

The Mac
Power User

Electronic

MUSICIAN

MAY 1988

A MIX PUBLICATION

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INSIDE L/A SYNTHESIS



MIDI:
Latest Developments

**ELECTRONIC
PERCUSSION:**
Tips, Mods, Programming Sounds

REVIEWS:

Yamaha WX7 Wind Controller • Alesis HR-16 Drum Machine • Tandy Data Recorder • Ear Works and Prosonus CD Sound Libraries • Engineered Percussion Drum Pedal
MAC: MOTU Performer 2.2 • Digidesign Q-Sheet
IBM PC: Ad Lib Music Synthesizer



Our Specs Are More Importantly, So

At Korg, one premise guides digital engineering: technology doesn't really achieve anything unless it brings you closer to your music. No matter how innovative a design appears on paper, the specs don't add up to anything unless they produce an instrument with superior sound and feel.

The DSM-1 Digital Sampling Module

Our new rack mount DSM-1 Digital Sampling Module is a case in point. To take Korg sampling a step further, our engineers used the latest technology to set new standards of sampling accuracy and realism. The

DSM-1 has extended memory (a full Megaword) and sampling rates of 16, 24, 32 and 48 kHz. With 16 fully independent voices, 16 individual outputs and a mix out. Plus multi-timbral, multi-MIDI channel operation for total flexibility.

With all of this, the DSM-1 is one of the easiest samplers to learn and use. The control format is thoughtfully designed to use familiar synthesis parameters, so you can edit sounds quickly and easily. Yet the logical design will take you as deep into the sample recording/editing process as you want to go. There's even a high speed RS 422 data port to give com-

puter software quicker access to internal memory.

The DSM-1 stands out from the crowd of current samplers as a truly advanced sound creation tool, one that will strengthen any MIDI system. The perfect complement for the DSS-1, it can use any sounds from the already extensive DSS-1 sound library, as well as its own high capacity library disks. There are over 70 DSS-1 and



Impressive. Are The Sounds.

DSM-1 disks available now, with hundreds of sampled sounds and synth waveforms.

The DSS-1 Digital Sampling Synthesizer

The DSS-1 has been making giant strides of its own. New options let you double, quadruple or multiply internal memory up to eight times (as much as 2 Megawords of sample storage). You can access hundreds of sounds instantly, with a touch of a button.

Performance improvements include new, enhanced disk operating software that cuts the internal disk's

loading time in half. And there's an SCSI (Small Computer Systems Interface) port that communicates with one to seven external hard disk drives. It lets you store up to 99 Systems per drive, then load any one in a few seconds.

The SG Sampling Grands

The name, the look and the crisp, positive weighted actions are the same; the sound is more realistic than ever. The *new* SG Sampling Grands have four times the memory of their highly regarded predecessors. That lets us use longer samples and more of them to create a sound that recreates the original acoustic and electric pianos with startling accuracy. The new SG sound is also available as a retrofit to your SG-1 or SG-1D. And there are now ten new SG voice cards available (many with split keyboard sounds) to expand your creative expression.

Korg sampling is for players who delight in the complexity of acoustic sounds — and in the unusual variations that conventional instruments can't produce. Only the DSS-1 and DSM-1 deliver the unique combination of advanced sampling and additive synthesis. So if you'd like to shorten the step from inspiration to expression, investigate the new high-performance DSS-1, the newly expanded SG-1D and the new DSM-1 at your Korg Sampling Products dealer. When it comes to creative sampling, studio efficiency and on-stage flexibility, there have never been digital instruments more musical than these.

KORG® Sampling
Products
Division

SAMPLING IS ONLY THE BEGINNING

DSM-1 features

Memory: 1 Megaword (1.5 Megabyte)
16 voices assignable to 16 separate outputs + Mix out
64 split points
Multiple Zones, Multiple Layers, 4-Way Velocity Switches and Cross-fades
High Speed RS 422 port (SCSI interface option available soon)
Linear and Equal Power Cross-fade looping
Additive synthesis
Media: High Speed, High Density 2 Megabyte 3½" disks. Reads DSS-1 disks

DSS-1 features

Memory: 256 Kword standard
61 note velocity- and pressure-sensitive keyboard
8 voices, 2 oscillators per voice
2 programmable DDLs
32 Programs in memory, 128 on disk
Velocity Switching
Sample Editing: Mixing, Linking, Reversing, Truncating, Sample Address editing
Autolooping with Normal and Back-and-Forth modes
Program Parameters include Octave setting, LFO's, Noise generator sync, 12 and 24 dB/octave filters, Resonance, two Envelope Generators per voice, Unison, programmable EQ, extensive pressure and velocity routing

New DSS-1 Memory Update

Optional Memory Expansions: 512K (2X), 1 Meg (4X), 2 Meg (8X)
SCSI Data Port for communication with external hard disks (up to 120 Meg drives)

New SG Sampling Grand Features

1 Meg memory
10 SG ROM sound cards available
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MIDI Pitch/Mod wheels
Local On/Off
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COVER

This month's feature on L/A Synthesis takes us inside the techniques of Roland's new approach to synthesizing musical sounds, so photographer Tony Carlson gave us a look at the real thing: the Roland MT-32 MIDI sound module. Along with the D-50 keyboard synthesizer, this unit represents the best of this new breed.



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Every now and then, the magazine goes to sleep for a few minutes and I get to go into the studio. During those times, I always manage to think of one or two little things that would make life in the MIDI age go a little easier, and I thought it might be fun to collect them into a sort of MIDI wish list.

MIDI connectors: Ever notice that some synths have the semi-circle of pins on their MIDI connectors facing up, while others have them facing down? Ever since Jock Baird (*Musician* magazine's editor) pointed this out to me, I've become very aware of the non-standard nature of MIDI connector positioning. On my OB-8, the semi-circle even faces sideways! Now,

running around the back of my synths and re-patching things is bad enough (okay, I know it's time to get a programmable MIDI switcher) without getting confused about how the connector wants to be inserted. It sure would be nice if all the manufacturers lined up their connectors in the same way.

A special patch bay for rack-mount synths: I've yet to see a patch bay specifically for rack-mount MIDI synths, but here's what I think it should have. First, you'd need lots of standard 1/4-inch audio connectors to accommodate all the rack stuff with multiple individual outputs. Next, you'd need a few more jacks to take care of pedal and footswitch connections.

How should MIDI be handled? I'd like to see a single MIDI In, connected to an internal MIDI Thru box, which would distribute the MIDI signals to all your rack-mount synth MIDI Ins. MIDI Out would be handled by a single MIDI Out connector in conjunction with a rotary switch; the rotary switch would choose which MIDI Out was currently selected from cords connected to the MIDI Outs from all the synths. The reasoning behind this is simple—rack-mounts don't make much use of MIDI Out, except to send patch data and such. You would simply dial in the synth's whose MIDI Out you needed at that particular moment.

Guitar and wind MIDI controller enhancement: How about adding a pitch bend (or aftertouch, or other controller) "window" comparator? Pitch bend data would not be sent unless it exceeded the value of the user-settable window. That way, all those zillions of small-value pitch bend commands, which are not of musical use as they are usually unintentional, could be effectively filtered out of the MIDI data stream. This makes any sequencer much, much happier, and would minimize MIDI data clogging. Keyboards with aftertouch might want to implement a similar feature to avoid sending out lots of low-level aftertouch information. Whenever the controller data values fell within the window limits, the synth (or guitar or whatever) would send out a single piece of data indicating a controller value of zero. This would remain in effect until the data exceeded the window's limits, at which point the controller data would proceed through unencumbered.

Controller data filters for sequencers: And while we're thinning out the data stream, how about a "remove consecutive equal-value controller data from track" command in every sequencer? Since a controller change message only signifies a *change*, if you have several consecutive pieces of data with the same value, only the first one of the series has any practical effect. A command like the one mentioned above would examine the controller track and strip out all unneeded data, thus freeing up a lot of sequencer memory.

These are all fairly simple suggestions, but I'd sure like to see them implemented. Manufacturers, feel free to take any of these ideas and run with them.

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Released and Recovered

Okay, everybody, you can stop sending in your "keep Robert Carlberg" letters now. He's no longer thinking about getting out of the record reviewing business; the outpouring of letters of support was pretty impressive (do you really have that many relatives, Robert?). Presented is the last Carlberg letter we'll run for a while, as it is representative of the type of comments we've been getting.—CA.

I read with great disbelief the possibility that Robert Carlberg's fine "Released and Reviewed" column may be discontinued. Mr. Carlberg is without a doubt the finest and most far-reaching music reviewer of any magazine. His invitation to talented musicians to have their music critiqued in an open and fair way can only be beneficial to all of us.

As an alternative music programmer, I have found Mr. Carlberg's column of inestimable value. His reviews have led me to discover a wealth of interesting and provocative performers. Not only has he provided a forum for new music, he provides a medium for artists to contact one another and share information and music.

After all, isn't it the music that we all are striving for? All the technology in the universe will not cure an empty spirit. Let's read more from Robert Carlberg and share the music we each love. Let's listen, and learn.

Dave Leonatti
Program Host
WSSR
Illinois

Stringing Along with Guitar-to-MIDI Conversion

I read Michael Poeschl's mini-article, "Faster Guitar-to-MIDI Tracking" (September '87 EM) with a great deal of enthusiasm and interest. My local music store has never come through with a long-promised update to the chip set for my Pitchrider 7000 and any idea that could improve the beast's performance was most welcome.

Unfortunately, when I followed Mr. Poeschl's recommendation, the system seemed completely unable to detect notes played on the sixth string! The fifth string was somewhat better, but decayed much more rapidly below the trigger level than the remaining strings.

I tried resetting the intonation, raising the hex pickup, checking various settings for the sensitivity and dynamics of the Pitchrider, and more, but not one of these helped enough to make the system playable.

It occurred to me that the Pitchrider might filter out higher-order harmonics in a string-dependent fashion and that a high "E" in sixth string position might fall outside of the filter's pass band. This led me to experiment with different combinations of tunings and transpositions. Eventually, I arrived at a configuration that really did improve the overall system performance for me.

Strings one through three I kept exactly as in the article but transposed them in the Pitchrider as follows:

E 1st string 0 (i.e., no transposition)
B 2nd string -5
G 3rd string -9

For the fourth string, I used the 0.010 gauge recommended in the article; for the fifth string, I used a 0.015 gauge (plain) string; and for the sixth, I chose a 0.020 (wound). Each of these I tuned one octave above standard guitar tuning and compensated by transposing them down by the same amount in the Pitchrider.

This technique reduces the time per string oscillation by a factor of two from standard tuning for the lower three strings. While another factor of two would be welcome for the sixth string (as in Mr. Poeschl's scheme), the improvement was very noticeable. Single line passages in the lower register come through more clearly with far fewer glitches. Chord patterns may be strummed much more quickly than before.

I'm not sure of the reason for the difference in results. Perhaps Mr. Poeschl's Pitchrider used a different revision of software, hex pickup, or filtering system than mine. Perhaps my pick attack is inappropriate for the proper triggering of the lower strings. Whatever the reason for the difference in performance between his scheme and the one I eventually chose, I would like to thank him for writing about the basic idea of using alternate tunings to mitigate the physical limitations of pitch-to-MIDI conversion. It really does make a significant difference.

Michael Glaviano
California

And Now, for a Little History . . .

Regarding John Diliberto's excellent article on John Cage (March '88 EM), as an amateur electronic music historian, I was especially amused by the quote on page 79, "The use of noise to make music will increase until we reach a music produced through the aid of electrical instruments which will make any and all sound that can be heard," John Cage, 1937. Consider these quotes as well:

"We have also sound-houses, where we practice and demonstrate all sound, and their generations. We have harmonies which you have not, of quarter-sounds, and lesser slides of sounds. Divers instruments of music likewise to you unknown, some sweeter than any you have: together will bells and rings that are dainty and sweet. We represent small sounds as great and deep: we make divers tremblings and warblings of sounds, which in their original are entire. We represent and imitate all articulate sounds and letters, and the voices and notes of beasts and birds. We have certain helps which set to the ear do further the hearing greatly. We have also divers strange

and artificial echoes, reflecting the voice many times, and as it were tossing it: and some that give back the voice louder than it came; some shriller, and some deeper; yea, some rendering the voice differing in the letters or articulate sound from that they receive. We have also means to convey sounds in trunks and pipes, in strange lines and distances."—Sir Francis Bacon, 1624, *New Atlantis*.

or . . . "My God! What has sound to do with music?!"—Charles Ives, 1923, *Essays Before a Sonata*.

or . . . "LOGIC, n. The art of thinking and reasoning in strict accordance with the limitations and incapacities of human understanding."—Ambrose Bierce, 1906, *Devil's Dictionary*.

or . . . "Music may yet be unborn."—Charles Ives, 1923, *Essays Before a Sonata*.

or . . . "Music, you ask? Nothing but sound, you fool."—Thaddeus Cahill, 1898 (inventor of the first electronic synthesizer, the Telharmonium).

By the time Cage uttered that insight, many instruments, other than Cahill's, were already pointing the way; to wit, the Theremin (1923), the Ondes Martinot (1928), the first in a long series of Hammond organ products (1929), an instrument with four oscillators controlled by punched paper rolls invented by Givlet and Coupleux (1929), and, of course, the Hammond Novachord (1936).

Bernie Krause
Wild Sanctuary Communications
California

Bernie—Hey, you really know how to send a letter to the editor! Thanks for the info. For those readers who might not be familiar with Bernie Krause, he is one of electronic music's true pioneers; his extensive history, as well as his fascinating current work, will be the subject of an upcoming interview.

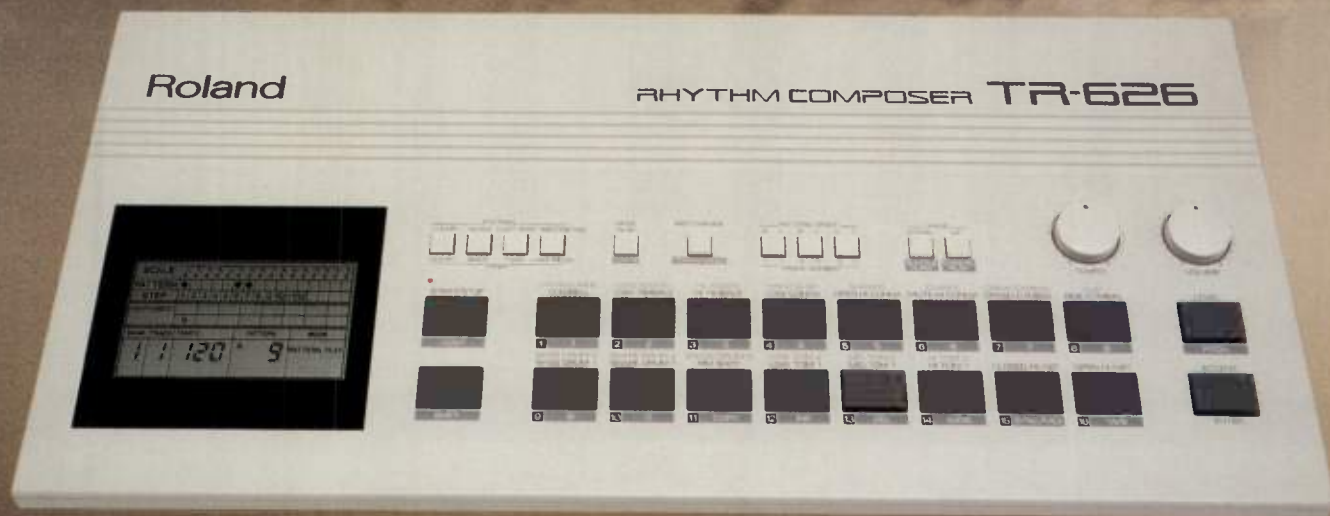
Public Domain Software Update

I was delighted to see Jim Johnson's review of FB-Patch in "First Take" (February '88 EM). I wanted to let your readers know that FB-Patch, an Atari ST voice editor/librarian for the FB-01, has been upgraded since the reviewed version (0.10). The current version (1.10) is now available in GENie's Atari ST library as file 4742. It's also available on CompuServe, Delphi, and several other bulletin boards.

Version 1.10 is much more "user-friendly" than version 0.10. FB-Patch now provides configuration processing, automatic updating of the FB-01 (optional), and improved documentation (as well as an on-line help feature). The voice "test area," which is now much more flexible, remains active while a voice is being edited. This provides quick auditioning of a new (or existing) voice.

I am more than happy to provide support for FB-Patch users on GENie. Just look in the

THE DRUM MACHINE WITH TODAY'S SOUNDS, TOMORROW'S FEATURES AND YESTERDAY'S PRICE



Assuming you haven't already heard its incredibly low price, the first thing that will impress you about the new Roland TR-626 Rhythm Composer is the sound. We went back to the studio to create all-new high-resolution PCM samples of the finest percussion instruments to give you the latest in today's sounds. And that's just what you'll find on the TR-626: round woody-sounding basses, tight full snares (even including a gated-reverb snare) toms deep enough to please a Phil Collins, clear, vibrant cymbals, and the most complete selection of latin percussion instruments that'll really add some spice to those dance tracks. Thirty digital samples altogether, and each one is tunable as well as level programmable.

Then, since we'd come up with all-pro sounds, we just had to balance it out with the state-of-the-art in performance features: like the most musically-natural and accurate programming software anywhere — combining the best of real-time and step programming with visual accuracy through its sophisticated LCD Display Window. To make the rhythms sound as real as the samples, we've included shuffle, flam and accent features.

On the TR-626 you'll also find songs up to 999 measures,

eight assignable outputs for separate processing of the instrument samples, stereo mix, tape sync, MIDI sync and trigger out. Finally, in a fit of nostalgia, we threw in a price

so low it sounds like the good old days: just \$495.00.* But probably the most important performance feature is one you won't find anywhere else — and it's an idea that makes the TR-626 the first drum machine that's really usable in live performance. We've added a Memory Card Interface that allows you to load-in stored songs and patterns as fast as you can push a button. Up to 18 songs worth of drum data can be saved and loaded in a flash from the credit-card sized M-128D Memory Card.

