SEPTEMBER 1987
USA $2.95
CANADA $3.95

MUSIC TECHNOLOGY

STEVE ROACH
Organic Synthesist

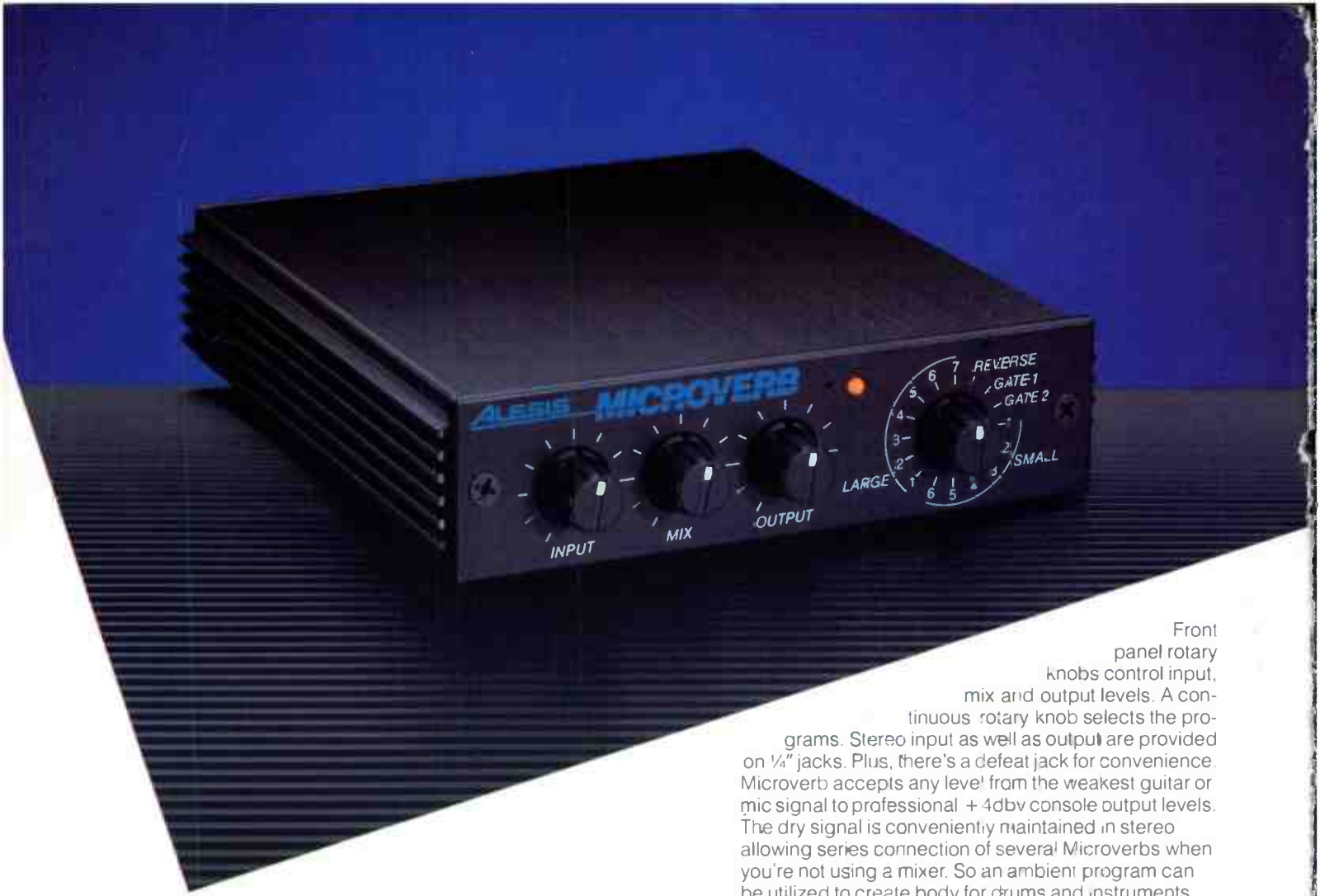
LEVEL 42 ASCENDS
Keyboardist Mike Lindup
Co-Producer Wally Badarou

REPEAT WHEN NECESSARY
Looping Explained

REVIEWS
Kawai R50 Drum Machine
Ioun Systems MIDI Fader
E! Board Version 2.0
Bacchus TX8IZ Editor/Librarian

IN BRIEF
Prophet 3000
Alesis HR16 & MMT8
Yamaha TX802

0 74470 19993 9 09



Front panel rotary knobs control input, mix and output levels. A continuous rotary knob selects the programs. Stereo input as well as output are provided on ¼" jacks. Plus, there's a defeat jack for convenience. Microverb accepts any level from the weakest guitar or mic signal to professional +4dbv console output levels. The dry signal is conveniently maintained in stereo allowing series connection of several Microverbs when you're not using a mixer. So an ambient program can be utilized to create body for drums and instruments through the first Microverb, and a plate, hall or chamber can be used on the second Microverb for a spacious reverb with smooth decay. In other words, Microverb is **instantly and effortlessly accessible...and flexible.**

The one third rack space extruded aluminum case is 19" rack mountable with the Microverb Rack Adapter. You can rack mount one, two or three or simply set them free standing on your amp, mixer or keyboard in only 5¾" of space. In other words, **you can take this digital reverb anywhere.**

And you will. Because like every other Alesis product Microverb is a breakthrough not only in design and performance but also in price. This means that you can afford to dedicate a Microverb to vocals, another one to drums, one for keyboards and guitars, and a spare for last minute creative urges. The sound of multiple digital reverbs (the sound you hear in every major record production done today) is now affordable to *anyone* who loves to make music. Your music deserves it.

FOR THE ABSOLUTE BEGINNER TO THE ABSOLUTE PROFESSIONAL ...THE ABSOLUTE BEST

In the few months since the Alesis Microverb was first released it has established itself as the new **digital reverb standard** in personal and professional music studios around the world.

Bold statements need factual support. How about these facts:

The design of Microverb is based on years of exhaustive research into the phenomena of spatial acoustics so that the sound of Microverb rivals even the most expensive digital reverbs. And Microverb has been nominated for the 1987 Technical Achievement and Creativity Awards of MIX Publications...other products nominated cost as much as 40 times more than Microverb! What's our secret? The heart of Microverb is an Alesis designed custom VLSI signal processing microchip using 16 bit linear PCM encoding with 90dB dynamic range. In other words, Microverb is **technically superb.**

Alesis digital reverb programs are legendary for their uncolored accuracy and warmth. 6 small reverb programs, 7 large, 2 gated and 1 reverse. Plates, rooms, halls, chambers, caverns and deep space. All these sounds are available to help you create deep, rich drums, lush strings and keyboards, super funky and tight rhythm tracks, or a brilliant sheen on lead instruments and vocals. Serious users tell us our reverb programs are the acoustic foundation on which they build their mixes. In other words, Microverb is **superbly musical.**

Don't settle for anything less. You can afford the absolute best.

Microverb's suggested retail price is $249. Alesis provides free educational materials and brochures to help you get the most out of our products and music processors in general. We encourage you to take part. Ask your Alesis dealer or write to.

LOS ANGELES:
Alesis Corp. PO Box 3908
Los Angeles, CA 90078

LONDON:
6, Letchworth Business Center
Avenue One, Letchworth,
Hertfordshire SG6 2HR

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Model **450-16**, 16 x 4 x 2, is a 450 with eight more inputs. The perfect 16-track production console with sonic quality you'd expect to cost three or four times more. Nothing else even comes close. **$1995.00***

And these are the sonic equivalent of duct tape.

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*Suggested retail prices are subject to change without notice.

VOLUME 2, NUMBER 2
SEPTEMBER 1987

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Cover photography *Ed Colver*

A .L THAT GLI TERS

ONCE IN A while it's likely that you'll walk up to a new instrument and wonder "Hmm...How the hell does *this* thing work?" Pressing the EDIT switch might not do what you expect it to. Adjusting the rotary encoder might have a different effect than you anticipated. Unplugging the thing might not turn it off... Well, perhaps things don't get quite *that* confusing, but the loops and curves that technology throws you can be pretty annoying.

How, then, are we supposed to come to grips with all the instruments we eventually come in contact with? I wonder if perhaps an understanding of how a piece of equipment works can lead us away from our original focus. After all, just because you understand how a sequencer works, or how to program a certain synthesizer, doesn't necessarily mean that your time is better spent recording your music, or creating your own patches.

For all its merits, technology is *not* the cure for all that ails you. It's a bit of a cop-out to go running out to buy new synths every time you find limitations in your current setup. As Steve Roach makes clear in this month's cover story, sticking with your instruments tends to pay off in the creativity department. When you jump from instrument to instrument, you're increasing your chances of missing out on a lasting relationship with a splendid instrument.

There is so much more to electronic instruments than many musicians catch onto in the shuffle to find the latest sound. There is a lot of character in many older synths, and getting to know these instruments can take years. It's sad to think that instruments can be so carefully designed for a unique "feel" of their own, and yet these wonderfully expressive instruments take a back seat to more current developments.

On the other hand, inexpensive synth modules often exemplify the amount of attention to detail that goes into software, usually without affecting the retail price. Clever MIDI features are great, but they don't amount to much if you don't have any controllers capable of taking advantage of them, or if you have to *look* for the obscure applications that will make these features more than gimmicks. I have nothing against extensive MIDI implementations, but it would be nice if life was made easier for the less technically-inclined user. Yamaha's decision to include 11 preset tunings on the TX81Z is an example of a simple and inexpensive path for musicians to follow through alternate tunings. (This month's article by Bob Rich on Just Intonation points out that the stage is being reset for new tuning systems, but that there is plenty of room for improvement if more musicians are really going to make progress in this area.)

It looks like quality still costs, especially if you're looking for high performance at the cutting edge of a technology. In the meantime, you could probably assemble MIDI systems to do just about anything you want them to, but you'd have to take the initiative and do all the research first. So, if playing music remains your primary interest, then dealing with the nuts and bolts of MIDI implementations is probably a nuisance you can avoid. Straight-ahead controls like knobs still have their place in the world, but they're likely to only be found on the more expensive new synths (or on second-hand gear, if you don't mind).

This is not to say that the most expensive instruments are always the better of the bunch, but that unless you look past some of the specs, and actually play them, you might never know the real difference between instruments at opposite ends of the price spectrum. At the same time, if nobody asks for sophisticated, but useful, features, they're likely to be forgotten. Now that MIDI has broken down electronic music systems into fairly standard modules, it looks as though the instruments you play have a new lease on life. Given the ability to buy this keyboard with that synth module, your chances of finding a great keyboard are improving.

Then there are all those MIDI control messages, and all the ways we can manipulate them to do what we want them to. It used to be that MIDI Out went to MIDI In, you played the keyboard, and voices sang. Now you can select a program on your keyboard, but transmit another. Then, a MIDI processor device translates that program number into yet another program number, while your synth at the receiving end performs one last conversion and selects the wrong program!

You now have three links in the MIDI chain that you can choose to adjust to get the desired result. It's nice to have a choice, but isn't there a chance that having that choice can act as yet another delay in getting from here to there. But these are the bells and whistles we gearheads are so used to demanding: more control, everywhere! Everywhere is where we end up finding these controls, sometimes hiding in a hidden utility page, waiting for that special moment when it can make its presence known to us all...

Maybe things aren't going to change overnight, but I'm willing to bet that we'll see some changes in where MIDI controls are concentrated in a system. I'm not guessing whether MIDI controls are going to concentrate in the master keyboards or in the synth modules, but eventually, the controls will have to land a bit closer to the musician's hands, even if this means an approach like Sequential's with their Prophet 3000.

All this new technology is out there right now because we need a selection. No "one size fits all" approach will do here, I'm afraid. Everyone has to find their own path through it all. Some will emerge intact. Others will look elsewhere next time they're looking for inspiration. As long as the music keeps coming out, either way is fine. ■

Stars shine brighter in Sunn light.

In light of all the rehearsing, planning, and plain hard work you do for a live performance, wouldn't you like to be seen as well as heard? Sunn thinks you would.

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So give yourself a break—to be sure that someone else does—and get a Sunn PLC 816 as part of your complete Sunn system. Because while you're out there playing clubs and concerts, so are thousands of other bands. But as everyone knows, stars shine brightest in Sunn light.

sunn

SUNN is a product line of Fender Musical Instruments Corp.
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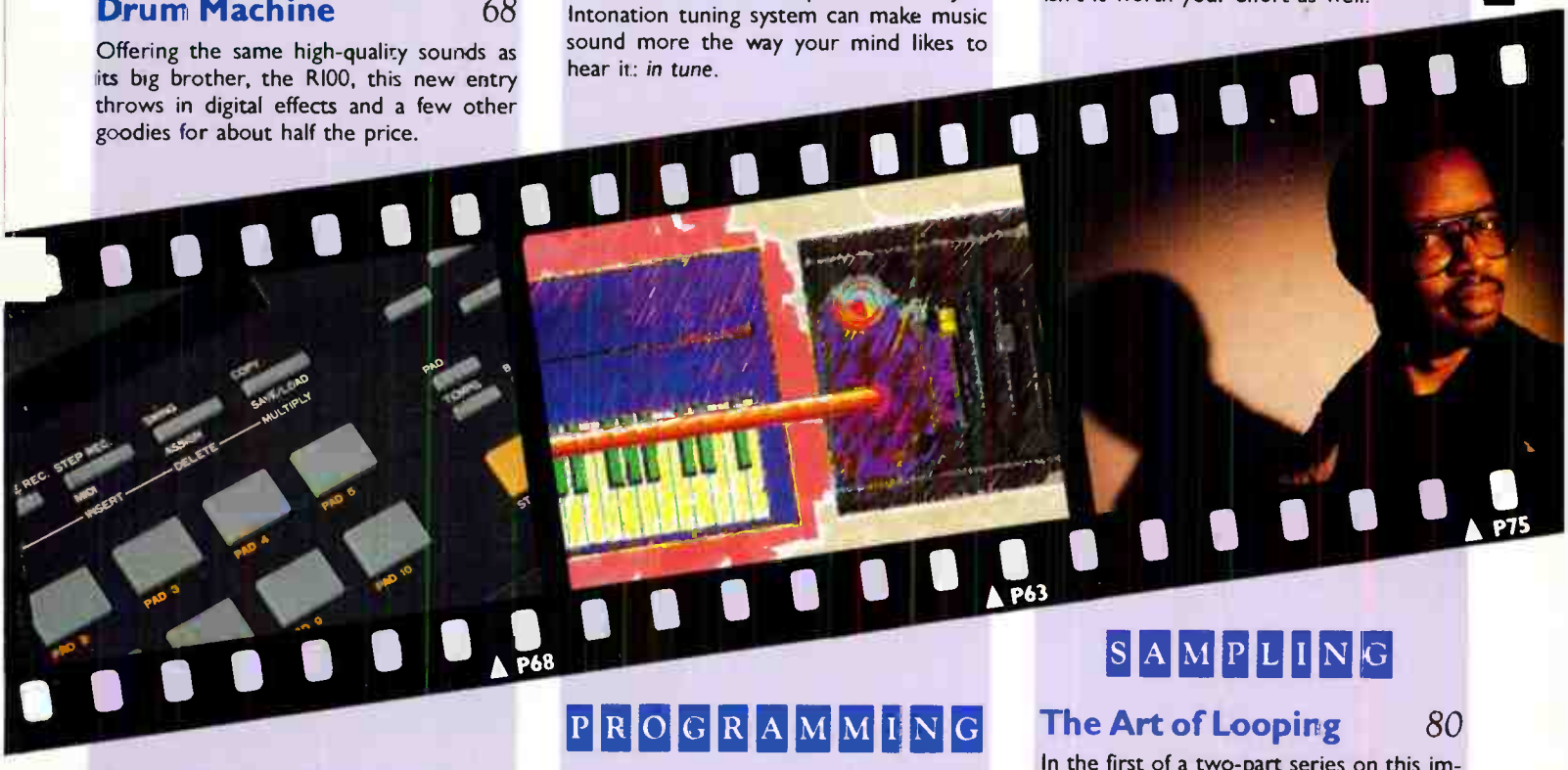
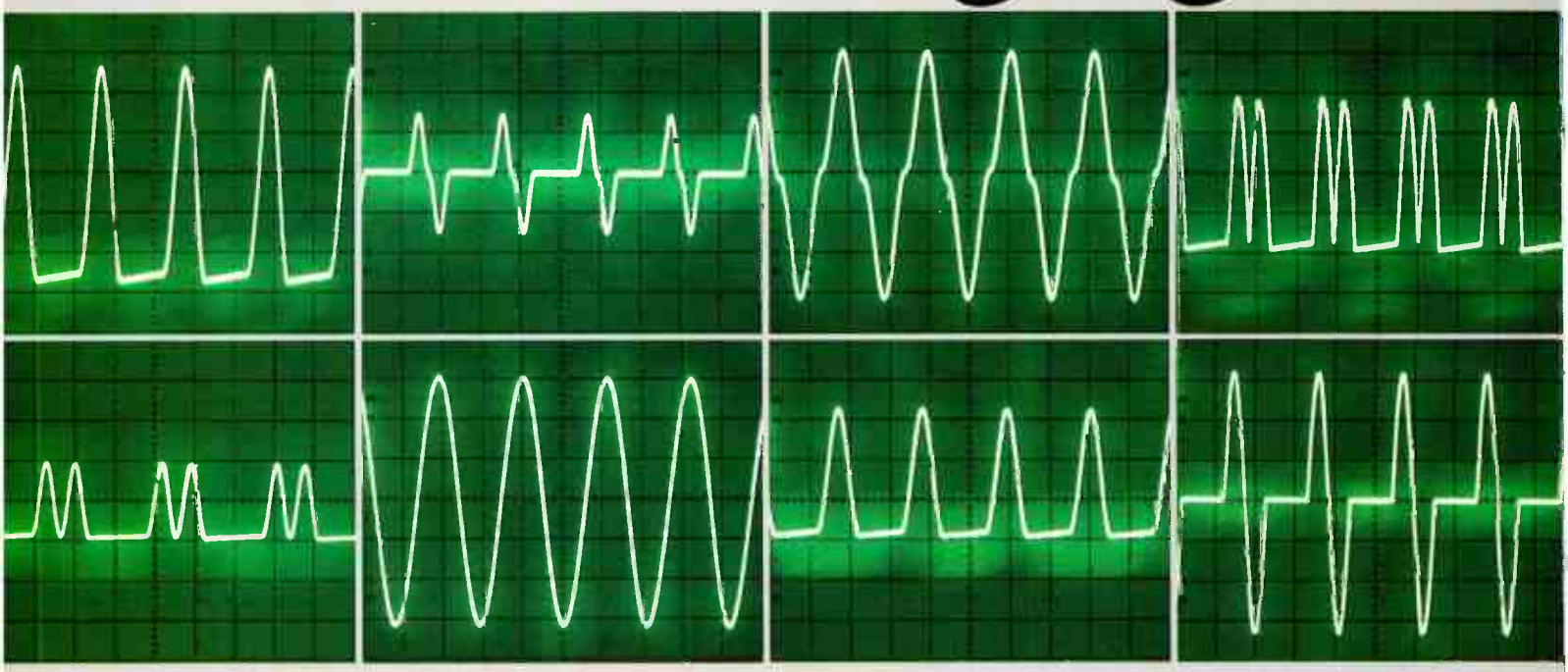


It understands more than sine language.



The new TX81Z is the first FM tone generator from Yamaha that offers eight different waveforms for each operator. So besides sine waves, now there are seven other exciting waveforms you can play with.

This not only increases the almost limitless sound possibilities of FM, it also gives the four-operator TX81Z a "six-op" sound. Yet the TX81Z is still compatible with other Yamaha four-operator synths and tone generators.

The TX81Z's Play Single mode lets you play voices with 8-note polyphony. There are five banks of 32 voices to choose from, including 128 preset voices and 32 user voices, programmable from the front panel.

Twenty-four additional performance memories let you play up to eight voices at one time. Instrument 1, for instance, could be a piano voice with 5-note polyphony while instruments 2, 3 and 4 could be monophonic voices. Note limits, MIDI reception channel, voice numbers, detune and volume settings for each instrument can be instantly changed in this mode.

Eleven preset and two user-programmable micro-tunings let you play a harpsichord voice, for instance, in authentic mean-tone temperament, or gongs and bells in Balinese gamelan scales.

And three effects including Pan, Transposed Delay and Chord Set (which assigns up to four notes to be sounded by a single incoming note) let you add greater expressiveness to your music.

And you get all this at a price that translates into a great deal.

Hear the new TX81Z FM tone generator at your Yamaha Digital Musical Instrument dealer. For more information, write: Yamaha Music Corporation, USA, Digital Musical Instrument Division, P.O. Box 6600, Buena Park, CA 90622. In Canada: Yamaha Canada Music Ltd., 135 Milner Avenue, Scarborough, Ont., M1S 3R1.

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NEWS DESK

SENTIENT SENSES PICK POSITION

A new guitar MIDI controller from Passac, the Sentient Six, boasts a unique pick position and pick direction sensitivity which permits these details of a guitarist's playing to influence the sound produced by MIDI synthesizers. The string sensors are integrated into a Kahler Tremolo Bridge System and utilize a patented "Delay Neutralization" process to provide fast tracking. The Sentient can also detect the distance of the pick from the bridge.

The guitar communicates individual string information to the rack-mount controller via a stereo cord. Continuous or semitone pitch-bend, as well as a three-octave transposition range, are controlled by the player. The unit also includes a programmable sequencer and delay unit and a built-in tuning mode.

The suggested retail price is $1245.

MORE FROM Passac, 759 Ames Avenue, Milpitas, CA 95035. Tel: (408) 946-8989

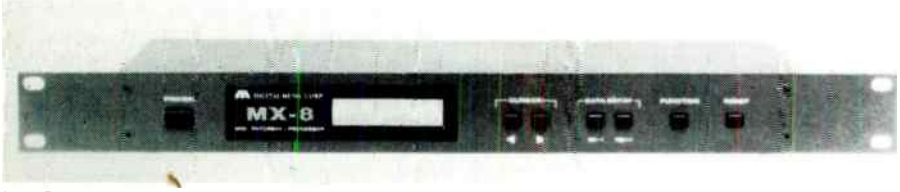
MIDI MODIFIER

Digital Music Corp. announced the recent unveiling of the MX8 MIDI Patchbay/Processor which combines a six-in, eight-out MIDI routing system with two MIDI data processors in a single rack space. Up to 50 routing and processing configurations can be named and defined, and recalled via MIDI program change or the front panel. A Reset button is also included on the front panel to shut off any stuck notes and reset controllers.

The MX8's processors can be assigned to any two inputs and can be used to simultaneously merge, transpose, filter, and channel shift any MIDI data. In addition, the processors can be used to set up velocity cross switches, velocity limits, mapping – which splits any master keyboard in up to four zones – and has two MIDI delays – which can be programmed in milliseconds or note value and tempo. The MX8 will also send out up to eight patch changes with each setup.

The suggested list price of the MX8 is $395.

MORE FROM Digital Music Corp., 21787 Ventura Blvd., Suite 124, Woodland Hills, CA 91364. Tel: (818) 704-7879



QUANTAR USES ULTRASONIC SCANNING

Beetle, Inc. has attempted to provide precise, instantaneous tracking of the position of fingers on strings with their new MIDI guitar controller, the Quantar. Rather than using conventional pitch-to-MIDI conversion, a patented ultrasonic scanning process senses string bending, damping, muting, hammer-ons, pull-offs or fretting.

The Quantar system comes as a complete package consisting of a MIDI converter, a guitar, and other accessories in a hardshell case, starting at $1000. A pickup and whammy bar assembly with the converter box is available for $699 and up.

The system is equipped with built-in foot pedal controls, continuous controllers, LED and LCD display, battery backed-up parameters and user-programmable patches.

MORE FROM Beetle, Inc., 120 N. Victory Blvd., Suite 101, Burbank, CA 91502. Tel: (818) 841-9922

FM AT THE MOVIES

Key Clique is offering a new video entitled *FM Made Easy and the DX7*, featuring Bo Tomlyn. Approximately 1hr/45mins in length, the video covers subjects relating to FM synthesis including algorithms, feedback, rate scaling, output level scaling, and function controls.

The DX7 is used to present musical examples, and chalkboard talks reinforce the discussions.

MORE FROM Key Clique, Inc., 3960 Laurel Canyon Blvd., Suite #374, Studio City, CA 91604. Tel: (818) 905-9136

NEW FROM AKAI

The ADR15, the first instrument resulting from the combined energies of Akai Professional and Roger Linn, is actually two products in one: a sampling drum machine *and* a full-featured MIDI sequencer. Touted as the "most user-friendly" MIDI ▶

► device available, it offers a 320-character LCD screen (eight lines by 40 characters) and a "Help" feature which provides a full paragraph of information on the function currently in use.

The sampling section offers a 40kHz sampling rate and 18kHz bandwidth, and up to 26 seconds of sampling time is available with the optional memory expander. The ADR15 is a 16-voice machine with up to 32 drum sounds resident at one time. The sounds can be mixed on the 32 input stereo drum mixer that is displayed on the LCD, or with a 32 input mono echo mixer with allows effects to be mixed with the drum sounds. Both of these mixers are programmable.

The sequencer section has a note capacity of 60,000 notes, and up to 99 sequences, each with 99 tracks, can be created. The individual tracks can be used for either drum or MIDI sequence data. The sequences can be organized into 20 songs, each with 256 steps. There is an "erase while recording" mode, as well as an "overdub" mode, and sequences can be manipulated by transposition or time-shifting. Editing functions include insert, delete, copy, merge, erase and step editing. Quantization can be applied both during and after recording.

There are two MIDI inputs and four independent MIDI outputs, as well as SMPTE timecode sync. The new MIDI Time Code is also available. Suggested retail price for the ADR15 is $4995.

Akai has also announced the addition of three products to its MIDI Effects line: The ME30P II MIDI Programmable Patch Bay, the PEQ6 MIDI Programmable Equalizer, and the MB76 MIDI Programmable Mix Bay.

The ME30P II is a four in/eight out patchbay which includes MIDI Merge (allowing multiple inputs to drive a single MIDI module). Memory has been expanded to 32 banks over the previous model, and a Bank Copy function has been added.

The PEQ6, a MIDI programmable seven-band equalizer, allows up to 32 banks to be programmed. The banks are accessible by the front panel bank switch, a footswitch, or by MIDI program change. There are six inputs and six outputs in this one-space rackmount unit.

The MB76 MIDI Programmable Mix Bay is a seven input/six output programmable audio patchbay. Each input has its own trim control, and input and output routing data can be stored in any one of the 32 banks. Bank changes can be implemented via the front panel, a footswitch or by MIDI program change.

MORE FROM Akai Professional, PO Box 2344, Fort Worth, TX 76113. Tel: (817) 336-5114

MIDI VISUALIZED

Soundware of Austin has announced the availability of a 45-minute video, *This Business of MIDI*, designed to bridge the gap between the typical equipment manual and a full-blown applications class.

Topics covered include binary and hexadecimal numbering systems, MIDI language structure, commonly-used MIDI messages, detailed descriptions of MIDI channels and modes, and a studio demonstration showing computerized sequencer use. A manual is included with the tape which presents a glossary of commonly-used MIDI and electronic music terms, a MIDI implementation chart, mode chart, and message chart, and a binary-decimal-hexadecimal conversion table.

The video is available in either VHS or BETA format for $39.95 (postage paid).

MORE FROM Soundware of Austin, PO Box 530242, Austin, TX 78753. Tel: (512) 339-6502

PITCH-TO-MIDI SOFTWARE

Advanced Software has come out with a new program – Sound, Song & Vision – which provides pitch-to-MIDI conversion at a fraction of the price of a hardware conversion system. Any monophonic sound

DIGITECH CONTROLS MIDI

Two new products from DigiTech, the DSP128 and PDS3500, have been added to their line of MIDI devices. While each operates independently, they can be combined to increase the control power over your MIDI gear.

The DSP128 is a MIDI controllable, multi-effect digital signal processor with 128 presets including reverb, chorusing, flanging, and delays. An LED display shows the program number in operation or displays the operating parameters when programming effects. Operating parameters of the 32 main algorithms may be changed by the user and stored in any one of the 128 memory positions. Programming is accomplished by use of the select and up/down increment buttons on the front panel, and memory settings are backed up by battery. There is also a master reset provision to restore the factory presets to the memory.

The PDS3500, a MIDI controller pedal, holds up to 1984 presets (64 banks by 31 presets). There are two operating modes, a bank/preset mode in which one preset at a time is transmitted and a bank dump mode in which all the presets in a bank are transmitted in order. Each preset consists of a MIDI program change number, a MIDI channel number and a pedal status number. There is a master reset function for clearing all of the entered presets, and the memory is backed up by battery.

When the DSP128 is connected to the PDS3500 (The MIDI Pedal), recalling presets is accelerated and many of the operating parameters can be continuously controlled. Adding the FX17 Wah/Volume Controller pedal allows access to all of the currently defined MIDI continuous controller definitions, including pitch-bend, modulation and volume.

The DSP128 lists for $399.95; the PDS3500 for $199.95.

MORE FROM DigiTech, 5639 South Riley Lane, Salt Lake City, UT 84107. Tel: (801) 268-8400; FAS (801) 262-4966; Telex 4943178

source will generate the voices, and the computer screen provides instant visual feedback of pitch accuracy. The program is capable of storing up to 30 minutes of input from each recording.

Frequency response ranges from 65-16,744 cycles per second. The program includes chord creating capabilities, allowing chords to be triggered by monophonic input. For each note, the user may define 0-4 notes and assign velocity sensitivity values to each note in that chord.

Hardware requirements include an Apple (48K) or Apple IIe with at least one disk drive, a Passport Designs or compatible MIDI interface card, a MIDI synthesizer, unidirectional microphone, standard or practice amplifier, and headphones or a stereo system.

The software lists for $95.

MORE FROM Imagine Computers and Software, 759 Ward Drive, Suite A, Santa Barbara, CA 93111. Tel: 1(800) 344-2964 in California; elsewhere Tel: 1(800) 626-1007

THE APEX OF THE ULTIMATE

The new APEX Column Keyboard Stand (AX48B) has been designed for live performance. It is a double-tier stand, and according to Ultimate Support can accommodate any size keyboard. Cord clips are a built-in feature which conceal cables from the view of the audience.

The APEX is a self-contained unit – the column itself is the actual carrying case for

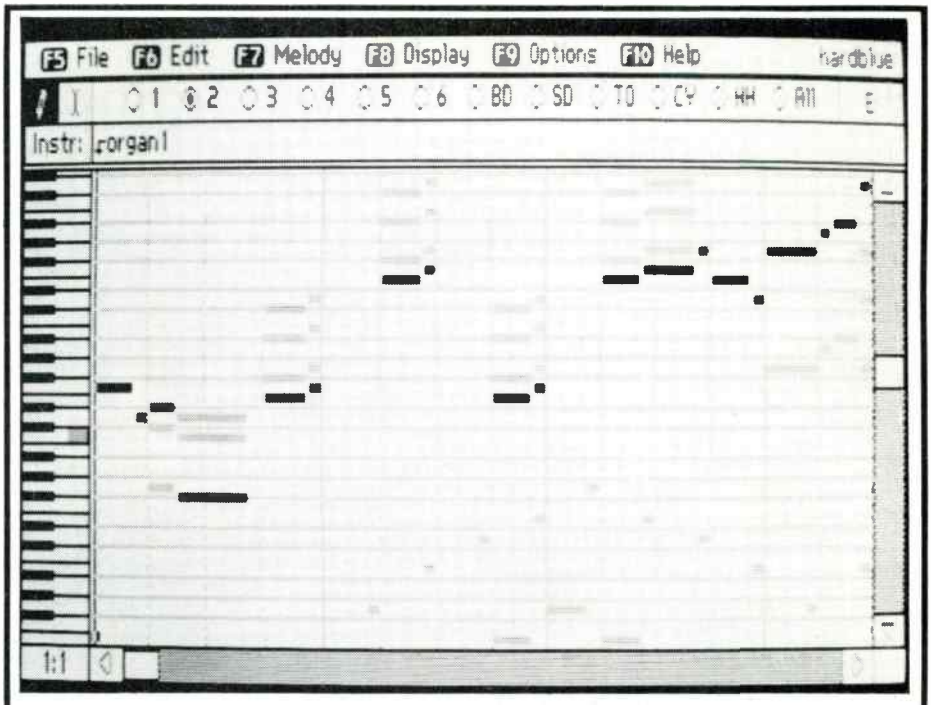
the stand. No tools are required for assembly. An optional "bra" is available to protect the column.

The suggested retail price for the stand is $199.99.

MORE FROM Ultimate Support Systems, PO Box 470, Ft. Collins, CO 80522-4700. Tel: (303) 493-4488.

SYNTH FACTORY SCULPTS EMAX

Sound Hound Software has announced the availability of a new disk for the Emax sampler: The Synth Factory. The disk features 95 performance patches (or presets), using 50 different digital waveforms, allowing individual tailoring of the "original presets." ►



IBM MUSIC SYSTEM ANNOUNCED

Ad Lib Inc. has introduced the Ad Lib Personal Computer Music System for the IBM PC, XT, AT and compatibles, consisting of a synthesizer card, a visual composer, a software package for composition and a song selection program.

At the heart of the system is the Ad Lib Music Synthesizer Card, a half-size card which allows creation and playback of up to six melodic and five percussive instruments simultaneously. The card features a headphone jack, an amplifier capable of driving a small speaker, and a built-in volume control.

Visual Composer is a musical composition program, enabling composition to take place by selecting an instrument and drawing a line across the screen. The vertical position of the line denotes the pitch of individual notes, while the horizontal length denotes the duration of the note. Volume, tempo, pitch and featured instrument can be modified on each track. Visual Composer comes with a number of preprogrammed instrument sounds, including drums, flutes, pianos and horns. The program accepts monophonic MIDI input for voice-by-voice editing.

Included with the System package are the card, user manual, program disk, ¼" to mini plug adapter, and a book explaining the basics of composing music. The suggested retail price is $245.

MORE FROM Ad Lib Inc., 50 Staniford Street, Boston, MA 02114. Tel: 1(800) 463-2686

► Versions for other samplers are also being developed.

The price of the disk is $34.95.

MORE FROM Sound Hound Software, 5339 Prospect Road, Suite 141, San Jose, CA 95129. Tel: (408) 866-0805

SYNERGY LIBRARIAN EDITS KORG VIA ATARI

SynthView, the new patch librarian and editor for the Korg DW8000 and EX8000 synthesizers and the Atari ST, is designed to provide easy editing and convenient storage. Fully GEM-based for point and click operations, the program allows patches to be named and banks to be printed out. Banks, as well as individual patches, may be sent and received from the synthesizer. Up to 180 banks may be saved and loaded from disk. A desk accessory is included which allows sending banks to the synthesizer within other GEM programs and sequencers.

SynthView works in both medium-resolution color and high-resolution monochrome modes. The cost is $49.95, plus $3 postage.

MORE FROM Synergy Resources, 754 N. Bolton Avenue, Indianapolis, IN 46219. Tel: (317) 356-6946

CX5M USERS GROUP

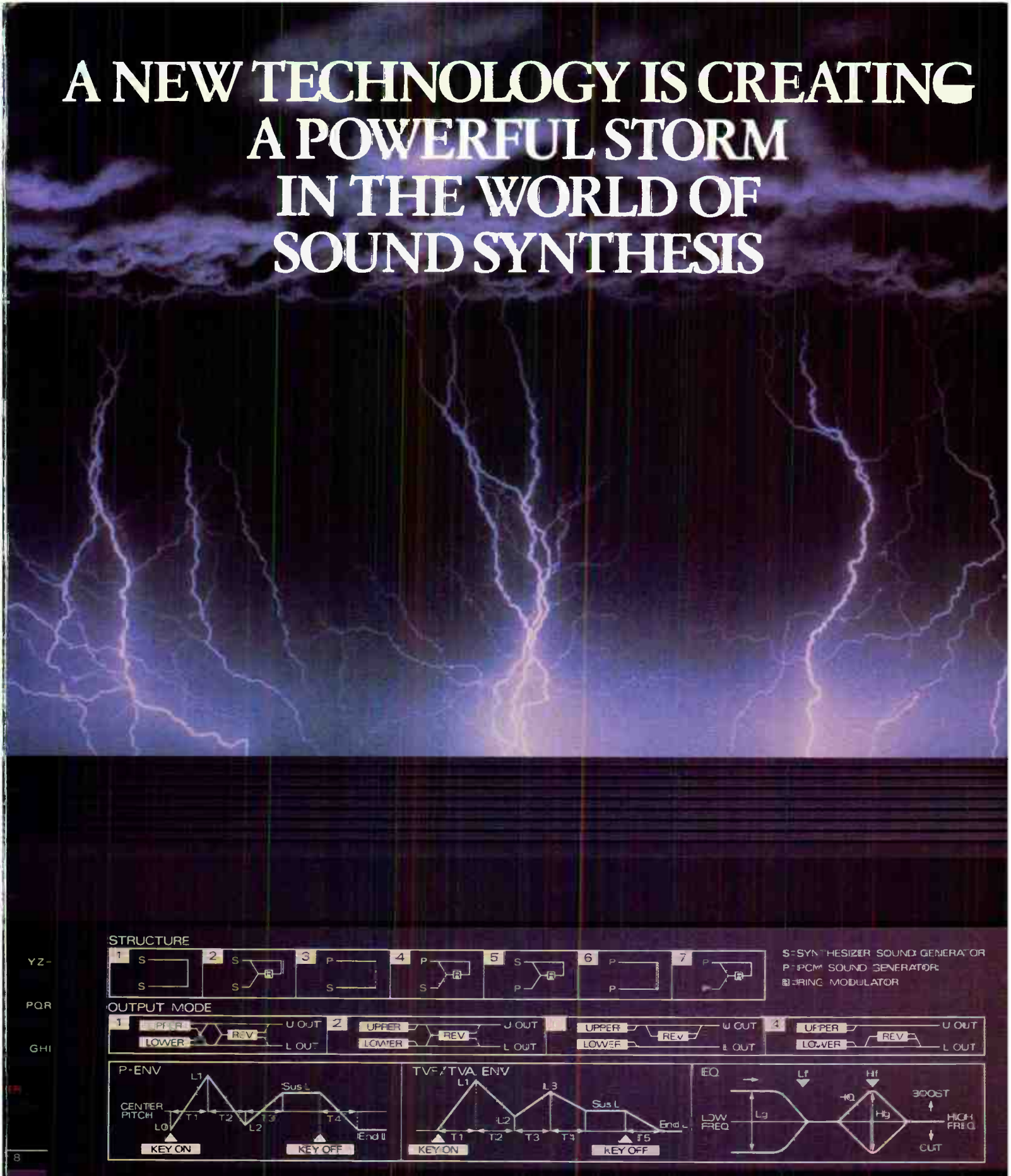
The New York CX5M User Group provides full support for the CX5M and other related products. A large library of software and patches are made available to members, and a newsletter is published.

MORE FROM NYCX5UG, 551 Central Avenue, Suite 22B, Cedarhurst, NY 11516. Tel: (516) 295-1427; Modem: (516) 295-0823 (Y.C.A.M.P. BBS)

SORRY STEINBERG!

In the rush to be the first past the publishing post with our NAMM report last month, one of our intrepid reporters slipped up in his report of the new range of software from Steinberg Research. The correct price of the Synthworks DX/TX program is $259, and not $350 as originally stated. ■

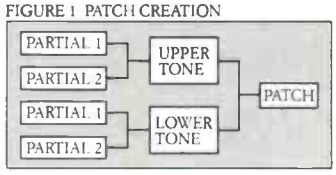
A NEW TECHNOLOGY IS CREATING A POWERFUL STORM IN THE WORLD OF SOUND SYNTHESIS



INTRODUCING THE D-5(
THE BOLD NEW FORCE IN DIGITAL

To the Player It's a Dream, To the Programmer It's a Miracle/Imagine a new technology that is so sophisticated that it offers totally new and unparalleled sound creation possibilities, combined with a programming method so logical that it actually builds upon the knowledge you currently have of sound synthesis. That is the essence of the D-50 Linear Synthesizer, a completely new, fully-digital synthesizer realized by Roland's Proprietary LA Synthesis Technology. The sounds created by the D-50 are simply breathtaking, resonating with character, depth and complexity, but with a warmth and completeness digital synthesis has never had before. The reason is that no sound has ever before been created in a manner so complex and rich with possibilities, and yet ultimately so very logical. Linear Arithmetic (LA) is normally used for computing complex mathematical problems in the field of science. In the area of sound synthesis it is an ideal creative method, offering superb predictions, analysis and control capabilities. Roland engineers have spent years developing a new highly sophisticated LSI chip, code-named the "LA Chip," that utilizes a linear arithmetic technique to digitally synthesize sounds. The "LA Chip" is the heart of the D-50.

FIGURE 1 PATCH CREATION



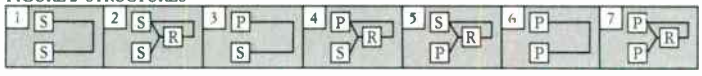
LA Synthesis Explained/LA Synthesis is component synthesis on the highest order. To create complex sounds, the D-50 starts with a very simple premise—build sounds from the ground up by combining different types of sounds together, and then experience the interaction of these sounds on each other. We start with individual elements of sound called Partials. Two Partials are combined to create a Tone, and two Tones are combined to create the Patch. (Figure 1) The D-50 can hold 64 Patches and 128 Tones. Each of the two Tones can be processed individually by on-board signal processing that is sophisticated enough to rival a rack-full of equipment, and includes digital reverb, digital parametric eq,

LINEAR SYNTHESIZER
SOUND SYNTHESIS TECHNOLOGY

digital chorus, digital delay and more. But before we go too far, let's get down to the basics, the building blocks of LA Synthesis—Partials.

