audio tape recorder, as they allow manipulations like looping, splicing, and editing to be performed easily and without the need for barbaric devices like razor blades (shave and a haircut, please, and while you're at it, can you edit in a new chorus...?). One of the most common uses in a recording situation, in fact, is to feed a word or phrase directly from the multitrack recorder into the sampler and to then 'break, break, brbrbr breakbreakbreak' to your heart's content, in real time to the

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final mix. More often than not, however, vocals (particularly backing vocals) as well as instrumental tracks have been submixed into a stereo image. If you then take that stereo image and sample it monophonically, obviously it's going to take a fair bit of tweaking to then lay it back into the stereo mix with any kind of continuity.

### Solutions

SO WHAT DO you do? Hire in a Fairlight? Fine, if you've got the dough. But if you already own one of those less expensive samplers, you can pocket your money, because what I'm going to do here is to tell you how to obtain stereo samples in your existing machine.

This technique was perfected on an Emulator II, which is the sampler I find myself using most often, but there's no reason why it won't work on many of the other aforementioned samplers just as well. The only real conditions are: 1) Your sampler must offer you the ability to assign two voices to a single key; 2) It must provide separate outputs for each voice (this leaves out the Mirage, I know – sorry 'bout that), and; 3) It must give you the ability to truncate the beginning of the sample.

It will also be useful, though not mandatory, to have an adjustable audio threshold setting in order to actually start the sampling process.

First of all, of course, you'll need a stereo source signal. This could be a record, tape, or CD, or it could be a stereo output from a single stereo synth, or it could be a stereophonic submix from either tape or MIDI'd synth system. Let's presume, for this example, that our source signal will be the stereo output from a submix of several backing vocal tracks taken from our multitrack master.

One problem that needs to be dealt with is that the left channel may not actually begin at precisely the same time as the right channel; after all, in a stereo submix you can place any part of your total sound anywhere in an imaginary 180-degree plane. Let's suppose, for example, that the backing vocals are singing the phrase 'stick it in your ear' and that the male backing singers are singing right at the start while the female vocalists just come in for the 'in your ear' part. You might want, for example, the male vocals in the right channel and the female vocals in the left. Or you might put all the vocals on one side and a short digitally delayed version on the other side. You see what I'm getting at, I hope – the point is, both channels won't necessarily start at the same time.

So we'll need to somehow synchronize the two sides so that the total stereo image begins

# SAMP

Your sampling keyboard may not have the stereo inputs or ultimate sound fidelity of mega-buck computer systems, but using some simple techniques, you can make your own stereo samples – and reap some rich rewards.

*Text by Howard Massey.*

at the same time, even if one channel starts a bit later than the other. Does this mean we need to resort to an arsenal of Master Beats, SBX80s, and Cooper boxes? Nah – let's get even more basic than that, and use good old-fashioned physical reality instead. Meaning – tape. Or cassette. Or (best yet) a VCR tape medium for a digital recording (like the Betamax used in the Sony or Nakamichi PCM systems). If we dub our stereo source signal onto one of these media and precede it slightly with some kind of recognizable percussive signal, then clearly the distance between the start of that percussive signal and the start of our stereo source material (the stuff we really want to sample) will remain constant, so long as the tape or VCR speed remains constant.

Therefore, do the following: Record some kind of sharp, percussive sound onto your tape, cassette, or VCR (if you're using the PCM system), making sure that it is recorded on both tracks at the same VU level. A second or so later, record the actual stereo sound that you want to sample. Try to keep the gap between the two as short as possible, for reasons that will be obvious in just a moment.

The real purpose of this percussive 'leader' is simply to trigger our sampler into actually starting the sampling process – assuming that you are working with an instrument like the Emulator II that provides you with an audio threshold control. If your particular sampler

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# LING *in* STEREO



doesn't have that feature, however, there's a way around that problem, though one which isn't quite as precise: instead of recording a single percussive sound, record four of them in rhythm to act as a kind of 'count-off'. What you'll then need to do is to manually start your sampler sampling on the fourth beat. If you've got any kind of decent sense of rhythm, this should work pretty well.

Obviously, since none of the samplers we're discussing here has a stereo input, we'll have to sample each channel separately. If your instrument has an adjustable threshold control, be careful to keep it at exactly the same level for both samples. If you're not, try to start the sampler precisely on the fourth beat both times. If you feel underqualified to do this accurately, call up your sister's boyfriend who happens to be a drummer and have him hit the button for you. The trick in either instance is to get the start of the sample the same for both channels. This will ensure synchronization of the final signal.

The next step, after you've sampled both the left and right channels (and saved them to disk, of course — you don't want anyone tripping over the power cable after all this hard work!) is to edit out the percussive trigger. Listen to both samples individually, and determine by ear which one seems to start earlier — this is the one we'll edit first. If they both seem to start at the same time relative to the percussive trigger, then you

can work with either one first. While monitoring just the one sample you've decided to edit first, use your instrument's truncate feature to remove everything from the percussive trigger right up to the actual start of the sound itself. Before you make the truncation permanent, write down the value of the new start point (in bytes or seconds, whichever way your instrument displays it). Now go to the other sample, and without even listening to it, simply truncate its start at exactly the same point. Since we took great pains to ensure that both samples started at precisely the same instant (either by means of the threshold control or because of your sister's boyfriend's phenomenal sense of rhythm), we can truncate them both at the same starting point with confidence that they will remain synchronized.

All you need to do now is to assign both samples to the same key or series of keys (up to a two-octave range in the Emulator II, possibly more in other instruments) and then to utilize the individual outputs offered by your instrument. Feed the sends into your mixing desk and pan them hard left and right accordingly. In the Emulator II, you can achieve up to four-voice polyphony of your stereo sample by assigning the left sample to channels 1-4 and the right sample to channels 5-8 — then simply pan channels 1-4 of your mixing board to hard left and channels 5-8 to hard right.

## Results

THE SUBTLE BUT important phase differences in a stereo image will immediately yield huge benefits when you listen back to your stereo sample — you'll undoubtedly find that your sound is immediately 'bigger' and far less directional, which will in turn make it much easier to mix in with your final stereo signal. We've gone a long way since the days of mono, after all.

There's no reason why your sampling instrument should be providing only monophonic sound sources if it has the (these days minimal) capabilities outlined above. Try it — I guarantee you'll like it! ■

**Howard Massey** is a professional synthesist, musician, composer, producer and engineer who has been involved in the field of electronic music for over a decade. He is the author of *The Complete DX7* and co-author of *The Complete Guide to MIDI Software* and *A Synthesist's Guide to Acoustic Instruments*. He is currently Director of the Center for Electronic Music, a non-profit organization offering educational services in synthesizer and MIDI technology based in New York City.

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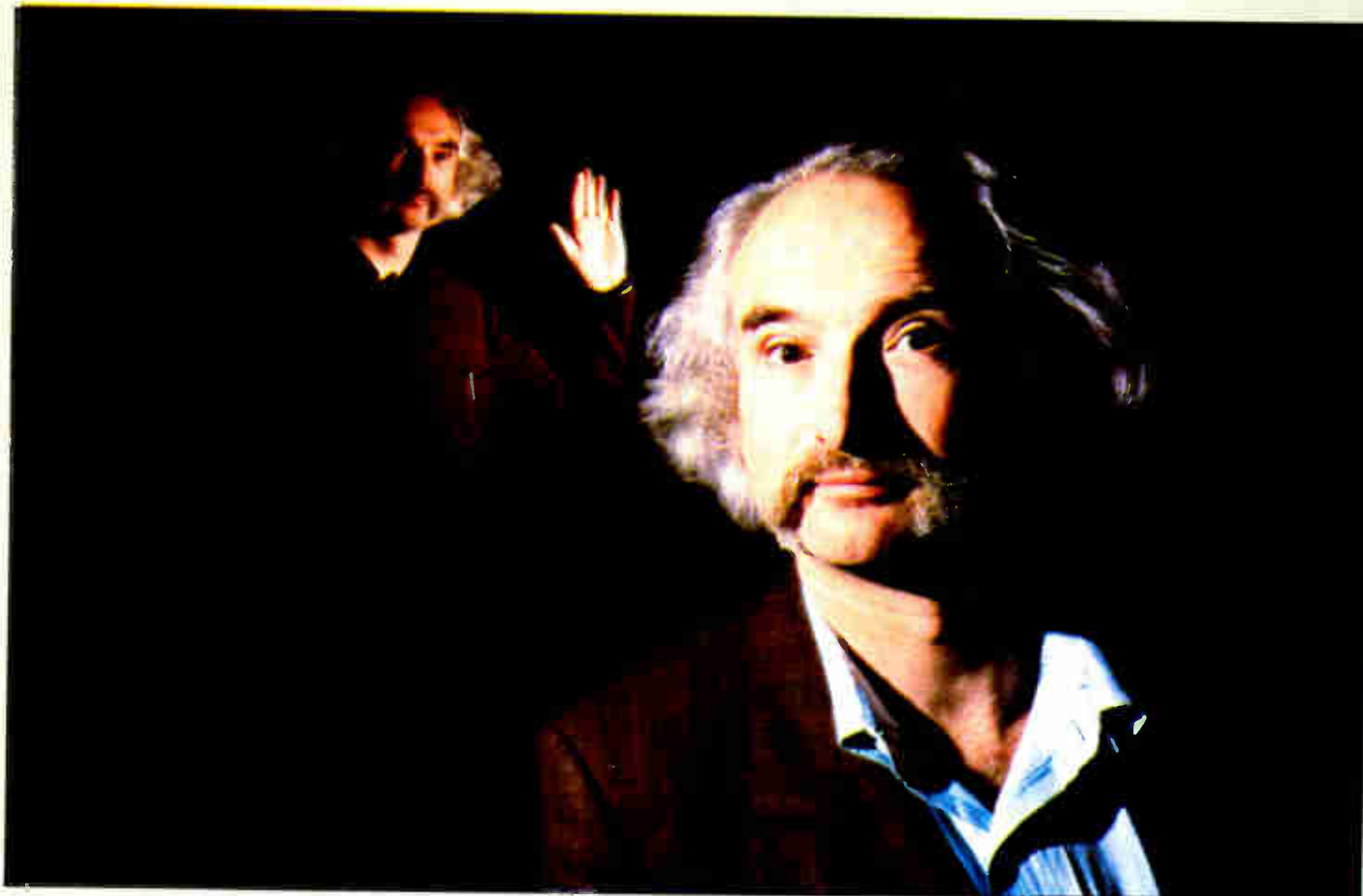


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# CANNED MUSIC

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What do a seminal German rock band of the '70s, short-wave radio recordings, and Pope John Paul II have in common? Answer: oddball musician Holger Czukay, whose new album is just out. *Interview by Dan Goldstein.*

**A**S THESE WORDS go up on the word-processor screen, old records are getting more US airplay attention than I can remember. They're either cover versions of old songs, or simple re-issues of records that date back more than 15 years. It's a sad state of affairs, and though this is neither the time nor the place to discuss all the possible reasons for its existence, there's simply no shying away from the fact that Nostalgia is the one dominant trend in today's popular music.

More people are buying old records, either because they remind them of their mis-spent youth, or because (in the case of record-buyers who are still busy mis-spending their youth) they allow them some insight into what young people got up to in earlier, more exciting times.

So whereas, in the late '70s and early '80s, it was fashionable for young musicians to assert that their main artistic goal was originality, today's equivalents are more likely to proclaim (loudly) that they are going

back to their roots – jazz, blues, psychedelia, punk... you name it.

One musician who hasn't, as yet, stopped claiming to be an original is Holger Czukay. And more than most of today's soundmakers, Czukay is a genuine individual. His clothes are thrown together with a refreshing lack of concern for co-ordination; his lifestyle seems anarchic and unrestrained; and his music stands out like a beacon of originality in today's murky sea of repetition and, like I say, nostalgia.

Czukay is an eccentric, and probably always has been since he was born in Germany just before the Second World War. His first musical experience was singing chorales for American servicemen in exchange for Coca-Cola, after the War was over. He then progressed through a series of abortive attempts at tuition in music theory and composition, after which he saw playing live jazz as his only possible musical opening. He played guitar in a Dixieland band, continuing his studies in harmony, theory

and basic composition under his own steam. The guitar remained his main performing interest, but he tried learning to play 'as many different instruments as I could'.

In the mid-'60s he secured a place studying composition alongside Karlheinz Stockhausen, an arrangement that lasted for three years until Stockhausen told Czukay he was 'too intellectual' for him. So the pupil acquired pupils of his own, teaching music in a Swiss private school. The syllabus was classically-orientated to the exclusion of almost all else, but one member of Czukay's class – a young guitar player by the name of Michael Karoli – encouraged his teacher to listen to the Beatles and the Rolling Stones. Czukay did just that, and eventually joined forces with Karoli and other musicians to form a unique rock band, Can.

What set Can apart from the majority of rock outfits in the early- to mid-'70s was their emphasis on improvisation as a means of composition, and their willingness to accept new technology and incorporate its use into a

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method of production that ensured the band's sound remained 'street', for want of a better term.

The various members of Can went their separate ways towards the end of the decade, with Czukay opting to make solo albums at the band's studio near Cologne, West Germany. The first of these, *Movies*, was an unexpected cult success – for though Can boasted a loyal following among musicians, their music was never likely to enter the mainstream on its own account.

That success enabled Czukay to lead 'a modest bachelor life', which was all he required to continue his work. Two further albums, *On the Way to the Peak of Normal* and *The East is Red* followed at the start of the '80s, and this spring, they are joined by another solo outing, *Rome Remains Rome*.

It's this new album that Czukay seems most eager to discuss as we sit in an unoccupied corner of Virgin Records' press office in London. He talks confidently, almost arrogantly, and he gives the impression of being pretty much set in his ways: his favorite expressions (his English vocabulary is excellent, his grammar nothing special) seem to be along the lines of 'this is perfectly good' or 'that would be absolutely stupid'.

'It took me two years to produce this new album', he says. 'That's a year-and-a-half of real work, and then some months of putting it into the cellar; it has to mature, like a wine. But in that two years, I actually produced four albums' worth of material. The rest of it is scull in the cellar. I'm waiting until the time is right, until the world is ready for me to release it.'

So Holger Czukay is more prolific than the level of his recent recorded output would suggest. He's also – in common with visionaries like Cage, Stockhausen, Eno and Zappa – as much concerned with the *process* of making music as he is with the music itself. The idea being, of course, that if you go about working in the right way, your work will ultimately benefit.

For Czukay, the most important part of his compositional process – which has hardly changed since Can days – is his own studio, a collection of ancient Telefunken M10 tape recorders and auxiliary valve equipment

technological systems make it possible for people who are unemployed to produce something, and you have total access to the data anyway – though not with computer systems, which have not progressed that far. But my system works like that.

'You could say that my system works like a stone-age system. But it is so effective and so fast, even the best computers cannot follow it. It's very simple. There are just four very reliable stereo tape machines, a good watch,

people should feel responsible for what they're doing.'

**T**HINGS DO NOT begin, however, at Czukay's ancient and individual studio. Stage one takes place at Can Studio, a more conventionally equipped multitrack facility where he records his own instrumental playing (guitar, synth, French horn, or whatever) along with that of guest musicians. In the case of *Rome*

*"I never allow myself the luxury of pre-conceived ideas. If you have those ideas you have to follow them through, but how can you be spontaneous if you have to follow some kind of pattern?"*



*Remains Rome*, those musicians included Michael Karoli and Can percussionist Jaki Liebezeit; ex-PiL bass player Jah Wobble; and an American broadcaster by the name of Sheldon Ancel, who provided much of the album's vocal content.

Most of what these people play is improvised, in the Can tradition, and the starting point for their ideas can be, as Czukay asserts, absolutely anything at all.

'My source can be anything. These days I have what you could call outside sources. *The East is Red*, for example, which is just a reworking of the Chinese national anthem, came about simply because one of the Chinese communist party leaders told the young people of the country that they shouldn't listen to western pop music, because it creates bad habits, makes people homosexual or whatever. A friend of mine asked me to listen to the Chinese national anthem to see if it had any elements of western rock music in it, and after listening to a lot of the world's national anthems (and especially those of communist countries), I realized that the Chinese anthem was the only one that had a real rock rhythm to it... I decided to make something good out of it.

'One of my most used sources is from the short-wave radio, or I could get inspiration from some kids. 'Hit Hit Flop Flop', on the new album, was just me going out to the beach and asking some kids to say 'Hit Hit Flop Flop'. I got them into the studio, tried to get them into the rhythm – which is quite difficult for kids of about ten – and recorded those words maybe 200 times. Of those recordings, you may have five which are usable. So the kids go home, and it's up to me to access the data and decide which of them is good.

'What I like, practically speaking, about working with other people, is letting people do just what they want to do. I don't want to get another musician into the studio and say "do this" or "do that". I like to set up an atmosphere that enables somebody else to do something that suits us both. And then he can make as many mistakes as he wants... And after that, he can go home. Then it's up to me to access the data he has input, and start working everything out. ►

*"The difference between today's writing system and that of 200 years ago is that now you can hear the data instantly; you don't need an orchestra, and most important, you don't need the unions."*

which forms a unique music 'computer' with which he obviously feels very much at home...

'One of the things I hate most of all is writing music down. I really hate writing. It's something that went out of date 200 years ago. It makes a lot of sense, much as I condemn it. It means you have total data access; you tell the musicians exactly what you want them to play.

'But you don't need to do it at all. Today's

and professional editing units – the kind of setup you'd find in a radio station.

'The difference between today's system and the writing system of 200 years ago – which is definitely a computer system of a sort – is that now you can hear the input data instantly; you don't need an orchestra, and most important of all, you don't need the unions.

'You are fully responsible for the end-product, and that's a good thing. I think

► And it's that stage, the 'working out', that takes place on Czukay's venerable Telefunken. As he's mixing, processing, remixing and re-recording, however, he has no particular goal at which to aim, nor any pre-conceived notion of what he may be able to achieve.

'I never allow myself the luxury of having pre-conceived ideas. Because if you have those ideas, you have to follow them through to a certain extent. You tell me: How can you be spontaneous if you have to follow some kind of pattern? Your hands are tied. You should make music clearly, freely, and with plenty of life. Then start thinking about what you have done, and what you may do with it.

'I start questioning my music after it has been created. And the system I have with these machines enables me to question everything I do. Let's say I have a guitar solo, or 20 of them. I can do 20 different mixes, make notes about them, and then make the final mix as a result of listening to all of them.

'At this stage I still have no idea of what I am going to do. It's important to start off with a completely empty head. This time, the last thing I put down was the voice of Sheldon Ancel. He is a radio announcer for the Voice of America in Germany. He's someone who has musical talent, but who was completely inexperienced at making music. He integrated perfectly, even after all the rest of

the mixing was done. It was only then that I thought about having a singer at all, not before.'

But if Czukay starts out on his road to composition without any ideas, how does he know when he's finished?

'Quite simply, when I have no more questions to ask. And actually, that's something that happens quite quickly. You find that you have done a load of recording and mixing and processing, and suddenly, that's it – no more questions spring to mind.

'So you have your finished product, though you can do a counter-check – which is to listen once again to everything that you've thrown away, and compare that with your finished product. Do that, and you soon start asking questions again.'

Which is all very fine and cosy and intellectually satisfying, but not, all in all, terribly democratic. This is just Holger Czukay, remember, taking the work of other musicians, and blending it with his own until he is satisfied with the result. Doesn't he ever ask anyone else's opinion?

'Oh yes, always. I have one golden rule, which is: "I am the Lord my computer, and I shall have no other God but me". That's while I am actually in the process of recording and mixing and processing.

'But then, when I have my finished product, I always get other pairs of ears to listen to it. That can take another month or

two, to play the music to other people, to get their opinion, to feel what they feel, and to go back into the studio and ask yourself: Was he right about that?

'When that is over, you can say for the first time that your product is ready for the public. Not before.'

**W**ELL, HOLGER CZUKAY obviously didn't ask this member of the public for his opinion of *Rome Remains Rome* before declaring it a finished product. For although it contains the germs of several great ideas and offers a couple of real gems (more of which later), the overall sound is confused, fragmented, and altogether too deliberately 'whacky' to really succeed. On this album, it seems, Czukay is wearing his eccentricity very much on his sleeve.

The first gem of a track is 'Blessed Easter', a sleazy, downbeat rock instrumental, overlaid with a recording of Pope John Paul II singing his Easter greeting to the world, backwards, forwards, and in a variety of different languages...

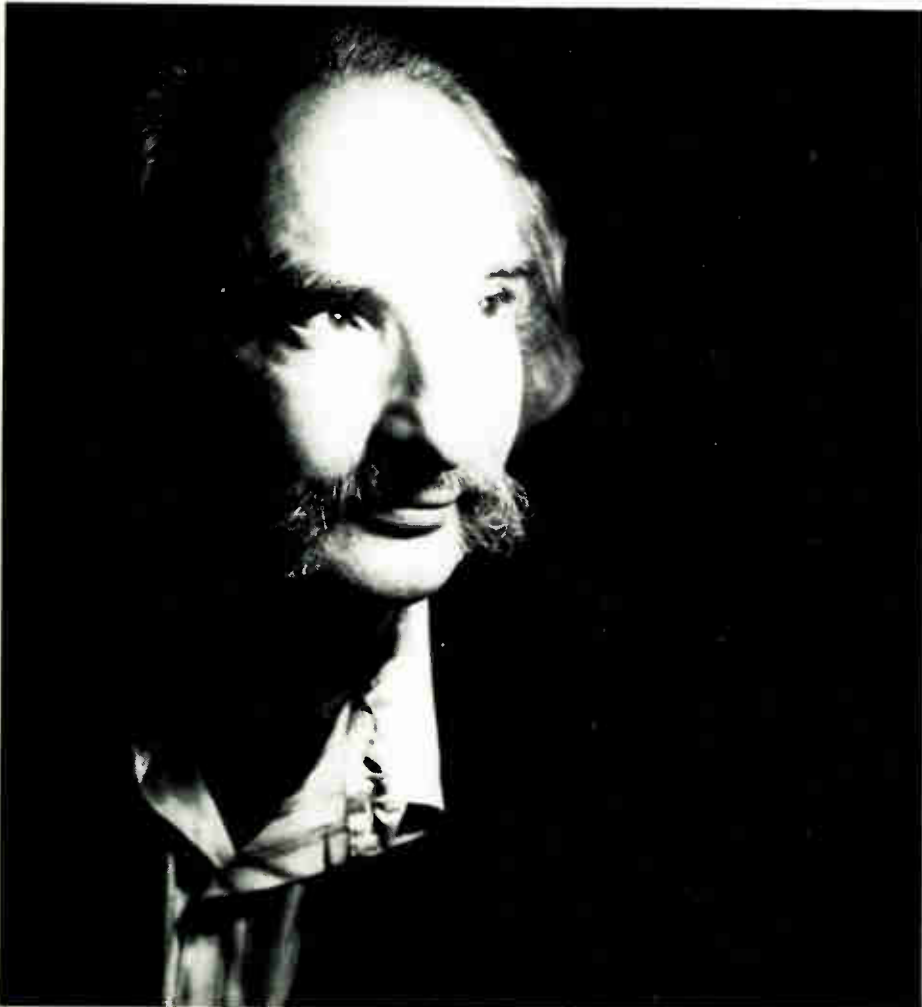
'The Pope just appeared on the television one day', Czukay recalls. 'I was listening to him, and I suddenly realized what a good singer the Pope really is. I heard that he had actually done some concerts in Germany that were a terrible flop, but that he was selling a lot of records. It suddenly became obvious to me that all he needs is a good band. So I decided to help him, and provide a band of my own creation.'

After 'Blessed Easter' comes the second gem, 'Sudetenland' – a more anarchic track that laces cuts from *Le Mystere des Voix Bulgares* (an album of Bulgarian vocal music released in the UK last year to considerable critical acclaim) in and out of some wild percussion-playing and Jah Wobble's nonsense vocal wittering. Curiously, Czukay denies taking the Bulgarian voices direct from the disc.

'That track happened the other way around to 'Blessed Easter'. We were creating a rhythm without really knowing anything about where it was going or what we were doing. And suddenly, on the short-wave radio, there were the Bulgarian voices, just waiting to fit in.

'The voices are chopped about and edited an awful lot. Then again, on the other hand, you have to retain a form that is understandable, and so they are totally in synchronization all the time. The rhythm we created was quite complex, but that is one reason why these Bulgarian voices fitted so well. The Balkan people are born rhythm-makers, as are the Turkish people. Everyone says rhythm was born in Africa, with the drums and so on, but actually the Africans got it from the Arabs.'

For the rest of the album, Czukay seems content to pursue two themes that have pervaded his work since before the premature death of Can. The first is his preoccupation





with traditional polyphony (by which several melodies are interweaved in the classical tradition to create chords, rather than block chords being created on one instrument), and the second is his assertion that rhythm, not melody, is the key to successful music.

'Rhythm is a digital language, like a morse-code language', he says. 'It does not require great frequency-response for people to understand it. You can broadcast it over a telephone line, which is one of the worst sound systems there is, and it can be understood perfectly at the other end. It can pass through all systems.'

'That's why people can latch on to a groove easier than they can latch on to a melody; the groove is easier to communicate. You can have rhythm without melody and it is still understandable. You can have melody without rhythm, also, but as soon as you create melody without a groove, you start to lose the gift of making music.'

**C**LEARLY, THOUGH, THIS particular composer isn't about to lose the gift of making anything. At the time of our meeting, his much-publicized collaboration with David Sylvian was due to be extended to include a separate album release (the material is already there, according to Czukay), while on a slightly bigger scale, Karoli, Liebezeit and company are preparing for a Can reunion, which should also result in some vinyl output before too long.

Busy and influential he may be, yet Holger Czukay isn't about to invade the airplay listings I mentioned at the start. Alas, his brand of music is simply too idiosyncratic to make it onto them, even if small groups of musicians mutter reverently about every note he plays.

'Of course I am never going to be communicating to a mass audience. I see no point in making any concessions towards that; it would be completely stupid. On the other hand, it would also be very stupid for me to say that I am making my music only to satisfy me, and that nobody else could understand it because it was very personal to me.'

'But one of the great fallacies of the rock business is that people who have hit records think they are influencing a lot of people. If somebody has a No. 1 hit record in some country and the record sells two million copies, then what is two million people against the five billion there are in the world, or the one billion that there are just in China?'

'My music lasts longer than most hit records, it gets better with each play, and my music stays with me. I am just as capable of making music now as I was 15 or 20 years ago. Many superstars have just one or two years when they can make music, then the pressure gets too much and suddenly they can't do it any more. I have the luxury of knowing that will never happen to me...' ■

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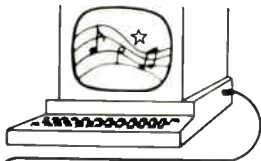
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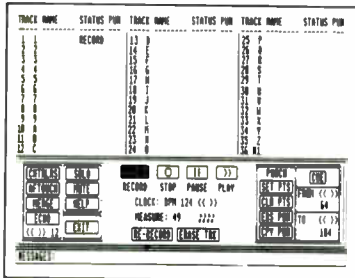
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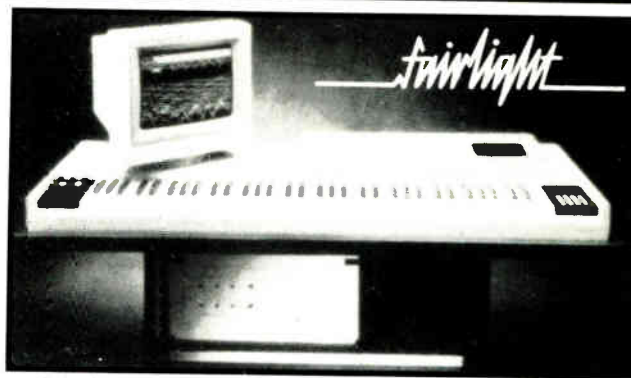
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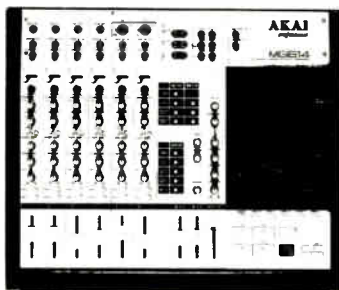
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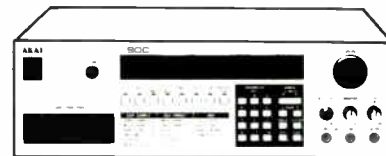
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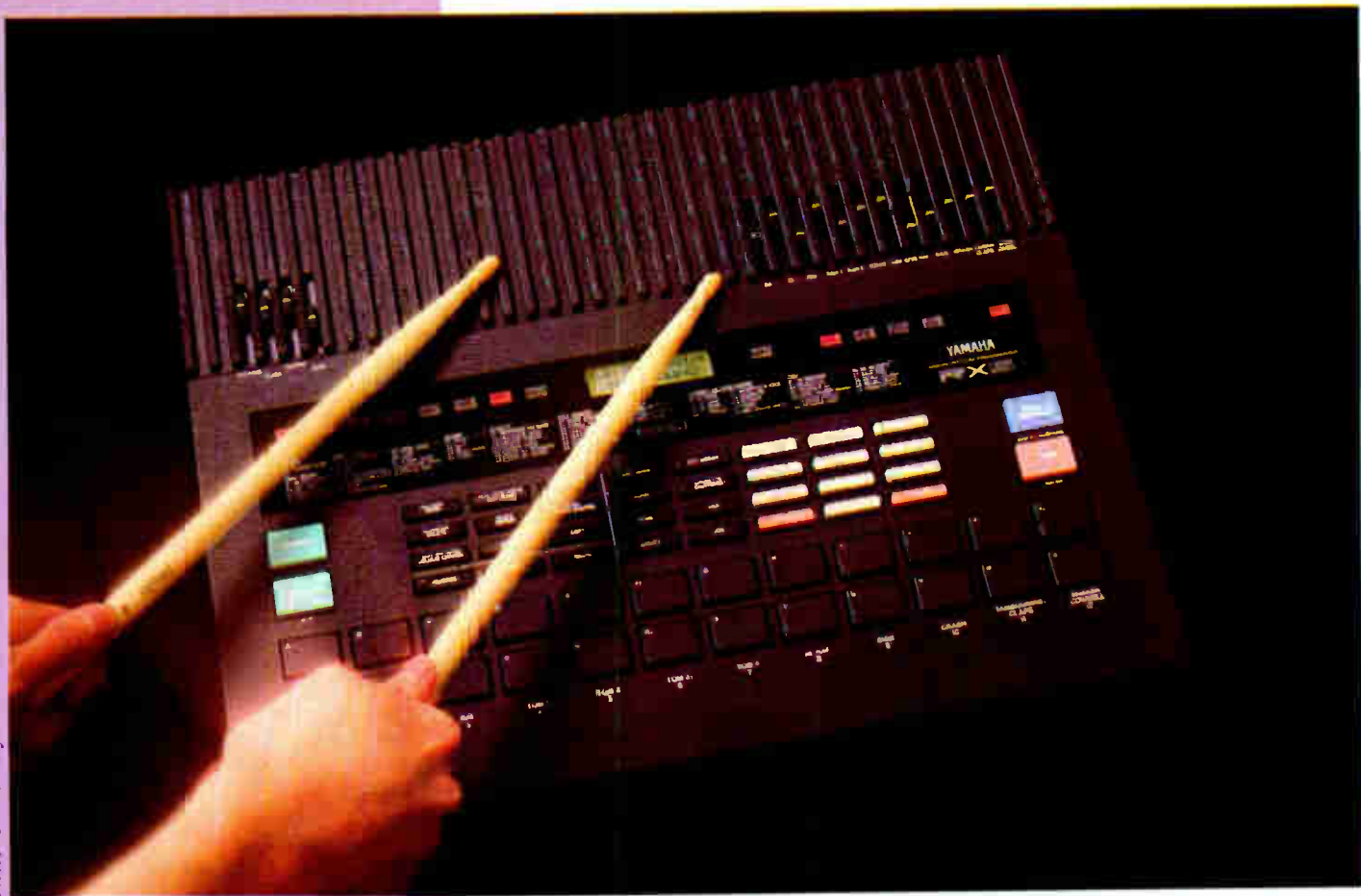


Photo: Tim Goudyer

# Yamaha RX5

## Programmable Digital Drum Machine

The next generation of drum machines is upon us, with the RX5 as the likely standard bearer. Does its flexibility justify the relatively high price tag? *Review by Trevor Gilchrist.*

**P**OWER ON? GOOD. Jeez! That's impressive, look at all those little lights... Now then, what happens when I press Start? Nothing. Great. Ah, headphones, that's better. And again... No, that can't be right, that's not a drum machine. Better just check I've plugged into the right socket... Yep, the tape deck's not on, the sequencer's not even plugged in, so it must be the RX5 making all the noise. But hang on a minute. Orchestral stabs? Slap bass? Tuned marimbas? Gongs? Vocal samples? What the hell's going on here?