If you think all this sounds like the most exciting drum machine to come down the pike in a long while, you're right. Because while the idea of a drum machine isn't new, the idea of a drum machine

with some really new ideas of sounds, features and price is positively revolutionary. See and hear the TR-626 today at your Roland Dealer. *Roland Corp US 7200 Dominion Circle, Los Angeles, CA 90040 (213) 685-5141.*



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The K1m low-profile design is ideal for desktop use.



new K1 synthesizer. Minimum moola.

Dynamic note assignment and velocity zone functions further enhance the K1's multi-timbral capability. Strike a key softly and one note will play. Hit it a little harder and you'll hear another sound—a tonal variation or a completely different timbre. Create a simple duet, complex orchestral passage or monster solo unison, then save it for instant recall.

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The 61-note K1 keyboard features Velocity, After-touch and weighted keys for excellent responsiveness. The LCD display and direct access buttons easily summon any of the K1's 64 internal single sounds or 32 multi-combinations. Optional memory cards expand the library of sounds available.

You'll also appreciate the easy, intelligent editing capabilities. Complete sound editing functions are available from the front panel without

any additional equipment. Existing sounds can be modified and new ones created easily. Sound programs can be stored in any of the 96 internal memory locations or externally on the optional memory card.

The bottom line: You need to hear this synthesizer.

The K1 is the epitome of intelligent engineering at a very affordable price. But don't take our word for it. Visit your nearest Kawai dealer today and find out how you can achieve maximum music for minimum moola.

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Music Category of the ST RoundTable or in the MIDI RT. Owners of other computers (as well as ST'ers) may want to visit the MIDI RT, a relatively new RoundTable that supports the "world of MIDI."

Thanks again to Mr. Johnson for his review of public domain software. The public domain is a fairly extensive source of MIDI-oriented programs; though usually not in the same class as the expensive software, these PD programs do help to fill the gap between the expensive do-it-all software and no software at all.

Harry P. Wootan
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Birmingham, AL 35226

Safety First

Just finished reading Toby Mountain's "Compact Disc Production" in your February issue—it's helpful information. One minor but advisable addition: if you choose the PCM-F1 format for safeties made from the 1610/30 masters, have two safeties made, not just one, and have them made on different brands of tape. Reason: fatal errors can occur on 1/2-inch video tape; that is, dropouts too big for the error correction circuitry to reconstruct, if the batch of tape is bad. By making two safeties, and using different brands of tape, you're covered.

I learned this lesson the hard way. I'm recently back from ten months of making digital recordings of Tibetan rituals and Balinese gamelan. Everything except the mics malfunctioned at one time or another—the mic preamp, two Panasonic NV8420s (industrial-grade VCRs), and the PCM-F1. I had to fly in a backup Sony digital processor, and that gave trouble, too. Most of the time, I recorded on both VCRs simultaneously, but in one important session, tape ran short, so I risked recording on just one VCR. Sure enough, I got a fatal error!

Paranoia pays. Make plenty of safeties!
David Lewiston
Conservation of Traditional Music
Hawaii

DAT Compromise?

In response to the "Editor's Note" column in the October '87 issue regarding the controversy surrounding DAT: on one side of the coin there's the RIAA and various record companies/publishers griping that home recording will cause these individuals and companies to lose substantial royalties, both now and in the future. On the other side, consumers and members of the hi-fi industry argue that even if copy code is deemed "inaudible," no one wants to purchase a disabled DAT.

Enter the compromise: production of both encoded and non-encoded musical products (CD, records). The encoded ones (which could not be copied) would sell for about 2/3 the price of non-encoded versions (which

could be copied). This would allow the DAT to compete with other forms of hi-fi equipment, and the record industry would get some compensation for profits lost.

Erik Schumacher
California

Erik—Some software is already sold on a similar basis; you buy a copy-protected program, and for a few dollars more, can send away for a non-copy-protected backup disk. We might even want to take this a bit further. A lot of times I'll be interested in buying a CD I haven't heard, but am deterred by the possibility of making a \$15 mistake. Why not rent out the encoded CDs for \$1 or \$2; that way, if you like something, you can buy the non-encoded version. If you don't like the CD, you're out only a dollar or two instead of \$15. This is sort of like the way video tapes are handled—you can rent something, but if you think you'll want to see it again and again, then you can buy the tape. Any comments?

Additions and Corrections

In "Mastering the TX81Z" (January '87 EM), the screen dump in Fig. 1 shows a set of performances labelled "Factory 1." The performances are actually from Leister Productions' excellent set of TX81Z patches; the mislabelling occurred during the process of creating the screen dump.

Mega-error correction: In "Juno 106/DX21 Patch Generator," an earlier, incorrect listing was inserted instead of the correct listing. The person responsible for this error has been shot. Following is the correct listing—clip it to the original article to avoid future confusion.

JUNO 106 RANDOM PATCH GENERATOR - BASIC LISTING

```
10 REM JUNO 106 RANDOM PATCH GENERATOR
20 REM BY CHUCK PIERCE
30 CW=56840:TD=56841:SR=56842
35 CW=56832:TD=56833:SR=56834:REM EM
40 POKE CW,19:POKECW,17:REM SETUP ACIA
50 PARM=18:REM NUMBER OF SYSEX BYTES
60 PRINT"[CLR][DOWN]"
70 PRINT"106 RANDOM PATCH GENERATOR"
80 REM SETUP NOISE GENERATOR
100 S=54272
110 FOR L=0 TO 24:POKE S+L,0:NEXT L
120 POKE S+14,121:POKE S+18,128
130 FOR A=1 TO PARM
140 X=PEEK(S+299) AND 127
150 REM INSERT CONDITIONALS HERE
160 POKE 49152+A,X:NEXT A
200 REM PRINT RANDOM DATA VALUES
210 FOR A=1 TO PARM
220 PRINT PEEK(49152+A);:NEXT A:PRINT
250 REM SYSEX HEADER FOR JUNO 106
260 WAIT SR,2:POKE TD,240
270 WAIT SR,2:POKE TD,65
280 WAIT SR,2:POKE TD,49
290 WAIT SR,2:POKE TD,0
300 WAIT SR,2:POKE TD,0
310 REM SEND DATA TO SYNTH
320 FOR A=1 TO PARM
330 WAIT SR,2:POKE TD,PEEK(49152+A)
340 NEXT A
350 REM SEND END OF EXCLUSIVE
360 WAIT SR,2:POKE TD,247
370 PRINT:INPUT" DO ANOTHER (Y/N)";B$
380 IF B$="Y" GOTO 60
390 END
```

EM

STANFORD UNIVERSITY COMPUTER MUSIC WORKSHOPS

Faculty:

J. Chowning, C. Chafe, P. Cook,
B. Schottstaedt, L. Smith, D. Zicarelli

MIDI-Based Synthesis and Composition

June 21 - July 15, 1988; Fee: \$1250.

Three weeks hands-on instruction, followed by one week of independent work. Limited to 20 participants. Topics will include computer-based modular systems having MIDI interconnections into synthesis, FM theory, psychoacoustics and composition.

Synthesis and Composition on a Large Computer System

June 21 - July 15, 1988; Fee: \$1250.

Three weeks hands-on instruction, followed by one week of independent work. Limited to 6 participants. This course will be based on the use of CCRMA's unique digital synthesizer-processor, designed by Peter Samson, using the compositional program PLA, written by Bill Schottstaedt. Topics will include digital synthesis, signal processing, psychoacoustics and composition.

Music Printing on Personal Computers

July 5 - July 15, 1988; Fee \$950.

Limited to 8 participants.

This workshop will concentrate on the use of the SCORE computerized music printing system which has been developed by Leland Smith.

Application and information requests should be sent to: CCRMA Summer Workshops, Department of Music, Stanford University, Stanford, CA 94305-3076 (415) 723-4971

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Accessories

The **MFC2 MIDI Foot Controller** (\$325) expands the expressiveness of the Yamaha WX7 Wind MIDI Controller. The MFC2 allows the musician to control two different MIDI channels, and hence, two different voices, simultaneously, but in slightly different ways. The *Key Hold* footswitch, for example, allows the player to sustain a note on one MIDI channel while playing an independent line on another.

The MFC2 connects via MIDI between the WX7's power pack and a MIDI synthesizer or other sound generator, and has *Bank Select* and *Program Select* switches that can call up any of the sound generator's 30 patches. LED indicators display the selected patch, as well as data for up to six parameters per program.

Yamaha Music Corporation, USA

Digital Musical Instrument Division
PO Box 6600
Buena Park, CA 90622
☎ 714 / 522-9477

Mentor (\$1,450) is a programmable MIDI processor that serves as a central controller/programmer, linking performance controllers—such as keyboards, guitars, or wind controllers—and sound mod-



Forte Music Mentor

ules or other MIDI accessories. It memorizes the status of a complete MIDI network, including program, volume, key range, transpose, delay and other parameters.

Mentor has two MIDI Ins, four MIDI Outs and an auxiliary MIDI control input. Programming and operation are simplified by four slide controls, a 48-character display and an optional memory cartridge for

recalling setups. The unit provides controller mapping, programmable, simultaneous filtering of all MIDI message types, arbitrary MIDI data generation with a programmable event trigger, sequencer control functions and special MIDI effects, including key mapping, velocity switch, and key inversion. The system is composed of a 1U rack-mount processor and a small remote programmer/controller, and has inputs for footswitches, voltage/volume pedals and other controllers.

Forte Music, Inc.
PO Box 6322
San Jose, CA 95150
☎ 415 / 965-8880

Controllers

The new **LN-4 MIDI Controller** (\$1,325) from Lync Systems is a sleek and powerful



Lync LN-4 MIDI Controller

tures include four octaves of full-sized keys, 64 master programs (each with four keyboard zones), and the following programmable parameters for each MIDI output: channel number (1 through 16), program number (0 through 127), keyboard velocity response (1 through 8), transpose amount (0 through 127), volume level (0 through 127), low and high key limits (C0 through C4), and MIDI controller number (0 through 127). Also included as standard equipment are two return-to-center wheels, one-touch program increment and decrement, hold and all-notes-off functions, and a rack-mount power module with four MIDI Outs. The LN-4 is available in black, red, blue, orange, yellow and ivory.

Lync Systems, Inc.
14 Walker Way
Albany, NY 12205
☎ 518 / 452-0891

Editor/Librarians

GM70 Companion (\$75) for the IBM PC, XT, AT and clones, providing easy editing/librarian functions for all parameters of the Roland GM70 MIDI guitar controller, is now available for the Macintosh (\$125), with an Amiga package slated for introduction soon.

Snap Software
1116 Janey Way
Sacramento, CA 95819
☎ 916 / 451-9914

Zero One Research's **D-50 Patch Librarian Mk. 1** for the Macintosh (\$49.95) is installed as a desk accessory. Memory resident, it runs concurrently with any Mac sequencer or any other application program,

and/or as a stand-alone application. It offers the ability to copy patches and/or tones among or within any open library file. The **Advanced D-50 Librarian Mk. 2** (\$79.95) allows eight open windows at one time. It includes a database manager with search functions, and the ability to sort patches automatically into new banks, keyed by user-selected parameters (such as PCM name) and allows you to export patch parameter information in standard formats to other databases. It includes advanced multi-tasking printing functions, and will import and export Opcode librarian patch files. In addition to the D-50 Librarian, the disk comes with a set of 64 new patches. A catalog of Zero One's patch libraries (\$29 for 64 patches) is available.

Zero One Research
PO Box 301
Brisbane, CA 94005
☎ 415 / 467-5007

Education

Music lessons over the phone are being offered for people for whom distance from schools or instructors is a problem. Instruction ranges from beginning to advanced material and requires only an electronic metronome, speaker phone and your instrument. Lessons lasting less than an hour are pro-rated, and can be scheduled when phone rates are low.

The Faunt School of Creative Music
4860 San Fernando Rd., #205
Glendale, CA 91204
☎ 818 / 247-2234

Electronics

The **LC77 Auto-Z LC analyzer** (\$1,895) tests capacitors



OFFICIAL NEWS FROM THE YAMAHA USERS GROUP

MAY, 1988.

Five of the most realistic piano sounds ever to fit in a rack.

NOW YOU CAN get piano realism without struggling with extra keyboards or bulky equipment, thanks to the Yamaha® TX1P Piano Tone Generator.

The TX1P takes up a single rack space, and can be connected to any MIDI keyboard controller. It uses the Yamaha Advanced Wave Memory™ (AWM) to digitally re-create five live instrument sounds with rather amazing quality: 2 acoustic pianos, electric piano, harpsichord and vibes. All voices offer full 16-note polyphony as well as full velocity sensitivity.

In addition, the TX1P has 3 built-in effects. There's a Stereo Chorus, for a rich chorusing effect. A Transposed Delay, for adding single or multiple repeats to any note (transposable for automated runs and arpeggios). And a Chord Play, for assigning chords, up to 4 notes, to specific keyboard notes.

The TX1P has a Master Tune function that lets you increase or decrease overall pitch up and down in 3-cent units, up to about a semitone. You can also transpose individual voices up or down in semitone steps, up to a full octave in either direction.

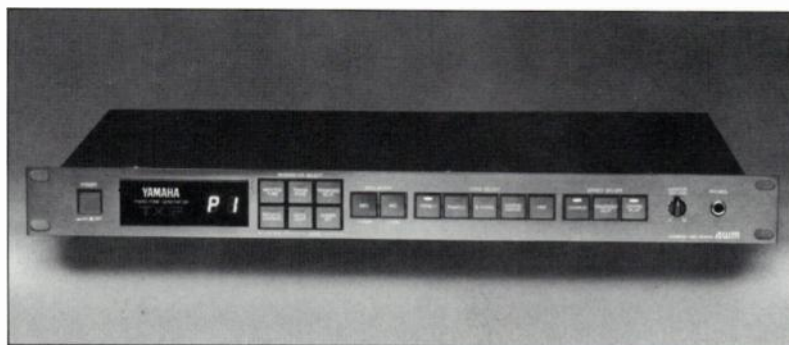
With its Note Limit function, you can define what range of notes your keyboard controller will play on the TX1P. That's useful in creating split keyboard effects, where, for example, you want to play a synth sound with the lower half of the keyboard and the TX1P with the upper half.

The TX1P has stereo outputs, for true stereo imaging. It also has full MIDI implementation, so you can switch sounds from your MIDI keyboard and transmit control change data for volume, sustain, key hold and other expressive parameters.

If you're interested in hearing the TX1P for yourself, that's easy enough. Your authorized Yamaha Digital Musical Instruments dealer has it today. Suggested USA retail price is \$895.00.

Hot Tips

Creating A/B Balance Control for the DX7II. With a DX7IID or DX7IIFD, there's an easy way of setting up an A/B balance control in Voice mode with-



out setting up any Performance parameters or editing existing voices. Simply select either Dual or Split voice mode, choose 2 voices and then press Edit. CSI will be set to control A/B balance automatically at this point, and you can alter the balance to your heart's delight. If you want to change voices, just press the lit Voice Mode button to escape from Edit mode, choose another pair of voices and press Edit again.

YAMAHA TX1P PIANO TONE GENERATOR.

Questions

I bought a Yamaha keyboard about two years ago, and mysterious forces seem to have done away with my manual. How can I replace it?

For starters, visit your friendly Yamaha dealer. He or she can order one from the DMI Division of Yamaha. If that doesn't work, you can take matters into your own hands by writing to Yamaha (not AFTERTOUC) at the address below, Attn: DMI Literature Dept.

Does a DX7II synthesizer always receive System Exclusive data, or is there some way to turn Sys-Ex reception off?

A DX7II synthesizer can easily be adjusted to prevent the reception of System Exclusive data.

Start by pressing the EDIT button. Then press button #32 (MIDI 2) until you see the "MIDI Device Number Receive Block" display. Position the cursor next to the "Device Number" parameter, and move the data entry slider up until the value under "Device Number" reads "off." Then—you guessed it—you've succeeded in turning System Exclusive reception OFF.

AFTERTOUC is a monthly newsletter filled with the latest on Yamaha products. Get a year's subscription free by writing to: AFTERTOUC, P.O. Box 7938, Northridge, CA 91327-7938.

YAMAHA.

Yamaha Music Corporation, USA,
Digital Musical Instrument
Division, P.O. Box 6600, Buena
Park, CA 90622.

and inductors. Capacitor tests include value (1.0 pF to 19.99 F), leakage failure (voltage range 1.0V to 999.9V; power 6W), dielectric absorption (the cap's inability to discharge completely), and the equivalent series resistance (0.10 ohm to 1990 ohms). Inductor tests include true inductance value measures (0.10 μ H to 19.99 H), and inductor ringing. The unit also tests for leakage current in very high resistances. It operates on 120 VAC or optional battery pack (carrying case extra).

Sencore

3200 Sencore Drive
Sioux Falls, SD 57107
☎ 800 / 843-3338
☎ (Canada) 800 / 851-8866
☎ (SD) 605 / 339-0100

MIDI

STIB (\$99) is a MIDI interface board that is a simple interface for the IBM PC, rather than a microprocessor-based unit such as the Roland MPU-401. It is offered along with also-simple software packages (from \$39 to \$199) and a custom cable (\$19). Instead of the fixed protocol used by more complex interfaces to capture MIDI data, the STIB is a UART-type device that uses interrupt processing similar to that of the IBM keyboard, making it easier to program and less expensive. Software now available for the STIB includes a sequencer, note and word editor with automatic chord dis-



Simmons PortaKit

play, a multi-track sequencer, a score printer, librarian and patch editor.

Standard Computer Corporation
PO Box 26
Plymouth, MI 48170
☎ 313 / 464-8562

Percussion

Simmons Electronics has announced the **Portakit** (\$995), a self-contained MIDI triggering system allowing drummers to access MIDI drum machines and samplers without compromising playing technique. The Portakit features 12 pads, each having an individually adjustable setting for sensitivity and a global setting for dynamics curves. Fifty kit memory patches can be stored, including MIDI and perform-

ance response parameters and effects. The unit also includes a dynamic, eight-note polyphonic internal sequencer with a 5,000-event memory; other features include a trigger recognition system for firing MIDI devices from acoustic drums via six drum mic inputs, an illuminated LCD status indicator, mergeable

intro/fill-in controls, and even comes with a pair of drumsticks.