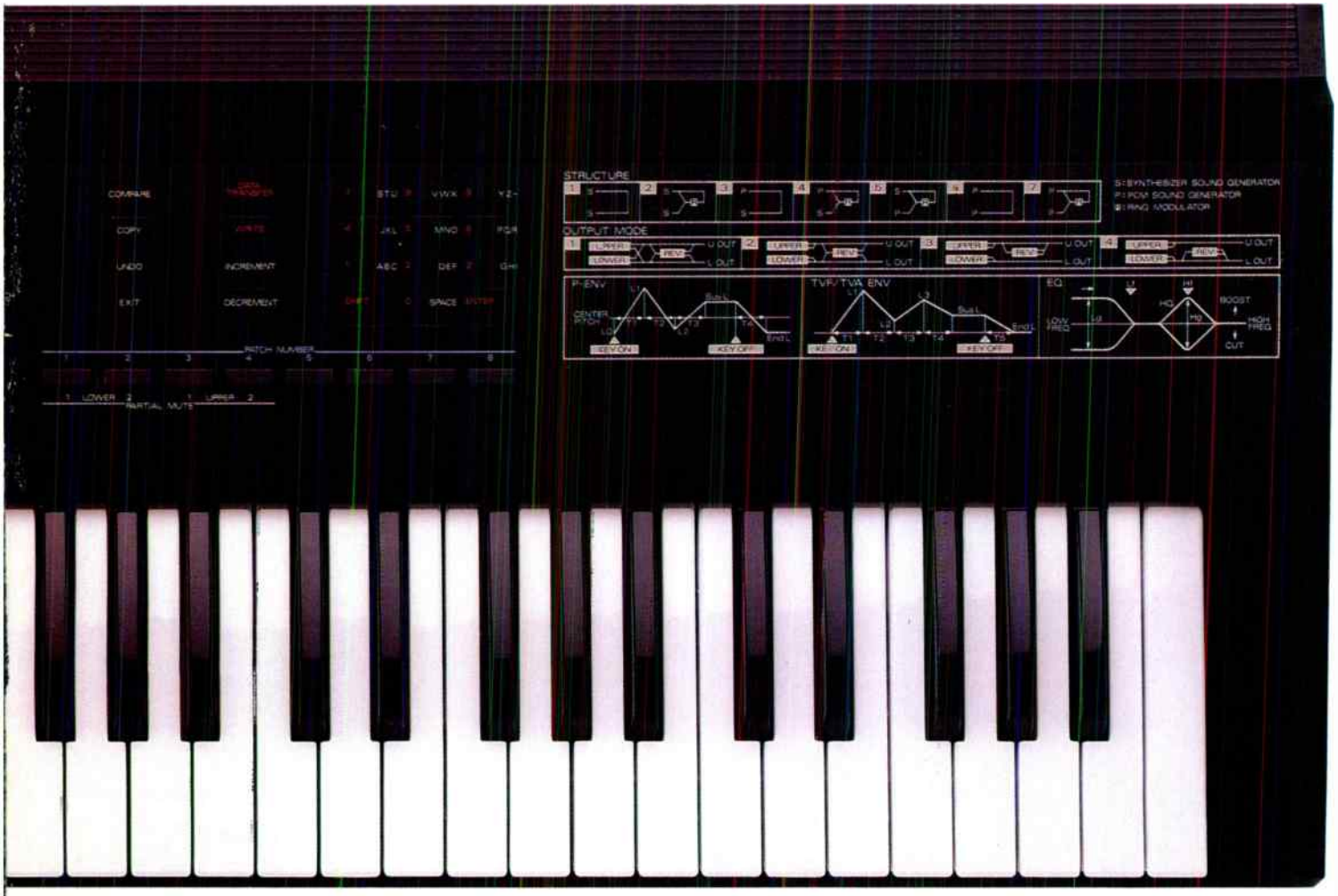
Synthesizer Partials/What is a Partial? A Partial can be either a digitally synthesized waveform, or a PCM sample. Each of the thirty-two Synth Partials contains all the components usually found in the hardware of an analog synthesizer, presented here as digital software. This includes the Wave Generator (to create a sawtooth or square waveform), the Time Variant Filter, the Time Variant Amplifier, three five-stage Envelope Generators and three digital LFOs.

FIGURE 2 STRUCTURES



In this way, even though the D-50 is a digital signal, programming the Synth Partial is very similar to programming on an analog synthesizer, (as these components react in the same way as VCO's, VCF's and VCA's on analog synthesizers) while offering sound synthesis capability beyond the most advanced digital synthesizer.

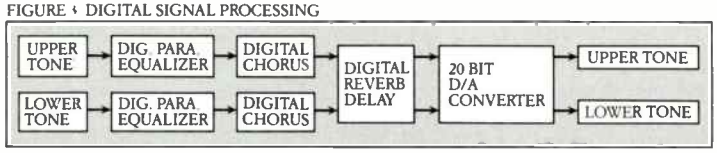
PCM Sampled Partials/A Partial can also be more than a digitally synthesized signal, it can also be a PCM sample. Resident in the memory (ROM) of the D-50 are over 100 carefully selected 16 bit PCM Sampled Wave Tables which can be used by themselves, combined with Synth Partials or combined with each other. The PCM Partials are carefully selected, and digitally processed so that they combine well with other Partials. Some of the sounds include a wide variety of the attack portions of percussive sounds: marimba, vibes, xylophone, ethnic instruments, grand piano hammer attack (with the fundamental removed), a variety of flute and horn breaths, a range of different string plucks and bows, nail files, guitars, and many more. The Wave Table library also includes Loop sounds and long samples, such as: Male and female voices, organs, pianos, wind and brass instruments, and also Harmonic Spectrum sounds, which are created by removing all of the fundamentals of a sound, isolating its harmonic components.



The sounds created by the D-50's PCM Waveform Generator are far superior to wave table samples found in other synthesizers, which are usually only one looped cycle in duration, and are usually no more than 5 milliseconds. In contrast, many of the PCM Partials on the D-50 are up to 256 milliseconds.

Structures/The combination of the Partials' operation modes can be set by selecting one of the seven Structures. (Figure 2) By choosing one of these Structures it is possible to combine two Synth Partials, or two PCM Partials, or a combination of the two in several different relationships. In addition, the Partials can be cross-modulated by the digitally-controlled Ring Modulator, which helps to create the complex harmonic environment for the resulting Tone.

FIGURE 1 DIGITAL SIGNAL PROCESSING



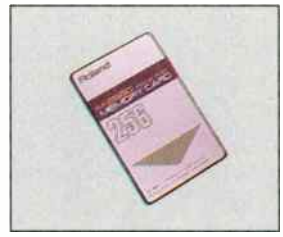
Unlike ring modulators of the past (which tended to be interesting yet unpredictable), the Ring Modulator in the D-50 is designed to track with the keyboard, ensuring the proper harmonic relationships as you go up and down the keyboard.

Built-In Digital Effects/The final routing of the signal before it reaches the output is through the digital effects circuitry. (Figure 3) But, far from being merely an add-on, the D-50's effects are as carefully thought-out as the rest of the instrument, and likewise just as integral to the creation of new and unique sounds. The first effect is the digital Parametric Equalizer, used to contour the equalization curve for the tone before it passes into the digital Chorus, or we should say Choruses, as the D-50 fields an arsenal of eight chorus circuits—all available simultaneously, configured in any of 16 modifiable presets such as panning chorus, tremolo, flanging and much more. Within each chorus there are parameters set up as to how these choruses interact for maximum effectiveness. Lastly, the signal passes through the digital Reverb, which can also function as a digital Delay, offering various room and hall sizes, gated (non-linear) reverb, reverse, stereo panning effects that can be routed to either or both of the stereo outputs. The awesome power of these built-in effects means that the D-50 requires literally no outboard effects processing. And just as important, because all the D-50's effects are processed in the digital realm, they are completely noise free.

PG-1000 PROGRAMMER

A Mother of a MIDI Keyboard/The D-50 is also an excellent mother keyboard for your MIDI system, as it is totally dynamic, offering 61 keys in four different key modes (Whole, Split, Dual and Separate). In the Whole mode the D-50 is 16 voice polyphonic, while in the other modes it functions as two 8 voice synths, one for each Tone. All mother keyboard functions are programmable per patch including a separate transmit channel. As the D-50 is truly bi-timbral it can function as two MIDI sound modules as each tone can receive on its own MIDI channel. All D-50 parameters and programs can be saved on Roland's new M-256D memory card which offers 32K bytes of storage in the size of a credit card. All of the D-50 functions can be programmed internally, or externally with the use of the optional PG-1000 programmer, which combines visual clarity and speed for the programming professional.

M-256D MEMORY CARD



Put It All Together/Taken as a whole, the D-50 represents more sound creation potential than most of the leading synthesizers combined. And just as important, it comes at a price that you can afford—$1895.00.* Of course, the only real way to find out for yourself is to play the instrument, but we'd like to suggest you do a little more. Go to your dealer, but before you try the D-50, try three or four other synthesizers first—really give them a good going-over. Then spend some time on the D-50. We think you'll find that the world of sounds you knew before, now seems to be black and white—while the D-50 has just exploded you into a universe of color. The new force has taken you by storm. RolandCorp US, 7200 Dominion Circle, Los Angeles, CA 90040 (213) 685 5141.

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*Suggested retail price.

READERS' LETTERS

Send any questions or comments that you may have to: Readers' Letters, Music Technology, 7361 Topanga Canyon Blvd., Canoga Park, CA 91303.

Dear Music Technology,

I am a bass player and a programmer, desperately looking for a sampling device for the IBM PC, and I wonder if you could help me.

I am interested in a professional tool, with 50kHz sampling rate and separate outputs, capable of syncing to the outside world. I believe such a product exists for the Atari 1040ST (ADAP by Hybrid Arts) and will soon be available for the Apple II (DS:4 by Greengate), but I can't find one for the IBM. I am all set and ready for the purchase, but can't find any product like the one I need. Your rapid help might solve all my problems. Please answer.

Lior Sa'ar
Tel Aviv, Israel

At this moment, we are aware of only one source for the device you're looking for: Design Science. Depending on your finances and needs, they can provide a 16-bit, two-channel board (approximately $4500) or a 12-bit, two-channel board (around $500). Before you jump on the $500 board, though, realize that you'll have to add a product like Music Magic (around $800) to enable actual sampling. More information from Design Science at 5245 Sale Avenue, Woodland Hills, CA 91364.

By the way, getting a letter from Israel really made our day! Thanks for writing.

Dear Music Technology,

I enjoy reading MT each month. I especially like the technical articles by Chris Meyer – his explanations of current technology in easy-to-understand language are outstanding. I also compliment you on being the most up-to-date of all the major music/MIDI magazines. If something is new and exciting, I can count on MT to have the first peek. However, I think one area that needs improvement are the software reviews. For example . . . .

In the review of The Copyist by Dr. T's Music Software your reviewer implies that both IBM and Atari ST versions are equally slow in printing out scores. Unfortunately, this is not the case. I understand that the Atari printer driver works about four times faster than the IBM driver, thus users of the Atari ST version will notice printing times drastically reduced from the figures given in the review.

Regarding the SMPTE Track review, perhaps some of your readers might be surprised to learn that the program isn't finished yet! From the absolutely, positively, glorious tone of the review I guess it doesn't matter since the reviewer implies that the program already does everything anybody could ask for. Or does it? The truth is that SMPTE Track's most impressive features are the affordable implementation of SMPTE synchronization and a wonderful real-time mouse interaction – an incredible achievement given all the GEM interface landmines. If your style is linear recording you'll love SMPTE Track. However I suspect anybody who has used Texture, Sonus Super Sequencer or Syntech Studio One knows better what true modular recording is made of. Sorry, but SMPTE Track was designed as a linear, tape recorder style sequencer. Sure, you can define a section, but you cannot easily and discretely create and manipulate parts.

Regarding the review of the Steinberg Cosmo editor, your reviewer never bothered to say what computer the program runs on, although I guess it's the Commodore 64. Your review concludes that the program suffers only in comparison with other CZ editors by Dr. T's and Hybrid Arts. Dr. T's sells two CZ editors for the Commodore 64. Which one were you referring to? And what features make it suffer by comparison? If the purpose of a review is to inform, then give me information. Further, I'm not aware of any Hybrid Arts editor for the Commodore 64. Comparing Cosmo to editors running on the Atari ST is pointless.

Michael Reid
San Antonio, TX

Apologies for omitting to mention which computer Steinberg's Cosmo runs on (reviewed MT June '87) – you're right, it is the Commodore 64. As for which Dr. T's program we were referring to, it was in fact their CZ Patch Librarian, which we felt scored over Cosmo insofar as it also had rescaling features, envelope copying, and a sequencer option which will play a tune while you mess about with the sounds.

Dear Music Technology,

In regard to Chris Meyer's article, "Sample Dump Standard," in June's MT, he stated that the Akai X7000 and S900 were not able to dump a sample over MIDI unless you send a MIDI dump request over MIDI to the instrument. This is not correct, and I'd like to explain how this can be done from the front panel. There is also a new software update for the S900: Version 2.0.

First thing you should do is add the optional ASK70 memory expansion board to the X7000. You can load 16 samples in, and you still have six-note polyphony. Hook your two MIDI cables to both instruments. Load a sample that you want to send to the X7000 into the S900, go to Edit Mode (shorten the sample to 32752 and reloop if necessary), press the 0 button, On/+ button, Off/– button simultaneously, then the down arrow button. The X7000 should hopefully say, "Receiving sample 1." Save the sample to a 2.8 disk and proceed to send over more samples and arrange them into programs.

It is also possible to send samples over to the S900 from the X7000 by pushing the bottom six black keys one at a time (starting from the bottom) and holding them down while you press the save button on the X7000. This can be very useful for backups, for further editing and for using the S900 in finding the perfect loop. The usefulness and samples of my X7000 have been greatly improved because of the ASK70 and the MIDI sample dump procedure.

Bob Lewin
Bartlett, Tennessee

We didn't get the opportunity to try out this procedure, but we'll pass it along for our readers to try.

Chris Meyer responds: "I'm glad that you have found a way to do it. I called IMC, and they told me there was no way. Of course, even if your solutian works, it does not address the issue that SDS was incorrectly implemented in the first place. I haven't tried the 2.0 software, but I'm happy that it works for you."

Dear Music Technology,

I am interested in corresponding or talking with anyone else who uses the Fairlight instruments. I work with a Fairlight III, but I'd like to hear from Series I, II and IIX users as well.

You can reach me by mail at 2563 Monterey Ave. S, St. Louis Park, MN 55416, or by phone during work hours at (612) 344-8528.

Jean Nelson
St. Louis Park, Maine

Hope you get good response! ■

IOTA SYSTEMS
MIDI-FADER

Iota Systems' first music-oriented product brings performance and affordability to fader automation. *Review by Scott Gershin.*

HOW MANY TIMES have you said to a loved one or heard from a friend, "I *promise* I won't try to sell the dog, the kids, or your mother again, and I *promise* this is absolutely the last piece of equipment I'll ever need to buy for my set up."

Well, I have some good news and some bad news. The bad news is: a new wave of MIDI products will soon be arriving in your local music stores. The good news is: the prices for most of these products are low enough for us MIDI maniacs (and those soon to be MIDI addicts) to afford.

One of these products is an eight-channel MIDI-controlled fader package called the MIDI-Fader from the folks at Iota Systems. In the past, fader automation systems for the common synthesist weren't even worth dreaming about because of the huge price tag that accompanied such a product. Well, someone must have written to Santa (or, in this case, Iota) because something that was ungettable is now gottenable.

Fader automation gives the user the ability to store all the level changes that occur during a mixdown session. If you like everything in the mix except the fade out, you can update the information and just redo the fade instead of trying to remix it again – only to find out that the level of the bass synth is too low. I think you catch my drift.

About The...

MIDI-FADER CONTAINS eight MIDI-controlled attenuators that can attenuate from 0-80dB using the front panel dial or by using a MIDI controller (which we'll get to later). The front panel is simple and easy to use. The back-lit LCD display shows each of the eight fader levels and a dB readout of the selected fader that you are programming. Each of the faders can be assigned to a different MIDI channel, and you have the choice of storing information as velocity info or controller info. All this information is stored on your sequencer in real time or by the numbers.

The front panel of the MIDI-Fader consists of six buttons: solo, mute, up, down, enter, and mode select. The solo button enables you to listen to the fader you are working on while muting the remaining faders. This is the only button that can't be controlled by your sequencer. It is meant as a quick way of previewing the fader while not having to mute each fader individually. The Mute button programs fader mutes for each of the eight faders. This can be done in real time or in Program mode. As with each fader, each of the eight mutes can be assigned a different MIDI channel and controller number. When a fader is muted an "M" appears instead of the fader number. The Up and Down buttons take you through each of the faders and through the different menus of each mode.

There are four modes – Display (which I just covered), Program, System Exclusive (program dumps), and Set Up (assignment of MIDI channel and controllers to a specific fader).

Program mode is just that. It can store up to 128 different programmed settings enabling the user to call up a specific set of levels instantaneously. Don't get this mixed up with recording fader changes in real time and playing them back; Program mode just allows snapshots of time to be used for any purpose needing instantaneous change. All the programs are saved even when the machine is turned off and can be stored on your computer using a librarian program.

To finish off the list of specs, the backpanel consists of an external power supply, eight stereo ¼" (phono plugs) for the use of inputs and outputs, and MIDI In/Thru/Out jacks.

Put To The Test

WITH CABLES IN one hand and manual in the other, I entered my studio with no compassion, no mercy, determined to test every inch of this device (OK, in reality it took only a few minutes to find an available outlet and figure out the new wiring scheme).

I took a few moments to read through the manual, which I found to be very straightforward and comprehensive. I will state for the record that good manuals are hard to find, and this is one of the better ones. For the MIDI computer hacker, they supply the formats of the MIDI-Fader's various data types and MIDI implementation.

There were some problems hooking everything up. The MIDI-Fader uses stereo ¼" connectors for the inputs and outputs. The purpose for this type of format is to be able to interface to the send/receive jacks in the back of your mixer. I'm not quite sure I agree with the format but Iota will sell you stereo to mono Y cables (three ¼" male connectors – stereo tip as MIDI-Fader input, one into keyboard and one into mixer) at $7.00 a piece. This allows you to

connect your keyboard into the MIDI-Fader and back out into your mixer.

The cables are approximately four-and-a-half feet in length from the keyboard to the MIDI-Fader. Most of them were about 6" too short from my rack of keyboards if set next to my mixer, so it was time to rearrange the room. I suggested that Iota create a female connector on the input cable so the user can interface quickly and easily with the unit; they said they would consider it. For those of you with some time and a solder gun, the manual supplies a wiring diagram to help you to build your own cables. I suggest that before buying this unit you make some decision on how you want to interface the MIDI-Fader to your own setup.

Operation *"MIDI-Fader contains eight MIDI-controlled attenuators that can attenuate from 0-80dB using the front panel dial or by using a MIDI controller."*

Once everything was hooked up, I loaded in a sequence from my sequencer and started to program each fader to a separate MIDI channel. This is where I feel the MIDI-Fader excels.

You can choose two modes of storing information on your sequencer. First as velocity information, where the volume is determined on how much velocity is played on the keyboard. That could be tricky to control accurately. Second and most effective is the ability to send information through the MIDI control lines. Since there are only 16 MIDI channels, to assign each fader to a separate MIDI channel would quickly use up all the channels and create problems. What Iota suggests is to assign each fader to the same MIDI channel as the synthesizer. (Example: DX7 MIDI channel #2 goes through fader #1. Fader #1's information is also sent to MIDI channel #2.)

By assigning an unused controller number (64=sustain pedal, 1=mod wheel) such as 127 for fader info and 126 for muting info, you won't run the risk of interfering with actual keyboard information. Once in the computer you can merge tracks or dedicate a number of tracks on your sequencer to MIDI-Fader info.

Once the MIDI-Fader information is recorded into your sequencer you can manipulate and edit those numbers just like you would keyboard information (assuming your computer allows editing control numbers, patch change, and velocity). I think Iota really did their homework here, and the feature for using an available MIDI control channel is a feature that should not go unnoticed.

So how does it work? It's easy. Once you've selected all the right number configurations and MIDI channels, and decided whether to have white bread or rye on your corned beef sandwich, simply go into record on the track you've selected (after choosing what fader you want to start with) and use the dial to control level changes "in real time." Then play back the track and see how your mixing performance was. Remember, you can always punch in and out of a section if your performance wasn't quite to your liking (or edit by the numbers).

If you find mixing one fader at a time too tedious, then you can create 128 different level configurations and insert them where you wish. The patch configurations can also be combined with the programmed information previously recorded in real time. I preferred to enter in each fader separately and use the program patch for drastic effects and sudden volume changes, since 128 different settings can be used up very quickly if mixing solely in program patch information.

So the man in the back of the room yells, "But how does it sound?" In my tests I compared the sound of the synth in and out of the chain of the MIDI-Fader and found no degradation in sound quality. However, I must caution you that when entering in level changes I noticed a high frequency digital gurgle bleeding into the audio signal. I suspect that the gurgle is the MIDI-Fader sending updated digital information which is bleeding into the audio signal. The low level crackle only occurred during actual level changes. I found that by bringing down the

STUDI

► individual faders on my mixer to 25% and bringing up the master fader to full, the digital gurgle was not as audible.

Since the MIDI-Fader uses a 12-bit DAC, the system is a bit noisier than if a 16-bit DAC was used. Iota informed me that using the 16-bit DAC the unit would almost double the price and that their objective was to create a unit that most people could afford.

I hate to say it, but "You get what you pay for." Fortunately, the prices of most products are dropping.

STUDIO

Nothing Up My Sleeve...

BEFORE CONCLUDING, I want to point out an array of tricks and slick applications I found for the MIDI-Fader.

In one test I used the MIDI-Fader to control the sends to my reverb and two other faders on the reverb returns. I was able to achieve sweeping reverb effects and used the muting feature for gating the returns to get a gated reverb sound. I did this with other reverb settings and achieved inverted reverb feels and a variety of other interesting effects.

In another test I used the MIDI-Fader as a variable VCA to automate different attack rates without having to change anything within the synth itself. That can be useful, especially when setting up multi-timbral patches in which you might want different synths to start and end at different times and rates.

The muting features can be useful in eliminating or adding different musical phrases without actually changing the data on your sequencer.

Sound *"I compared the sound of the synth in and out of the chain of the MIDI-Fader and found no degradation in sound quality."*

In the hardware mod category, I opened up the MIDI-Fader to take a look under the hood and noticed that there is enough room to install eight more connectors if you want separate input and output jacks. Unfortunately that will probably void the warranty; the decision is up to you.

For the MIDI couch-potatoes who refuse to get out of their chair to interact with their equipment and can't afford rollers for the chair, you can assign your mod wheel a pedal or keyboard controller to the same controller channel that your MIDI fader is assigned to and use your keyboard to enter in the fader levels. (This can only be accomplished on a keyboard that has the capability to assign keyboard controllers to a specific controller channel.) That can be really useful to keyboardists in a live situation where they want to create a fade in or out for their keyboard setup by using the mod wheel or a pedal controller.

The MIDI-Fader can also be connected to the outputs of a tape machine to control pre-recorded material as well, while having the sequencer sync to tape. By adding two or three MIDI-Faders both your pre-recorded material and sync'd sequencer can be totally automated; all you have to do (after hours of programming and recording) is press play. In studio situations, that can save a lot of mixing time and money.

Conclusions

SINCE I'VE WAITED until the conclusion to mention the price, I want to note that a product should be able to hold its own and not fall under the category of "Well, what do you expect for that price?" The MIDI-Fader sells for about $500 and gives the user a lot for the dollar. If used creatively, it can help open up other dimensions in sound design and creative mixing. For those of you that cannot tolerate any background noise whatsoever, no matter how indistinguishable, I suggest that you check out this unit very carefully before purchasing it; it may not be what you want. But for the rest, I feel that the MIDI-Fader is the beginning of bringing the technology of fader automation to a price that the average consumer can afford. ■

PRICE $499

MORE FROM Iota Systems, PO Box 8987, Incline Village, NV 89450. Tel: (702) 831-6302

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But for all its sophistication, the K5 is easy to master. It creates sounds the same way nature does. So you can just use your ears and the full-sized LCD display.

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And the K5's system of dynamic allocation deploys voices where they are needed, when they are needed.

With the KAWAI K5/K5m Digital Multi-Dimensional Synthesizer, you're in control. KAWAI's combination of additive synthesis and flexible voice allocation will make you the master of your musical craft. Visit your nearest KAWAI dealer and find out how the K5 or K5m can bring your sound to life.

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PROGRAMMING

we can't go on
BEATING LIKE THIS
part 6

Illustration *Stuart Catterson*

Our voyage into the land of alternate percussion controllers gets curiouser and curiouser, as three of the most imaginative instruments in the market are surveyed in this, our sixth installment. *Text by Matt Isaacson and Chris Meyer.*

WE CONTINUE THE safari we started last month into the world of exotic and unusual percussion controllers with three instruments intended to be shaked, rattled, and rolled – Palmtree's Airtriggers and Airdrums, and PKI's Gun Drums.

As implied, rather than being attempts at copying guitars, marimbas or pads, these are controllers that are closer to percussion toys in concept. They are all hand-held, and the direction you shake them in (along with some other sundry settings, such as the last button depressed or program selected) decides what they do to the connected equipment. Without much further ado...

Airtriggers

THESE LITTLE BEASTIES are the electronic equivalent of Airdrum sticks. They are metal tubes about 7½" long and 1½" in diameter that you swing at the air. At the end (or beginning, depending on how you hold them) of your swing, they send a pulse out a ¼" jack on one end. This trigger is then processed by the trigger-to-MIDI converter of your choice (in the same way as the drum pads we discussed two months ago) and plays any sound of your choice. They are covered with thin, grippy foam rubber, and have a good weight and feel. A slight ridge running the length of the tube serves to help orient them.

How many times have you acted out the drum parts to a tune (on the radio or in

your head) by swinging around at imaginary objects and making little "boosh" sounds? At first, Airtriggers seem to be able to make that fantasy a reality, but they require a bit more discipline than that. If you grab them as if they are bones or hammers to swing and throw about in the air (still holding on to them, of course), you'll be deluged with a seeming random hash of triggers. Cradled between thumb and pointer finger and shaken – either hit on the bottom with the middle and ring finger a la drum sticks or by the wrist or forearm so that they rebound against the palm of the hand – they respond much more nicely. With a little practice, it's possible to play them very quickly and still maintain a good deal of control over dynamics.

"Trying to use Gun Drums like drum sticks can be frustrating, since they require a different motion; but once you picture what's going on inside, they become easy to play."

Since they are merely being moved, as opposed to being used to hit a non-moving object, they are arguably easier to play than drums (for non-drummers, that is), since one can concentrate on timing instead of aim. However, where it is possible to swing at many drum pads with one stick, only one trigger (and therefore, for all practical purposes, one sound) can be played per hand with these tubes.

Inside, there is a nine-volt battery that unplugs itself when the cable is disconnected. A very flexible cable is provided with each trigger, and this is important – standard guitar cords are too heavy and inflexible, causing problems with backlash when trying to play the triggers quickly. You also have to be careful of any extraneous movements, which can accidentally be interpreted as a swing – it's embarrassing to get a massive snare or ride cymbal while merely stretching.

It's worth mentioning that we had a little trouble with reliable triggering with some trigger-to-MIDI converters. We looked at what was coming out of the tubes on an oscilloscope, and called Palmtree about the problem. They in turn gave us a list of converters they had already tested the Airtriggers with, and the next day sent us a new pair of tubes modified to work with the interfaces we mentioned. One cannot over-emphasize how valuable that level of concern and service is.

Are they a replacement for pads and sticks? They are a good deal smaller and lighter, and make no noise by themselves. Perhaps a pair of these and a kick pedal driving an inexpensive trigger-to-MIDI converter (for a rundown on a variety of such converters, see the June 1987 installment of *Beating Like This*) would be good for someone wanting to lay down more physical drum tracks on a sequencer than a keyboard will allow, with a minimum investment. And something can be said for their theatric value, or for giving the lead singer something to do while the drummer is soloing (on second thought, better keep them away from the singer).

However, they really aren't a replacement for a kit of pads around you with a variety of sounds to swing at. To use a variation on a tired phrase, *you'll* have to figure out exactly what you intend to accomplish before buying them.

Photography Scott Peer

At the top of the evolutionary ladder rests the Airdrums, complete with a powerful MIDI controller.

PKI Gun Drums

A STEP UP the evolutionary (and price) ladder from the Airtriggers, the Gun Drums consist of two palm-sized hand-held grips, festooned with buttons that connect to a small black box with a belt clip. This in turn connects to a small box with jacks for MIDI and a wall-mount power pack. There are three additional jacks on the belt pack (which may also be placed on the floor – the cables provided are long enough); these are for footswitches to trigger kick drums or hi-hats. There are metal balls inside the grips that are shaken around – by shaking them forward, they trigger sounds over MIDI (and as would be expected, the harder the shake, the higher the velocity transmitted along with the notes).

There are six buttons on each grip, just where the fingertips reach, and two along each top. The inside buttons decide which sound that grip will trigger, with one button on the right-hand grip setting both grips to the same sound (simulating two stick rolls). You don't have to hold the button associated with the selected sound per grip – it remembers it – but each grip can only trigger one sound (a slight shame in these days of layered mondo sounds, but then again that's all one can hit with one *stick* at a time). One of the buttons along the top, if held, puts the grip in a mode where both forward and backward strokes trigger sounds. The other one is used to adjust the grips' velocity range (one hand raises, the other lowers it).

There are eight preset mappings of grip buttons to MIDI notes, selected by a set of three tiny DIP switches on the side of the belt pack. The buttons may not be reprogrammed by the user (again, a pity, but allowing such would have most definitely added to the complexity and cost of the Guns), but they do map to a good variety of drum machines, and you could always map the sounds on a sampler to match. The footswitches are of the standard variety and are not velocity sensitive, but

The Airtriggers from Palmtree Instruments are the equivalent of Airdrum sticks.

PKI promises a velocity sensitive kick pedal in the near future.

One quick warning of a problem that may be solved by the time you read this – the Gun Drums do not send a MIDI note-off, just a note-on. The vast majority of drum machines will not have a problem with this, but with samplers and synthesizers this will leave notes indefinitely hanging and even confuse some voice handlers (and sequencers). PKI has been alerted to the problem and promises to put in note-offs before shipping.

How do they play? Rather well, actually. They fit comfortably into the hand and can be played very fast. They take a very positive move to trigger, which can be a touch fatiguing after a while (then again, so is real drumming), but this does avoid the "accidental trigger" problem.

Trying to use them like drum sticks can be frustrating, since they require a slightly different motion. But once you can picture what's going on inside – you are throwing a little ball against the front wall of the grip – they suddenly become easy to play. The non-drummer of us two adapted more quickly, but in general, they were a real gas to use.

So, what we have here is control of a full drum kit with just two small "pistols" and a pair of footswitches – very small, portable, quiet, responsive, and not that expensive. The sound selector buttons are a little small and close together, but can be learned without undue hassle.

Overall, Gun Drums present a very viable tool for a non-drummer who is ready to use something more like drums to program percussion parts.

Palmtree Airdrums

EVEN ANOTHER STEP up the price and evolutionary ladder is Palmtree's flagship product, the Airdrums (see the In Brief preview in MT, December '86). The set consists of a pair of hand-held tubes similar to the Airtriggers, but slightly lighter and smaller in diameter. These connect via flexible telephone-like cables to the brain unit, which consists of an attractive 15"X11"X2½" box with a 2X16 character backlit LCD, a pair of seven-segment LEDs to indicate program number, a generous array of touch switches to select programs and editing features, and MIDI In/Thru/2 Outs, and four ¼" jacks for footswitches.

The tubes sense motion in six directions – left, right, up, down, rotate clockwise, and rotate counterclockwise. Yes, it *is* very difficult to learn to separate and control these separate motions (you would be surprised how inaccurate your hands can be), but thankfully there is a programmable sensitivity adjustment per axis of motion. There are 12 buttons and LEDs on top of the controller that are used for selecting which axis is being edited, and to show which axis is triggering or muted. How vigorously the tubes are moved in each direction determines the velocity. The programmed note (or notes) is sent at the *end* of the motion.

"In general, the airdrums is one of the friendliest, easiest to use pieces of equipment we've encountered, despite the depth of its features – a very special tip of the hat, there."

PKI's Gun Drums fit well in your hand and can be played very quickly.

The Airdrums have one of the most

powerful MIDI implementations of any MIDI controller we have seen. There are 12 internal "busses", each of which can be assigned a MIDI channel, a program number to transmit over MIDI when a new preset is selected, and a trigger mode. These trigger modes include leaving a note on until a new note is to be sent (great for drone work), gating a note on for a specified length of time (up to 4 seconds), and leaving a note on until a new motion turns it off (without sending out a new note on that buss). Movements may be grouped on whatever combination of busses desired – up through giving each its own buss for the maximum in flexibility.

The MIDI messages sent may be programmed per axis of motion. Each motion can transmit up to eight(!) notes. They are programmed by sending notes to the Airdrums over MIDI and saying "capture!" from the front panel, thus remembering whatever notes are held at that moment. This is fine and dandy if you have a MIDI controller hanging around (any old keyboard will do) and don't mind repatching to program the Airdrums, but it *would* have been nice to be able to dial up the MIDI note number from the front panel. A minor quibble.

There are also live performance modes where the different motions cause three possible outcomes: playback of whatever group of notes is currently held at the MIDI In; playback of the last note played into the MIDI In; or transposition by notes at the MIDI In jack – all great (with some forethought) for interactive playing. (The latter is our sole gripe about using Yamaha PMCI's velocity note transpose feature – other players didn't know what key the drummer was about to switch to.)

The four footswitches are for incrementing the preset number, muting a selected group of motions, a hold function, and selecting preset #0. Repeated selection of preset #0 causes alternate jumps between the last two presets selected – nice for quick program jumps. There is a button on the front panel for each of the 30 presets, making changing programs extremely fast and friendly.

There are also a whole host of other editing features such as naming presets, swapping and copying parameters, and so forth, plus what should be a required feature on any new instrument – a *reset* button.

In general, the Airdrums is one of the friendliest and easiest to use pieces of equipment we've encountered, despite the

depth of its features – a *very* special tip of the hat, there.

Which is all well and good – but how does it *play*? To be honest, they are simply too finicky and precise for either of us to play percussion with. No doubt, more practice would definitely help, but there was a feeling of, "Why?" To beings like us, drumming still represents something more primal than controlled.

Now forget what we just said. This isn't a percussion controller; this is a whole new instrument. Once we gave up triggering drum samples and went over to driving a MIDI'd stack of keyboards (Oberheim Xpander and DPX1; Sequential Prophet 2002 and VS) we started *really* having fun (define "fun" as not writing, turning on the tape recorder, and taking turns jamming with the toy for a half-hour each).

Besides being a great drone controller and setup for all sorts of interactive performance possibilities, Airdrums start to trip over into the land of performance art and the avant-garde, with gestures being translated into notes. Anyone who might have glanced into our studio, attracted by the wall of sounds billowing out of it, would have been both confused and amused to see us with arms outstretched, concentrating, performing our intricate gyrations.

Every now and then in the course of this series, we run across an instrument that transforms our interest from "review" to "ownership." These have included the Roland Octapad, Yamaha PMC1, Simmons MTM, and the Kat mallet controller. Palmtree's Airdrums have definitely joined these ranks. It *is* a tad pricey, but it is also extremely thorough and unique.

Safari Ended

These past few months have indeed been a journey into a strange land. We have told many tales of strange, unseen or unheard of beasts. Next month we step back on terra firma, and investigate "bugs" – transducers and mics to be placed on normal drums for triggering other MIDI devices. We'll also create a few animals of our own by placing them on non-drum items for triggering (and taking a humorous look at others' similar efforts). Brush the dust off your hat, and join us next month... ■

PRICES Palmtree Airtriggers $99 each; PKI Gun Drums $699; Palmtree Airdrum $1595
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READERS' TAPES

Reviewed by Yung Dragen.

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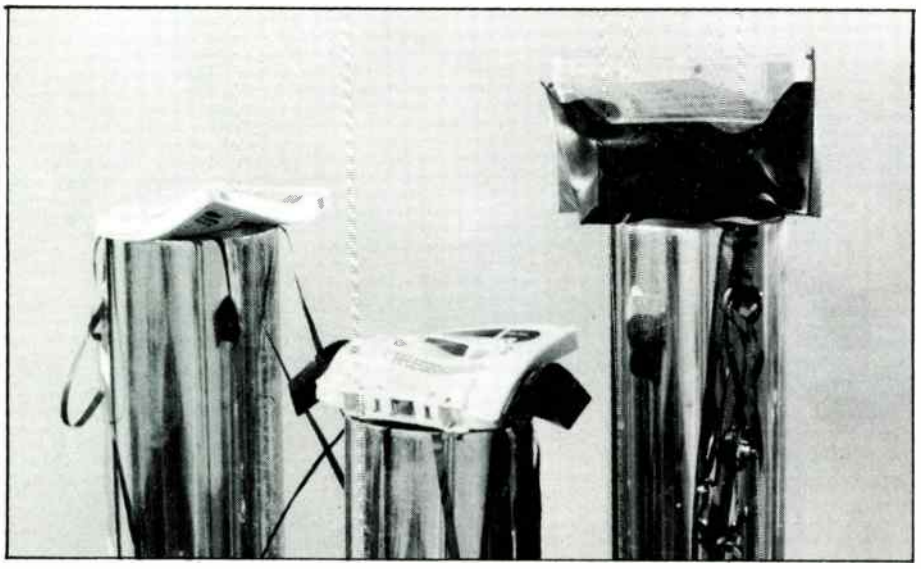

LAST NIGHT MY roommate and I threw a party, and guests eventually gravitated towards a nearby stack of records and started pawing through our album collection. They dug out a few of my oldies, and we ended up spending the last half of the party listening to classics like 'Hold Your Head Up,' 'All The Young Dudes,' 'Hurdy Gurdy Man,' and so on. Finally, a girl asked me, "Do you listen to anything that came after the '60s?!"

Well, yes, I do. I was just hitting my stride as a teenager when punk rock broke on the scene, and I feel that I became an adult to new wave. So this month we trip firmly into the land of '80s pop. Since this column hasn't come firmly to grips with it yet, it's high time we did. I mean, "new wave" is a decade old now!

We start this month with the Chicago-based band, **Big Game**. They consist of Brian Gorman on percussion and keyboards, Philip Beeman on vocals, lyrics, and guitar, and Bill Wood on keyboards, who also does the band's writing.

They were immediately endearing to me because they were the first to address a letter directly in my name (alas, after the greeting was a form letter aimed at record PR heads). The music? While I happen to like synth bass, electronic percussion, alternately soft and sharp-edged rhythm guitar, and synths in general – all of which this has – the end result here is too slick and, therefore, utterly forgettable. The production is reasonable to good, but the rhythm synths sound a touch too "analogish", although there are occasional nice timbres (such as the altered organ on 'Love is a Speeding Train').

The vocals and lyrics are a bit clichéd, synth bass work bouncy on 'Let's Start a Fire' and solid on 'Train' and 'The Jungle,' guitar work good (bring it a little further forward in the mix next time, guys), and the drumming pretty normal.

The music is by no means bad; it just sounds way too generic to raise more than a yawn. By trying too hard to find acceptance in sounding like everybody else, there is nothing left worth accepting – a cruel zen riddle to describe the end result.

Faring much better is **Steve Hollogram aka**. Guilty conspirators here include SR. Hallahan on vocals, synthesizers, samples, drum computer, and programming and Glenn McNulty playing guitars and sax on the second of the two cuts.

The first cut, 'It's a Heart,' sounds like a cross between a human-feeling Depeche Mode and girl:bike:dog (reviewed three months ago). Synths are again of the analog variety (there *were* some DX bells on Big Game's material), featuring a good "cloudy" quality that lots of modulation and a bit of reverb bring with anthemic phrasing – I swear, even the orchestral stabs sound right instead of tired. The drums are obviously a drum machine, but the programming is good – nothing tricky, but nothing mechanically stiff, either.

'Without You' does not fare quite as well, needing a slightly stronger vocal performance and melodic variety, but I'm more than willing to be enthused by the potential that Mr Hallahan shows. On a writing and production level, this is definitely one of the better one-man shows (Glenn's contributions are pretty minimal) I've heard so far.

My favorite submission of the month, though, is **Jonathan Best**'s *The Invisible Man*. My advice to you readers is to send this person your money, right now – it is impossible to dislike this tape. Jonathan gets some help on this album-length effort from Maya Goretsky (vocals and chair on 'Horn & Blow'), Benjamin Gerideau (tambourine throughout), Patty Hill (vocals on 'Maximize Me'), Mary Pelzel (vocals on same), and Wendy Winkler (vocals on 'Push for Peace').

Best himself sounds like Randy Newman and applies a bent, humorous approach to his lyrics and his instrumentation. This tape should prove to be an encouragement to all of those who continue to fear that a big budget is the only path to good music – the primary audio elements we hear on this tape are mainly drum machine, four-operator FM synths (with lots of bending and velocity modulation overdrive) and simple production, but the drum patterns are busy and interesting and the music nicely quirky.

Not every song is a winner – Jonathan, I'm sure, has better inside him than any of these efforts show – but just a little more time and home studio equipment could polish all of these works into gems. The important point here is that more or less one person has applied "Today's Sounds" and equipment in a refreshing, humorous manner.