Wait a minute, wait a minute. Turn the damn thing off and let's have a look at the manual... Hmmmm. No, that's right. 24 internal voices; another 28 on this neat little cartridge ROM, and yeah, vocals, electric bass, tympani, orchestra...

Ah, but what about the 'proper' sounds?

Where's the snare and the toms, and what about the kick drum? Didn't think of that, did they? Er, wait a second... Yes, it seems they did. Three kick drums, three snares, eight toms, four types of cymbals... Okay, okay, I get the idea. Now it's your turn.

This, ladies and gentlemen, is the Yamaha RX5. And, in case you hadn't already guessed, we're talking power, flexibility, incredibly high-quality sounds and yes, just about everything that Yamaha never managed to include on their previous machines — the RX11, RX15, RX21 and RX21L.

Let me just say, right at the very beginning, that I found this machine lacking in only two relatively insignificant areas. This is state-of-the-art equipment. It is the argument for drum machines, as opposed to any other method of creating rhythm you can think of.

The RX5 was launched upon an almost ▶

▶ totally unsuspecting world at the Winter NAMM show in Los Angeles last January. A short while after that, the world, his wife, and their albino rabbit saw it at the Frankfurt Musikmesse.

It's destined to hit the shops at around the \$1200 mark, so Yamaha are obviously directing the RX5 at a serious and committed sector of the buying public, and it would be worth

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"At no point are you barred from exploiting the machine for want of experience in digital synthesis – the manual is in plain English and makes good sense."

keeping that in mind while reading what follows. This machine is a lot of fun, but it's anything but a toy.

Now, \$1200 is big bucks, but as I shall attempt to illustrate, the RX5 is in every way worthy of such a sum. For starters, it offers the user an enormous array of voices – all the expected, standard kit sounds; a full percussion section; a tuned percussion, Clavinet and electric bass department; and an ambitious (if a little clichéd) selection of special effects, like gunshots, crashing glass and vocal 'Ooos', 'Wows' and 'Heys'.

Before you start complaining that I've dragged you away from your Monday Night Football to read about another stupid, gimmick-ridden beat box, just take into consideration the fact that *any* of these voices can be tuned, in tenths of a semitone, over a +24 to -36 full semitone range; that their envelope structure (attack, decay, and so on) can be edited in six stages to a ridiculously useful degree; that each voice can be subjected to pitch-bend over a selected range and rate, and then programmed to an individual volume level over a 31-step range (pause for breath...thank you); that any individual voice can be assigned to the top row of 12 pads on the front panel at 12 different tunings, thus turning the RX5 into a programmable sequencer; and that any of the voices can be played or programmed in reverse, at the touch of a button.

There are two ways you could sum up the RX5 in terms of the sounds it provides. First, you could say that 'Yamaha has provided an incredible amount of choice and flexibility on the RX5'. Or second, you could say that 'the RX5 is an absolute monster'. Either way, you'd be wandering pretty close to the truth.

## Sounds

LET'S START WITH the standard drum voices. Like the rest, these are all 12-bit samples which, if you're not familiar with sampling terminology, means that they're very, very good indeed. Not perfect, but far superior in terms of definition, accuracy and simple *credibility* to the eight-bit sound sources of the 5's predecessors, the RX11 and the RX15.

To say that this machine offers a choice of three snares is true enough, but then the presence of those powerful voice-editing facilities means that such a statement really only tells a fraction of the whole story.

Altering the attack, decay, gate time, tuning, pitch, and relative volume of each voice is so easy (once you're familiar with the

machine's layout), that the three basic snare sounds constitute mere starting points for straightforward and individual experimentation. And (perhaps more importantly), at no point is the user barred from exploiting this facet of the machine's capabilities for want of previous experience in digital synthesis. The manual is written in plain English and makes good sense – but more on that later.

You'll have perhaps realized by now the potential the new RX offers for personalizing sounds within your programmed rhythm patterns. And of course, the same flexibility applies to the three kick drum samples, the two rimshots, the eight toms and the hi-hats. Marrying together all of these is where your 'to-be-acquired' skills come into play – and remember, we've not touched on the machine's percussion section yet.

Patience... Let's do the cymbals first. Again, we're given four, very impressive samples to explore – China, Crash, Cup (or bell) and Edge (normally just known as the ride). Gone are the days of cymbals that stop dead just as they're getting interesting. Gone are the feeble, noisy, tinny excuses that normally pass as crashes and rides. Thanks to that most wonderful of voice-editing facilities, the loop, which takes hold of the tail end of a sample and repeats it at a steadily decreasing level to give a full, authentic-sounding decay, we can enter a whole new realm of convincing cymbal voices. Thus the already splendid china becomes a delicate splash or a rich, deep gong; rides go from dark and heavy to bright and lively at the push of a couple of buttons; and if you use a crash to end a pattern, it will die away just as if you'd hit the real thing.

It's plain to see, or rather hear, that Yamaha's engineers have been doing their Latin homework as well. The RX21L machine was a hit in its own right, but the RX5's percussion section represents a significant improvement. The sounds are better and more flexible; the clarity and realism have been improved, and basically, with high muted conga, high open conga, low conga, bongo hi, bongo lo, agogo hi, agogo lo, whistle, cuica, cowbell, tambourine, shaker, timbale hi, timbale lo, marimba and claps, you're going to find its flexibility very hard to fault.

Remember, we're talking about tunable, bendable, reversible and assignable voices here. With the aid of tuning, the congas alone can become the most disturbingly deep log drums, tambouras – or whatever the hell takes your fancy...

Enough, I've made my point. Let's have a look at how the machine works.

## Programming

YAMAHA IS AS notorious as anybody for heaping more than one function onto any single button or keypad on their instruments. Sometimes it's justified – like the provision of the alphabet for song naming, which is something used so little that it doesn't warrant its own set of 26 keys – but sometimes it's not.

Their philosophy with the RX5, because there are so many functions, is obviously to rationalize the whole process. This has been necessary because where a machine like the

RX21L has some 24 different functions, the RX5 has about a hundred; and flexibility aside, this is bound to cause problems. This is how Yamaha has coped...

The most important button on the whole machine is called Job. Functions are grouped together under headings such as Edit Voice, Edit Song and Key Assign, each of which can be accessed via their respective pads on the front control panel. There are eight banks altogether, all with fairly self-explanatory titles and all containing between one and ten functions. Having called up the desired bank (and they're all listed on the front panel), your access point to the various commands that each contains is this Job button.

For instance, let's say you want to alter the tuning of a marimba. You summon up the Edit Voice bank, press Job 01, and then the marimba key to call up that particular voice, followed by Job 02 to access the pitch-change facility. LEDs along the main information panel remind you of which mode you're currently working in, while the back-lit, 32-character LCD keeps you informed of everything else.

It's all very straightforward, it's just that there's quite a lot of it — though after a few days' intensive use, you may well be able to put the 60-page manual back in the box for good. In fact, I'd go as far as to say that getting to know this machine is quite a pleasurable experience, simply because you're dealing with logic and common sense all the time.

It goes without saying that the RX5 offers all the usual step-time and real-time writing

facilities. In Pattern mode we've got quantization (auto-correct) down to 1/48, or off altogether; a variable Swing function from 54% up to 71%, and the usual Erase, Copy and Append commands for linking bits together. In Song mode too, all the expected chaining features appear, but Yamaha has been far from content to leave it at that. The RX5 is not merely a standard drum machine with a few

*"This is not merely a standard drum machine with a few clever voices tagged on for effect; its writing facilities and memory capacity are both utterly vast."*

clever voices tagged on for effect; its writing facilities and memory capacity are both absolutely vast.

The 100 available pattern locations can be stretched to a length of 99 bars each, which is pretty good in itself. But once written, as many as five parameters relating to individual notes can be edited. Switching to Song mode, these 100 patterns can be linked together to assemble up to 20 songs — each comprising (deep breath) 999 parts. Each song can be given its own name of up to eight letters, and an initial tempo which can then be programmed to increase gradually (accelerando), or decrease gradually (ritardando) over a variable range and duration as many times as you wish throughout the song. And the same is true of the volume of particular sections, which may be programmed to add subtler dynamics to various passages, or to create fade-ins and fade-outs for songs — though it's worth remembering that unlike the Korg DDD1, for

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▶ example, the RX5 doesn't possess touch-sensitive programming pads on its front panel.

Locating those particular sections has been made easy too, with the provision of a Search Mark facility which allows you to insert *named* locator marks within a song that can be called up for the start of editing or playback.

Song chaining on the RX5 is ridiculously simple – with the provision of enough memory to make and name three chains, each containing some 90-odd steps. But – wait for it – a song containing 999 parts constitutes *one* step in one chain. Making a total of 269,730 parts in three chains.

Just think about that for a moment. It means you could program in a few empty bars between each of your songs, turn the machine on at the start of a gig, and not have to touch it until the end – and you'd still probably have left much of the memory unused.

Want to know how much you *have* used? Call up the Utility mode, press Job 02, and the display tells you the percentage of memory left in a particular song. Simple.

## Interfacing

NOW, I'M NOT going to wallow too much in the nitty-gritty of this facet of the RX5, because that's what manuals are for, and I wouldn't want to put Yamaha's technical writers out of a job. On top of that, there's so much to the MIDI side of the new RX, there just isn't enough room to get it all in – so a brief outline must suffice.

There are ten functions (or 'Jobs') within the MIDI mode, plus MIDI In, Out and Thru sockets on the back panel. The RX5's MIDI facilities allow its voices to be triggered from an external keyboard or sequencer (or from a drum pad-to-MIDI converter, of course); external keyboards and sequencers to be run from the RX5; and individual voices to be assigned to the keys of a keyboard, providing immediate access to the full pitch range of the voice, and enabling full programming of dynamics.

Access to the Receive, Transmit, Note Number Assign and EG Velocity features is again achieved through the Job button, and is as straightforward as everything else – if you know your MIDI.

In Sync mode, Yamaha have provided the poor, by-now-befuddled user with a further four options: Internal Sync, which allows the RX5 to be controlled by its own internal clock (this is the mode used for all normal playback and real time write functions); MIDI Sync, by which the machine can be started, controlled and stopped by another MIDI device; Tape Sync, which links it to a synchronization signal recorded onto tape; and External Sync, which ties the machine to another, non-MIDI device that puts out a gate-type clock or trigger signal.

Before we get back to the fun side of things, we've got to find room to say that all your pattern data can be saved to, or loaded from, either a separate RAM cartridge or a standard cassette. You can also save 12 edited versions of drum voices to RAM, and have access to them (for insertion into patterns) at the same time as the 24 built-in voices and 28 ROM

voices – making 64 sounds simultaneously available. That done, we can indulge a little further in the delights the machine has to offer...

## Verdict

SO YOU'VE SPENT your \$1200. You've managed to get the RX5 home in your car without dropping it, and now it's sitting next to the four-track in your bedroom.

You're committed. You've got to spend time getting to know the machine. There's a lot to learn, a number of previously forgivable preconceptions about drum machines to dispel, and a whole new approach toward creative programming to adopt. If you're willing to expand your thinking, the RX5 will reward you and reward you well. The sounds that it makes available are nothing short of stunning, while its programming power and flexibility put it streets ahead of the opposition.

On the fun side, the three vocal samples 'Hey', 'Wao' and 'Ooo' are a barrel of laughs, injecting the enthusiasm of some strapping, beat-crazed hip-hopper into the final mix. Reverse the voices, and the 'Hey' becomes a 'Yeh?'; tune them down and you've got a long, agonising groan – a bit like an audience at a *Late Night* recording.

If you want to add a bassline to your rhythm patterns, this machine makes it possible. Using the Multi Assign mode, you simply allocate the voice Electric Bass Low to the first row of 12 instrument keys on the front panel (over a range of 12 full tones, or 12 semitones, or 12 tenths of semitones), and just play the bassline you want in Real Time Write over the pattern. Alternatively, the unique capability (mentioned above) of the RX5 to stretch an entire sound's pitch across a keyboard makes for an even broader range of melodic options.

Want to add a Clavinet melody? Go back to Key Assign, substitute the Clavinet voice for the bass, put the machine back into Real Time Write, and away you go. You could also add a couple of orchestral stabs (via the same process) to spice things up even more. You've already got a stirring Latin percussion section driving away in the background, replete with resonant log drums, deep-tuned marimbas and exuberant cries of delight... So all that remains is to spill out a stereo mix via the two main outs, or to assign all the 24 voices to the 12 separate outs along the back panel if you're engaged in multitrack recording.

After a couple of hours you're making music. After a couple of days you're ready to set the world on fire. Like I said before, this machine is the argument *for* drum machines, and I don't see it being long before we see extra voice cartridges from Yamaha that will establish the RX5 system as the studio digital drum box.

I mentioned there were two areas in which the RX5 fell short. First, there's no facility for creating your own samples. Second, federal law prevents marriage to a drum machine – whether you're a man or a woman. If you feel you can live with both of these limitations, go down to the nearest Yamaha dealer, and ask them to play 'Demonstration Song 02'. And make sure there's a chair nearby; you'll need to sit down for a while afterwards. ■

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# READER TAPES Reviewed by Yung Dragen.

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DO AEROBICS AND ZEN mix? Apparently not. I'm currently suffering a case of shin splints from my recent cardiovascular excursions. Raquetball and Taoism is a lot closer; the movements a ball takes inside that small white court do not follow any western rules of physics I'm aware of. Injuries from the former have prevented me from enjoying the latter. Thus, I'm left with dancing as a way to lose weight. I'm an embarrassing dancer; however, people from my predominately female aerobics class were planning to go to a local nightclub recently, so why let foolish pride stop me?

Unfortunately, it was predominantly the male population that showed up, but I enjoyed myself more than enough with the females that did come along (and yes, I did slightly worsen my shin splints, along with throwing out my neck from trying to find something to move other than my legs).

Which is all a roundabout way of saying we're reviewing dance music this month.

The three entrants this month are more of the demo, as opposed to finished product, variety. Two were hand-labeled dupes, and all three took up one side or less. Keep this in mind if you're looking to trade or find them through alternative distribution. Any tape that can pull me out of a blue funk is more than worth the magnetized rust it's recorded on.

Nile's *It's Rock and Swing!* wins that award. Swing is not my cup of plum wine, but these

guys are just too much fun to let that get in my way. The style is just as the title implies – more than passable swing with rock guitars and drums joining the synths and horns. Nile consists of Stevie Adams and James Manley (both on guitars, guitar synths, and vocals), Jethro Foxx (drums and vocals), Stephen Fitzpatrick (keyboards), and Michael Nile (bass and vocals). Technically, the tape is recorded a touch dry, but it doesn't suffer – really 'present'. The synth patches are a bit weak on one tune but are otherwise good, along with all of the other musicians – kudos in particular to the drum (yes, Virginia, there really is a live drummer), guitar, and vocal work.

The five songs vary from an almost-tongue-in-cheek ballad to bop, swing and blues. I really want to go to a party that these guys play. If this is anywhere near your cup of tea, grab it if it goes by.

Second in this month's pantheon of reader's tapes is a self-titled two-song demo by **Dance In Colors**. The word for this presentation is *catchy*, both the music and the pages of promotional material it came with. The first piece, 'The Heat', stands out most for being a solid piece of drum programming – massive snare, very tasteful Simmons fill in the breaks, and good percussion and reverse reverb accents – notable for being varied, as opposed to repeated to death. Good synth programming,

effective guitar breaks, and solid production and song form in general – more than I'm used to hearing from this type of tape.

The second piece, 'Guardian Angel', is just a notch short of 'Heat' – sort of like a solid B-side to a single. The singing is primarily a male/female duet (Gary Del Ponte in the lead), with Donna Amatore and the rest of the band – Joe Davis, Mike Marra, and Brian Horta – doing backup, and being more than competent, if not quite perfect or uncontrived.

Complaints? The tempo is just a touch fast for dancing (unless I went real slow and followed just the snare beats – the percussion lines are too brisk for my feet), and to be honest, I found myself remembering individual sounds as opposed to the melody or lyrics themselves – in other words, a touch lacking in substance. However, that's never bothered the commercial world, and I wouldn't be surprised if **Dance In Colors** got a record contract. The list of bands they've opened for (Models, Level 42, Ministry, and so forth) indicate that they're well set up.

Last is a three-song demo (very official, with printed one-color label and 'soap dish' enclosure) by the Arizona electro-new wave trio **girl:bike:dog**.

Best reference here is early John Foxx/Ultravox. Yeah, yeah, the drum programs sound a bit rhythm-boxy, many of the synth patches are a bit thin, the stylized cold/shuddering vocals could be a little more intelligible, the solos could be more inspired, and the four-track cassette mix is simply too dry. But damn it, these songs are *catchy*.

All three musicians – Jim Spareous, Dave Muggeridge, and Jim Johnson – play synthesizers (with the exception of a touch of flute), and the songs percolate along at a quick, quirky pace, with tasteful sound effects and percussion fills occasionally thrown in. Those doing this genre of music could stand to listen to it – movement and variety keeps this basically sequenced style from getting boring.

The second piece, 'Sleepwalk', feels almost like a modern ballroom dance, while the other two ('Close Feeling' and 'Infinite Monkey') are for whatever quick bouncing you may be into, may it be fluid or robotic ('Infinite Monkey' is fast enough to require pogoing).

It is the least produced of the three tapes this month, but one I keep listening to and would go see live. Unfortunately, the friend who gave me this tape said that **girl:bike:dog** is temporarily (if not permanently) inactive. What a shame – you still had room to grow, guys, but this was a very good start.

What style next month? I don't know; perhaps dirge rock. In the meantime, keep sending those tapes... ■

#### Contacts:

**Dance In Colors** c/o Elfette Music, P.O. Box 28556, Providence, RI 02908.

**Nile** c/o Big Records, 29169 W. Heathcliff, Suite 9572, Malibu, CA 90265 ☎ (213) 457-5457.

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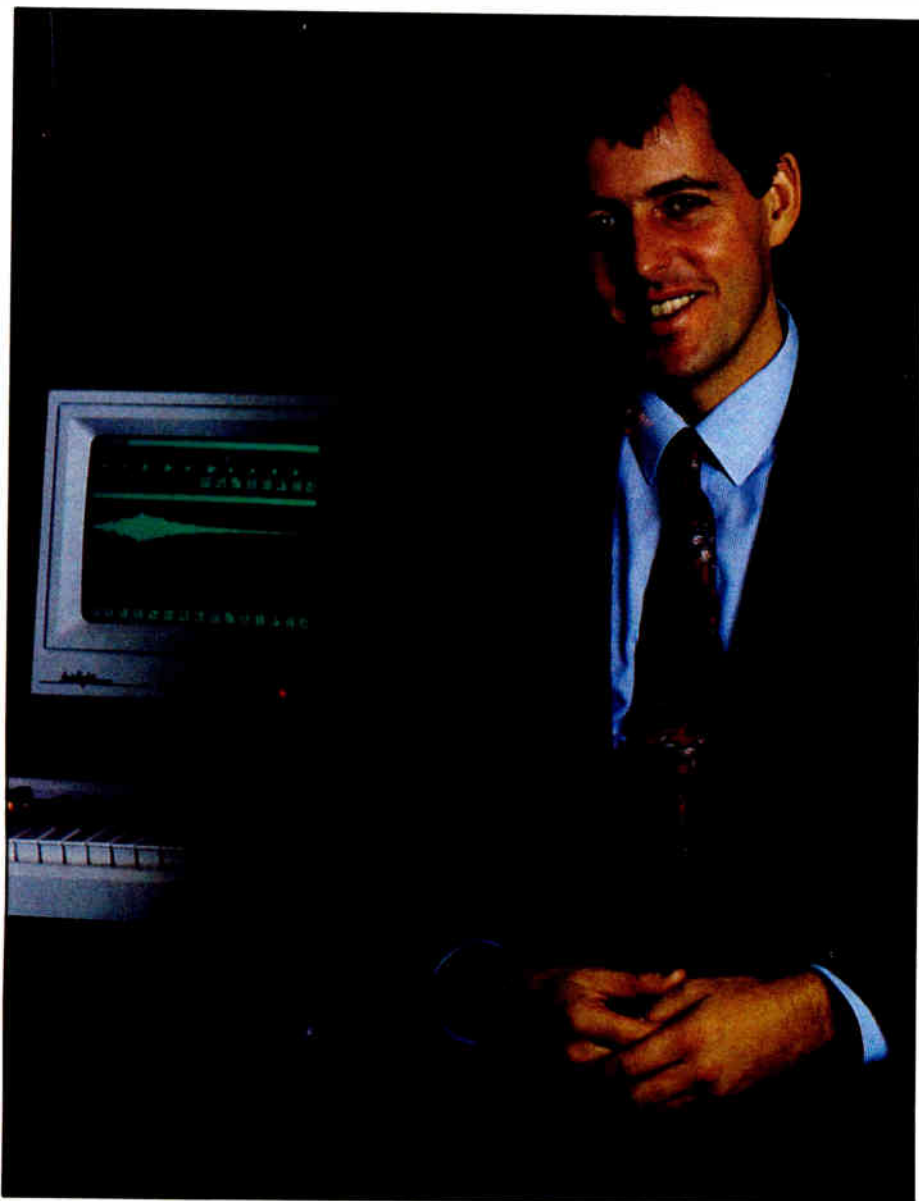
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# FAIRLIGHT'S FATHER

In the first part of an exclusive two-part interview, Fairlight co-founder Kim Ryrie outlines the background behind the CMI's invention, and gives a sneak preview of what may happen in the future. *Interview by Simon Trask.*



**Y**OU MAY HAVE heard the story of the two Australians sitting by Sydney harbor, eating their lunch and arguing about what to call their new company. The Sydney harbor hydrofoil drove past while the two were in mid-argument, and they both noticed the name. Problem solved.

The two Australians were Kim Ryrie and Peter Vogel, and the hydrofoil was called the 'Fairlight'. A star was born, but the origins of the Computer Musical Instrument have more to do with one man's enthusiasm for music and electronics than with water transport.

'In 1970 I started an electronics magazine called *Electronics Today International*. We tried to come up with four DIY construction projects each month – a new garage door opener, things like that!

'After the Moog and *Switched On Bach* came out, I decided to run a do-it-yourself synthesizer construction project in the magazine. The result was an analog synthesizer called the ETI4600. It was a bit of a monstrous beast, but it was fun!

However, that fun soon turned to dissatisfaction with what could be achieved with analog techniques. Ryrie called in Peter Vogel, an old schoolfriend who also happened to be a wizard electronics designer. It was the start of a partnership which is still going strong, with Ryrie now managing director and Vogel head of R&D at Fairlight.

'I said: "How about we start a company and build a new synthesizer? We could use these new microprocessor things..." My original plan was for a digitally-controlled analog synthesizer – something like the Prophet 5 turned out to be. But around 1975 we met up with a computer consultant called Tony Furse, who was Motorola's consultant in Australia on the 6800 range of microprocessors, and had previously worked on the design of integrated circuits for Fairchild in the States.

'Tony had been working for some years on an all-digital waveform manipulation system. This would generate by means of additive synthesis a whole series of complex waveform cycles and in effect "animate" them. So we picked up on this and worked on it for several years.'

The prototype system consisted of some 20 circuit boards and 4K of static RAM (a large amount in those days), could handle eight voices, and was about twice the size and price of the current CMI – not a very viable product commercially. But around 1977, the team turned their attention to the new 16K dynamic RAM chips that were starting to become available.

'These were really far out! We got hold of some and designed one channel onto one card – memory access time wasn't fast enough to allow us to put all eight channels on a single card.

'Having designed this new system we then thought: "Gosh! We've got so much memory – 16K for each channel – maybe we could actually sample a real sound and play it back." So it wasn't until we'd designed the hardware that the thought came to us to do that. It wasn't hard to implement – you could buy eight-bit ADCs which weren't outrageously expensive because they were used in many other applications. Sampling didn't require anything particularly profound, technologically. We were just using two 6800s talking out of phase to the same waveform memory – a single 6800 simply didn't have the power to do what had to be done in real time.'

If the technology involved wasn't profound, the ramifications for modern music-making certainly have been. But what was the first sound that the Fairlight team chose to sample?

'The first sampled sound ever came from a dog which belonged to one of our programmers. You could tell it to speak and it would bark! We sampled that onto the first prototype board, which had wires trailing all over the place. That sample ended up in the original Series I sound library.'

Years of R&D doesn't come cheap, of course. Fairlight initially financed their operations by producing an Electronic Paintbox which converted a monochrome signal into six colors, and which sold well to local TV stations. Subsequently, the company produced the hardware for a business computer marketed by Remington Office Machines.

'We didn't get rich doing that, but it certainly made us enough money to keep going. That lasted for about two years, which was long enough for us to start being able to sell the CMI I.'

Ironically, it was Japan's entry into the business computer market which prompted Fairlight to phase themselves out of that area, feeling it would no longer be a profitable area for them...

The Series I CMI made its debut in 1979, with sampling as the star of the show and the original additive synthesis approach relegated to a supporting role on Page 4. The Series II

*"We had the CMI at an AES show in New York in 1979, and the reaction was universally: 'Oh my God, that's amazing – what would you use it for?', which was a bit depressing."*

followed a few years later with essentially the same architecture, but offering improved fidelity and replacing the 6800s with dual 6809 processors.

Today, the Fairlight has achieved such fame that even non-musicians are aware of what it does. But what did musicians and producers make of the CMI when it was first launched?

'We had the CMI at an AES show in New York in 1979, and the reaction was universally

"Oh my God, that's amazing – what would you use it for?," which was a bit depressing. The software was rather basic, but we were able to play sounds on the keyboard, and some people immediately thought it was wonderful – but as a whole it took a while to get moving. Some people say the CMI changed their lives – perhaps it did. In terms of sales the response was enough to keep us in business, but we weren't about to turn into a multinational overnight.'

If the response from many people was initially one of non-comprehension, the ramifications were bound to set in before too long. Here was an 'instrument' which didn't have any sound of its own, but which could imitate the sound of any other instrument. What was perceived as a new freedom by some people was perceived as a threat by others. Livelihoods were at risk... Was the idea behind the initial CMI that it should be a 'transparent' instrument?

'I don't think that we did necessarily feel that a flute should sound like a flute. At the back of everyone's mind, of course, that's the ideal situation, but it was more a matter of going for what you could – what *could* we do? Many productions were done with flutes not sounding like flutes, but it seemed right for the piece of music. So we really didn't get involved in those discussions; it wasn't really our department.

'Obviously one of the big questions was: Aren't we going to put all these acoustic players out of business? But that was never the intention; rather, the intention was just to be able to play any sound – and traditional instruments just happen to be a subset of that.

'We made the machine because we wanted things to sound complex, not necessarily exactly like a classical instrument. I personally love classical instruments, and I love real orchestras. We're starting now to be able to do that on the Series III, and even then it's only quite reasonable. That personally gets me terribly excited, because I love the power of a real orchestra and I'd never heard that reproduced on an electronic instrument. So in

a way I'm thrilled that we can do it, but we weren't disappointed when we couldn't.'

**W**HILE THE CMI's sampling ability stole the limelight, there was another aspect of the Computer Musical Instrument which had a profound impact on the musicians who actually used it: the famed Page R. How did the rhythm page come about?

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While working on the sampling, we were also working on a keyboard sequencer which we called Page 9. It was an overdubbing keyboard sequencer that recorded key velocity, but which didn't really have good editing facilities at all.

I think it was at the 1980 AES show that Roger Linn came along with his drum machine. We let him share our booth, and we gave demonstrations on the half-hour, alternating demos with Roger. I honestly thought that Roger was going to slash his wrists by the end

*"We added features we felt composers would want, and Page R developed into an interactive sequencer because of the way it's structured. It's inefficient as a memory storage system, but it's very interactive."*

of the show. Everyone was coming in and playing with his drum machine, and virtually everyone was saying: "That's amazing. What would you use it for?". He was so depressed!

I was quite impressed by the organization of his drum sequencer, with patterns and so on. I thought that that approach could work on the Fairlight with all our sampled sounds. So I drew up a very simple display page with blobs for the notes, and we thought we could call it the Rhythm Sequencer. Our programmer Michael Carlos wrote Page R from that basic specification, and although we intended it to be rhythmically oriented, we found that people were using it increasingly for more general music composition.

So we added more and more features that we felt composers would want, and Page R developed into a very interactive sequencer because of the way that the memory is structured. It has a block of memory with X number of bytes in it all the time, whether they're used for notes or not. So it's incredibly inefficient as a memory storage system, but it's terribly interactive because of that structure. That's why it's only 16 monophonic channels – eight on the Series II – and of

dramatic new developments.

We've just purchased the exclusive rights to something called "Clynes' microstructure", which we're intending to make available in the second stage of CAPS.

Dr Clynes is the head of the electronic music department at the Sydney Conservatorium. He spent about five or six years researching what he calls the "pulse" of composers. His claim is that all of the classical composers, for example, have an inherent "pulse" – the way that they play things. For

instance, the third microbeat in some part of the music will always be played slightly ahead of time by a few milliseconds, and perhaps at a slightly lower amplitude, and perhaps the note will attack and decay in a slightly different way. He spent an awful lot of time analyzing all this on his department's computers, and he's come up with all these pulses for all the classical composers. We'd been sitting on the sidelines watching all this develop, because we were a little bit skeptical. But the results are absolutely startling.