Yamaha Music Corporation, USA

Consumer Products Division
PO Box 6600
Buena Park, CA 90622-6600
☎ 714 / 522-9011

Synchronizers

The **MTS-30 MIDI/FSK Translator** (\$225) offers reliable MIDI/FSK conversion and uses MIDI Song Position Pointer to provide synchronized playback—from any point in a composition—of MIDI equipment and multi-track tape decks. The unit's powerful error correction circuitry prevents sync loss caused by conversion errors, and an automatically switched MIDI Out/Thru port eliminates the need for repatching when changing from record to playback modes. The unit measures



Tascam MTS-30

MIDI input, two MIDI outputs, remote foot-control jacks, and a metronome output.

Simmons Electronics USA Inc.
23917 Craftsman Road
Calabasas, CA 91302
☎ 800 / TEC-DRUM
☎ 818 / 884-2653

9.5x1.5x3.75 inches and includes an AC adapter.

Tascam, TEAC Professional Division
7733 Telegraph Road
Montebello, CA 90640
☎ 213 / 388-5200

Synthesizers

The **VZ-1 Digital Synthesizer** (\$1,395) is a 16-voice polyphonic, 61-key synth that uses new "interactive phase distortion (IPD)." The VZ-1's eight independent "modules," working in pairs, each generate a waveform that can be mixed with another waveform, can modulate another for "ring,"



Yamaha DD-5

How to read a Kurzweil spec sheet.



Don't get us wrong. Specs mean a lot to us at Kurzweil. But the best way to appreciate the Kurzweil® 1000 Series' performance specifications is to use your ears. You'll hear sounds so dynamic and real you'll almost be able to see them.

It will make you a believer before you even get near a spec sheet. But once you do, you'll see that each instrument gets its depth from up to 24 fully multi-timbral voices, created by Kurzweil's proprietary 16-bit floating point sampling system. And, a 3-level operating system delivers program-

ming simplicity, flexibility and depth that is head and shoulders above our competitors.

The numbers and buzzwords may or may not interest you. But the sounds will definitely impress you. And one figure will make you do a double take—the price. The Kurzweil 1000 Series starts at just under \$2000, suggested retail.

Visit your nearest Kurzweil dealer to hear the specs on the new 1000 series.

KURZWEIL
Music Systems



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Today's best buy in a 4-track cassette recorder/mixer is this third generation of the very format we invented.

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Call the **Fostex X-30** technology high, hip or hot -- it's your best 4-track value today by far -- because it's all yours for just **\$499.00†**.

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Fostex®

"phase" or "external phase" modulation. It has 64 presets, and interchangeable memory cards can store up to 64 additional sounds and up to 64 keyboard setups with voice layering and keyboard split.

The VZ-1's velocity split and positional cross-fade capability can control multiple voices, and in "combination" mode, up to four patches can be loaded and output through the Mix output or through one of the two assignable outs. The VZ-1 is multi-timbral, accepting input from up to eight MIDI channels at once. A white backlit LCD provides a friendly graphic editing interface. The keyboard responds to both velocity and aftertouch, and a pitch bend wheel and two user-assignable wheels are provided.

Casio Inc.

570 Mount Pleasant Ave.
Dover, NJ 07801
☎ 201 / 361-5400



Oberheim Matrix-1000

The **Matrix-1000** (\$575) is a rack-mounted, six-voice synthesizer with 1,000 on-board analog patches, including 195 keyboard sounds, 118 string sounds, 130 woodwind and brass sounds, 239 synthesizer sounds, 119 brassy, 74 leads, and 125 effects and percussion sounds. There are 800 presets in ROM and 200 in user-loadable RAM that can be programmed via MIDI with an Oberheim Matrix-6, 6-R or any Matrix-6-compatible patch editor/librarian. In *Group Mode*, the Matrix-1000 can be linked with up to five other Matrix-1000s to make a 36-voice instrument, or with one Matrix-6 or 6-R to

make a 12-voice instrument, with *Rotate*. For use with any controller, the Matrix-1000 offers *Transpose*, *FineTune*, and MIDI Mono and Unison.

Oberheim-ECC

2015 Davie Ave.
City of Commerce, CA
90040-1704
☎ 213 / 725-7870

lishers and other exhibitors, and slated for May 14 and 15, will be held at the Technical Career Institute (formerly the RCA Institute), located across from Madison Square Garden in New York City. **EM**

All prices are suggested retail prices, as supplied by the manufacturers. All prices and specifications are subject to change without notice. Inclusion of product information and manufacturers in this magazine does not necessarily constitute a recommendation by Electronic Musician magazine or its staff; we suggest that all mail order purchases be COD. Contact manufacturers for further information.

Calendar of Events

This year's Sam Ash Electronic Keyboard and Sound Expo is expected to be bigger and better than ever. The two-day event, featuring manufacturers, pub-

E!

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series

DX7IIFD • DX7IID • DX7S

We added a few things

The Octal mode • Play 8 single voices at a time!
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SE!quencer • 16 Tracks/16 MIDI channels
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• 22,000 event memory for DX7IID/DX7S
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ENGINE • 16 Track DX/MIDI event processor
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Expanded memory • 256 internal single voices
• 128 internal Performances

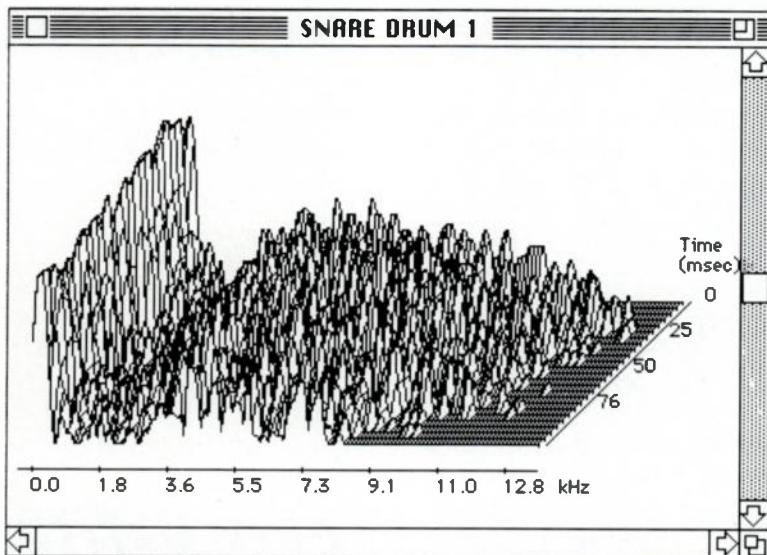
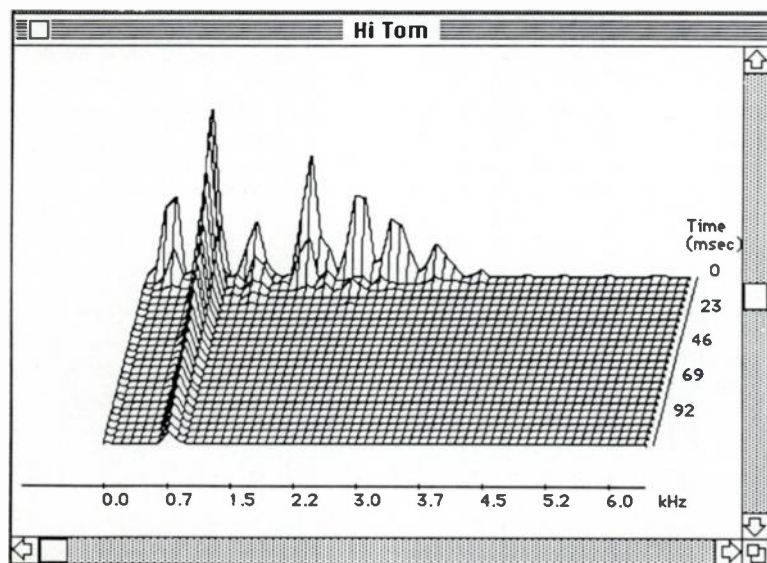
Suggested retail price: \$399

15916 Haven Avenue Tinley Park, Illinois 60477

GREY MATTER

Here's a hands-on, how-to guide to programming
percussive sounds using FM synthesis. It's easier than
you think— if you know a few crucial secrets.

Powerful Percussion with **FM SYNTHESIS**



Two percussion sounds as shown on
Digidesign's Sound Designer software
package.

MOST NATURAL SOUNDS are very complex—even the Neanderthal custom of beating on a drum creates a highly complex sound. If you were to look at a visual representation of a snare drum being struck, you would see an incredible number of frequencies interacting in an apparently random fashion. To re-create this kind of complex sound through FM synthesis, it helps to break the overall sound into smaller components, and identify particular characteristics of the sound you want to synthesize. For example, with a snare drum you can hear the drumstick hitting the top head, the sound of the snares against the bottom head, and the basic resonant tone of the drum. The general idea when synthesizing a sound is to “divide and conquer” these components separately, then combine them to create the finished voice. This is what we refer to as *component voicing*.

BY PHIL BLOCH & SCOTT PLUNKETT

STU STU STUDIO.

When you hear the fidelity and accuracy of the **AKG K 240DF Studio Monitor Headphones**, you'll know why it's become a standard for recording engineers and professional musicians around the world.

This latest version of our well known K 240 (now K 240M) has been created to meet a recently proposed IRT (Institute for Broadcast Technology) international standard. The K 240DF establishes a uniform sound quality free from environmental variables. As opposed to sound from loudspeaker monitors, that is colored by variations in control room design, the K 240DF is unchanging and reliable.

Each K 240DF is tested in a diffused sound field to arrive at a headphone design with a flat frequency response ($\pm 2\text{dB}$) and matched sensitivity. This professional headphone is close to perfection—without coloration or distortion. The self-adjusting headband supports the circumaural ear cups, each containing hand selected, large dynamic moving-coil transducers and acoustic filters. Minimum weight is well distributed for maximum comfort over longtime wear.

The **AKG K 240DF Studio Monitor Headphone**, a total design concept, is just right for your **Stu Stu Studio**.



Studio-Monitor

FM BASICS FOR PERCUSSION

The most outstanding feature of FM and other synthesized drums is that they are completely programmable, so you can change virtually any characteristic of a voice until it sounds good to you. Unfortunately, you can't begin to edit an FM voice until you become familiar with some key concepts and terms; for general information on FM sound programming, see Kevin Stratton's article on programming the DX7 family in the November '87 EM, and some of the references listed at the end of this article. Now let's consider some specifics.

Referring to the drum voices included with this article (Fig. 2 and Fig. 3), note that most of the operator envelopes (which determine timbre and/or level) have a peculiar triangular shape. Fig. 1 shows this in detail. This type of envelope re-creates the sharp attack (fast rate one to level one) and quick decay (slightly slower rate two to level two) common to the sound of a drum. With drum sounds, both levels two and three often have a value of zero, since percussive sounds (especially kicks and snares) are relatively short and more envelope control isn't necessary.

The pitch EG, which determines how the sound's pitch varies over time, is also crucial to getting a good drum sound. The operation of the pitch EG is similar to that of the operator EG; the main difference is that the pitch EG uses the center line (level 50) as its starting point. Levels above 50 will create an upward pitch bend for the entire voice, while levels below 50 create a downward bend. Fixed frequencies are not affected by the pitch envelope. In summary, the operator EGs control the output level of an individual operator over time, and the pitch EG changes the pitch of the entire voice over time.

The low frequency oscillator (LFO) is

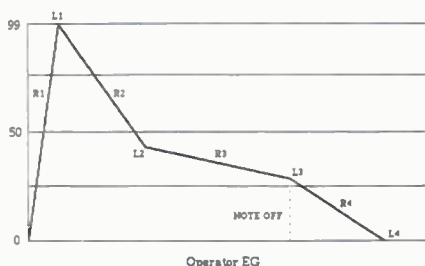


FIG. 1: A typical operator envelope used for synthesizing percussive sounds.

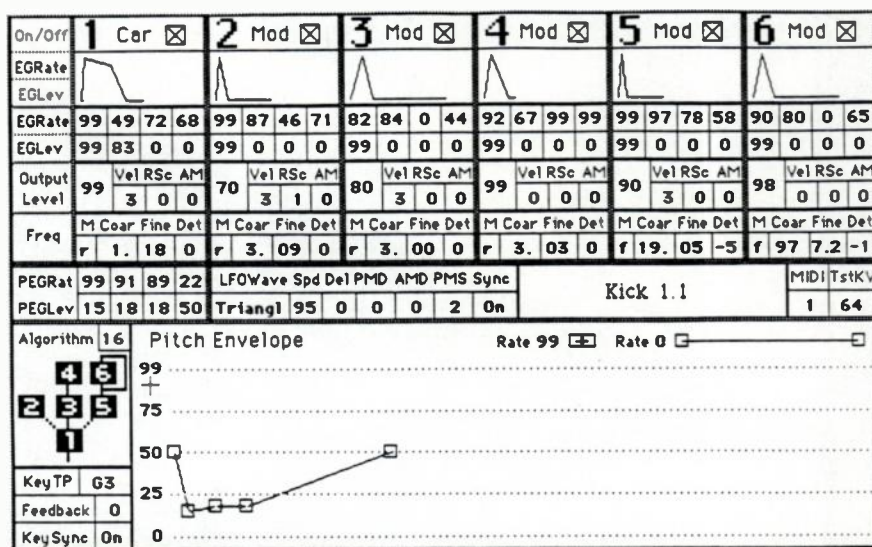


FIG. 2: Parameters for an FM kick drum voice.

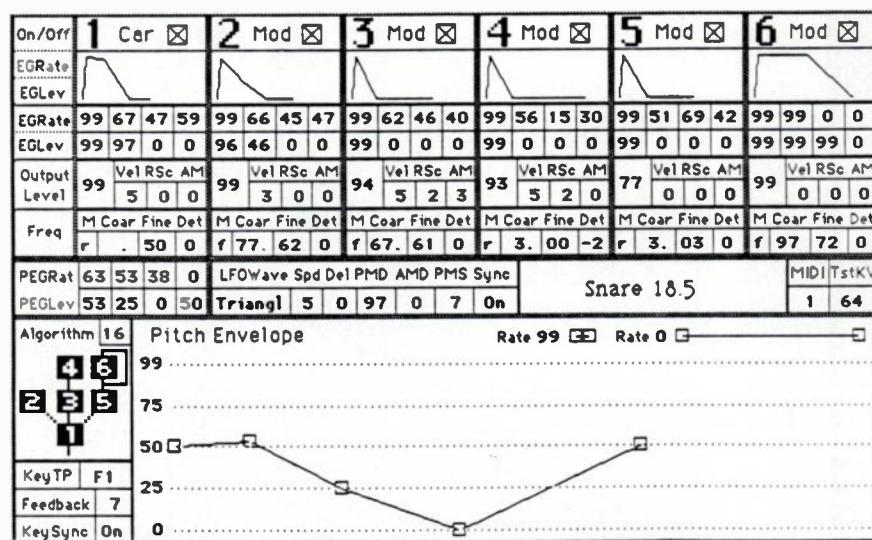


FIG. 3: Parameters for an FM snare drum voice.

another sound editing tool. The LFO generates one of several waveshapes (operators only generate sine waves) with a much lower frequency than the operators. It is not routed to the sound generating circuitry, but to the pitch or volume control of the operators to create tremolo, vibrato or periodic timbre changes.

Although the LFO isn't used extensively in creating drum voices, it can be useful for certain effects. Modulating the sound with a fast LFO can add a certain roughness to the sound, and as we'll see later on, you can also use the LFO to create pitch bend effects.

We also need to consider the effects of velocity sensitivity on the voice. The

velocity sensitivity control allows an operator's output level to change in relation to your playing dynamics. Thus, the timbre and volume of the drum voice can change as you play harder, which adds realism to FM drum voices.

THE FM KICK DRUM

Now let's dissect a few FM drum sounds from the version 1.4 drum voices for the TX816. If you don't have the version 1.4 voices, you either can purchase them from Yamaha, or enter the parameters for the two voices under discussion into a DX7, DX7II, TX802, etc., using Fig. 2 and Fig. 3 as guides. These voice charts, by the way, are modified print-outs from

If you need to translate MIDI to multitrack, here's a pointer.



Getting digital signals onto your multitrack has always involved compromises. But that was before Tascam's MTS-30 MIDI/FSK translator with song pointer compatibility came along.

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Opcode's DX/TX Editor/Librarian program for the Macintosh. You'll find it handy to use a computer-based editor such as this one when doing programming. We'll take you through programming step-by-step for the DX7; those of you with other FM synths can make the necessary minor translations. When it's time to push a button on the DX7, we'll enclose the instruction in [brackets].

Let's start with Kick 1.1. Press Edit/Compare to enter the edit mode, and look at the LCD's top line. The upper left corner shows the number of the algorithm used to create the voice. The middle of the top line shows 111111, which indicates that all of the operators are turned on. If an operator is turned off, a 0 appears in the appropriate position. For instance, if operator 3 is turned off you will see 110111 (Fig. 4). If a parameter can be applied individually to any of the six available operators, the selected operator number will appear in the LCD's upper right corner. [Press 18] to see this; you can cycle through the six operators by pressing Operator Select.

Kick 1.1 was created using algorithm 16 (Fig. 5), which has one carrier (operator 1) and five modulators (operators 2 through 6). Only three of the 32 algorithms have a single carrier, but these are used quite a bit for drum voices since they tend to be the most powerful algorithms in terms of volume and punch.

Now turn off operators 2, 3, 4, 5 and 6 [press 2, 3, 4, 5 and 6]. The top of the LCD should read: 100000. Next, play F1

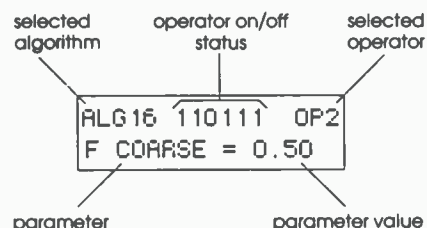


FIG. 4: The DX7 LCD.