Is any of this material commercial – like, will it get a record contract? **Big Game** is trying too hard. **Steve Hollogram aka**, on the other hand, is much closer to the combination of playing in the currently popular fashion (never let me be accused of not being fashion-conscious) while having a sound just individual enough not to get tossed. **Jonathan Best** seems to be more interested in just selling tapes to people like me – which is good (I'll probably send money away for his other tape, *Blood on the Ivories*). This is particularly true today because it seems that either dance music or "roots rock" (Del Fuegos, Georgia Satellites, and so on) sells as opposed to quirkiness or humor – although rumor has it that Warren Zevon is at it again (with REM and Neil Young, of all people). ■

Contact addresses:

Big Game International c/o Bill Wood, PO Box 738, Grayslake, IL 60030.

Steve Hologram aka, PO Box 5696, Concord, CA 94524.

Jonathan Best c/o Bubble Records, 2350 Broadway, Suite 412, NYC, NY 10024 ($6 for the tape).

Send your demo-tape, along with some biography/equipment details and a recent photo if you have one, to: Reader' Tapes, Music Technology, 7361 Topanga Canyon Blvd., Canoga Park, CA 91303.

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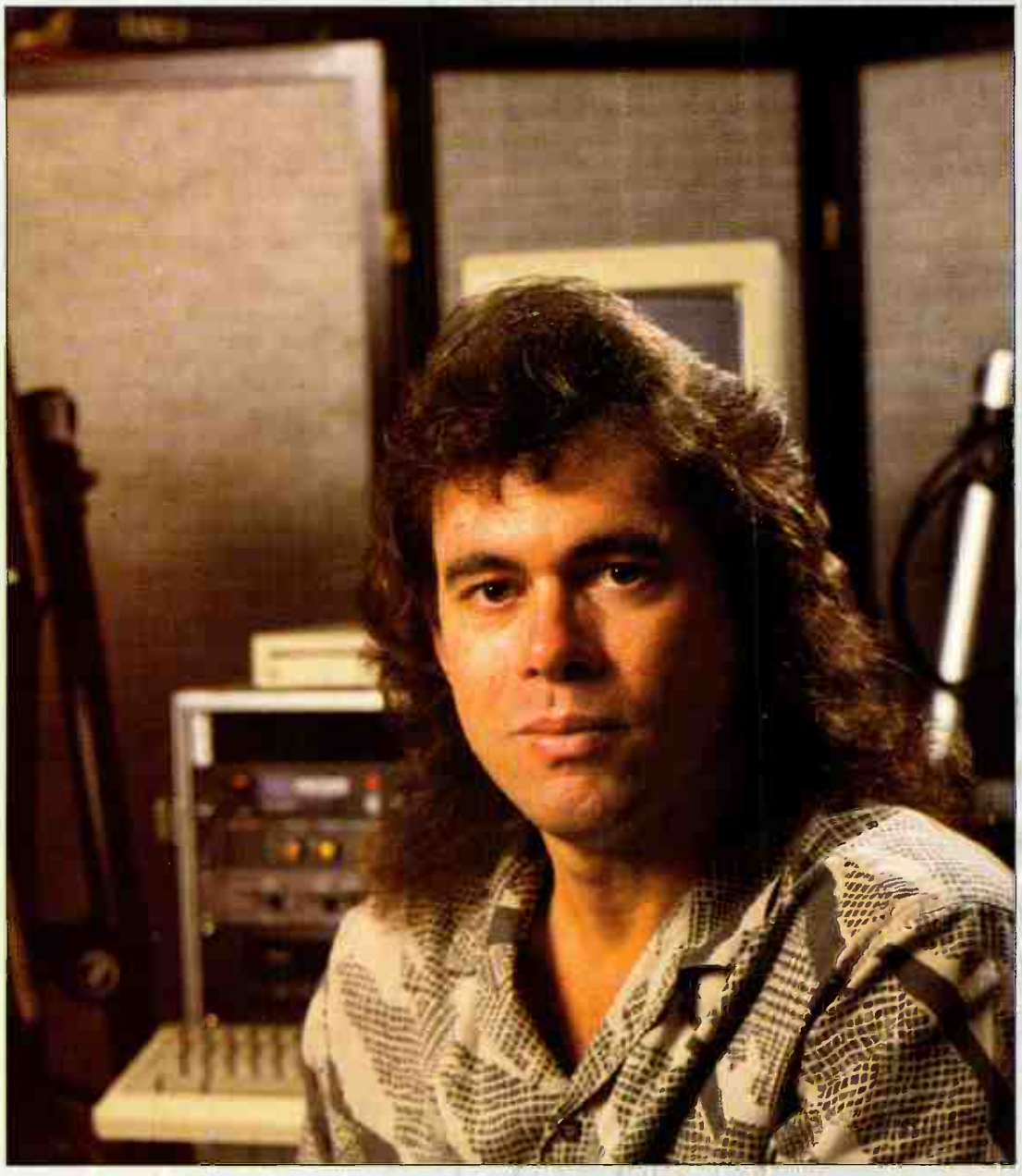


Photography *Ed Colver.*

In and through his sublime, emotional music, long-time electronic music composer and performer Steve Roach has brought the task of programming his synthesizers and sequencers to a new level: art. *Interview by Bob O'Donnell.*

ELECTRONIC MUSIC IS going through an interesting phase right now; it's becoming fashionable. New age electronic albums are selling like crazy and it's not uncommon to hear television and radio commercials with music by composers who only a few years ago would have been considered "underground."

While some fans of the genre worry that this popularization will dilute the artistic integrity of the music, others realize that the spotlight will give well-deserved exposure to many artists who have gone unrecognized for years. One such individual is synthesist Steve Roach.

Probably best known for his landmark album of atmospheric music entitled *Structures from Silence*, Roach has been composing and performing compelling electronic music for the last fifteen years. He juxtaposes powerfully rhythmic sequencer-based pieces with more serene passages and blends the two into a music that is uniquely personal and immediately

recognizable. "The rhythmic music, to me, really relates to the heartbeat quality, that kind of adrenaline-based excitement," explains Roach, "and the chords and the flowing stuff is more from a deep breath kind of dream state."

Roach, who bought himself his first synthesizer – a Roland SH1000 – at the age of 20, had been deeply involved in motorcross racing but changed his career after two friends were killed in accidents. Inspired by the music of Klaus Schulze and other European synthesists and their work with the early modular synths, he decided to investigate the possibilities of synthesizers. "I had no idea what these instruments were," Roach recalls, "but after I first heard the music it didn't matter. They could have been washboards or a wall of modules, as I later found out they were. I just wanted to get involved.

"For me the synthesizer was the first instrument that really put me in touch with some very deep feelings. When I first heard electronic music it affected me so strongly that I just knew I had to play it."

The fact that the instruments making the sounds were electronic and could be programmed made Roach's interest even stronger. "Having the kind of mind I do, which is intrigued by technical things, actually finding out what the instruments *were* was even more exciting. There was that quest for sounds and quest for knowledge about how to operate these machines. Plus, the idea that every day you could go in and have a new feeling and approach the machines differently was very romantic to me. It seemed you could have a whole new experience any time at all and ultimately the only limitations that you had were the ones you drew in the little circle around yourself. So every day there was a question like, 'Are you going to step out of it today, or are you going to go back and just keep doing what you've been doing?'"

More often than not, Roach decided to stretch himself. As a direct result, he developed the knowledge and experience necessary to become an extremely adept synthesist. In addition to *Structures from Silence* (which his album label, Fortuna, recently re-released on CD), his work has been documented over the years on a number of different records, including *Empetus*, *Now*, *Traveller*, *Quiet Music*, *Volumes 1-3*, and his latest project, *Western Spaces*, which was done in conjunction with fellow synthesists Richard Burmer and Kevin Braheny. Roach has also begun work on his next record, *Dreamtime Return*, a double album that will be used as a soundtrack for a film on the art of the Dreamtime of the Australian aborigines. (The Dreamtime is a complex mythological/anthropological state that the aborigines use to describe their creation and past history.)

With Roach, the emphasis on "electronic" music is quite appropriate because nearly every piece of music he has ever recorded has been done entirely on synths. But his music is far from being cold and heartless. Ironically enough, it seems that some of the textures he can create with his electronic instruments are more expressive than a good deal of music done with acoustic instruments.

"To me, the Xpander is the pinnacle of the digitally-controlled analog instrument; I can see spending a lifetime with it."

Roach creates the sounds for his music with an impressive collection of synths, sequencers and drum machines. As a true synthesist, he takes pride in understanding his array of instruments and getting as much out of them as he possibly can. He also takes pride in the system he has developed. "I've been building this system for ten years," he explains as he looks around the studio room he's created in his home. "I've

arranged it so that I can sit in the center position and reach any control and change things very quickly. That's important to me because you lose a lot if you're in a spontaneous flow, which is how a lot of my music comes to me, and have to go through a big process to change things."

Roach's actual equipment list includes an Ensoniq ESQ1, an E-mu Systems Emax, an Oberheim Xpander, a Casio CZ101 and a complete Oberheim System, including a MIDI'd DMX drum machine, a DSX sequencer, a MIDI'd OB8 synth and another Xpander. He's partial to Oberheim equipment because he likes the amount of control it provides him with and, even more importantly, the sound. "There's a real majestic quality and a real lushness to the sound that I enjoy. And to me, the Xpander is the pinnacle of the digitally-controlled analog instrument; I can see spending a lifetime with it. I also like the fact that I can have six independent voices coming out simultaneously with a myriad of zoning possibilities. It's very intelligent MIDI-wise too. It was when it came out and it still is. And the fact that I grew up with the modular approach makes me think that the instrument is the perfect completion to that."

Other pieces of equipment which give away Roach's roots in the past are his treasured Arp 2600 and two Arp sequencers, all of which have been modified and cut down to fit into travelling cases. "I still use the 2600 on occasion because I love the sound – there's nothing to replace it – and because I've developed a dialog with it over the years. I tie it and the sequencers into the rest of the system with a click out from the DMX.

"I don't discount any of my equipment because of age," Roach explains. "I certainly acknowledge the senior citizens here in the studio, including the Arp String Ensemble and the two Roland SH3As over there. In fact, I used one of the Rolands as a kind of signature sound for years; it has a chorus unit on it which gives it a very beautiful lead sound. I even used it on *Western Spaces*."

Roach's enthusiasm for equipment extends to his recording gear as well. "In my rack I've got a Yamaha Rev7 reverb, an ADA digital delay, a Roland SDE1000 digital delay and a 360 Systems MIDIPatcher for switching. I run everything through a Soundcraft 200B 24:4:2 mixer with sweep EQ and monitor through JBL AL15's and Fostex RM780's. The power amp is a Nakamichi Audio, high end audiophile-type amp. My tape decks are a Tascam Model 32 two-track reel-to-reel and a Model 38 eight-track with dbx noise reduction all the way around. Right now, the main mixdown unit is the Sony 501 digital PCM processor onto a VHS video deck."

The newest piece of equipment to appear in Roach's home studio is a Macintosh Plus. "I'm integrating the computer very quickly now. I haven't had it that long but I've been thinking about it for quite a while and I've got friends who've been using one for some time. Right now I'm using the M program from Intelligent Music and I really love it.

"It's kind of funny. I finally put the 2600 sequencers aside for live performance and it seemed like the next week along came M. To me, M is like having a room full of Arp sequencers, at least that's how I approach it. So that's one program I've integrated immediately. Another one I'm using is Blank Software's Soundfile librarian for the ESQ. I've also started to learn Opcode's sequencer but for the moment, I'm still ▶

"When I first heard electronic music 15 years ago, it affected me so strongly that I just knew I had to play it."

► solid with the ESQ's sequencer. It's driving the whole system."

AS HAPPY AS he is with his equipment, Roach admits that he occasionally starts to fall prey to a disease he calls technolust. "I like to try to keep a balance between getting intoxicated on all the latest four-color ads that seduce you into feeling guilty because you don't have the newest piece of gear, and my budget. A lot of times a creative block comes and the temptation is to run out and buy a new instrument because you can immediately turn it on and have all these new sounds and get instant gratification. Thankfully, nowadays you can spend $40 on a new cartridge and once you've gotten over the block you realize you haven't blown the next month's rent on a new instrument. But there's something to be said for just pushing through with what you have and going deeper with it."

Roach's long time involvement in electronic music has allowed him to see and directly experience the changes in technology that have resulted in new and better instruments. But as enthusiastic as he is about some of today's newer synths, there's one thing about them that upsets him – the lack of knobs and sliders. "I can't warm up to the single data slider idea because my experience with sound is very tactile and very direct. I have to experience

the sound and I have to shape it and carve it and form it as I'm hearing it. I just haven't had that experience with a single potentiometer. In fact, that's one of the reasons why I don't have a DX7.

"That's also why you see a lot of knobs and sliders in here," Roach comments. "I like something that I can really respond to. That's one reason why I like Roland synths too, because they have those programmers with all the sliders on them."

Of course, the reason Roach likes knobs and sliders in the first place has to do with the very strong emphasis he puts on programming original sounds. "I feel that programming is very important. A lot of times I'll start with a basic stock patch and carve it from there and other times I'll take off from where somebody else left off. In other words, I may start with a factory sound and use that as a springboard to get to somewhere else. I never really settle on a

sound that came with the instrument, even if it's really programmed well, because there's something I feel when I hear a sound that's personal to me, and I'll want to change it to reflect that.

"I'm really into sounds," Roach explains, summing up his basic philosophy, "I just love working with sound, shaping it and making sounds that are very personal. That, to me, is a lot of the excitement of being a synthesist. That's also why I work primarily in the analog realm at this point. Of course, the Emax is a digital sampler, but it has a lot of analog approaches. It's also very quick and I can react to it spontaneously."

Roach, in fact, uses the Emax in a very analog-type fashion, even to the point of sampling analog sounds. "The first thing I did with the Emax, which is also a relatively new addition to the system, was sample sounds I had created on the Xpander. I've been wanting to do that for a long time now. I've created a lot of monophonic sounds using all six voices stacked up that are tuned to these 'out there' intervals, but I haven't been able to use them polyphonically. Now I sample them into the Emax and I've got up to eight-note polyphony of a six-note chord, so I've got chords upon chords.

"That's one approach that's very exciting to me," says Roach, "taking analog sounds from the 2600 and all these other instruments and working them up like a paint palette. Then I capture them with the Emax and take them even further. So my first step into sampling is really working with the colors that I've worked with so far, but I'm also very interested in sampling acoustic instruments and then combining these two types of sounds to see how that works."

Despite the numerous possibilities for sounds inherent within his system, Roach knows that too much of a good thing can be counter-productive. Consequently, rather than trying to amass as many different sounds as he can, he prefers to refine some of his existing patches. "I'm really interested right now in collecting maybe two dozen sounds that I'll continue to define and work on and make more and more expressive. I'd like to get them to the point where they have the complexity and expressive quality of a fine piano or a fine violin or something of that nature. But I also want them to be completely emotional sounds, where you can hit one note or one chord and that's it, you just have to hold it there because it gives you everything. That's what I'm shooting for, sounds that are fulfilling in that way."

While Roach can begin to produce sounds of that quality with his instruments alone, he adds the final touch after the signal has left the synths. "I use reverb to complete the sounds I design because the reverb and the combinations of reverb really help create the space. In fact, the reverb is one of the key elements to my music. I love to make sounds that are bigger than life, so that the feeling when you play it back is just cavernous. You can have a little blaster on the floor, but with the right amount of reverb all of a sudden it's like a huge dome. I just really like to create many different types of environments that the music lives in and then bring those environments to the listener; that's exciting to me."

"I think the fact that the new Roland D50 has a reverb onboard is definitely a step in the right direction," adds Roach. "That way you can complete the sound in the instrument itself by creating the acoustic body right there."

In addition to his work with programming synths, Roach spends a great deal of time programming the various sequencers he uses to create some of his music. As he explains, "I'm partial to dedicated sequencers, especially because of ▶

"I can't warm up to the single data slider idea...I need to be able to shape and carve the sound as I'm hearing it."

► the spontaneity I can get in live performance, so I'm basically using the Mac now as a laboratory for experimenting. I also like playing with a combination of sequencers, doing things on M and then shooting them through MIDI into the ESQ and then mutating them further and just continuing to create new matrices of combinations of DSX to ESQ to Mac."

When working with a single sequencer Roach also enjoys using it in non-standard ways to allow his creativity to get more out of a piece of equipment than was originally intended. One of his favorite methods involves playing against the quantization. "Let's say I come up with a pattern that I'm playing on the keyboard in a way I would normally want to hear it. I'll start quantizing it to a normal rate, like sixteenth notes, and start to get a feel for where the quantization is hitting and then I'll quantize it again to quarter notes while still continuing to play the pattern as I was over the top of it. What happens is that there's a chance factor involved and you start to develop a dialog between what you're playing and what's coming back after you quantize it. Then you start to see that if you push one note a little further this way and another that way that you can get things going with the quantization that you would never be able to read about in the manual."

SPENDING AS MUCH time as he does with the sounds and sequences in his music, it is not surprising to hear that he shares equal concern for the recording process. "My basic approach is that I like to get as much going live as possible and then lay it right down to two-track or two tracks of the eight-track and build from there. I try to keep the initial burst of energy true to its first arrival rather than saying I'll do it over again because there's always that procrastination in the creative process.

"The recording process, for me, has always been to some degree about defying technology."

"Right now I like to go direct to digital two-track, but I'm not a total digital junkie," Roach explains. "I haven't really been able to A/B it yet with analog and say, 'Oh, this is better,' or 'This digital sounds cool and this analog sounds warmer.' With the new album, though, there are definite advantages because of the nature of the music – in other words lots of breathing space and pauses between things. With digital those pauses are so silent that they become music in its inversion and I'm keeping that in mind as I put it together.

"On past albums I've used cassette two-track tapes and transferred them right to the two-track for some pieces and I have definitely gotten feedback from serious engineers asking, 'What 24-track studio did you record this at?' So the recording process, for me, has always been to some degree about defying technology. I'll record the tape as hot as I can get it, play around with the EQ's on the tape deck or whatever just to push things as far as I can. Ultimately I'm just winging it," he admits, "but playing something back and hearing how it sounds is the best test for me."

Roach plans to use all of his unique sounds and unique programming and recording techniques on his new record, *Dreamtime Return*. He had been working on parts of the album for quite a while when early this year it took an interesting turn for the better. "In February I received a letter from a writer and producer who was doing a PBS documentary on the art of the Dreamtime and who wanted to know if I was interested in doing the music for it. He had heard some of my music on *Hearts of Space* or some other radio programme and thought it would be appropriate, but it was only by coincidence that he happened to write while I was working on a similar project. Anyway, I called him up as fast as I could dial and said, 'This is incredible, I'm working on an album called *Dreamtime*

Return,' and all these things started coming together in a nice way for the project.

"So I told him of course I would do the music, but I had to go with him when they filmed the documentary, that was part of the deal. I just said there's no question, I'm going, what time do we leave? Fortunately, he thought it was great and he supported me, so he talked to the money people and they coordinated the trip over there. So I'm leaving for a three-week journey to Australia on September 1. We're going out into the Outback and documenting the sites where the cave art is."

Roach hopes that the experience will inspire him in the same way that the Southwestern US inspired him to come up with the concept of *Western Spaces*. "Right now I'm looking at having the first half of the album done before the trip and then coming back and having the second half be more of a reflection of the trip. My whole reason for going is to just be in that land and draw the inspiration from it."

As for his own future and the future of electronic music in general, Roach feels very optimistic. "More than ever before, this is really a golden time for technology and technology-based music. People are incorporating technology into all forms of music, whether it's acoustic or a combination of acoustic and electronic and I think it's a really exciting period. There's going to be a lot of experimentation and a lot of growing on a number of different levels. I mean I feel the music is definitely getting more expressive through every step forward. I also feel that, from my own experience, I have to keep going back and not get too far ahead of myself in technology. I have to learn the basic tools that I have and keep drawing emotion from them."

Roach adds that as tempting as it may be for him to just keep jumping from new instrument to new instrument, he strives more to develop himself and get the most from what he has. "I feel that to develop yourself as a musician and as an artist is really number one, and to come at the tools with that idea and to keep sharpening your musicality and what you want to say with the tools is really important. I mean the instruments are just tools basically, and you have to decide what you want to do with them.

"On one level I see a whole arc of people going off to the side that just gets really heavy into the techno for techno's sake. The path that I'm on, though, the goal I feel I'm moving towards, is working to maintain a balance between the techno and being aware of all the possibilities to a point and the creative process of forgetting it all and continuously learning. Ultimately it's nothing that you really want to have to think about, it's just your instrument and the way you work." ■

Alesis HR16 Drum Machine & MMT8 MIDI Recorder

Alesis has come up with two easy-to-use, high-quality products at prices which finally bring affordability to 16-bit drums and sequencing. *Review by Bob O'Donnell.*

WHEN THE WORD first reached us that Alesis planned to introduce some impressive new products at the NAMM Show, we thought perhaps they had made another leap in the world of cost effective signal processing. A programmable MIDIverb III? A MicroMiniVerb? Our minds wandered.

Imagine our surprise when we arrived in Chicago and found that while the company did have some new signal processing gear – in the form of the MicroLimiter, MicroGate and MicroEnhancer – the big news was a 16-bit drum machine and a companion eight-track MIDI sequencer (or MIDI recorder, as they refer to it) at ridiculously low prices. A drum machine from Alesis, though? What could it sound like? And a sequencer? What do they plan on doing with MIDI?

Well, if you read our NAMM Show report last issue you know that the answers to the second and fourth questions are "great" and "a lot," respectively. In fact, the drum machine sounded so good and the sequencer seemed so complete that people were flocking to the Alesis booth to see just what the fuss was all about. Obviously, you're going to have to hear and see for yourself before you make your decision, but let me give you a few specs to whet your appetite.

The HR16 High Sample Rate Digital Drum Machine – its official name – has 48 individual 16-bit sounds on board sampled at a rate of 47kHz, which translates to a frequency response of 20Hz-20kHz. Each sound can be panned to any one of four outputs – two sets of stereo pairs – and tuned over a two octave range – up about a

fifth and down about an octave and a fifth. The sounds themselves consist of a variety of acoustic drums – there's about eight or nine snare drums and kick drums each – electronic drums, cymbals and percussion instruments. Don't look for slapped basses or weird sound effects, though, because you won't find any – this is definitely a *drum* machine.

The HR16 has 16 channels, and any 16 of the 48 available sounds can play at one time. You can even have a single sound play polyphonically – such as having cymbals overlap for a more realistic ride effect.

Any sound can be assigned to and played by one of 16 velocity-sensitive drum pads – eight levels of velocity are available – and each of the 100 available patterns will memorize the sound selection, tuning and panning for all 16 pads. If you want to use the HR16 as a sound source, you can use these locations to store 100 drum kits, which can be called up via MIDI program change commands. Each of the pads can be assigned to any MIDI note and this too will be memorized per pattern or per kit. The machine will also respond to and record from external MIDI keyboards or MIDI drum pads.

The patterns can be linked in any one of 100 songs – the machine's total memory is 25,000 events – and both patterns and songs can be named. Patterns can be recorded in real time or step time and a single step editing mode allows you to make minute changes to velocity or whatever it is you choose to edit. Programming is greatly eased by the presence of a backlit 32-character (16×2) LCD – which is also found on its similar looking companion, the MMT8 Multi-Track MIDI Recorder.

The specs for the MMT8 are worth drooling over as well. Each of its 100 parts holds eight tracks of information, and each track can store data from all 16 MIDI channels. The parts can be combined into any of 100 songs – the total memory is 10,000 notes – and each part and song can have a name of up to 14 characters.

In addition to recording note information, the MMT8 will also record any controller information and even Sys Ex data. Or if you prefer, you can selectively filter out the controller data you don't want. The filters can also be used when copying or erasing certain tracks or certain parts.

Editing on the MMT8 goes down to the single event level and anything which can be recorded can be edited, including pitch, velocity, duration, MIDI channel, pitch-bend, other controller information and Sys Ex data. Best of all, the information is presented in English, so for example, if you come across some pitch-bend data the display will say Pitch Bend and give a value. There's no need to know how to read raw MIDI data.

Tracks can be merged and unmerged by MIDI channel and portions of a track can even be rechanneled at a later time. Eight different levels of quantization are available and quantization can be turned off for resolution of a 1/384 note. In addition, four types of quantization are available: you can adjust the start of the note, the end of the note, both the start and end, or choose a mode where the start of the note will be adjusted but its original duration will be maintained.

The sequences can all be looped and the dedicated track buttons allow you to easily mute and unmute each track individually. If you're in song mode these mute on and offs will be memorized. There's also a dedicated button for turning the MIDI Echo feature on and off.

Like its brother, the HR16, the MMT8 includes the ability to transmit and respond to MIDI Song Position Pointer data. Both units also have a tape sync facility, MIDI In, Out and Thru jacks and the ability to store their respective memories on cassette tape or via MIDI System Exclusive data.

Of course, there's one spec I haven't yet told you about either of the machines and to be honest, it's the most important and most impressive of all: their prices. If you look down a few lines into the fine print, you'll see a few numbers that just don't seem to correlate with what you've read but believe me, they are *not* typos.

Needless to say, as soon as we get hold of these puppies, we'll be giving them full-blown reviews. I hope it's soon. ■

PRICES HR16 $449; MMT8 $299

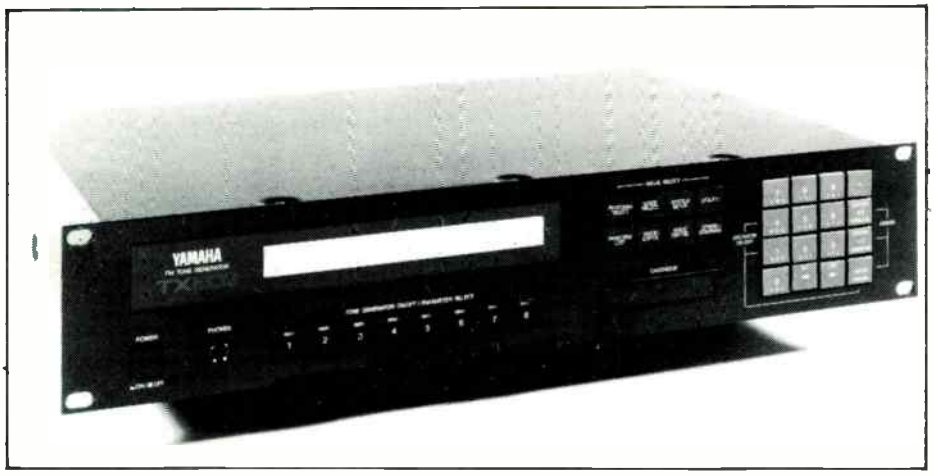
MORE FROM Alesis Corp., 7336 Hinds Ave., N. Hollywood, CA 91605. Tel: (213) 467-8000

REVIEW

I·N B·R·I·E·F

Yamaha TX802

FM Synthesizer Module



Just as the original DX7 spawned a whole slew of spin-off instruments for different applications, the MkII version looks like it may be doing the same. Here's the first.

Review by Dan Goldstein.

TOO OFTEN, IT SEEMS, musical instrument designers have been happy to take the electronics from inside their keyboards, put them into smaller, keyboardless boxes, and sell them as rack-mount "expander modules."

Few people seem to have realized that users of rack-mount units may have different requirements from musicians who want a complete, all-in-one instrument. Even musicians who have both keyboards and rack-mounts in their collection may require different things from them – yet up until very recently, they were most likely to get no more than the same wine in a different bottle.

Now Yamaha, along with several other of the major manufacturers, has seen fit to equip their latest voice module with a few features of its own.

The machine in question is the TX802, essentially a modular version of Yamaha's new-generation six-operator FM synths, the DX7IID and the DX7IIFD. All the new DX7 features are here: fractional level scaling, random pitch, microtonality, aftertouch pitch control, expanded LFO, and so on.

Also present – for the sake of convenience and ease of access, if nothing else –are a slot for the new Yamaha standard RAM4 cartridges, and a 2×40-character LCD capable of displaying small bar graphs of levels as well as conventional words-and-numbers data.

But, as I've just intimated, the TX802 goes a bit further than this – and usefully so, too. To start with, there's an expanded memory capable of holding 128 preset sounds and 64 user sounds; you can also squeeze 64 of your own creations – or 63 of your own custom tunings – onto each RAM4 cartridge.

A single cartridge can also hold up to 64 "performance combinations," and herein lies the key to the TX802's versatility, over and above that of its keyboard-equipped brethren. For the new TX is, to quote from popular hi-tech music parlance, eight-voice "multi-timbral."

That means up to eight of its ROM or RAM voices (or "timbres") can be combined together to form a single "performance," accessible through a single program number. You specify what the note range of each timbre is to be, which MIDI channel (1-16) it will receive on, and whether the timbre's audio output is sent through the 802's stereo mix out, or through one of eight individual voice outputs.

In the studio, this flexibility of MIDI and audio channel assignment should make the TX802 a tremendously versatile source of voices. Playing FM sounds manually from a MIDI keyboard is something any number of similar Yamaha modules makes possible, but up until now, a complete TX816 system has been necessary for engineers requiring separate MIDI channels for sequencing, and separate audio channels for adding effects.

Putting a load of complex, state-of-the-art electronics in a two-space rack unit can have its disadvantages, of course. Particularly if, like Yamaha, you want to encourage users to get inside those electronics and start doing some serious programming. The less space you have, the fewer knobs, sliders, graphics and displays you can fit on – and that's normally bad news for the enthusiastic programmer.

In some ways, though, economy works in the TX802's favor. The front panel is neat and uncluttered, and therefore easier to get to know (though not necessarily *understand*) than that of the DX7II.

A row of eight switches beneath the LCD are used to turn the module's tone generators on and off (what could be simpler?) and also to select parameters when you're in a programming frame of mind.

Beneath that lies a cool operation guide which can be pulled out from within the 802's casing at any time. This gives you a rundown of features and how to access them, and is supplemented by three graphic charts (similar to those found on the DX7s) which show level scaling, EG and algorithm formats.

Another set of eight switches is used to select modes (Voice Edit, System Setup and so on), while a numeric keypad serves as the main method of data input, along with separate pairs of increment/decrement and yes/no switches.

There's not really too much to be said about the way the TX802 sounds. If you like the sound of a DX7II, you'll like the sound of this; and if you like the sound of the original DX7, you'll *love* the sound of this.

The factory presets are arranged in two banks of 64, and while the organ, FX and tuned percussion programs (I especially liked "Nu Marimba" and "MalletHorn") are better rounded than their first-generation FM equivalents, the biggest improvement comes with strings and brass – especially on solo (as opposed to ensemble) voices, which have much more depth and detail of movement than before.

All in all, it's taken Yamaha some while to get around to the multi-timbral way of thinking. But now that they have, they've done it with a vengeance.

I simply can't over-stress just how important the individual MIDI *and* audio channel assignment is in today's studio world – on anything from a dancefloor remix demanding separately-treated weirdo percussion noises, to complete instrumental soundtracks requiring a variety of interweaving timbres.

Think about it. When was the last time *you* heard an FM synth sound on a record that wasn't dramatically treated by outboard processing?

There may be any number of rack-mount modules currently offering "digital-type clarity." But if I was a keyboard player who spent a lot of his time in a multitrack recording environment, I know which one I'd choose. ■

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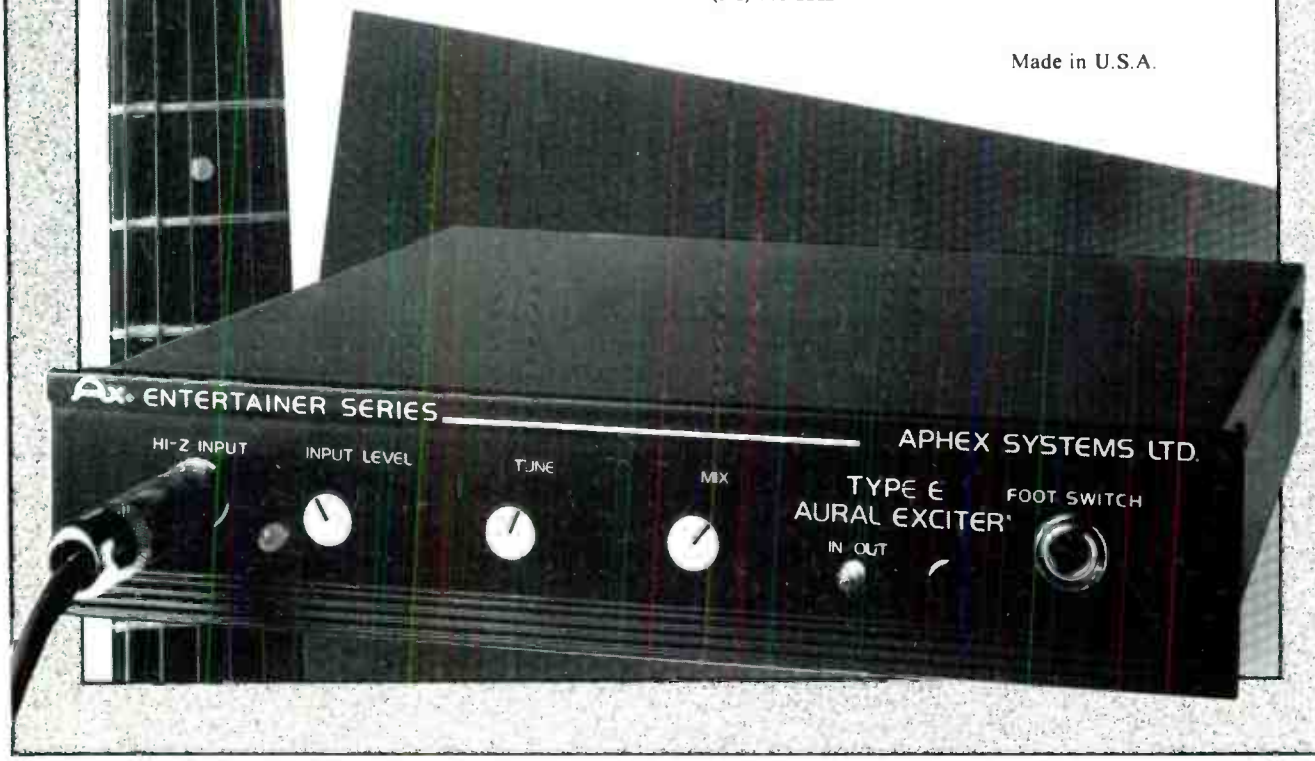
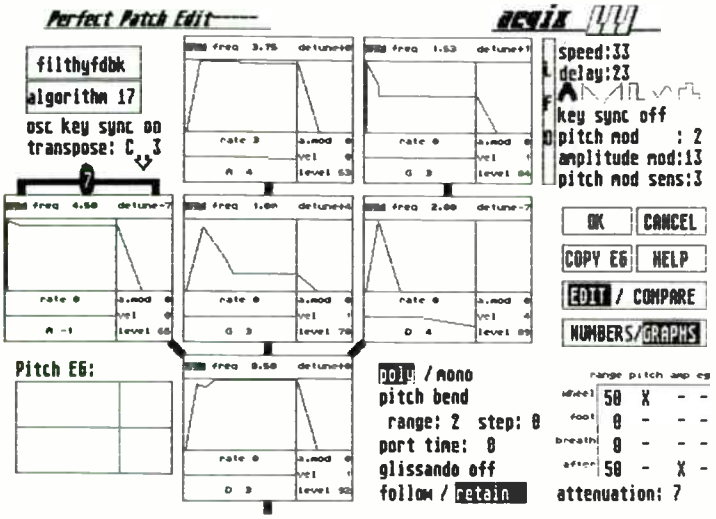


Aegix Perfect Patch

Editor/Librarian



Oh, No! Not another librarian! Well, though editor/librarians for the DX7 do abound, this inexpensive little beauty from Aegix for the ST stands apart. *Review by Scott Gershin.*

IF YOU ARE an Atari ST and DX7 owner, I recommend that you take a moment and read this article. If you haven't yet decided on a computer, this article might help you make the right selection. Finally, if you're a Mac user, all I can say is that the Atari arsenal of software is growing daily; and if you need help with a Mac program, ask an Atari user. He's probably running it with his Mac emulator . . . .

No, this is not an Atari ad, but a review on a piece of software that I feel is essential to the users that own DX7s and Atari STs. It is, of course, the world-renowned DX7 librarian (not the blonde type). Just when you think that you have heard all the sounds that the DX7 can produce, someone comes along and blows you away with a new set of patches. But in spite of the flexibility of the instrument, one major drawback has been the difficulty of programming through the LCD display, one page at a time. Hence the creation of the computer editor/librarian which has the power to display all the parameters and functions of the DX7 in one screen.

Da specs . . . Without further ado, let me introduce you to Perfect Patch by Aegix. Perfect Patch is a DX7/TX7 editor and librarian. It enables the user to view three banks of 32 sounds at any given moment. The opening screen displays the names of all three banks and their locations. Each bank of sounds has its own pull-down menu consisting of: load from DX7/TX7, load from disk, save to DX7/TX7, save to disk, copy from one bank to another, rename, and print out patch names.

As an accessory, Perfect Patch contains a control panel that gives the user the ability to change screen color and mouse speed.

For those of you like myself who, when getting a new piece of software, quickly rip open the packaging and thrust the 3½" disk into the drive, only to find yourself faced with a blank screen, Aegix supplies a Help pull-down menu with all the information you'll need to know in getting around the Perfect Patch.

To select a patch, click the mouse on the chosen patch name. It will cause the name to change color to let you know that you have selected that patch. If you go to the pull down menu marked "Edit" and click at "Edit Voice," you will then enter the edit screen which displays all the parameters and functions for that patch.

The screen is set up in the same configuration as the patch's algorithm, showing in block diagrams all the operators and their parameters. The envelopes can be shown in graphics or numbers and can be manipulated in either mode. In graphics mode you can mouse over to one of the four points in the envelope and click and drag, changing the shape of the envelope. The parameters are shown on the left and update as the graphics change. Since the screen tends to be slightly busy, you can enlarge certain parts of it to be able to make more accurate edits, such as for the envelopes and the scaling.

All updates are being done in real time, which means that as you change a parameter it is being changed in your DX7 as well. Using the function keys (F1-F10), the user can trigger notes from the computer enabling him/her/them/us/"Spot" to have all the power at the computer and not have to run between computer and keyboard (another victory for the couch potatoes).

Perfect Patch will remember the different real time functions in the TX series and the program has incorporated a software toggle to turn this feature on and off, so as to not conflict with the DX7's incapability of processing such data.

So, Doctor, will he live? Well, I'm not a doctor, but I do know this: everyone with a DX7 should have and use an editor/librarian. One of the strong points of Perfect Patch is the ability to cut and paste between the three banks. They even created a clipboard for temporary storage while moving patches around. You also have the ability to rename patches and name each bank of sounds.

The editing screen is straightforward and I really like the idea of displaying the operators in the same configuration as the algorithm. It gives you a great graphic representation of how the sound is constructed. Aegix also includes a screen of all the algorithms that you can mouse through and change, which automatically updates the editing screen to the new algorithmic configuration.

I also really like being able to play the DX7 at the computer and the ability to print out a list of the banks and names of all the patches. The real time features of Perfect Patch, though, are what makes this product valuable. (If you don't believe me try the old way of "edit, guess, and transfer"!)

Even though DX7 editors are not very new in the synth world, they are a very functional tool and a standard in the arsenal of software that you should have. Perfect Patch is an excellent program and would be a terrific investment if you don't have a librarian already.