You could play in a piece of Bach and it might not sound particularly authentic. But you would then run his software through the composition – in this case the Bach algorithm – and the music would actually come back sounding like Bach.

In fact the way that it's played seems to make it sound more like Bach than the notes themselves, because you could then run the Beethoven algorithm on the same piece of music and it would come back sounding more like Beethoven than Bach, even though it was Bach who had composed the notes!

So it's a fascinating concept, and one of the reasons why it's quite involved is because it

*"The first sampled sound came from a dog that belonged to one of the programmers... We sampled it onto the first prototype board, and it ended up in the original sound library."*

necessity is quantized to some degree.

The new CAPS sequencer for the Series III is the more traditional form of sequencer, in that it records note-ons and note-offs and so forth. The idea is that you can use Page R to get the structure of your song together, and once you've done that you can transfer across to CAPS and move on to the rest of the song.

As you may already know, CAPS is an 80-track sequencer which fully integrates MIDI into the Fairlight scheme of things. The software is only just being made available on the Series III, but Fairlight is already planning

does involve the way in which notes attack and decay. We apply what are called Beta functions onto the attack and decay slopes, and of course you can't get that information through MIDI – there's no way for it to handle that. So all this has to happen within the CMI system, between CAPS and the internal voice-generating section of the machine. However, we can send out key velocity and differences in playing time over MIDI – that does give you some of the effect, but the whole effect requires control over the envelopes. Where notes are played will define



how they're shaped.

'Now, Clynes' work relates to classical music, and one of our big concerns was whether or not this would be of interest to popular musicians. So then he started doing experiments in that area, and it really does seem to make a difference. You can also come up with your own algorithms – put in any old thing and it comes up sounding rather interesting.

'So we don't know where it's heading, but we feel confident that it's heading somewhere! There's still a fair amount of research to be done in putting Clynes' system on the Series III, but there may be a release before the end of the year.'

Technology doesn't always keep pace with human imagination. Did the Fairlight team want to achieve more with the early CMI than the technology of the time allowed them to do?

'Oh, I think so. But we tended not to think of that at the time, but just go for whatever we could do with the available technology rather than get depressed about it. I don't think you get anything done if you concern yourself with what you can't do.

'It's like if you're producing a piece of music and you're always concerned about what the hardware won't allow you to do, then that's the end of your composition, because suddenly your whole mind is working in limitation mode rather than getting-something-out-of-the-door mode.

'So it really wasn't much of an issue. When something new came along we'd start playing with it and seeing what we could do with it. That's why we kept the Series III in a very modular arrangement. The first version of Series III had all of the analog outputs and inputs on a couple of large circuit boards, but

in the end we felt that that wasn't a very good idea because if someone were to bring out a new startling and amazing anti-aliasing filter, or a much better A-to-D, or a better de-glitching arrangement, we'd have to redesign the whole thing and sell that.

'What we've done is come up with a very modular arrangement of circuit boards, with each channel's A-to-D on a separate board. We do have an ongoing hardware development program which will make new versions of some of the CMI modules depending on how the technology is moving. It's one of the advantages of a modular system versus the approach of everything on one card in one box.'

**A**NOTHER REASON FOR the CMI's success has been its emphasis from the outset on user-friendliness. As it turns out, there's a good reason why that has always been a priority.

'Well, I hate computers. I've never been able to sit down at a computer and program it. I have an Apple II at home which I use only when I absolutely have to.

'I know the way musicians feel about computers. The hard thing is to enthuse programmers, who love typewriter keyboards, about the idea that some people like knobs and buttons and seeing things on screens and not having to type much – being able to poke at things with pens rather than having to type at 300 words a minute.

'So user-friendliness was part of a very early philosophy, and Peter was always in agreement about that. And because we had quite a number of musicians working on the project, they also felt strongly about that aspect of it. It became a bit of a thing to see who could make

the most user-friendly display page.

'That wasn't too difficult with Series I and II, but with Series III it became a big problem. Whereas you could teach anyone how to use the Series II in 10 minutes, the III was a whole different ball-game. Instead of having sounds that were always 16K in length you suddenly had 14 Mbytes of RAM, variable sample lengths, 64 subvoices per voice, as many voices as you liked in an instrument...

'It's been a real challenge getting the Series III software as user-friendly as the Series II was, because there's so much more involved. Just to give you an example, control parameters such as vibrato rate and attack and decay rates can be set for subvoices as well as voices – local and global parameters – and that's quite hard to orchestrate and make accessible to the user.'

While Japanese manufacturers concentrate on producing ever more sophisticated instruments at the budget end of the market, Fairlight has remained resolutely at the top end. But although we're unlikely to see a £2000 instrument from the company just yet, times are changing.

'We work towards a system that will allow what we consider to be state-of-the-art production. If we could do it for £2000, we would do it.

'In fact, we've had a lot of interest from people who can't afford a Fairlight who have asked us if we could do a smaller, cheaper one. But the amount of R&D that goes into the Fairlight is so enormous that we feel we really just want to concentrate on one design at a time. That's not to say that we aren't working on the next generation, which may allow a more powerful system to be produced a little more cheaply, but our mind is always on what can be produced rather than how much it costs, though we do try to get the cost as low as we can.

'What we are doing is bringing out a new configuration of the Series III which will use 20Mbyte floppy disks rather than hard disk. It'll use the Series III's hardware and software – so, for instance, it'll have CAPS – but a typical configuration will probably be eight voices with 4Mbyte of RAM. The advantage of that may be that some people would be able to afford to make it part of their production system, and then add on to it as money allows – it'll be upgradeable to the complete Series III system.

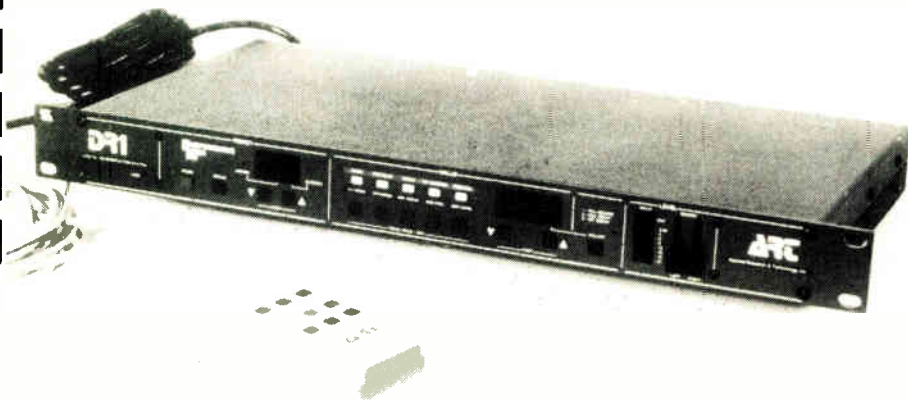
'The eight-voice/four-meg configuration allows you to play virtually any Series III sound that is now around; most multisample-1 sounds on the III take about 4Mbyte. So what it means is that people who can't go for the full system will at least be able to get those sounds that they can't get using the cheaper sampling instruments. That's something that we're hoping to bring out quite soon...'

# ART DR1

## Programmable Digital Reverb

'Performance MIDI' is what ART call their system of real-time control of reverb characteristics. It's good, but there's a lot of competition. Review by Simon Trask.

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(where you set the amount of reverb for left and right channels separately, and view the overall input level on a ladder LED); two two-digit LED windows indicate memory number and parameter value respectively.

### Programming

THERE ARE SEVEN effect parameters directly accessible from either the front panel or the accompanying hand-held remote control. These are: room, pre-delay, decay, high-frequency damping, position, diffusion and minimum decay. While front-panel access is straightforward enough, selecting and editing parameters is made a lot easier by the remote control (which comes attached to a lengthy stretch of cable, and therefore allows you to program the DR1 on a flat surface far removed from your effects rack – invaluable in the studio, of course). Let's take a closer look at these programmable parameters.

Pre-delay is adjustable from 0-200mSecs in millisecond intervals. This governs the time interval between the source signal and the first reflections, allowing the former to sound uncluttered and more distinct.

Decay is variable from 0.1-25 seconds, with a greater resolution of values provided for shorter times. 'Decay time' is defined here as the time required for the reverberant sound to decay to one millionth (-60dB) of its original energy.

'Minimum decay' on the DR1 is a useful

NOT SO VERY long ago, there was a clear dividing line between the out-board equipment used by professional studios, and what you were likely to find in the average home studio. But the past year has seen the arrival of microprocessor-based digital reverb and multi-effects units whose relatively low price belies their professional quality, and which have consequently found their way into both types of studio.

Applied Research & Technology (ART) are no strangers to signal processing, having started life as part of the renowned MXR company. The DR1 is ART's top-line digital reverb, and as such appears to be subject to ongoing software updates which are intended to make it one of the best-specified reverbs on offer. For instance, the latest update (version 1.2) introduces what ART call 'Performance MIDI' – essentially a means of controlling reverb parameters in real-time via MIDI.

### Specification

THE DR1 HAS a frequency response of 35kHz dry and 14kHz reverb, with a 16-bit linear DAC and a dynamic range in excess of 90dB in all modes. A bass rolloff switch located inside the unit (time to get the screwdriver out) allows you to tailor the low-end frequency response of the DR1 – low-frequency filtering is applied to the incoming signal before it's sent to the reverb processing circuitry. The switch selects between two rolloff frequencies: 50 and 150Hz (50Hz is the default setting, and should prove adequate for most requirements). One slightly alarming aspect of the DR1 is that it 'runs warm' (to use ART's phrase) and exhibits a degree of hum

(presumably from the transformer), but as long as you leave adequate ventilation space, these hiccups don't appear to cause any operational problems.

The unit comes with 40 ROM preset and 100 user-programmable memories onboard. The presets provide a healthy selection of reverb and other effects, based on 21 different 'room' algorithms: five plate, five room, five hall, two effect, one reverse, one gated, one DDL and one flanger/chorus. However, unlike the SPX90s and DEP5/3s of this world, the DR1 doesn't allow you link different effects – either in series or in parallel.

The DR1's presets can of course be used as

---

*"The plates are quite 'ringy', and the gated and reverse effects may not be to everyone's taste, as they lack bite. Otherwise, full points."*

---

the basis for creating your own effects, which can then be stored in any of the user-programmable memories. A particularly handy feature is the ability to lock any of the latter individually, which guards against accidental overwriting of some effects while allowing others to be created and stored.

The rear panel of the DR1 sports quarter-inch jack stereo inputs and outputs, MIDI In and Thru (the latter software-switchable to Out), a footswitch input for controlling the 'Kill/Inf' function (more on this later), telephone-style input for a remote control unit (which comes with the DR1), a button for selecting a choice of two input levels, and a further button for switching the dry signal in and out of the signal path.

The front panel divides into three sections: Preset (governing memory selection), Value (governing parameter setting), and Level

feature which essentially brings a shorter decay time into play when the signal level builds up – useful for avoiding boominess in a reverb simulation with a long decay.

Diffusion refers to reverb density, which is a function of the number and spacing of reflective surfaces in the simulated environment. On the DR1, a setting of zero creates the illusion of sound bouncing off a lot of surfaces, with a resultant 'choppy' effect – especially in the context of percussive sounds. Increasing the parameter value results in a progressively smoother effect, which creates a more natural-sounding reverb.

Another characteristic of reverberation is that higher frequencies are absorbed more quickly than other frequency components, with the rate of absorption depending on the nature of the reflective surfaces that define the environment. On the DR1, damping is

# THE 1987 MUSIC TECHNOLOGY READERSHIP SURVEY

# READERS' WRITES

## PART 1 YOUR GEAR

Here's a list of modern musical instruments and auxiliary equipment. Please check the box alongside the instruments you use regularly and specify make and model on the line underneath each one.

### INSTRUMENTS

- Computer musical instrument 1
- Digital polyphonic synthesizer 2
- Analog polyphonic synthesizer (MIDI) 3
- Analog polyphonic synthesizer (non-MIDI) 4
- Monophonic synthesizer 5
- Sampling keyboard 6
- Sampling module 7
- MIDI controller keyboard 8
- MIDI remote keyboard 9
- Vocoder 10
- Keyboard mixer 11
- MIDI drum machine 12 .....Configuration.....
- Non-MIDI drum machine 13
- Dedicated sequencer (MIDI) 14
- Dedicated sequencer (non-MIDI) 15
- Electric piano 16
- Acoustic piano 17
- Electronic drums 18
- Acoustic drums 19
- Electric guitar 20
- Acoustic guitar 21
- Guitar synthesizer 22

- Bass guitar 23
- Brass instrument 24
- Wind instrument 25
- Other instrument (please specify) 26

### COMPUTING

- Computer 27
- Disk drive 28
- Printer 29
- Sequencing software 30
- Sound librarian software 31
- Sound editing software 32
- Sample editing software 33
- Scorewriting software 34
- Other music software (please specify) 35

### EFFECTS

- Multi-effects processor (MIDI) 36
- Multi-effects processor (non-MIDI) 37
- Delay unit (non-MIDI) 38
- Delay unit (MIDI) 39
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- Reverb (MIDI) 41
- Graphic/parametric equalizer 42
- Compressor/Limiter 43
- Psychoacoustic enhancer 44
- Harmonizing device 45
- MIDI FX 46



# THE 1987 MUSIC TECHNOLOGY READERSHIP SURVEY

FX pedal 47 Do you sing? 68

Other effects (please specify) 48 Do you play original compositions? 69

Or cover versions? 70

## RECORDING

Cassette recorder 49 Or a mixture of both? 71

Tape recorder (reel-to-reel) 50 Do you gig fairly regularly? 72

Multitrack recorder (cassette) 51 Do you record in a studio? 73

Multitrack recorder (reel-to-reel) 52 Is the studio in your own home? 74

Mixing board 53 Or is it at a friend's home? 75

Microphones Configuration 54 Or is the studio a commercially-run facility? 76

Monitors 55

Video equipment 56 As a musician, would you class yourself as professional? 77

Other recording equipment (please specify) 57 Semi-professional? 78

Do you sync to tape? 58 Or amateur? 79

Using SMPTE timecode? 59

Using non-SMPTE timecode? 60

**If you could place your music in one or more of the categories listed below, which would it be?**

Avant-garde 80

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Cabaret/show 82

Classical 83

Conventional pop 84

Conventional rock 85

Electro-funk 86

Electro-pop 87

Ethnic 88

Heavy metal 89

Heavy rock 90

Hip Hop 91

Instrumental electronic music 92

Jazz/jazz-rock 93

New age music 94

Progressive rock 95

Punk/New Wave 96

Soul/Dancefloor 97

## SOUND REINFORCEMENT

Keyboard amplifier 61

Drum amplifier 62

Guitar amplifier 63

Bass guitar amplifier 64

PA equipment 65

## PART 2 YOUR MUSIC

Please indicate your present musical status, giving further details if you wish on the line below.

What is your main instrument?

What is your second instrument?

Are you in a band? 66

Or do you play your music solo? 67

## PART 3 YOUR AMBITIONS

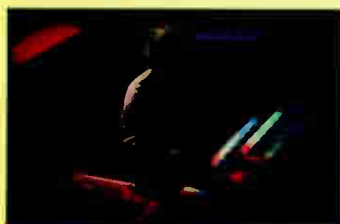
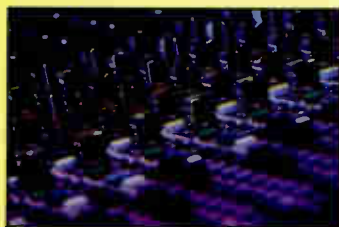
What is your next intended purchase, if any, in the following areas?

Instruments .....

Computing .....

Effects .....

Recording .....





# THE 1987 MUSIC TECHNOLOGY READERSHIP SURVEY

Sound reinforcement.....

**Have you aspirations to do any of the following in the near future?**

- Become a professional musician? 98  
 Record your first demo? 99  
 Make your first record? 100  
 Obtain a publishing contract? 101  
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(Feel free to elaborate on any of the above points on a separate sheet.)

## PART 4 YOUR COMMENTS

Below is a summary of the editorial content of Music Technology. We'd like you to indicate on the left whether you'd like to see more or less of a particular feature, and then check the box on the right which reflects as accurately as possible your opinion of that feature.

### MUSIC

- | More of                      | Less of                      |                           | Excellent                    | Good                         | Average                      | Poor                         |
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| <input type="checkbox"/> 104 | <input type="checkbox"/> 105 | Interviews with musicians | <input type="checkbox"/> 106 | <input type="checkbox"/> 107 | <input type="checkbox"/> 108 | <input type="checkbox"/> 109 |
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### REVIEWS

- |                              |                              |                  |                              |                              |                              |                              |
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| <input type="checkbox"/> 158 | <input type="checkbox"/> 159 | Sequencers       | <input type="checkbox"/> 160 | <input type="checkbox"/> 161 | <input type="checkbox"/> 162 | <input type="checkbox"/> 163 |
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| <input type="checkbox"/> 170 | <input type="checkbox"/> 171 | Computers        | <input type="checkbox"/> 172 | <input type="checkbox"/> 173 | <input type="checkbox"/> 174 | <input type="checkbox"/> 175 |
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| <input type="checkbox"/> 188 | <input type="checkbox"/> 189 | Keyboard mixers  | <input type="checkbox"/> 190 | <input type="checkbox"/> 191 | <input type="checkbox"/> 192 | <input type="checkbox"/> 193 |

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| <input type="checkbox"/> 200 | <input type="checkbox"/> 201 | Reviews of effects units         | <input type="checkbox"/> 202 | <input type="checkbox"/> 203 | <input type="checkbox"/> 204 | <input type="checkbox"/> 205 |
| <input type="checkbox"/> 206 | <input type="checkbox"/> 207 | Reviews of studio equipment      | <input type="checkbox"/> 208 | <input type="checkbox"/> 209 | <input type="checkbox"/> 210 | <input type="checkbox"/> 211 |
| <input type="checkbox"/> 212 | <input type="checkbox"/> 213 | Studio techniques                | <input type="checkbox"/> 214 | <input type="checkbox"/> 215 | <input type="checkbox"/> 216 | <input type="checkbox"/> 217 |

### TECHNOLOGY

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| <input type="checkbox"/> 230 | <input type="checkbox"/> 231 | Music theory                                     | <input type="checkbox"/> 232 | <input type="checkbox"/> 233 | <input type="checkbox"/> 234 | <input type="checkbox"/> 235 |
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| <input type="checkbox"/> 242 | <input type="checkbox"/> 243 | Music composition                                | <input type="checkbox"/> 244 | <input type="checkbox"/> 245 | <input type="checkbox"/> 246 | <input type="checkbox"/> 247 |
| <input type="checkbox"/> 248 | <input type="checkbox"/> 249 | Computer technology                              | <input type="checkbox"/> 250 | <input type="checkbox"/> 251 | <input type="checkbox"/> 252 | <input type="checkbox"/> 253 |

- | More of                      | Less of                      |                  | Excellent                    | Good                         | Average                      | Poor                         |
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| <input type="checkbox"/> 254 | <input type="checkbox"/> 255 | Video techniques | <input type="checkbox"/> 256 | <input type="checkbox"/> 257 | <input type="checkbox"/> 258 | <input type="checkbox"/> 259 |

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If you have any specific feelings about Music Technology not covered by the questions above, please use the spaces below to list them.

The magazine's editorial content.....

Its writing style.....

Its photography.....

Its visual presentation.....

Do you read Music Technology every month?  
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 Or occasionally? 297

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 Or do you buy your copy from an MI dealer?  
 Or from a newsstand/bookstore? 298  
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What happens to your copy of Music Technology:  
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 Or do you throw it away? 302  
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Do any other people read your copy?  
 If so, how many? 304  
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- |                                | Regularly                    | Occasionally                 | Never                        |
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The average amount you spend on instruments and equipment in a year? \$.....

**Please feel free to ignore the following section and fill it in only if you wish your questionnaire to be included in the draw for ten free subscriptions to Music Technology. (But if you don't wish to complete in full, please indicate your City and State.) All information will be treated in the strictest confidence - and thank you again for your co-operation.**

Name.....

Address.....

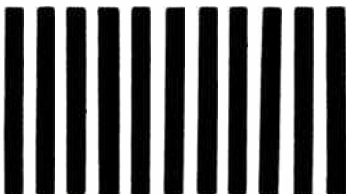
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State.....

Zip.....

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**Fold here — B —**

**When you've completed the questionnaire, extract the pages from the center of the magazine, fold it in two at 'A', and fold it again at 'B'. Then simply tape it round the edges and pop it in the mailbox. You don't need a stamp!**

variable over a relative range of 0-19. A value of zero actually results in a sound which is brighter than what you'd find in the real world, while values above 9 result in treatments which are unnatural at the other end of the scale. All in all, this turns out to be one of the most effective features in determining the character of a DRI reverb effect.

Position allows you to change the listener's apparent position in the environment being

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*"For each memory you can choose two groups of four values: the front-panel parameter, the MIDI message used, the scaling, and the starting/center value."*

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simulated. This is achieved by varying the mix of initial sound and subsequent reverberation. In real life, if you move away from a sound source, you hear less of the initial sound and more of the reverberation. On the DRI, a Position parameter value of zero means you are at the front of the room, 5 puts you in the middle of the room, and 9 puts you somewhere near the back.

The above parameters apply to the 'normal' rooms in the DRI's apartment block-full of acoustic treatments. In the case of special effects, they take on new functions. For instance, with the flanger/chorus effects, the controls assume such functions as left and right Sweep Width, Sweep Speed and Regeneration, while for the multi-tapped DDL, Decay and Min Decay become left-channel and right-channel delay times respectively (a tenth-of-a-second to a second in 10mSec increments for each channel).

On the subject of non-reverb effects, the DRI's ROM presets include such effects as step flange, reverse slap, reverse swell, drone, ping-pong, echorec, downward percussive flange and chorus – all of which are useful treatments, though as the DRI can only utilize a single effect at a time, their use may be constrained by your need to use reverb effects. If outboard equipment is at a premium and you're involved in multitrack recording, you can always record with one treatment and mix with another.

Subjectively speaking, the quality of the DRI's effects is (almost) everything that you would expect from a pro-quality digital reverb unit nowadays. However, the DRI exhibits more coloration on its reverb effects than you will find on some other reverbs; to these ears the Ibanez SDR1000, for instance, has a more transparent and smoother quality. The DRI's plates in particular are quite 'ringy', and the gated and reverse effects may not be to everyone's taste, either, as they lack bite. Otherwise, full points.

Now, about that 'Kill/Inf' button. This can be assigned to have one of three effects: kill the entire reverb signal; kill the decay (early reflections continue), or infinite hold, which far from killing anything, actually sustains the reverb effect. Useful and usable, Kill/Inf can also be selected by a footswitch plugged into the DRI's rear panel.

The DRI provides another murderous feature: a 'kill' preset memory. This has the effect of killing any reverberant signal, which effectively means that you can deactivate the

DRI via a MIDI program change – a handy feature.

In their quest to pack the DRI with as many features as possible, ART have included a Factory Demo mode. This auto-steps through the unit's factory presets, displaying each parameter value in sequence; the speed at which this happens can be set on a scale of 1-10. Thus, when trying out the DRI, you can concentrate on playing and listening while the

DRI does all the fiddly selection work for you.

Yet another feature, this time potentially useful in performance, is the Increment Preset mode. This allows you to select a sequence of chosen memories that can be stepped through from either the front panel or a footswitch.

## MIDI

I'VE MADE BRIEF mention of the DRI's newly found 'Performance MIDI' features without going into them in any detail. Before I do that, I'd better mention that MIDI on the DRI doesn't confine itself to such involved functions; there are some perfectly standard facets to the implementation, too.

To begin with, the reverb's programs can be called up remotely from a MIDI instrument using MIDI program-change commands. You can assign an onboard memory to each incoming program-change number (1-128) so that, for instance, MIDI program 67 could call up DRI memory 24. This feature (now fairly common on MIDI-compatible effects processors) allows you to assign the same effect to a number of synth patches without having

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*"There's no denying the value of System Exclusive communication – particularly for studio engineers who want to store groups of settings used on sessions."*

---

to duplicate effects in memory. Program-change reception can be allocated to any single MIDI channel (1-16).

And so to Performance MIDI, which allows the DRI to have two of its current values simultaneously altered via various MIDI messages: note-on and note-off velocities, note-on and note-off key numbers, poly and channel aftertouch, pitch-bend, continuous controllers 1-11, and switch controllers 64-67. For each DRI memory, you can choose two groups of four values: the front-panel parameter affected, the MIDI message used to affect it, the scaling, and the starting/center value. The greater the scaling value (the range is -128 to +128), the greater the DRI will change in response to MIDI messages (the negative scalings allow inverse responses). Now this is what I call flexibility – or, more specifically, performance responsiveness, which is what this aspect of the MIDI specification is all about.

The possibilities offered by Performance MIDI are too many to consider here, but a few examples are: note-on/off velocity controlling

decay, so that the harder you play, the longer the reverb effect continues to decay; note-on/off key number controlling position, so that depending on where you play up and down the keyboard, the apparent position of the listener in relation to the reverberant field changes; volume controlling high-frequency damping; sustain pedal controlling Kill/Inf on/off; and sostenuto pedal controlling high-frequency damping.

It's significant that ART have called this feature Performance MIDI, because there's no doubt that used in conjunction with a MIDI keyboard – I used a DX7IID – or with something like Yamaha's MCS2 MIDI Control Station, this aspect of the DRI hugely enhances the unit's effectiveness as a creative performance tool.

The DRI's MIDI section also caters for System Exclusive communication, allowing its memories to be sent to another DRI or to a remote storage device. While the onboard memory provision is plentiful, there's no denying the value of this ability – particularly for studio engineers who want to store groups of settings used on particular sessions. The DRI allows you to dump the current memory settings, or all the memories plus the MIDI program table.

It's also possible for the DRI to transmit and receive SysEx messages for individual parameter value changes in real-time, which makes for interesting possibilities both for slaving a second DRI, and for recording and playing back effect parameter changes using a MIDI sequencer.

The manual gives full details on the DRI's SysEx implementation, so no-one should be left in the dark about what can and can't be done. Finally, a word of praise for the DRI manual in general. It's thorough, easy-to-read,

and educational – throwing in a sensible discussion on the nature of reverb alongside explanations of how to use the DRI. Also included is a (very) handy quick reference card.

## Conclusions

AS WELL AS being a high-quality reverb with a great deal of flexibility when it comes to creating effects (which can be 'natural' simulations or 'unnatural' creations), the DRI comes packed with useful features.

Still, it's worth bearing in mind that there are other high-quality digital reverbs on the market (the Ibanez SDR1000 and the new Korg reverbs, for instance) which are significantly cheaper than the DRI, and some of which also manage to offer sophisticated MIDI control. Listening to space has never been this crucial. ■

**PRICE \$1295.**

**MORE FROM** Applied Research & Technology, 215 Tremont Street, Rochester, New York 14608. ☎ (716) 436-2720.

# STEPPIN' OUT

In MT January, we reviewed the Stepp DGI guitar, ending months of speculation about the instrument's capabilities. Yet we've still only scratched the surface of what is an undeniably complex innovation. Steven Randall, the Stepp's inventor, puts us further in the picture.

*Interview by Neville Marten.*

TELL US SOME THINGS that we don't already know about the Stepp.

Well, the starting point is that we wanted all of the controllability of the instrument to be on the guitar, because we felt it was very important that the guitarist controls guitars and not synthesizers. It's also very important not to blind the guitarist with science, so even though there is a membrane panel with lots of terminology which he might not understand at first, there are only three knobs on it – the master control, which takes him through 100 different sounds, a master volume and a master tune.

In a way, the guitarist can ignore anything else. He gets the guitar, turns it on, and there's the sound. By turning the master control you go through from sound number one through to sound number 80, and then into split sounds – which are a different sound on each string, multi-timbral. If he wants, that's all he has to do. The more adventurous guitarist can edit the sounds and then re-record or rewrite them into the instrument. So that's the starting point.

But the challenge of making it expressive or guitar-like is totally different to dealing with a synthesizer. On a synth you basically have a key, which you press down and it turns the circuit on – take your finger off and it turns the circuit off. It's a very easy thing to imitate a piano's type of action, but on a guitar you pluck strings, you mute strings, you bend strings, you slide up, you slide down and you do all sorts of things, and sometimes you do these things subconsciously. For a guitar to sound like a guitar, it has to do all those things.

Once you can create those things in software, then you can impersonate a guitar so accurately that the expression of, say, Eric Clapton can be translated into electronics and sound different to Bert Weedon, for instance, and the two will sound different for obvious reasons.

For the instrument to sound like a guitar it must be responsive immediately – you don't want a delay. In our particular case, we have gone for an active neck rather than real vibrating strings. Systems like the Roland have their merits because they almost started it all, but, from where we were standing, we thought the Vox Guitar Organ was nearer in concept than that.

Anything with a vibrating string needs to be translated, first of all, into a language that synthesizers understand. In translating a vibrating string into MIDI or anything else, there has to be a time delay; whether it's looking at it for one cycle, two cycles, half a

cycle – it's still a delay. The lower the string, the bigger the delay, and that's just to get 'note on' information.

So we steered clear of that and we used active frets, which we call SCI (Semi-Conductive Intelligent) frets. It's a one-piece component – not made of metal; it's a special material which detects when a string is touching it, and then knows how far the string has been dragged across it, for bend information. It's constantly analysed by software which, because it sees the string moving, can say 'Update pitch by a semitone or an octave, or whatever the program is'.

But it needn't be pitch. These are effectively 'software' frets. You can bend a string and it can control pulse width, or the cutoff frequency of the filters, or the waveforms.

*The average guitarist probably doesn't even understand that terminology, so can you give it to us in guitaristic language?*

Yes. Well, I'm a very average guitarist so there are certain things which I see guitarists doing and I think: 'I wish I could do that!'

Bending one string against the other, so you bend one string up to the frequency of the other, is a technique which I find almost impossible on a conventional guitar. If you route the frequency of one bank of oscillators to the frets and you keep the other frequency static, but a bit higher up – you can actually do that on the Stepp automatically. Just bend any string and it will slur the frequency up to the other one.

Another one is that some people might want to have a tone change when they bend a string, rather than a pitch change. So, if I take the cutoff frequency and put that on the frets, you actually get something that's quite cat-like.

*So you are bending wah-wah?*

Yes, but rather than being a function that goes backwards and forwards automatically, like the Low Frequency Oscillator (LFO) on a synth – a static function, it's a function that's under the fingertip control of the guitarist. It's something that's translating expression.

There's a major difference between the Stepp and any conventional guitar, in that the strings are split in the middle. That is done so that the electronics can tell the difference between your right hand and your left hand, because you do all sorts of things with your right hand, like damp strings and pluck strings, the computer needs to know the difference between each hand. The only way to do it is to split the strings.

That is quite a weird thing at first for people

to grasp, because all the tactile references that they're used to – like bending a string and feeling a slight bend in your right hand, or plucking a string and getting a vibration in the left hand – all of those things you use very, very subtly, but you take it for granted. When you pick up the Stepp, you become aware that that tactile reference has been taken away.