—the lowest F on a DX7 keyboard. The muffled sound you hear is the carrier operator playing alone. Turn on operators 2, 5 and 6 [press 2, 5 and 6] and you'll hear a short, tacky sound that has some of the characteristics of a kick drum beater. Finally, turn on operators 3 and 4 [press 3 and 4]. The beater becomes much bigger sounding. From this we see that with Kick 1.1, operator 1 takes care

of the main "woof" of the drum, operators 2, 3, and 4 work together to simulate the upper midrange spike of the beater, and operators 5 and 6 contribute the high frequencies present in the beater spike.

Experiment with turning on and off different combinations of operators and listen to how this affects the sound. Note that the voice doesn't make any sound when you turn off operator 1 since when you turn off a carrier, you are, in effect, also turning off all of the operators that modulate the carrier. Similarly, because operator 4 modulates operator 3 (another

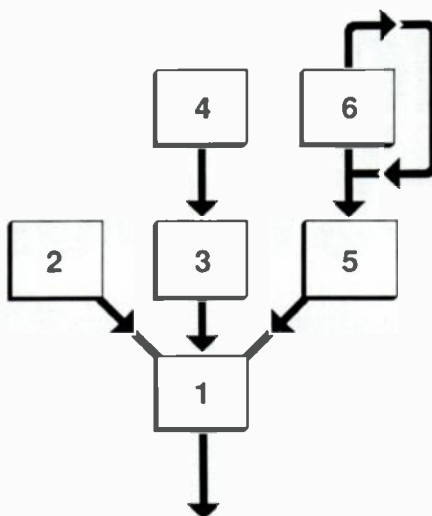


FIG. 5: Algorithm 16, which is often used in the creation of drum sounds.

modulator), operator 4 cannot be heard when operator 3 is turned off. You may also have noticed that operator 4 provides a tremendous amount of power in this particular voice. If you listen to operators 1, 3 and 4 alone, you will hear 90% of the voice. Listen carefully, though, as you add in operators 2, 5 and 6. Even if their contributions to the final sound are small, they are still important.

Always make a practice of isolating all of the components of a sound—as we've just done—before you begin editing a voice. Until you know which operators are responsible for each part of the voice, you will have a hard time knowing where to begin editing.

INTO THE EDIT ZONE

Now that we know how the voice is constructed, let's edit it. To make fairly big changes, play with operator 3's output level [press 27, then press Operator Select until you see OP3 in the upper right

corner of the LCD]. While you play F1, slowly move the data entry slider up and down. As you move the slider up (raising the output level), the sound of the beater takes on a bright sound that seems to splatter somewhat. Moving the slider down (lowering the output level) makes the sound much darker—somewhat like our original example above before we added operators 3 and 4. In general, higher output levels on a modulator will add brightness to a sound, while lower output levels will darken the sound.

Since velocity sensitivity affects output level, let's change the voice's timbre by changing operator 4's velocity sensitivity [press 28, then press Operator Select until the LCD shows OP4]. As you play the voice, go from playing very softly to playing loudly. Listen to the way the sound of the beater brightens slightly as you play harder. Now change operator 4's velocity sensitivity with the data slider to a value of 7 (full sensitivity). Play the voice again, going from soft to loud; note that the beater makes a fairly obnoxious sound as you reach the upper velocities. This is because the output level of operator 4 is fluctuating over a larger range than it was before (in fact, since operator 4's velocity sensitivity was turned off before, it is a *much* larger range). To avoid the aforementioned obnoxious quality in the upper velocity range, try lowering operator 4's output level until it appeals to your aesthetic sensibilities. Of course, you may find this makes the beater sound too soft at lower or middle velocities; you'll have to experiment with the right combination of output level and velocity sensitivity settings for your particular application.

Changing an operator's frequency can also change a voice's timbre. Use the data entry slider to change operator 4's coarse frequency setting [press 18]. As you raise the frequency, the beater takes on a metallic quality and as you lower the frequency, the beater becomes more muffled. Since the coarse frequency control changes the pitch of the operator over a wide range, even small changes can have a large effect. For finer control, use the fine frequency parameter [press 19]. The timbre now changes over a much more useful range as you play and move the data entry slider. A good rule to follow when you are creating or editing voices is to try to find the general frequency area for an operator using the coarse frequen-

cy parameter, then use the fine frequency parameter to dial in the exact frequency. If needed, you can use the detune parameter for even finer control.

The EG determines how the operators attack and decay over time; this is how you create the short crack of a snare or the long tail of a tom. To hear the effects of changing the EG parameters, change the carrier EG [press 21, press Operator Select until the LCD shows OP1]. Moving the data entry slider down slows the attack of the entire voice. Begin playing, and slowly lower rate 1. It won't be long before you wind up with something that sounds like very bad bass pedals running backwards. Move the data entry slider all the way up (99) to return to a bass drum, and press 21 again.

This time you will be editing rate 2, which roughly corresponds to the kick drum's decay. Moving the data slider all the way makes for a very short envelope, which turns the kick into a small stick. Now, continue playing and slowly move the data entry slider down until you reach about the middle (49). First you will hear the click get louder, and then you will begin to hear the familiar woof of the kick drum. Lowering the data entry slider further would give the attack of the kick followed by a low organ-like tone. You can also alter rate 1 and rate 2 of the modulators to change the attack and decay characteristics of the beater without affecting the overall drum envelope.

SNARE DRUM EDITING

When you are finished playing with the kick voice, select the snare sound (Fig. 3). Play C4 on the DX (an octave above middle C); when you're ready to begin editing, press Edit/Compare.

This electronic snare voice uses the same algorithm as the kick drum. When you turn the operators on and off, note that operators 2, 3 and 4 are creating the "snap" at the beginning of the voice, and operators 5 and 6 create the noise of the "snares." The main body and tail of the voice is actually just operator 1. Turn off the other operators and listen to operator 1 by itself.

This voice provides a good example of fixed and ratio frequencies. Turn off operators 4, 5 and 6. Remember, operators 2 and 3 make the knocking sound at the beginning of the voice. Now, play notes from C4 to the bottom of the keyboard. Even though the pitch of the

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"drum" obviously changes as you move down the keyboard, the knock remains at the same pitch. Also, the knock is completely excluded from the effects of the pitch bend. This is because operators 2 and 3 are fixed. This technique is used fairly often with FM drum voices.

This voice also demonstrates how to use operator 6, the feedback operator (operator 6 is the only operator capable of having its output fed back to its input). Turn off all of the operators except 1 and 5; play for a bit, and you'll hear the familiar tone of operator 1 and a sort of "plastic" tone along with it—this is the effect of operator 1 being modulated by operator 5. While this is an interesting sound, it's not too helpful for creating drum voices. Now, turn on operator 6, whose feedback is turned up to maximum. When you play the snare, you should hear the "white noise" effect commonly found on electronic drums. Next, select the feedback parameter [press 8] and move the data entry slider down. As you decrease the amount of feedback you will begin to hear a modulated high frequency instead of noise.

One of the most obvious characteristics of this electronic snare voice is its extreme amount of pitch bend. There are two basic ways to create pitch bend effects on the DX7, and this voice uses both of them. By far, the most convenient and flexible method is to use the Pitch EG. The bottom graph on Fig. 3 shows the Pitch EG. The middle line (50) represents normal pitch, and everything above and below the center represents some sort of pitch bend. In this case, the pitch moves slightly up at the beginning of the sound and then pulls down.

To get an idea of the effects the pitch EG makes possible, try the following changes. First, turn all of the operators back on. Turn off the effects of the LFO by setting the Pitch Modulation Sensitivity to 0 [press 15 and move the data entry slider down until the PMOD SENS. is set to 0]. Change all of the pitch EG levels by pressing 30 continuously to move through all four levels, and using the data entry slider to change each level to 50. Playing the voice an octave higher (C5) will most clearly demonstrate the effects of the pitch EG. Now, begin moving pitch EG level 3 down as you play the drum voice, and continue until level 3 reaches 0. Changing the level, as you have just done, changes the pitch bend depth. To alter

the speed of the pitch bend, experiment with rate 3 of the Pitch EG [press 29 three times]. By lowering rate 3 to a value of 10, you will hear nothing resembling a Radio King! Instead, there will be a long slide down from the initial pitch. Speed rate 3 up to 70, and you'll hear the "goosh, goosh" sound reminiscent of your favorite electronic drums.

The second method of creating pitch bends uses the LFO. Set pitch EG level 3 to 50 [press 30 three times and use the data entry slider to change the value to 50] as this turns off the effects of the Pitch EG. While playing C4, move the

.....

There are two basic ways to create pitch bend effects on the DX7, and this voice uses both of them.

.....

Pitch Modulation to 7 [press 15 and move the data entry slider all the way up]. The pitch bend returns even though the pitch EG isn't active. This time you are hearing the LFO (low frequency oscillator) changing the pitch of the voice. When the voice is first triggered, the LFO is at the top of the cycle of a triangle wave. The LFO is creating a continuous succession of triangular waveforms, similar in appearance to a row of Alpine peaks. Pretend that the pitch is at a mountain peak and every time you play a voice, it slides down to the base. You can determine how quickly the pitch changes by speeding up or slowing down the LFO. Speed up the LFO [press 10 and move the data entry slider up] and listen to the results. As soon as you have made even a small change, you will hear the pitch go down and then begin to come back up. Increasing the speed creates the familiar LFO "vibrato" effect.

Because the LFO can quickly become annoying by itself, this method of creating pitch bend is probably most effective

when it is used in conjunction with the Pitch EG.

ON AND ON . . .

This just about ends our whirlwind tour through FM theory and practice as it applies to creating and modifying drum voices. It wasn't our intention to get involved too deeply in a lot of theory, but if you want to learn more about programming the DX7, these books will help you:

DX7 Owner's Manual (available through your local authorized Yamaha dealer).

The Complete DX7 by Howard Massey; published by Amsco Publications; 1986. Howard has also written *The Complete DX7II*.

How to Understand and Program the Yamaha DX7 by Lorenz M. Rychner; published by Alexander Publishing; 1985.

(The second two of these books are available from the Mix Bookshelf, 6400 Hollis St. #12, Emeryville, CA 94608 ☎ 415 / 653-3307.)

I've tried to show a few of the most important parameters for creating good drum voices. Study some of the voices from the existing library to see how they are constructed and when you begin to edit, use them as a starting point. You can make big changes to these voices by concentrating on just the few parameters we have mentioned. As you get used to the kinds of changes you can make, you will be able to create your own voices. Be patient—it can take a while to get used to voicing, but the ability to create unique sounds (instead of using the same tired voices everyone else is using) makes it all worthwhile. Good luck! **EM**

For three years **Phil Bloch** has been working with Yamaha designing their electronic percussion systems. His technical understanding of both acoustic and electronic percussion instruments, as well as years of live and studio playing experience, have earned Phil a reputation as one of the most knowledgeable consultants on computerized and MIDI drum systems in the country.

Keyboardist **Scott Plunkett** has been playing and programming synthesizers for 15 years and was part of the team that developed the FM drum voices for the TX816. In addition to his consulting work for Yamaha, Scott composes, does studio work and has toured with Boz Scaggs, Don Henley and currently Michael McDonald.

Level II

for Atari, Amiga
and Mac Computers

STEP TIME RECORDING TRACK 1

Key	Time	Key	Dur	Key	Vel
0	0	F	1	0	16
1	3	0	2	0	32
2	4	0	3	0	64
3	6	0	5	0	96
4	8	0	7	0	128
5	9	0	8	0	160

TRACK NAME STATUS PUN

TRACK	NAME	STATUS	PUN
1	conductr	PLAY	
2	Drums	NOTED	
3	Bass	PLAY	
4	Emax gtr	PLAY	IN
5	Mirage	NOTED	
6	dpx1 ch5	PLAY	
7	MT-32	NOTED	
8	D-50	PLAY	OUT
9	FZ-1	PLAY	
10	K5 mngls	PLAY	
11	B	RECORD	
12	C		

TRANPOSE RANGE

All Event Range: 6 17
Measure Range: 2 3

TRANPOSE OPTIONS

Pitch Transpose: .12
Velocity Invert: .68
Auto-Correct: 6
Compress/Expand: 180
Time Reverse: 180
Channel Assign: 1
Velocity Scale: .87
Erase Controllers: 45
Clear Deletes

CONTROL PANEL

RECORD STOP PAUSE PLAY
CLOCK: BPM 120 << >>
MEASURE: 2:04.1
RE-RECORD ERASE TRK

INTERVAL PATTERN SELECTION

Interval: 1/2, 1, 3/2, 2, 5/2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

Pattern: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

Interval Pattern Selection

Macro (Evolving Music)

Macro	From	To	Exp	Ops
1	1	1	0	0
2	1	1	0	0
3	1	1	0	0
4	1	1	0	0
5	1	1	0	0
6	1	1	0	0
7	1	1	0	0
8	1	1	0	0
9	1	1	0	0
10	1	1	0	0
11	1	1	0	0
12	1	1	0	0
13	1	1	0	0
14	1	1	0	0
15	1	1	0	0
16	1	1	0	0
17	1	1	0	0
18	1	1	0	0
19	1	1	0	0
20	1	1	0	0

Macro Screen

Pitch Map Matrix

Octave	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	11	12	13	14	15	16	17	18	19	20
3	21	22	23	24	25	26	27	28	29	30
4	31	32	33	34	35	36	37	38	39	40
5	41	42	43	44	45	46	47	48	49	50
6	51	52	53	54	55	56	57	58	59	60
7	61	62	63	64	65	66	67	68	69	70
8	71	72	73	74	75	76	77	78	79	80
9	81	82	83	84	85	86	87	88	89	90
10	91	92	93	94	95	96	97	98	99	100

Pitch Map Matrix

Level II contains all of the features of the KCS V1.6 sequencer, plus the Programmable Variations Generator and the Master Editor. PVG adds 10 screens of algorithmic editing features to KCS and lets you use the power of the computer to create incredible variations on your own music. You have full control over which parameters are affected and how. Master Editor includes an additional 6 screens of powerful editing features including Blend, Chords, Controllers, Tempo Changes, Track Utilities and Pitch Map. All of the operations of both PVG and Master Editor are easily accessed using an entirely mouse-controlled interface. PVG and Master Editor manual by Keyboard Magazine's Jim Aiken.

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Kawai K-5

Roland MT-32

Roland MT-32

D-50

D-50

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Fingers

The Multi Program Environment is the first desktop music-workstation for the Atari ST computer. MPE compatible programs include Caged Artist editors, Fingers, and the Phantom (synchronizer).

Getting the **MOST** From Your **DRUM MACHINE**

Drum machines have changed the face of popular music, and with good reason: a few hundred dollars can buy you the sounds of a complete drum set, and the “smarts” necessary to sequence these into useful drum patterns. From mods to techniques to basics, the following tips should help you get the most from your drum machine.



Towards Better Drum Machine Sounds

By Chris Corso

One of the constant struggles for the home recording enthusiast or small studio owner is trying to get the most sound out of a limited amount of gear. A particular problem is the redundancy of sound when using the same drum machine for most or all of your work, but creative use of outboard gear provides a solution. Using the Yamaha SPX90 (although the same principles apply to other pitch-altering devices), I've found some unique ways around the same old boring sounds.

Processing different instruments of your “kit” through the SPX90's pitch change presets (numbers 21 through 24) can yield results from startling to bizarre. One favorite application of mine is to use

preset #21(A) and lower just the snare to give a nice fat effect. Lowering or raising the hi-hat pitch instantly gives a new identity to your drum sound, as does pitch-changing cowbells, open hi-hat, and hand claps. Speaking of hand claps, for a really full chorus of “clappers” try this patch:

Preset C(#23)

L pitch +12	R pitch -12
L fine +8	R fine -8
L del .2ms	R del .1ms

If you'd like to make your entire drum kit sound a bit more “electronic,” try running it through this patch:

Preset C(#23) or B(#22)

L(1)pitch -6	R(2)pitch -12
L(1)fine +8	R(2)fine -8

Experiment with delays of 1 ms to 8 ms. By raising the respective pitches, you

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can re-create the sound of those old electronic drum machines, which can sound great for rap, hip-hop, and techno-pop.

Incidentally, all of these patches sound great with acoustic drums, and percussion instruments too. Depending on how you mix your balance of wet/dry signal, you have total flexibility in just how much you change or enhance the overall sound.

The Optimized Drum Machine Mixer

By Jules Ryckebusch

An outboard mixer is essential if you want to get the most from drum machines with separate audio outputs. I suggest building a small eight-input (or as many inputs as you need) mixer; there are suitable plans in *Electronic Projects for Musicians* (available from Mix Bookshelf). Don't forget a few extra direct-to-bus inputs for returns from all the wonderful stereo-generating effects currently available (SPX90, ProVerb, MIDlverb, etc.).

One very important feature is an *effects loop* for each channel, which is easily realized with a closed circuit phone jack (send), and a normal phone jack (receive). Referring to Fig. 1, these are wired

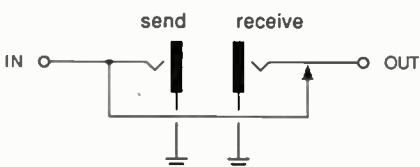
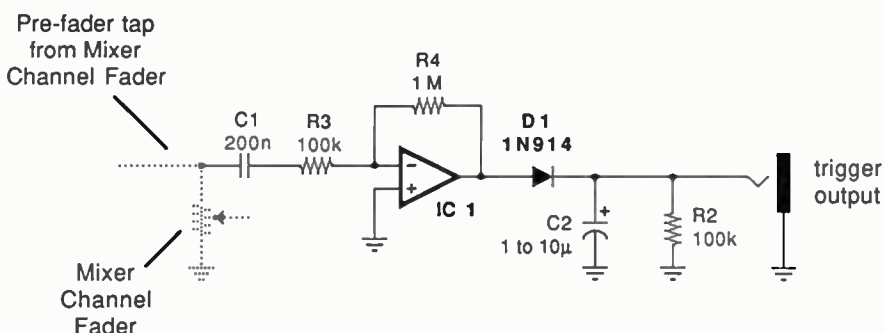


FIG. 1: Send/receive loop jacks allow signal access for independent processing of mixer channel inputs.

so the signal path is uninterrupted until you plug a patch cord into the send jack. This allows for independent signal processing of each drum voice—a necessity in getting that fat “pro” sound.