I personally would like to see DX7 librarians include the editing capabilities for E! (Grey Matter Response) and the DX7II series, but I suppose that I will have to wait for at least a couple of weeks before the next wave of software approaches. ■

PRICE $59.95

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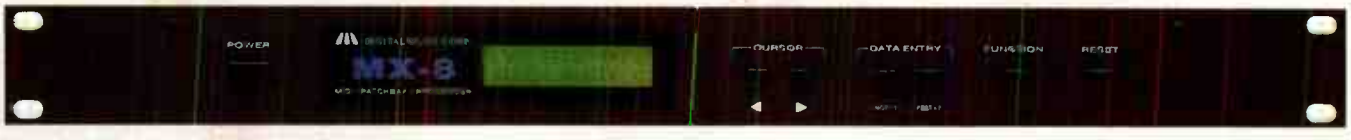

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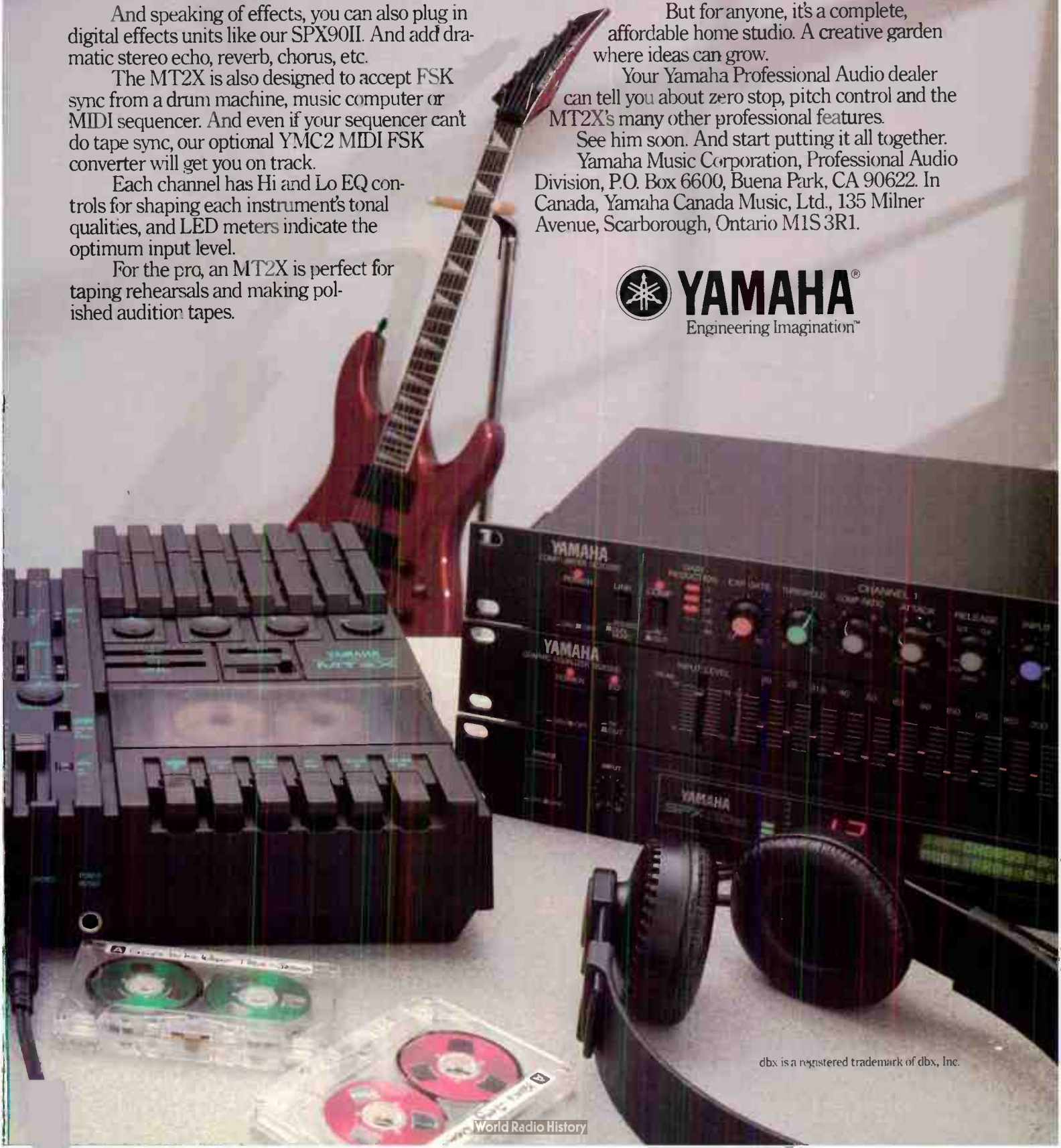

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Sequential Prophet 3000

Now that 16-bit sampling is an affordable option for the professional musician, manufacturers seem intent on not providing a new wine in the same old bottle. Sequential's Prophet 3000 is among the first to test the waters. *Preview by Rick Davies.*

IT SEEMS LIKE a week doesn't go by without another company introducing yet another 16-bit sampler. This is no complaint. But for anyone who has looked into the 12-bit market, there is probably some doubt as to whether or not the higher quality samples will, in their specific situation, justify the to-be-expected higher price tag. Were all 16-bit samplers to sport features similar to those found on their 12-bit counterparts, this feeling would be understandable.

Many manufacturers, however, are using new technology and custom chips to help differentiate their products from one another, not just in sound quality and editing features, but also in ease of operation. Sequential's latest in a series of Prophets, the Prophet 3000, is a perfect example of a sampler that not only sounds better than earlier models, but promises to eliminate much of the hassle that tends to make sampling a formidable ordeal.

Starting with the basics, the Prophet 3000 is a 16-bit stereo sampler with eight voices, and 2Megabytes (which translates into 1Megaword, 16 bits wide) of sample memory built into a 2U rack-mountable chassis. Additional expanders for the 3000 provide eight extra voices each, for a maximum of 32 voices with three expanders. (Sequential's newsletter indicates that one expander is the maximum, but a company representative indicated otherwise.) Samples may be stored on quad-density 3.5" disks using the built-in disk drive. So far, so good.

As with earlier Prophets, memory expansion is possible, and thanks to a SCSI port (forthcoming), sample storage will be possible on hard disks. Sequential have plans to release their own hard disk to ensure that compatibility problems do not arise between the 3000 and other SCSI hard disks.

Sampling rates of 32.0, 44.1, and 48.0kHz provide a range of sample qualities and sample times with the usual trade-offs. At the 48kHz rate, the standard memory will hold a 49sec stereo sample! Sampling in mono doubles this time, and also allows for full eight-voice polyphony, whereas stereo sample playback renders four-voice polyphony.

Voices can be panned anywhere in the stereo image, or routed to any of eight individual outputs and removed from the stereo outputs. Again, to obtain independent stereo outputs, each channel of the stereo signal must be routed to a different individual output. Apparently, dynamic voice allocation allows several voices to be routed to each output, which makes voice grouping much easier.

The stereo sample line input is on the 3000's front panel along with the "mix" output level controls (its assumed that if you want to use the individual outputs, that you'll control those levels from your mixer). The standard MIDI In/Out/Thru ports on the back panel complete the 3000's initial connections to other equipment. That's all there is to the rack: pretty much everything you *won't* need to mess with very often.

Sequential have taken the remote sampling module approach to a new level: the 3000's *real* front panel controls are on a remote controller which connects to the rack's front panel via a telephone-style cord. The remote's front panel consists of an 8×40 LCD window, a rotary encoder, four cursor controls, and six "soft" (assignable) switches. Obviously, the 3000 would be best left near the musician or engineer, and with the exception of the occasional disk change, the rack could be left well alone. And if a hard disk is connected, then the only part of the 3000 that's likely to need attention is the remote.

Of course, the LCD is put to good use beyond simple sample saving and loading; advanced sample editing is made easier by providing graphic displays of waveforms, and all functions are laid out in a "menu" format, along the lines of those you may have come across in software packages. By having the 3000's entire "front panel" controlled by software, Sequential have left the 3000 open to updates by simply booting it with new disks. One option that should raise a few eyebrows is the SCSI/direct-to-hard disk recording option which is planned for release around the beginning of 1988. If that seems a ways off, don't worry – first production run starts in early Fall.

On the processing side of the 3000, there are sustain and release loops, loop crossfading and compression (to reduce loop level fluctuations), hard sync (for synth-like sounds), an additive synthesis mode for waveform creation, and four-pole low-pass filters, three envelopes, and two LFO's for each voice.

These features make the Prophet 3000 a nice package as it is, but it looks as though several firsts have been made to the user's benefit. Of particular interest is an auto-mapping feature that uses pitch-detection to automatically place samples in appropriate areas of the keyboard, and shuffle other samples around as necessary, thus eliminating one of the more tedious aspects of programming sampling keyboards.

Considering the impressive specs and control system, the Prophet 3000 might well cost a lot more than the Prophet 2000 family members, but apparently, Sequential plans to offer a very professional package at a price which, if performance meets the expectations, could be hard to resist. ■

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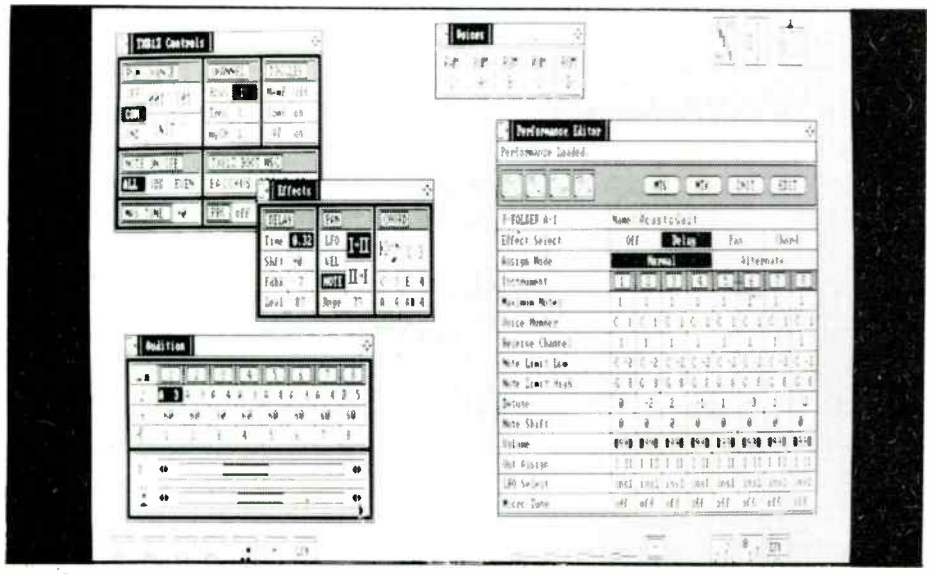
REVIEW

Bacchus

TX81Z Graphic Editing System

for IBM PCs/Compatibles

Bacchus' new voicing editor/librarian for the PC uses impressive Mac-like windowing to enable fast, full access to the TX81Z's numerous controls and registers. *Review by Michael Stone.*



SOFTWARE PROGRAMS FOR the IBM are not generally known for their graphics but Bacchus' voice editor for the Yamaha TX81Z may change all that. Their new effort is an ambitious program that expands the capabilities of the performer (beyond the already-impressive features of the 81Z – see review, MT July '87) and defines what could well become an industry-standard graphical interface for PC-based music software.

The system requirements of the non copy-protected program are substantial: you'll need a loaded IBM-PC or "true" compatible. (It ran just fine on my Taiwanese clone.) Among the necessary upgrades to your PC are 640K of RAM, a mouse, and an upgraded graphics adapter and/or monitor. Because of the high-resolution graphics employed, the program runs only on a Hercules monochrome display, an EGA (IBM Enhanced Graphics Adapter) display or on the less common Wyse vertical display. The program will run on a dual floppy-disk system – although anybody with this much hardware probably already has a hard disk. You also need ROM version 1.3 for the TX81Z.

The program displays in black-and-white even on the EGA; a Bacchus spokesman says that the decision was made to provide users with maximum operating speed instead of opting to provide color graphic capabilities.

The program uses the mouse-and-icon based graphical interface familiar to Macintosh and ST users. Bacchus has written a close cousin of the Mac's "Finder" windowing system within its program, and theirs runs faster. It's not a Mac clone, says Bacchus, which claims to have used the best features of the Apple, Sun and Xerox PARC user interfaces. Hide everything except the mouse and screen, though, and you'll swear you're running on a Mac. Mac users and PC users alike will be blown away by the program's speed – it runs faster on a standard-speed PC clone than do most text-based programs running on an 80286-based IBM AT.

Operation

THE PROGRAM FIRST checks to see whether the 81Z will respond to MIDI System Exclusive messages; if the 81Z's MIDI output is connected to the PC, the program operates in Send/Receive mode. If not, the program assumes the 81Z is at least receiving MIDI data and indicates that it's in "Send Only" mode. Many of the functions don't require Send/Receive, but some do, and if you try to use a function requiring a MIDI response from the 81Z a warning message will appear.

If the 81Z's MIDI input is connected, and if the correct MIDI send and receive channels are selected, you can see the 81Z's green LED-display perform various gyrations while the editor program initializes itself. The various parameters (kept in the 81Z's non-volatile memory) are loaded into the editor's memory, and the master volume bar graph can be observed going all the way down to 0 and back up to 99.

After the "initialization completed" message, the program paints its icons on the screen and you're ready to begin editing. The desktop displays a number of icons grouped into functional categories such as "Toolkit," "Effects," and "RAM/ROM." As on the Mac, you can open a window by pointing and double-clicking the mouse.

One difference between the Bacchus architecture and that of the Mac is its use of pop-up rather than pull-down menus. When you're not pointing to any of the editing windows, you can press the right mouse button to access one of three pop-up menus: Desk Manager, Voice Edit (or V-Edit), and Performance Edit (or P-Edit). (A pull-down menu requires that you move the mouse to the top of the screen before pressing the button.) When the mouse points to an area within a window, different pop-up menus appear containing unique functions within each window.

The editing functions can be divided, as in the TX81Z, into two functional groups: Voice or Performance. The TX81Z has five banks of 32 voices (four in ROM and one in the TX81Z's non-volatile RAM) and one bank of 24 performances (stored in RAM). The synth also has one edit buffer for "voice" and one for "performance." The contents of the edit buffers are maintained onscreen, and any changes are sent to the 81Z as they are made.

The editor program stores voices and performances in "folders," each of the two voice folders holds 32 voices. These can be saved to a disk file or can be loaded, singly or en masse, into the TX81Z's voice RAM

area. Each of the performance folders holds 24 sets of performance data. In a manner similar to that of the primary function icons, you can double-click on a voice or performance to load that selection into the edit buffer. You can also point to the name of a voice or performance and "drag" the voice to the other file folder or to a different position within the same folder.

A "file cabinet" icon can be used to display the contents of the current floppy disk or hard disk subdirectory or to transfer between the folder and a data file. Each floppy disk or hard disk subdirectory can store up to 70 voice or performance "folder" files. One complaint I have is that it's too easy to perform destructive operations, especially on entire folders or TX81Z internal memory banks. Since there's no "undo" feature, should you mistakenly hit the wrong line on a pop-up menu, all you can do is sit and watch as all 32 of your voices are replaced by "INIT VOICE." A frustrating prospect to say the least.

Voice Editing

YOU CAN EDIT the current voice by either opening windows for the four operators, the LFO, the algorithm, and so on or you can select "V-Edit" from the Desk Manager pop-up menu and all of the necessary windows would open.

If you double-click on the "speaker" icon, an "audition" window appears. The audition function sends MIDI Note On/Off messages to sound a note whenever a voice or other parameter is changed. Up to eight notes with independently selectable pitch and send channel can be used to test voices or performance settings. The volume and length of the audition note(s) are shown as rectangular images of volume control slide-pots.

When editing an FM operator, one of the TX81Z's eight waveform types is displayed graphically in the center of that operator's window. Numeric settings can be increased or decreased by clicking the mouse button. As a future enhancement – I tested version 1.01 – it would be nice to have the capability to graphically display or edit the envelope information instead of having to enter these values numerically.

The eight possible algorithms are shown in pictorial form, which is a vast improvement over the TX81Z's LED display. The LFO settings are shown in a separate window. Some LFO settings, however – those associated with individual operators – have been placed in the windows for the respective operators rather than in the LFO window (as in the TX81Z's front-panel entry mode). So you may have to hunt around the various voice-editing windows for the desired setting.

A "functions" window holds various settings that don't fit neatly into any of the other windows, such as the various pitch- ▶

► bender/breath controller/foot controller options. Here also is the field for entering the name of your newly-defined voice.

Performance Editing

IN PERFORMANCE EDIT mode, eight columns are used to represent the eight independently selectable voices of the TX81Z. The performance function can be preset to select each of the eight voices as separate instruments or parts of a single polyphonic instrument. The columns display the voice number, receive channel, detuning, minimum/maximum note value, channel assigns, number of simultaneous notes and microtuning for each voice.

Bacchus does not document every icon and window in its manual; indeed, the manual contains only text – no pictures – leaving the musician to fend for himself if he wants to manipulate the icons. You must sit in front of the PC and carefully study the Yamaha manual, comparing each Bacchus window against the corresponding Yamaha manual section.

A better approach would have been to attempt to re-document the 81Z, using pictures of each of the windows and icons, together with a paragraph or example describing the respective 81Z function. At least one could study the manual at a place of one's own choosing instead of having to be physically seated at the PC.

Telephone support from Bacchus was excellent; I was connected to a knowledgeable member of the development group with no hassles and without having to identify myself as the MT product reviewer.

Conclusions

THOUGH THE PROGRAM is a bit expensive and a bit demanding in terms of system requirements, it certainly fulfills all the requirements for an editor/librarian and it performs its duties in a very elegant fashion. The user interface is very intuitive and because of its speed, the program is a pleasure to use.

The wonderful Mac-clone user interface suggests a multitude of future Bacchus programs (in fact, they have one in the works for Yamaha's new TX802). This prompted me to ask the Bacchus rep whether the operating environment will be "opened up" to other developers who wish to create icons and windows that can be accessed from within Bacchus products. The topic was said to be under discussion within the development group, and Bacchus and others who use non-standard windowing environments should be encouraged to make their windowing tools available to others. ■

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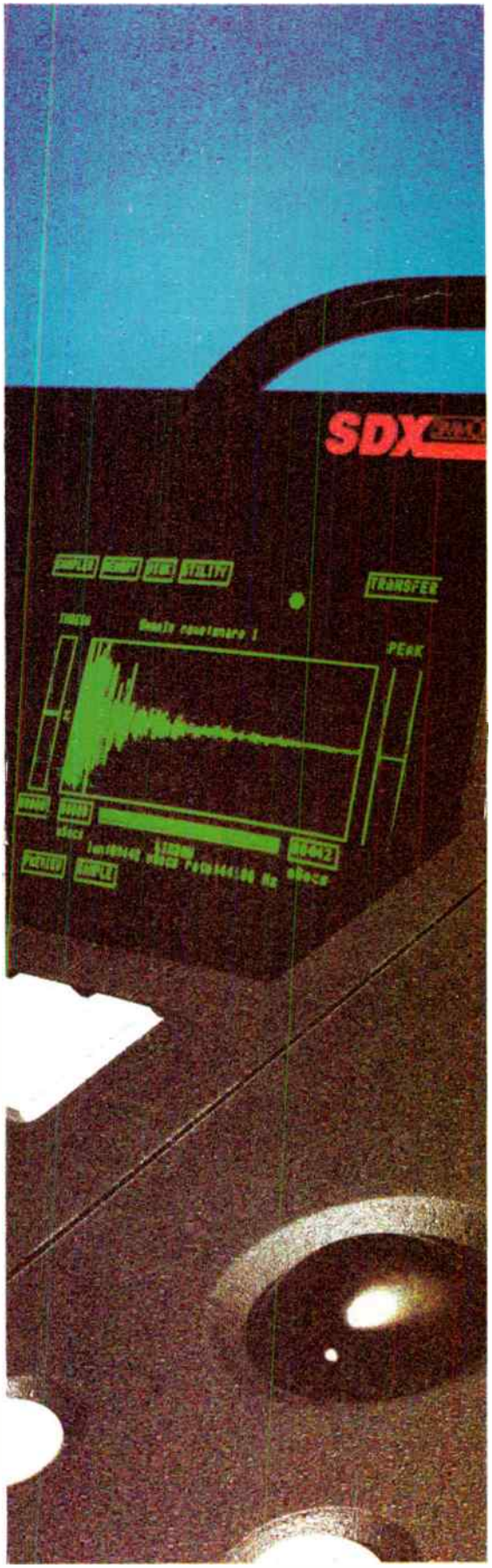

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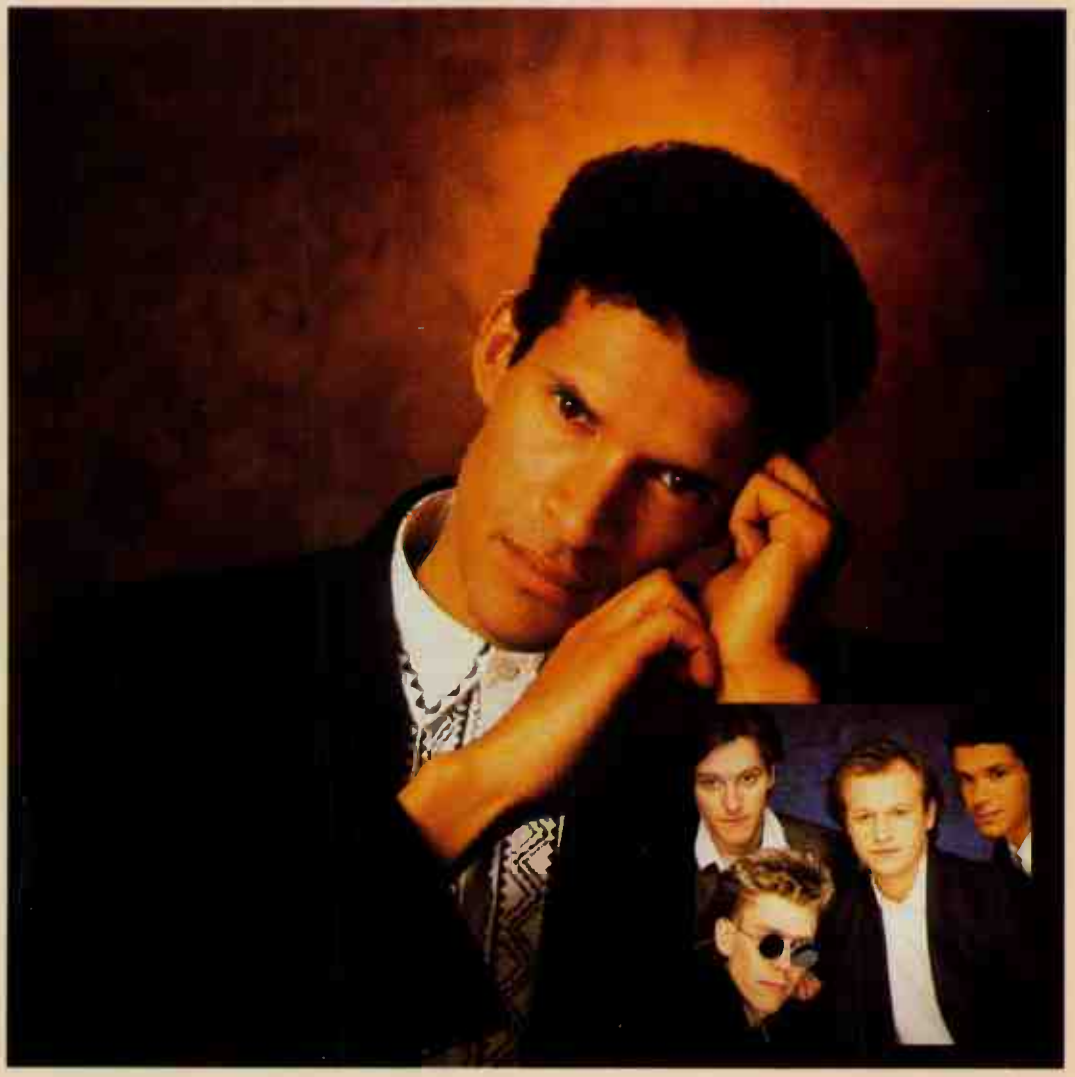

Following success in their native Britain, Level 42's blend of danceable rhythms, hi-tech sounds and immaculate production has finally begun to make its mark on the US charts.

Interview by Lee Branst.

YESTERDAY – EUROPE. TODAY – America. Tomorrow – The World. If you're a member of the English pop success story known as Level 42, such is your plan for conquest of the pop music world.

And who's to argue? With the tasty synth work of Mike Lindup, the seamless production of behind-the-scenes man Wally Badarou and the rock solid, grooving bass lines of Mark King, the band has established itself as an important force on the charts and in the dance clubs. The group first reached the English Top 40 in 1981 with a single 'Love Games' from their first album and since then, the hits have just kept on coming. In fact, the latest album, *Running in the Family*, has contributed four singles to the European pop charts. Not a bad batting average for a record with only eight songs.

Despite their success overseas, however, Level 42 has had a tougher climb here in the US. *World Machine*, the group's last album, sold about 700,000 copies on this side of the Atlantic. Now that's certainly respectable, but it's not quite the platinum paradise that they'd like to attain. Things should be improving quickly, though, because the band recently completed an American tour as the opening act for Madonna.

As for their long-term plans – the rest of the world, that is – they're about to begin a tour of Australia, New Zealand and Japan. In January, it's off to South America.

But before we get too caught up in the

future, let's return to the past and the band's beginnings. Keyboardist Mike Lindup explains how the group got together and the rather curious, circuitous route he took to get to the land of synths and sequencers.

"Well, we have really been together as a band since 1980," says Lindup. "Phil Gould, the drummer, and Boon, the guitarist, are brothers. They and Mark King, the bass player, are all from the Isle of Wight, which is a small island off the south coast of England. They came up to London independently to forge a musical career. I met Phil at a music college in London where I was studying percussion in classical music. He was coming up for part-time lessons with the same teacher. Through him I met Mark and Boon, who were sharing a flat. We realized we had common musical tastes, those being Miles Davis, John MacLaughlin, Weather Report and so on.

"At the time we all met, I was studying percussion and playing a bit of drums in a very awful college band. Mark was also a drummer, but he couldn't get a job in a music shop which sold drums. So he was working in a shop that sold basses and guitars, and that's where he did a lot of work playing the bass. So around the end of '79 we started playing together and rehearsing at music college on borrowed instruments.

"Fortunately for us, Phil and Boon had another, older brother who was working for MCA Records in London. He had a connection with a producer who had his own independent record label and was looking for new bands to sign. So this producer came down and heard us," Lindup recalls. "We were doing all instrumental stuff in those days and he liked one of the tracks, but he said, 'You have to make it into a song and then I'll sign you to my independent record label.' So we did a couple of singles with him that were distributed by Polydor.

"Around Christmas of 1980 Polydor said, 'We really like the band. We want you to sign with us direct, but we don't like the album you just did with this independent guy. We'll team you up with another producer, and you are now working for us.' And that was our first album, which was simply *Level 42*. It came out in the summer of 1981, and we had our first Top 40 hit from that. Afterwards we went on tour for the first time.

"Then we got a bit of a break later that year," Lindup continues. "We were invited to open seven concerts for The Police in Germany. That really did our live show a whole world of good. To go from playing in front of 300 people in a club to 8000 people who have not come to see you, you really have to get your shit together. Fortunately we did. That really started the whole ball rolling in Europe."

A fine story, but there's one point that's been overlooked. How exactly did a percussionist make the transition to synthesizers?

"Well, I've played piano from a while back; it was the first instrument I started to take lessons on. I went to a specialist music school in Britain called the Cheatham School of Music which takes kids from junior age to age 18. Basically they study all the normal school subjects, and music is crammed in everywhere else – that's individual lessons, orchestra, choir, analysis and so on. "Anyway, I took up percussion when I was in college because I realized while I was at music school previously that I didn't have the dedication to be a concert pianist. So I changed my first study from piano to percussion. It was a lot of fun, actually, because I got to play in the big symphony orchestras. Now that was really enjoyable because I love classical music, and it's a great thing to be in a band where you've got so many people having to play as one."

"We often double the bass line on synth and have other keyboard parts on top...it's impossible for me to do that live so we use sequencers for about 60% of our songs."

Generally that principle is fine and good, but in Level 42, it seemed everyone wanted to play as one drummer.

"When the band was forming, Mark was really a drummer playing bass; Phil was also a great drummer; and here I was trained as a percussionist; and you can't have three drummers in a band. We needed keyboards, so I started plunking on the piano."

"Plunking on the piano" hardly does justice to Lindup now. His technique and style are playing a large part in the propulsion of Level 42. He did begin his keyboard work in Level 42, however, with a trusty electric piano.

"The first instrument I owned was a second-hand Fender Rhodes which I finally retired last summer. Then I got a second-hand Minimoog. That's really how the keyboard setup got started. After we had done our first album, I got hold of a Prophet 5. That was really a big thing because we did a lot of work with it on our first couple of albums."

Another important contributor to the band's sound has been keyboardist Wally Badarou, who has co-produced all of the group's albums and is as responsible for their success as anyone.

"Wally was quite influential to me then because he was involved from the very start – playing some keyboard parts, but especially as a sound programmer. He came up with these great sounds for the Prophet. That sort of partnership has continued 'til the present day, so he has programmed for and played on all our albums.

"We complement each other as keyboard players, too. However, it's not likely that you could differentiate between us. There isn't any real definition as to what's Wally and what's me, unless you know us really well. I think we are just really fortunate that when we play together it sounds like a band with an extra member who is with us all the time. Our keyboard parts tend to really blend together."

In addition to his work with Level 42, Badarou has other outside projects, including a solo career (see our interview with him elsewhere in this issue).

"At the moment I think he's in Nassau finishing his next album," Lindup explains. "He divides his time between Paris, where he was born, and Nassau, where he has worked a lot, although he also comes to the States to work occasionally. He has a good career going as a solo artist. His last album did well in a lot of places, plus he is a very prolific session keyboard player. But the studio is really his home environment, and I think it would be difficult for Wally to rough it on the road. Circumstances would probably have to be very cushy to persuade him to come on the road with us. But he doesn't play with us live, so I have to try and do the work of two keyboard players."

Of course, that means using a sequencer.

"Right. We use a sequencer on stage for about 60% of the songs, I guess. We start working on the sequences in the studio because that's really how the song is done. Take, for example, the riff in 'Hot Water,' which needs that mechanical type of rhythm. We often like to double the bass line as well as have keyboard parts on top. But it would be nearly impossible for me to try and do that. Something would suffer. Quite often, we get a sequence to do the bass part with Mark, and sometimes add a rhythmic clarinet part. That leaves me free to do the other part."

MT described Lindup's setup in the February's *On Stage* column, but Lindup says that his instrumentation has changed considerably since then. This is the way he sets up now.

"I'm on a tall riser and I am facing the audience. In front of me is a Yamaha KX88 MIDI master keyboard, which has two MIDI channels. MIDI channel 1 runs to four modules of a Yamaha TX816 which is like eight TX7s in a rack. Channel 2 goes to the Roland digital piano. Above that I have my Prophet 5, which is now a MIDI Prophet 5. Then to the right of me I've got ▶

three keyboards in a stack, starting at the bottom with the Emulator II and then the DX7, and the PPG 2.3.

"I also have two racks behind me. The TX816 is in the left-hand one; the other four modules are being run by a QX1 sequencer which is also on my right. Plus I have a Roland chorus echo and a mixer in that rack. In the rack next door, I have the Roland digital piano and a DDL and the Yamaha SPX90 to use for reverb and another mixer.

"Those two mixers mix all the different keyboards plus the signal from the Vocoder. I have a Roland SVC350 Vocoder which I use on a couple of songs.

"All those keyboards are mixed to a line mixer," Lindup explained. "I also have my own speakers on the racks behind me for my own keyboard mix, in addition to the one I get from the monitors.

"The only other thing I would mention is that I use a head mic. It's a Countryman microphone and a headset which is made by a company called Hardware House in London. That's my setup."

Lindup adds that he's gotten rid of some of the equipment he started with. "I'm not using the Fender Rhodes any more because it was getting a bit long in the tooth and it wasn't sounding as good as it did. But this is really a good setup I have now with the DX sounds, the digital piano and the analog Prophet 5 kind of sitting on top of that.

"With all of these keyboards, it's possible to create a lot of different sounds and colors. I think it's a setup that I can grow with, too, because I still haven't fully explored all the possibilities of each individual keyboard."

Like many contemporary keyboard players, Lindup finds it difficult to stay on top of all the technical sides of his instruments. "You have to divide your time as a programmer, and as a writer, and as a performer. At the moment, performing is taking up the most time. So I haven't got time to sit down and fiddle about with knobs and things."

Lindup adds that he is also too busy to keep up with the constantly growing array of new products. "There is so much development it's almost frightening," he says. "What I've realized is that I haven't got the time to go and check out every new keyboard as it comes out. I can't afford to do that. So what I have done is tried to find keyboards that I can develop with and then stick with them. Occasionally I might update the keyboard, like get a new DX7, but there is still a lot you can find with the existing equipment.

"I mean, even the Propher 5 can do things that really no other keyboard can do, and I appreciate it for that. It's kind of got its own character, as the PPG has. There are some sounds that are very nice that it does well, and other things it can't really do. It's a bit limited in that way. But it's totally different from all the other keyboards I have, so it adds to the sound color.

"The only thing I have acquired recently is the new DX7II, which I am reading up on, sort of doing some homework on. I think there are a lot of changes from the original which are really exciting. It's a good keyboard."

"When I discipline myself to program, I find that as you modify a sound, that sound can inspire you to have an idea. Then you can go off on a tangent."

Lindup is also enthusiastic about the infamous Linn drum machine/sequencer. "I think the Linn 9000 is a great instrument. Mark King has one which he's used to great effect as a writing tool. It's really a shame that it kind of fell by the way, although it's apparently sort of coming again under the guise of Akai. So it will be interesting to see what that's like."

For the moment, though, Lindup is satisfied. "I have no plans to get any new equipment soon because the setup I have can cover all the sounds of all the stops that we are playing right now. We are going to be really touring this album until the end of next year, so there is no point in it for me at the moment."

In addition to discussing his array of synths, Lindup explains that when the band gets into the studio, it makes use of a Synclavier. That's where Wally Badarou comes in.

"Yes. Wally's really the Synclavier man. He's had one for almost three years. We tend to use it as a synthesizer to add to our overdubs because Wally is very much into creating his own FM synthesized sound on the Synclavier. We also use it to help out with creating vocal effects and then flying them into the piece. Plus we use it for the more unusual sounds like sampled sounds that we do either in the studio or that Wally has on disk.

"But it's an additional thing," Lindup is quick to point out. "It's not the mainstay of the sound while we are in the studio. It's an addition both to the music and to the mixing desk. It works in both senses."

Lindup also takes advantage of Badarou's technical expertise in programming other synths.

"I regard myself as a musician who has learned to use synthesizers...well, is learning how to use synthesizers. I don't have that sort of computer brain Wally has. At the moment, Wally seems to like writing his own programs on the Macintosh. That's how far he goes into that side of it. He's a great musician as well, but he also likes to sit down and just spend hours modifying and so on.

"I prefer to play. I would much rather be jamming, as it were. So I find it kind of difficult to discipline myself to program somehow. When I do program I find that as you modify sound, the sound inspires you to have an idea. Then you go off on a tangent. So, for me, it becomes a creative process."

The creative process has been fruitful for Lindup and company, as a quick listen to *Running in the Family* will demonstrate. The band uses a variety of musical sounds and consciously avoids developing an easily recognizable "signature" sound.

According to Lindup, "We try hard to get different sounds for each song that we are doing; we try to create a special atmosphere for that song. So we go out of our way to get variety. I haven't really been concerned with trying to find a good sound that I could say is me and use that sound all over the tracks."

In fact, the *lack* of a predetermined formula and prefabricated sound has proven most beneficial to Level 42 on its planned ascent to the top of the charts. Their spontaneous – and infectious – creations have begun to take hold here and promise to keep us dancing for some time. The summit is clearly in sight. ■

Photography *Samuel Barksdale*

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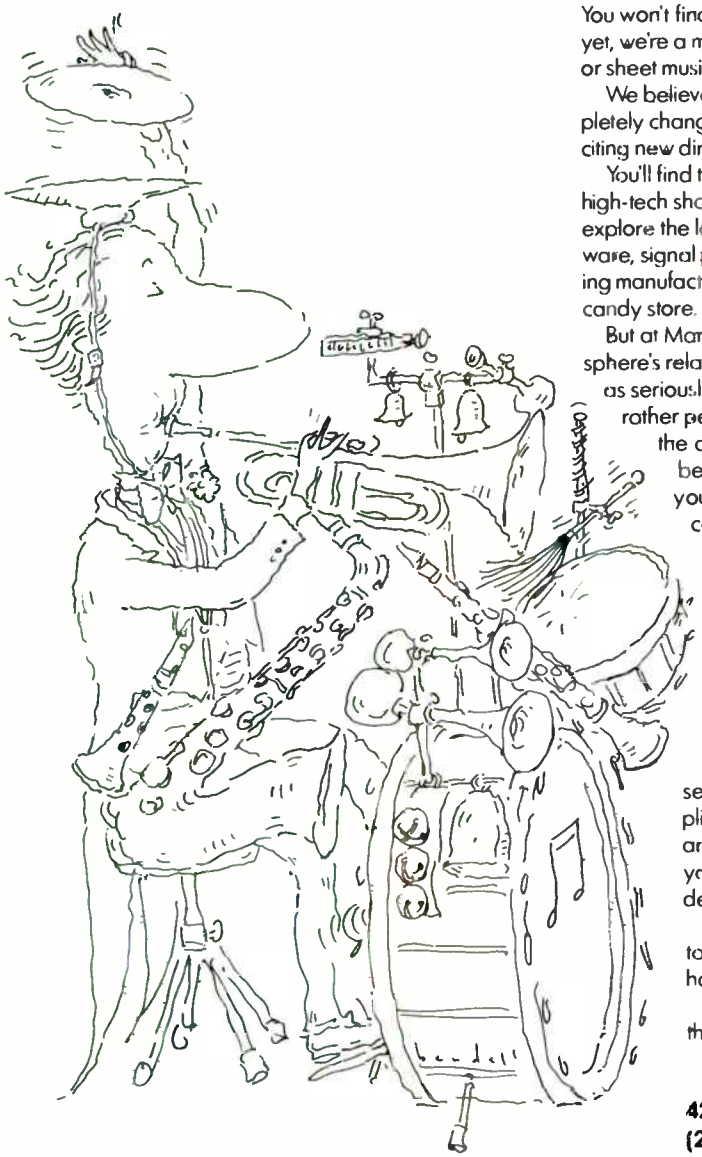

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SOUNDS natural

Part 3: The Snare

In the third and final segment of our series on synthesizing and sampling the sounds of acoustic instruments we examine the elusive snare drum.

Text by Howard Massey with Alex Noyes and Daniel Shklar.

PROGRAMMING

MT is reprinting excerpts from a new book written by three staff instructors at the Center for Electronic Music, a non-profit organization based in New York City which offers educational services in music technology. Entitled *A Synthesist's Guide to Acoustic Instruments*, the book presents a discussion of 25 acoustic instruments from the point of view of the synthesist – no matter what kind of axe he or she is using. Each instrument is examined in the same general way – with an explanation of its physical construction, commonly employed playing techniques, timbral analysis, and envelope characteristics. After those discussions, tips are presented as to how to go about synthesizing these types of sounds with generic subtractive synths (including most analog instruments), digital phase distortion synths (ie. the Casio CZ instruments), and digital FM synths (like the Yamaha DX and TX synths). Last, but by no means least, each instrument chapter concludes with guidelines on the best ways to sample the acoustic sounds themselves into the sampler of your choice.

A SNARE DRUM IS essentially a hollow cylinder with two membranes attached. The cylinder of the drum (called the shell) is quite shallow, and constructed of metal, wood, or plastic. The membranes stretch across both ends of the cylinder and are referred to as the heads or skins of the drum, as they were originally made of animal skin. The heads are held in place by a series of metal lugs, which may be tightened or loosened to alter the tension of the head. Tighter head tensions produce a sharp, snappy, sound (typically used in orchestral or jazz settings). Looser head tensions result in a thick and full snare drum sound (often used in rock settings).

Stretched across the bottom head are a series of strands of thick wire or gut (with up to twenty-four individual strands). These wires are called the snares, and they rattle when the bottom head starts vibrating as a result of the top head being struck. This serves to add the characteristic bright "crack" to the sound of the instrument. These snares can also be disengaged from the bottom head with the push of a lever. When they are disengaged, the snare drum sounds very much like a tom tom.

The diameters of snare drum heads range from sixteen to twenty inches. The depth of the drum's cylinder may be as little as three inches (in the piccolo snare drum). A cylinder depth of six or seven inches is found in the orchestral snare drum, which is also commonly used in rock settings. The cylinder depth may be as great as eighteen to thirty-six inches in the case of the military snare drum. In general, snare drums of greater depth will produce deeper sounds.

When the top head of the snare drum is struck, the resultant vibrations are transmitted to the air trapped inside. This, in turn, causes the lower head to vibrate sympathetically, which then causes the snares themselves to vibrate. One of the characteristics of the snare drum is its tremendous dynamic range. It is capable of producing sounds ranging from barely audible to nearly as loud as the report of a small explosive!

How It's Played

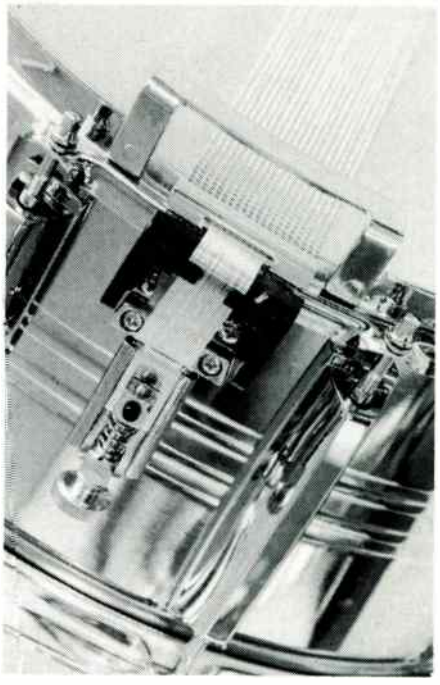
THE SNARE DRUM is played by striking its top head with a drumstick (usually made of wood), or by hitting or stroking the top head with a wire brush. Some drumsticks are fitted with plastic tips, although these have a much greater effect on cymbals than they do on the snare drum.

The top head may be struck near its center (but not usually at dead center), resulting in a full sound. It may also be struck at its edges at the same time as the metal rim is struck. This is called a rim shot, and produces a sharp "crack." Obviously, when the drumstick is brought into contact with the head with greater force, the resulting sound will be louder. Heavier sticks, or even the blunt back ends of drumsticks, are often used to impart even more force to the blow.

There are also many different strokes used by drummers. The head may be struck by a single drumstick, or it may be struck nearly simultaneously by two sticks (this is called a flam). It may be struck repeatedly with alternating sticks (a single-stroke roll), or repeatedly with two strikes of one drumstick, followed by two strikes of the other (a double-stroke roll). The former technique is often used in contemporary rock settings, and the latter more for military and orchestral playing. Drummers may also occasionally place the tip of the drum stick near the center of the drum and drop the blunt end of the stick onto the rim (called a sidestick). This

SNARE DRUM

Note Range: Unpitched
Polyphony: Monophonic
Related Instruments: Tom tom, timbale, and tenor drum



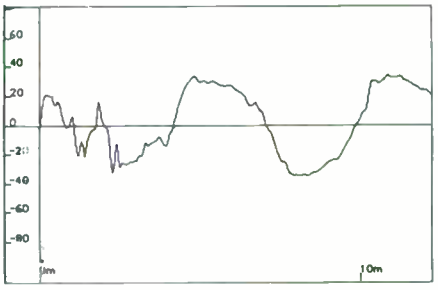
produces a sound very much like that of a resonant woodblock. There are many more types of drum strokes commonly used as well.