You also become aware that bum notes and all sorts of other things come out just as gloriously as the accurate information. So that takes a little bit of getting used to, but apart from that, there really isn't a compromise. The fact that the strings are split in the middle does mean that they are anchored just past the last fret, and bending at the top fret is a bit tighter than normal, but we have a multiplier effect so the resultant bend is bigger than normal.

Most people will find it easier to bend in the middle of the Stepp, rather than at the top. In fairness, this is an instrument that is aimed at guitarists, because the instrument is in a guitar format, but it's got to be treated as a new instrument.

The electric guitar was treated as a new instrument when it was introduced. In fact, when it first came out, people said it was a thing that wouldn't work properly; it fed back, it distorted. It took people a long time to know how to treat it and it's only when you play rock music on an electric guitar that it becomes a new instrument – electric guitars shouldn't really be used for finger-picking classical music.

So every guitar has got its purpose, and I don't think an electronic guitar is an instrument that should be picked up and treated exactly like an electric guitar.

The other half of it is that synthesizer players are very used to playing the sounds. If you've got a very slow string sound, you don't start stabbing away at it percussively, because nothing will happen. You will never get past the attack curve. When the synth first came out, the only people that understood how to play it were piano players, because that was the format. A lot of people said: 'It doesn't feel like a piano, so I won't play it', and it took many years before things like *Switched on Bach* and *Popcorn* started making people so curious about the sounds that they didn't really care about the tactile differences.

I think that's going to happen with electronic guitars. The conservative guitarist will be afraid of it, but almost for the sake of being afraid of it. It's not like a Gibson, it's not like a Strat, and I never want to be in a position where I'm convincing somebody to buy it

because I don't think of myself as a salesman. I would rather think of myself as somebody that's spreading the gospel about electronic guitars.

If people are interested, they will do different things. I've had a number of cases now where guitarists have come back to me and discovered things about the Stepp and I've learned things from them.

*I remember Bill Aitken, the SynthAxe designer, saying much the same thing about the SynthAxe – that every single person played it in a totally different way and got a different thing out of it. Do you find that?*

I find there's a period of about five minutes where I can tell whether a guitarist is going to be an electronic guitarist. And I would say that 99% of it is nothing to do with his hands – it's to do with his brain. It's nothing to do with whether you're a brilliant guitarist or not. It's purely mental attitude.

Again, it happened with Simmons drums, which have the facility of making an average drummer sound brilliant. If you are a brilliant drummer, you could use that technology to sound impossibly brilliant, or you might find it so restrictive that you could be made to look like an idiot.

Because the guitar is such a tactile instrument, everything about it is sweat, really. On a synth you can pick it up and get something straight away, which means that it's a very disposable instrument. Kids get bought little synths for Christmas; they tinker away at them and most of them end up on top of cupboards and are never used again. The thing about guitars is you have to have your fingers in a state where they're hurt, almost bleeding, and if you get to that stage you're a guitarist for life. The kid that's been bought a little Spanish guitar to learn on, one day will want a Gibson or a Fender, and that really hasn't changed.

One of my ambitions is to have a situation where someone can go into their local drug store and buy a Casio electronic guitar. He presses a little button and it plays a metronome type of drum and he learns E, A and D. And one day he wants to buy a Stepp, because that's the granddaddy of the electronic guitar.

I don't know how far we are from that, but judging by what's happened with synths and drums, it may take five years. We have to educate the people first.

I'd love to do a bass guitar version of the Stepp. That's a totally different challenge. Bass guitars are being virtually replaced by synthesizers now, and a lot of people have asked me about a bass version. It's very easy to say no, it's too difficult, but there's got to be a market for that sort of thing.

*But you can tune the Stepp into a bass-guitar register, can't you?*

Yes, this has got an eight-octave range, but it's the scale and it's the fact that you'd like to be able to slap onto it as well, and get a totally different envelope. I think it would be nice to dedicate an instrument to a bass. I'm not saying we're doing it, because I think the task is almost as mammoth as making the Stepp in the first place...

Another aspect of why playing the guitar is

different from playing synthesizers, is that people mute strings all the time – either damping a string to turn it off or plucking and muting the string at the same time, which gives you a totally different, shorter envelope. If you muted and plucked a violin string sound, you'd want to get it 'pizzicato', and that's something you can't do on a (keyboard) synthesizer. But you can do it on the Stepp. The muting envelope is a totally separate portion of the envelope. There are two independent envelopes that can be routed to different parts of the synthesizer so, in English, that means you can have a particular 'shape' of the sound which is overridden with a different shape when you mute the strings and pluck them.

On a guitar, touching a string is sometimes an intentional piece of musical information. You might want to stop that string from vibrating and, in reality, you would stop it from vibrating. In a software-based guitar you are telling the software that if I pluck that string I don't want it to vibrate, I want it to go 'flupp'. So, I'm touching the string, you can't hear anything but the software knows I'm touching it. It's monitoring for being touched.

*How does the Stepp detect that you are touching the strings; is it resistive?*



It's actually capacitive. Capacitance is monitored all the time. I think you can do it with resistance as well, in fact I'm not even certain that we don't do it that way, but I think it's capacitance.

On the right-hand side we use sensors to pick up the vibrating string, but we don't need to see a vibration as such; we need to see just the first impact.

Say you rely on a vibration for your information, which is what the Roland does. Let's imagine you've got a sound – a long orchestral string sound. Sometimes the sound will dominate your thoughts, you'll pluck a note and the sound's a long, beautiful, swirling sound and you're not listening to the string, you're listening to the sound. If the string stops vibrating, and suddenly shuts off this orchestral piece, it can be a very embarrassing moment. So Roland get round it by having a hold pedal. But then the guitarist could

become like an organ player with lots of pedals on the floor.

The way a guitarist deals with sustain is that he knows when he plucks a string that it's got a particular sustain; he hits it harder and it will go on a bit longer, and on the Stepp you can program that. If you want the string to take five seconds to decay, or 30, you can program that. You can also program the sustain so you can hit it and it'll go on forever. The way of overriding that is just to damp the string with your right hand, which is what you would do on a conventional guitar.

*Supposing you want to change chords but still have the notes ringing as you take your hand off?*

You can only do things that are guitar-like. The best way of thinking about this would be to suppose you've got a conventional electric guitar and a fuzzbox which will give you infinite sustain; can you play a chord, and get the chord to sustain forever? Once you start sliding around, you carry on sustaining because you haven't damped the string. If I take my fingers off very slowly, I've actually damped it. If I take my fingers off very quickly, I've pulled off to an open string, which will actually happen on a guitar.

Now, people that know a lot about synthesizers can actually see something there that the guitarist doesn't necessarily know about yet – it's sort of the next question.

*Supposing you play a chord and you take your fingers off and you want the chord to continue?*

Well, that's an interesting thing, but it's something that's impossible on a guitar. It's not impossible on an electronic guitar because once you've got the information, you can decide what to do with it. At the moment we choose not to do anything with it – almost out of arrogance – because if guitarists pick it up and it's in a sustain mode, or a hold mode, it's just another parameter they have to come to grips with.

We're introducing a pedal which will be called the Universal MIDI Station, and it will have the facility to remember the last chord and just sustain it 'til you release the pedal, a bit like the Roland, and SynthAxe, almost.

*The SynthAxe does it by turning the left-hand damping off...*

The more adventurous guitarists that have played this have virtually dictated what the



# How the ESQ-1 can sequence, display, control and sound better than any other synth in its class...

**L**et's start with sound. After all, sound is your first criteria for any musical instrument.

In his review of the ESQ-1, Peter Mengaziol of GUITAR WORLD wrote, "The ESQ-1's sound combines the flexibility and analog warmth of the Oberheim Matrix-6, the crisp ringing tones of a DX-7, the realism of a sampler, the lushness of a Korg DW-8000 and polytimbral capacity of the Casio CZ-1".

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Page by page the 80-character ESQ-1 display makes programming and sequencing a breeze.

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*"At \$1395, it would be a bargain just for the sounds it makes, but when you consider the sequencer as well, this thing is a steal!" — Jim Johnson — KEYBOARDS, COMPUTERS & SOFTWARE Oct. '86*

ESQ-1 itself. Go to the store and ask to hear the DEMO 1, 2 and 3 songs to appreciate what the sequencer section can do using the internal voices alone... it's scary." And if you're really brave, you can connect as many as 8 MIDI units to the ESQ sequencer and control them all independently.

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*"Every once in a while, a product comes along that begs to be raved about. Ensoniq's ESQ-1 synth is just such a case" — Benjamin Russell — CANADIAN MUSICIAN Feb. '87*

*"Its voice has the kind of sonic potential that today's musicians demand, its 80-character display gives you plenty of information to help in programming, its keyboard splitting and layering are superior and the on-board sequencer is a killer... you simply can't afford not to check out the ESQ-1." — Jim Aikin, KEYBOARD Sept. '86*

*"I often suggest the ESQ-1 to those looking for a cost-effective mini MIDI studio." — Craig Anderton — Editor, ELECTRONIC MUSICIAN*

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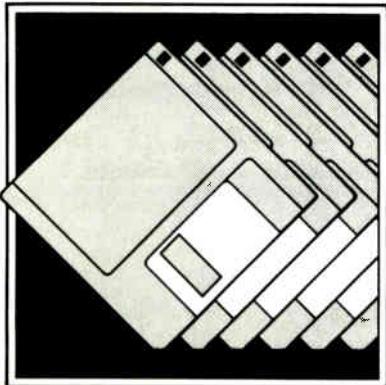
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pedal should and shouldn't do. Because we can now take any of the parameters from our membrane and put them onto the floor, you're changing things that would be impossible on a synth or on a guitar, so why not utilize this pedal for more than just hold, for all sorts of things? It will be an automatic—no pun—stepping pedal so you can step through the programs in any order, which is really useful for live work. Again, there are pedals available at the moment that can do that, but we want ours to do lots of different things.

The Stepp really wasn't designed specifically for live work or studio work, but it really is more of a studio instrument at the moment—in the same way that a Fairlight is more of a studio instrument. I think in a live situation the guitarist will make demands on it that the studio musician might not. Even getting a cable that's long enough for a 60-foot stage...things like that are not just a question of making a 60-foot cable, you have to deal with digital information.

*Tell us about the vibrato bar.*

Well, not only are the frets software controlled, but also the bar and the strum strings. You have the facility now of having a wah-wah on the bar, or bowing volume—it's actually very nice to have a string sound and be bowing it on the bar. And it's much easier to use the bar as a volume control than using a volume knob. Again, as an average guitarist I found it very difficult to get my little finger around the knob and bow. Some guitarists have got an incredible technique of doing that, and they might find that the bar is harder than what they've developed over 15 years of practice. But for the average guitarist, it's much easier to use the bar.

You can also do things on the strum strings. If you route, say, the balance of the oscillator banks onto the strum strings, they can have really lifelike feedback. You can tune the two oscillators so that one's a harmonic of the other and the harder you hit, the more you bring in the other oscillator—which actually sounds like you're picking up a harmonic.

You find that if your ear hears the LFO more than a couple of times, it realizes that it's not natural. But it's very difficult on a track to hear that as being a synthesizer—it would sound like a guitar feeding back.

This is where it gets quite interesting, I think, because that's an effect that's enhancing the guitar-type technique, or enhancing the guitar-type sound, electronically. Which means that either an average guitarist can sound more interesting, or an interesting guitarist can sound almost impossible. Or either guitarist can have that effect electronically controlled, say, with a sequencer. He can have the screeching guitar solo feeding back via a sequencer, which is all very bizarre. Your performance could be captured in MIDI, and then afterwards the producer could decide what he wants to do with the solo, whether he actually likes every single note, or whether he wants to change the sound...

The Keyboard Mode switch, or left-hand trigger, is something which allows a string to be instantly triggered the moment it touches a

fret, which is useful either for very fast solo things—you don't have to strum it and you can slide all over the place and get incredibly fast licks—or for two-handed play.

We've actually discovered that you spend a few milliseconds getting the fingers into position when you shape a chord, and if the sound is too percussive and too short, you can actually hear the fingers going down in series. This whole area of the Stepp requires a technique that really opens it up, but if you just approached it from scratch and thought you could get something straight away out of it, you'd be wrong.

For me that's quite an interesting area, because I'm using two hands, which I've never been able to do. It's never occurred to me to do that and I'm now doing things that to a certain extent might not be that interesting to a synthesizer player, even though it might be pretty difficult to do on a conventional synth. I'm doing things that are very unguitar-like, and that's one of the areas that I think people must grow to appreciate, because you can't just pick it up and suddenly start a new method of playing an instrument.

What it does give you is the format. You recognize six strings, you recognize the 12th fret, you know exactly where you are, so that's the starting point. Then you need to lock yourself away in your bedroom for about a month and develop whatever you want to develop—how best to maximize this new facility of playing. In some cases people won't, but in other cases people will do things that have until now been impossible on any musical instrument. I think that's where it's gonna get exciting.

*Guitarists are going to be interested in what you can do as regards playability. You've given it a very low action, I see.*

We're doing work all the time on the guitar so that the action can be adjustable, or frets can be a certain height. I mean, it's very difficult to say: 'This is the standard guitar that's going to please everybody'.

As far as the playability is concerned, from the first fret up to the 15th, the scale is exactly the same as a Gibson Les Paul. From the 15th onwards the frets have been evened out so that they're a bit easier to play. The string spacing is very similar to a Fender.

We use the same gauge strings, which are especially made pure stainless steel. All the guitar strings on the market which are called stainless steel aren't really: they're stainless steel plated and they will tarnish eventually.

So again, as far as playability is concerned, the guitarist has to come to terms with playing a single gauge string. As of the end of January we are offering four different gauges, but they won't be wound strings. They'll range from 14 thou to 20 thou.

*Do you have the tension of the neck strings set to anything specific?*

They don't need to be tuned; the tension is purely a preference of the guitarist. You'll find there's an Allen key that's housed in the headstock, which adjusts the tension. If you wanted to, you could have ridiculously low action with very, very floppy strings, so that it's incredibly fast. Or you could make the strings extremely taut, so that it's very tight.



Most people actually adjust the tension so that it's more or less what their real guitars feel like. You can adjust the tension on the strum strings in the same way, and most people just want them fairly tight.

We've had a sort of controlled experiment where we changed things physically that have no effect at all electronically, but guitarists still perceive there to be an effect. We've also had situations where people that really don't understand the technology have been astounded that there are no delays, that they play it and there are no delays. And yet they still think that the bass strings are slower than the top strings, no matter what you tell them.

*Which parameters can you assign to the control knob?*

Well, not every single parameter is assignable. Obviously you can tune the instrument to whatever frequency you want, from an E up to three Es higher, or whatever. Or, press 'Tune' again, and tune just the sixth string, press it again and tune the fifth. You could change the volume of each string in the same way. It's just a patch, so that patch 19 might be (open) tuned to C, whereas patch 20 might be a standard E. You can punch in a chord and that will be memorized as a chord.

*So if you punch it in to patch 28 for instance, every time you call 28 up, it will be in that tuning?*

Yes, and anything that requires updating, resonance for instance, can be changed by using the master controls.

There are three digital displays. One tells you which program you are on, one tells you the range of the parameter that's been assigned – to, say, the performance bar or the strum strings – and the bottom display gives you the value of any parameter you are changing.

When you first go into edit mode, you have an opening menu which flashes at you, and anything that's flashing can be edited. In that state the master control is doing nothing – it hasn't been assigned to anything. If I press say, Cutoff, everything stops flashing, apart from something that can still be edited to cut off. But cutoff stays on, and the display shows you the value for cutoff and the control now adjusts the value of cutoff.

Apparently, by routing 13 modulation destinations to six modulation sources in any combination, there are something like six billion permutations.

*Is the guitarist still going to be confused by these technicalities?*

I steered clear of getting involved with too many technical traps because I was brought up on synthesizers that you could turn a million controls and accidentally find sounds, and nowadays, that's really not the norm.

For instance, bend is something that guitarists know about. Just press Bend and you can change the amount of pitch-bend on the instrument on that patch. Before we named that function 'bend', you had to assign oscillator frequency to the frets – so you'd already lost guitarists...

It's designed so that from the start, all you need to do is turn one knob for different sounds. If you just press one button, you can tinker around and change things and you're not going to do any damage, because it's a

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two-handed operation to erase any sound. You have to know what you're doing to erase the sound and put a new one in.

*You've given MIDI a secondary role but admitted it exists, and given your Stepp player the facility to use it...*

What we've said is that MIDI is very important. It's on every instrument, but it's not the sole reason that instrument exists. MIDI takes the same priority on the Stepp as it would do on a DX7; you don't buy the DX7 because it has MIDI, you buy it because of the sounds. So the MIDI facility on the Stepp needn't be very complex. But I think that most guitarists that take up the Stepp are looking at the Stepp before they are looking at MIDI.

On the MIDI side, you can plug it into a DX7, strum it and away you go, or plug it into

a sequencer and record your guitar and, because we've got MIDI In, you could do something like plug a keyboard in to the Stepp and have the keyboard controlling the Stepp. You'll be defeating all the guitar expression, because you are controlling it from a keyboard rather than strings – but you can still do that.

*Does it take guitarists very long to get to know how to operate the Stepp?*

I think it takes longer to feel comfortable with a brand new instrument, than to go forward once you're comfortable with it. From personal experience over a relatively short period of time, I would say that people need to sit down for a couple of hours before they even start breathing properly – so, once they've got over those two hours, then it's very exciting.

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# The Latest Page in Audio History.

## 1877: The microphone is invented.

Developed by Alexander Graham Bell, Thomas Edison and Emile Berliner, it was patterned after the human ear itself. The first of many attempts to capture sound as we really hear it – a goal that took more than a century to realize.



## 1896: The first synthesizer.

Thaddeus Cahill's Telharmonium weighed 200 tons! A touch-sensitive keyboard drove a complex labyrinth of motors, pulleys and alternators.

## 1924: The dynamic loudspeaker.

The design first developed by Chester W. Rice and Edward W. Kellogg has changed very little over the years. But today's broad frequency bands and increasingly complex audio signals are challenging the loud speaker like it's never been challenged before.



## 1925: The vacuum tube amplifier.

The collective work of Edison, John Fleming and Lee DeForest. Transistors later came to replace tubes, but audiophiles have never been entirely satisfied with what they heard.



## 1958: The advent of digital.

Working at Bell Telephone Laboratories, Max Matthews developed a computer program for creating and storing audio waveforms as digital data. Today, digital technology is widely available to musicians and consumers through innovations like user sampling devices and CD players. To hear the sound, however, it's still necessary to translate it back into the analog domain. And that's where problems develop.



## 1978: The BBE breakthrough.

When you put a power amp and a loud speaker together, something has always been lost in the interface. That's where phase and amplitude distortion develop, due to "miscom-

munication" between amp and speaker. And that's why amplified sound has never had the dimension, depth and realism that the human ear can hear all around it in nature. That is until Bob Crooks made an important discovery – BBE. BBE is the vital "missing link" between amplifier and speaker. It analyzes the action of both – automatically and on a continual basis. It applies the phase and amplitude correction that's needed to make the sound come through the way you and nature intended it. The difference is easy to hear. Improved low-end definition and punch. Cleaner high-end transients. Better mid-range presence. *In short, unprecedented clarity.*

## 1984: BBE on stage.

Major P.A. companies like Stanal Sound and Best Audio made BBE part of their touring systems. And when the entertainment industry



gathers for such events as the Grammys and the Academy Awards, BBE is there, making sure the sound is as special as the occasion itself.

## 1985: BBE in the studio.

Award winning producer Steve Levine joined forces with the Beach Boys and teamed them up with BBE for an all digital recording session for CBS/Caribou. "BBE is to digital what equalizers were to analog," said Levine. "I can't imagine ever recording without BBE again."

## 1986: BBE today.

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# Eighth Wonder

**It may not have the classic ancestry of a Minimoog or the cachet of a Prophet 5, yet Roland's Jupiter 8 is arguably the most influential analog synthesizer ever built. What were the qualities that made it so popular, and how useful is it today?**

*Text by Tim Goodyer.*

**C**AST YOUR MIND back to the long, hot summer of 1983, and the arrival of Yamaha's first FM synthesizers, the DX7 and DX9. Exciting, wasn't it? Two new synths that promised just what the technology-hungry (but relatively impoverished) keyboard player wanted: a completely new palette of sounds, a new vocabulary in sound creation, and a fully professional spec, at a laughably low price tag. In other words, small synths with big ideas that actually worked.

Up until then, the big synth held court exclusively. The Prophet 5, Oberheim OBXa, Memorymoog and Jupiter 8 — all were professional, programmable analog polysynths with lots of oscillators and filters, making obese brass sounds, rich, sweet string washes, and fascinating, polyphonic, portamento-enhanced (except in the case of the Prophet) changes from one innocent chord to the next. They all made very impressive listening (and playing), but not without making a big dent in your bank balance.

The DX7, on the other hand, weighed in at less than half the cost of the Jupiter. Anyone who'd thought seriously about investing in a professional analog polysynth probably had enough cash to buy a DX straight out. It's little wonder, then, that the 'big synth' found itself held in abeyance, while the novelty value of FM gave way to more serious use.

If a revolution in sound synthesis wasn't enough, another innovation accompanied the arrival of the DXs: MIDI. Although the MIDI implementation on the DX7/DX9 was crude, it was, nonetheless, MIDI. The same could not be said of Roland's DCB (Digital Communication Bus), Moog's ancient CV, Gate and S-trigger, Sequential's Analog/Digital buses, or Oberheim's Performance System.

The big synth was in big trouble. Moog discontinued the Memorymoog, and stopped making synthesizers altogether soon after. Oberheim went a little quiet before helping to restore everyone's faith in analog with their phenomenal Xpander. Sequential struggled with their SixTrak, MultiTrak and Max, before giving up on analog synthesis making good with their Prophet 2000 sampler. And Roland hastily concocted the Jupiter 6 — a slimmed-down Jupiter 8 with a crude MIDI implementation — slipped further downhill, and then finally struck gold again with their MKS80 Super Jupiter module — as devastatingly versatile as the Oberheim Xpander, but in a

format people were already familiar with.

What Oberheim and Roland proved was that FM was no more the death of analog synthesis than the LinnDrum was the death of the acoustic drum-kit.

What, then, of the musicians who'd already invested thousands in yesterday's 'big synth' technology? And what of the instruments themselves? Well, Roland Jupiter 8 serial number 222571 was the stuff dreams were made of when I bought it in 1982, and I'm happy to report that, five years on, it's *still* an extraordinarily powerful and usable synthesizer, even when set alongside Yamaha's latest DX7IIIFD. And even five years on, JP8s are still cropping up in interviews, studio reviews, and on LP credits with monotonous regularity. Particularly on this side of the Atlantic, where big, fat analog synth sounds have never gone out of fashion, they have become something of an institution.

One glance at the Jupiter 8's control panel shows another major hardware difference between it and the DXs — knobs, and lots of 'em. And they all do different things at the same time, unlike these incremental and multi-function controllers. You can actually see what's going on in your patch, as opposed to jotting down hundreds of parameters on scraps of paper, or needing a short-term memory of Gigabyte order. Now, the cost of this hardware represented a significant proportion of the JP8's original retail price. But once you've worked with a panel full of knobs instead of a tiny LCD display (which many of today's younger synth programmers have not, of course), you'll know what all the fuss is about.

Without reading too much about oscillator syncing, cross-modulation of one oscillator by another, switchable -12/-24dB/oct filters and self-diagnostic fault programs, the paper spec reveals the JP8 to be an eight-voice, 16-oscillator synth with split and layering facilities. Eight voices, that is, in Whole mode. When Split mode is selected, this becomes four voices each side of the split, and in Dual mode four voices stacked on top of the other four.

Each bank of four voices has its own output available simultaneously on standard quarter-inch jacks and cannons — neat when it comes to EQing and processing patches independently of each other.

A simple calculation tells us that the Jupiter 8 ordinarily uses two oscillators per voice, and a screwdriver reveals another of the beauties

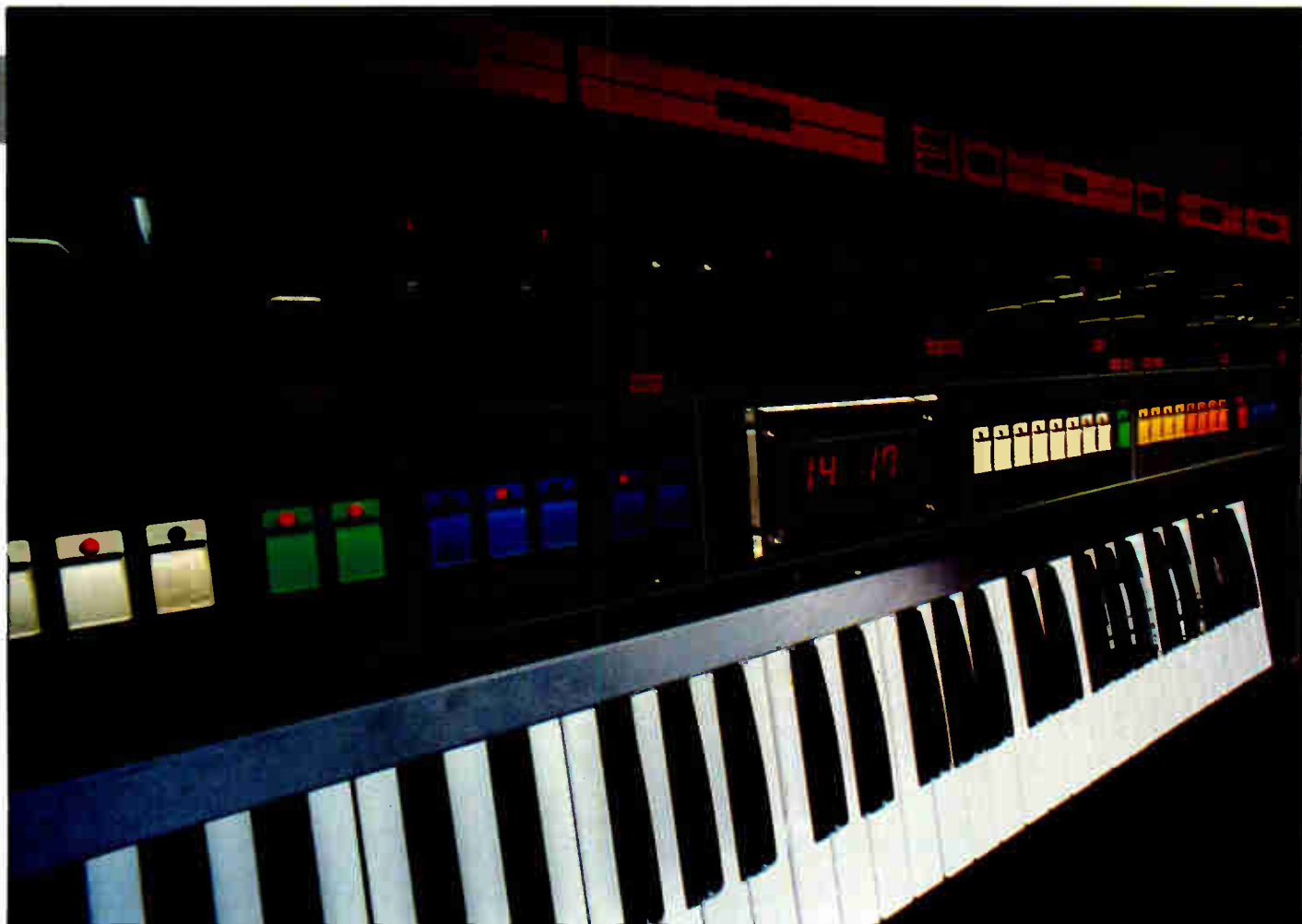
of the instrument: inside, there are two identical voicing boards, each responsible for half of the instrument's power — and each a fully capable four-voice synth in its own right. Apart from allowing you complete freedom to assign any of the Jupiter's 64 patch memories to either module, this configuration ensures independent detuning and dynamic characteristics, and an exceptionally flexible arpeggiator arrangement.

As well as being one of the strengths of analog synthesizers in general, strength of tone is one of the Jupiter 8's specialties — and keys to its popularity. In Whole mode the oscillators and filters give a pretty good account of themselves, but there are two ways to fatten the sound still further. The first of these is Unison mode, which ensures that all 16 oscillators are in operation regardless of the number of notes being played. Be warned, though. One 16-oscillator note assumes the destructive power of a small bulldozer, and should be treated with extreme care. Meanwhile, a two-note chord has four oscillators assigned to each note, and so on. Apart from anything else, this arrangement also keeps the audio level fairly constant, and so prevents your chord melody disappearing should you choose to throw in a couple of single notes, and stops you inverting speaker cones if you want to chuck a couple of big chords into an ear-splitting single-note solo. Calculated, but neat.

The alternative sound-fattening procedure is patch layering. When a patch is layered on top of itself, slightly detuned and stereo panned where possible, the results can be devastating — never mind SPX90s, and all the other outboard sound-fattening tricks that have been discovered over the last 12 months.

Yet the value of sound layering has been sadly underestimated by a good many pre-MIDI analog programmers. I found that, by treating the JP8 as a four-voice synthesizer with four oscillators and four envelope generators per voice, it became a far more sophisticated programming tool. Not only have you then doubled-up on the number of oscillators and envelope generators per note, but each pair of oscillators and envelopes is completely independent of the other. In other words, you're dealing with a simple, but very powerful, two-stage wavetable. It's possible to construct a composite patch (and store it as such in one of the eight Patch Preset memories that accompany the 64 ordinary memory locations) with each keyboard layer responsible for different aspects of your sound. Among other things, this is still the only way to get a convincing Simmons drum sound from a keyboard synthesizer, as the demands placed on the filter by the white noise and pitched elements of the sound are normally incompatible.

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Meanwhile, the value of a Split mode had been conveniently overlooked by FM designs (and by post-FM analog designs) until the recent popularity of MIDI layering and MIDI controllers with keyboard zones.

As well as having a useful programmable split point (now once again common property among well-specified modern keyboards), the Jupiter 8 takes splitting a stage further with its arpeggiator.

In Whole mode, the arpeggiator deals with as many as eight notes arpeggiated up, down, up and down or randomly over one, two, three or four octaves. In Dual mode, the same options are available to both patches but with only four-note polyphony. And in Split mode, only the patch assigned to the lower area of keyboard is arpeggiated, with the same options including the four-octave range. This, again, is more like having two four-voice synths playing simultaneously than compromising one synth by asking it to do two jobs at once.

Being more cunning than most of its brethren fitted to less worthy machines, the JP8's arpeggiator also has the ability to memorize notes in the order in which they are input, and at the pitch they are input. Or to put it another way, they are *not* compressed into one octave before being repeated over the chosen octave range.

Yet the arpeggiator really comes into its own when synced up with a drum machine. Happily, the provision of a Sync 24 input MT MAY 1987

means that it's possible to sync to most recent drum machines, and if all else fails there's always MIDI and a suitable interface.