If you have some analog drum modules or drum synthesizer patches that you want to trigger from your drum machine, add the circuit in Fig. 2 to at least one or two inputs of your mixer. This circuit is an envelope follower that generates a pulse in response to an audio signal; for example, you could tap off the snare drum channel with this circuit, then trigger another snare drum and send it into the mixer as well. Pan these two snares in stereo, and you'll have a real big



Note:

All resistors in Ohms
All capacitors in Farads
Power supply connections to IC 1 assumed

FIG. 2: This simple envelope follower circuit generates a pulse in response to a transient audio signal, such as a snare beat.

snare drum sound.

Regarding the circuit, almost any op amps will work. A single 741 would do the job and can be battery-powered. Connect +9 volts from one battery to pin 7, its minus lead to ground; then connect -9 volts from a second battery, and its positive lead to ground (of course, you'll probably want to include a switch in series with the leads going to pins 7 and 4 to turn the batteries off). If you need to trigger several modules, use a quad op amp, as this lets you put together a quad trigger circuit with one IC. C2 can be from 1 to 10 μ F; smaller values give a faster response, but increase the odds of false triggering.

Here are a few more tips on how to get the best sound with your drum mixer.

Kick drums tend to get lost in the reverb. Put it in front of the mix with a little midrange or upper midrange EQ (this emphasizes the “click”) or some gated reverb. If you gate the kick drum, use a short (100 ms) or less gate.

The *snare* is probably the most important drum to customize. For that hot “Phil Collins” sound, use a “small room” but with bright, gated reverb. Slow ballads sound nice with large lush reverbs, or “new wave” it with a delay set for 5 to 20 ms and a lot of regeneration. Of course we can't forget the traditional gated snare; 300 to 400 ms sounds real good. If you are gating both the snare and the kick drum, use separate processors with different settings.

Cymbals are also easy to modify; start

by spreading them out in stereo with a little delay between channels. Turn the level down a bit and then enhance them with a sonic exciter, harmonic sweetener (September '87 EM), etc. For a really unique sound send the cymbals through a phase shifter or a chorus/flanger. Or, run them through a wah-wah pedal and play them to the beat. If these effects sound too drastic, then run a cord from a channel's loop send jack to the effect input, then bring the effect output back through a different channel. Adjust the volume of the effect channel for the desired amount of subtlety (or bombast, for that matter).

Tom-toms will sound tuned with a slow sweeping flanger or phase shifter. For a “flammed” sound, add a little slap-

PARTS LIST

Resistors (1/4 watt, 5%)

R1 220 ohms
R2, R3 100k
R4 1M

Capacitors (rated at the power supply voltage)

C1 200 nF (0.2 μ F) disc
C2 1 to 10 μ F electrolytic (see text)

Semiconductors

D1 Any small signal diode (1N914, 1N4001)
IC1 741 or other general-purpose op amp (see text)

back echo. For *cow bells*, I like putting them through a long, deep reverb, and use the effect sparingly.

For any sound, try programming a digital delay line (DDL) for a 16th note delay, and add a touch of modulation to give a bit of randomness to the beat. A DDL can also be set for quarter- or half-note delays, and set for a few repeats to give an interesting synchro-sonic effect.

I hope these ideas are helpful and spark your imagination. Experiment and try new things—the resulting sound will be unique, different, and truly your own.

Drumulator (and others)/MPU-401 Interface

By Daniel Shear

As a composer of soundtracks and video producer for the company Performance Video, I'm always looking for new sounds and was fortunate enough to have been given a pre-MIDI E-mu Drumulator to use with my IBM-based MIDI studio. While visions of wild, hard-driving drum parts circled in my head, I proceeded to connect the Drumulator to my system (which includes a Roland MPU-401 MIDI interface and Roland MPS sequencer software). Unfortunately, visions of great drum parts soon left my mind, as there was no practical way to sync the Drumulator with my system.

After reviewing manuals for both the Drumulator and MPU-401, I noticed that the Drumulator operates at 24 ppqn (pulses per quarter note) and there is also a 24 ppqn output on the MPU-401. However, the MPU-401 pulse output runs continuously, but the Drumulator assumes that the start of a pulse train indicates the start of a song, and the end of the pulses indicates that the song is over. (Many other pieces of pre-MIDI rhythmic gear

work similarly, including units like PAiA's Master Synchronizer.) To reconcile the two units, I combined the MPU-401's run/stop signal with its 24 ppqn clock using a simple logic IC, so that clock pulses reach the Drumulator only when the system is running (playing or recording). This is accomplished by logical ANDing the two signals together with a 7408 AND gate (Fig. 3). I decided to battery-power this circuit, but there isn't any reason that a battery eliminator type of power supply (Radio Shack part #270-1552B) couldn't be used instead; or, you could tap off any regulated +5 volt supply and feed it directly to pin 14 of IC1.

Construction is not difficult. Use perf board so that parts are physically secured, and mount the circuit in a suitable enclosure. If you use metal, make sure the parts don't short out to the enclosure. Finally, check out all wiring before hooking things to the MPU-401 or Drumulator—you don't want to blow them up.

Plug P1 into the MPU-401's sync out jack, and run a cord from J2 to the Drumulator's Cas/Clk In jack. Now turn on the power, and place the Drumulator into external clock mode by pressing the Ex-

PARTS LIST

(with Radio Shack parts numbers)

Semiconductors

IC1 7408 AND gate (276-1822)
IC2 5-volt regulator (276-1770)

Other Parts

J1 RCA jack (274-346)
P1 5-pin DIN (MIDI) plug (274-003)
S1 SPST on/off switch (275-645)

Miscellaneous

9-volt battery connector (270-325), 14-pin IC socket (276-1999), perf board, wire, solder, enclosure, etc.

ternal Clock button while the Drumulator is stopped. The external clock LED should now be on. Press the Run/Stop button; the run/stop LED should be lit, and the external clock LED will start flashing, which means that the Drumulator is in the external clock mode and that no clock pulses are being received. When the sequencer (in this case MPS) starts playing, the LED should be lit steadily, which indicates that clock pulses are being received. Remember that in this configuration, the Drumulator is slaved to the sequencer, and will only play while the sequencer is running.

With this inexpensive sync circuit, I was able to utilize my favorite drum sounds from a somewhat older, and therefore inexpensive, drum machine. Now those drum patterns that were only thoughts are playing in sync with my music.

Roland-to-Sequential Sync

By Shiv Naimpally

The Sequential Model 64 interface accepts sync in via a 1/4-inch stereo phone jack, but I wanted to use it with my Roland TR-707, whose output uses a 5-pin DIN (non-MIDI) connector. After publishing a request in "Operation Help" (Ed. note—a semi-regular column in this magazine), I received a bunch of assistance. So, here is the answer on how to construct a cable to convert Roland (or Korg) sync to Sequential sync.

DIN Pin 1 (Run/Stop) connects to the 1/4-inch plug ring. DIN Pin 2 (Ground) connects to the 1/4-inch plug ground. DIN pin 3 (Clock) connects to the 1/4-inch plug tip. That's all there is to it! **EM**

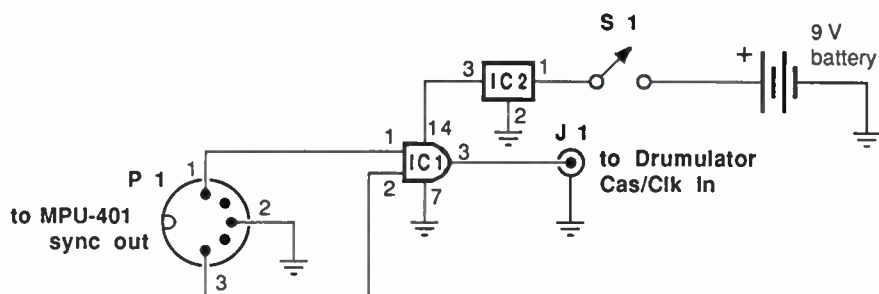
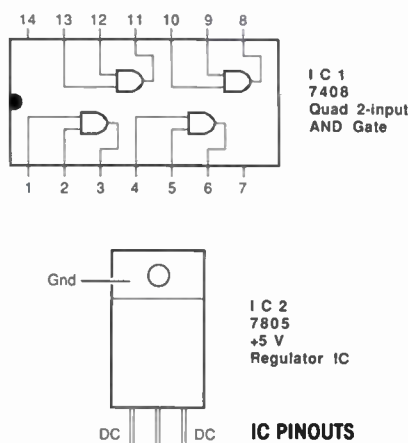


FIG. 3: This circuit allows a Drumulator (or other piece of pre-MIDI drum hardware) to sync with a Roland MPU-401.

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a musical instrument but—
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a volume control.



Meet Zelda:

An ALTERED OCTAPAD

BY JIM FIORE

I guess you'd say that I'm a drummer. I've been playing this "somewhat Neanderthal" instrument since the fourth grade. As I grew up, my friends started playing instruments—things like guitars and keyboards—and using amplifiers and effects devices, which had that elusive item for which I lusted: the omnipotent *volume control*.

Alas, I thought, was it not to be? Was I to be caged behind a jungle of chrome stands, boom arms, and mic cords forever? Banished, as I found myself, to the realm of *not-being-able-to-practice-at-odd-hours-without-risking-certain-bodily-harm*, I longed for the technological vastness of the future where surely things would be different.

Well, here it is: the future is now. After trying a number of different electronic drum systems from various manufacturers, I have finally come across one I like. I finally have, not only a volume control,

but *much* more from a conglomeration of parts from a variety of sources, including the home-brew sort. I call my set Zelda. I've been playing her, nearly trouble-free, for over a year, and so that you can construct your own version of Zelda, I'd like to detail the construction and system interconnection. Please bear in mind much of this information can also be used to upgrade existing drum systems.

In essence, Zelda is a MIDI-based drum system. A slightly modified Roland Octapad serves as the controller and feeds a variety of MIDI voice units (synths, samplers, drum machines, etc.). My own system uses a Sequential Prophet 2000 sampler and an E-mu SP-12 drum machine. The Octapad is driven from a set of custom-built drum pads using widely available roto-tom hardware. The system is completely open-ended for expansion, so let's walk through the system from stick strike to speaker.

THE PADS

The pads are an extension of the type used in the Octapad. The batter surface is a 1/16th-inch sheet of gum rubber, glued with contact cement to a sheet of 16-gauge aluminum. To prevent the edges from peeling back or becoming loose over time, they're all taped over with 2-inch packing tape. A piezo transducer is attached to the back of this sandwich (off center) with silicon-based glue.

Transducers are available from Murata-Erie and a number of other manufacturers. If you can't get any locally, buy the simple piezo transducer sold at Radio Shack and carefully pry it out of its plastic shell. You may need to solder (or resolder) the pickup wires, so use caution and make sure you solder with reasonable speed (especially on the center conductor), as the transducers are easily dam-

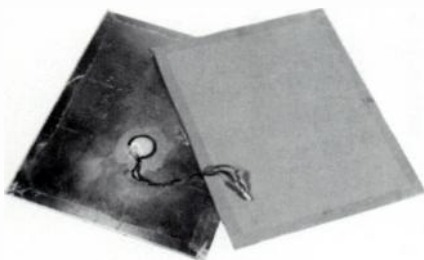


FIG. 1: Completed pad sandwich—rubber sheeting covers aluminum plate, with piezo transducer attached underneath.

aged. If you get the three-conductor type, simply ignore the small feedback connection. To keep repair hassles to a minimum, I placed crimp-type connectors on the ends of the wires. Fig. 1 shows a completed sandwich.

This sandwich is then placed on a carrier, made up of a 3/4-inch thick block of wood with a hole dead center to accept a 3/8-inch bolt. Off to one side is another hole to allow passage of the pickup wires. The center hole will be fitted with a roto-tom mounting bolt/handle. (This is the little monster that prevents rotos from falling apart and connects them to their stands.) You will need a couple of 3/8-inch nuts and washers for this as well. First place a nut/washer on the roto bolt and then thread this into the wooden carrier. Make sure that you don't over-size the hole; the fit needs to be snug. The threading is most easily done on a roto stand with the bolt firmly locked in place. Thread by rotating the wooden carrier and continue until approximately 1/4 inch

of bolt protrudes through the top surface. Tighten a washer and nut on the bolt while also tightening the bottom nut; a good snug fit is required, or your pad will inadvertently rotate. You may even wish to add a drop of wood glue before threading. A mounting bracket and 1/4-inch audio jack for the pad's trigger output need to be located in the vicinity of the second hole.

The next item you'll need is a sheet of spongy, open-cell foam about 3/4-inch thick. Cut a piece the same size as the batter sandwich and trim any areas that will be in the way of the bolt head and piezo transducer.



FIG. 2: The completed pad assembly.

You'll place this foam layer between the wooden carrier and the sandwich. All that needs to be done now is to lock this whole affair together. This can be done via small C-shaped clamps that overlap the top of the sandwich by a half-inch or so and can be screwed into the bottom of the wooden carrier. For maximum roadability, the clamps should run the entire length of the edges they hold. Once the piezo pickup wires are connected to the audio jack, you're finished.

The pads can be virtually any shape and size. I find rectangles easiest to work with and I like small pads, so mine are about 7 x 9 inches. A number of these pads can be connected to a single roto stand, or with the addition of the AD10 and AD100 adapters and a length of track, they can be mounted to cymbal stands. If you already own some roto hardware, this can be a very inexpensive way of getting a start on electronic drums.

The pads should have a nice feel even if they don't exactly respond like a drum head. The gum rubber batter surface makes for a very lively stick rebound, and the foam damper absorbs a good deal of shock. These pads work best with the Octapad; they can be a little tricky to use with other drum systems. If you get double triggers, you probably have loose

wiring or insufficient compression of the foam (it should compress to 50% to 75% of its original thickness). Also, many systems (like the Octapad) are polarity-sensitive and may provide a stronger signal if you reverse the wires on the jacks (crimp terminals are very handy for this purpose). Fig. 2 shows a completed pad assembly. Similar setups can be used for kick drum applications with the appropriate hardware (legs, spurs, and such).

THE ROLAND OCTAPAD

The Roland Octapad is equipped with eight small built-in pads and jacks for the connection of six external pads. While the built-in pads have a nice response, they can be difficult to blend into a traditionally arranged kit. Fortunately, it is very easy to modify the Octapad to accept up to 14 external pads.

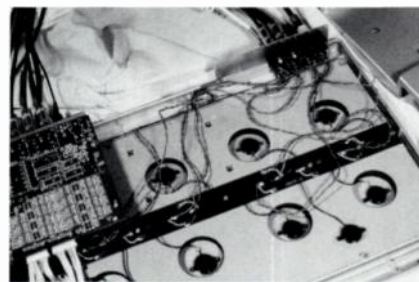


FIG. 3: The modified Octapad now accepts up to 14 external pad inputs.

Since piezo transducers exhibit a relatively high impedance, parallel connections create virtually no problems due to the additional loading. Basically all you need to do is parallel one 1/4-inch jack to each internal pad. After you remove the bottom of the Octapad, notice that each internal pad makes a connection to a PC board, which eventually hooks into the master processing board. Carefully solder a pair of hook-up wires to this board for each of the eight sets of pad connections. Connect the wire pairs to 1/4-inch jacks and you're nearly done.

Use the section with the large Roland logo as your chassis connection. There are two ways to do this. One requires removing the logo, drilling the appropriate holes in the plastic chassis and mounting the jacks. The second involves removing the logo and cutting away the plastic chassis section underneath. Using the logo section as a guide, form a similarly sized aluminum plate, pop the appropriate holes, mount the jacks, and

then slide the plate assembly into the old logo position. This second method looks much nicer, and I believe you'll find it somewhat easier than the first. I also found that the plastic chassis sections are easily cut with a good carpet knife. (Be advised that this sort of surgery, minor though it may be, will almost certainly void your warranty.)

Fig. 3 shows a completed unit. You may now treat these jacks as you would the other six external pad jacks, the only difference being that a given sound can now be triggered from the internal pads as well. If you don't plan on using the internal pads at all, it is quite possible to rip out the main processing board/display section and transfer it to the compact chassis of your choice (rack-mount perhaps). I like to have the small pads handy for various odd fills and otherwise impossible parts.

SYSTEM INTERCONNECTION

One of the real handy aspects of the Octapad is the fact that each pad can be programmed with its own note number and MIDI channel as well as dynamic curve, sensitivity, and gate time. This makes multiple voice-unit setups a breeze. For example, we might wish to access the kick, snare and cowbell sounds from a drum machine, and tom and cymbal sounds from a sampler. By setting both voice units to Mode 3 (omni off), we can access them separately by using different MIDI channels for the pads.

We can create different presets in a number of ways. First, the Octapad has four different configurations, sets A through D. This would allow us to change, for example, the note numbers for each set. Second, samplers and synths have a number of presets, and by changing these, our drum kit ends up with different timbres. Third, some drum machines (like the SP-12) have different "mixes" available and this would also allow for variation in terms of drum tuning, loudness, or drum timbre. Finally, all of these elements may be combined through the use of program change commands, initiated via the Octapad.

There are a number of techniques for getting very realistic drum sounds—the most important of which may be the blending of repeated strikes. If you don't know what I'm referring to, then try doing a cymbal roll on a basic, inexpensive drum machine. It's impossible to get a

smooth crescendo, since the drum machine simply retriggers the sample with each successive strike. This is evident on snare drum rolls, too. What's needed is a form of dynamic voice allocation—layering—that will start a new sample while the old sample plays out. Even this isn't a perfect mimic of true acoustic percussion, but it's quite believable. Unfortunately, few drum machines have this mode (one that does is the Korg DDD-1), although most samplers do.