In rock settings, the snare drum is the predominant drum. Here, it serves to provide the backbeat – meaning that the drum is regularly struck on the second and fourth beats of each four-beat measure. In jazz settings, the snare drum is more commonly played "around" the beat, with one stick or brush often lightly filling in with syncopations. In orchestral music, the snare drum is used more for specific accents, and to provide dynamics to the music. The instrument is a staple of military music, where its characteristic rolls and flourishes add much to the flavor of the music.

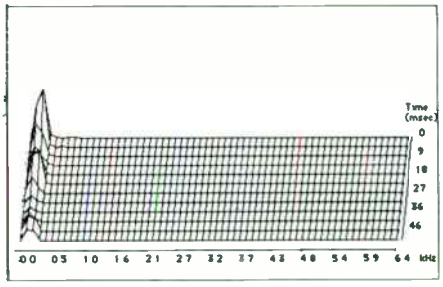
Timbral Analysis

THE SNARE DRUM sound has no definite pitch. Instead, it contains a broad range of inharmonic overtones ranging in frequency from about 100Hz all the way up to 20kHz and beyond. The particular metal shell snare drum sound that we sampled and examined, for example, exhibited inharmonic overtones all the way up to approximately 121 times the 100Hz fundamental frequency! The overtone content of a specific snare drum depends upon many factors. These include the construction of the shell, the thickness of the top head, the force with which it has been struck, and the location at which it was struck – with the last of these having perhaps the greatest effect on the overall timbre. Striking the head at dead center yields the dullest sound, with a predominant fundamental and slightly subdued overtones. Striking the head just off center seems to lessen the strength of the fundamental just a bit, while increasing the amplitude of the higher overtones. As the snare drum is struck closer to its edge, the fundamental is attenuated further still, while the higher overtones increase in strength even further, resulting in a thin and bright sound.

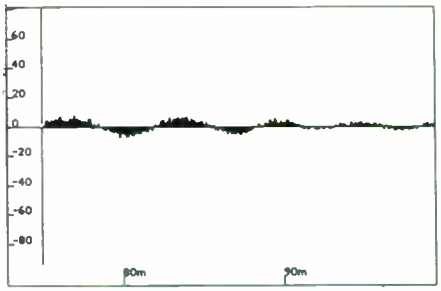
Although there is little discernable pitch in this sound, the fundamental frequency, as noted above, can be altered by changing the tension of the head. This is accomplished by tightening or loosening the tuning lugs which hold the rim tightly over the head and against the drum body. There are generally eight to twelve of these lugs, and it is usually desirable to apply equal tension to each in order to produce the most pleasing tone from the instrument. As the head is stretched tauter, the fundamental frequency rises and as the tension of the head is relaxed by loosening the lugs, the fundamental frequency will fall. The thickness of the



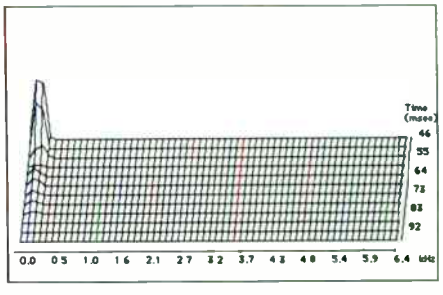
Start of snare sound: *Note the very rapid attack and very irregular shape at the onset of the sound, indicating a sound composed almost entirely of inharmonics.*



Start of snare drum sound (FFT): *Note the presence of a few random high inharmonics during the attack of the sound.*



End of snare sound: *At this point (less than a tenth of a second into the sound), the waveshape is much more like a sine wave, but with very low amplitude and a few jagged edges, caused by the high inharmonics generated by the snares vibrating.*



End of snare drum sound (FFT): *Note the rapid decay, first of the overtones and then of the fundamental frequency itself.*

►material used for the head (almost always plastic) has considerable impact upon the timbre of the sound. Thicker skins generate fewer high overtones than thinner ones (since they absorb the vibrational energy more readily). These and various other anomalies make it difficult to generalize about the timbral makeup of the typical snare drum sound, but certain features are common to most.

The overtone structure of any vibrating circular membrane is quite complex. The nodes of vibration travel across the surface of the head in different circular and linear configurations. The circular patterns are concentric, while the linear patterns often cross one another to produce inharmonic, rather than harmonic, overtones. Some of the overtones produced by simpler vibrational nodes occur at 1.59, 2.13, 2.29, 2.65, and 2.91 times the frequency of the fundamental. These non-integer components, and many more, are present in great strength, making the snare drum sound closer to pure, unpitched white noise than perhaps any other acoustic instrument.

Changes in Sound

THE SNARE DRUM sound is of brief duration (generally lasting less than a second) – a non-sustaining and transient sound. The drum's head is stretched when struck by the stick and snaps back almost instantly – producing no more sound until it is struck again. Because of its brevity, this sound produces virtually no periodic wave.

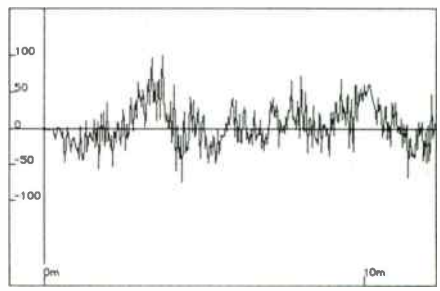
The sound's attack and decay times are virtually instantaneous, with no sustain. The snares have a damping effect on the bottom head, causing a very short release time. The snares themselves also quickly cease vibrating. This basic shape characterizes the timbre, as well as the loudness, of the sound, although the higher overtones of the snare drum sound are the last components to fade away.

Subtractive Synthesis

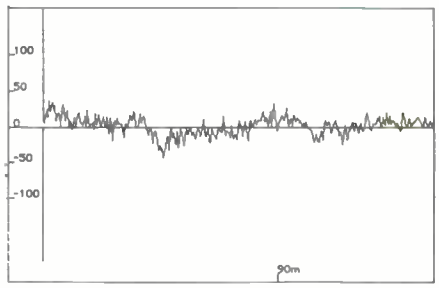
BECAUSE THE SNARE drum sound is almost entirely without pitch, you need no audible oscillators for this patch, so shut off their signal completely at the mixer. Then, raise the output of your noise generator to maximum. This will create a random, unpitched timbre.

Set the low pass filter cutoff frequency at about 30% (but adjust this by ear for your particular subtractive synthesizer). Add no resonance, and no keyboard control, so you can generate a fixed timbre throughout the keyboard range.

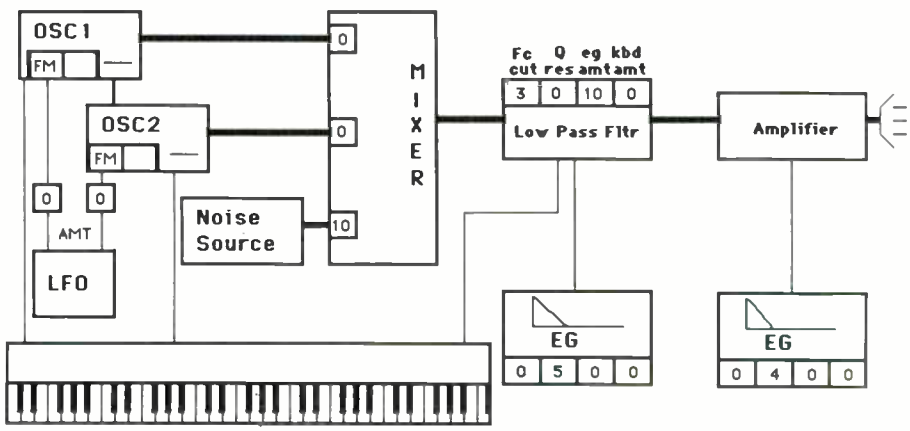
Since the snare is such a bright sound, it ►



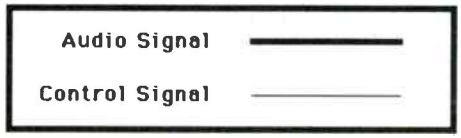
Start of subtractive snare drum patch: *This waveform reflecting the presence of pure white noise, is far more aperiodic than that of the real snare drum.*

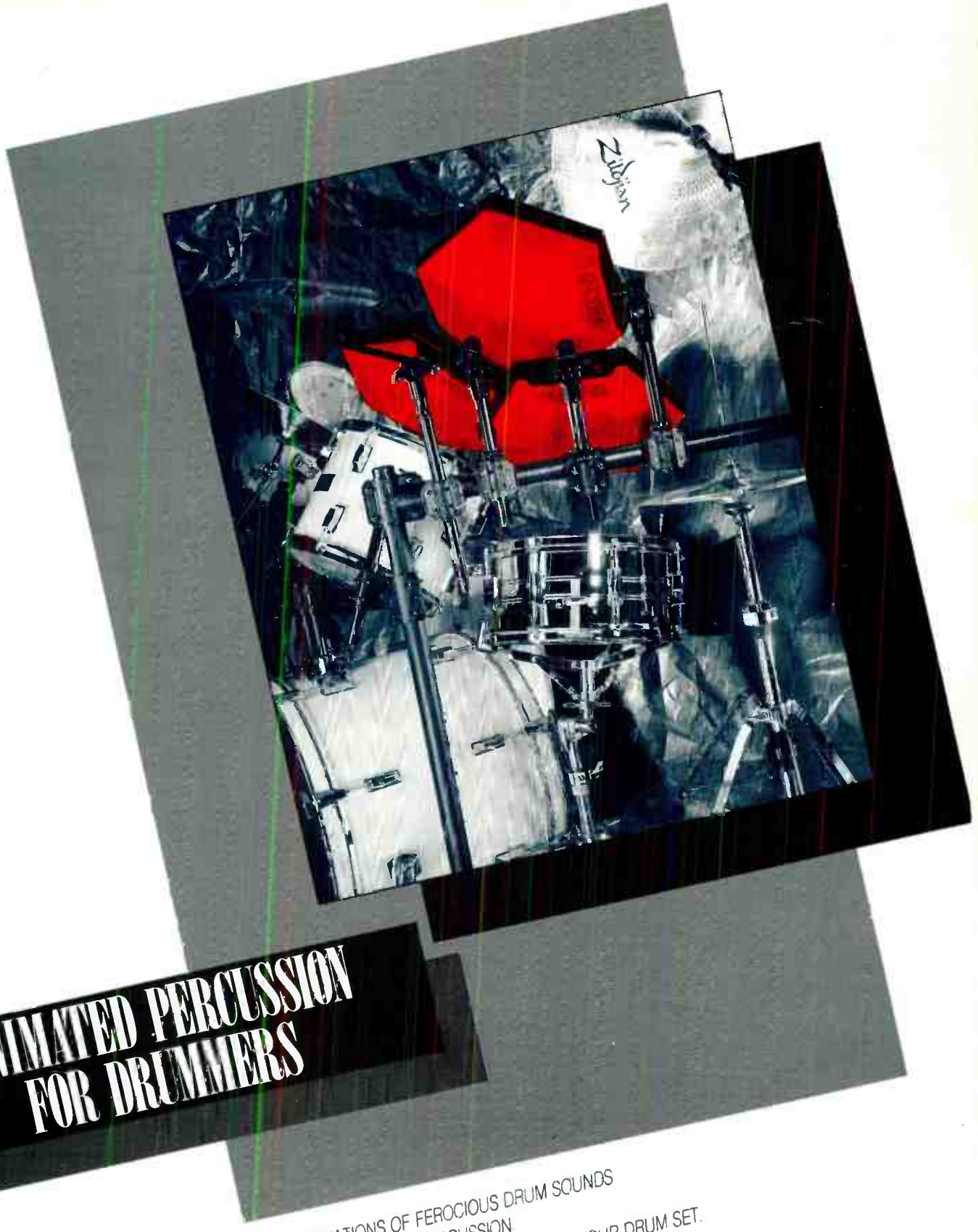


End of subtractive snare drum patch: *The overall amplitude has decreased in a fashion similar to the real snare drum, but the sound is obviously more noise-like and less pitched than that of the acoustic instruments.*



Subtractive snare drum patch chart.





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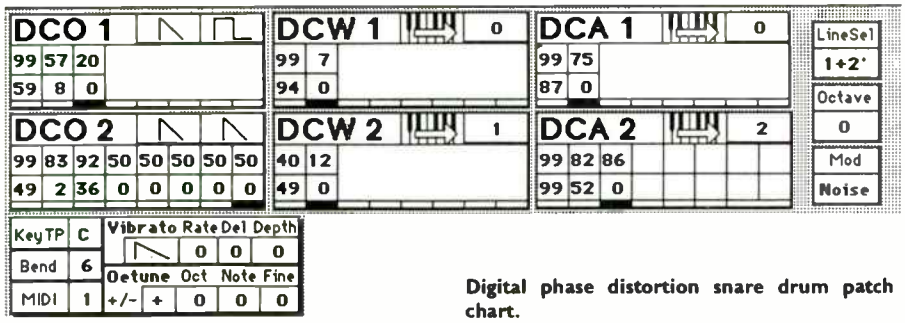


Digital phase distortion snare drum patch chart.

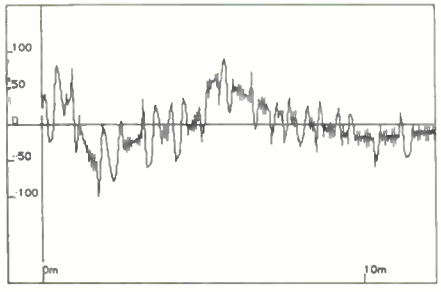
may surprise you to see such a low filter cutoff setting. However, the filter EG compensates for this setting by sweeping the frequency considerably. Set this for maximum depth, an instantaneous attack, a decay time of about half of its maximum, no sustain, and a very short release. You should adjust the decay time further by ear, as it has a great effect on the type of snare drum sound produced with this patch. Set the amplifier EG with very similar values, but make sure its decay time is a bit shorter than that of the filter, as you don't want to be able to hear the filter close down completely at the sound's end. These EG settings will allow you some articulation, as playing staccato notes will result in short, transient sounds.

Further articulation controls are available to you if you are working with a velocity-sensitive keyboard. If so, route some of this controlling signal to the amplifier and/or filter. This will cause louder and/or brighter sounds to be produced as keys are struck more quickly. If your system has a high pass filter, you may find that removing some of the lower overtones in the noise may help the "crack" effect in the snare drum sound – a result of the fundamental dying away rapidly, leaving only the higher overtones at the sound's end. You might also want to try adding a very small amount of one of your audio oscillators, tuned to a low, audible range frequency (90 to 100Hz), and using a triangle wave. This should help to add some "thud" to the "crack" being contributed by the noise generator.

Finally, if you have access to some outboard signal processing equipment, you will undoubtedly find that some reverb or short feedback delay helps this patch a great deal.

PD Synthesis

THIS RELATIVELY straightforward patch uses the 1+2' line configuration with two harmonically rich waveshapes (the sawtooth and pulse). A great deal of detuning should be employed here, as well as noise modulation for the contribution of the snares themselves.



Start of digital phase distortion snare drum patch: *As with the waveshape of the subtractive snare drum patch, this jittery and aperiodic waveform reflects a sound which is more noise-like and less pitched than that of a real snare drum.*

Both DCO envelopes are set to produce a sharp drop in pitch throughout the brief duration of this sound, in emulation of the typical pitch change which occurs in the snare drum sound. Set the DCW envelopes to very simple percussive shapes, with no keyboard following for line 1, and only the minimum amount for line 2. This renders higher pitches considerably brighter than low ones – allowing you to ▶

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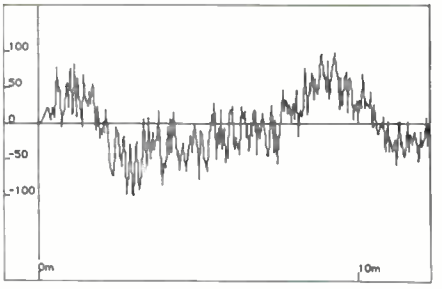
►synthesize various types of snare drum sounds in the different registers of the keyboard. You can then pick the one note that best represents the sound you want. We found this patch to be best between the lowest and second lowest octaves of the keyboard, but your ears may tell you differently.

Give the DCA envelopes percussive settings as well, to cause the sound to exist for only a very brief period of time, in imitation of the transient nature of the snare drum sound itself. Again, use no keyboard following for line 1, and only a very small amount for line 2. These offsets mean that part of the sound will undergo more rapid changes for higher notes – while another part of the sound changes consistently throughout the keyboard range – helping to add complexity (and therefore realism) to the final synthesized sound.

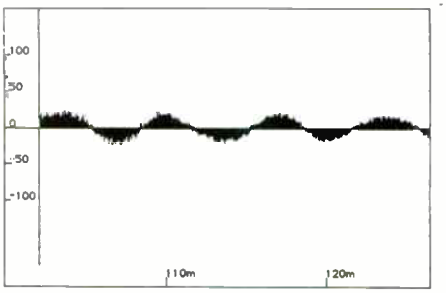
You do not need to use the LFO here at all. However, if you play this patch on a velocity-sensitive synthesizer (like the Casio CZ1), route some of this controlling signal to both the DCA and the DCW. This will give you a great deal of dynamic control – important with an instrument with as great a dynamic range as the snare drum.

FM Synthesis

VERSATILE AS THE digital FM system is, it is not particularly good for generating random timbres or noise effects, because



Start of digital FM snare patch: *This waveshape is remarkably similar to that of the start of the subtractive snare drum patch. Again, this sound is more inharmonic than the real snare drum sound.*

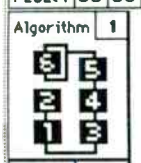


End of digital FM snare drum patch: *At this point the wave is far more sine-like, indicating a clear pitch component. The irregularities reflect the ongoing presence of upper inharmonics (simulating the snares). This is in fact visually, and therefore sonically, closer to the original acoustic sound than either the subtractive or digital phase distortion patch.*

On/Off	1 Car ☒				2 Mod ☒				3 Car ☒				4 Mod ☒				5 Mod ☒				6 Mod ☒			
EGRate	99	53	99	62	99	70	43	38	99	58	99	28	99	99	99	39	99	21	99	64	99	99	99	33
EGLev	99	0	0	0	99	79	0	0	99	0	0	0	99	99	99	0	99	0	0	0	99	99	99	0
Scaling	0	A-1		0	0	A-1		0	0	A-1		0	0	A-1		0	0	A-1		0	0	A-1		0
Curve	-lin		-lin		-lin		-lin		-lin		-lin		-lin		-lin		-lin		-lin		-lin		-lin	
Output Level	97	Vel	RSc	AM	78	Vel	RSc	AM	99	Vel	RSc	AM	98	Vel	RSc	AM	85	Vel	RSc	AM	99	Vel	RSc	AM
		0	0	0		0	0	0		3	0	0		0	0	0		0	0	0		0	0	0
Freq	M	Coar	Fine	Det	M	Coar	Fine	Det	M	Coar	Fine	Det	M	Coar	Fine	Det	M	Coar	Fine	Det	M	Coar	Fine	Det
	f	91.	20	0	f	63.	10	0	f	10.	00	0	f	1.0	00	0	f	1.0	00	0	f	70	7.9	0

PEGRat	99	99	99	99	LFOWave	Spd	Del	PMD	AMD	PMS	Sync
PEGLev	50	50	50	50	SawDwn	0	0	71	0	7	On

Algorithm	1
KeyTP	C3
Feedback	7
KeySync	On



Digital FM snare drum patch chart.

the system becomes erratic and unstable when distorting a sound to this extent. Creating this patch was therefore perhaps the greatest challenge of all of those presented in this book. The resulting sound is a pretty realistic imitation of the sound of a military snare drum.

As with the subtractive and digital phase distortion patches above, white noise forms an important basis for this sound. This is because its lack of pitch and its strength in high frequency components make it the ideal sound source from which to generate the sound of the vibrating snares. One good way of generating white noise in a digital FM system is to use a stack of three modulators to feed a great deal of signal into a single carrier. This results in an overloaded and distorted timbre. With the luxury of the six operators available in the DX7, two operators can then be allocated to produce the hollow "drum" part of the sound. Algorithm 1 provides the necessary configuration. We chose this specifically over algorithm 2 (which is virtually the same) because algorithm 1 provides a necessary feedback loop on the stack – rather than on the single modulator-carrier system, as does algorithm 2.

All operators are set in a fixed frequency mode, resulting in a single snare drum sound throughout the keyboard range. This allows you to play this sound percussively. Let's start by examining the simpler system – consisting of operators 1 and 2. A snare drum's fundamental frequency is approximately 100Hz, so set operator 1's fixed frequency in that area. You can adjust the tuning of this patch by raising or lowering this frequency slightly, but we got the best results at 91.2Hz. Set operator 2 about 30 cycles per second lower, to generate a wide variety of inharmonic undertones, as well as overtones. Adjust its output to a fairly low level to produce a warm and hollow timbre. Apply no velocity sensitivity to either operator. Since you need a consistent sound throughout the keyboard range, there is no need to use keyboard level scaling controls either. The EGs of both of these operators should be set to a fairly simple percussive shape, with operator 2's EG being slightly more contoured. Both EGs have a short after-ring, with that of the modulator relatively longer than that of our carrier – so you never quite hear the end of this timbral shift. Again, because you are creating a consistent sound throughout the keyboard range, use no keyboard rate-scaling here either.

So much for the hollow "drum" component of the sound: now let's see how to make the sound of the snares with the other operators. As mentioned earlier, this process requires the use of three stacked modulators feeding a great deal of signal into a single carrier. The idea here is to eliminate the fundamental frequency being produced by the carrier – which, in theory, is not truly possible. However, this effect can be achieved by placing the fundamental frequency of the carrier in the sub-audio range (10Hz, in this instance). Then, do the same for the two modulators immediately above it. Set the top modulator in the stack, which has its feedback loop wide open, to an audible range frequency (707.9Hz, in this case) to produce something more than a rumble. All of these modulators are placed at or near their maximum output level to induce a great deal of distorted sound. With these settings, something close to white noise is produced.

Use the envelope generators in these four operators to shape this white noise into something approaching the sound of the rattling snare. This is easily accomplished by setting the carrier for a basic percussive shape (with a small ▶

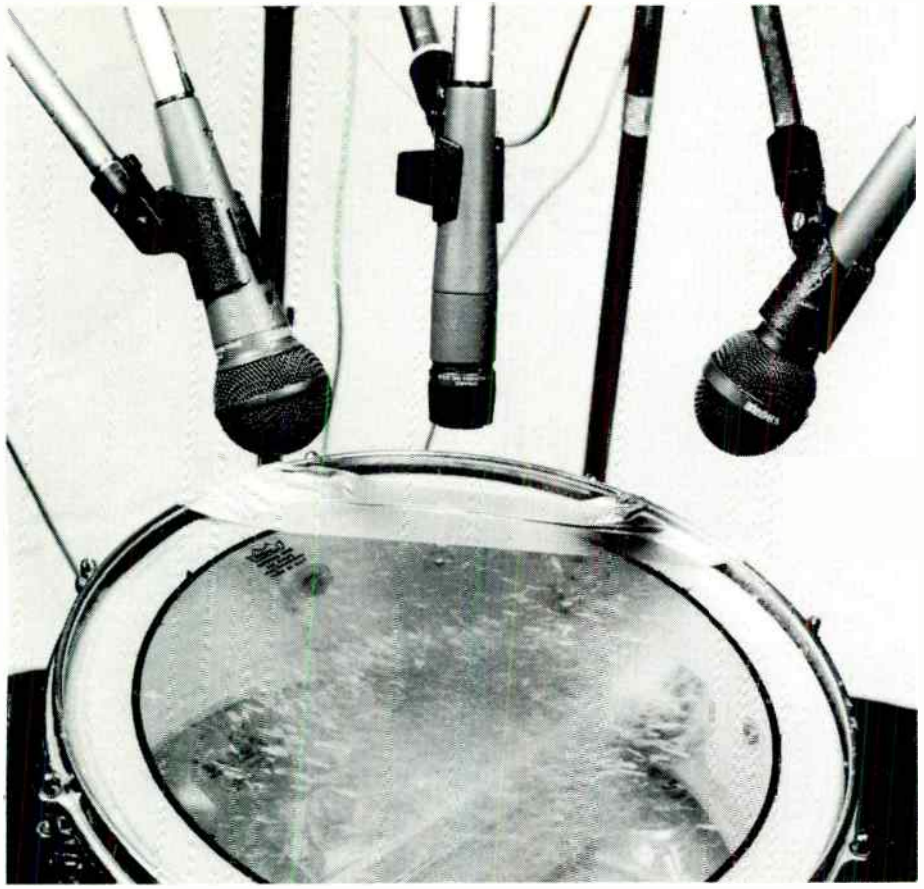
► amount of rate 4 after-ring). Retain the basic square EG shapes in both operators 4 and 6 – and add just a bit of different after-ring values to each. Then, adjust the EG of the middle modulator (operator 5) to a percussive shape similar to that of the carrier. As before, use no rate-scaling or keyboard level scaling, but add some slight velocity sensitivity in the carrier (operator 3), so that as keys are struck harder, notes will have a bit more "snare" sound.

The last important component of the snare drum sound is the characteristic pitch shift found in all vibrating membrane instrument sounds. The typical digital FM system (like that of the DX7) provides you with a separate pitch EG. The problem is that the pitch EG does not affect any operators in fixed frequency mode – and all the operators in this patch are in that mode. The LFO provides a solution. Set it for a sawtooth-down waveshape. The beginning part of this wave is almost instantaneous – this is followed by a slow drop. Slow the LFO speed down to minimum and – most importantly – synchronize it so that each new key depression starts a new wave. Then, use this signal for direct pitch modulation. (This affects all operators equally). This causes the pitch to drop somewhat after each key strike – just as a real snare drum's pitch drops immediately following each strike of the drumstick.

Sampling

EFFECTIVELY RECORDING THE snare drum is a demanding job for the recording engineer. The task is a complex one, often requiring a great deal of signal processing and more than one mic.

Current fashion favors an ambient snare drum sound. This is usually obtained by placing mics a distance of ten feet or more from the instrument. These should face a reflective surface (eg. a wooden ceiling or floor, or a glass window). The resulting ambient sound is usually combined with a sound obtained by close-miking – facing mics at a distance of a few inches toward the top head, bottom head, or both. Miking the top head will add more "thud" to the recorded sound. Miking the bottom head will result in more "crack" as the rattling snares themselves are here more prominent. Occasionally, undesirable head "ringing" may occur – especially with drums that are not correctly tuned. This can usually be eliminated by adjusting the tuning lugs or by placing a strip of thick tape along the length of the top head. If multiple microphones are used, be sure that they are all in phase with one another, or serious frequency cancellations may result. Close mics are generally placed at a distance ranging from one to six inches from the drum's head – about a quarter of the distance from the rim to the center. If you change the mic placement even



slightly, the sound will often undergo a considerable change.

The choice of mic is also very important, the most critical factor being whether it is capable of handling the very loud dynamics that the snare is capable of generating. Dynamic mics, such as the Sennheiser 421 and the Shure SM57, are perhaps most commonly used. Condenser mics such as the AKG 414 or the Neumann U87 are also often used to record this instrument, but they must have their attenuating pads switched in. Sometimes the best results are obtained by placing a dynamic mic over the top head and a condenser mic under the bottom head (as the condenser is typically better able to reproduce the very high frequencies that emanate from the snares).

Typical signal processing used includes good doses of EQ, often boosting the 100 to 200Hz and 12 to 15kHz areas. This enhances both the "thud" and "crack." Some mid-range frequencies may be rolled off as well. Compression is also often applied to give "punch" to the sound. To this end, slopes of 3:1, 4:1, and greater are used, with peak attenuations of anywhere from a few decibels to ten or more decibels. If ambient mics are used, they are often gated and keyed from one of the close mics – and they may be even more severely compressed, with relatively slow compressor attack times. This adds a "sucking" effect to the sound (see Collins, P. and Bonham, J.). If your snare drum is first recorded on tape, careful tape saturation techniques can add a smoothing effect to the sound which is sometimes preferable to that added by a compressor. In other words, record the sound at as hot a level as possible, without causing undesired distortion. Short reverberations and/or slap echoes (echoes with feedback) are usually added as well – sometimes with a slightly delayed feed (predelay) so as to separate the reverb from the main signal. Other, more exotic recording techniques include using the snare to key a gated white noise source (typically from an analog synthesizer) – or to trigger sampled "whip-crack" sounds.

Of course, you have the option of sampling an unprocessed snare drum sound, and processing the sample itself. However, it is more common to sample a processed sound, since this calls for little manipulation of the sound after it leaves the sampler. Looping is unnecessary here, since the snare drum is a non-sustaining and transient sound. Because the pitch area of the snare drum sound does not change much from note to note, multi-sampling for pitch change is also unnecessary. In general, you should do most, if not all, of the signal processing before the snare sound reaches your sampler. Again, record the sample at as high a level as possible without overloading (be particularly careful here as digital overload is not a nice sound). Take the time to experiment – some of the finest professional recording engineers spend their entire careers searching for the "perfect" snare drum sound. ■

MIDI 102

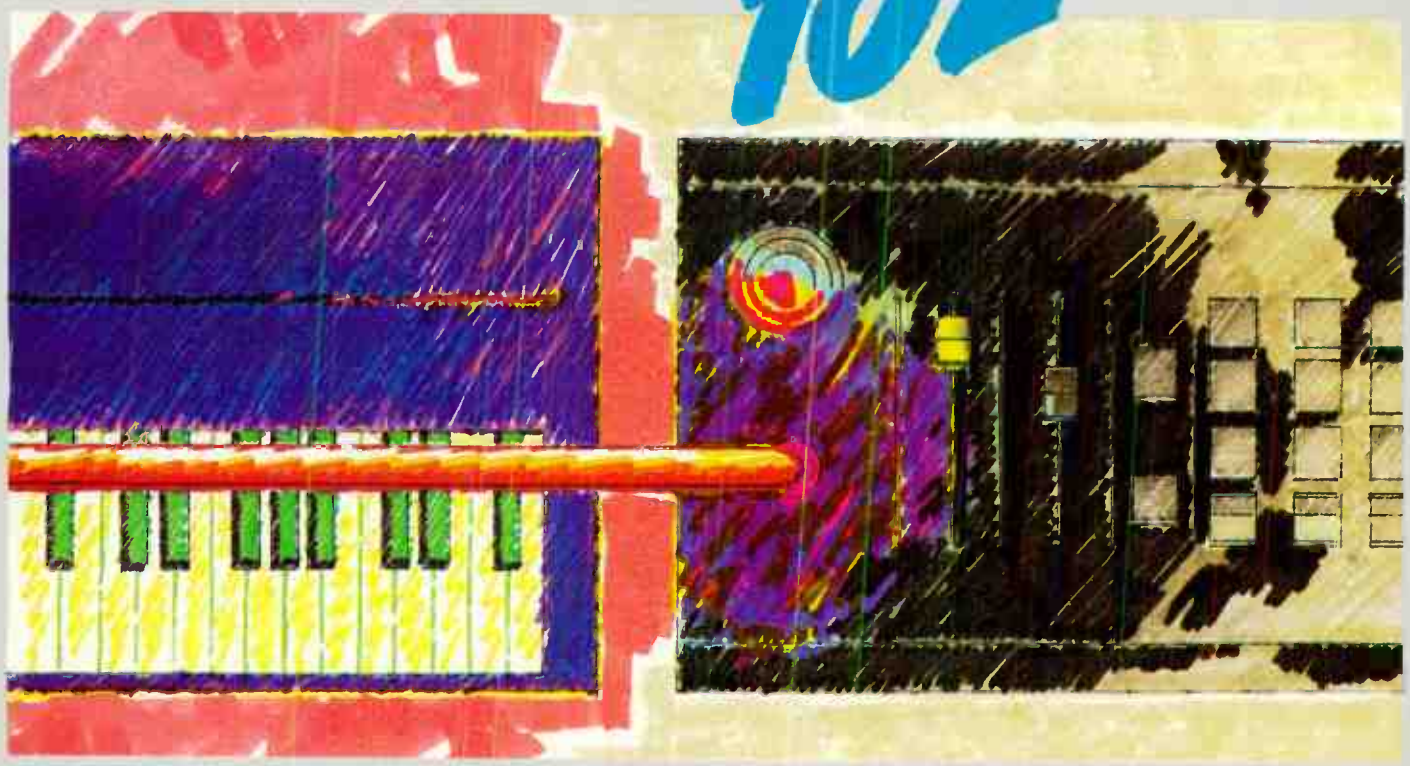


Illustration Stuart Catterson

In the second part of our series on MIDI basics we explore the important connection between a MIDI keyboard and an expander module. *Text by Bob O'Donnell.*

ONE OF THE first things that people who start working with MIDI discover is that in addition to being a helpful tool, MIDI is a lot of fun. Playing a couple of synthesizers at once from one keyboard gives you a very enjoyable feeling of power. There's nothing quite like pushing down one key and hearing an enormous *sound* emanate from the speakers. Add a sequencer and drum machine into the package and you end up with a music making system that's as intoxicating as it is inspiring.

Interestingly enough, working with these instruments also gives you an equally strong urge to learn more about and do more with the Musical Instrument Digital Interface. And now that you've waded through, digested and completely understood the basic theory in the first part of this MIDI series (OK, so maybe you didn't get *all* of it . . .), it's time to do just that.

This month we'll begin our look at real world applications of MIDI – no more theory, I promise – and start to put together our typical MIDI system. The layout of this system (which was supposed to have run last month but didn't because of a last minute production problem), is shown in Figure 1.

Keyboard and Expander

PROBABLY THE MOST basic connection (in terms of hookup) but most important (in terms of understanding exactly how MIDI works) in the world of MIDI is the one between a MIDI keyboard and another synth, whether a "keyboard-less" synthesizer module or another keyboard. If you've spent any time at all with MIDI products, then you've undoubtedly seen how you can hook two instruments together via the MIDI In and Out ports and play one remotely from the other. The reason this is possible, as was explained last month, is that the main keyboard sends MIDI messages out of its MIDI Out port and into the second instrument's MIDI In port and these messages tell the second instrument which notes to play, how loud and so on.

Before we go any further into explaining what these messages are, though, it helps to look at the basic structure of a typical MIDI keyboard synthesizer and explain how it differs from an expander module and a keyboard controller. As you can see in Figure 2, the two basic components of any synthesizer are the keyboard itself and the sound generating circuitry. The keyboard is, of course, self-explanatory and the sound generating ciruitry is the portion of the instrument which is actually being referred to if you say an instrument is an analog synth, or an FM synth or even a sampler.

In most instruments the two component sections are hardwired together so that whenever you play a note on the keyboard, the sound generating circuitry produces the correct note. The interface between the keyboard and the sound generating circuitry may consist of a data bus, some control voltages, or some combination of control signals – the specific control signals employed are not really the issue here. For the time being, let's just say that this "local control" exists in some form or other.

Some instruments allow you to disconnect the local control so that playing a note on the keyboard will *not* produce any sound. Referred to as Local On/Off, this feature is primarily used for advanced sequencing functions (which we'll get to next month). For our purposes, though, we can use it to understand how expanders and keyboard controllers work.

A synth module, which is basically a synthesizer in a box, is functionally equivalent to the sound generating portion of a synthesizer. It cannot produce any ▶

► sound on its own, but as soon as it receives the right control signals – specifically MIDI note messages – it acts upon them and plays the appropriate notes. Keyboard controllers, on the other hand, function like the keyboard portion of our "typical" synth. They produce no sound of their own, but instead send out control signals in the form of MIDI information which "tell" the synth module what to play. So if you combine a keyboard controller and an expander module together via MIDI cables, you have the equivalent of an all-in-one keyboard synthesizer (see Figure 3).

M I D I

"A MIDI Thru port transmits an exact replica of the information that came into an instrument's MIDI In port back out into the system."

Most keyboard controllers ("master" or "mother" keyboards, as they are sometimes called) offer more sophisticated MIDI controls and often have more piano-like keyboards than most synthesizers. Manufacturers have to control their costs to produce instruments at prices that you and I can (or think we can) afford and, with the synth voices being generated from a separate module, the focus of master keyboards is on the keyboard action and MIDI control features.

Lately, keyboard synthesizers have started offering more sophisticated controller features, also. This type of instrument offers excellent value. For the purposes of this article, we will assume that our master keyboard produces sound as well.

Basic Connections

OK. WE'VE REACHED the moment of truth. Having connected the master keyboard's MIDI Out to the synth module's MIDI In, it's still possible that we won't hear both instruments when the master is played. Let's have a look now at all the potential potholes in the MIDI system.

The first thing you need to check is what MIDI mode the synth module is operating in. As mentioned last month, there are four possible MIDI modes affecting how an instrument deals with incoming MIDI data. Many instruments power up in Omni Mode (Mode 1) which lets them accept messages on any MIDI channel, and therefore play any notes sent on any channel – a simple way of ensuring, at least initially, that MIDI connections are OK. So the quick fix for a silent synth module is to put it into Omni mode.

If you were to have more than one synth module in your system connected to the master keyboard's MIDI output, however, you might not want to operate in Omni mode. If you want each synth to play a different group of notes, you'll need to use different MIDI channels for each group, and each synth must be set to Poly mode (Mode 3) or Mono mode (mode 4). For the case at hand, we'll use Mode 3 to show another solution to the muted synth module dilemma.

With the module in Mode 3, it can only respond to the master keyboard if the MIDI channel of the module matches that of the note messages sent by the master keyboard. It doesn't matter whether you change the master keyboard's transmit channel, or the synth module's base receive channel – the result's the same.

Of course, the note messages sent from the master to the slave merely determine what note is played, and not what sound to play, although this, too, can be arranged, as we'll soon see. But first, let's have a look at what MIDI messages are made of.

The Messages

THE MOST BASIC type of MIDI information exchanged between the master and the synth module are **Channel Voice messages**. Several bits of information are included with each of these messages. For example, when you play a middle C on the master keyboard, it sends a MIDI message to the synth module saying, "A note has been turned on, on channel 3, it is note number 60 and it was played at this velocity." In English this means that you played a middle C on a specific transmitting instrument, and hit the key with a certain amount of force.

The Message Status: The first thing made clear about this message is that it is a "Note On" message.

Channel Number: Of course, we're dealing with Channel Voice data here, so the master keyboard's MIDI channel number is included in the first part of the message as well.

Note Number: The number 60 refers to one of the 128 possible notes that the MIDI specification allows for. Each of the notes in this ten octave range – three more than a full-sized piano – are assigned a specific number so that information on what notes were played can be sent over the MIDI cables as digital data. Not all instruments can respond to the entire range – in fact, very few can – but every MIDI instrument will transpose the notes out of its range into notes it can play.

Velocity: The velocity refers to how hard you hit the key and, as a result, how loud the

Figure 1.

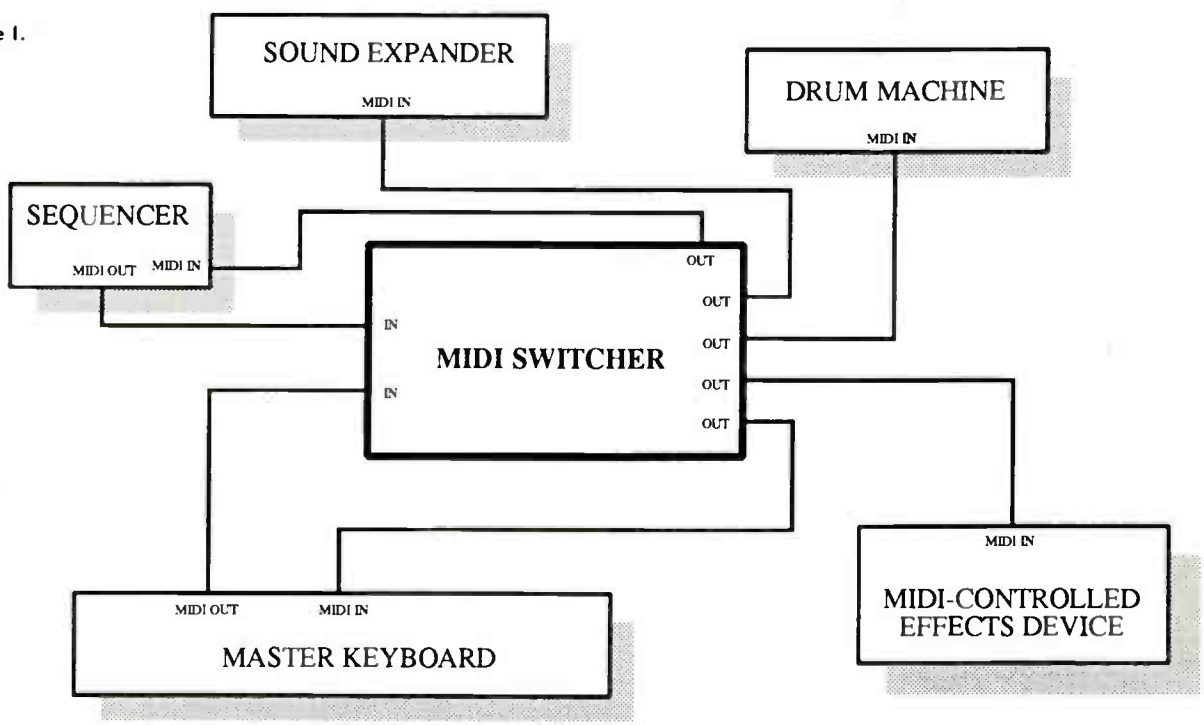


Figure 2.