Now, my guess is that, after reading the last couple of paragraphs, you're thinking either that the JP8's arpeggiator is the finest ever designed, or that it's no less a waste of time than any of the others. But let me put it like this. Before I got my JP8, I'd probably have fallen into the latter category. Arpeggiators were poor man's sequencers, I thought, and not to be meddled with when there was more serious work to be done. The Jupiter made me an instant convert. So much so, in fact, that I'd say there are fewer better uses for an arpeggiator than *alongside* a sequencer, where a little confusion equates to a little harmonic *je ne sais quoi*. The Random setting, in particular, can help bring freshness to a tiring chord progression. Believe me, it's a useful tool.

The original Jupiter 8 production model had no facilities for interfacing above a CV/Gate output from the highest keyboard note in use, and Roland Sync 24 and trigger inputs for the arpeggiator. A modification became available, however, to fit Roland's Digital Communication Bus (DCB) and hence permit the instrument to exchange note-on/off and pitch data with the MC4 MicroComposer – and eventually with the JSQ60 DCB sequencer and the MSQ700 MIDI/DCB sequencer. Later models, dubbed Jupiter 8A, were fitted with DCB as standard.

But then along came MIDI, and with it

(Roland must have *known* people were going to hang on to their JP8s) came the MD8 MIDI-DCB Interface. This allows transmission and reception of note-on/off, pitch and program-change data over any of MIDI's 16 channels. Not a stunning spec, but one that helps keep the Jupiter 8 on speaking terms with ever-advancing technology. You may have a few communication problems, but you shouldn't ever be faced with a total breakdown.

You can pick up a secondhand Jupiter 8 now for under \$2000 – or less than the cost of most state-of-the-art digital synthesizers. Not bad for an instrument that was once high up in (perhaps even the leader of) the big league of big synths. If you're *at all* interested in creating fat, original, electronic sounds, and you're prepared to forego the luxuries of disk storage and the more comprehensive interfacing capabilities of MIDI, it makes an awful lot of sense. Your JP8 may be a little dirty between the keys and a little scratched around the edges, but they don't build them like this any more – it should last a long while yet.

Then again, if MIDI is an essential part of your music-making, the above-mentioned MKS80 Super Jupiter module contains the essentials of the Jupiter 8, plus a healthy dose of MIDI, increased programming flexibility, and an improved bass end – though this too has become something of an industry standard, and doesn't come cheap. Ah, the high price of fame. ■



# Texture Version 2.5

## Software for IBM PC and Commodore Amiga

**Texture is one of the US computer music industry's longest-established sequencer packages, with a constant flow of updates that improve its performance. What do the latest clutch of modifications achieve? Review by Chris Marry.**

**I**N THE WIDE WORLD of computers, it's software that makes the machine. IBM moved into the business world several years ago, in no small part due to an innovative and very popular spreadsheet program. In the music industry, the choice of computer for many musicians has been the Macintosh, due again, in no small part, to the availability of high-performance sequencing and librarian/editor software. It's not that there hasn't been plenty of good programs for other computers, or that I'm making any judgement on the relative merits of the Mac vs. your favorite computer. It's just that certain computers have settled in certain niches, and the Mac tends to be found in more professional music applications than, say, a Radio Shack Color Computer.

But just as the introduction of quality business software enabled Macintosh to gain more than a foothold in the corporate boardrooms of America, so has the increasing amount of excellent music programs written

for the IBM (and compatibles) allowed Big Blue to find its way into the halls of recording studios.

Texture 2.5 is one of these programs that has made the PC into a valid music-making tool. A MIDI-based sequencing system (also available for the Amiga), Texture handles up to 72,000 notes on a 640K PC, which even the most busy-handed keyboardist will be hard pressed to fill up. It's an easy sequencer to learn, once you understand its approach to music creation. It does impose a certain degree of organization on the musician, but this is implemented with such flexibility that once you start to work with the system for a while, you don't even notice it.

### Format

TEXTURE USES A concept called Modular Recording. Most musicians will recognize this as the 'drum machine' method of sequencing, to simplify it. In other words, you are asked to record your music in manageable chunks

called patterns, then link these patterns together into a completed piece of music.

Now, whereas this is an ideal method for composing songs that use an ABACB pattern, for example, I've always felt a certain amount of restriction on having to plan out my music that way from the beginning. Even when programming a drum machine using the pattern method, I have to work hard not to let things get too repetitious if only because it's 'easier' to instruct the machine to play pattern 19 again instead of working up one more variation of the rhythm. When writing music, the last thing I want is a program that dictates how I write and in what way I have to sequence it. It was with some reservation then, that I began working with Texture 2.5.

Right away, in the opening tutorial, the program makes no bones about the approach it takes towards sequencing music. However, your pattern length can be anything from 1 bar to 2730 beats (682 bars of 4/4). I don't know about you, but I usually don't think of 500 bars

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of music as a pattern, which is exactly the point; although the layout of the program is the familiar pattern/song affair, the scope of it takes one far beyond any repetitive approach to music. Each pattern consists of up to 24 tracks of music, any one of the tracks assignable to any of the 16 MIDI channels. The screen layout is very manageable, using functional window areas for playback and record controls, data viewing and track editing and user commands.

The left window gives global information regarding the status of the current pattern and song – i.e. tempo, quantization values, pattern length, synch mode, tracks used, number of clicks per quarter-note, and so on. The right window displays other information depending on which mode you're in. The initial right window screen is 16 of the available 24 for pattern 1, set up for immediate recording (Pattern mode).

Recording is easy. Press R to enable recording, press R again to start. Count-off is programmable, as is the length of the pattern. Pressing the space bar pauses your recording, pressing it again lets you continue from where you left off. For Playback press – what else? – P. Most of the commands have been given the appropriate single letter command to make them easy to find. File commands are accessed by pressing F, erasing portions of tracks is E, H gives you Help, and so on. This makes it very easy to learn the commands, and quickly becomes second nature.

Rather than discuss the fundamental features that Texture is capable of, which include all the basic functions of a good workhorse sequencer such as quantizing, tempo changes, MIDI channel assignments, and other things we take for granted, let's take a look at some of the things which makes this program different from others.

One of the nicest things about Texture is the constant interaction you have with the program. Just about any command you can give can be issued in real time, as your track is playing. You can change tracks on the fly, record tracks on a loop, à la drum machine, erase tracks, and so forth – all without stopping the music. One very handy feature lets you play over a looped section of music a number of times, then by accessing the buffer, it will tell you how many takes you did and let you review them one at a time so that you can choose the best performance of the lot. In other words, if you start jamming with some funky four-bar loop and want to keep what you played the third and the eighth time the loop passed by, it's all there in the buffer (dependent on how much memory is available, of course). You could then edit down the solos by erasing the last half of the first take and combining it with the first half of the second, and get the perfect performance you wanted.

One of the biggest complaints about earlier versions of Texture was its lack of step editing, but this has been nicely remedied in Version 2.5. Just play your note, then hit Insert or a function key and the last note is stored in memory according to the current duration value. You can change the duration value at any time, erase wrong notes, back up to

earlier sections – which generally makes step editing, if that's how you like to enter your music, a breeze.

If you've ever worked with a sequencer and made mistakes in your editing of tracks, you'll love the Undo feature. As the name implies, Undo allows you to take back the last data-changing action you made. This opens the way for lots of experimentation, as you know you can always reverse what you tried if you don't like it. On something like Texture's quantization implementation, this kind of feature is mandatory, as unlike many other popular sequencers, quantize actually alters the track data. It's not that big a problem (you can always make a copy of the track before you alter it), but with liberal use of the Undo function, it's no problem at all.

As long as we're talking about quantization, any track can be auto-corrected to virtually any value. It's the user's choice whether or not quantizing occurs before or after you record the data, and the program does allow you to mix tracks with quantized and unquantized material. Some additional features in v2.5 allow you to deal with note-off (duration) data specially. There are now three options regarding note durations: Align, which quantizes the note-offs; Equal, which causes all notes to be the same length (like all-16ths for those rigid sequencer like passages); and Unaffected, which bypasses any quantization of note-off commands.

An additional feature, Arpeggiate, actually staggers the notes played on a track to produce an arpeggio effect. You don't have a lot of control (read none) over what direction your arpeggio takes (it's just whatever is found in the MIDI data stream), but some interesting effects are produced using this option. And besides, if you don't like it, you can always Undo it.

But the best part of the current version, in terms of quantizing, is selectable timing correction. You can select Texture to correct only beats 20-28 on a given track, and leave beats 0-20 and anything following beat 28 totally unquantized. Normally you'd have to record the part you wanted unquantized on

one track, record the corrected part on another and merge them together, but now you can just selectively quantize any part or parts on any track. Very nice.

## MIDI

THE MIDI EDITING functions have also been improved in v2.5. MIDI data editing is pretty rudimentarily implemented, essentially covering the basics of which beat the event occurs (broken down into sub-beats and timebase units), which note and what the status code was (including only note-on/off, program change, aftertouch, key pressure, pitch wheel and control change). It's always been a little tedious doing editing directly with the datastream, which was made even harder when you couldn't actually hear the notes you were altering.

Version 2.5 remedies that, allowing you to Play the notes you are searching for in the MIDI display. Another new feature, Exchange, allows you to replace note or channel data on a track within a pattern. It's kind of a global MIDI edit function where you can change, let's say, all the middle Cs to Fs. Even better, though, is reassigning every third note (or whichever value you want) to a different MIDI channel, creating a limited kind of hocketing effect. You'd need to have a multitimbral synth or several synths at your disposal to hear this, but it's great to be able to switch voices throughout a rapid 16th- or 32nd-note four-bar pattern, especially if the instruments you're working with have panning options.

Another function that is unique to Texture is a scaling feature, which can be applied to time, velocity or duration. This allows information to be changed by a relative percentage, making accelerandos or decelerandos easy to program. You select which information you want to alter, and establish by what percentage you want to change it. Then you decide whether or not you want to have this implemented as a constant or to slope it in, slope being the best for ritards and the like.

When you apply this technique to velocity, you can add a lot of personality to your performance, simulating decrescendos or just



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gaining better touch control over your velocity-responsive sounds. And using duration scaling can produce some very interesting effects, going from staccato to legato smoothly over an eight-bar phrase. You could also do this kind of editing in the MIDI data editor, but it would take a lot longer to edit every event.

The scaling feature let's you play with it on a track-by-track basis.

While describing some of the new additions in v2.5, I've only lightly mentioned the fact that Texture is a menu based program. Most commands are set up to respond to single key access, using letters, numbers or the IBM function keys. This makes it very easy to get around the program while you learn it, and the real-time interaction seems to have been a large overall criterion in the development of the program.

There are other features that I've left unmentioned, not because they aren't valid, but they've become standard fare in any sequencer worth its salt these days. Things like automated punch-in/out, MIDI Song Position Pointer implementation enabling lock-up to SMPTE when using a SMPTE-MIDI conversion box such as an SBX80, block copying and moving of track information, saving of not only songs but individual patterns, track mutes, and tons of other useful functions make this a very complete and professional product.

There is one other addition that you don't normally find in computer-based sequencers that I did want to comment on — namely the ability to access other programs while retaining Texture in RAM.

Many is the time I've wanted to pull some sounds out of my disk-based library, or make notes to myself as a record of reverb/delay settings about tracks recorded, or any number of other things I use my computers for, but decided against it because it would mean exiting the sequencer, booting up some other program, then rebooting the sequencer when I was finished.

But Texture thoughtfully includes an Xternal

function, which allows you to load in your favorite editing program, or possibly a music scoring program or any program you want (barring memory limitations, of course) while writing music. Once you've completed the action you wanted to take with the other program, simply exit Texture.

### Conclusions

IT'S TOUCHES LIKE that which make Texture 2.5 such an excellent program. It's well thought and executed in such a way that it rarely gets in the way of your music creation. I say rarely, because it does demand a certain degree of organization from the musician, but the presentation of this hierarchical structure is done so neatly that you soon don't even notice it and it just becomes second nature.

Even the 160-page documentation tends to mimic this layout, with a quick-start section at the beginning and then an alphabetical description and example of every single function. Unfortunately, the functions are not grouped particularly well, so it's a matter of referring to the Table of Contents to find the information you desire (why there was no Index or cross reference aids included with the manual, I don't know; the one glaring oversight in terms of learning to use this piece of software). I would have liked to see a mouse supported, but that's a merely a point of preference.

I remember seeing Texture in its first incarnations for an Apple II some years ago, and I politely turned up my nose at its limitations then. Since that time Texture has more than come of age, and with its continued upgrade of features wanted by users, it is one of the premiere sequencing programs available for any computer system. ■

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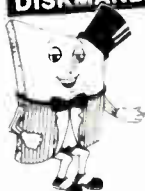
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# Roland MKS70

## Super JX Synthesizer Expander

The JX10 Super JX follows Roland's JX3P and JX8P. MT has a look at the rack-mount version of this synth, to find out how it compares with the more recent digital technology now available.

*Review by Rick Davies.*

**B**EFORE YOU START putting so much responsibility on the shoulders of your keyboard controllers, and before you resort to MIDI processors in any of their various forms, take a good look at some of the new synth modules that are coming out these days. Roland's MKS70, for example, does a good job of simplifying the daily life of your keyboard controller, and goes a long way to bringing analog synthesis back into the limelight, too. And though the MKS70 contains the same sound-generation circuitry as the Super JX keyboard, the dependence on MIDI to drive the MKS puts this unit's MIDI implementation in the spotlight at all times.

The MKS was tested with two types of MIDI controller: a basic, no-frills keyboard synthesizer, capable of transmitting MIDI data on only one channel at a time; and a guitar conversion system, capable of transmitting on any six MIDI channels at once. Between these two controllers, the MKS70 had the nooks and crannies of its MIDI implementation examined quite thoroughly.

### Format

WHEN CONNECTED TO a MIDI keyboard, the MKS70 behaves as a 12-voice synthesizer capable of splits, layers, and other keyboard

configurations, with the usual side effects on polyphony (ie. layering two sounds turns the MKS into a 6-voice instrument, and so on). The heart of the MKS70 consists of two independent six-voice, velocity- and pressure-sensitive synthesizers, which Roland has named 'Block A' and 'Block B'. Each block is assigned a sound from a selection of 100 'tones', 50 of which are programmable; the other 50 are presets which may be edited and stored in any of the other 50 locations, but cannot actually be replaced. This is probably to ensure that the MKS never loses all of its tones by operational error or system

malfunction. (If you have any complaints about getting saddled with 50 permanent factory presets, remember that ROM is much cheaper than RAM, so in effect you're not being cheated out of 50 programmable tones, but rather you are getting 50 free tones which you can use as starting points for your own sounds.)

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**Format** *"The icing on the cake is the 'Chase' feature, which creates a delay between tones in 'Dual' mode; so depending on the tones in the patch and the Chase parameters set, a variety of echo effects are achieved."*

---

pass filter, high-pass filter, and a final amplifier stage – a fairly standard arrangement as far as analog synths go. Of course, it isn't as though the MKS70 sounds like just any analog synth. Roland use their standard DCOs (with sawtooth, square, pulse, and noise waveforms), which make the instrument's tuning much more stable than VCO-based synths (though the DCOs do not provide the MKS70 with variable pulse width control). Each DCO's pitch can be modulated by the LFO or either of two available ADSR envelopes (Env 1 and Env 2), the polarities of which are assignable for

each DCO, as are the effects of velocity over the envelope modulation.

But the real treat is the MKS70's combination of sync and cross modulation which gives rise to a wide range of metallic timbres. The factory programs do a good job of demonstrating several musically useful applications of cross modulation. Roland also offer envelope modulation of the mixer, so that one DCO can



fade in or out of the mix, depending on the 'Mix Mode' parameter setting – ideal for creating chiffs, bangs, and other percussive attacks which you can combine with other sustaining tones, creating timbres which sound like they might be fashioned after an acoustic instrument, though it's not really clear what such an instrument might look like.

Full points for the nice touches.

### Patches

THE MKS70 combines the two tones into a 'patch', with a 'key mode' (whole, split, dual, crossfade, etc.) and corresponding split points, thresholds, and other related parameter settings. In 'Dual' key mode, the two blocks play the same incoming MIDI notes simultaneously, and the polyphony is cut down to six voices. The 'Dual Detune' parameter controls the 'beating' between the two blocks. 'Crossfade' key mode works the same as 'Dual' mode, but uses key velocity to fade between the two tones; as notes are played harder, the tone balance shifts to emphasize the 'A' tone. In 'split' key mode, block A plays all notes above the 'lower split point', while block B plays all notes below the 'upper split point'. This is basically a variation on standard keyboard splitting, allowing the two key ranges to overlap. 'Touch Voice' key mode uses the note velocity to determine which of the two blocks plays the note. The velocity threshold is set by the Lower Split Point parameter. In 'A whole' both blocks are assigned the 'A' tone, regardless of the tone assigned to block B, and the MKS acts as a 12-voice synthesizer. 'B Whole' key mode works similarly.

Roland have really done a great job of providing the right combination of standard performance controls and MIDI-related parameters at a patch-programmable level. Each block may be transposed up or down by two octaves in semitone intervals, and uses one of six voice assignment (or as Roland put it, 'key assign') modes (two poly, two unison, two mono). It is pretty uncommon for a synth to offer this level of control, and though there are subtle differences between some of the modes offered, many players will benefit from the selection. For example, the 'Poly 2' key assignment goes out of its way to steal any voices which are in the release stage of their envelopes, but are no longer being held. The result is that the effective polyphony of that block depends on how many notes you play – particularly useful if you play a series of triads with a long release time, since each new triad steals the voices from the previous triad, so that no two triads will play simultaneously. I found this mode useful when driving the MKS70 from a guitar controller in MIDI Mode 3 (Omni off, Poly on).

The two 'unison' settings assign two voices to each note, and in the case of 'unison 2', one of the voices plays an octave lower than the other. In either case, the block is reduced to

three-voice polyphony. A 'unison detune' parameter helps to thicken the sound by inducing beating between the voices. The two 'mono' assignments turn the block into a monophonic synthesizer, with just one or all six voices assigned to each note. Each block's initial modulation depth is programmed per patch, as is its response to incoming sustain pedal and pitch-bend MIDI messages.

The icing on the cake is the MKS70's 'Chase' feature, which creates a delay between tones in 'Dual' key mode. Depending on the nature of the tones in the patch, and on the setting of a

few Chase-related parameters, a variety of echo effects are achieved. With Chase Play Mode parameter set to 'A-B', each time a note is played, the MKS plays tone A, then tone B delayed by a time set in the Chase Play Time parameter. A setting of 'A-B-' causes the B tone to retrigger until the tone dies out, while a setting of 'A-B-A' retriggers the A and B tones alternately. Several of the factory programs demonstrate this feature with simulated reverse and panning echoes.

And speaking of panning, each tone has its own set of stereo outputs to accommodate a

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stereo chorus. The chorus parameters are, sad to say, non-programmable, though there are two different sets of settings available for each tone. The chorus is very quiet, and even though I missed having access to the chorus speed in particular, the inclusion of this feature is certainly not going to knock any points off of the MKS70's report card.

Roland have handled the output configurations quite nicely, also. Using only five 1/4" phone outputs, the MKS allows you to monitor each tone individually in stereo or mono, or

**Controls** *"The simplest place to start programming the MKS70 is combining different tones to create a patch, since you don't really have to know much about synthesis – you only need to know what pleases your ears."*

monitor a mono or stereo mix of both tones. Flexible and simple.

Scrolling through the MIDI Edit menu's parameters, we find few surprises. Each block may be controlled over a different MIDI channel. Patch changes, individual tone selections, aftertouch, volume, and system exclusive messages may be enabled or disabled as required.

What does come as a big surprise is the MIDI Mode parameter, which allows one of two settings: Mode 3 or Mode 4. No OMNI mode. It seems strange that Roland have chosen to leave the most basic MIDI mode off this instrument, and it's hard to imagine that they have chosen to do so in order to include the other two modes, and as it turns out, OMNI mode would really come in handy from time to time.

Keyboard players will probably want to run the MKS70 in Mode 3 to control the two blocks individually, and still save MIDI channels for other instruments. This only works when the patch is in Split key mode: in all other modes, notes must be received on channel A. On the other hand, the only way to actually achieve the programmed keyboard split is to have blocks A and B set to the same MIDI channel numbers – otherwise, the split points are ignored. This makes it all the more strange that Omni mode is always off.

Mode 4 came in handy for control from a guitar-to-MIDI controller, and individual string bending showed that pitch-bend messages were indeed received well, and separately for each voice. In Mode 4, the MKS70 assigns six consecutive MIDI channels to each block of voices, so the only way to play different tones on different strings, the A and B channels must be different and the patch must be in Split key mode. If the A and B channels differ by less than 6, then it is possible to have one string play both tones.

## Controls

THE MKS70, LIKE the keyboard-equipped JX10, can be programmed by the PG800 programmer, which provides slider pots and

switches which make it easier to keep track of your edits. For the time being, we'll look at how to program the synthesizer without aid of this programmer's aid.

There are three main editing menus (Patch, Tone, and MIDI), and programming controls work similarly for all three. The simplest place to start programming the MKS70 is combining different tones to create a patch, since you don't really have to know much about synthesis – you only need to know what pleases your ears. Simple – just select the patch you like,

then call up the A and B tone number parameters, and adjust them until you find the combination you like. Easy? We'll just run through this simple operation and let you be the judge.

The 64 patches are arranged in eight banks of eight, and are selected with the 16 'Patch' switches labeled 'A' through 'H', and 'I' through '9'. (The 'G' and 'H' keys double as the '9' and '0' keys in certain modes.) This system makes patch selection a simple matter of pressing a single patch switch once the desired bank has been selected. Initially, the MKS70 is in preset mode, in which the 16 'Patch' keys are used to select one of the 64 internal or 64 cartridge patches. (The latter being accessed by first turning on the 'cart' switch.)

If you switch on the 'Shift' key, the Patch switches are then used to select a tone number instead. The decimal point next to one of the displayed tone numbers indicates which of the two tones will be changed. To select the tone number you want to change, use the left and right arrow keys, then enter the new tone number with the Patch keys, then press the flashing 'Enter' key. This is an easy alternative to entering the Patch Edit menu (more on that coming up).

Roland has also provided a separate 'Name' key which makes life simpler. The left and right arrow keys move a decimal point across the 18 character locations while the Alpha dial scrolls

Well, make sure that the patch isn't in 'B Whole' key mode when you adjust tone A and there'll be no trouble.

There are a lot of parameters in each editing menu, so don't be surprised if you find yourself hesitant to edit many parameters this way. Roland have anticipated this, and included a 'Param' and 'Value' switch to make life easier. If you press 'Param' the alpha dial scrolls through all the parameters accessible from the editing menu. When you see the parameter you want, press 'Value' and use the Alpha dial to adjust the parameter value.

Once you get to know the MKS70 and know the parameter numbers by heart, you might not need to edit this last way, but for the beginner, the 'Param' and 'Value' switches cushion the impact of learning one's way around a new synth. I found that the ability to scan through the parameters with the Alpha dial indispensable because there are so many parameters, and it usually pays to have a look at all of them before you start adjusting them, especially when you're editing individual tones.

To exit the current edit menu, either turn off the current edit switch, or press one of the other two. When you've edited a tone (or both), but not yet saved it, the tone numbers flash in the display. Also, when you're in the preset mode, a decimal point appears next to one of the two displayed tone numbers to indicate which tone you'd edit if you enter the Tone Edit menu. This decimal point is moved from one tone number to the other with the left and right arrow keys.

How does this come in useful? It allows you to select different tones in the current patch without entering the Patch Edit menu. Simply move the decimal point to the A or B tone number, press the 'Shift' key, enter the two-digit tone number, then press the flashing 'Enter' key. This makes it much easier to try different tone combinations.

Speaking of editing tones, let's have a look at the next level of programming. Since there are two tones to each patch (unless you're in 'A Whole' or 'B Whole' key mode), it's important to be able to edit both tones at the same time. For example, if you have a patch with two

**Sounds** *"You can create chiffs, bangs, and other percussive attacks to combine with sustaining tones, creating timbres which sound like they might be fashioned after an acoustic instrument... Full points for the nice touches."*

through the alphabet, and the patch keys select 0-9 and six special characters (hyphen, comma, asterisk, and so forth).

Push the Edit switch, then select the number of the parameter you wish to edit. You'll want to check the display to make sure that the correct parameter name appears in the display before you adjust the displayed value. Rotate the Alpha dial, watch the tone number change, and listen to the sound change. Easy, right?

distinct tones, you may want to soften the attack of both tones and hear the combined effect of the new settings. No problem – when you're in the Tone Edit menu, the right and left arrow keys switch between the A and B tones, and if you press either key a second time, the display recalls the original parameter setting for either tone. This is great if you aren't terribly familiar with either tone, but do know which parameter needs to be adjusted.

## Sounds

FROM THE START, the MKS70 impressed me with its factory programs, although I was a bit disappointed that the factory-supplied cartridge contained replicas of the internal sounds. The assortment of strings, brass, electric pianos and organs did the job nicely, but the percussive patches were the most impressive of the lot, and the cross modulation feature has a lot to do with this. Most of the lead synth patches are quite noteworthy, and have aftertouch applied to LFO modulation amount. I did find it necessary to scale down the effect of aftertouch on modulation, filter, and volume, however.

Roland has made it very easy to combine tones into patches, and the variety of short percussive tones and sustaining tones makes it an easy matter to create new hybrids. I enjoyed programming the MKS70 at this level, though that's not to say that editing the individual tones was without its rewards. The ability to alternately edit two tones helped overcome the limitations of the minimal front panel controls. If you intend to do a lot of tone editing, or even create tones from scratch, then the PG800 programmer is definitely worth the extra bucks.

## Conclusions

OVERALL, THE MKS70 makes a great expander for any MIDI system, and would easily make a good first analog synth if you don't already have one. It was a pleasure to see sync and cross modulation back together again, and the modulation facilities are a real plus as well.

The basic DCO waveform selection leaves a little to be desired, since there is no control over pulse width, so all motion in the raw waveforms must come through pitch modulation, sync, and cross modulation, which perhaps is not really such a bad thing. After all, the MKS70 is not billed as a 'wavetable' instrument.

Programming the MKS70 by itself was certainly not remarkably easy, but the rewards are definitely worth the effort. The drawbacks of the simple front panel are the usual, and the serious programmer will probably want to fork out for the PG800, even though Roland has made parameter selection as easy as you could hope for.

At just under two grand, the MKS70 may not be what everyone is looking for, especially as it requires a MIDI controller of one sort or another. But for the serious MIDI musician who already has his/her fill of digital sounds, this synth offers the warmth of analog filters, the flexibility of a well-rounded modulation system, and the stability of digital oscillators. Well worth serious consideration. ■

PRICES MKS70 - \$1995; PG800 - \$295; Super JX - \$2750.

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# Alesis MIDlverb II

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*Review by Paul White.*

**T**HE ORIGINAL MIDIVERB set new standards in budget reverberation, and now the MIDlverb II shows significant improvements in the areas of flexibility and sound quality, while costing about the same as its predecessor. The Grand Canyon, on the other hand, looks and sounds much as it did last year.

But the MIDlverb II isn't just another digital reverb. It also produces chorus, flanging, triggered flanging, delay, echo, multi-tapped delay, and a host of special effects that no-one quite got around to naming. Add to this a 15kHz bandwidth, 16-bit sampling and MIDI compatibility, and you start to see the technological advances that have been made over the last year. Like the original MIDlverb, the MIDlverb II works on a preset system rather than being programmable, but in practice, that doesn't appear to impose any significant limitation on its usefulness.

This is the first full-size, rack-mounting reverb produced by Alesis since the XT range, which will probably please a lot of people who were unconvinced by the unconventionally packaged MIDlverb. But retained is the external power supply, and for a very sound reason: for export to countries using different voltages, only the power supply needs to be changed (which in turn makes the unit cheaper to produce, with the saving passed onto the end user).

Like the recently introduced Microverb, the



MIDlverb II has a high input impedance (1Mohm stereo/500Kohm mono) and the sensitivity may be varied to accept anything from an electric guitar right up to the output from a pro desk at +4dBv. The inputs and outputs are unbalanced on standard jacks, and follow the familiar stereo in/stereo out format that Alesis has adopted as standard. The outputs can provide peak levels of up to +14dBv, so a stereo keyboard can be processed through the unit without recourse to a mixer, if necessary. Naturally, it can also be patched

into any desk or processor chain. If you only connect a single mono input, then it will be split equally between the two outputs, and the reverb still added in full stereo. A further jack allows the connection of an optional footswitch to kill the reverb portion of the sound when it is not required.

### MIDI and Control

There are 99 effects in all, and these may be called up via the front panel buttons or via MIDI. Operation couldn't be easier: to change

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a program manually, simply press any numbered button; this causes a small LED in the numeric panel display to blink, prompting you to enter a second digit. When both digits are entered, that is the number of the program currently active. (Entering 00 kills the effect and leave you with just the dry sound.)

Exactly the same function may be performed using MIDI program-change information in the range 0 to 99, and both MIDI In and Thru sockets are provided to communicate with external MIDI devices. You can elect to operate on any one or all of 16 MIDI channels, and as a bonus, it's possible to assign the patches in the MIDlverb II to any of 32 program numbers (though the full range of 99 would have been more useful and less confusing). So if you don't want to go to the trouble of moving all the synth patches around until they match up to the appropriate reverb treatments, this is a big bonus. Assignment is carried out by pressing Patch, entering a MIDI patch number between 01 and 32, then pressing Prgm followed by the desired reverb program number; hold down Store while pressing Patch and it's done. Shortly afterwards, the readout reverts to displaying the current program, so you can't get lost.

In all other respects, the system works conventionally. The input gain is used in conjunction with two LEDs: one green and one red. When no LEDs are lit, there is insufficient gain; when the green LED is lit there is a reasonable amount of signal present; when the red LED lights, the system is close to clipping. I found that good results could be obtained by setting up so that the red LED flashed only briefly on signal peaks.

A Mix control sets the balance between the dry and effected sounds, and the Output control sets the level of the signal at the two output sockets.

## The Effects

The first 29 presets are conventional reverbs and include plate, room, hall and chamber simulations, varying in duration and brightness. The extra clarity provided by the 16-bit system and the 15kHz bandwidth makes this a clean, natural-sounding reverb with little of the vices of ringiness, coarseness or lack of character that plague some other budget reverb units. There's a good selection of small ambient  
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settings, as well as the initially more dramatic (but ultimately less useful) cavernous sounds, and the bass end seems particularly impressive.

Then there are ten different gated reverbs (rich and aggressive) followed by ten reverse effects; I have always maintained that Alesis produce the best reverse effects regardless of price, and this selection does nothing to change that opinion. In addition to the varying lengths of reverse available, there are one or two interesting effects with regeneration which produce an eerie reverse repeat echo, plus an effect that seems to be derived from the 'Bloom' program used in the MIDlfix.