Another problem common to most

drum machines is the lack of dynamic variation of timbre. Hard drum strikes are brighter and sharper than laid-back hits, so even if you program in level changes, you'll notice that, while the drum may be quieter, it doesn't sound like a soft drum strike. There are a number of ways to mimic this effect in samplers. First, make sure you've got a good, solid, hard strike sample. To get softer-sounding versions of this is to key the VCF cutoff to velocity: as the velocity increases, the VCF should open until at

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The Casio FZ-1: A Drum Machine By Any Other Name...?

A drum machine in keyboard's clothing? Could be. The Casio FZ-1 has several features that make it a good drum sound source, whether played by sequencers or by MIDI drum pads. The unit has a long sample time at a high rate for those nice, bright, long-decay cymbal sounds, and a large number of different sample "slots" for use with a variety of percussion sources. Sample manipulation functions are also very important for realism, partic-

ularly in response to volume changes. Extensive MIDI capabilities and some form of dynamic voice allocation for rolls are a must. Mode four capability is also important. Generally, the FZ-1 achieves these goals quite well. First of all, via an optional memory expansion, the unit delivers a total of 29 seconds of sampling time at the machine's maximum rate of 36 kHz. This is a lot of time and should produce a number of long samples. You can divide up sampling time in just about any way you wish without having to worry about "memory banks," including into a single 14-second sample unit. However, the FZ-1's 36 kHz maximum sampling rate loses a tad of the upper register so vital to realistic cymbal and sharp percussion.

Up to 64 different samples can reside in memory at one time, which offers enough latitude for most setups. While 64 slots might seem like a lot, because of the FZ-1's velocity switch capabilities, the slots get used up rapidly. For example, let's make up a set of very realistic tom toms, using three

different acoustic toms for our original source. To achieve realistic dynamics, we could sample each drum at four different strike levels and then use the velocity switch function to move among them. This will require a total of 12 different tom samples. The active range of each sample may overlap the range of the other samples, but without fade-in/fade-out blending. One big plus is that this form of operation is not global: in a given preset,

some keys may be set up for velocity switch, and some not. This technique can also be used to switch between dissimilar samples, such as open and closed hi-hats. Other tricks to increase the dynamic variation include velocity control of the DCA and DCF parameters. I found that the attack time adjustment is rather coarse and there is no facility for velocity-controlled release time on the DCA (for example, to make cymbals appear to ring longer). Sadly, the FZ-1 does not feature velocity control of the sample start point, which can be used to good effect.

The FZ-1 features eight audio outputs. Unfortunately, the eight voices are not dynamically allocated, so when a cymbal, for example, assigned to output number two is triggered a number of times in rapid succession, each new trigger will cut off the preceding sound. This also creates a problem if you assign two different sounds to the same output. You will never be able to hear both sounds simultaneously (the last one triggered "wins"). Fortunately,

the FZ-1 allows for the assignment of any sample to a number of different outputs. So if we assign that cymbal to outputs three and four and then sum the two using a mixer, we will have produced net over-ring. Even though we don't know which output produces the sound at any given instant, we know there will always be at least two voices available.

This way, the FZ-1 acts as a four-voice sampler with dynamic allocation. Many sounds don't require over-ring, and a few (like hi-hat) need some form of exclusion. Since the FZ-1 lets you decide what goes where, you have considerable flexibility. Further, the unit supports MIDI mode four: each sample area is assigned to a given MIDI channel. Other manipulation features include eight-stage envelopes (that can make tuned sources appear more percussive), waveform drawing, sample mixing and delay effects (useful for flanging or ambient sounds), and rudimentary additive synthesis functions.

Overall, the Casio FZ-1 makes for a nice drum machine, but a little factory tweaking would make it even better. First off, Casio should avoid using extraterrestrial beings to write their owner's manuals, as Venusians are not known for their particularly lucid grammatical constructs. On a more technical note, an increase in the response time of the CZ-1's "VU" meter function is needed. When sampling percussive sounds, the meter may indicate a good recording, but the waveform display may show gross distortion. Assuming that an average responding meter was Casio's goal, they at least should have included some form of clipping indicator in the display. Also, the resistor foot pedal should be expanded so that it can control items like the DCA rates or pitch. In this way, drummers could use it for hi-hat and choke cymbal sounds as well tympani effects. Finally, a rack-mount version would be a most welcome addition.

—Jim Fiore



Casio FZ-1

high velocity, it's open wide. A subtle adjustment is all that's required here, as heavy-handed settings will be anything but realistic.

Another basic technique involves changing the attack time with a VCA. Again the VCA should be keyed to velocity, fast attacks at high velocity and slower attacks with lower velocity. If your sampler features a velocity start point control (like the Prophet 2000/2002), use this. Set it so the entire sample is played at full velocity, while less and less of the beginning of the sample is used at lower velocities. Since attack information occurs at the very beginning of a sound, we can alter the subjective attack by altering the start point.

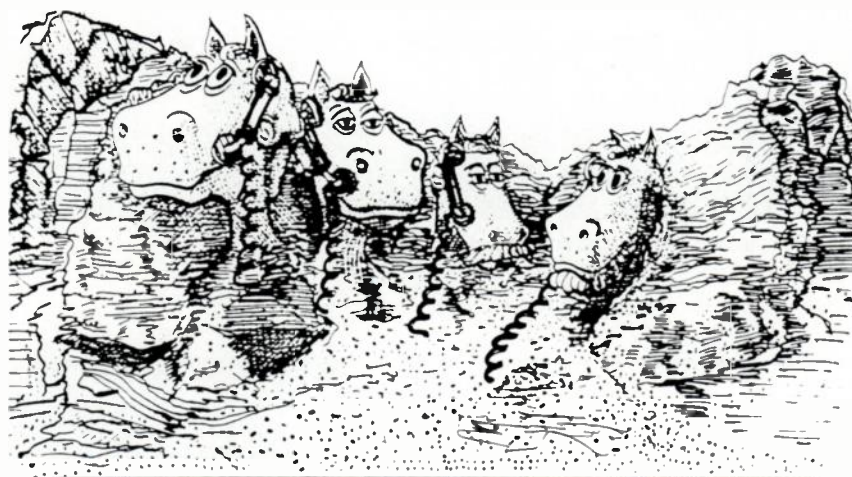
Finally, multiple samples with some form of velocity layering will achieve very impressive results, though of course you will require a larger number of samples and a corresponding reduction in net sample time. Many machines will also end up with a reduction in the number of voice channels available, since two or more will be required per layered voice.

While somewhat time-consuming to set up, the combination of all the above techniques can produce very lifelike drum sounds, or some very bizarre sounds.

Some interesting sounds come from combining different sources. Layer the sounds of a synth and a sampler, each with a marimba sound, and the two together might sound more realistic than either unit alone. Combine two complementary timbres such as snare drum and handclaps, or dissimilar sounds, like toms and a pipe organ. If your sampler allows you to combine different samples into one final sample, try combining three or four different versions of the same sound or spice up a sound with a hint of synthesized potpourri.

You might also wish to rewire your pitch and mod wheels for special effects. In most samplers, it's relatively easy to connect a 1/4-inch switched jack in series with either wheel, and plug a simple resistive-type foot pedal into your keyboard. This way your feet will control pitch and mod settings (very useful for tympani effects). Wire the jack in the fashion of a patch bay, so when the footswitch is not plugged in, the wheel is "normaled" through the jack, and when it is plugged in, the wheel connection is broken. It's important that the resistance of the pedal

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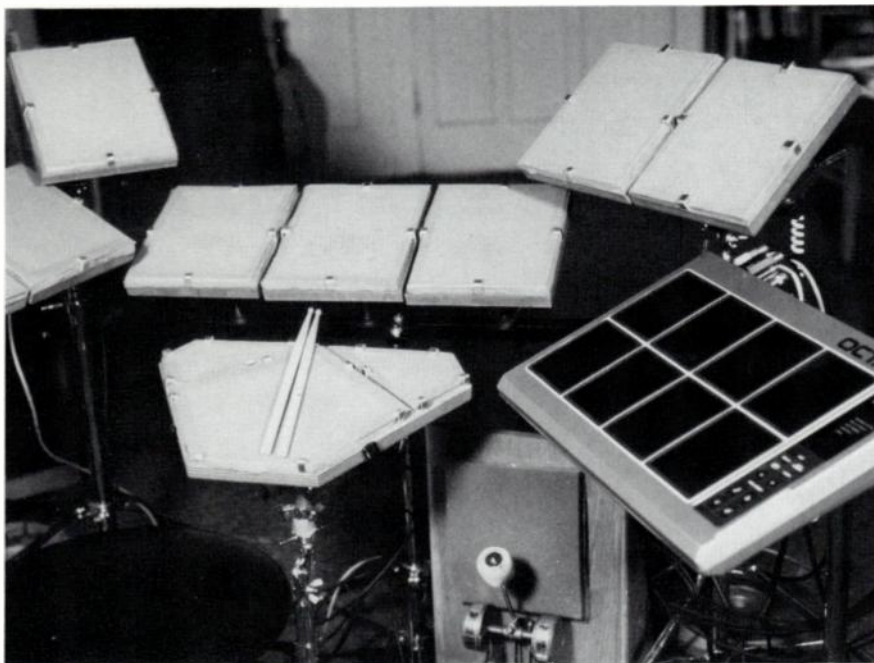


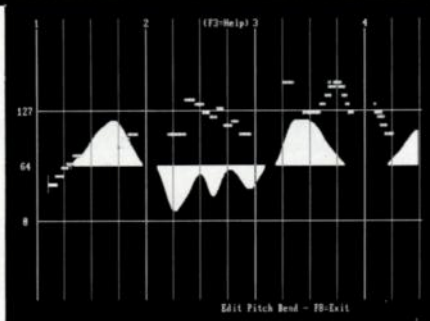
FIG. 4: The author's Zelda percussion system.

Keyboard, Aug '87: "Elegant, unintimidating... laden with features, many of which make life easier."

Music Technology, July '87: "Easy to understand... uncluttered...easy to use."

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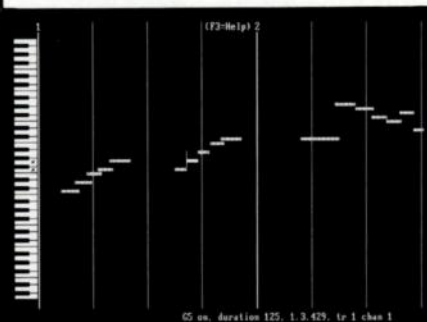
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is the same as the wheel's, and it's often a simple job to replace the pedal's potentiometer if it is not the correct value. One of the local electronic salvage houses should have what you want for about \$5.

On the road, Zelda takes a lot less space than the old acoustic kit, and since most synths and samplers are available in rack-mount form, a very compact kit is possible. A number of compact, self-contained electronic trigger kick pedals are presently on the market, and do not require any sort of kick drum pad.

Hi-hat pedals can be a bit trickier. To my knowledge, no one makes a dedicated MIDI hi-hat controller. There are two easy (though not perfect) ways around this. One is to use two pads for your hi-hat, one with an open sound, the other closed. (This is one place where the non-blend problem mentioned earlier works to your advantage—after all, you can't hit a hi-hat both opened and closed simultaneously.) Of course your foot never sees any action here, so you might try to rig up a pedal that will trigger the closed sound, or use a foot switch to go between the open and closed sounds. The first method takes some getting used to, but will allow you to do some interesting things.

Fig. 4 shows the complete Zelda; there's a lot more to Zelda than what's been described here, but I hope that I've broken some new ground for those percussionists interested in new means for self-expression (and a volume control). Have fun.

EM



When not sprawled out semi-conscious next to his Amiga, listening to King Crimson, Mr. Fiore takes time out to consume as many peanut butter and banana sandwiches as the warden will allow. His hobbies include waxing the phone, pretending he's a game show host, and hosing down the neighbors.

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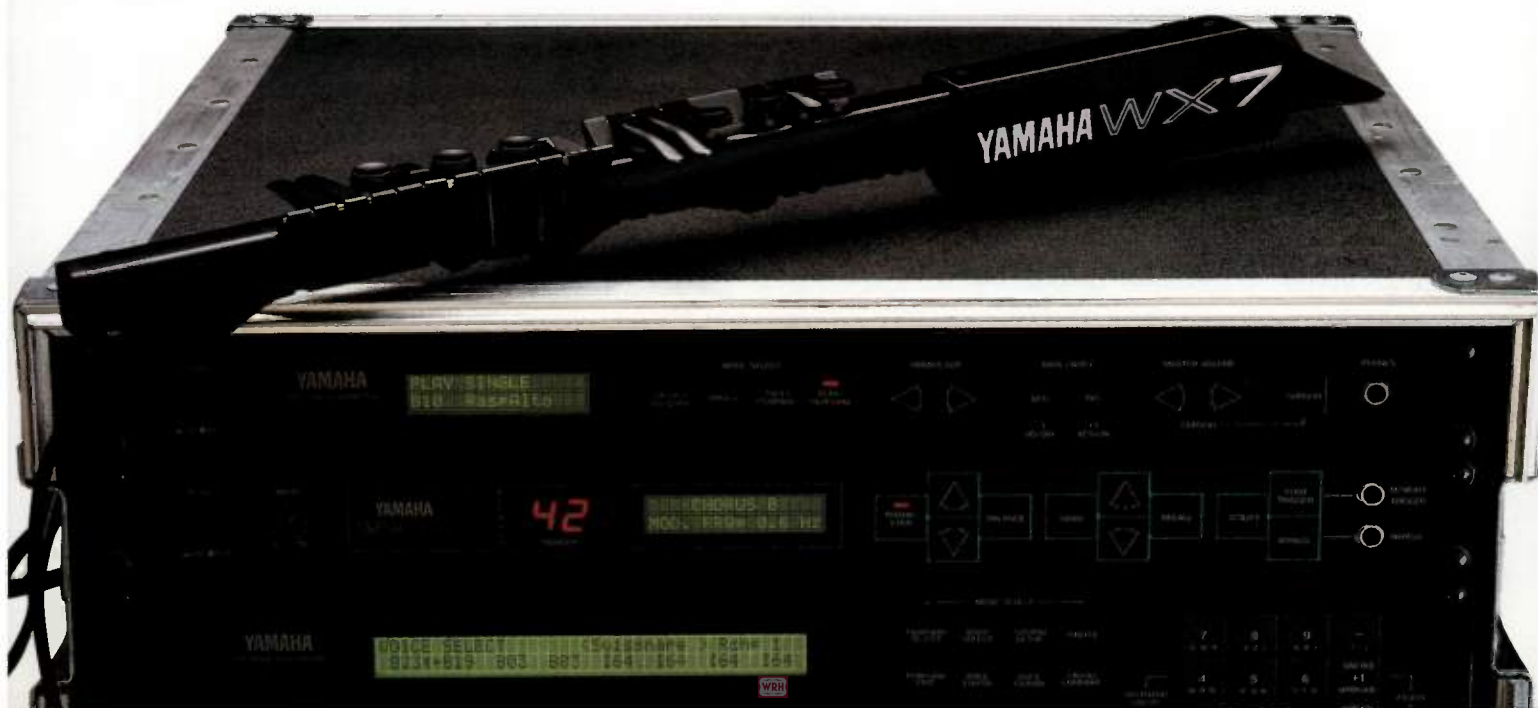






ILLUSTRATION BY RICK BISACCIA

IT USED TO BE THAT if you wanted to get into synthesizers, you could have any kind you wanted—as long as it was analog. Then came a significant departure: Yamaha's surprisingly affordable DX7, which offered a new type of sound created by *FM synthesis*. Compared to better analog synths the DX7 sounded somewhat gritty, but offered the advantage of a brighter, much more harmonically complex sound that also took full advantage of the DX7 keyboard's velocity and aftertouch response. Progress didn't stop there, though. Casio introduced *phase distortion synthesis*, which sort of sounded like an analog synthesizer in digital clothes—not quite as “bright” sounding as FM, but with more clarity and transparency than most analog synths.

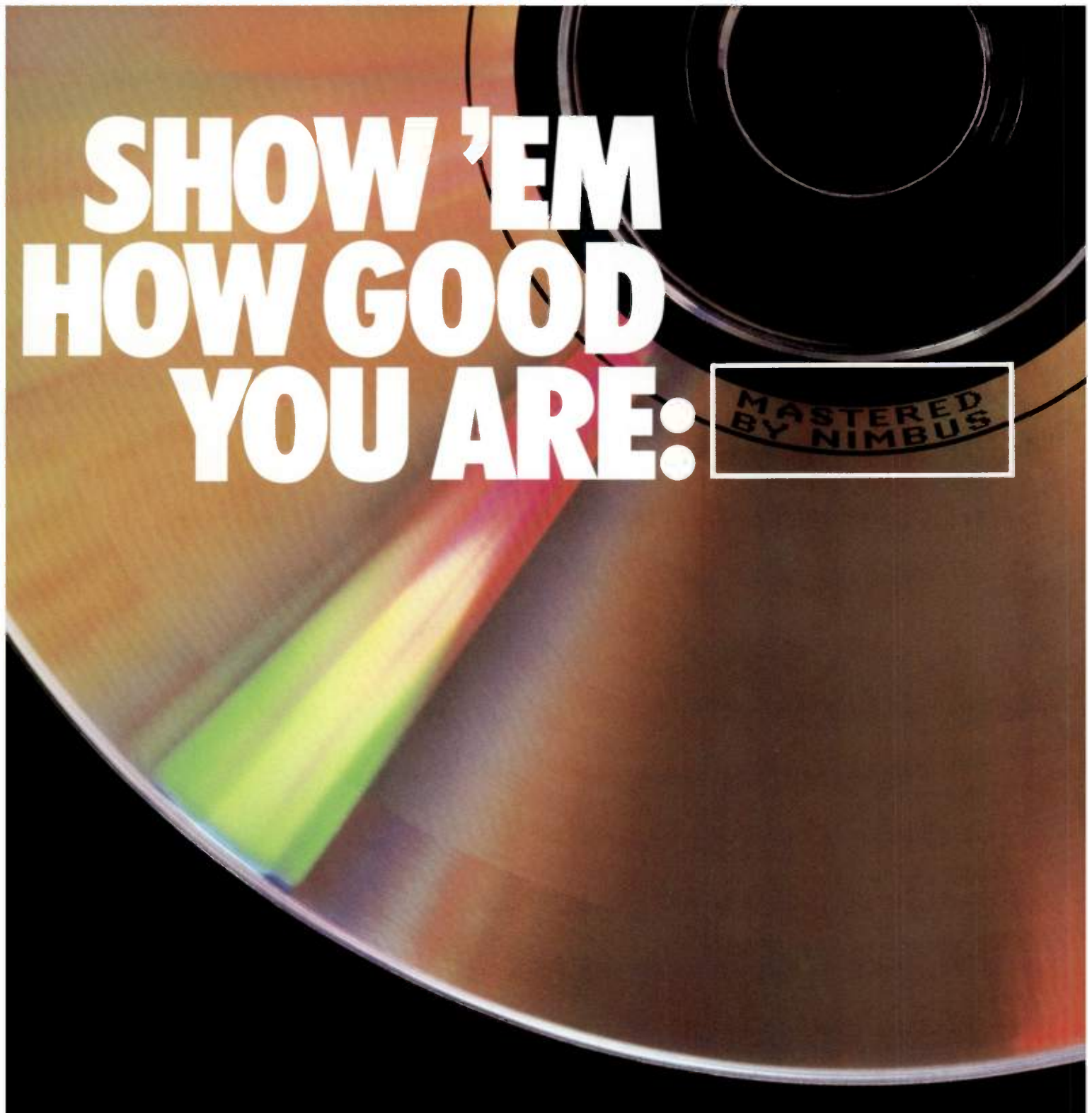
Roland's L/A synthesizers, based on a hybrid of sampling and traditional synthesis, have created the biggest buzz since FM first appeared on the scene. What's the commotion all about?