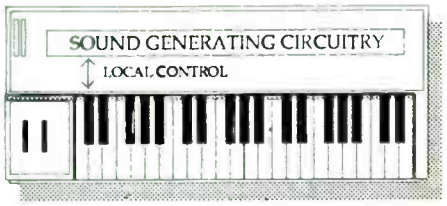
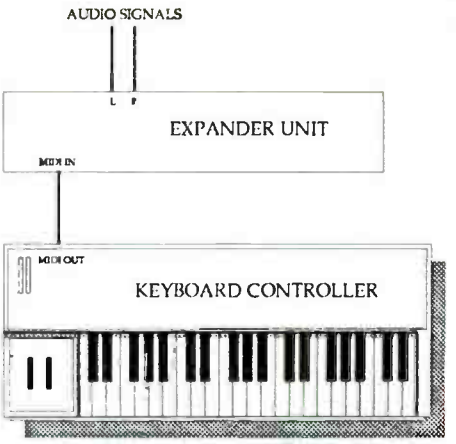


Figure 3.



sound will be. If your master keyboard is *not* touch sensitive, however, the velocity level will always be the same – as will the volume – no matter how hard you hit the key.

Once the expander unit receives these messages it will respond to them by doing exactly what the sound generating portion of the master keyboard did – play the notes. In other words, the system works as if the master keyboard is directly connected to both sound generating sections.

Other Messages

Of course, playing a synthesizer involves more than just pecking out a few notes on the keyboard and MIDI is also capable of transmitting and responding to other types of messages as well. Performance controllers such as pitch-bend, the modulation wheel, pressure or aftertouch – that is, the pressure applied to the keyboard after you have initially played the keys – the sustain pedal and overall instrument volume play a very important role in making the synthesizer a *musical* instrument and all these types of controllers can also be sent as Channel Voice messages via MIDI.

The controller messages, which are referred to as MIDI controller data (oddly enough), come in two forms: continuous controllers and switches. Continuous controllers send a continuous stream of messages – hence their name – which continually define the position of the controller as you move it. For example, if you set the pitch-bend wheel – one of the many continuous controllers – to change the pitch one octave at its fully extended position, then as you're moving from the center position to the extended one you'll hear the pitch change from its initial note to one that's an octave higher.

The reason why you hear a smooth change between these two and not simply a jump from one note to the next is because the pitch wheel is constantly sending out information about its location between the two points. If you stop somewhere in the middle the messages will stop momentarily and the last location message sent should tell the synth and the expander to play a pitch around a fifth higher than the original.

One thing you need to be aware of, though, is that the pitch-bend *range* of the two instruments must be set to the same interval if the effect is to be the same on both instruments. The pitch-bend controller only sends information about its relative location but if one instrument is set to a seven-semitone range and the other to a two-semitone range, then as you move the pitch wheel you're going to hear some very odd intervals going on. Other continuous controller information that can be sent as MIDI messages includes aftertouch, the modulation wheel, breath controller (an accessory device for some Yamaha synths that you blow into and which sends out controller information based on how hard you blow), foot controller (similar to a volume pedal, but which may control a number of different synthesizer parameters, and others.

Switches, the second type of controller information which can be sent as Channel Voice messages, are self-explanatory. You either turn them on or off. Examples of switch controllers include the sustain pedal, portamento on/off and a footswitch which could be used as a sostenuto pedal or soft pedal.

If the expander is not responding to these controller messages, then there are two possible explanations. First, although MIDI is an incredible tool it is not magical. Hence, if the expander module does not include the capability to respond to mod wheel and aftertouch control data, sending it MIDI data for the mod wheel and aftertouch will not magically give the instrument these capabilities. Instead, the particular MIDI messages that an instrument cannot respond to will be ignored.

Some instruments, however, can respond to information that they cannot send. For example, Roland's Alpha Juno 1 synth does not have a touch or velocity-sensitive keyboard and cannot send velocity information over MIDI, but it can *respond* to velocity information sent over MIDI from another instrument. To find out exactly what MIDI information your instruments can transmit and respond to, refer to the MIDI implementation charts that came with them – they're usually in the owner's manuals.

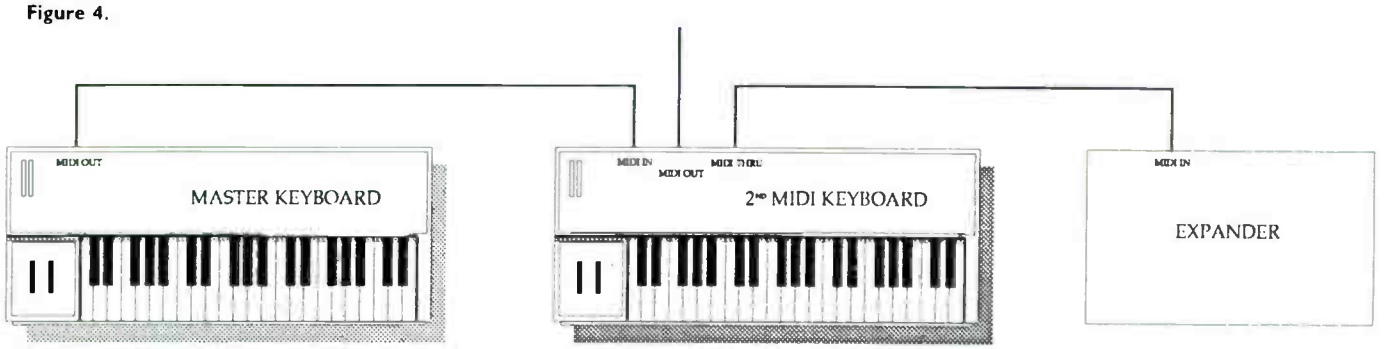
The second possible reason is that some instruments allow you to selectively enable and disable – that is, turn on and off – the transmission and reception of certain MIDI controllers (ie. pitch-bend, mod wheel, sustain pedal, aftertouch and so on). You'll need to refer (again) to your owner's manuals to find out what "disable" functions are implemented, but as an example, Ensoniq's ESQ1 allows you to turn on and off the transmission and reception of various controllers such as pitch-bend. In other words, even though the instrument is *capable* of sending and receiving pitch-bend information, it will not do so if this control is turned off. So if the note reception is fine but the controllers don't seem to work, you may want to check these settings.

Yet another type of switching message which can be sent over MIDI as Channel Voice data, but which does *not* consist of controller information, is a program change. Program changes consist of a number between 0 and 127 – some instruments cannot send the whole range – that corresponds to one of the many programs or patches available on a synthesizer. By sending program change messages from your master keyboard, you can remotely select patches on the expander or second keyboard just as if they were notes. In other words, if you select patch 35 on your master synth, the slave expander will also call up whatever patch corresponds to MIDI program #35.

Be aware of the fact, however, that because different manufacturers use different numbering schemes for their ▶

"Playing a synthesizer involves more than just pecking out a few notes on the keyboard, and MIDI is also capable of transmitting and responding to other types of messages as well."

Figure 4.



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patches, figuring out what program change number calls up which patch can be a bit confusing. Remember also that a program change is only a number, it does not tell the connected expander anything about the parameters or the timbre of the patch it is playing.

Sys Ex Messages

IF YOU ARE interested in sending information about the specific parameters of a patch from the master keyboard to the expander it is – in some cases – possible to do that as well. The messages used to describe this information are not of the Channel Voice variety, though, but rather the System Exclusive genus. Generally, System Exclusive messages (which, if you recall from last month, reach every instrument connected in the system, regardless of their mode or reception channel) are sent between synths and personal computers for the purpose of patch storage and editing with specialized MIDI software (we'll get to that in another segment).

If you have two identical instruments, however, it is often possible to transfer the patch memory from one to the other. For example, if you MIDI together two DX7's or a DX7 and a TX7, you can transfer all the internal patch memory from one instrument to the other so that the slave instrument will have all of the sounds from the master keyboard put into its internal memory.

System exclusive messages can also be used to remotely program one instrument from another. Right now you can only use this procedure with two of the same instruments but recent additions to the MIDI specification point to a time when you may be able to program any synth from any other one.

Multiple Expanders

IF YOU WANT to use more than one synth expander with your master keyboard it is certainly possible but a couple more complications arise which need to be addressed. First, on a purely practical level, you need to have a way to connect the master keyboard to the additional expanders. The designers of MIDI were aware of this possibility and created the MIDI Thru port to deal with it. What a MIDI Thru port does is transmit an exact replica of the information that reaches an instrument's MIDI In port. So, for example, when our master keyboard sends information to the expander, an exact duplicate of those MIDI messages are transmitted out of the expander's MIDI Thru port and these can be used to control another expander or another keyboard (see Figure 4).

MIDI Thru ports do *not*, however, combine incoming MIDI messages with information generated from the instrument itself. In other words, if the first expander is replaced with another keyboard and you play both the master keyboard and the second keyboard at the same time (for your Keith Emerson imitations), two sets of different MIDI messages are created. The first set, which comes from the master keyboard, will come out of the master keyboard's MIDI out port and the second keyboard's MIDI Thru port, while the second set will come out of the second keyboard's MIDI Out port and, if one is connected, the third instrument's MIDI Thru port. The second keyboard's MIDI Thru port will *not* have both sets of messages combined; you need a specialized device called a MIDI merger to get a combined signal. Also, because it is not receiving any information via its MIDI In port in this example, the master keyboard's MIDI Thru port will not transmit anything.

As nice as MIDI Thru ports are, some instruments, unfortunately, do not have one. If your expander or second keyboard doesn't, then you can overcome the problem with a MIDI Thru box. A Thru box, or MIDI splitter as they are sometimes called, functions just like a MIDI Thru port on an instrument; it takes the MIDI signal present at its MIDI In port and produces an exact replica at its MIDI Thru port. In the case of a Thru box, though, there are multiple Thru ports, so you can use the input from a master keyboard to simultaneously control a number of different expanders.

In the diagram of our typical MIDI system at the beginning of the article you'll see an 2X8 MIDI Switcher connecting the various pieces of equipment. A MIDI Switcher is basically a fancy Thru box with more than one input and several outputs. If you have several pieces of equipment which may function as the master controller – such as another keyboard or a sequencer – a switcher becomes advantageous because it allows you to easily switch between different MIDI controllers without reconnecting any MIDI cables. Another bonus is that a switcher allows you to easily disconnect a master keyboard from an expander.

The second problem that needs to be addressed has to do with MIDI channels. If you want all the connected expanders to respond to the same note information from the master keyboard, then all you have to do is make sure that they are all in the same mode and, if they are in Omni Off, on the same MIDI channel. With this type of setup, the expanders will play all the notes from the master keyboard at the same time.

But if you have a master keyboard which can transmit on two or more MIDI channels at once, then you may want to try something a bit more involved. Some instruments, for example, allow you to split the keyboard and send notes played on the lower half on one channel and notes played on the upper half on another channel. So if you wanted to send the lower half of the keyboard to the first expander and the upper half to the second expander, all you'd have to do is make sure that the transmission and reception channels for those two groups matched up. You wouldn't have to worry about multiple MIDI cables because MIDI messages for all 16 possible channels are sent at the same time over a single cable.

Next month we'll add a sequencer to the system and look at the possibilities and problems that *that* entails. ■

If you want even more technical information, one option is to join the International MIDI Association, for which you'll receive the latest spec, a monthly newsletter with all the latest news, and access to a technical support hotline and a MIDI database. If it's a detailed description of the spec that you're after, the MIDI Detailed Specification Document is also available. Contact the IMA at 12439 Magnolia Blvd., Suite 104, North Hollywood, CA 91607 for full details.

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ALESIS

Kawai R50
Digital Drum Machine

REVIEW

Photography Liz Ellis

The competition rages on among manufacturers of digital percussion instruments, leading one to wonder who will be left standing when the dust clears. In terms of affordability and versatility, Kawai's R50 may well survive. *Review by Simon Trask.*

PRODUCING AN ECONOMICAL electronic instrument traditionally requires cutbacks in the machine's hardware. Many of the budget decisions revolve around the number of parts used in an instrument, what those parts are, and how much it will cost to tool up for the production line. When it comes to software, however, there is no easy correlation between price and sophistication. After all, how do you relate the cost of a ROM chip to the sophistication of the software that is encoded into it? And what's more, once the software routines are in place for one product it becomes easier to add further routines (and further sophistication) to another product which uses essentially the same design. Thus Kawai's R50, while being around half the price of its big brother, the R100 (reviewed in MT January '87), is in a number of ways a more sophisticated instrument.

The most obvious compromises are to be found by looking at the new instrument. It's half the size of the R100, has a less well-specified front panel and a non-backlit LCD, and uses flimsy rubber buttons. On the plus side Kawai has given their new drum machine ten pads, ie. two more than are on the R100. Not surprisingly, though, the R50's pads aren't touch sensitive, though the instrument *is* touch sensitive via MIDI. Personally I can live with the physical limitations. Far more important are the quality and range of sounds the drum machine provides and the sophistication of its programming system.

Still, a more significant area of compromise can be found on the R50's rear panel. Here the R100's eight individual outs (both the 100 and the 50 are eight-voice machines) have been replaced by a single individual out (in addition to the stereo

outs, of course) to which any one of the R50's 24 sounds can be assigned. This does at least allow you to send out the bass or snare for separate processing, which is a big improvement on no individual outs.

The R50 loses nothing in the sound department compared to the R100. Not only does it use the same 24-sound ROM chip as the 100, which means you're getting a healthy variety of 12-bit 32kHz drum and percussion sounds, but you can swap in new chips just as you can on Kawai's first drum machine. More accurately, you can swap between two sound chips, as these are all that Kawai currently has available.

Sounds

THE SOUNDS THAT come with the machine offer a healthy selection of standard kit and Latin percussion sounds, with three kick and snare drums; hi, mid and lo toms; open and closed hi-hats; a selection of crash cymbals; and cowbell, claps, agogo, shaker, tambourine, conga, timbale and claves. Kawai's sounds have a bright, clear yet tight and compressed quality; most of them have been recorded dry, lending them an upfront character.

One of the main disappointments of the 100 was its inability to combine the sounds of more than one ROM – tough luck if you liked a bass drum on one and a snare on another. The same limitation applies to the R50, but by hooking up an R100 and an R50 (or, perhaps better still, two R50s) you could have both sound chips available simultaneously. If you play your drum voices from a set of pads or a MIDI keyboard, and if you record your rhythm parts into an external sequencer, two R50s make a lot of sense.

Another area where the R50's cheaper price shows is event storage and the number of patterns and songs. The R50 has approximately half the storage capacity of the R100, and though it still has 100 patterns only 50 of these are programmable. This leaves you with 50 preset patterns in ROM which are presumably intended as starting points for more detailed patterns – in which case they can be saved into RAM pattern memory.

One side-effect of the R50's ability to accept alternative sound ROMs is that the preset patterns start to sound, er, different when you plug in another ROM – and, to my mind, even less useful. Still, even with the reduction in memory capacity, you'd be unlikely to fill 100 patterns even if you had them, especially if you're recording multi-bar patterns.

Format

THE R50 ALLOWS you to construct 10 songs, and provides the usual insert and delete features plus the more unusual multiply, which is a quick and memory-efficient way of setting up a repeat-until-fade section at the end of a song. Unlike the R100, Kawai's new drum machine doesn't allow you to set up tempo changes within a song. On the other hand, one small but valuable improvement over the R100 is the ability to specify a tempo for each song. On the R100 you could only specify tempo at the chain level.

The R50's 10 songs can be chained together by specifying at the end of each song which one should come next. This simple approach has its limitations, but could be useful for automating the running order of a set.

Effects *"The R50 retains all the R100's sound editing features, but it also adds digital effects in the form of gate, short delay and flanging."*

The sonic flexibility of the R100 was greatly enhanced by the ability to tune each voice over a +/−8 range (16 semitones in the case of pitched sounds) while additional features allowed you to set level, accent and pan values for each sound. Not only does the R50 retain all these features, it adds digital effects in the form of gate, short delay and flanging, though the nature of each effect varies depending on what sound they're applied to. Although there isn't much room for nuance (you can choose from three settings which progressively increases the effect in each case), these effects do greatly enhance the quality and the range of sounds that can be obtained from the R50.

Real-time recording on the R50 offers no surprises. You set up a pattern length (1-99 bars), time signature (1-99/4, 8 or 16), quantization value (from quarter notes to 96th notes, including triplets) together with a metronome beat rate (quarter notes to 32nd notes, including triplets) and a tempo value (40-250BPM), and you're ready to record. Unfortunately you have to leap in at the deep end, as you don't get any count-in period. This isn't so bad with a short pattern, where you can use the first pass through as a count-in, but for more lengthy patterns a count-in would have been helpful. And given that you can record long patterns it would also have been helpful to be able to start and stop record at any position within a pattern; as it is, you have to start from the beginning each time.

Step-time recording is a fairly straightforward affair. You select from nine note and rest duration values (which can be straight or triplet) as you go along, and tap the relevant pad to enter the sound you want. Any sound can be entered at any step, though it's best to enter a single part on each pass through the pattern. Notes can be deleted in step-time by selecting a rest value and tapping the relevant pad at the relevant position. Kawai's system is uncomplicated and uncluttered, and easy to use within short patterns. Step-time and real-time methods of recording can be combined within a single pattern, so if there's one tricky part that you can't quite get right in real time you can input it in step time.

Kawai has included an after-the-event "swing" function which can be used on patterns recorded in real and step time. "Swing" allows you to delay the timing of offbeat 8th or 16th notes by a fixed amount, either for individual parts or for a whole pattern. The idea is to give a pattern a more "human feel" by placing sounds slightly behind the beat, but its implementation is so mechanical that it has the opposite effect. Surely the best way to get a human feel is to set the minimum quantization value possible (96th notes in the R50's case) and record "with feeling," rather than trying to build the feeling in after the event.

REVIEW

Programming

UNDOUBTEDLY THE MOST significant addition to the R50 in programming terms is its use of 12 "kits" (four preset, eight programmable). Each kit is an arrangement of sounds on the R50's 10 pads. The programmable kits allow you to create customized arrangements of these sounds, while the preset kits concentrate on presenting unaltered versions of the 24 sounds in various combinations.

All you have to do to call up a kit is press the Pad button and then step through them; when you've found the one you want, or when you've set up a new kit, pressing Pad again will take you back into the mode you were in before.

Nothing is recorded in Pad mode, so if you're recording a pattern and want to select a different kit, create a new kit within the context of the pattern, or even "edit" one of the R50's 24 sounds, you can do it without affecting the pattern. Pad mode also comes in useful for quickly rehearsing a part while you're recording, as it effectively allows you to drop in and out of record mode at any point in a pattern.

The R50's kit-style organization allows you to take full advantage of the drum machine's array of sounds. Whereas the R100 limits you to a single version (edited or otherwise) of each of its 24 sounds, the R50 makes multiple edited versions of a sound equally available. For instance, you can place several different tunings of pitched sounds like the agogo or cowbell in a single kit, which makes recording of pitched parts a piece of cake (on the R100 you have to either use an external MIDI source or "drop in" different pitches each time round the record loop). Obviously this is invaluable if you're using the bass samples in Kawai's second sound chip.

Yet another possibility is to spread the same sound over several pads, changing just ▶

► the volume level in each case so that you can create some form of pseudo touch-sensitivity off the drum machine's resolutely non-dynamic pads.

In fact, the possibilities are so numerous that you soon find yourself wishing you had more kits at your disposal. I guess it's just never possible to get enough of a good thing.

REVIEW

Kawai has also allowed you to play each drum sound polyphonically or monophonically. Polyphonic playing even allows you to use several edited versions of the same drum sample; not only can this be very useful when you're using pitched sounds, but it opens up a new degree of sonic variety by allowing you to combine two or more versions of the same sound. And that's what Kawai's new drum machine is all about: being as experimental as you can be with the sounds at your disposal.

Sounds *"Above all, the R50 is a drum machine for musicians who like to be experimental with the sounds that make up their rhythm parts."*

In addition to the 24 sounds within the R50, Kawai has provided eight "triggers" which can be assigned to any of the drum machine's pads and recorded into a pattern in the same way as the sounds. Each trigger can be assigned its own MIDI note number (0-127), MIDI channel (1-16) and note length (semibreve to 32nd note). Now you can incorporate a much broader range of sounds into your rhythm patterns by triggering sounds on slaved MIDI instruments from the R50. You may, for instance, want to add more percussion parts from another drum machine or a sampler, or equally you could incorporate a bass line into your patterns (but remember that you're limited to a maximum of eight notes). Unfortunately, you can't make use of the triggers if you're playing the R50 from external pads or a keyboard.

A very useful feature carried over from the RI00 is the ability to append one pattern to another to create a new, longer pattern. The real value of this is that it allows you to record parts of varying lengths – for instance if you have a fairly short repeating pattern that you'd then like to extemporize over in a more spontaneous and extended fashion.

A quick way of changing both the volume and panning of sounds within a pattern is to use the Mixer. This is best thought of as a 24-channel mixer with a volume fader and pan knob for each channel, and is best used with care as it affects sounds globally. For instance, if you are using several tunings of a sound they will all be affected alike. But the pan section does at least allow your recorded pan settings to be preserved.

The R50 has provision for two footswitches, each of which can be programmed for one of a variety of functions. You can use them to trigger one of the 10 sounds in the current kit, start/stop the R50, step upwards through the kits, step upwards through the patterns or open the closed hi-hat and close the open hi-hat. One other function allows you to repeat any pattern within a song until you release the footswitch, though I couldn't get this to work.

MIDI

THE R50's THOROUGH MIDI implementation follows in the tradition of its bigger companion. On the MIDI input side of things you can allocate an R50 sound (complete with the seven parameters which define it) to each of the 128 MIDI notes. Thus you can play any of the R50's sounds from a set of MIDI pads or a MIDI keyboard – and as with the RI00 you can record patterns into the R50 in this way. You can also turn key info, velocity, volume, program changes and start/stop on or off.

For MIDI output you can assign each of the R50's 24 sounds to a single MIDI note, and either assign all sounds to a single channel (poly) or each sound to its own channel (mono). Transmission of instrument notes, trigger notes, velocity, program changes and start/stop codes can be turned on or off.

When it comes to keeping a permanent record of your efforts the R50 provides two options: cassette and MIDI. Cassette presents the usual save/verify/load facilities, with each operation taking one minute to transfer the complete RAM memory of the R50. Of course, storage through MIDI onto a computer is a preferable method if you have the requisite software and hardware. For a start, transfer time is a mere 4-5 seconds. Swapping pattern and song data in and out of the R50 becomes a minor task.

Then there's the possibility of using sophisticated librarian and "editing" software (if you have a general-purpose computer as opposed to a dedicated MIDI storage device). What's more, it's easy to incorporate two R50s (each with its own sound ROM, say) into this setup, as the drum machine's SysEx data is channel-specific.

And finally the R50 allows you to selectively filter out MIDI reception of mixer, pattern and song, in key number, out key number, pad and trigger-note data. So for instance you could load in a new set of pad and in/out key number assignments whenever you swap in a different sound ROM. Or you could effectively have 20 pad assignments for a single set of pattern and song data. Just about the only thing that's missing from this idyllic picture is the ability to transfer individual patterns and songs.

The R50's sonic expandability is a definite plus point, even if it does mean opening up the machine and slotting in a new sound chip – a bit low-tech in these days of plug-in cartridges. The second ROM is now available and has found its way into our R50 review model. Kawai have provided a ZIF (Zero Insertion Force) socket, which you can get your local music shop to fit for you. Once this is in place, removing and inserting chips becomes a much easier business, though in practice a certain amount of fiddling is still involved as pins and socket aren't always perfectly aligned.

Kawai has sensibly insured that their new sound chip (which will of course work in both the R50 and the RI00) provides a healthy variety of basic kit sounds. They've concentrated on providing some solid acoustic and electronic kick and snare drums and toms, spiced up with orchestra and brass hits, mellow and funk bass guitars, and tympani and finger-clicks in favor of the Latin percussion sounds that are to be found on the standard sound chip. Atomic, room and acoustic kick and snare drums all pack a hefty punch, while the funk bass is so upfront it almost slaps you in the face.

As with the sounds on the standard chip, the new set have been recorded dry, which seems to fit well with Kawai's philosophy of encouraging experimentation with the basic sound material. The R50's sounds are tight, crisp, metallic – in short, contemporary to the hilt.

Verdict

DESPITE FALLING INTO the budget category pricewise, Kawai's R50 is actually one of the most sophisticated drum machines currently available. Kawai has also managed to come up with a programming system which is both easy to understand and remarkably fast to use. Like its bigger companion, the R50 is a very interactive instrument which could just as easily be used live as in a programming environment (shame about the gloomy LCD, though).

And while ultimately the R50 doesn't offer the sonic open-endedness of sampling drum machines, the range of sounds that Kawai have provided coupled with the ways that you can twist and turn them into different sounds means that you can coax a quite extensive sonic vocabulary from the instrument. And you don't have to waste time loading in your sounds before you can do anything, either.

Above all, the R50 is a drum machine for musicians who like to be experimental with the sounds that make up their rhythm parts. It's also incredible value for money. ■

PRICE R50 $495; CP2 sound chip $129

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WHY JUST INTONATION?

With the ability to function in alternate tunings becoming a prominent feature on new instruments, a spark of interest has been reignited in this fertile area. But when treated as more than just a novelty, just intonation can change the way you think about music. *Text by Robert Rich.*

WE HAVE BEEN hearing a lot of talk lately about alternate tunings, and just intonation in particular. But if there is a revolution taking place, it has been going on for a long time.

The American composer Harry Partch may have instigated the present interest in tuning in 1979, when he published his book, *Genesis of a Music*. Since then, composers like Terry Riley, Lou Harrison and LaMonte Young have been writing and performing music in just intonation, and Wendy Carlos has done a great deal recently to publicize the issue. Jon Hassell, Michael Brook, Glenn Branca, and many others have also worked with just intonation. That such a large company as Yamaha should start supporting microtonality shows that *something* must be changing.

Now it seems that hundreds of composers are clamoring to talk about just intonation (myself included). Up until this point, however, most of the interest in alternate tunings has been in the avant garde community – which has perhaps led to the misconception that alternate tunings sound weird.

In reality, whether a tuning system sounds strange or not depends mostly upon what you do with it. A *random* tuning *does* sound strange. But a real tuning system is not a random thing; real tuning is logical, it makes sense. (The scales that we all know and love are based on logical systems too, although musicians do not always understand these systems when tuning their instruments.)

Of all the tuning systems around these days, just intonation is getting the most hype. Just intonation is defined as any tuning system whose frequencies all relate to each other in whole numbered ratios, with a preference for ratios expressible in small numbers. For example, if the tonic (or unison) is defined as 1/1, the fifth is 3/2. This means that the frequency of the fifth note in the scale is exactly 1.5 times the frequency of the tonic.

The use of these whole-numbered ratios results in scales whose intervals coincide with the way the ear naturally hears harmony. Unlike equal temperament, just intoned intervals are not equally spaced, but then neither is the natural harmonic series. The commonly used equal tempered system, in fact (which is based on an exponential series of incremented multiples of the $\sqrt[12]{2}$), only approximates natural harmony.

So what makes a tuning system sound good or bad? I mentioned earlier that there was logic to it, and there is. The logic involves overtones, and how they align. (Note that there is a bit of controversy over this. I am speaking from my background in psychophysiology. Some composers feel that overtones play only a minor role. These differences in opinion only really enter the picture when many non-harmonic overtones are present, such as in bell tones.)

When two notes play together in a harmonic relationship (ie. an interval) some of their overtones will match, and some will not. By "match", I mean that the frequency ratio between two notes is expressible in small whole numbers. In general, when lower overtones in the harmonic series align, a greater number of higher overtones will match as well. The lower overtones are also generally louder, so their coincidence will be more apparent.

One other point to keep in mind is that once a ratio has been reduced to prime numbers, the smaller those numbers are, the "better" the ratio sounds as a chord. So the chords in which lower overtones are aligned will sound better than those in which only the higher overtones coincide.

For example, in the octave (2/1) – which we all know sounds good – all the harmonics of the higher note will match every second harmonic of the lower note. In fact, the second harmonic itself is the octave (see Figure 1). In the case of the fifth note in the scale (3/2), the third harmonic of the lower note matches the second harmonic of the upper note. Other intervals are more complex in their alignment, but the process is the same.

The History

JUST INTONATION HAS been around since the beginning of formal music – at least since Pythagoras, possibly since the ancient Babylonians. Just intoned ratios are, in fact, the basis for all harmonic theory. In contrast, equal temperament was developed by contemporaries of Bach (his 'Well-Tempered Clavier' codified the new tuning system) and consequently, has only been around for about 300 years.

So why are musicians starting to bring back just intonation after its 300-year vacation? Well, first and most importantly, just intonation can sound better. I say "can" sound better because where it provides for more natural harmony than equal temperament, it can also create much nastier dissonances. But these dissonances are only part of a wider harmonic vocabulary. For instance, you can choose between at least two good sounding major thirds (using either a ratio of 4/5 or 7/9).

A composer can obtain some fantastic special effects, too. How about a melody line that plays hide-and-seek around the harmonics of another note? At last, harmony and timbre can merge! Indeed, one of the most satisfying aspects of just intonation is the fact that harmony suddenly makes sense. This is not an intellectual satisfaction, but a gut feeling. The mind and the senses can work together without conflict.

Before I get too carried away, I should mention that tunings don't always conform to their abstract ideal when converted into

music. In acoustic instruments especially, real tuning does not always fit the theory. But because of its natural basis, it is much easier to tune just intonation than equal temperament. String players naturally approximate just intervals, as do horn players, singers and others who have fine control over the pitch of their instrument.

Why, then, did theorists bother to create equal temperament in the first place? It all has to do with that wonderful invention, the keyboard. During the time that those black and white ivories were starting to replace the big levers on the front of organs, composers were thinking of ways to make more complicated music. One of the major complications involved key changes.

Just intonation does not accommodate key changes very easily; you need either 20-40 notes per octave, or a way to redefine the frequency of each key on the keyboard while in the middle of playing – in other words, the ability to bend notes. Note-bending poses no problem with fretless string or wind instruments; players do it naturally. Neither individual note-bending nor flexible octaves should pose a problem for electronic keyboards either, although designers have rarely bothered to include these capabilities.

On a mechanical keyboard, though, the problem was nearly insurmountable. The solution? Fudge the scale. Since all the notes in equal temperament are the same distance apart, it doesn't matter what key the music is in – it all sounds the same.

The inventors of tempered scales did not claim that they sounded better. They knew that tempered scales were compromises. Equal temperament works pretty well. In fact, equal temperament is downright convenient, and not everyone who uses it will benefit from changing to just intonation. A musician has to learn new playing techniques for just intonation, and composers must take care when creating harmonies, as a misplaced just intoned chord can sound pretty bad. Key changes pose a special challenge, but not an insurmountable one.

Still, the biggest difficulty in playing with just intonation is that not many fretted or keyboard instruments are retunable. Yamaha has made a commendable move by including microtonality in the TX81Z and DX7II, though the DX's pitch resolution of 1.2 cents leaves a lot to be desired. (The TX81Z is even worse – around 1.6 cents.)

Electronic keyboards promise intonational freedom at last, but only a few companies have seen fit to let it happen. More power to them – and engineers, please take note.

Real World Use

USUALLY, THE BEST way to learn something is to try it, and the same is true for just intonation. If you do not own an instrument that can be retuned, then you may have some difficulty. If that's the case, pester your dealer or a friend for some time with a TX81Z or DX7II. Although the tuning presets on those instruments can become a real annoyance, they are a good introduction to alternate tunings. Other retunable instruments include the Prophet 5 rev. 3, the Synergy, Kurzweil and Synclavier among a few others.

On a DX7II or TX81Z, go into performance memory edit and call up tuning preset 2. The manual does not give the ratios for this or any of the tunings, so they appear in Figure 2. Now pick a thin, bright, sustaining sound with no vibrato (thin sounds are more transparent to tuning differences). Holding down the C (1/1),

Figure 2. TX81Z/DX7II Tuning Preset #2 "Pure Major".

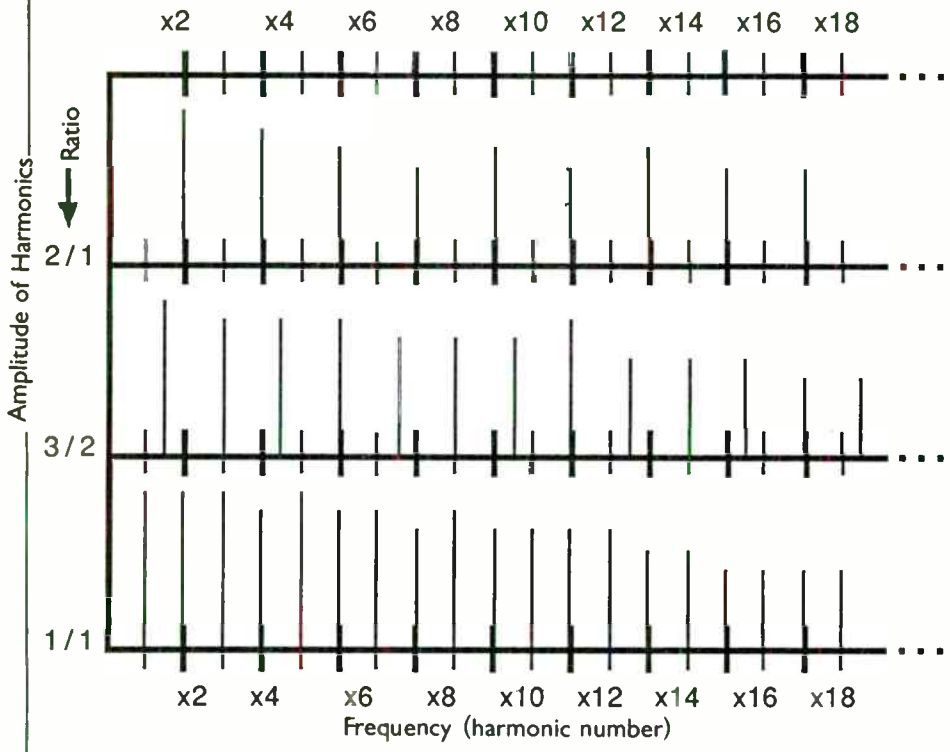
Note	Cents*	Ratio
C	0.0	1/1
C#	70.7	25/24
D	203.9	9/8
D#	315.6	6/5
E	386.3	5/4
F	498.0	4/3
F#	568.7	25/18
G	702.0	3/2
G#	772.6	25/16
A	884.4	5/3
A#	1017.6	9/5
B	1088.3	15/8

*Cent values are theoretical Actual cents.

play one note at a time slowly up the scale. To get an A/B comparison with equal temperament, you will have to lift up on the keys, then switch the tuning preset to 1 – equal temperament – before holding down the keys again. Because of poor tuning resolution, you will hear slow beating in the harmonics of some of the just intoned chords. But if you listen to the approximations of these chords in equal temperament, you will notice that this beating is usually so fast that it muddies up the harmonic spectrum. A good just intoned chord will "lock into" the harmonics so well that subharmonics are clearly audible – actual phantom harmonies whose overtones are the very notes you are playing.

It takes a while to learn the capabilities of just intonation, but the beauty can be immediately appreciated. Thinking in terms of true harmonic relationships can open the mind as well as the ears to the magnificent logic hidden within musical structures. Perhaps soon, the capabilities of our instruments will match the abilities of our ears and minds to hear true harmony. ■

Figure 1. Examples of Harmonic Alignment.



Further Reading: *On the Sensation of Tone*, Helmholtz, Hermann; Dover, New York, 1954.

Intervals, Scales and Temperaments, Lloyd, Lloyd S.; Boyle, Hugh; MacDonald & Co., London, 1963.

Genesis of a Music, Partch, Harry; DaCapo Press, New York, 1979.

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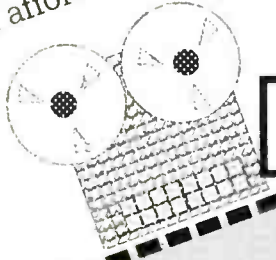

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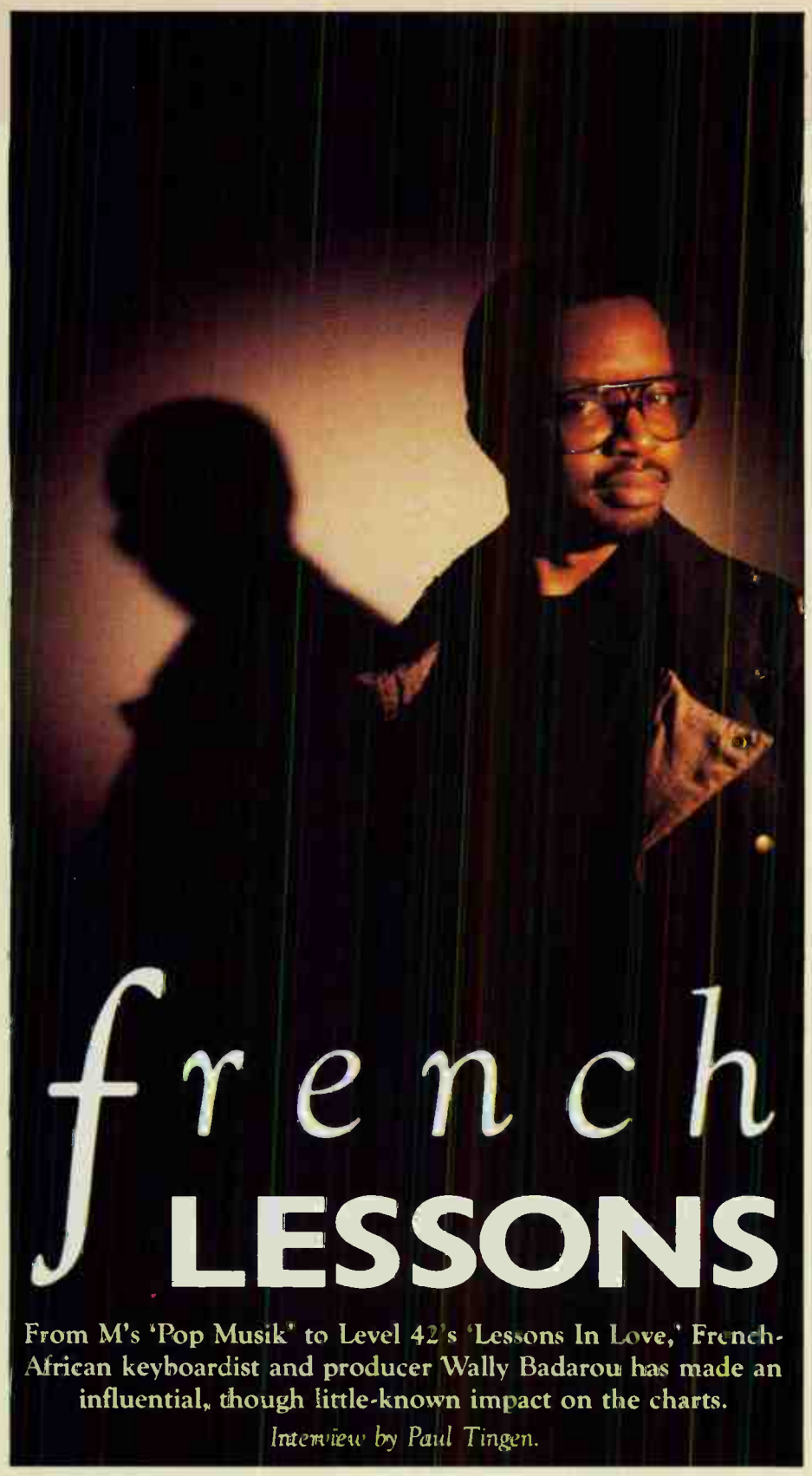

french LESSONS

From M's 'Pop Musik' to Level 42's 'Lessons In Love,' French-African keyboardist and producer Wally Badarou has made an influential, though little-known impact on the charts.

Interview by Paul Tingen.

THE SCENE IS a slightly seedy cafe on the west side of Paris, France. Opposite me sits Wally Badarou, acclaimed keyboardplayer, Synclavier programmer, producer, composer and solo artist. He is dressed entirely in black, including a set of incredibly dark glasses, and smiles as he complains of the deteriorating standards of food and drink offered by this city's restaurants, brasseries, cafés and *salons de thé*.

Then, while we order, he dives deep into his own personal history, explaining that his parents are from Benin (formerly called Dahomey, and a French colony in West Africa) and that, although born in Paris, he lived in Benin from age seven to 17. His time in Africa had a profound impact on his musical outlook.

"In Africa one didn't make much difference between different categories of music. People would be listening to James Brown, Otis Redding, salsa music, African music, French artists like Johnny Hallyday, or Western rock music, without creating intellectual barriers and saying things like, 'This type is better than that type.' We didn't have that kind of thinking, which is very prominent in Europe.

"I'm trying to protect that openness in my own mind, because it's the only way that I can survive as a creative entity. I would hate to be bound to one area of music and to play just rock and nothing else. If it has to be rock at one moment, fine. But I want to be able to switch to bossa nova or jazz the next. That's one of the reasons why I work with so many different people."

And Badarou certainly has worked with an impressively long and varied list of artists over the years: Grace Jones, Foreigner, Robert Palmer, Mick Jagger and Talking Heads are just a few of the names with whom he's worked as a keyboard player. He considers himself lucky that he was always hired for his specific approach to keyboard-playing.

"Nobody ever told me what to play; I've never been a real session player in that sense," he says proudly. Apart from that, he has worked with British jazz-funkers Level 42 since their pioneering days, first as a songwriter and keyboard player, and then – on their last two albums, *World Machine* and *Running in the Family* – as a co-producer with the band.

Quite apart from all this work for others, Badarou is also working on a career as a solo artist. In 1984 he released his first solo album of instrumental music – *Echoes* – on the Island label. The disc featured 10 pieces composed, played and produced by Badarou himself – except for a single guest musician on percussion. It was distinguished by its smooth, organic-sounding rhythms, often with an Afro-Caribbean feel to them, and by its simple, cheerful melodies. Badarou's feather-light keyboard touch and delicate pitch-bending gave the synth solos an astonishing flute-like quality, and the sounds themselves were nothing if not original: clear, light, yet always warm. And although, compositionally, the album strayed into a slightly questionable nightclub jazz area on one or two of its tracks, it still makes pleasurable and challenging listening, three years after its completion.