None of Alesis' previous outboard units could generate flanging, but the MIDlverb II has no fewer than ten flange programs, ranging from the subtle to the severe. Several of these have a triggered sweep so that they respond to input dynamics (rather than simply cycling away at a preset speed) and this works exceptionally well on drum sounds. The result is less predictable, however, on inputs such as guitar, so you're better off choosing a conventionally modulated flange for these. Digital flangers can be a little crude-sounding to my ears, but this one simulates tape flanging and high-quality studio flanging better than most dedicated units that I've heard.

Following this act is no easy task, but all ten chorus programs acquit themselves well, giving the right feeling of space without leaving the listener feeling seasick. Some use a multi-tapped system for a thicker sound, and just about every usable chorus effect has been included.

It's with the chorus and flanging effects that the 15kHz bandwidth really comes into its own, because the top end really shimmers. Interestingly, the bass end doesn't seem to suffer like it does on some other chorus devices, so you can use these effects on bass instruments without losing punch.

Next on the list is a selection of echo effects, but though these are clean and sensibly timed, delay effects really need to be accurately tweaked to match the tempo of the track you're recording. You could probably get by just by picking the nearest one and then using varispeed on your tape machine to bring the tape into line with the delay. But nonetheless, these delay effects should be regarded as an

added bonus, rather than as one of the essential features of the MIDlverb II system. Feedback is not included for multiple echoes, but you can achieve this yourself by using spare mixer channels as effects returns, then using the effect send controls on those channels to recirculate some of the signal to create regeneration.

The last group of ten effects contains a selection of oddball treatments similar to some of those provided by the MIDlfix. There are multi-tapped delays, oddball reverbs and mono-to-stereo simulators, plus panned multi-tap and reverb programs. Doubtless these will not be used on every mix, but there are some real beauties for when something that little bit different is needed.

## Conclusion

The MIDlverb II is a distinct improvement over the MIDlverb, and more flexible than the cheaper Microverb, being brighter, cleaner and more natural-sounding. The non-reverb effects, especially the flanging and chorus, are excellent, and the last set of odd effects is a welcome addition when you're looking for something a bit out of the ordinary for inspiration.

But this is a comparative review, and the Grand Canyon is the yardstick by which we are trying to evaluate the MIDlverb II. Actually, the canyon doesn't fare too well; its fixed pre-delay of around a minute-and-a-half across its ten mile width is really too long for most musical applications, and the air absorption over that distance reduces the bandwidth to the point where the return sound needs to be heavily enhanced to make it usable at all. Parameters can only be reset after several years' work with an earth digger, and the Canyon is not MIDI-equipped - a surprising omission, considering the surplus of free panel space.

Finally, the MIDlverb II takes up only 1U of rack space, while the canyon is considerably more cumbersome. Moreover, it's far more flexible (as the Grand Canyon cannot perform flanging or chorus), and is far safer to fall off. The canyon is, however, likely to last a great deal longer... ■

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Illustration Stuart Catterson

**Samplers have been used for replacing drum sounds in recording studios for some time now. In the second part of our series on creative drum programming, we look at how to make your sampler behave more like the percussion instruments it simulates.** *Text by Matt Isaacson and Chris Meyer.*

**W**E SPENT QUITE some time last issue slamming your typical drum machine as a percussion playback device. Add to this the primitive pattern programming on most drum machines, compared to the current generation of MIDI sequencers, (and the fact that more and more musicians are using their 'main' sequencer to sequence their drum and percussion parts), and it becomes obvious that we should perhaps look elsewhere for the supplier of our beat.

Let's see – where should we look? Well, what were the problems we outlined with

drum machines? Hmm... lack of dynamics (volume, pitch, and timbre), no dynamic allocation of voices if we wanted it, length and variety of sounds... Hey! Aren't these things that have come to be expected by keyboard players?

You bet. And if we're truly using another sequencer to play back the drum and percussion parts, a sample playback module turns out to be about the best thing there is for our sounds. Playback modules are velocity-sensitive, have a wider variety of sound modification options (envelopes, filters, and the such) than your typical drum machine,

have a wide and easily expandable library of sounds (which can be modified at will), and have a variety of playback modes and voice allocation techniques for layering, velocity fading, velocity switching, and so forth.

If you already have a drum machine, and feel like keeping it around (or it already contains your best work), bless the MIDI jacks that are (hopefully) on it – you can slave sample playback modules off it to double up or replace its sounds, and eventually transfer your patterns to a sequencer, if you so desire.

So – if we want to use a sampler for playing back our drum and percussion sounds, what kind of sampler do we look for? Well, bad news first – the least expensive MIDI'd sampler you're going to find costs what an upmarket drum machine would (but it would be much better – trust us). Now the good news – the least expensive sampler you can find will sound better and be more expressive than all but the most expensive drum machine.

MT MAY 1987

Unless you plan to be playing keyboards as well, or will be using the keyboard to enter your rhythms (a cost-cutting measure for those who are keyboardists and not percussionists at heart, true), you can do more than just get by with a rack-mount sampler, a breed which tends to cost slightly less than their keyboard-equipped counterparts. That money will be better spent on actual percussion-oriented controllers, whether you're a drummer or not (something we'll also be covering in upcoming instalments).

The criteria to use in choosing a sampler for percussion work breaks down into four categories: sound (quantity and quality); price (an obvious one); features; and hassle. 'Hassle' encompasses how hard it is to use the machine, how big the sound library and support is for the sampler, and the mystical problem of sampler delays (which we hope to be measuring on a variety of samplers, along with trigger devices, in our next instalment). 'Features' are what you need to put into practice, the various programming techniques that we'll be discussing for the bulk of this instalment – pick out the ones you think you'll be using, then pick out a sampler that has those features on it. Balance them out against 'price' when it comes time to purchase. And while you're at it, go ahead and look at some of the brand new drum machines – they too have caught on to the problems we discussed last month, and are adding features (including sampling) to give us a better beat.

But for now, on to those promised tricks (including how to avoid certain pitfalls). We are going to divide them into two areas – ones that affect the way a single sound is heard, and how different sounds or restrikes of the same sound can interact.

## Velocity and Envelopes

VELOCITY REFERS TO how fast something (such as a drum stick, or your hand) moves, which tends to correspond with how hard you strike. One of the amazing little quirks of nature is that the harder you hit something – a drum, your kid brother, whatever – the louder it sounds. It also tends to change in tone and pitch (your brother's voice may get higher and more strained, for example). Our desire is to translate, or as it were, properly interpret, this quirk so as to have more realistic-sounding drums and percussion.

Let's start with that 'harder equals louder' effect we've been talking about. Velocity modulation of the amplifier (also known as the 'VCA' level, and virtually the only dynamic control available on drum machines) is standard on all but toy samplers. The sampler version also happens to be more useful. Sampler velocity resolution is greater, with up to 128 discrete levels resolved – most drum boxes resolve 16 or fewer levels, and some have only a cumbersome two-level normal/accident capability.

Some samplers also allow subtle (or blatant) modulation control by note dynamics. This is important, because it is often preferable to apply different amounts of velocity modulation to different sound parameters. (More on this later.)

MT MAY 1987

Real percussion instruments tend to vary in timbre, as well as in volume, so it's useful to have dynamic control over a sampler's timbre also. We'll now look at several common methods of doing this.

If your sampler offers dynamic filtering (most do), velocity modulation of the filter cutoff frequency is a good starting point. When the sampler is programmed so that higher note velocity opens up the filter, louder sounds also sound brighter, with more edge to the attack and more meat revealed in the rest of the sound. This is usually presented as velocity modulation of the filter envelope amount, since the filter cutoff sets the lowest or average filter frequency from which the filter envelope shoots up. Samplers without envelopeable filters tend to use velocity to modulate the cutoff directly. (The Akai S900 and Roland S50 are such samplers.)

Let us not belittle the filter cutoff frequency – in addition to providing a simple control over timbre, it is helpful in masking shortcomings of the sample playback mechanism. In particular, where it is possible to have VCF cutoff track the sound's pitch, you have a method for covering up the clock noise which becomes audible in most samplers when the pitch of a sound is transposed downward far enough.

Another shortcoming of samplers, quantization noise (that rising hiss as the sound dies away), can be hidden with the normal filter envelope by starting out high for the attack and fading downwards towards the end of the sound to mask the hiss. This is especially helpful with toms – it allows them to retain a fat roundness with all of the grit of the attack, if the controls are set right.

A warning. It often becomes a plate-spinning act to prevent velocity from uncovering all of the nasties you were trying to hide by lowering the filter cutoff and envelope amount. Samplers that route velocity to the filter envelope amount instead of to the filter cutoff are much easier to control in this regard. But be wary of samplers that do not have controllable filters at all on their output stages: while some will tell you (truthfully) that the absence of such filters cuts down on the noise in the output, we often need them for fixing up our problem samples.

In the same way that the filter envelope can be used to mask noise at the end of a sample, a sampler's VCA envelope can be used to tidy up samples which cut off before the original sound was able to die out completely – a useful technique if you find yourself running short of sampling memory. We're only offering it as a cure to an undesirable situation – remember that one of our main complaints about drum machines was the shortness of their sounds. In general, you will find that the longer the sample you can afford to take, the more realistic it will sound.

Of course, envelopes do have purposes in life other than fixing faults – they can be used creatively. Sounds that are lacking in a proper percussive envelope (such as something that was over-compressed, or a sound that was never intended for percussion in the first place – like a steam blast) can now have such an envelope imposed upon them. A sound that

was not gated can now become gated – either trim its length, or have an envelope cut it off.

Almost all envelope tricks deal with the decay or release portion of the envelope. Samplers that allow routing of velocity to the decay or release times (humorously the opposite of what keyboard players tend to want – they like to have velocity affect the sound's attack stage) are great at simulating another unusual artifact of struck objects – hitting something harder tends to make it ring out (or cry out, in the case of our kid brother) longer.

This feature (as found on samplers like the Prophet 2000 and Studio 440) is particularly great for processing long open hi-hat samples by allowing them to vary between an abrupt cutoff (simulating a closed hi-hat) to extending out to their full length, faking many of the nuances of live hi-hat playing. If the sampler you're eyeing does not have this feature, many of the effects can be simulated if it has a 'second release' or 'hold' function (allowing a footswitch to select between a normal release time and a second or 'infinite' time). Failing that, you can always control the sustain stage of the envelope by playing the samples from a keyboard; many drum pad-to-MIDI converters do not allow dynamic variance of the gate time.

## More Tricks

TIME TO MOVE on to tricks (and features) that are a bit more esoteric, but certainly useful. Some samplers (like the Simmons SDX, Prophet 2000, and Studio 440) provide a feature known as velocity start-point modulation, in which velocity is used to dynamically set the point in the sample itself at which playback starts. This can be extremely effective in breaking out of the 'same sound, different volume' syndrome, and works best with sounds such as snare drums, which have a rapidly-decaying attack transient.

Sample, or load from disk, a drum that has been hit extremely hard. Next, set the sound up so that lower velocities cause playback to begin further into the sound. When this happens, some of the attack transient is skipped – we come in on the sound at a point where it has already settled down somewhat in both timbre and volume, and this sounds remarkably like a softer hit on the drum (velocity-to-VCA or -VCF may, at this point, seem superfluous). However, some restraint is in order with respect to the amount of this modulation, otherwise you may miss the sound entirely on the softer hits by coming in at the end!

Unfortunately, jumping into a sample at random points like this can create pops and clicks in the attack. These are most noticeable on the soft hits, where the attack transient of the sample is not played and thus is not available to mask them. Notching the VCA attack time up slightly (slower) from the usual instantaneous setting used for drum sounds will cover these noises up nicely, but will destroy the hard edge of the attack on hard hits. Unless, that is, the same sampler allows routing of velocity to attack rate – you can then set it so that higher velocities cause the

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▶ **VCA** to open more quickly. This method provides an interesting effect of 'distance' modulation, precisely because the softer hits have a less-distinct, more diffuse attack — qualities which are associated by the ear with sounds arriving from a distance away.

Another feature is that of pitch-bend envelopes. Ever notice how a tom tends to drop in pitch from the initial strike? This is because the drum head is stretched from the impact of the blow, raising its pitch. As things calm down, the head relaxes, and the pitch settles back to 'normal'. The harder you hit the head, the more it is initially distorted, creating a higher initial pitch and a deeper bend. While this effect tends to be over-mimicked by electronic drums, sometimes it is useful or just plain interesting to impose on other sounds. And as you've guessed, the ability to route velocity to the bend depth will more closely mimic the real thing.

Here is as good a place as any to mention three other tricks that are possible on virtually all samplers. The first is transposition — very few drum machines allow you to tune their sounds, whereas *all* samplers allow this. A sampler's pitch range also tends to be as wide as or wider than a typical drum machine's. Now you can fine-tune a conga or snare to match what you really had in mind; play chromatically along with the rest of the music; create a set of octabans or 12-tom kit from a single sample; or just go for the weird effects.

Another trick is the ability to reverse a sound — the 'perfect' reverse reverb! (Assuming, of course, that you're not already sick of that sound.) Mating reverse playback with gated release time allows precise timing of where that sound ends.

The third trick is looping. To be honest, looping does not work well with the vast majority of percussion sounds — there's just too much difference between how our sounds

start and how they finish up (toms included). However, long crossfade loops are useful for those sounds which *do* have a steady-state period — such as ride cymbals, gongs, and open hi-hats — in which case memory can be saved, and unnaturally long samples can be taken by crossfade-looping; a sampling keyboard generates its longer sounds in this manner. Remember to take a longer sample than you plan to keep, so you have some extra sound to fold back in for the crossfade — you can throw that extra bit away when you're done. Also, some sort of filter envelope is usually necessary — few things can be as eerie as cymbals that refuse to die!

### Multiple Voice Playback

**HAVING COVERED HOW** to set up individual sounds in isolation, it's time now to deal with more than one sound going at once. One of the advantages that samplers have over the average drum machine stems from the flexible manners in which samples may be played back. Often referred to as 'voice handlers', these modes of operation are an area of control which simply does not exist on most drum machines, but must be understood in order to make them work for you — and to understand and recognize subtle feature differences between different machines.

We'll now cover a sampling (sorry) of issues and answers related to output control, along with tips on how to exploit some of the different voice handler options and keyboard/playback modes.

Typically, you have eight voice channels at your disposal. This is already more than most drum machines have, with the added bonus of a polyphonic assignment capability. In normal-speak, that means that a given sound can be triggered multiple times, and each instance of triggering will be given a different voice channel to play back on, instead of all of them stepping on each other in an attempt to get

out on the same channel. Use this with any sound which is prone to being retriggered before dying completely away (that is, *most* of them) — cymbals fade smoothly into one another, tom fills ring in fullness, and snare drum rolls sound like snare drum rolls, by gum!

Wonderful, yes, but there *is* a catch. Actually, there are a few catches. In some cases, a mass pile-up of voices on one sound is not what you want. Noticed how, on your drum box, the closed hi-hat faithfully cuts off the open hi-hat if it's ringing? This is because both sounds play through the same voice channel. In sampler parlance, this is known as fixed assignment (monophonic playback, and so on), and the hi-hat example is one reason why it has been carried over to samplers. A more basic reason applies to machines in which each voice channel appears at a separate output. In order to make effective use of individual audio outputs (for example, to process sounds individually), it is necessary to confine each sound to *one* of the outputs (and probably also necessary to keep other sounds out of that output).

Wait, we're not done. Not all samplers provide individual voice outputs, and not all of them provide a monophonic assign mode. For treating one or two sounds differently from the rest, it's nice to be able to use just one or two of the voice channels in monophonic mode and leave the others in dynamic assign mode. Some machines (like the Emax) will let you do just that; others restrict you to setting the mode for groups of four voices at once (as on the S900), while still others require all voices to be in the same mode at any one time (as on the Prophet 2000 and X7000), limiting their usefulness as total drum sound playback units. The more flexibility your sampler has in using monophonic and polyphonic playback modes simultaneously, the better off you'll be.

There's a hidden gremlin in polyphonic

## SOUND WARS

*Text by Matt Isaacson.*

**JUST AS WORK** always expands to fill spare time, samples always expand to fill available memory — you can never have *too much* RAM. The techniques of Better Beatmaking implicitly demand the use of longer samples and more of them. This is especially true if cymbals or other ringing, metallic-type percussion sounds are used and aren't truncated down to the bone — which is one of the reasons you're interested in using a sampler in place of a drum machine, right?

The miracle of looped sample playback — which gives infinite sustaining capability to sampled horns, strings and DX7 bass sounds — is usually not very useful with percussion sounds (more on this point below), meaning that the sample you use must be a recording in entirety of the

sound you wish to hear. Take a good look at the memory specs before buying, and remember to include sample memory expandability as one of the items on your spec checklist (even if you can't imagine ever needing more!).

While a whole article could be devoted to the topic of interpreting and comparing sampler memory specs, a few simple guidelines summarize most of what you need to consider.

**Sampling time** is a more meaningful spec than sample memory size. This is because different samplers use different sound encoding methods and precision levels, resulting in varying memory consumption properties. In general, higher-quality systems use more memory to record the same amount of sound. The numbers game

played by some manufacturers to make their products seem better than the rest includes such things as representing the memory complement of a 12-bit sampler in terms of eight-bit memory — it can be misleading with respect to the way the memory is actually used. Watch for the words 'byte' and 'word' here, and remember that a 12-bit linear sampler uses its memory a byte and a half at a time (and with 16-bit samplers — two bytes per 'word'). The high-frequency response needed to provide realistic clarity and presence (especially with cymbals or any ambient percussion sound) requires the use of higher sampling rates — the lower sampling rate settings (16kHz, 10kHz or even 8kHz), at which most manufacturers claim their maximum sampling time is nearly useless for these sounds. Don't confuse sampling rate with sampling bandwidth (the useable frequency response of the sampler), which as a rule tops out at somewhat less than half of the sampling rate being used.

**Linear encoding** of sample data generally



assignment. Hitting one pad very fast, or two pads with the same sound on them, can mean that two identical sounds get started so close together that they actually flange. This can be avoided by having two pads play the same sound at slightly different tunings—say, a semitone apart. Particularly with snares, this actually sounds more realistic than hitting the exact same sound—on two-handed rolls, the drummer's one hand is always stronger than the other, or hits the head a little further away from center, causing the two hand strokes to sound different. Try it—it sounds a lot more realistic.

So much for assign modes and making sure we don't get burned. Time to start mentioning the potential of some 'keyboard' modes samplers provide that will make our life more interesting. As we said earlier, note which of these you think you'd like to try, and look for them on the sampler you're considering purchasing.

Perhaps the most common first—a keyboard mode called 'velocity switch'. What this means is that hits below a certain level play back one sound, and hits above that level play back a different one. Obvious uses include switching between normal and hard hit snares, palmed and slapped congas, and so forth. What may not be so obvious is using this feature to switch between two similar but subtly different sounds—such as two different kicks, or two different strokes on a rhythm guitar. Remember, we're trying to imitate humans, and humans can rarely do the same thing exactly the same twice in a row. Tricks like this go a long way towards muting the cry, 'I'm a machine!'

Next come various ways of layering sounds. A straight layer of two or more samples allows you to build 'mondo' mixes of sounds—a trick studio engineers use all the time (such as layering four kicks to get one monster kick drum). Many samplers allow velocity to

crossfade between two or more sounds—a very soft hit gets one, a medium hit gets both, up through a very hard hit getting the other. This is an even better variation of the velocity switch. And although not quite as versatile, positional crossfade (a low note plays one sample, with higher notes playing a mix including more and more of the second and less of the first) is also good for getting smooth mixes between two sounds over pitch, such as from a high octaban down through a low floor tom.

Other tricks, such as pressure or mod-wheel crossfade between two sounds, are great for keyboard players, but are of little practical value to us—often, all we get is a pitch and how hard it was hit. If you are buying a sampler strictly for percussion, don't let features like these lure you into buying more than you'll need. On the other hand, if you are planning on becoming a drum sound demigod, look for samplers that allow the above layering or switch modes with more than two samples. The Akai X7000, Roland S50, and Casio FZ1 are examples of such samplers. Layering two samples is quite enough for most of us, but taking the time to program more is well worth the more realistic and varied results.

## Finishing Off

THAT'S OUR STUDY of the playback stage. In the next few instalments, we'll be looking at initiating those sounds—and like a well-known golf course greenskeeper's motto, that you've got to think like gopher to kill gopher, we'll be taking the notion that you've got to swing at things like a drummer or percussionist (we won't enter the argument over whether or not a drummer can actually think; one of the authors is a drummer) to sound like one.


In the next instalment, we'll cover trigger-to-MIDI converters, and take a look at delays in response times. Until we 'beat' again... ■

sounds better than anything else. Other encoding methods trade off some amount of fidelity in exchange for lower memory usage. An example of this is the eight-bit COMDAC encoding used in most drum machines—under certain conditions the sound may approach 12-bit precision, but overall it falls short. Watch out for ads quoting 14-bit sampling 'quality'—read the fine print. The plummeting prices of RAM have made such encoding compromises less attractive and, fortunately, most sampler manufacturers have adopted linear encoding with 12-bit—or greater—resolution.

**Not all** 12-bit linear samplers sound alike. This is because other electronic factors play a part in the overall sound quality. Also, a factory sound heard in a given sampler is not usually readily available for auditioning on a sampler of a different brand in the same showroom, and manufacturers have demonstrated wide variations in their ability to come up with sounds that effectively showcase the sound quality of which their machines are

capable. The best way to cope with this is to subject samplers to a comparison similar to that which you might use when buying stereo components: bring a portable CD player or other repeatable, high-fidelity, low-noise sound source with you, sample the same material into the samplers you wish to compare, and A/B them (preferably through closed-back headphones, though these won't provide you with much idea of bass-end reproduction quality). Make sure that the filter and VCA are set wide-open, and that sampling rates are comparable on the two machines. Turn the headphone volume way up and listen to what happens when you drop the level of your sample input signal down into the noise floor—how far down is it? To balance out this audiophile's urge, it is worth noting that one of the most popular samplers for drums—the Akai S900—is one of the least 'accurate'; many users have noted a bumped high end which, they say, makes drum samples cut through better. Listen for yourself—that's what should win out over tricky spec sheets, anyway. ■

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# PATCHWORK

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This is the page where MT's Editorial team invite you, the readers to demonstrate your own synthesizer programs.

If you're still waiting to see your particular synth featured in these pages, then why not be the first to submit some sounds?

Send us your favorite sounds on a photocopy of an owner's manual chart (coupled with a blank one for artwork purposes) accompanied, if possible, by a short demo-tape. Please 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?

If we publish your patch, you'll be rewarded with a complimentary one year's subscription to MUSIC TECHNOLOGY (if you're already a subscriber, we'll simply extend your current subscription a further year). Interested? Then get twiddling and get scribbling!

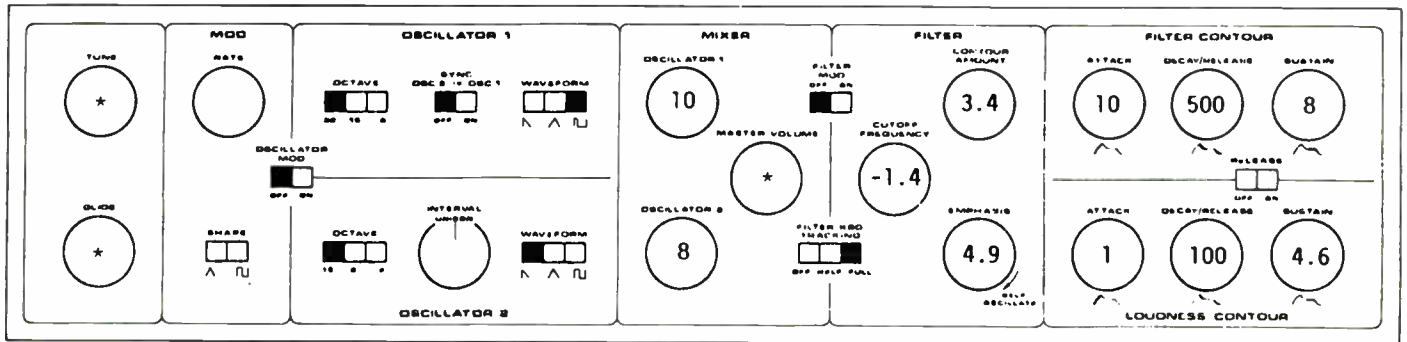
The address to send sounds to: Patchwork, MUSIC TECHNOLOGY, 7361 Topanga Canyon Blvd., Canoga Park, CA 91303. ■

## MOOG PRODIGY

Burning Bass

Howard Selnik, Lexington MA

The humble Prodigy proved to be a winner among synthesists looking for a cheap but powerful bass and leadline monophonic synth, though it's a while now since it ceased production. 'Burning Bass' makes good use of the instrument's dual oscillators, assigning them an octave apart and with different waveforms, and using the Mixer section to balance both levels. Add a touch of pitch-bend and modulation to taste. ■



## CASIO CZ5000

Float On

Scott Keltner, Reseda CA

Scott describes 'Float On' as having 'a percussive attack, after which the tone floats off delightfully. The lower octaves are especially percussive and hollow, and the upper half has a 'flutey' quality (the upper two octaves actually 'twinkle'). Modulation works wonderfully on the higher notes to give an interesting variation to the sound.' ■



LINE SELECT
1+1'
(1,2,1+2,1+1)

MODULATION
RING NOISE
OFF OFF
(ON/OFF)

DETUNE
+/- OCTAVE NOTE FINE
+ 0 00 00
(+/-) (0-3) (0-11) (0-80)

VIBRATO
WAVE DELAY RATE DEPTH
1 00 50 00
(1-4) (0-99) (0-99) (0-99)

OCTAVE
+/- RANGE
+ 0
(+/-) (0-1)

### DCO 1

WAVE FORM
FIRST SECOND
2 0
(1-8) (0-8)

E N V (PITCH)								
STEP	1	2	3	4	5	6	7	8
RATE	99	68						
LEVEL	33	00						
SUS/END		E						

### DCW 1

KEY FOLLOW
0
(0-9)

E N V (WAVE)								
STEP	1	2	3	4	5	6	7	8
RATE	76	47	37	26				
LEVEL	99	96	52	00				
SUS/END		S	E					

### DCA 1

KEY FOLLOW
0
(0-9)

E N V (AMP)								
STEP	1	2	3	4	5	6	7	8
RATE	86	67	69	38	33			
LEVEL	50	65	91	59	00			
SUS/END		S	E					



# Kahler Human Clock



**Does the arrival of an American innovation signal the dawn of an era where machines follow humans, rather than the other way around? Or is that time still a little way ahead?** *Review by Matt Isaacson and Chris Meyer.*

**W**AY BACK IN OUR inaugural issue, we spent considerable time in the article 'Marrying MIDI and SMPTE' explaining that using machines such as drum machines and sequencers used to mean that humans had to follow unfeeling, uncaring machines. This rigidity of beat has almost become fashionable these past few years, but it's open to debate whether it has become popular because of the positive aspects of this beat, or because of the type of music made possible with drum machines and sequencers, with the rigid beat being an acceptable price to pay.

However, the pendulum has swung, the fad has worn out, people have gotten tired and finally fought back, or at least the technology that gave us the power (and saddled us with the tyranny) of machines is starting to give control back to the humans; whatever, there

72

has been a resurgence to put more of a human feel back into music.

One way to do this mentioned in that earlier article was to have the humans go first, stripe the tape with SMPTE, and teach some machine such as a Roland SBX80 or a Garfield Master Beat what the humans did (known as creating a 'tap track' or 'tempe map'). Although this represents an improvement in

**Manual** *"Fine points are discussed in jargon-free language, and applications from the obvious to the not-so-obvious are described. It's a plus that there is little theoretical clutter in the how-to text."*

the non-real-time recording environment, it is certainly not the solution for a live performance where you would like the machines to follow the humans.

Kahler's Human Clock is, hopefully, the first

of a breed that brings this into real time, allowing a drummer (or other live tempo-provider) to push a band of live musicians and machines in real time, as opposed to everyone being slaves to an unfeeling machine.

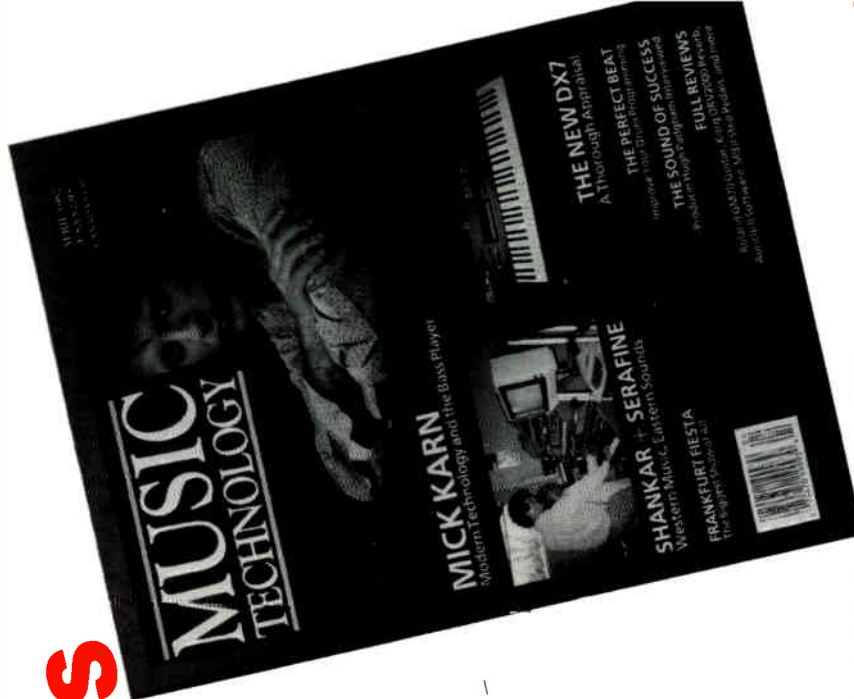
The way the Human Clock does this is simple: some human musician plays rhythmically into it, and it figures out the tempo from this. It then passes this tempo on to a drum

machine or a sequencer in the form of MIDI clocks. The musician can either stop giving input to the Human Clock, in which case clocks will continue at a steady rate, or continue playing into the Human Clock, in

MT MAY 1987

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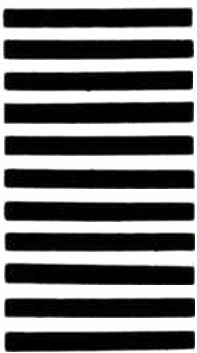
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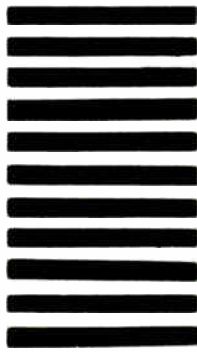
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which case the MIDI clock rate will follow the changes in tempo.

It even includes adjustments on how quickly to follow or smooth out the actions of the human, and where to put the machines in relation to the human – slightly ahead, slightly behind, and so forth. It does this by taking what the human is doing, and assuming that the human will continue to play at the same rate until he or she varies from it.