L/A SYNTHESIS *INSIDE*

Korg, Ensoniq, and Kawai followed this act with *wavetable synthesis*, where a few cycles of complex, sampled waveforms substituted for the by-now familiar analog waveform triumvirate of sawtooth, pulse, and triangle waves. Even *additive synthesis* (where the levels and envelopes of

BY CRAIG ANDERTON

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numerous harmonics can be altered), in the form of Digidesign software for samplers and Kawai's K5 synth, started making serious inroads into the synth sweepstakes. And, of course, sandwiched in among all this was the rise of the *sampling* keyboard, as initially exemplified at the high end (for the average musician) by E-mu's Emulator II, and at the low end by Ensoniq's Mirage.

Despite the fact that wavetable synthesis borrowed a trick from the sampler's book, and samplers borrowed VCF/VCA/envelope generator processing blocks from analog synths, most of these families of synths had their own distinctive characters that, while musically compatible, were not integrated into any one instrument. Synths had started to stratify into different categories, not unlike what electric guitars had done (the "Les Paul" sound, "Strat" sound, etc.).

PART I: The Technology

SOMETHING OLD, SOMETHING NEW...

The name Roland has chosen for its new type of synthesis—L/A (Linear Arithmetic) synthesis—immediately sets up a contrast with FM synthesis, which is technically considered a *non-linear* process since it relies on controlled distortion of sine waves. The basis of L/A synthesis is that it incorporates familiar elements, but combines them in strikingly innovative ways. From analog synthesis comes the legacy of sustained, repetitive waveforms, along with time-varying filter and amplifier effects to create harmonic and level sweeps over time. From sampling comes the use of 16-bit PCM samples of transient attacks. From wavetable synthesis comes sampled loops of sound, such as organ and piano waveforms. Finally, the influence of FM appears in the form of *ring modulation*, a signal processing technique from decades ago that is excellent at generating the clangorous, percussive sounds for which FM is justly famous, yet without using FM technology. Sounds are constructed using any or all of these elements.

The basic sound sources in Roland's D-50, the first L/A synthesizer, comprise two synthesized, repetitive waveforms (variable width sawtooth and pulse waves;

note that shifting the sawtooth width can create triangle waves) and 100 PCM samples (some of which are looped, some not). Roland refers to these basic sound sources as "partials" (which is not used in the traditional sense of "overtone," so don't confuse the two terms). These partials can then be structured, layered, and doubled in very useful and clever ways. Those who recall my review of the Roland MKS-70 in the Nov. '87 issue may remember how much I liked the voice architecture; the D-50 works similarly, but adds more variations.

Partial can be paired to make what's

PRODUCT SUMMARY

Product:

D-50

Type:

L/A synthesis keyboard synthesizer

Sound Generators:

PCM samples, looped sampled waveforms, and variable pulse width/sawtooth wave generators

Retail Price:

\$2,095

Features:

Velocity and aftertouch-sensitive keyboard, 128 simultaneously available patches (with optional memory cartridge), stereo outputs, easy programming

Manufacturer:

Roland Corp US,
7200 Dominion Circle,
Los Angeles, CA 90040
☎ 213 / 685-5141

PRODUCT SUMMARY

Product:

MT-32

Type:

L/A synthesis expander module

Sound Generators:

PCM samples, looped sampled waveforms, and variable pulse width/sawtooth wave generators

Retail Price:

\$695

Features:

Responds to velocity, 128 ROM presets plus 64 programmable presets, stereo outputs, 30 drum sounds, compact size

Manufacturer:

See above.

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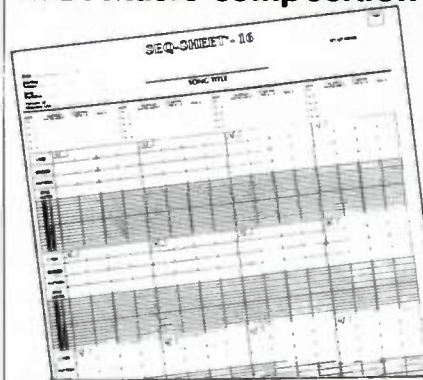
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called a *tone*. For example, you might want to combine a PCM sample of a cello bow scraping across strings together with a sustained sawtooth, thus creating a synthesized cello sound. In the D-50, 47 of the PCM sounds are of attack transients—a thunk of a piano key, a marimba hit, bass slap, trumpet “blat,” and so on. Waveforms 48 to 67 are pitched loops of varying timbres, 68 to 76 are mostly unpitched loops (bells, noise, etc.), and 77 to 100 are effects—trills, arpeggios, sample-and-

hold effects, and several sound combinations that are repetitively looped (some of these sound pretty silly, but can be fun in the right hands). The MT-32, a consumer-oriented L/A synthesis expander that’s one-third the D-50’s price, has 128 PCM samples (these include 74 attack transients and drum sounds, along with 54 loops and repetitive combinations). However, more doesn’t necessarily mean better, just different. The D-50’s samples hone in on purely musical applications,

while the MT-32’s drum samples and repetitive loops seem more suited to consumer-oriented MIDI systems.

Grafting these complex sounds onto the synthesized loops gives the illusion of sampled sounds, but without the humongous memory requirements or other trappings of a standard sampler. This is not necessarily a novel concept—Emulator II owners have been splicing transients on to loops for years now, and Ensoniq’s SQ-80 (which was in de-

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Grafting complex sampled (attack transients) onto synthesized loops gives the illusion of sampled sounds, but without the humongous memory requirements of a standard sampler.

.....

velopment around the same time as the D-50) also employs this technique. Nonetheless, the extremely flexible mixing of samples and synth waveforms is what differentiates the D-50 from most other synthesizers.

tone structures

The two partials in a tone can be arranged in any one of several ways, with each arrangement called a *structure*—the conceptual equivalent of an “algorithm” on FM synths. The output of the partials are then mixed together to produce a single output. Available structures in the D-50 are:

- Two mixed PCM sounds
- Two mixed synthesized waveforms
- PCM sound mixed with synthesized waveform
- PCM sound ring-modulated by PCM sound



Originally introduced in January, 1987, the D-50 was Roland's first L/A synthesis product.

- Synth waveform ring-modulated by synth waveform
- Synth waveform ring-modulated by PCM sound
- PCM sound ring-modulated by synth waveform

The MT-32 adds five additional structures, most of which involve ring modulation or panning.

Each type of partial has an associated collection of processing submodules. In addition to an envelope generator to modify the synth partial's pitch, synth partials can also be processed through a filter/envelope generator (Roland calls this a TVF, for Time-Variant Filter) and amplifier/envelope generator combination (called TVA, for Time-Variant Amplifier). Normally I don't like using new terms when equivalent terms exist, but I must say that Roland's nomenclature makes sense, since filters and amplifiers are almost always associated with envelope generators that vary the harmonic content or dynamics respectively over time. There are also three available LFOs. All of these processing submodules include the kind of functions you'd expect from any advanced synthesizer: keyboard tracking for envelopes, multiple LFO waveforms, the ability to tie envelopes to velocity, and so on. The envelopes are all five-stage, time/level types, except for the pitch envelope (a common parameter), which has four times and five levels. Although the PCM partials are processed similarly, there is no TVF and only one LFO.

So now we have a pair of *partials*, arranged in a *structure*, to form a *tone*. There's still one more element of the voice architecture: a *patch*, which defines such performance characteristics as: which

tones to use (two tones can be present simultaneously); tune and pitch bend functions; aftertouch; velocity sensitivity; keyboard mode (dual, split and such); settings for the on-board digital signal processing; MIDI parameters and others. A patch is what you call up when you're playing live; the other elements are more commonly called up and altered when editing.

VOICE ASSIGNMENT AND POLYPHONY

Both the D-50 and MT-32 provide 32 partials, but they assign voices in ways radically different from each other. The D-50 is designed more as a performance instrument and keyboard controller, and assigns voices in a fairly traditional way. The MT-32 is more of an expander/sequencer adjunct, and so offers a lot of multi-timbral action along with dynamic voice assignment. We'll cover specifics under each individual instrument.

PART II: The Instruments

MEET DAD: THE D-50

The first L/A synthesis product, the D-50, was introduced at the January 1987 NAMM show but did not appear in stores until several months later. Once it hit these shores, the D-50 was in such demand that it was in a constant state of back order, and even the music press couldn't get "official" review instruments from Roland until the last quarter of 1987.

In addition to the standard L/A synthesis features described above, the D-50 allows for up to two tones, an *upper tone*

and a *lower tone*, to be present simultaneously on the keyboard. This leads us into a discussion of voice assignment. The upper tone can be assigned to cover the entire keyboard (*whole mode*); since playing a key requires two partials to play a particular tone, and since there are 32 available partials, you will be able to play 16 notes at once. *Dual mode* layers both tones across the keyboard. Since playing a key requires four partials (two for each tone), you can play eight notes at once in this mode. In *split mode*, the upper tone is assigned to the upper split, and the lower tone to the lower split. You can therefore play eight notes on either side of the split; unfortunately, voices are not dynamically assigned between the splits in any of the split modes (e.g. if you play ten notes on the upper split and only two on the lower, the upper split will not "steal" two unused voices from the lower split).

All of the above modes can also work monophonically (e.g., in *whole*, the keyboard acts like an old monophonic synthesizer; in *dual*, you still play a single note but it contains two tones; and there are two split options—mono on the upper split and polyphonic on the lower, or mono on the lower split and polyphonic on the upper). What use does monophonic operation offer in this polyphonic world? Ask anybody with a MIDI woodwind controller, for starters. These players find it very useful to have mono keyboard modes available.

A final mode, *separate*, lets you play the upper tone (in eight-voice polyphony) while the lower tone responds to data at the MIDI In port. There's also a mono variation where the upper tone plays monophonically and lower still responds to MIDI data with eight-voice polyphony.

Note that if you are in a mode that allows eight-voice polyphony, hold down eight keys, and then play a ninth, the ninth note will not sound or "steal" one of the other voices. In the world of L/A synthesis, if you're holding down a note, it is assumed you want that note until you release it. However, this phenomenon does not occur during the *release* phase of an envelope: if you strike and then release eight keys set for a long release, then hit a ninth key, a note will be stolen and you will hear the ninth key. While a bit unusual, this assignment scheme works logically enough (and has taught me to lift my fingers off any keys that aren't being used).

The keyboard offers channel (mono) aftertouch (it's not polyphonic, but it does have a smooth response) and an aftertouch sensitivity slider (thank you). Aftertouch can be routed to pitch, pulse width, filter cutoff, or level. The velocity response is predictable and even; overall, the keyboard feel is extremely good for an instrument in this price range. Regard-

ing programming, the instrument is not hard to program at all. The operating system is quite non-intimidating, and I like the cosmetics (although I wish manufacturers would print BIGGER LETTERS

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You have a large part of your effects rack built right into the instrument.

.....

on the legends!!). While there's no "alpha dial," the joystick can be used to good advantage for programming, and can vary such parameters as partial and tone balances in real time. I don't know about you, but as someone raised on analog

synths who likes to vary parameters during a performance, I find this feature most welcome.

The D-50 can store 128 tones and 64 patches in its memory, and additionally accepts those cute little Roland M-256D credit card-sized memory cartridges (\$140) for access to another 128 tones and 64 patches. There is no built-in disk drive, although you can swap cartridges pretty fast, and don't need to turn off the power to do so.

Part of the credit for the D-50's success and pleasing sound quality goes to the on-board digital reverb with 32 different presets. This is an excellent-quality, 16-bit stereo reverb/stereo delay (it does echoes too) that, if nothing else, frees up an out-board delay line for use with some other instrument in a MIDI studio. It does take a second or so for a new delay setting to appear when you change presets, but the delayed sound fades in unobtrusively in the background. That's not all; you also get eight chorus sounds in addition to the reverb, and a programmable equalizer!

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What this means is you have a large part of your effects rack built *right in the instrument*. Of course, some of this design philosophy is enlightened self-interest—the reverb helps cover any “cracks” between the end of an attack and the onset of a loop, as well as adding an apparent spaciousness that sounds great in a store demo. On-board signal processing certainly appeals to the desire for cost-effectiveness that seems an inbred part of any electronic musician—our desires always exceed our budgets by a factor of at least ten (even Synclavier owners talk about wanting “just another couple more megabytes of RAM. . .”).

At \$2,095, the D-50 is the flagship of the L/A synthesis line. I know several D-50 owners, each one highly satisfied with their new toy. I have only heard two reservations raised: first, that it's noisy. I don't agree, and I'm very picky about noise in the form of hiss; what I *do* hear is that kind of high-pitched “whistle” that happens when you transpose a sample way down, although this isn't too noticeable once you get out of the lower registers.

This problem occurs because there is no multi-sampling in the D-50; each PCM sample is “stretched” to cover the entire keyboard, which means the sample gets kind of tinny at the high end and has

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The factory patches are anything but an embarrassment.

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that subtle “whistling,” along with some graininess, at the low end. Some samples don't even cover the entire keyboard; obviously this is due to cost constraints, and I suspect the next generation of L/A synths will have multi-sampled PCM sam-

ples for a sweeter, more hi-fi sound (assuming, of course, that the price of memory continues to decline).

The other reservation I've heard is that once you've checked out all the factory presets, you've pretty much heard what the D-50 will do. Time will tell whether that's true for certain, but again I tend to disagree. Standard analog synthesizers include a far narrower palette of sound, yet are still capable of generating fresh timbres, even after all these years. I suspect the problem might be that there are only a certain number of *obvious*, easy-to-program sounds in the D-50. Getting to the next level of sophistication takes some practice, as does programming any instrument. I think that a few more months down the line, when people have become really familiar with the instrument, we're going to hear some truly breathtaking sounds.

I might also add that the factory patches are well-done and musically useful. It seems someone at Roland got the bright idea that if you stuffed a really cool



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bunch of sounds into an instrument, people would be more disposed towards buying it. When you first turn on a D-50, up comes a multiple-layer sound that really shows what the D-50 can do. Aside from some weak patches here and there—mostly of the imitative variety—the factory patches are anything but an embarrassment.

If you don't need a keyboard, the D-550 (\$1,895) is also available. It's essentially a D-50 in a 2U rack package.

MEET JUNIOR: THE MT-32

The MT-32 offers both less and more than the D-50. Intended more for the consumer market (although it certainly seems to have caught on with pro musicians as well) as both a music system add-on and a computer peripheral, the MT-32 includes a set of 30 drum sounds (playable over one MIDI channel) and—shades of the D-50—built-in digital reverb. The drum sounds, which are excellent (although a bit “tame” for rock use—throw on some signal processing), include not only the usual acoustic kick drum, snare, and toms, but also several Latin, electronic, and other percussion sounds. These are all nicely placed in the stereo field, as shown on a helpful chart. The cymbals are obviously looped, and the high hats sound a little peaky, but there's no denying that when you get an MT-32, you also get a pretty decent set of drums.

Unlike the performance-oriented D-50, the MT-32's multi-timbral, dynamically assigned MIDI implementation is geared towards those who want to try out sketchpad orchestrations. (In this respect, the MT-32 fills the same kind of function as the Yamaha FB-01 or TX81Z.) Eight different “synthesizers” (Roland calls them *parts*) may have any of the 128 timbres assigned to them, and are accessed over pre-assigned MIDI channels 2 through 9; the drums appear on channel 10. While we're at it, let's put to rest

the rumor that you cannot change these channel assignments. You can shift the group of instruments down to cover channels 1 to 8 (the drums remain on 10) from the front panel or, via System Exclusive commands, assign any instrument to any channel. (People often ask why Roland chose channels 2 through 9 as the defaults. Roland envisions the MT-32 as an integral part of a consumer-oriented setup based on the use of a Roland MIDI piano, which defaults to channel 1.)

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The spartan front panel might cause people to underestimate the MT-32's rather extensive capabilities.

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The sheer number of sounds is impressive: 128 ROM patches and 64 programmable patches. The ROM patch selection includes eight pianos, seven organs, accordion, eight miscellaneous keyboards, four synth brass, four synth bass, eight straight synth sounds (which start to show the power of L/A synthesis), 11 string sounds (including some not-so-spectacular solo cello/violin, but some beautiful harps), four guitars plus sitar (the weakest of the lot, for this is where the noise shows up the most), eight basses (including some lovely acoustic bass, and some buzzy funk basses), 16 very effective wind instrument sounds (although the saxes aren't so hot—what else is new?), nine brass timbres (the French horns are quite something, even

with some less-than-pleasant modulation noise), eight mallet sounds (marimba, vibre, etc.), seven “ethnic” sounds, ten unusual percussion effects, and six special effects (from “orchestra hit” to “one note jam,” a truly Devo patch that merits a place in the Pee-wee Herman Hall of Fame). Not a bad collection, and they all tie in very well with velocity.