Today, Badarou is busy recording a new solo album, which will feature his ►

► interpretation of synthesized orchestral music. The (heavy) influences are Ravel and Stravinsky, names that are often quoted as classical sources of inspiration by jazz and rock musicians. Nonetheless, this is a surprising new venture in Wally Badarou's already colorful career.

MUSIC

WHEN THE COFFEE and some sandwiches arrive (true to Badarou's word, they are lukewarm, tough and tasteless), the musician takes time to explain some things about himself.

"I should thank you for giving me the opportunity to fix something in the minds of people who are looking at me for being either this or that. What I'm really trying to be with anything that I'm doing is just being myself as an artist. I could be a programmer, a synth player, a producer or a singer, but I want to be all of that at once. I'm not limiting myself to one particular area.

"All I deal with is music, not only as a sound medium, but also as a visual medium. I think of music as being visual, which is one reason why I've also been involved in writing film soundtracks."

So, there are two more areas of creative expression to add to Badarou's already extensive list. The film soundtracks he's done are for two movies, *Country Man* and the successful *Kiss of the Spiderwoman*. But his qualities as a singer have yet to be put to vinyl . . .

"It's something that I haven't pursued because, being French, I have a language problem. Although my English might be considered as good, I don't want to sing in a language that I do not really master as a native language. And French is also a problem. It is wonderful to speak, but it's such a hassle to use in anything that is groove orientated: you always end up singing something *chanson*-like. So language is the thing that's prevented me from singing on record so far.

"Apart from that, I'm not sure yet what I would want to express in songs. Even though I write more songs than instrumental music at the moment, I'm not quite sure of my direction. Sometimes I think: 'Maybe I shouldn't do love songs, because that's already been done so often and some people might be doing that better than me.' I mean, I want to do something new. If it's not new, there's no point. I'm not just sitting here and doing my job, I want to bring something that hopefully hasn't been done before and I know that I can do that in an area of sound, synthesizers and instrumentals. But with songs I'm not sure yet."

As far as bringing new ideas to music is concerned, Badarou certainly has a reputation to keep up. Because to a large degree, it's been his inventive application of keyboard textures and advanced musical technology which has made him such a sought-after musical collaborator. Yet, though he is now considered one of the world's foremost experts at working with digital synthesizer technology, he started his musical career playing bass guitar in a hard rock band.

"Bass has always been my favorite instrument," he says. "I like low sounds, and at the time – this was the beginning of the '70s – I listened a lot to Deep Purple, as well as things like Jimmy Smith and Santana. I remember being really angry with my father when he bought a piano, because I was just getting into organs, you know, Jon Lord and things."

Wally Badarou is now 32, yet it took him a long time before he realized that music was what he wanted to do more than anything else.

"As a kid I was playing some melodica, mandolin and flutes, but I was not seriously into music. I was more into airplanes; I wanted to become a pilot, and I was building tons and tons of radio-guided models. That was probably my technological background." (Laughs.)

When the Badarou family moved back to Paris (his father was appointed Ambassador of Dahomey), young Wally began studying law, and in his free time joined several amateur bands. Yet the tide turned swiftly, and as Badarou's taste in music moved into the jazz-rock arena, he acquired his first keyboard, an Electret piano. Later still, he started working with a group of West Indian musicians who managed to get a deal with Barclay Records. When the band fell apart, Badarou was contracted as a solo artist, but nothing of any importance was released.

What did happen, though, was that he was introduced – in 1979 – to Robin Scott, who was preparing the recording of M's single 'Pop Musik.' Badarou put a newly acquired Korg 800DV synthesizer to creative use ("it was a pretty neat machine – most of the synth sounds on the single are from it"), and when 'Pop Musik' became an immense international hit, it gave him a ticket to the international music scene.

"The tune is still regarded as pioneering in the new wave area," says Badarou now. "People like David Byrne still refer to that tune each time I'm talking to them. Even Trevor Horn told me he was inspired by it to record 'Video Killed The Radio Star'."

After 'Pop Musik,' the Afro-French keyboard player started taking on a heavy load of session work in Britain. This eventually resulted in a call from Island boss Chris Blackwell, who invited him to join recording sessions at Compass Point Studios in the Bahamas for a new Grace Jones album. For Blackwell, the sessions were a huge gamble: he'd thrown together a group of musicians who'd never worked with each other before, and seemed at the outset to have little in common with each other. Yet the chemistry worked, and gave birth to the now near-legendary *Warm Leatherette* album.

Badarou worked on two more Grace Jones albums, working from Compass Point – at the time one of the world's most fashionable recording venues. It was there that he met up with a lot of the acts he would later work with, and also set up his own studio.

"Chris Blackwell was so pleased with *Warm Leatherette*, that he offered everyone the chance to stay there permanently; you could bring friends over and so on. That's how the whole idea of me being the 'in-house Compass Point keyboard player' came into being, although I never considered myself 'in-house' anything. But they gave me the chance to build my own private studio there. It's on the Compass Point premises, but quite independent from it."

"I record everything direct to disk with the Synclavier. It's a technology which has travelled too fast for the record companies, because my contract says that I must deliver them tapes."

BADAROU'S COMPASS POINT studio has a full Synclavier system as its centerpiece. Apart from that, there's a Macintosh computer, a DX7, a couple of TX816 modules, a Roland digital piano and two analog synths: an Oberheim OB8 and a Prophet 600.

"I have a 24-track tape machine and of course a mixing desk, and there's also a Dr. Click, now almost fallen into disuse. I used it a lot on *World Machine*, to derive sequences from live drumming, but now with MIDI, I hardly need it anymore – only occasionally to alter or resynchronize existing tapes."

Today, Badarou's main workhorse is the

Synclavier, an instrument which offers possibilities the record companies haven't yet caught up with.

"When I work in my studio, I'm definitely bypassing the tape recorder. For my new album, I won't even be using it anymore. The only reason for using the tape recorder would be to backup what I'm doing so that somebody could make a remix later. I record everything direct to disk with the Synclavier, which has a 100kHz sampling rate. It's a technology which has definitely travelled too fast for the record companies, because my contract says that I must deliver them tapes. So what I will deliver to the record companies will be digital tape. It might be F1 or DAT, if that's available soon enough, and of course there'll still be a multitrack tape backup copy of my Synclavier work."

As a beta-tester for New England Digital, Badarou has the full range of Synclavier possibilities at his disposal – though his system's memory capacity is relatively limited. Yet, courtesy of MIDI, that doesn't bother the Synclavier owner too much.

"I've managed to duplicate some of the synthetic Synclavier sounds in the TX816 modules, which saves a lot of memory space. On the Synclavier I have 200 tracks, which are basically MIDI tracks. I also use some of the tracks for audio material, like percussion and things. My Synclavier has 16 audio outputs, which I route through the board. On top of that I run all my machines off the Synclavier, via MIDI, and through the desk to add effects."

It's when we start discussing the idea of technology versus (or with) human feel, that Badarou suddenly gets fired up, and explains why he thinks the Synclavier is such a fundamentally different machine from any sequencing device or software program.

"The major advantage of the Synclavier above any other system resides in a place where no-one would expect it to reside. It is the fact that the performer, once he has switched on the machine, doesn't have to choose between quantized mode and non-quantized mode. Nothing comes back quantized unless you specify it. To me this is incredibly clever. Of course you can put any other machine in a non-quantize mode, but you have to specify that before you press Record.

"I know this might sound silly, but it's very important, because it means there is no technological barrier between the purely creative flow and the result. When I switch on the Synclavier, I just play. I don't have to think about how many bars I'm going to play, what kind of quantization mode I want to hear, and so on. That is a definite conceptual difference. It means that you are looking at a machine in a different way. You're seeing it as a recorder, not as a sequencer.

"And I want things to be in real time. I like playing. The reason I'm a musician is that I want to play. On my new album, which is a non-groove album, everything will be manually played, so the machine has got to record things fluid enough. Everything that I play, every ritardando, every accelerando, has to be recreated."

Mind you, that's not to say Badarou is opposed to *any* form of sequencing. On *Echoes*, the rhythm section contains extensive sequencing – in fact depends on it for its survival. So although most of the keyboards are played live, Badarou describes the record as having a "quantized mode."

Today, he regrets the almost obsessive demand for rhythmic exactness that's made on music by the charts and the clubs, yet he doesn't think it makes today's music any less human than its predecessors.

"Take a young kid: what do you think he's gonna dance to? Is it going to be some King Sunny Ade type of thing, or a modern pop record? It may be sad to say, but people are looking for something exact and square. But that doesn't mean that it isn't human anymore. It still takes somebody to play the part, unless you sit down in front of a computer and type it in, note by note, which I don't suspect a lot of hitmakers are doing. And if you quantize the part, the result will still depend on the player.

"Take for instance the MSQ700, the Roland sequencer we used a couple of times with Level 42. It gives a different feeling to each note, depending on how long you've been holding this or that key, even if you quantize. On top of that, it takes somebody to create a part, so even if you step write, it's still human."

Well, from a conceptual point of view, there are few who would dispute that. But when it comes down to that elusive quality which musicians call "feel," sequencing remains open to much debate – some of it none too restrained. Perhaps it's Badarou's proficiency as a keyboard player, and his eagerness to play as much as he can manually, which makes him less afraid of the "inhuman" musical element so often ascribed to modern, computer-controlled equipment.

"We did do quite a lot of sequencing on *Running in the Family*," Badarou confides. "Knowing that Level 42 is a band widely acclaimed for its playing ability, we wanted to make the point that we were not afraid of sequencing technology at all. We knew what we were going for, and we didn't use it in a shameful fashion, to cover up mistakes or because we couldn't come up with better ideas in other ways.

"I used the Synclavier only for conceptual reasons, to get the best possible result. For example, there are some voices and bells which you hear at the beginning of 'Lessons in Love.' They weren't there initially, when we only wanted them to happen in the middle of the tune. But when we decided that it would be great at the beginning, I copied it as a whole, all the eight tracks, with the Synclavier, rather than re-recording everything.

"The way I'm working with Level 42 is ▶

► that we usually start off doing a lot of pre-production in Mark King's place. We use the Linn 9000 there for its sequencing and percussion abilities; despite its problems, I think it's a really good machine. I have one in the Bahamas and one in Paris. You have 32 MIDI tracks along with a very good drum machine in one thing, so you don't have to worry about synchronizing while demoing.

"Mark and I usually start out spending time writing songs, and then we go into choosing synth sounds, setting tempos and writing sequences. On the synth side we work mainly on the DX7 and the TX racks, and there's also a couple of Roland machines like the Juno 6. The whole band joins in the pre-production, but Mark and I are more involved on the technology side, so we probably have a more predominant influence over the way things are going to be recorded in the studio.

"Although we prepare a lot of the sequences at Mark's home, there's still a lot of live playing going on in the studio. Phil Gould, the drummer, might play guiding a sequencer, rather than following it. The Synclavier gets introduced in the second third of the recording process to do all the special icing things, like put on a vocal or a drum effect. That's my area. It's also why we record in Sarm West in London, because of their Synclavier."

Apart from his contributions on the technical side, Badarou sees his role with Level 42 as more that of a sideman, the provider of a valuable, objective second opinion.

"Because I'm not part of the band and because I'm not gigging with them, I have sufficient distance from what they are doing to come up with some valid opinions that they respect. That's why they invite me as a co-producer."

Let's move back to Badarou's adventures in his own studio. Or perhaps we should say studios, because the keyboard player, spending his time between the Bahamas and Paris (where he's involved in producing French acts, too) also has a nice demo setup at his Parisian home.

"At home I have a DX7, a Prophet 600, the Linn 9000, a couple of TX racks, a Macintosh with Performer sequencing software, and an eight-track mixing desk for making some rough cassette mixes and to add effects. I just use it for recording ideas, which I later work out in Nassau on the Bahamas. I create by improvising, and having a recorder open all the time."

Being used to working with a Synclavier system most of the time, does Badarou find the sound facilities of his Paris home challenging enough to come up with inspiring ideas? The artist confesses that, after much long and hard labor, his capacities as a DX programmer are now up to levels where he can virtually create any sound he wants...

"I found it hard to program the DX in the beginning. Sounds that would take me 10 minutes to create on a Prophet 5, the main synth I'd worked on before I got the Synclavier, could take a couple of days on the DX, even with the software programming packages. You have to create each component in such a different manner each time with digital programming, it took me a long time to learn to deal with that.

"I found it hard to program the DX in the beginning. Sounds that would take me 10 minutes to create on a Prophet 5, could take a couple of days on the DX, even with software programming packages."

"If you listen to each component of a digital sound, it doesn't tell you at all what you're going to end up with, whereas with analog you start with the raw material of where you want to go, and then just move around with your envelopes and ring modulator.

"But today I feel confident with the DX and TX. I'm starting to get some fantastic analog-sounding strings out of the TX racks. If you were to listen to each module individually, you wouldn't believe that these components together create the huge sound that you hear in the end. They don't even sound like a violin individually. They sound like awful square sounds.

"Programming digitally, you do quite a bit of guesswork at the beginning. And even now, I'll still shadow a digital sound with an analog to make it sound warmer."

THE NEW, CLASSICALLY orientated album will hold a lot of surprises for Badarou's fans. The composer is the first to acknowledge this.

"The new record is going to be very unconventional. I know that some people will be disappointed because of expectations they might have of me, and also because there's definitely a trend against solo artists using electronics to recreate symphonic works.

"But what I'm trying to do is to create a polyphonic ensemble without trying to imitate a symphony orchestra. Although the spirit of the album will be completely dominated by Stravinsky and Ravel – and I know this might sound very pretentious – it will be an exploration into a new area. Some of the tunes will be played using samples, others using more synthetic sounds.

"And of course, there will be a strong African influence. I have lived there a long time, I am an African, so I only have to listen to myself to create an African feeling. There will be a lot of flutes and stuff, because that, to me, is the instrument that speaks closest to people's hearts. I don't want it to be an intellectual project; I want it to be melodic and I want to keep the warmth of the melody."

When I ask Badarou when his new venture will be released, he remains vague, "I hope sometime later this year, but I'm not in a hurry. I probably have a different way of thinking about time. What I praise in classical music is its capacity to be everlasting. Beethoven's concerto for violin will always be a great piece, no matter how much time goes by.

"I know this might sound pretentious, but that is what I want my music to be as well. I don't want to do something that's going to be forgotten within two months. So if my album needs twice as long, I will take twice as long. And after that I will tour, playing my own material."

Surprisingly, Badarou is planning to play material from both *Echoes* and his forthcoming album on this tour.

"Yes, I want to do that. It's a necessity. I want people to come to a Wally Badarou concert not knowing exactly what to expect. I don't want it to be just a groove concert; I want to play other things as well. The more I talk to people, the more I realize that their tastes can be quite broad, and why not? I want to play to those people. I want to play to people who are not ashamed to say that they like Ravel and James Brown."

And why not, indeed? ■

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The Art Of LOOPING

part one

As if getting a good sample wasn't enough work. Now you want to loop it too? Technology meets the discerning ear once again. *Text by Chris Meyer and Bill Aspromonte.*

NEW TIMES BRING new skills. Since programmable synthesizers first appeared in the '70s some folks have got by using factory presets while others have invested considerable time and energy learning how to program them from scratch.

Today, many of us are dealing with samplers. And many of us *still* get by with presets. There are a lot of us, however, who have found that the advantages of learning how to program these beasts from scratch are well worth the trouble. Some of the skills are familiar –they're similar to the analog synthesis skills we learned before. Others are brand new, and we hope to help teach them here in this mini-series.

The newest concept samplers have forced on us is *looping*. In this installment we will describe the whys and hows of simple looping, including some hopefully helpful hints. Next month, we will talk about that wonderful piece of magic called "crossfade looping," including how to exploit what it has to offer us. Finally, and ironically, we will try sampling some of the synths of yesteryear in order to give them some sort of "preset" memory in the form of disks for our samplers.

What Is A Loop?

SYNTHESIZERS HAVE A wonderful, magical ability to hold a note for as long as we hold down a key (or blow on a wind controller, or can keep a guitar string sustaining, etc.). They pull this sly trick off by having a sound source – an "oscillator" – that puts out a continuous sound for as long as the instrument's plugged in. To cut the note off the synth uses a filter and/or amplifier to fade the oscillator out when the note has been released.

Where samplers differ from synthesizers is that in place of oscillators, they are playing back a digital recording of a sound. Unless the sample of the sound is infinitely long (people keep saying digital memory is cheap; well, it's not *that* cheap *yet*...), it has to end sometime – sometimes before the musician is ready to release the note. A good analogy is thinking about a reel of audio tape playing back – eventually the reel is going to run out of tape to play, whereas the motors would be quite happy to keep going until they were unplugged (just like our oscillator).

We cheat this fate by employing the trick known as looping. Looping enables us to stick our tongues out at oscillators by repeating part of our digital recording over and over, thus acting as if the sample *is*

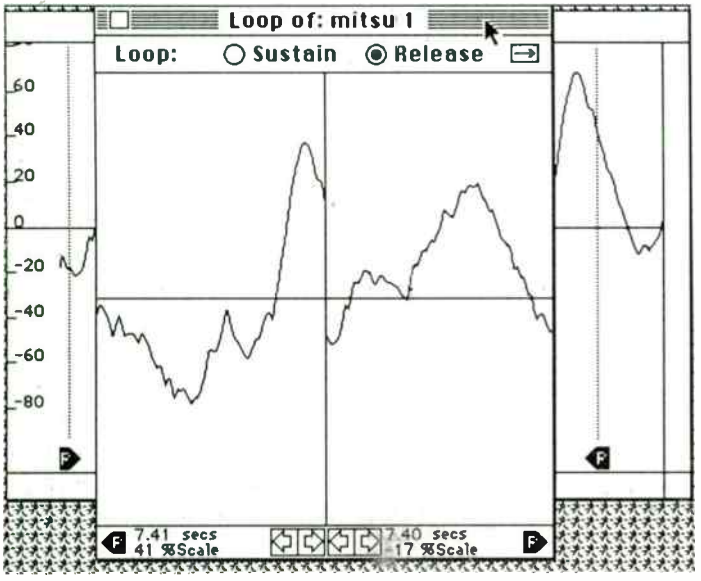

Figure 1. *Bad 'forwards only' loop.*

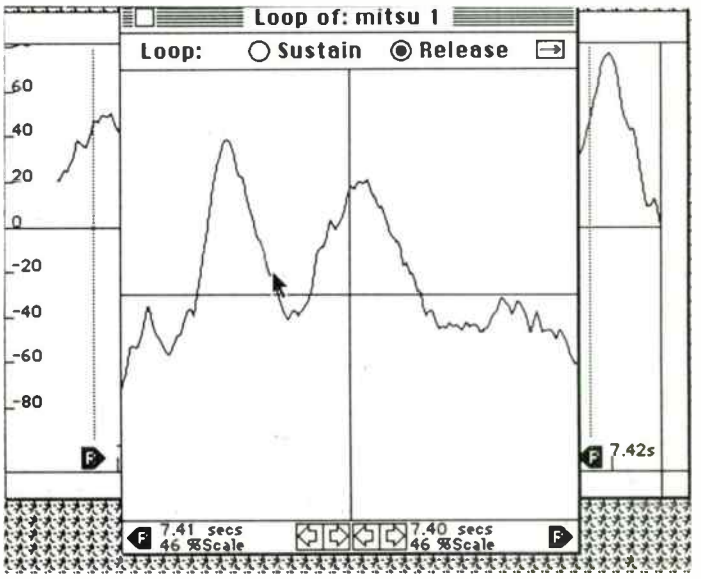

Figure 2. *'Forwards only' loop with matched levels.*

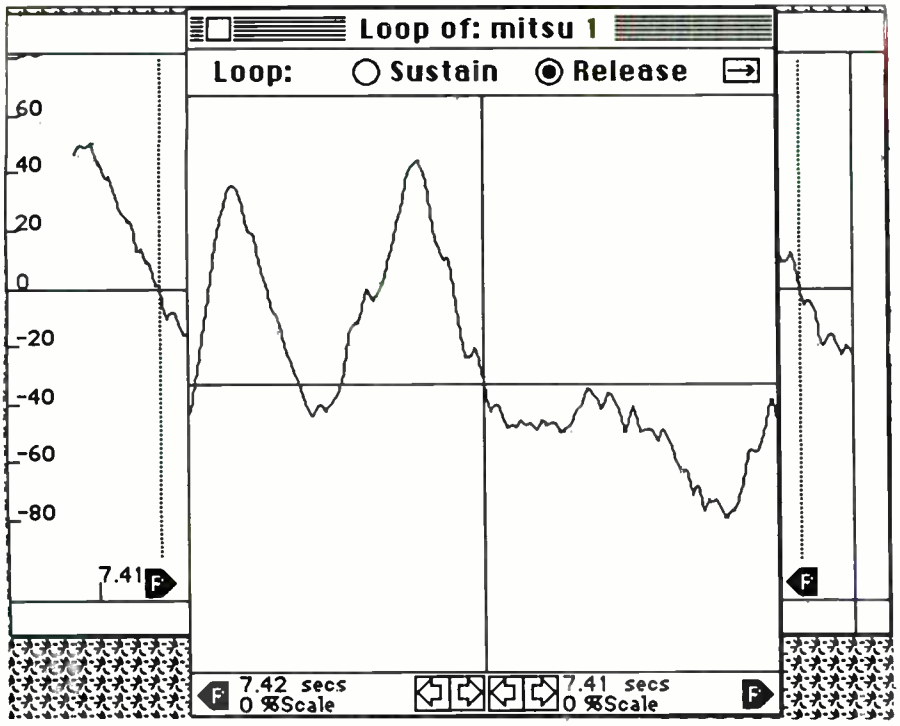

Figure 3. *'Forwards only' loop with zero crossings.*

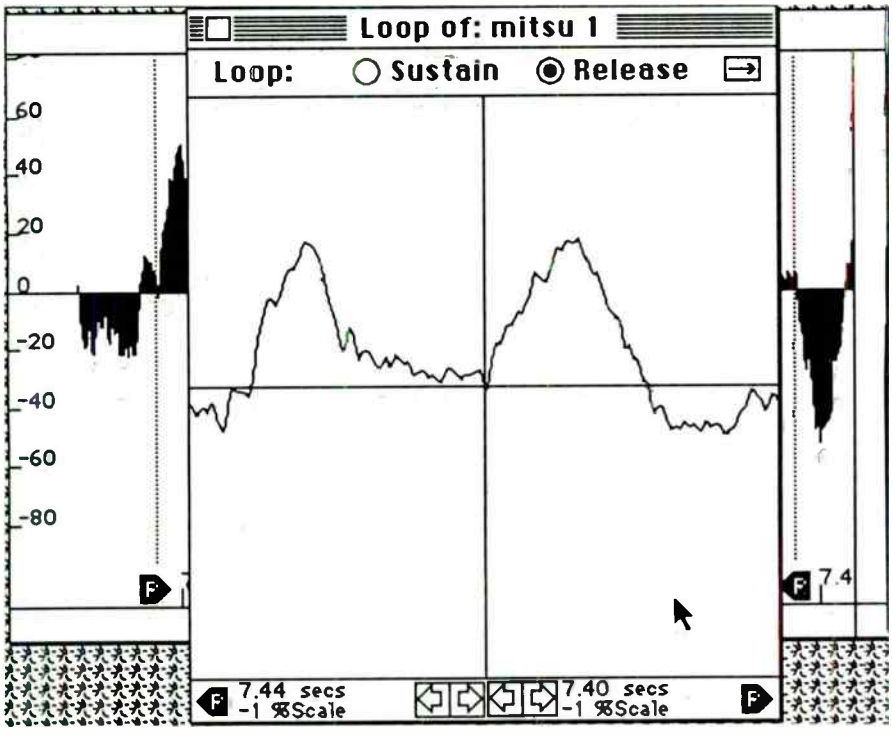

Figure 4. *'Forwards only' loop with zero crossings, but phase mismatched.*

infinite (think of taking the tape that would be winding up on one reel of our deck, and instead feeding it back to the reel from which the tape is coming off).

There are different types of loops – some that play back in one direction over and over, some that play the repeated section alternately forwards and then backwards, some that stay looping only while a note is being held, some that repeat until told to start the sound from the beginning again, and some that repeat for only a specified amount of time. There are also (subjective) good loops and bad loops. And there are a whole group of tools that aid and abet in this thievery of infinite time – many of which are built into our sampling instruments. So, let's talk about them...

Forwards Only Loops

Also known as "unidirectional loops," these are the most common type of loop. With these, an instrument working its way forward through a sound goes until it reaches a marker that signals the end of the loop (which, on many samplers, also happens to be the end of the sound). At this point, it will jump back to a marker that signals the start of the loop, and then work its way forward until it hits the end marker again. Think of (or if you have a sampler around, sample) the phrase "one two three four." Imagine again that the loop start point ("marker") is between the words "two" and "three," and the loop end point being just after the word "four." In this case, as long as nothing else got in our way (such as the cat pulling out the plug, or the musician releasing the note), we would hear the phrase played back, "one two three four, three four, three four, three four," ad infinitum.

This is very similar to what our synthesizer's oscillator is doing – it is playing back something (quite often, a sawtooth or square wave) over and over again. In a sampling instrument, we will quite often use this type of loop to turn a sample into an oscillator, by repeating one wave or section of the sound.

Backwards/Forwards Loops

Not seen as often, these are also known as "bidirectional stops" (the EII and Prophet 2000 have them). Here, a sound happily progresses until it hits the loop end, but instead of jumping immediately back to the loop start, *it turns around* and progresses backwards until it hits the loop's starting point. Then it turns around again (like a drunk spinning between two walls) and moves forward until it hits the loop end again. Taking our example of the phrase "one two three four" with the loop points being between the "two" and "three" and after the "four," we would hear back out, "one two three four ruof eerht three four rouf eerht three four," ad nauseum.

A backwards/forwards loop more closely imitates the effect of a sound bowing back and forth (like a violinist's bow). It also has the additional trick of making a loop sound twice as long as it really is – we hear the looped section forwards and then backwards before it repeats, thus making the repeats less annoying. But we're starting to cross into the artistic realm, which we will deal with more later. We still have some more terms and software mysticism to explain . . . .

Release Loops

Most often samplers have only one loop. The sampler's output channel plays back the sound from its start, plays back the loop over and over again, remains there – even if the note is turned off – until the channel is required by another note. These types of loops are (in the case of there being only one loop – such as the Akais, Rolands, and Korgs) either known simply as "the loop", or on samplers with two loops (such as the Emax and Prophet 2000) as the "release loop." Once a sound is through with its attack transient and the like, they sit here and quite happily play over and over – kind of like a note out of a trumpet or an organ. ▶

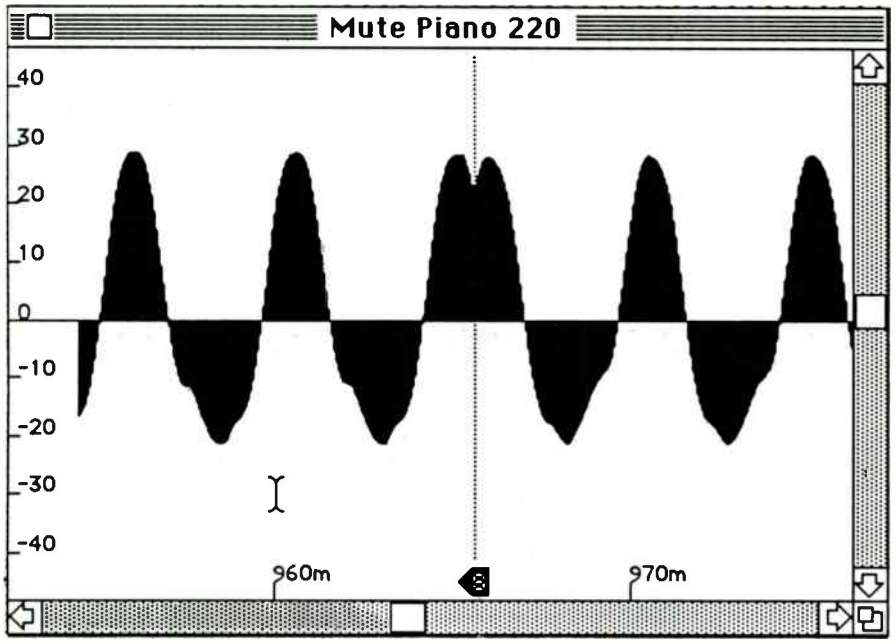

Figure 5. *Bad 'backwards/forwards' loop.*

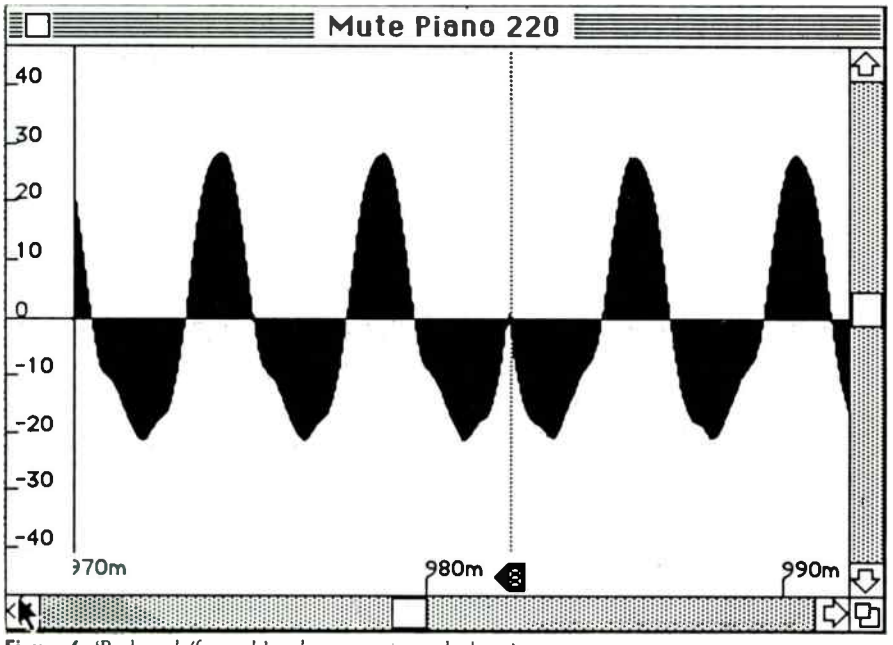

Figure 6. *'Backwards/forwards' and zero crossings – bad again.*

Although these appear to be sustain loops – because they play while you are holding down a note – in actual fact, the sampler doesn't care because it has begun to play the loop prior to your sustaining the note.

What does that make the other loop on those samplers with two? Obviously, they're called . . . .

Sustain Loops

These are loops that play only while a note is being held. When the note is released, the sound progresses on to play its release loop. Picking up our example of the phrase "one two three four" yet again, imagine a release loop being where we've placed it before, the start of the sustain loop being between the words "one" and "two," and the sustain loop's end point being between the words "three" and "four" (for simplicity, we will also assume forwards only loops). We would then get "one two three two three two three" until the note was released, at which point we would hear "two three four three four three four" until somebody shut the thing off – probably with a filter or amplifier, in the same way they would mute a synthesizer's oscillator.

Sustain loops are useful for special effects, or for where there is no release loop, and the remainder of the sample is some additional inflection of the sound shutting off (say, the muting of a guitar string). The drawback of using sustain loops for this is when one releases a key, s/he may have no idea where the sound is in the loop. Say, for example, we *did* sample a guitar note, and the loop was one second long. When we release the note, we want to hear the sound *beyond* the loop end – the finger muting sound – immediately. However, if the sound is at the very start of the loop (or, anywhere *except* the very end of the loop), there will be some delay while the sound plays back to the end point. Therefore, this effect works best with short loops, or notes where timing is not critical.

Timed Loops

A new type of loop – one that plays back for a specified number of repeats or length of time – has just landed in the user's hands courtesy of the Casio FZ1. It has eight(!) loops in all which can be set up in various ways, including a timing scheme. Aside from special effect value, ultra slick and clever programmers will use these to further the illusion that there really *isn't* a loop by repeating a little section a couple of times, and right before the listener gets wise, move on and repeat a different section a couple of times. All of these are ways to, once again, pretend that we actually do have infinite sample memory available to us.

Looping Aids

THERE ARE WAYS that the software which is built into our samplers can help us get better loops. Looping isn't simply a matter of slapping down a couple of loop points and calling it "art", (sigh – if it only *was* that simple – we get all sorts of nasty clicks and strange warbles, not unlike a skip in a record or a bad splice point on tape). With samplers, we need some electronic help to place our razor blade/loop marker in a better spot.

Before looking at what kind of help samplers offer, let's examine where those clicks and pops are coming from. The skipping record is an excellent analogy for one kind of interference – any discontinuous jump in the flow of our sampled sound *will* end up sounding like a pop. Some sounds don't like to be suddenly reversed – imagine slamming your car's gears abruptly from drive to reverse. Other side effects, such as warbling, an "out of tune" loop, and the like, need to be cured by a blend of technology, patience and ears.

Zero Crossings

Let's go back to our forwards only loop, and a case where the two loop points have been thrown haphazardly together. As we mentioned, at the point where the loop hits the end point and decides to jump back to the start point, we are going to have a discontinuity in the sound (see Figure 1) and therefore a click. What we need is to find two points that have the same amplitude (level), and use them as loop points. If we have a visual editing package lying around, we can pull it out and try to eyeball two loop points that *do* have the same level (see Figure 2). One way to guarantee that the two levels are the same is to pick them where they are both silent – namely, 0 volts DC (ground level), also known as a zero crossing (see Figure 3).

Several samplers (Korg DSS1, Prophet

2000, and so on) have built-in zero crossing detectors. They look for when a signal is just making a transition from a negative voltage (excursion) to a positive voltage, or vice versa – the only trick is that the same set of rules has to apply for both loop points, or there will be a sudden jump from a sound waveform going up to a waveform going down (see Figure 4), which would also cause a click. By using zero crossings, a sampler can help a user get electrically correct loop points, if not always a musically useful ones.

Zero Slopes

This is just a different criteria for picking a loop point – namely, for backwards/forwards loops. Since these loops instantly reverse direction at a loop point, and a quiet transition occurs only when there is no sudden discontinuity in the waveform's direction, the best loop points are where the waveform's level is not changing. Picking just any loop point results in a spike in the waveform (see Figure 5). Picking a zero crossing isn't necessarily any better (see Figure 6) – with backwards/forwards loops, level isn't the problem; the change in direction is. Points at which the level is not changing are called "zero-slope" points. Therefore, a zero-slope detector tries to

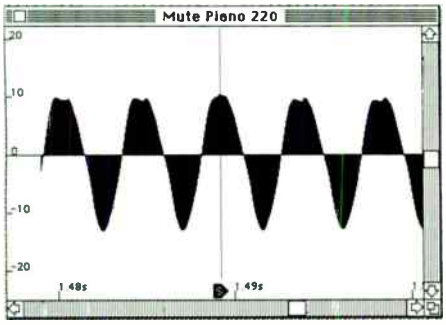

Figure 7. *'Backwards/forwards' loop with zero slope.*

pick where a sound's waveform is "rounding the bend" (see Figure 7), and has no slope (change in level). Again, an electrically correct loop point, if not always a musically pleasing one.

Autolooping

While these simple looping helpers are definitely very useful (without visual editing, it is virtually impossible to get any kind of a good loop without them), they certainly aren't the solution to all our looping problems, nor are they as far as manufacturers have gone so far.

A common problem with very short loops is that they end up playing a different pitch than the rest of the sound. This annoying shift is caused by a rather technical brawl between the sampling rate and the pitch of the instrument being sampled.

For example, let's suppose you have used a sample rate of 44kHz to sample a flute playing an A440 note. Performing a little math shows that one cycle of this sound will ▶

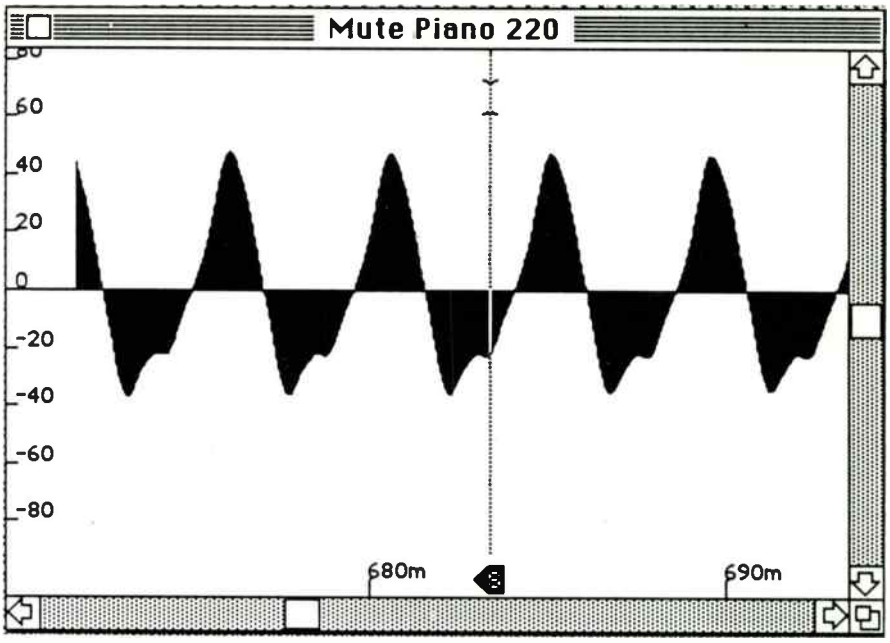

Figure 8. *Temporary zero slope.*

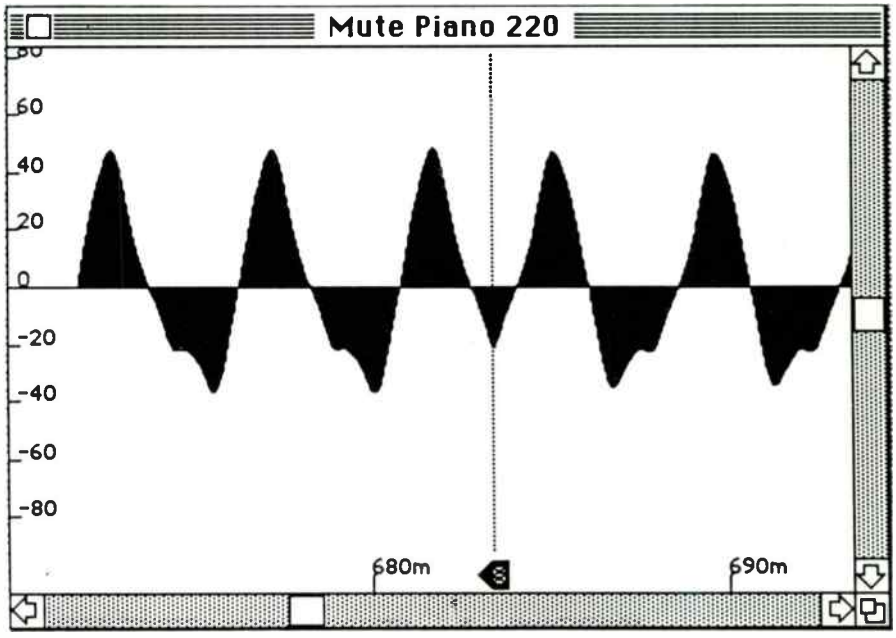

Figure 9. *Result of using temporary zero slope for 'backwards/forwards' loop.*

▶ be 100 "samples" (however many bits wide *that* may be) long. If the loop is a little shorter or a little longer, the cycle length is altered, and the resultant pitch is different from the rest of the sample. To get the loop "in tune," you will need a loop length of either 100, 200, 300 (and so on) sample words. This sounds great on paper, but who wants to have to enlist the aid of an oscilloscope and a calculator just to get a good loop? Let the machine do the work . . . .

One technique intended for eliminating pitch shifts is called "magnitude differencing" and appears in the Emax and EII. This technique looks for matching portions of the waveform around the start and end points, and then adjusts the end point so that its position in the cycle corresponds to the start point's position. This renders a loop length that is an integer multiple of the cycle length (so the loop is in tune), and also minimizes loop clicks by keeping the waveform running in the same direction when it jumps from the end point to the start point.

Backwards/forwards loops don't have this problem with amplitude or pitch discontinuity at the loop points, but work best when the sample is symmetrical around the loop points so that there are no phase problems at the loop points. Turning around is all fine and dandy, but turning around abruptly can still cause a click (original waveform in Figure 8, result in Figure 9). One way around this is to compare data around the loop points for symmetry and adjust both loop points accordingly.

Correlation

Correlation is just a fancy word for saying

"this is a lot like that." The backwards/forwards autolooping routine mentioned above (implemented on the EII) is an example of correlation – trying to pick loop points that will result in the sound continuing just as it would. Software can do a little of this for us; for the rest, we have to depend on our eyes and ears (and continue to pine for more clever software).

Look at the forwards only loop point in Figure 10. This is certainly a nice match of zero crossings, but what the waveform was doing at the left has nothing to do with how it "continues" at the right. First, the slope (angle) of the waveform before and after the zero crossing is different; second, the undulating pattern that the waveform was naturally following has been shaken by this selection of loop points. Figure 11 shows a much better "correlation" of what the sound was doing before and after the loop point (even though it isn't a zero crossing), and is the type of match to look for if using a visual editing package to trim samples.

Correlation can (and should) be extended beyond the immediate couple of wave cyles around the loop points. If a sound has a particular vibrato pattern (such as an inflected violin or flute note) or "rolling" (such as a pipe organ in a big space), similar points in these longer "cycles" of the sound should be matched up to make a better splice.