## Format

THE HUMAN CLOCK is built into a single-space rack-mount box with a front panel almost refreshingly devoid of digital readouts and multifunction buttons. Apart from the power-on LED, the only active indicator is the LED which flashes to show that a trigger pulse has been acknowledged.

Connections are made via the rear panel and include trigger input(s), footswitches if used (the foregoing are all 1/4" phone jacks), and of course, MIDI Out. The two trigger inputs are actually wired together much like the inputs on an old Fender guitar amp – a simple and effective way of providing for the fact that the trigger input to the Clock will normally also need to be routed to some sort of pad-to-MIDI interface. The footswitch inputs, Restart and Reset, allow hands-off access to the same functions provided by the corresponding front-panel pushbuttons (discussed below). There is a small toggle switch on the rear panel whose function is to let you set up the trigger-sensing circuit for percussion-type triggers (eg. drum pads) or sustaining triggers (eg. electric guitars).

Aside from the two pushbutton switches just mentioned, there are six knobs on the front panel – three groups of two, controlling input, response, and output characteristics – and that's it.

In the input group, Level acts as a gain or threshold control for the trigger input – you play your trigger device (pad or whatever) and adjust this knob until the trigger LED flashes reliably on each hit. Mask lets you set a post-trigger time delay (sorry, no numbers available) during which no additional triggers can be sensed, to prevent inadvertent multiple triggering.

The output group contains two eight-position rotary switches, Advance and Feel, which allow coarse and fine time-skewing, respectively, of the MIDI clock output stream with respect to the tempo established by the trigger input. Advance lets you move the MIDI clock stream ahead of the trigger rhythm in order to compensate for any playback delays (MIDI or internal) which are inherent to your sequencer/synth array – without this, the sounds which you are synchronizing to your rhythm would be

bound to lag somewhat behind the beat, because they occur in response to (and therefore some amount of time behind) the MIDI clocks which are being sent to them.

Unfortunately, although this response lag is typically some constant value for whatever equipment you are using, the Human Clock's Advance function is implemented as a selectable number of MIDI clocks (anywhere from 1 to 10) by which the unit bumps the slaved sequencers forward upon starting. These clocks are inherently tempo-dependent, meaning that the actual time corresponding to a given Advance setting depends upon the tempo at any moment. For the user, this means that the setting which works best will vary along with the tempo, and that no one setting will be truly appropriate for a piece of music which covers the full range of available tempos.

Occasional contact with reality (everything in moderation) induces me to declare this a glaring technical error, but not a catastrophic user roadblock – fairly few pieces of music cover such a wide tempo range, and fairly few sequencer/synth systems require the higher advance settings at which this problem is most noticeable.

It's unfortunate that there is no memorization of parameters – maybe for a live performance only one setting would be needed, but for different songs and certainly for studio work, response and feel would no doubt want to be fine-tuned and called up instantly. True, that would have added additional cost, but it would have been well justified in this case.

The characteristic for the Feel control, in contrast, is defined in terms of absolute time, mostly in the direction of added delay (–11 to +3 milliseconds – an extension into the positive end of the scale would make Feel a workable tempo-independent alternative to Advance). The other difference between the two controls is that Feel can be adjusted while playing, whereas Advance cannot. As its name implies, it is used for tweaking the rhythmic feel of the system (drums pushing or dragging the beat).

The Sensitivity and Smooth controls trim the response of the Clock to its trigger input. Smooth is a double-headed function of six settings which provide all possible combinations of three different Window settings with two different Speed settings.

The Window is the interval of time surrounding each eighth-note during which the Clock will respond to a trigger pulse as a valid timing reference beat and figure it into the ongoing tempo computation. Triggers *outside* the Window are ignored. Narrower Window settings allow the Clock to track a tempo through trickier rhythms, while wider

Window settings enable it to detect more rapid changes in tempo which the narrow Window settings would ignore.

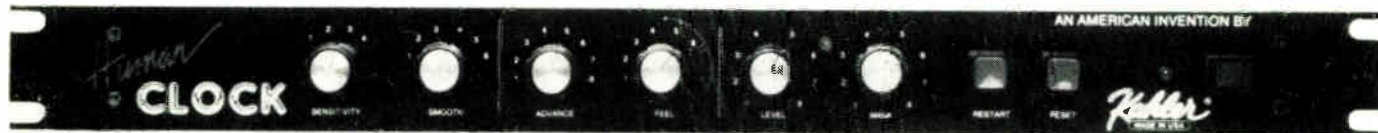
The Speed settings determine how quickly the Clock will alter its internal tempo in response to a detected change in the trigger rhythm. The high Speed setting is recommended in the manual and allows the Clock to follow tempo changes more promptly; when the low Speed setting is used, the Clock needs more convincing before it will adjust to a new tempo, making this the setting to choose when the input timing is erratic.

Sensitivity (perhaps better called Insensitivity, as the higher settings are less sensitive) is an interesting parameter – the maximum settings allow the Clock to outwardly respond to tempo changes more rapidly than its own internal tempo is actually catching up (at least, this is how I was able to understand the difference between this function and the Speed portion of the Smooth function). In use, this means that with the correct technique, a relatively large 'local' tempo change can be brought about without permanently altering the overall tempo. Until you realize what is happening here, this can be pretty confusing – the effect shows up as a tempo 'backlash', in which the Clock appears to be paying attention to you when you lay into it heavily, but goes back to its previous tempo if the heavy stimulus is not maintained for a sufficient length of time to make the new tempo stick (this amount of time presumably being determined by the Speed setting). To my mind, the manual does not differentiate clearly enough between Sensitivity and Speed parameters.

Overall, by the way, the manual is quite good. Features and controls of the Human Clock are presented in a logical progression and with an easy-to-read style. Fine points are discussed in straightforward, jargon-free language, and applications ranging from the obvious to the not-so-obvious are described. I consider it a plus that there is little or no theoretical clutter in the how-to text, although I would have felt more comfortable had there been more details available concerning the internal workings of the Clock – for example, some actual numbers or diagrams describing the different Window settings, for those of us who *relate* to things like numbers and diagrams.

## In Use

THE FIRST NEGATIVE impression came when the unit was pulled out of its box – it was broken. After being shipped twice (short distances) and taking a 30-mile ride in my car, two of four screws holding one circuit board came loose, and a free-standing voltage regulator broke off another circuit board. ▶



Points off for durability. After effecting repairs, I proceeded with the evaluation.

Once the controls are set, the Human Clock is operated entirely via the Reset and/or Restart buttons (or footswitches, if you are using any). Reset stops the Clock when it is running, and also causes any recent changes in the settings of the Advance and Smooth controls to be registered. Alas, it has no other effect over MIDI – the sequencer is left hanging and must be stopped by hand.

From this point, two methods of start-up are available. Hitting the Restart button readies the Clock to start upon the next trigger pulse it sees, at the tempo which was last being used. If Restart is not used, the Clock is started by means of a two-bar count-in performed via the trigger input – the third hit is the one which gets you going, while the first two hits are interpreted as the first beats in the two count-in bars. The time relationship of these three hits determines the starting tempo. Since the Clock is listening only to the trigger input, you can do whatever else you want during the count-in bars (drum solo intro, for example) without distracting it – provided that it doesn't alter the action on the trigger input. It works well, and it's fun – having your sequencer jump in on top of a groove you've set up is exhilarating, to say the least!

I did find it at least theoretically objectionable that the count-in is arranged so inflexibly. Admittedly, 4/4 is the predominant time-signature in MIDI-sequenced music, but we must hope that some people out there are interested in alternatives. Also, the overall operation of the Human Clock is beat-based rather than bar-based, and a beat-oriented count-in may be preferable to some users. Being able to set up a count-in lasting a selectable number of beats would sidestep the alternate time-signature problem. Apart from the difficulties it might cause in sync-to-tape applications (eg. a whole-note count-in is required on the click-track), I think this is something that any capable drummer will be able to work around.

Testing began with a Roland Octapad driving drum sounds through a sequencer. An electronic kick pedal was used as the trigger source for the Human Clock, and was also routed to the sequencer to trigger sounds. An early thought I had was that the Clock could let me out of having to record drum

sequences in time with the sequencer metronome – with the Clock in charge, I could turn the metronome off and let the sequencer follow me through my somewhat jittery time reality while recording.

At this point, I came to appreciate the fact that my sequencer has separate inputs for MIDI clocks and MIDI data, as the Human Clock has only the MIDI clock output available. This could pose a serious problem when using a sequence recorder having only one MIDI input for all MIDI information – namely, how to get the data and clocks in or the same input. In the case of the Octapad, which provides a MIDI merge or through-echo input, one can run the Human Clock's MIDI output into the sequencer via the pads – otherwise, a merge box is required.

Since the Clock naturally can only respond to tempo changes *after* it has seen them (whereas the sequencer records events with respect to the MIDI clocks *currently* coming in from the Human Clock), the results of recording this way left much to be desired when I did not take pains to keep a steady beat. This might not be the case if the Human Clock could respond more swiftly to tempo changes – for example, by listening for trigger pulses from all parts of the drum kit, which would give it more frequent points of tempo reference. But to do this with the unit as it now stands would require submixing of the trigger inputs to the Clock (which really has but one input) in order to keep them separated from each other on the way to their trigger destinations.

Another approach which will hopefully be taken on future incarnations of this product is to take trigger input in the form of selected MIDI events. This would limit to one the number of trigger connections needed for any number of trigger sources, and would provide compatibility with trigger sources such as the Octapad, which has no analog trigger outputs.

Throughout all setting ranges, the Human Clock is quite the rhythmic flywheel. I experienced almost no instance of unintentional tempo change, even through some rather involved patterns and at maximum settings for Sensitivity, Window and Speed. By the same token, these settings seemed necessary in order to create *intentional* tempo changes.

This is probably my single greatest complaint with the machine – tempo changes can be

accomplished only gradually, at best. Pulling off tempo changes using a normal (for me, anyway) playing style proved to be difficult. I tended to get much better results by resorting to steady eighth-notes or quarter-notes, and by thinking in terms of playing slightly ahead of or behind the beat of the sequencer in order to drag the tempo to where I wanted it, rather than aiming specifically at a new tempo. It seems as though we haven't quite escaped from playing in time to the sequencer, so much as we've added some new twists to the game.

A minor hitch also comes in outputting only MIDI clocks – some devices that create tempo maps (such as the SBX80 or Master Beat) prefer to get quarter- or eighth-notes to create their maps. Again, the Human Clock shows its design bent towards live performance over studio work.

As an experiment, I tried using the metronome output of another drum machine as the trigger source for the Human Clock. By exercising some restraint over the rate of tempo adjustment, I was able to make the system track successfully from 110bpm up to 240bpm and back down to about 65-70bpm – at which point it seemed to get stuck, and I was unable to regain external control of the Clock's tempo to speed it back up. The click-track input also brought the tempo-dependent nature of the Advance feature right out into the open when the tempo was dropped way down. Particularly when tracking a decreasing tempo, the Clock seemed to be staying somewhat ahead of the click, even with Advance set to minimum. To fall into line with a slower beat, the Clock should have slowed down briefly below the input tempo at some point, to compensate for the input tempo having dropped behind it. Instead, it stayed in 'trying to get there' mode (fallout from the Speed control?). This may account for my subjective impression that it was harder to make the Clock slow down in response to my playing than to make it speed up.

Later on, when I switched over to electric guitar as the trigger source (with the guitar signal through-connected into the audio mix), there was a nasty surprise in store – it seems that the trigger input does its share of damage to the signal fed into it.

There was a slight injection of hum and noise related to the setting of the Level knob, along with clipping which seemed to be



related to activity on the trigger LED. Performance under guitar control was somewhat less satisfactory than performance under drum trigger control – again, the demands of the tempo-sensing interface force a tradeoff between natural playing style and control over the Clock.

### Conclusions

BOTH OF US hate to play against the rock steadiness of a machine, for the dual reasons of our own sloppiness, and also because of the 'feel'. However, both of us enjoy the compositional power given to us sequencers and drum machines.

The 'band' we occasionally play in together is pure improv – we jam for two or three hours, record it all to tape, and go back later and edit out the good parts. Wouldn't it be great if this performance was instead recording into our wonderfully powerful sequencers, and we could edit and massage it there? Without losing the feel?

Marrying devices such as the Master Beat, SBX80, Studio 440, or the new Marmony MTX1 (which prints a tempo map and a SMPTE-type stripe simultaneously to tape)

with ones like the Human Clock allows new possibilities (such as our dream/goal) to emerge. Having a tempo map printed to tape (or committed to RAM) eases the overdub process later.

If the musical parts are also recorded into a

**Performance** *"I tended to get better results by playing slightly ahead of or behind the beat of the sequencer in order to drag the tempo to where I wanted it, rather than aiming at a new tempo."*

MIDI sequencer (now a possibility with MIDI'd guitars, drums, keyboards, and even wind instruments), and that tempo map is editable as easily as the sequence data itself (a capability which we are just a hairsbreadth away from), we will finally have fused the creativity and feeling of a live performance 100% with the precision editing and manipulation that modern sequencers and MIDI allow us.

Alas, we are not there yet. Kahler's Human Clock does do an adequate job of what its ads and manual claim, and what *that* is – making machines follow humans in a live situation – is

unique. This is a significant achievement that we in no way intend to belittle. However, its response to human musicians is too slow to allow accurate recording of a sequence in real time *unless* a very coarse autocorrect is used. And a few corners have been cut, such as

preset memories, pulse clock outputs, MIDI and pulse merging, and so on.

It could have been a little more roadworthy, and it still needs another device (and occasionally, a bit of trickery – such as dividing MIDI clocks back down to quarter-notes) to create a tempo map from a rhythmic performance.

Our *real* hope is that it will inspire a second generation of devices that truly integrates the live performance with machine editing, both live and in the studio.

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# ALLAN HOLDSWORTH

One of the most influential guitarists in recent years has just completed a new album, *Sand*, much of which was recorded at home. It combines sequencing and live interplay to produce a collection of electronic jazz music that is decidedly unusual. *Interview by Rick Davies.*

**I** NEVER REALLY WANTED to play guitar in the first place, it was just an accident.'

(I can't believe I'm hearing this.)

'I wanted to play saxophone. I wouldn't have been a musician at all, except my dad bought a guitar from an uncle, and left it lying around. At the time, saxophones were very expensive and not very easily come by, so I started messing around with it.'

So begins the story of one of the most influential guitarists of the past decade. A story which also involves many of Europe's most influential jazz-rock groups, as well as a few on this side of the pond.

Starting his musical career in a Mecca dance club in Sunderland, England, Allan finally made the move to London after alto flute player Ray Rollie asked him to sit in at a jam session. This led to Allan to join Jon Hiseman's band, and eventually to the ground-breaking jazz-rock band, Soft Machine. Since then, he has performed and recorded with Tony Williams, Jean-Luc Ponty, Gong, UK, Bill Bruford, and his own band, IOU, with Jeff Berlin.

His last solo album, *Atavachron*, marked a turning point in Allan's career, featuring much more synthesizer than is generally expected on a 'guitarist' album. His involvement with the SynthAxe is largely responsible for this development, since it has allowed him to step into a role generally reserved for keyboard players. But the changes in his music are not merely in the tonalities of the lead and backing instruments; the character of his compositions has definitely evolved in new directions since his plunge into synthesizers without forsaking the nuances of his playing style altogether.

I met Allan at Bernie Grundman's Mastering Studios, where he was mastering his forthcoming album, *Sand*, for the Relativity label. The two cuts I heard indicated that, yet again, Allan Holdsworth would be setting new standards for guitarists, even though synthesizers are the main components in his new textures. This album will certainly give guitarists food for thought...

'The line-up on this album is a trio. Jimmy Johnson played bass on the whole album, Chad Wackerman played drums on one side, and Gary Husband played on the other side. So it's basically a trio. We did have a guest soloist, Alan Pasqua, who is my favorite

piano player. He always has been since we worked together in the Tony Williams band. I really like to work with him... He's great, a lovely guy. He played a solo on one cut. That's the only keyboard-controlled racket on the album. I'd love to get him to go on the road; he's a very busy chap, and it's difficult to get him away for any length of time. But if we did some local gigs, or some short tours, two-

magic thing, it rarely happens. I'm sure other people have that rapport with other, different musicians. It's almost like I want to stay as a trio unless I can get Alan to go out with us...

'I'm interested in what people think about it. I think it's going to be immediately obvious that you wouldn't be able to do that on any other kind of controller. Some of the textures and the controllability would be

*"Then I took a multitrack tape home, stripped everything off it and left Chad's real drums there, and re-wrote the whole piece. Instead of just writing a chord sequence, I wrote it around what I heard him play."*

week spans, we'd hook him up, somehow. When I work with Alan, he always seems incredibly focused. The music never changes, it grows. He always manages to take something I've written and make more of it in a way in which I would hear it. That to me is a

impossible on something else. Who knows? They might hate it. "Where's the guitar, where's the guitar? Allan's not playing guitar anymore!"

I am amazed to find out that there was, in fact, no guitar on either of the two tracks I heard in the mastering studio...

'That was the SynthAxe through a Marshall. The first track was guitar, but the last track was the SynthAxe. Most of the other sounds I used on the SynthAxe were guitar-like sounds, or horn-like sounds, because that's the instrument I hear in my head. I've always tried to get the guitar to sound like a horn. It's easier for me to get the SynthAxe to sound like a horn than it was the guitar.

'One tune we did, a piece called 'Distance vs. Desire', which is a ballad, is like a duet with myself. I think I was able to get as much expressiveness out of the synthesizer as I've ever been able to get out of a guitar. So that was a revelation to me, something to get totally excited about, seeing as I'm still new at it.

'On the last piece, where I did the guitar sound, I wanted to see if I could do that. I just did it as a challenge. It's really amazing that you thought it was guitar.'

Holdsworth seems to pattern a lot of his playing after wind instruments. Is this intentional?

'I guess it's just a natural thing because I always wanted to play a horn. Always wanting to play a horn and shape a note, have it get loud and then quiet and soft, and then bend it and straighten it, make it loud and then mellow again. All after you've played a note, which are things very difficult to do on guitar. And I tried to do them on guitar, the way you hit the string with either hand, the way you can shape the note with a pick...'

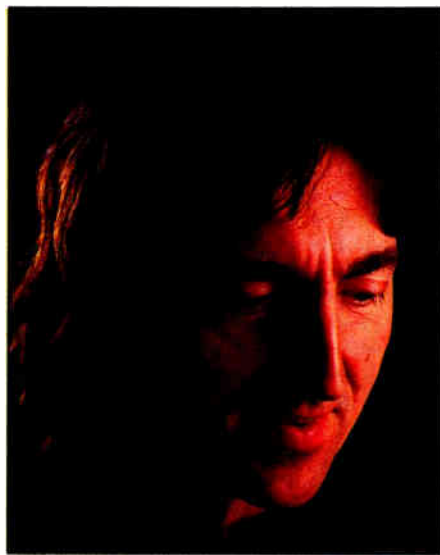
So if he's primarily using the SynthAxe,



does he record his performances as MIDI data into a sequencer?

'I've considered it; I might even do something like that on another album. I'd like to do an album like that. And because it would *all* be synthesized, I could just record it into the computer, like we did on the last track on the album. Everything was recorded on the computer except the solo; *that* was recorded to tape, because I used the guitar amplifier and all that. It would have been more complicated to record it and *then* process it, because I wouldn't have been able to get the same feel without hearing that sound.'

As it turns out, one of the tracks I heard, entitled 'Mac Man', featured some stunning sequences created using Mark of the Unicorn's Performer program and a Roland digital piano. Allan points out that he used the SynthAxe's Poly mode 3 rather than Poly mode 1. From there, Macintosh ace John England (Mac Man, himself) edited the



*"The only synthesizers I used on the whole album are Oberheim. I'm an Oberheim freak. . . I started off in the deep end, because the first synthesizer I got was a Matrix 12."*

sequenced track with Performer. Chad Wackerman played live to the track, and his performance was recorded as MIDI data into the sequencer, leaving the leadline the only part *not* sequenced. Allan says he's looking forward to getting into an Atari ST to run the Steinberg sequencer program, which is apparently ideally suited for recording MIDI data output by the SynthAxe in Poly mode 3.

**O**N ONE TRACK on *Sand*, Holdsworth took advantage of the multitrack recording process to enhance his composition.

'We did that piece in a really bizarre way. I wanted to describe a train ride. I used to catch this train called the Bradford Executive from London to Bradford, and I wanted to try to musically depict the changes from south to north on that train. So we just set up the drum machine to get the chug-a-lug kind of feel, and then I improvised some chords. Then we added real drums and guitar, just improvising over the chords, myself and Chad.

'Then I took the tape home, stripped everything off it again, and just left Chad's real drums there, and wrote the whole piece

around the drums. Instead of just writing a chord sequence, I wrote it around what I heard him play. The chord sequence never repeats; there's a little motif at the beginning and at the end, but the rest of it never repeats at all, for eight minutes or so.

'I just wanted to do *that* track like that. I'll probably never do it again, but it was an interesting experience. It was like writing to a picture – film music, in a way.'

Running a home studio obviously affords Allan the luxury of such experimentation. What is his home studio like?

'I have a place where I can work, but I don't have a board as such. You really don't need one except for monitoring. I use an Akai 1214, and I recently started using the 14D, which is the rack-mount Akai tape deck. It's a nice-sounding machine and it really worked out well. I did all of the solos on it. I didn't do any of the solos in the studio.

'We used to go in the studio and spend hours miking up. I learned quite a bit about miking techniques, so I decided it would be a good idea to make a totally enclosed box. So I did, and it works great. It's probably about 5' long, 3' high and 3' wide, and that contains a speaker cabinet design with totally exchangeable baffles. I can take baffles out

and change speakers really quick. It's got a Neumann U87, and a specially constructed stand which I can move, but once I find a sound I like, it's permanently located.'

Allan drives 'the box' with a Pearce amp head, and listens to it over studio monitors when he's recording, though he has found this system to be equally indispensable in live performance.

'I started out with the road version, which was much more primitive. I was fed up with getting a different sound every night, and I wanted to make it consistent. Almost everywhere I go, the guitar sound is consistent. The only thing that changes is the PA maybe, or the room sound, but the sound that comes out of the cabinets is always the same. For convenience sake, I've just been using a couple of single-12" cabinets with those new JBL guitar series speakers, though I really *should* monitor it on more full-range speakers.'

**O**VER THE LAST couple of years, Allan Holdsworth has become one of the SynthAxe's most vocal supporters. In 1986, he released *Atavachron*, proving that there is, now more than ever, a difference between 'keyboard' and 'synthesizer' music. Yet as Allan explains, there is much more to his favorite axe than the sounds to which he now has access.

'In a way, the SynthAxe has kind of taken over for me, because I can reach what I want to do musically *more* with the SynthAxe than I could with the guitar. It seems like I've been waiting all my life for this instrument, because it allows me to do all the things I could never do with guitar. Like the last track on the album; it sounds pretty much like guitar, and I did that by creating a sound using the Oberheim Matrix 12, and then combining two separate sounds and putting them into a little 15-Watt Marshall.

'That was my first attempt, and I did that solo really fast. Usually, I'll spend time making a solo, getting a sound. I might spend five or six hours on a sound. At home, that is – I wouldn't do that in the studio. At home it's great, because I just say, oh, this sounds pretty good, go out and have a beer, and come back next day and listen to it. And if it doesn't sound good to me, I can change it until it does. If that was studio time, I'd be paying a lot of money for experimenting, and

I'm such an experimenter, really. So using the Akai has just been fantastic, because with the noise-reduction system on it, it hasn't impaired the guitar sound at all, and I think I've been able to achieve as good a sound, if not the best sound, as I've had so far.'

And speaking of sounds, are there any samplers on the new album?

'I've got a Kurzweil 250 Expander I used on some of the things. But the only synthesizers I used on the whole thing are Oberheim. I'm an Oberheim freak. I've got an Oberheim Xpander and two Matrix 12s. They're really flexible, just great.

'I started off in the deep end, really, because the first synthesizer I got was a Matrix 12, and it isn't the easiest synthesizer for a beginner. But it helped me, I think. I've had a lot of help from Marcus Ryle, who's one of the designers. He must have been fed up with me calling, "Marcus, Marcus! how can I do this?" But I've got a reasonable understanding of it now. I've created a lot of my own patches from scratch and it's getting closer. No cigar perhaps, but it's getting closer.'

Getting back to guitars, what's it like translating all of Holdsworth's guitar technique to an instrument like the SynthAxe?

'The only limitations are in your ability to control the synthesizer and make it understand what you want it to do. That's really opened up to me in the last year. When we did the first album with the SynthAxe, *Atavachron*, I was still pretty new at it. It's been a year and a half now. I've learned a lot about synthesis since then, and have used a lot of different things.

'I use the breath controller a lot on it, because I always wanted to play a horn. Breath controllers have been around for a long time, but keyboard players generally don't like them. But for me, it seems so natural, because I really think I should have played a horn. So when I play the SynthAxe with a breath controller, I am playing a horn; I feel like I've actually achieved what I wanted to do.

'There are a lot of things on the last track on the album that I did with the SynthAxe simulating the guitar sound that were very reminiscent of things that I would do on guitar if I could do them almost the same way.

'Plus the fact that I could even use the breath controller to control the guitar sound, or a SynthAxe guitar sound. That's one of the things about the SynthAxe as well that, to

me, is so superior to all other kinds of guitar synthesizers or controllers. A guitar's not a really good way to control a synthesizer. When you play a note and the string dies, then the note's going to die, unless you've got a hold pedal, and you're constantly fighting with another pedal on the floor, whereas with the SynthAxe, I can program it to sustain that note until I mute it.

'So to me, to put hexaphonic pickups on the guitar, the way Roland does it, is silly; besides, I think the pitch-to-voltage—or pitch-to-glitch technology, as I call it—is

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*"Breath controllers have been around for a long time, but keyboard players generally don't like them. But for me it seems so natural, because I really think I should have played a horn."*

---

coming to an end. They've gotten just about as far as they can go. It's a glorified guitar tuner. You play a note, it has to decide what the note is, and then figure out if it made any mistakes. There would be no keyboard player in the world who would play a pitch-to-voltage keyboard, so why do they expect guitar players to do that?

'To me, the SynthAxe is the birth of the next generation of controllers, and the improvements and advancements that they've made since I got the first one have been astounding. Every week, they've got something else that does something it didn't do before. You can write your own law tables for velocity—the way the keys work and everything. It's awesome. Nobody really appreciates it yet, but I've found the SynthAxe is the only way to get total control over everything.

'...I always think of sounds as a uniform thing. If I'd been a piano player, I wouldn't be a guy that would want to play and accompany myself. I like playing with other people, I like the interaction. I can't play bass—I like to play with somebody like Jimmy who's fantastic. It's a whole different way of looking at it; they're "low note" men. It's fantastic, because there's no way I'd be able to think like that.

'I've mixed more than one sound, obviously, a lot of times, but always on every string. The EQ might change from one string to the next, or the filter might change as it goes up because of the way the sound was programmed. It wouldn't be one sound on one string, and one sound on another. Not that there's anything *wrong* with that, it's just that I've never had the desire to do that.

'It's really difficult for me to say enough about the SynthAxe, because in some ways it's gone against me with SynthAxe themselves. They see me as a person who already loves the thing—which I do—so they may be less likely to listen to me than to another guitar player who isn't convinced by it. There are certain aspects of things that I would really like to stress to them that they should always keep, like I think they should always have 24 frets, because to me that would be like taking the EWI, the Electric Wind Instrument, and putting only one

octave key on it just because the saxophone only has one octave key. When you're dealing with a synthesizer, you don't have those range problems anymore, it can go from DC to VHF. So you've got eight octave keys on it, and that's great! Why restrict yourself to these silly things that apply only to acoustic instruments because there's a law of physics involved? So to take frets off your guitar is silly, especially when even a modern guitar like a Steinberger has 24 frets. It's got to have 24 frets!

'There are some things you can do with the SynthAxe's trigger keys for soloing that would be incredibly difficult with a pick. I don't use a pick with it anymore—I'm trying to develop a technique to play on it with my fingers. You see, on a guitar you use a pick for the *sound*, but on the SynthAxe it makes no difference.'

So Holdsworth is not terribly worried about giving up the feel of a real guitar?

'Oh no. Why? If I'm playing a guitar and I'm hearing a flute, I'm not hearing a guitar anymore anyway. So for me, I hear the SynthAxe, I'm able to respond and get inside the sound I'm using more than I could with a guitar. When I play a guitar with any conversion system on it, I'm still thinking "guitar". Whereas, while I'm playing the SynthAxe, I'm totally engrossed and lost in that sound, with what I'm doing at the moment. It's still new to me, and I'm still growing and learning about it, but it's totally rejuvenated my way of thinking about music. I think that eventually, I'm going to be able to get closer musically to what I can hear in my head than I could with the guitar. I'll try.'

# ClickTracks 2.0

## Software for Apple Macintosh

REVIEW

Software-based click programs for film music composers are getting thicker on the ground, but this is one of the first for the Apple Mac. It's cheap to buy, but does it get the job done? *Review*

by Jim Burgess.

THE FIRST TIME I was involved in producing music for film, I encountered a very strange phenomenon: The Big Click Book. A massive, indecipherable volume of seemingly unrelated numbers and tables. I asked several experienced film composers to explain how to use it to me. After they had, I was more confused than ever.

Eventually, it all became clear. Film composers are victims of an imperfect world. They are given near-impossible tasks with ridiculous deadlines within which to perform them. Often their efforts to do their job within a specified time frame are impeded by others. It's a wonder so many of them are able to pull it off consistently with such quality.

Computers have made at least one part of the film composer's job easier. Now there's no reason to have to deal with books and complex film math calculations. Let the computer do the dirty work — we just want to make music!

### The Problem

YOU'VE JUST LANDED your first film music gig. The director has a rough cut to screen and both of you have gone through it from beginning to end, taking note of each key point or cut. You record a description and location for each, using the slow motion or freeze-frame option on your VCR and the visual burned-in SMPTE Time Code on the screen.

After going through the entire film this way, you resolve that there are 18 separate musical cues to be composed. Each is a different length, and each must connect smoothly and musically to a number of key 'hits' (cuts, emotional peaks, mood changes, whatever) that fall within that musical cue. What tempos are going to make it work? A few years ago, it would be time to get out The Big Click Book. Nowadays, just boot up ClickTracks.

### The Solution

CLICKTRACKS IS WRITTEN in Microsoft BASIC by Bruce Coughlin of Brooklyn, NY. It's actually three mini-programs in one: 'Clickbook', 'Hitlist' and 'Scan'.

'Clickbook' is essentially just that: a software version of The Big Click Book. Its operation is pretty straightforward. When you select 'Clickbook', the program asks whether you'll be using bpm (beats-per-

minute) or Frames (frames-per-click) tempo values. You'll be asked to choose a format. ClickTracks supports all film formats (16, 35 and 70mm) and all common SMPTE formats (25 or 30 frames per second and Dropframe 30). You can enter an offset point for each cue. If you're using SMPTE format, this offset will represent the location of Bar 1, Beat 1 — in other words, the start of the cue.

And that's all there is to it. ClickTracks will generate pages of data showing the exact location of each beat in whichever format you've chosen. Better yet, it'll print it all out. If you want to try a new tempo or offset point, no problem: just click on the appropriate function at the bottom of the Clickbook display, and the program will prompt you for the new information.

The 'Hitlist' is the second part of ClickTracks. This is where you enter the locations of the various hits you've mapped out. Beside

each hit location is a description field that you can use to reference each key point or cut. ClickTracks accommodates up to 30 hits per cue — ample for most applications. Once you've entered the hits and selected a tempo, the Hitlist program shows you how close (or far) your hits actually fall in relation to the selected tempo and start point. ClickTracks uses a resolution of 24 units per beat for this purpose, making it easy to convert this timing data to drum machines or sequencers with 24 clocks per quarter-note (or multiples thereof). In addition, ClickTracks will even suggest hit points of its own, with selectable resolution from 16th-note triplets to quarter-notes. If the hits aren't falling where you want them, try a new tempo or shift the start-of-cue point forwards or backwards — all from within the Hitlist program.

Mind you, nobody wants to sit around guessing which tempos might work for very long. So make the computer do it for you! That's what the 'Scan' program is all about. It asks you for a range of suitable tempos and gives you the seven best choices, complete with a score for each one. The more hits a given tempo works for, the higher the score. What could be easier?

You can choose a 'Limited' Scan between two tempo ranges or a 'Full' Scan which searches a wide range of available tempos. Either way, once the Scan is performed, you will be prompted to choose one of the seven tempos (usually the one with the highest score) and the program will return to the Hitlist mode where the exact location of each hit will be displayed.

Completed Hitlists may be saved to disk for recall or further editing when required.

### Conclusions

THIS ISN'T THE first software-based click program, but it is one of the first to be written for the Macintosh. And the Mac is definitely habit-forming; once you're hooked on it, you don't want to even think about using any other computer.

I found ClickTracks to be well-designed and logically laid out. The documentation provided was excellent and got to the point, but also included some useful background information that will be especially handy to newcomers in the film music field.

If you're used to running Mac software, it may annoy you that ClickTracks doesn't follow all of the regular Mac conventions. For example, text editing doesn't work quite as nicely on this program as it does on most other Mac programs. Let's say you make a mistake when entering a SMPTE location for a hit. Rather than highlighting the error and typing the correction, ClickTracks makes you

BEAT	FRAMES	TIME	BEAT	FRAMES	TIME	BEAT	FRAMES	TIME
1	0 00	0 00	13	144 00	0 50	25	288 00	0 12 00
2	12 00	0 05 0	14	156 00	0 6 50	26	300 00	0 12 50
3	24 00	0 1 00	15	168 00	0 7 00	27	312 00	0 13 00
4	36 00	0 1 50	16	180 00	0 7 50	28	324 00	0 13 50
5	48 00	0 2 00	17	192 00	0 8 00	29	336 00	0 14 00
6	60 00	0 2 50	18	204 00	0 8 50	30	348 00	0 14 50
7	72 00	0 3 00	19	216 00	0 9 00	31	360 00	0 15 00
8	84 00	0 3 50	20	228 00	0 9 50	32	372 00	0 15 50
9	96 00	0 4 00	21	240 00	0 10 00	33	384 00	0 16 00
10	108 00	0 4 50	22	252 00	0 10 50	34	396 00	0 16 50
11	120 00	0 5 00	23	264 00	0 11 00	35	408 00	0 17 00
12	132 00	0 5 50	24	276 00	0 11 50	36	420 00	0 17 50

YOUR LIST	DESCRIP	BT/24TH	BT	OFFSET	LOG
1 0 0 5	Start of Cue	1/0	1	0	+0.0 0 0 00
1 0 5 10	Theme 1	11/0	11	2 2 2	-1.2 0 5 12
1 2 45 8	OminousDrone	33/7 5	331	2 2 2	+0.8 2 45 12
1 2 59 15	Boor Freak	358/21	359	2 2 2	+1.2 2 59 38
1 3 11 25	Room Tone 1	384/8	384	2 2 2	-1.2 3 11 62
1 3 14 29	Footsteps 1	390/14	390	2 2 2	-1.5 3 14 75
1 3 20 12	HardBreathing	401/11	401	2 2 2	+0.5 3 20 25
1 3 28 20	Scream	418/0	418	0	+0.0 3 28 50
1 3 32 5	Knife Sound 1	424/0	425	0	+0.0 3 32 00
1 3 35 10	Body Falling	431/8	431	2 2 2	-1.2 3 35 12

YOUR LIST	DESCRIP	BT/24TH	BT	OFFSET	LOG
1 0 5 10	Theme 1	10/11	10	2 2	0.5 0 4 75
1 2 45 8	OminousDrone	330/10	330	2 2	+1.5 2 44 75
1 2 59 15	Boor Freak	358/21	359	0	+2.0 2 59 00
1 3 11 25	Room Tone 1	383/11	383	2 2	-0.5 3 11 25
1 3 14 29	Footsteps 1	389/19	389	2 2	-0.8 3 14 38
1 3 20 12	HardBreathing	400/16	400	2 2	+1.2 3 19 88
1 3 32 5	Knife Sound 1	424/5	424	2 2 2	+0.8 3 31 62
1 3 35 10	Body Falling	430/11	430	2 2	-0.5 3 34 75

finish entering the rest of the data, delete the hit, and start all over. To be fair, I suspect the limitations of Microsoft BASIC – rather than the programming itself – are responsible for these minor but nonetheless annoying idiosyncrasies.

Unlike all other parts of the program, the Scan mode forces you to enter tempos in frames-per-beat only. If you were weaned on bpm like me, you might find it a little awkward to get used to translating bpm tempos into Frame tempos. It's pretty easy once you get used to it, though.

Yet although I couldn't exactly call ClickTracks bulletproof software, the only times I managed to make it crash were when I tried to make it do something it's not supposed to do (like feeding it an illegal SMPTE location). Aside from that, a couple of minor screen glitches were cured by a software update that arrived just before this review went into E-Mail mode.

Here's my wishlist of features for Version 3.0 of ClickTracks, which is under development now.

First, it should be able to accommodate variable tempos within the Hitlist mode. Besides retards and accelerandos, this would make it easy to land right on top of key hits by using subtle tempo variations to butt up right to where you want to be.

Second, it would be helpful if the program supported meter changes. Film composers use meter changes all the time as quick (and dirty) solutions. Of course, the present system of numbered clicks works fine for any meter or combination of meters, but I think the option to display measures and beats would make the program that much more useful.

Third, there should be an actual audio click on the Mac that the program can play when requested. That way, those of us using SMPTE/MIDI controllers would be able to transfer our carefully-constructed tempo maps into the memory of our sync boxes and use it to control sequencers and drum machines. How about an SBX80 download? It's a natural, what with so many of those boxes out there now, all crying out for somebody to take advantage of their System Exclusive capabilities.

ClickTracks weighs in on the inexpensive side, offering users a lot of features for its modest \$69 price tag. To make it even more appealing, the current version of the program is not copy protected, making it easy for those who use hard disks to install it. Let's hope this doesn't get abused by unscrupulous software bootleggers – it's obvious the author has put a lot of time into putting the program together, and the selling price is certainly reasonable enough. If the program gets supported the way it should be, it will continue to be developed, and everyone will win.

ClickTracks does the job it sets out to do very nicely, without flashy graphics or a high price-tag. It's a very functional tool for Mac users working in the film music medium – to be honest, I can't see how anyone in this field would want to do without it. After all, what could be more satisfying than burning The Big Click Book? ■

MT MAY 1987

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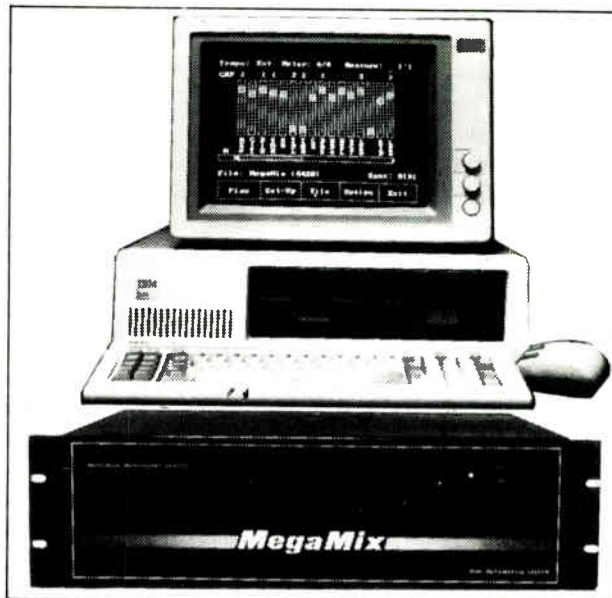
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A black and white portrait of Carlos Alomar, a man with dark curly hair and glasses, smiling. He is wearing a dark jacket over a collared shirt.

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# Casio SK2100

## Portable Sampling Keyboard

**I**F YOU WERE asked to name the main ingredients for a small, modern MIDI-based music composition system, what would your reply consist of? A synthesizer (maybe two, maybe more). A sampler. A multitrack sequencer, whether of the dedicated or computer-based kind. And a drum machine, with the option of a few pads to play it off of. Link that little package of goodies up to some recording equipment, and you've got yourself the archetypal small electronic studio of the late 1980s.

But there is an alternative. One that puts all of the non-recording ingredients mentioned above into a small box, is easier to get to learn  
**MT MAY 1987**

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**Take all the ingredients for today's MIDI music system, strip them down to their basics, and put them in a single instrument, and you've got a typical example of today's hi-tech home keyboard. Does its appeal stretch into the pro and semi-pro fields?** *Review by Dan Goldstein.*

and use than any of them, and is also cheaper than any of them are likely to be.

Ladies and gentlemen, I give you the Casio SK2100 — flagship of the company's 'SK' range of instruments (keyboards that are aimed at

the home market, but which feature sampling as a major selling point), and by any standard a very tidy piece of technological packaging indeed.

It's a sampler, obviously. Actually, it's an ▶

▶ eight-bit polyphonic sampler with a sampling rate fixed at 10.113kHz, and various editing functions – but we're not at the detailed spec stage of this review yet. It's also a synthesizer, with a 49-key splittable keyboard, 12 preset sounds for the upper section, 10 for the lower, and a one-finger chord option to make playing easier for the novice. And it's a drum machine, with seven percussion sounds, 20 preset patterns (all with their own fill-ins), and provision for programming your own patterns

not being used; leave the SK2100 alone for a little over five minutes, and it switches itself off – though your rhythm patterns, your sequences, and (crucially) your samples remain intact during this quasi-power-down procedure.

Next come four slider controls for adjusting the relative levels of the SK's bass, chord, rhythm, and sample sections, plus a fifth for varying the overall output level. If you want to hear how your auto-chords and arpeggios are

to point out that this is also one of the worst microphones I've ever used for anything.

As I've intimated, there are two speakers at either end of the SK2100's keyboard, though a pair of output jacks on the rear panel allow you to use external amplification – the results of this are certainly worthwhile. Other rear-panel connections are few and far between: just a headphone socket, a connection for a volume footpedal (optional), the plug for the mains adaptor (9V DC, and also optional), and two phone inputs for microphone and line signals to go to the sampler. Then there's a master tune control (50 cents either way) and that's that.

R  
E  
V  
I  
E  
W

## Rhythm "This is what modern rhythms are all about: steady, metronomic pulses, filthy sounds, and neat fills that don't shove the groove off the rails."

in real time. And it's a sequencer, with capacity to store two separate 'channels' of information: the first can hold 2000 notes, while the second can hold 1000, plus a total of 159 chord changes.

There's even an amplifier, twin speakers (the SK2100 does *everything* in stereo), and a microphone for sampling – so that, in Casio's own words, your keyboard is 'built to boogie, whenever and wherever you are'

### Format

IT'S A PRE-REQUISITE for an instrument like this one that the options it offers, no matter how sophisticated, must be quickly and easily accessible. Amateur musicians, dabbling at a keyboard in their living-rooms because there is nothing special on television (yet), are likely to be even less patient and diligent than their pro and semi-pro counterparts, so things must happen *fast* on the SK2100 if the people most likely to gain from using it are not to lose interest.

Thankfully, things happen very fast indeed. Selecting a preset synth sound involves pressing only a single button. Sampling involves pressing two.

Actually, there are quite a number of buttons on the SK2100's front panel, which on the one hand makes the first encounter initially perplexing, but on the other hand means that very few switches are called upon to perform more than one function. For finger-sore programmers used to the multi-function, multi-layered parameter access systems used by many 'pro' hi-tech instruments, this panel is a sight for sore eyes.

From the left, we begin with the power switch, which continues the Casio tradition of incorporating an automatic cut-off circuit to save on battery wear when the keyboard is

working out without the interference of the Casio's drum sounds, all you do is steer the relevant slider down to zero.

A small but critical assortment of switches follows – small because the switches are neatly and economically arranged, critical because their position dictates which 'mode' the SK2100 is in. For it's here that you select whether you want to start up the drum box, adjust its tempo, or bring in one of its fill-ins, and whether you want to split the keyboard, and then play it manually or call upon Casio's auto-chord system for assistance.

Next come four 'pads' (really little more than big, non-dynamically sensitive plastic switches) which you use to trigger samples manually in time with the rhythm pattern – or at whatever moment seems appropriate. You can also use them as a means of inserting and deleting drum voices to/from your own rhythm patterns in real time, if you don't fancy playing those voices from the lower section of the SK2100's keyboard.

The biggest and most complex array of switches comes next, well away toward the top right of the instrument. Essentially, these buttons are what you use to select whether you're playing synthesized or sampled voices from the Casio's keyboard, which rhythm pattern the drum machine is playing, and whether you wish to start making use of a number of auxiliary operations like sampling and its associated options.

Finally, we come to an input level control for sampling (this actually raises or lowers the threshold of the Casio's auto-trigger system to match the level of the signal you're sampling, and is allied to a five-LED ladder for accurate level indication), and a cute little microphone that springs out of the instrument's case on a looped cord – though I ought

### Sounds

THE DOCUMENTATION MAKES no mention of the manner in which the SK2100 generates its synthesized sounds. But after listening to them all thoroughly, I'd be willing to bet that digital technology plays a large part in their creation; there's brilliant, sparkling clarity, great precision, and...the inevitable quantization noise.

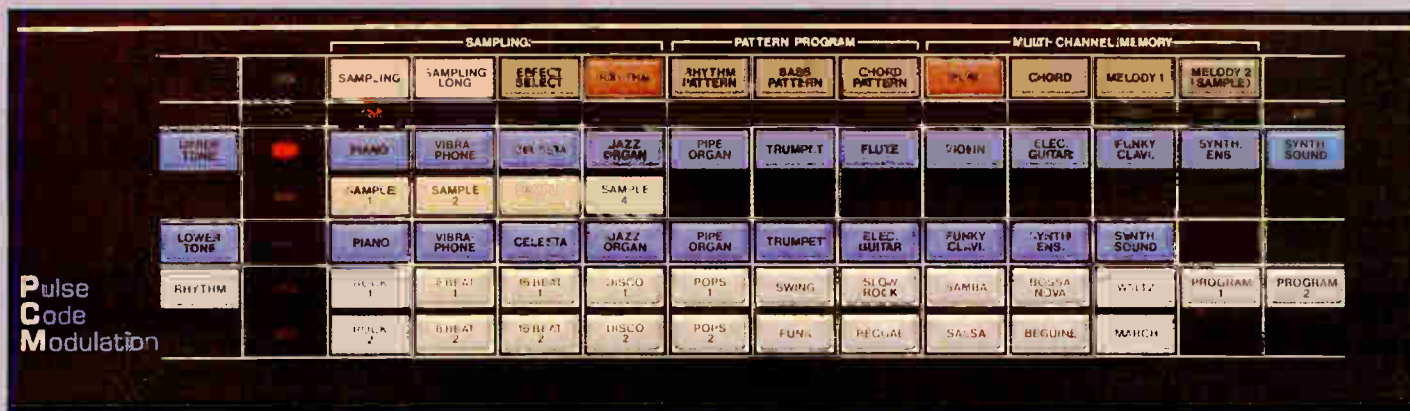
Like most digital systems (for in truth, this is something that can be said for even the most sophisticated sampling systems available), this one excels at reproducing acoustic timbres that have a percussive attack and a comparatively short decay time, but falters when it comes to longer, sustained sounds because it is simply not 'clever' enough to recapture the sort of sonic movement that goes on when, say, a string section is in full, sustaining flow.

Thus the best of the SK2100's sounds are the likes of the vibraphone (richly resonant and, damnit, *vibrant*) and the celesta (a truly glittering occasion), while the piano is also usable if a little on the dull side. The solo violin is also nice, if not especially violin-like – the basic envelope characteristics are there, but some of the timbral details are not. With the brass and organ sounds, things start to stray dangerously into Toytown territory, and the less said about the unimaginative 'Synth Sound' and 'Synth Ensemble' programs, the better.

The SK2100's drum voices are PCM-sampled, but are nothing like as bright as those of some other, similar machines – including some of Casio's own. The kick-drum is little more than a soft, dull thud, the snare an insistent crackle, the cymbals and hi-hats weak splashes, and the handclaps a tinny, half-hearted crunch.

Unpromising though they may be in





isolation, however, these voices contrive to sound like a pretty credible little ensemble when played together as part of the SK2100's preset rhythm patterns. These patterns are modern (less waltz, more rock), interesting and well thought-out, and it's while playing along with them that you realize: Hell, this is what modern rock and dancefloor rhythms are all about. Steady, metronomic pulses, filthy sounds, and neat fills that alter the direction of the pattern subtly without shoving the all-important groove off the rails.

The other main ingredient of today's rhythm is, of course, the spice we know as samples. Those naggingly infectious, ultra low-quality vocal snippets, orchestra hits and reversed drum sounds that distinguish today's dancefloor workout from those of the late '70s or early '80s.

Well, the Casio can do those, too. In fact, it comes with four such samples onboard, and safely protected from corruption in ROM so you'll never be free of them. There's a piano with a truly excellent 'plink' to it, a vibraphone that's a pleasing if gritty contrast with the Casio's synthesized version, a slightly muffled conga and a French horn with an identity crisis — though I'm not sure what it actually thinks it is at all.

## Sampling

IF YOU WANT to sample your own sounds, you can choose whether you want to use all four of the RAM locations, which'll give four samples each 0.81 seconds in length, or whether you want to merge the locations

**Editing** "There no tricky LCD of values or monitor-full of waveforms — just five drawings of different envelope shapes matched to keys."

together to form two bigger ones, each 1.62 seconds long.

Whichever you decide on, however, the sampling rate remains the same at 10.113kHz. This is a pity, since I'd have thought an option to double the sample rate to give two higher-quality, 0.81-second samples would have been handy to have. There surely comes a time — even for domestic keyboard dabblers — when sonic quality matters more than sonic variety, but I guess Casio's engineers reckoned an additional 'rate' parameter would confuse people more than it would help them.

As with any other sampling system, the best way of minimizing noise problems is to sample

at as high a level as you can without encountering distortion (so that the playback system doesn't have to impose its noise characteristics on the sample in order for you to hear it), and to use a line input wherever possible (so that microphone noise doesn't have a chance to intrude, either). I used all three input possibilities (built-in mic, external mic, and line-level) during the test period, and can confirm that the least noisy results — though not necessarily the highest-quality ones — were obtained using the last option.

Once you've taken your sample, you can play it back polyphonically (maximum three voices) from the SK2100's keyboard, use it as an instrument in a rhythm pattern (preset or user-programmed), and do a number of other things with it. However, since it's not possible to play more than one sample back from the keyboard at any one time, you can't use your four memory locations to record the same instrument at four different pitches. In other words, you can't 'multi-sample' with the SK2100. So, depending on the signal you've sampled, the pitch range over which it can be played while remaining fairly realistic can be rather narrow.

Of those 'other things' mentioned above, the most interesting fall into the category of sample manipulation, rather than sample performance. You can loop your sample, reverse it, mutate it so that it follows a choice of five different envelope shapes, and transpose it up to eight semitones down or seven semitones up. The reversal and envelope procedures can be particularly rewarding, and

they're a cinch to use. There's no tricky LCD of values or monitor-full of waveforms to deal with here — just five drawings of different envelope shapes matched to five of the keys in the lower half of the Casio's keyboard; get into the right mode, press one of the keys, and your sample suddenly has a new envelope imposed upon it.

Looping on the SK2100 is done automatically by internal software, and though this means that it can be accomplished just as quickly as any of the other editing options, it also means that the finished product rarely complies with any legal use of the term 'glitch-free'.

Sadly, Casio hasn't made any provision for users to dump their samples as digital data for retrieval at a later date — even to humble cassette tape. They're retained in memory during power-down, but as soon as you put another sample into a certain location, the sound that previously occupied it is erased. Home-keyboard users may not want ultra-high sound quality, graphic editing packages or velocity-sensitive keyboards, but they sure as hell would like to build up a library of their favorite family samples. Wouldn't you?

## Conclusions

YOU MAY HAVE wondered, from the outset, why this magazine was even looking at a keyboard like the SK2100 in the first place. I hope I've made our reasons fairly clear during the course of the review, simply by outlining what the instrument is capable of doing.

First, it represents an excellent choice for the amateur musician who's keen to get into sampling, sequencing, drum programming and so on, but can't hope to afford to do so unless all those things are available within a single package.

Second, it is exactly the sort of instrument that domestic 'non-musicians' — people who at the present time do not have any particular ambitions to play modern music, but who may acquire them someday — to let their creativity loose a little bit more than instruments in the \$150 league will allow them. Casio has sold over a million of the baby SK1 sampling keyboard, and they know that the SK2100 players of today are the FZ1 programmers of tomorrow.

Third, it makes a fine addition to the arsenal of instruments possessed by pro and semi-pro musicians. It can be a practice keyboard for those last-minute, hotel room panics; it can be a handy tool for songwriters to map out simple arrangements of new material; and it can be a cheap and relatively painless way for, say, accomplished piano players to find out for themselves whether sampling really can be a musically useful technique.

So yes, the Casio SK2100 can be a toy. But it's also of great educational value, and it has a number of other aspects to its character that give it a broader appeal than most home keyboards could have aspired to a couple of years back. I for one am glad that it's around. ■

**PRICE \$699**

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# Peavey ED300

## Electronic Drum Amplifier

Peavey's latest offering – the formidable ED300 is one of the largest currently available drum combos. Can it make room for itself in a market that's growing rapidly?

Review by Nigel Lord.



**U**P TO A FEW YEARS AGO, the best clue you had to the line-up of an unknown band *before* they took the stage often came from the names next to the glowing mains lights on the back-line equipment. If you saw Marshall up there, you just knew there were going to be guitarists. If it was Roland, chances were there was a keyboards player. The presence of Trace Elliot would have pointed to a well-heeled bass player.

Of course, there were exceptions to the rule. A Yamaha logo, for instance, could have indicated the presence of a guitarist, a keyboards player, or maybe just the roadie's motor-bike. But the one thing you wouldn't have expected to find is the prestigious Peavey logo anywhere in the vicinity of the drummer. Until now, that is...

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Now, there's nothing *unfamiliar* about Peavey gear – even, I suspect, to drummers. But the recent launch of two combos – the ED100 and ED300 – represents the first chance these musicians have had to take up van space with their very own heavy black boxes bearing the Peavey name. Nevertheless, we're still talking about a name which is much more closely associated with guitarists – the current range of amplifiers having gained a particularly favorable reception from the twangy-twang brigade over the last couple of years or so.

It's the larger of the two units – the ED300 – which is the subject of this review, and certainly, if appearances are anything to go by, it's quite a formidable beast. In fact physically, it's probably the largest drum combo currently on the market, clocking in at an impressive 33"x24"x14¼". I say *physically*, since despite its dimensions, it is

only rated at 130 watts (RMS), which on paper certainly doesn't qualify as overkill, especially given its percussion applications. But as any audio engineer will tell you, a paper specification doesn't give you anything like the complete picture. Perceived volume can often be much higher than the simple measurement of output power would suggest. We shall see.

The speaker system – a Scorpion 15" low-frequency driver plus a CDH high-frequency horn – certainly looks well qualified to handle the requirements of electronic drums. Despite assurances from other manufacturers that the 12" units fitted in their combos are perfectly capable of taking the strain, I for one always feel more comfortable in the presence of a 15" driver.

Externally, though a rather unimaginative rectangular shape, the cabinet looks and feels immensely strong and well-made – as any attempt to lift it single-handedly confirms. This can be a double-edged sword, though. If it's portability you're looking for (after delighting in the ease of carrying electronic pads around), this is probably not the system for you; the ED100 looks a much better bet if you go for a hit-and-run stage approach. On the other hand, one of the immutable laws of acoustic design holds that big cabinets equals big (ie. deep) sounds, and no amount of clever design can really make up for this. So if your requirements lie not in great portability, but in quality of sound, the ED300 looks like the system for you.

But enough of this idle speculation. Let's look at what you get, and listen to what you get from it.

### Design

**CURIOSLY, FOR SUCH** a large system, the entire amplification section is contained within the top two inches of cabinet space. This somewhat 'compact' design is achieved by combining the eight EQ controls into four dual knobs (we'll come back to this later) and, more significantly, by limiting the number of input channels to two – Normal and Bright. Peavey obviously has other ideas, but I don't think this is enough.

The primary purpose of a combo such as the ED300 is to provide a small-scale but nonetheless complete amplification system for electronic percussion. And this really *must* include a minimum of three channels for the kick, snare and toms found on most kits. And optimum performance often demands the use of separate channels for every drum voice – not necessarily for balancing volume levels (as this can usually be done on the drum system's 'brain' anyway),

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but for independent control of external effects (such as reverb) and individual adjustment of EQ levels for each instrument.

Whichever way you look at it, you can't treat the sound of a kick drum in anything like the way you do the snare, or even the toms. Yet with only two input channels available on the ED300, this is precisely the limitation you have to work with.

The range of other facilities on the amp is thankfully quite comprehensive, and in addition to the obligatory Input sockets and Gain controls, we find the (four-band) equalization mentioned earlier, plus a combined effects send and return socket provided for each channel.

The inclusion of four bands of EQ per channel is certainly welcome, though it's difficult to understand why these controls had to be doubled up to four pairs of inner and outer knobs (inner control 1 for low, outer control 1 for low middle, inner control 2 for high middle and outer control 2 for high). With an overall cabinet size approaching some three feet, it seems incredible that a little more space couldn't have been found on the front panel to permit the use of individual controls for each frequency.

Don't get me wrong over this. The system as it stands works perfectly well, but it is all too easy to get momentarily confused with the control layout, and end up turning the wrong one - even more so, I'd imagine, in a live situation with bad lighting. Obviously, slider controls would have been better suited to this sort of 'mini-graphic' application, but even two rows of four rotary controls would have made life much easier. All musicians (and none more so than a drummer sat behind a set of drums) need to be able to check the control settings of an amplifier *at a glance*. Surely, the additional expense to make this possible on the Peavey's EQ section would have been worth it?

One area which has been given considerable thought is that of monitoring, and next to the Input Gain controls on each channel we find a further Level control which governs the amount of pre-EQ signal sent to one of two Monitor Out sockets on the rear panel.

One area which has been given considerable thought is that of monitoring, and next to the Input Gain controls on each channel we find a further Level control which governs the amount of pre-EQ signal sent to one of two Monitor Out sockets on the rear panel. Additionally, there's a Summed Monitor Out socket (also on the rear panel), which provides a combined signal from both channels.

The purpose of these connectors is to allow you to take either common or individual feeds from the two channels of the amplifier (before the sound has been altered by the EQ controls) to a mixing desk where it can be 'acted upon' by your trusted sound engineer, and then passed into the main PA system. Through this, the equalization settings chosen to suit your needs on stage are not necessarily inflicted on your audience, for whom the sound requirements may be totally different.

Now, if you're the type of player who insists on determining your own balance and EQ levels (leaving the guy on the desk to make of it what he will), you're also catered for in the MT MAY 1987

form of a Line/Recording output socket (again situated on the rear panel), which provides a post-EQ feed for the mixing-board for recording purposes.

Additional features on the ED300 include a Master level control, Slave In and Out sockets and an LED Compression indicator. Compression indicator? Yes, it seems that Peavey decided the system required some sort of protection from any 'harsh and harmful clipping distortion' which may occur, and so have designed a circuit which automatically compresses the sound slightly at anything approaching the onset of distortion. Given the wide variation of drum systems which could end up being used with the ED300 (and the attendant possibility of overload), this is a very worthy addition indeed, and certainly one which works well in practice.

Speaking of which, isn't it about time we switched on?

### Performance

WHATEVER MY RESERVATIONS about some of the design aspects of the ED300 system, they certainly don't tie in with the sound it produces. It's simply magnificent. At low frequencies it remains smooth and uncluttered - rapid kick-drum rolls fail to cause any irritation - while the definition and clarity maintained by the high-frequency horn really *lifts* every type of drum voice you feed into it. Also to be applauded is the range of control provided by the EQ sections, which prove very effective indeed, offering some real extreme effects at full cut or boost settings.

But perhaps most important, as with all good amplification systems, is the fact that whatever the ED300 does, it does *effortlessly*. At no time do you get the least impression things are working toward the edge of their tolerance. This is probably the effect of the cleverly designed compression circuitry, though I'd have thought it was also a result of using carefully matched components - particularly in the speaker system.

As I suspected, the quoted output power of 130watts RMS is rather misleading - the ED300 in full flight is one hell of a loud piece of hardware. Just *how* loud, is not something easily conveyed on the printed page. Suffice it to say, you'll have volume to spare at all but the largest gigs.

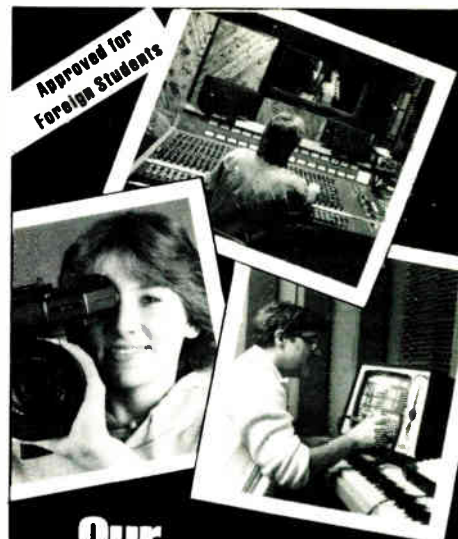
So, as far as it goes, the ED300 is a superb drum amplification system. It amply demonstrates how a company like Peavey, with long years of experience behind them, is able to develop probably the highest-quality equipment currently on the market in its category. Yet to an extent, it also demonstrates how specialized a manufacturer's expertise can be. Peavey obviously had no previous expertise in producing amplification equipment for electronic percussion, and this inexperience has shown itself in the design failings noted above. And it's those failings that make the ED300 a good percussion amplification debut, rather than an excellent one.

But where there's a good debut, there should be one hell of a follow-up. ■

PRICE ED100, \$379.50; ED300, \$599.50

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