For example, a good loop is one that doesn't have a sudden pitch shift at the end loop point, which *will* happen if your sample has a pitch shift or vibrato going on somewhere between the loop points (or during the whole sample!). The easiest way to solve this problem is to either pick loop points where the sound has similar pitches, and trying to match the length of the loop with the rate of the vibrato so that the loop points "correlate." Another solution is to keep your loop length as small as possible (even as small as one cycle of the wave), but this robs the natural character of many acoustic instruments – the sampled vibrato is a desired effect. Of course, one could always cheat and re-sample the sound with no pitch change and use the sampler's modulation section to add these effects back into the sound.

Sundry Other Tricks

FINALLY, WE CROSS over the line to where software, visual editing, and hokey religions can help no more – one must rely on ears, battle-smarts, and a great deal of patience. Just as there is no sure-fire great guitar sound, there are no hard-and-fast foolproof rules for getting good loops. However, here *are* a list of suggestions to try and keep in mind:

– Start by picking a musically pleasing place for the loop to be, clicks be damned. *Then* start worrying about eliminating those clicks while trying to stay close to the ▶

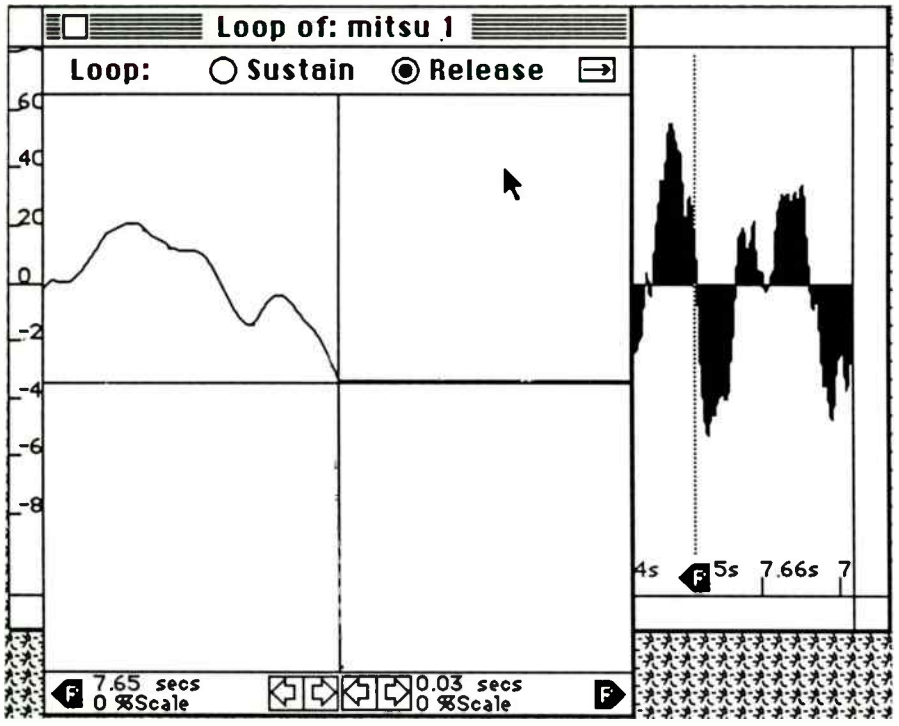

Figure 10. *'Forwards only' loop with zero crossings, but no correlation.*

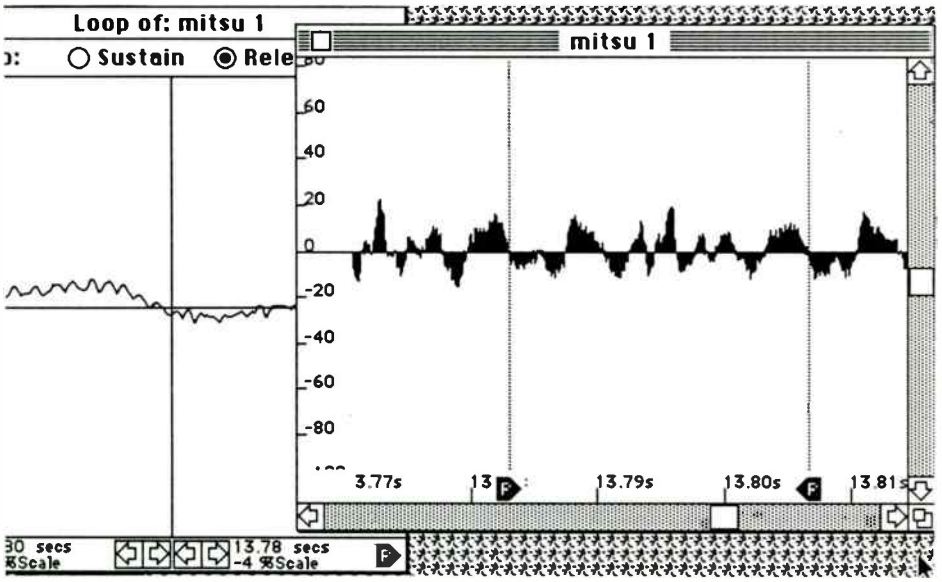

Figure 11. *A correlated pair of zero crossings*

► original loop points.

– Large loops are nice, in that they give the impression of a longer sound. Ears quickly catch on to something being repeated. Having a long, repeating wash is far favourable to having a short, repeating warble.

– Make sure that the attack portion of a sound is not included in the loop (except, of course, for special effects). Pick noise, horn attacks do not naturally reappear when a guitar chord or horn note is being sustained, so keep them out of your loops.

– Sounds that do not have a steady state need short loops. For example, something that is continuously changing (and never going back to the way it sounded just milliseconds before) such as pianos and most other plucked or struck instruments *cannot* have long forwards only loops (the change in overall sound level from beginning to end is too drastic), and giving them a bowing effect with a backwards/forwards loop is too unnatural. Either compress them heavily to even them out, or put a very small loop at the very end of the sound. A sound can be given the illusion of continuing to decay even after it has hit a loop point by timing the filter and amplifier envelopes to continue the dynamics of the sample.

– If using zero crossing or zero slope detectors on a short loop, try moving the points around as pairs – punch up the next zero crossing for the loop end point, and then the next for the start point. This is a quick way to move a loop of the correct length around to find the right place in the sound for it.

– If forced to use very short loops, detuning and/or modulation does everything in the world. Ensoniq gets a very believable piano sound out of the Mirage with extremely short samples by just detuning the samples slightly from each other. This phasing/beating pattern distracts the ear from the repetitiveness of the wave, and should be exploited on multi-oscillator-per-voice instruments such as the Mirage and Emax. Also, vibrato or tremolo induced by a sampler's onboard LFOs can help animate a short loop very nicely.

– Backwards/forwards loops sometimes just physically don't work. Let's take the example of a sawtooth wave. Turning it around suddenly produces a triangle wave for one cycle, not a continuation of a sawtooth. You will be lucky to get a click-free backwards/forwards loop on most pure tones. However, a sample with a lot of motion going on is more likely to be successfully backwards/forwards looped.

– Remember that with backwards/forwards loops, you are dealing with *two* loop points, not one. The "start" and the "end" are two different turn-around points to perfect – it is very easy to forget this and start adjusting one loop point when it is actually the other that is clicking (this is not a problem with forwards only loops, since the two loop points join to form one). A good thing to do is to wave a hand back and forth like a baton tracing the playback direction of the sound to isolate which point is clicking.

– Noisy sounds with something pitched inside will refuse to be looped –particularly with forwards only loops. Examples of these are snare drums and cymbals. To use fancy jargon again, it is extremely are to find two suitable points between the mixture of pitch, noise, and weird harmonics that correlate. Try another sound.

– Play back a looped sound at several pitches. Some clicks seem to disappear at some notes and reappear at others (in other words, don't celebrate a "good" loop too soon!). Also, loops tend to become more noticeable as you transpose a sample upwards – this is because the loop plays back quicker, therefore becoming "shorter", and therefore the ear catches on quicker.

– *Patience*. Not one of us could get a good loop during our first several encounters with a sampler; you shouldn't expect to either. Stick with it, moving the loop points 'round and 'round, learning as you go all the subtle indescribable clues of where a good loop will be found. It's just like learning good intonation on a violin or fretless bass – an "impossible" task becomes possible only through practice and not allowing yourself to get frustrated.

Next month, we get to learn a whole new set of rules – and techniques – as we explore the wonders of crossfade looping. ■

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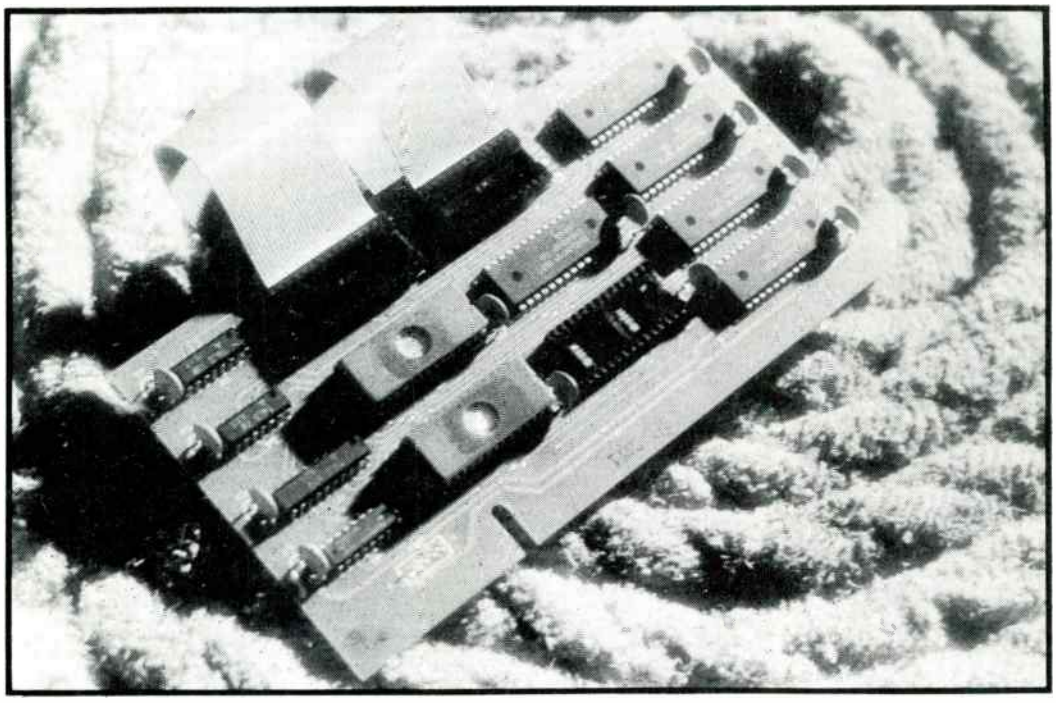
Grey Matter Response
E!
for the DX7, Version 2.0

REVIEW



The circuit board enhancement from this innovative company fights DX obsolescence by offering greatly increased memory and some features not even found on the new DX7II.

Review by Jim Burgess.

IN THE COMPUTER industry, the major players like Apple and IBM often are responsible for the creation of entire sub-industries. Hundreds of innovative companies may thrive by providing unique products (both hardware and software) for a single successful PC. These third-party developers usually enjoy a close relationship with the computer manufacturer they develop products for; after all, each company stands to gain from the success of the other.

The MIDI industry has numerous examples of third-party entrepreneurship, but most are in the software field. Aside from third-party RAM cartridges, relatively few companies have successfully marketed hardware add-ons or peripherals for other MIDI products.

The exception to this rule, however, is Grey Matter Response. This Chicago-based company has been around for almost as long as the instrument they set out to improve. E! is designed as an enhancement product for the Yamaha DX7, still by far the largest-selling MIDI product the world has produced.

Though successful, Yamaha's most well-known instrument is not necessarily perfect. In fact, far from it; hence the creation of E! The DX was designed at a time when MIDI was still an idea, so it's understandable that it hit the market lacking many of the MIDI features that we take for granted today.

Let's face it: a DX7 makes a lousy controller. Sure, the keyboard feels nice. But the DX can only transmit on channel 1. It's output velocity falls well below the maximum velocity value (127) that the MIDI spec defines. Furthermore, it has no Local Off Mode, a crucial feature for any sequencer controller.

E! changes all that by enhancing the DX7 with entirely new features and capabilities. Put simply, E! defies DX obsolescence.

Best of all, E! itself keeps improving. Here's a look at E! version 2.0, the current release.

Overview

E! CONSISTS OF a single circuit board that is installed neatly inside the DX7. The installation is routine and can be performed in minutes by a technician or adventurous DX owner. E! ties in to the DX7 at the source by plugging into the empty sockets of the two Yamaha EPROMS it replaces. By essentially replacing Yamaha's brain – or operating system – with E!'s, your DX7 literally becomes a new machine.

E! doesn't require the installation of a single new front-panel control. Its functions are accessed directly from the DX front panel by means of five special software "pages": Memory, Function, MIDI, Scales and Physical Control. In practice, E! behaves as if it was a part of the DX7 way of life from day one.

Memory

E! STARTS OUT with lots of memory: enough RAM for up to 320 sounds – or voices, as Yamaha calls them – in 10 banks of 32. That's ten times the memory of a standard DX7. In addition, an optional 256-voice ROM library is available from GMR at nominal charge. Grey Matter will even burn ROMs with your choice of 256 FM sounds that will permanently reside inside your DX.

That's up to 576 sounds available, instantly. Handy.

Things seem even better when you consider that unlike a standard DX, E!'s

RAM is capable of storing function parameters with each voice. And because E!'s function parameters include everything Yamaha's does plus programmable volume, note ranges, and a host of other setup features, you'll be getting a lot of new memory capabilities not previously available.

Don't forget about RAM cartridges. E! provides two ways of formatting them: the standard Yamaha format or a special GMR format which is capable of storing both voices and function parameters on a single RAM cartridge. Naturally, a GMR-format cartridge will only play back on an E!-equipped DX7.

Most of the utilities relating to memory loading and saving are accessed in the Memory Page.

Performance

THE FUNCTION PAGE is used to set up a variety of performance parameters to control both the DX and an external MIDI slave independently. A complete set of function data is stored with each voice, including a specific MIDI Out channel which determines which MIDI slave(s) will be combined with the selected DX sound. The volume of both the DX and the slave is also stored with each voice.

E!'s six different velocity response curves let you fine-tune the response of the DX's keyboard to your playing style. You can also set a minimum and maximum velocity limit and set a velocity shift amount for both the DX and a MIDI slave.

There's no less than five keyboard modes available to let you play the DX and a slave in different configurations. Normal Mode behaves like a regular DX. Rolling Mode alternates notes between the DX and the slave to produce interesting results when playing chords: some notes sound on the DX while others sound on the slave.

Float Hi Mode lets you play the DX with your right hand while playing the slave with your left; E! keeps track of which is which on its own. Track Hi Mode sends only the highest note currently being played to the slave, while the DX sounds all notes. And Local Off Mode simply severs the direct connection that otherwise exists between the DX's keyboard and its own sounds: especially useful if you use your DX as a controller for a MIDI sequencer.

E! features a key limit function that lets you define upper and lower note limits within which both the DX voice and the MIDI slave will respond.

"Timbre" is one of E!'s best tricks. All DX owners will appreciate something that behaves like a filter control. Timbre works by simultaneously adjusting the output levels of all of the operators acting as modulators in the current patch. The result? You can tweak the overall brightness of your sounds quickly with a single control.

Of special note is GMR's Random Detune feature, which lets you define a range of variance in tuning for every note. Unlike the standard detune function we're all familiar with, this feature applies a random tuning value – within the range selected – to each new note. The intention is to imitate some of the tuning inconsistencies that occur naturally with acoustic instruments, and it's a very useful inclusion.

MIDI

AN E! EQUIPPED DX7 can transmit on any channel while receiving on another. A variety of Merge Modes are available for combining incoming MIDI data such as key events, controllers or clock data with the DX's own MIDI output. Most MIDI users will agree that one more device that merges will be a welcome addition in the studio.

GMR has attempted to optimize the DX for use with guitar controllers. The result is Guitar Mode: a Pseudo-Mono Mode. You'll also find a complete set of Sys Ex-utilities to define E!'s communication with the outside world: editor/librarian/patch generation software, TX modules, additional FM storage devices, etc . . . .

The MIDI Page also contains a useful patch mapping facility that lets you re-direct an incoming patch change to any other program number. This feature is especially handy if you have to plug your DX into somebody else's set-up or sequence file. You can use the buried patch changes to call the sounds you want the DX to play without having to shuffle sounds around in memory to match the original patch change numbers.

Selective Data Filtering

THE PHYSICAL CONTROL page is where you'll find the Master Tuning button, which now features a display accurate to ⅓ cent. Finally!

A complete set of MIDI data filters are available for both incoming and outgoing MIDI data. Sys Ex, Sustain Pedal, After Touch, Mod Wheel, Breath Controller, Foot Controller, Pitch Bend and Program Changes may be ignored ("In Filters") and simultaneously blocked from transmission ("Out Filters") – in any combination.

E! also provides a series of Local Filters that mimic Local Off Mode. Rather than blocking the DX from responding to notes played on its own keyboard, Local Filters block the DX from responding to its own controllers. This lets you send a patch change to the system without changing the sound you're playing on the DX, for example.

DX Stack Mode is a wonderful feature that lets you sound two DX voices per note. Polyphony, naturally, is reduced from sixteen voices to eight, but the results are worth the sacrifice: especially if you combine this feature with the Random Detune Mode described earlier. The result is a beautiful chorus effect that, because of the random pitch deviation, has no predictability (other than the maximum amount).

The Physical Control Page also contains controls to re-map the DX7's controllers to other controller destinations.

Most of the parameters of the Physical Control Page can be stored as – what else? – Physical Presets. You can store up to sixteen of them and recall them instantly by holding down the portamento pedal and selecting buttons 1-16. That type of instant reconfiguration makes an E!-equipped DX an ideal controller for live performance.

Microtonality

IN THE INTERESTS of creativity, GMR have introduced microtonality to the DX7. GMR has provided users with a direct means of accessing the DX's internal 4096 pitches-per-octave tuning for new adventures. Storing the 16 user-definable scales does take some memory, though; be prepared to lose two banks (ie. 64 voices) of E!'s RAM to free up the space. That still leaves a 256-voice RAM capacity – a small price to pay for unlimited access to bold new worlds.

There's two ways of creating scales: adjust the pitch values individually for each note – one at a time – or use E's handy utilities for automatic scale generation.

Conclusions

IF YOU'RE PLANNING on holding on to that old DX or perhaps picking up a used one cheap, E! is definitely a worthwhile investment. Considering the surprising price tag, E! would be a pretty good deal if all it did was store 320 sounds!

Getting the most out of it takes a bit of effort, but then again so does just about everything about the DX7. In the end, the wealth of features that E! makes available justifies the time it takes to master its operation.

Perhaps you, like me, are wondering just exactly how a small company with only one primary product developer can manage to come up with an enhancement that the monolithic Yamaha failed to. Many of the features made available to the DX7 with the original version of E! have been incorporated into the DX7II as standard; now this new version of E! gives an old DX7 features not contained on the new DX7II. And now E! for the DX7II has arrived, featuring – amongst many other things – eight-voice multi-timbral capability. So, one might ask, is Yamaha leading the industry, or are companies like Grey Matter Response leading Yamaha? ■

PRICE $299

MORE FROM Grey Matter Response, 15916 Haven Ave., Tinley Park, IL 60477. Tel: (312) 349-1889

REVIEW

NPAS' ISSUES

NOVEMBER 1986

• Synth king Howard Jones talks recording and programming, David Sylvian comes clean, and we track down The Philip Glass Ensemble, and touring keyboardist Greg Whelchel.

On test are Akai's MX73 master keyboard, the Ensoniq Digital Piano, the Unique DBM controller keyboard, the Fostex E16 multitrack, Dynacord's ADDone drum module, the Korg DDD1 drum machine, Steinberg's Pro24 sequencing software for the Atari ST, Yamaha's FB01 FM synthesis module, and the Roland DEP5 multi-processor.

We get the lowdown on mixdown, examine the SPX90's MIDI Mode 4, and continue our guides to sequencing, FM programming, and creative sampling.

JANUARY 1987

• Synth-pop pioneers, OMD, feature alongside Heaven 17 and avant-garde composer Morton Subotnick.

The review roll-call includes the E-mu Emax and Akai X7000 sampling keyboards, the Kawai R100 drum machine, Yamaha's QX5 sequencer, Stepp DG1 guitar synth, Tascam Porta Two, and Steinberg's ProCreator software for the Atari ST.

We start an overview of hard disk technology, conclude our series on creative mixing techniques, and see how guitarists can benefit from MIDI Mode 4.

FEBRUARY 1987

• The enigma of contemporary music – Frank Zappa – talks tech in a rare in-depth interview and Robert Irving III, keyboardist with Miles Davis, tells how he coped with the pressure of following in the footsteps of Herbie Hancock and Chick Corea. Also featured is Japanese composer/arranger Seigen Ono.

Reviews include the Oberheim DPX1 sample replay unit, Roland RD300 piano, Jam Factory & Dr. T KCS software, and the revolutionary Mandala video-MIDI instrument.

On the feature front we continue our investigations into the worlds of hard-disk technology and MIDI Mode 4 for guitarists, and take a look at how modern percussionists can keep in time with the times.

MARCH 1987

• We reveal why Adrian Belew is one of the world's most innovative modern guitarists, and the unusual method employed in recording Peter Hammill's latest album. Also in conversation are jazz-fusion keyboardist Jeff Lorber and film-soundtrack composer Michael Stearns.

Being put to the test are the Yamaha DX7II, Sequential Studio 440, Korg SG1 piano, Simmons SPM8:2 mixer, Barcus Berry processors, and MegaMix and Intelligent Music's 'M' software.

Bandwidth jargon is deciphered, MIDI Modes are dissected, and experiments carried out to the Sample Dump Standard.

APRIL 1987

• Mick Karn talks about bass playing, high technology and jazz, while we catch up with Ravi Shankar and Frank Serafine, a partnership of traditional Indian music techniques and applied American technology. We also put the spotlight on producer Hugh Padgham.

Reviews uncover the Yamaha DX7II, the Roland MKB200 keyboard and GM70 MIDI guitar, the Korg DRV2000 reverb, the Photon MIDI guitar converter, the MIDI Step bass pedal/foot controller, Sonus C64 software, and Auricle II film composer's time processor (C64).

A new series kicks off on programming drum machines, and we detail how samplers can produce new waveforms for use in programmable wavetable synths.

MAY 1987

• Allan Holdsworth, one of the leading advocates of guitar synthesis, and eccentric composer Holger Czukay, talk to our intrepid reporters, while Kim Ryrie, Fairlight's co-founder, and Steven Randall, designer of the Stepp guitar, speak frankly about their technological achievements.

On test are the Casio SK2100 keyboard, Roland MKS70, Yamaha RX5, Kahler Human Clock, Alesis MIDIverb II and ART DR1 reverbs, and Texture and ClickTracks software.

We assess the Apple Mac II, continue our drum programming series, and explain how your sampler can produce stereo samples.

JUNE 1987

• Fusion pioneer and former Mahavishnu violinist Jerry Goodman discusses his new work with us, and Bill Bruford, characteristically in the vanguard of new technology, talks about

electronic percussion as an art form which is distinct from acoustic drumming. We also interview Richard Horowitz and Sussan Deihim on their unique, new electronic and vocal recordings.

Our reviews check out the Casio FZ1 sampling keyboard, the Roland D50 synthesizer (Part 1), 360 Systems MIDIMerge+, Steinberg's Cosmo software, and the Kawai R50 and Korg DDD5 drum machines.

We also find some ways to speed up Macintosh MIDI workstations, get the story straight regarding MIDI delays and we conclude our interview with Kim Ryrie. The third part of our series on creative drum programming assesses the relative merits of different trigger-to-MIDI converters.

JULY 1987

• Ryuichi Sakamoto, Yellow Magic Orchestra's founder, shares perceptions on his latest album and plans for the future. Geoff Downes, former Yes and Asia keyboardist, discusses his personal history with synthesizers, while Cutting Crew talks about their unique blend of guitars, guitar synths and other music machines.

Our in-depth reviews highlight the Korg DS8 synth, 48 Track PC II, Yamaha TX81Z and MDF1, Passport Master Tracks Pro, as well as Part 2 of our in-depth look at the Roland D50.

The fourth segment of our series on creative drum programming looks at electronic drum pads, and the DX7IID upgrades are examined. We begin a new series on recreating the sound of acoustic instruments with a focus on the trumpet.

AUGUST 1987

• The reigning queen of technological innovation, Laurie Anderson, gives us a new definition of music and Oingo Boingo's frontman, Danny Elfman, invites us into his home studio. The unique British ensemble Man Jumping show us how they blend MIDI with classical arrangements.

On test are software packages from Intelligent Music (Upbeat) and Roland (MESA), as well as full reports on Kawai's K5 synthesizer and the Simmons MTX9 Expander. We offer in-brief reviews of OMI's Universe of Sounds, Volume II, and the IMS Dyaxis.

We start a new series on the basics of MIDI, explain wavetable synthesis, and continue our series on creative drum programming by looking at some of the new alternatives to drum pads. The second installment of our series on recreating acoustic instruments with synth programming focuses on the Fender Rhodes. ■

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PATCH WORK

PROGRAMMING

This is **the page** *where MT's editorial team invites you, the readers, to demonstrate your own synthesizer programs. Send us your favorite sounds on a copy of an owner's manual chart, accompanied by a short demo tape. Include a description of each sound, noting any interesting ways that you may use it, and write your full name and address on each chart. Be sure and include a blank of the owner's manual chart. If we publish your patch, you'll be rewarded with a* **complimentary one year's subscription** *to MUSIC TECHNOLOGY. Interested? Then get twiddling and get scribbling!*

The address to send sounds to: ***Patchwork, MUSIC TECHNOLOGY, 7361 Topango Canyon Blvd., Conogo Park, CA 91303.*** ■

OBERHEIM MATRIX 6R

Breath

Shawn Gordon, Anaheim, CA

Although Shawn describes his monophonic 'Breath' patch as sounding like a sampled "Ah," we didn't really agree. We did agree, however, that it is a great patch, with a fantastic breathy quality that could be used in lots of ways. The patch has a long decay and sounds like it has a built-in reverb effect (it even sounds good completely dry). This one can really add ambience to your tunes! ■

	0	1	2	3	4	5	6	7	8	9
00 DCO1	Freq	Fr/Lf1	Sync	Pw	PW/Lf2	Wave	Wsel	Levers	Keybd	Click
	27	0	0	0	0	53	OFF	BOTH	KEY	OFF
10 DCO2	Freq	Fr/Lf1	Detune	Pw	PW/Lf2	Wave	Wsel	Levers	Keybd	Click
	12	+30	0	0	0	63	WAVE	BOTH	KEY	OFF
20 VCF/VCA	Mix	Freq	Fr/En1	Fr/Prs	Res	Levers	Keybd	E-VCA	VCA/Vel	VCA/En2
	0	60	0	0	62	OFF	KEY	45	0	+63
30 FM/TRCK	FM	FM/En3	FM/Prs	TrackIn	Track1	Track2	Track3	Track4	Track5	
	21	0	0	KEYB	63	12	2	2	2	
40 RMP/PRT	R1 Spd	Trigger	R2 Spd	Trigger	Port	Spd/Vel	Mode	Legato	Keymode	
	0	STRIG	0	STRIG	0	0	LINE	OFF	UNI	
50 ENV1	Delay	Attack	Decay	Sustain	Release	Amp	Amp/Vel	Trigger	Mode	Lf1trig
	0	0	31	0	10	0	+63	STRIG	NORM	NORM
60 ENV2	Delay	Attack	Decay	Sustain	Release	Amp	Amp/Vel	Trigger	Mode	Lf1trig
	0	28	18	50	30	40	+63	STRIG	NORM	NORM
70 ENV3	Delay	Attack	Decay	Sustain	Release	Amp	Amp/Vel	Trigger	Mode	Lf1trig
	0	0	20	0	20	40	+63	STRIG	NORM	NORM
80 LFO1	Speed	Sp/Prs	Wave	Retrig	Amp	Amp/Rp2	Trigger	Lag	Sample	
	40	0	TRI	0	0	+63	OFF	OFF	KEYB	
90 LFO2	Speed	Sp/Prs	Wave	Retrig	Amp	Amp/Rp2	Trigger	Lag	Sample	
	30	0	TRI	0	0	+63	OFF	OFF	KEYB	

Matrix Modulation

	Source	Amount	Destination
0			
1			
2			
3	TRAK	-30	VCF FQ

KORG POLY 8000

Sounds Acoustic

Mike Vickers, Cincinnati, OH

A superb selection of sounds for the DW8000, which were most ably demo'd by their creator. The theme is simulating acoustic sounds, while emphasizing the need to play them sympathetically – yep, it's the way you play 'em time again. So without much further ado, we'll pass the mic to Mike(!):

Acoustic Piano (A): *Very effective around the middle, though the top end suffers from lack of a scaling facility; great for general accompaniment.*

Nylon Guitar (B): *Benefits from sympathetic playing, arpeggios and repeated notes and so on. Very beautiful (with strings) as a melodic instrument.*

Saxophone (C): *good for solos and polyphony, so it's excellent as an ensemble sound for beefing up rhythm sections.*

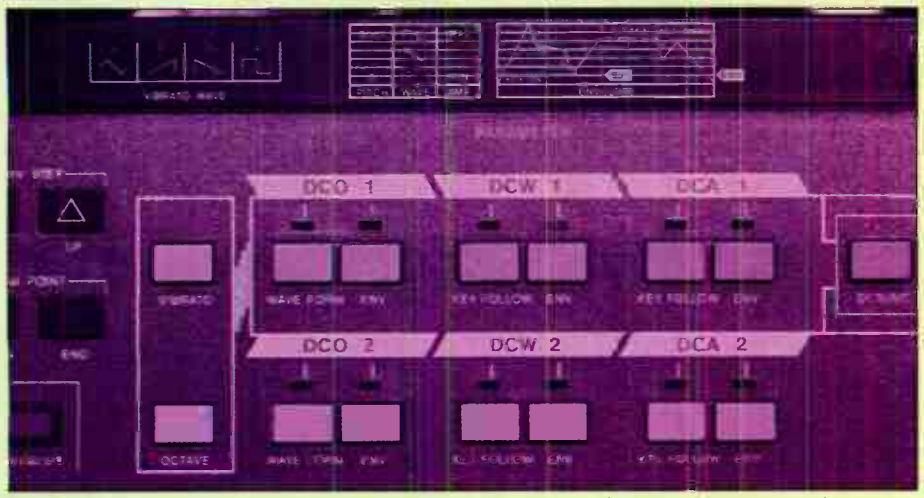
Strings (D): *the old reliable. Tonally, this sort of sound is perennial because of its homogeneity through all registers. The real-time parameter I've programmed is a bowing one, taking it from legato, through détaché, to hammered with one slide of a finger.* ■

Parameter	(A)	(B)	(C)	(D)
Osc 1:				
11 Octave	16	8	8	16
12 Waveform	3	11	12	1
13 Level	31	31	24	31
Auto-bend:				
14 Select	0	3	2	1
15 Mode	–	2	1	1
16 Time	–	3	1	1
17 Intensity	–	1	7	10
Osc 2:				
21 Octave	16	8	8	16
22 Waveform	10	2	9	8
23 Level	21	31	31	31
24 Interval	1	1	1	1
25 Detune	1	0	1	3
Noise:				
26 Level	0	0	6	4
VCF:				
31 Cutoff	14	7	24	29
32 Resonance	3	7	3	3
33 Kbd Track	2	0	2	3
34 Polarity	1	1	1	1
35 EG Int	22	28	19	31
VCF EG:				
41 Attack	0	0	3	2
42 Decay	4	24	27	0
43 Break P	29	11	16	10
44 Slope	29	31	25	0
45 Sustain	45	0	29	9
46 Release	11	7	6	8
47 Vel Sensing	3	3	4	2
VCA EG:				
51 Attack	0	0	3	11
52 Decay	15	0	19	21
53 Break P	16	31	21	19
54 Slope	30	26	24	24
55 Sustain	0	0	13	16
56 Release	6	15	6	9
57 Vel Sensing	4	4	4	4
MG:				
61 Waveform	0	0	0	0
62 Frequency	21	19	17	22
63 Delay	2	0	15	3
64 Osc	0	0	0	5
65 VCF	0	0	0	0
Bend:				
66 Osc	0	1	2	2
67 VCF	0	0	0	0
Digital Delay:				
71 Time	1	0	5	2
72 Factor	12	1	6	13
73 Feedback	11	9	14	11
74 Mod Frequency	3	0	8	21
75 Mod Intensity	31	31	1	11
76 Effect Level	11	8	13	15
Portamento:				
77 Time	0	0	0	0
Aftertouch:				
81 Osc MG	0	–	–	0
82 VCF	0	–	–	0
82 VCA	0	–	–	–

CASIO CZ101

Best Piano

Marvin Morris, Denver, CO



"Close your eyes when you play this one," writes Marvin. "You won't believe it!" Well, we did, and we didn't! This is a great piano patch.

Be careful of the EQ set up on your amp, as mid-range kills this voice. Marvin recommends that you use your hi and low EQ only to set the tone. Thanks a lot! Your free subscription is on its way. ■

PARAMETER	TONE NAME	CARTRIDGE NO.	TONE NO.
	BEST PIANO		

LINE SELECT	MODULATION RING	MODULATION NOISE
1+2'	OFF	OFF
(1,2,1+2,1+1')	(ON/OFF)	

DETUNE +/-	DETUNE OCTAVE	DETUNE NOTE	DETUNE FINE
+	0	00	02
(+/-)	(0-3)	(0-11)	(0-66)

VIBRATO WAVE	VIBRATO DELAY	VIBRATO RATE	VIBRATO DEPTH
4	00	75	00
(1-4)	(0-99)	(0-99)	(0-99)

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

1

DCO 1

WAVE FORM FIRST	WAVE FORM SECOND
2	3
(1-8)	(0-8)

ENV (PITCH) STEP	1	2	3	4	5	6	7	8	
RATE	99								(0-99)
LEVEL	00								(0-99)
SUS/END	END								

DCW 1

KEY FOLLOW
9 (0-9)

ENV (WAVE) STEP	1	2	3	4	5	6	7	8	
RATE	99	99	00						(0-99)
LEVEL	99	85	00						(0-99)
SUS/END			END						

DCA 1

KEY FOLLOW
1 (0-9)

ENV (AMP) STEP	1	2	3	4	5	6	7	8	
RATE	95	23	43						(0-99)
LEVEL	99	00	00						(0-99)
SUS/END			END						

2

DCO 2

WAVE FORM FIRST	WAVE FORM SECOND
2	3
(1-8)	(0-8)

ENV (PITCH) STEP	1	2	3	4	5	6	7	8	
RATE	99								(0-99)
LEVEL	00								(0-99)
SUS/END	END								

DCW 2

KEY FOLLOW
9 (0-9)

ENV (WAVE) STEP	1	2	3	4	5	6	7	8	
RATE	99	99	00						(0-99)
LEVEL	95	83	00						(0-99)
SUS/END			END						

DCA 2

KEY FOLLOW
4 (0-9)

ENV (AMP) STEP	1	2	3	4	5	6	7	8	
RATE	95	23	43						(0-99)
LEVEL	99	00	00						(0-99)
SUS/END			END						

PROGRAMMING

Ensoniq ESQ1

Yerass

Psyche Shriek, Los Angeles, CA

We were a trifle worried when we saw the name of this patch – it looked to be percussive, and we thought . . . well, never mind. As it turns out, the bottom end (sorry) is real gritty and has a great bite to it. Mr. Shriek was looking for "an unusual polyphonic that had a nice ensemble effect," and succeeded. ■

	OCT	SEMI	FINE	WAVE	MOD1	DEPTH	MOD2	DEPTH
OSC1	-2	00	00	EPNO2	LF01	+01	-	-
OSC2	-1	00	00	SAW	LF01	+03	-	-
OSC3	0	00	01	SAW	-	-	-	-

	FREQ	RESET	HUMAN	WAVE	L1	DELAY	L2	MOD
LFO1	22	OFF	OFF	TRI	00	00	00	WHEEL
LFO2	-	-	-	-	-	-	-	-
LFO3	-	-	-	-	-	-	-	-

	LEVEL	OUTPUT	MOD1	DEPTH	MOD2	DEPTH
DCA1	55	ON	-	-	-	-
DCA2	00	ON	ENV2	+51	-	-
DCA3	00	ON	ENV2	+51	-	-

	L1	L2	L3	LV	TIV	T1	T2	T3	T4	TK
ENV1	-	-	-	-	-	-	-	-	-	-
ENV2	+63	+50	+63	00	00	00	50	63	00	00
ENV3	-	-	-	-	-	-	-	-	-	-
ENV4	+63	+56	+56	16	00	00	24	63	27	00

	FREQ	Q	KEYBD	MOD1	DEPTH	MOD2	DEPTH
FILTER	084	10	18	WHEEL	+05	-	-

	SYNC	AM	MONO	GLIDE	YC	ENV	OSC	CYC
MODES	OFF	OFF	OFF	00	OFF	OFF	ON	OFF

	FINAL VOL (ENV4)	PAN	PAN MODULATOR	DEPTH
DCA4	63	08	-	-

	SPL/L	S/L PROG	LAYER	L.PROG	SPLIT	S.PROG	S.KEY
SPL/L							

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ROLAND JX8P, PG800 programmer and case, immaculate condition, two MC16 memory cartridges, sustain pedal, $1150. Randy, Tel: (512) 366-9531 or (512) 522-1154.

YAMAHA CB70B with road cases, excellent, $1750 OBO; Moog Opus 3 with cases, $300 OBO; Prodigy with cases, $250. Tel: (206) 641-9135.

YAMAHA ELECTRIC KEYBOARD PS6100, year old, mint condition, with stand and case. Will accept best offer. Tel: (305) 661-1292.

SOUNDS

JUNO1 OWNERS! I'll trade patches. Details? Send SAE to: Synthetic Garden, 14 Armstrong Road, Enfield, CT 06082.

JX10 PATCHES Acoustic guitar and harpsichord patches wanted for Roland Super JX10. John, Tel: (714) 774-0057.

MATRIX 12 XPANDER sounds. Send yours and I'll send you mine. Dave, Box 1834, Studio City, CA 91604.

OBERHEIM 4-VOICE; ESQ1; Source; Odyssey owners; Write me, exchange patches: Charles Butler, 7 Thorne Ridge Drive, Durham, NC 27713.

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EMULATOR II LA USERS GROUP, 1000 disks to share. Write: Steve Mitchell, Outer Planets Production, 24201 Philiprimm, Woodland Hills, CA 91367 (PAN: Outerplanets). Tel: (818) 883-7255.

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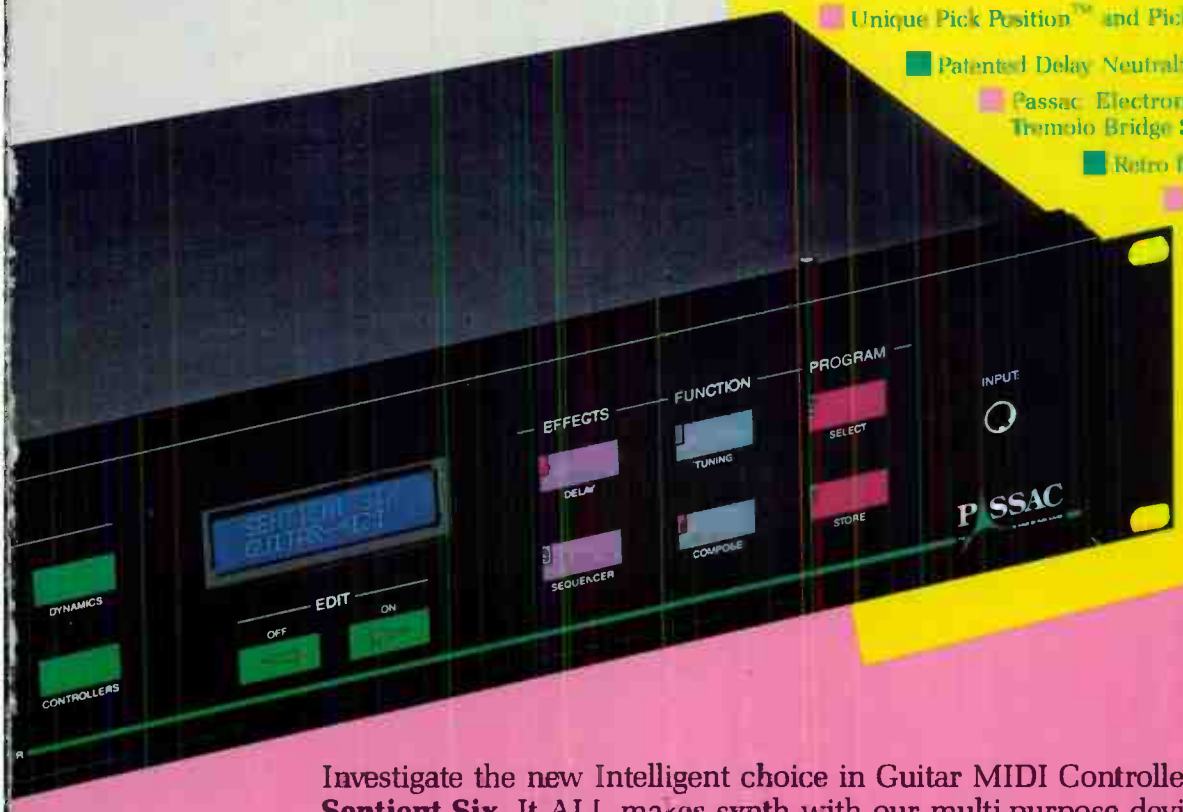

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