It's important to note that the MT-32 does not have the same PCM samples used in the D-50. The selection is less varied, the sound quality seems somewhat buzzy, and there are quite a few of the combination-of-sounds loops that seem of dubious musical value. Still, I don't think designing in these particular loops added much to the cost, and I always prefer to have more options and not use some than have fewer options overall. For all I know, someone will probably base an act around these sounds and score big.

The sound quality is good, but not up there with the D-50, especially with respect to a type of modulation (quantization?) noise. This is most problematic in the lower registers with simple waveforms; for more complex waveforms, this grit actually adds a little depth to the sound. If you need the highest-fi, then the D-550 or D-50 is well worth the extra money, but the MT-32 is still acceptable for all but the absolutely most demanding applications. Another limitation compared to the D-50 is the MT-32's inability to recognize aftertouch (although it does receive velocity).

The MT-32 is designed as a “plug 'n' play” type of box with virtually no front panel editing, save for fairly obvious functions (patch selection and volume, for example). This is unfortunate, because the MT-32 has virtually as much power as the D-50, including TVFs, TVAs, and so on; the spartan front panel might cause people to underestimate the MT-32's rather extensive capabilities. However, I'm sure that trying to make the MT-32 fully editable from the front panel would have created one of the world's most hideous user interfaces, so Roland has done the next best thing and implemented a very extensive set of System Exclusive commands. (This is particularly important



While intended for the “consumer” market, the MT-32's 128 on-board, multi-timbral sounds has made it quite popular among musicians.



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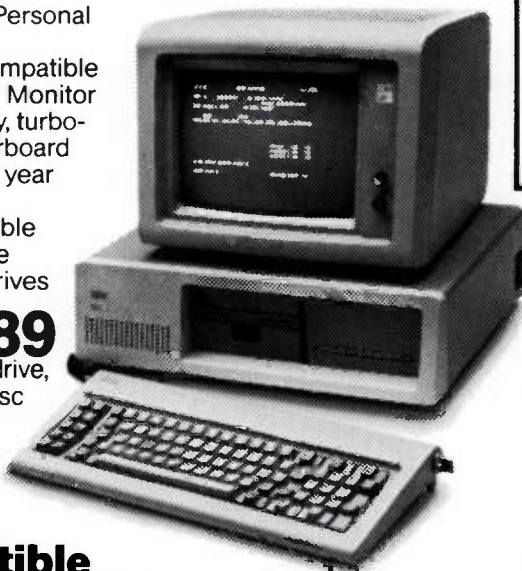
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when you consider that there is no battery backup for the user programs.) As a result, attaching the MT-32 to a computer running a decent voice editing program can unlock a considerable amount of power, and let you customize sounds as desired. But first you need editing software, which brings us to our next section.

PART III: The Support

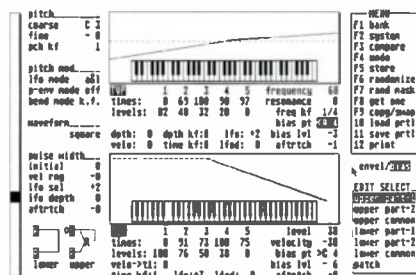
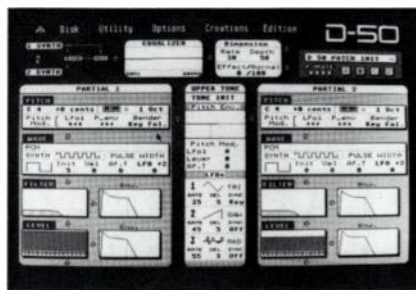
SOUNDS AND SOFTWARE

Third-party sound and software companies lead a precarious existence due to the pressing problems of software piracy and the fashion-oriented vagaries of the music business. As a result, if these companies are going to devote time and effort to develop software for an instrument, they're gambling that the instrument in question is going to be a hit. When the D-50 was first shown, companies started lining up to get on the bandwagon, and Roland fueled the fire with a D-50 programming workshop at the summer '87 NAMM show.

Roland itself introduced the first programming aid, the PG-1000 (\$495). This outboard box plugs into the D-50's MIDI In, and provides a set of slide pots for altering parameters, just like an analog synth. For making fast changes to a sound, this is the way to go; it certainly is more convenient than using a computer-based editor. However, computer-based editors can also include librarians, random patch generation, and other "goodies" impossible to coax out of the PG-1000. (Well, I suppose you *could* do random patch generation by having a bunch of kids move the sliders randomly, but you know what I mean.)

Originally, I had hoped to compare a few representative editing programs for the D-50, but between the time I started writing this article and the time I finished, it seemed like every software company under the sun had come out with some kind of D-50 or MT-32 editor. Any pretense at comprehensiveness went out the window, so you'll just have to stay tuned to upcoming reviews in *EM* for details on specific programs. For what it's worth, I've tested Atari ST-compatible editor/librarians by Dr. T's for both the D-50 and MT-32, as well as giving a test spin to a

Beta version of their MT-32 editor/librarian for the Amiga. Bob Melvin wrote all of these (the Amiga version was ported by David Silver), and they work like previously reviewed Melvin programs (*4-Op Deluxe* for Yamaha four-operator synths was reviewed in the November '87 *EM*, and *K3 Editor* in the July '87 issue). Essentially, Bob has created his own editor/librarian operating system—once you've learned one of his programs, you've learned them all. Like the other members



Two D-50 editor/librarians: Steinberg/Jones Synthworks for Atari ST (top); and Dr. T's for Amiga, ST and Mac.

of his family, the D-50 and MT-32 programs are reliable, functional, and easy to use. Speaking of the Amiga, I also got a brief demo of the Sound Quest D-50 editor, which looks extremely powerful, at the winter NAMM; unfortunately, as of this writing I haven't had a chance to check it out in detail.

I had also hoped to review some third-party sounds, but like editing programs, these have proliferated beyond the abilities of a single person to absorb their positive and negative qualities within a reasonable amount of time. However, I did investigate two sets of D-50 patches, and these are worth mentioning particularly because they demonstrate an important point about patch software in general. It seems there are two types of patch sets in this world. What I call "Type I" is where someone has taken a limited number of voices and tweaked them into

sonic perfection, including sophisticated controller assignments, intelligent use of a synth's special features, and so on. These sounds are usually programmed for specific applications, and while they may sound beautiful when isolated, they may be too personalized for more generalized applications. "Type II" patch software goes for *numbers*, with lots of variations on bread-and-butter patches like bass, piano, strings, brass, etc. Both patch types have their advantages and disadvantages. With a Type II patch set that has, say, a dozen different pianos, it's easy to hop through the different sounds when the producer says "gimme a piano"—and nine times out of ten, one will come at least close to what you want. While a Type I patch set might have one or two really exquisite pianos, there's no guarantee that they will fit the exact context you require, which may call for some re-programming.

The advantage of Type I patches is that each patch has a "special" quality that, beyond any sonic appeal, also serves as an excellent example of how programming works. Sometimes Type I sounds are so good and/or unusual that they inspire new tunes.

For a good Type I set, check out James Newman's three sets of 64 D-50 patches (New Man Studios, Box 1235, McMinnville, OR 97128). The three sets are Rock, Orchestral, and Spectrum (sort of a potpourri of various sounds). This is basically one guy working out of his studio, so don't expect fancy packaging and stuff; but the sounds are good.

Prices per set are \$25 for data sheets, or \$25 to program a RAM cartridge or a blank disk that you send him. ROM cartridges are also available for \$89. Available disk formats include Roland MC-500, Atari ST (Dr. T's editor), and Macintosh (Opcode software). All patches make excellent use of aftertouch and velocity sensitivity, although some sounds are rather specialized.

On the Type II side of things, Leister Productions (14 Hill Blvd., Mechanicsburg, PA 17055 ☎ 717 / 697-1378) has two 192-patch volumes of sounds available on disk for \$40 per volume—quite a deal. Some of the piano, bass, string, and brass sounds are truly outstanding, and overall, if you need a sound you should be able to find it somewhere in this set. These patches also serve as good examples of D-50 programming. Supported

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Here's the setup.

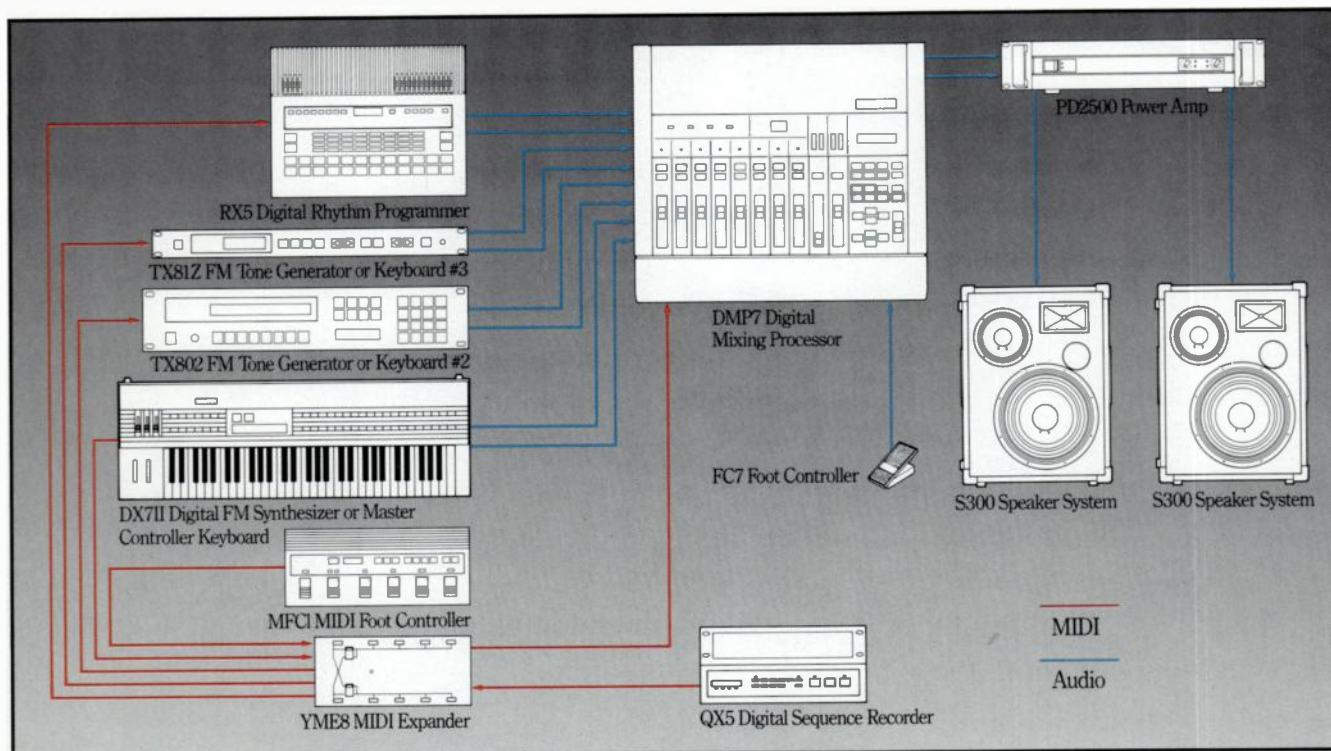
On stage, the DMP7 gets your act together. In the system shown here, the outputs from several keyboards or tone generators and our RX-series Digital Rhythm Programmer are mixed to "stereo." The DMP7 also adds effect processing at this point.

The FC7 Foot Controller sets the output level of the entire system. An MFC1 MIDI Foot Controller, connected to the DMP7's MIDI IN terminal, provides even more foot control

capabilities. The MFC1 can be programmed to switch memory presets simply by tapping a footswitch.

By connecting an FC7 to the MFC1, you can independently control specific faders, effects or other DMP7 parameters, for the ultimate in expression and control.

MIDI routing is done through YME8 MIDI Expander. Sequenced program and parameter changes are controlled by the QX5 Digital Sequence Recorder.



Yamaha Music Corporation, Professional Audio Division, P.O. Box 6600, Buena Park, CA 90622.
In Canada, Yamaha Canada Music Ltd., 135 Milner Avenue, Scarborough, Ontario M1S 3R1.

editor/librarian/Sys Ex recording formats include Macintosh (Dr. T's, Opcode, Performer and Beaverton), Atari ST (Dr. T's, Hybrid Arts "Genpatch," and Music Service Software's Data Dumpstor), IBM (ProLib, Dr. T's), and Commodore 64/128 (Sonus D-50 editor/librarian). The Atari ST disk also includes a copy of Mini Dumpstor (an excellent shareware program written by Dean Richard of Music Service Software) that lets you load the Leister sounds from any GEM application—you don't need a dedicated librarian to use these sounds. By the way, as we go to press, Leister has just released a bunch of sounds for the MT-32.

But I mention these only as representative examples. There's a ton of third-party sounds out there, including new entries from Valhala, Zero One, and too many others to mention here. Well, that's what ads are for: order a few demo cassettes, and see what sounds turn you on. I'm not going to even attempt an overview—it would probably take up the next two issues!

PART IV: *The Future*

MEET THE REST OF THE FAMILY

Roland's desire to capitalize on the success of L/A synthesis was underscored by several new product introductions at the winter NAMM, all based on this technology. While we haven't had any hands-on experience with these units, and prices/specs are always subject to change without notice, here are thumbnail descriptions of the next L/A units in Roland's product line. All three trace their heritage back to the D-50 and/or MT-32.

The D-110 (\$995) is conceptually like an MT-32 in a 1U rack mount, but adds six assignable direct audio outputs. Its performance mode offers three keyboard configurations—split, dual, and whole—as well as 128 patch locations in which to store configurations. Multi-timbral mode, suited for use with sequencers, provides eight different "instruments" and drum sounds; it also includes 128 patch locations for storing which tone is used for which part, what MIDI channel accesses that tone, tone volume and panning, and the level of the currently selected built-in reverb or delay. As with all the new L/A

The D-110 Multi Timbre Sound Module features six assignable audio outputs in a single rack space unit.



The D-20 offers an internal 9-track sequencer holding up to 16,000 notes.

units, the drum sounds are more aggressive-sounding than the ones on the MT-32, reinforcing the role of that instrument as more of a home entertainment/computer peripheral type of device.

The D-10 (\$1,395) is virtually the same as the D-110, but tacks on a 61-note keyboard with velocity sensitivity (it has no individual outputs, though). This is positioned for musicians who want an L/A synthesis keyboard, but can't afford a D-50. Like the MT-32, the D-10 works very well in a multi-timbral context, and is a useful adjunct for sequencers.

Finally, the D-20 (\$1,795) competes directly with "all-in-one" MIDI devices like Ensoniq's SQ-80. You can think of the D-20 as a D-10 with an on-board 9-track sequencer, plus a disk drive to store both sequence and sound data. The sequencer is quite sophisticated, and offers quantizing, overdubbing, punch-in and -out, and the ability to drive other MIDI instruments from the D-20's MIDI Out port. The disk drive lets you store up to 76,000 steps of sequence data or eight sets of patches (128 multi-timbral and 128 performance) along with 64 tones.

Interestingly, both the D-10 and D-20 include an on-board 64-pattern drum machine (which includes 32 pre-programmed patterns); partials as well as drum sounds can be used.

All of the above units may be programmed, with a certain amount of tedium, from the front panel or for greater programming ease, with the optional PG-10 programmer (\$399.50). In addition, an M-256D memory card can store up to

64 user-programmable sounds and 32 patches. (Note that just because this is the same memory card used with the D-50 doesn't mean you can transfer D-50 sounds into these other units.)

IS L/A SYNTHESIS HERE TO STAY?

We're not talking about a simple keyboard instrument here, but a complete family of products that sound fresh, are quite easy to use and apply (especially given their sophistication), and are even reasonably cost-effective (too bad about the recent D-50/D-550 price increases forced by the weakness of the dollar, though). The emerging flood of third-party software and sounds also means that L/A products will have staying power, if for no other reason than because so many companies have staked their success to the success of the D-50 and related products. Granted, much of what can be done on a D-50 can be realized on a sampler MIDled to an analog synth and processed by reverb and EQ, but for those who just want to plug in and play, the D-50 and its relatives are the most exciting developments in applied synthesis since wavetable synthesizers and FM hit the scene. **EM**

Craig Anderton is the author of MIDI for Musicians, Home Recording for Musicians, The Digital Delay Handbook, Electronic Projects for Musicians, Seven Simple Steps to Buying a Word Processor, and Guitar Gadgets. He has just completed The Electronic Musician's Dictionary for AMSCO Publications.

Last month, we learned how desk accessories can hot-rod your Macintosh into a higher-performance machine. Are you ready for the next step on the road to the ultimate Mac?

Mac POWER USER= POWER MUSER

Part 2: Power Utilities

When you're working creatively with the muse, you don't want your Mac to bog you down in endless disk swapping, or frequent visits to the slow desktop environment to quit

and launch various applications. Remember: the computer in your musical life exists to serve you, not the other way around. In part 1, we looked at desk accessories that can help you become a power

“muser” (and included a listing of manufacturers whose products are mentioned in this series); now it's time to move up to intermediate level power

INITs AND CDEVs

INITs and *cdevs* are two types of software “accessories” that enhance system operation and are automatically loaded on power-up. Until fairly recently, *INITs* had to be painfully installed in the system file using Apple's Resource Editor, but now, any *INITs* placed in the system folder will load automatically. *INITs* are generally unalterable by the user while they are in operation, whereas *cdevs* allow for alterations via the Macintosh control panel. Popular *cdevs* include *Pyro*, a screen saver that blacks out the screen and runs an animated fireworks display after a user-specifiable interval of inactivity; *SCSI Bus*, which lets you install additional SCSI devices from the control panel; and *CheapBeep*, which changes the standard Macintosh system beep into a sampled sound (using 8-bit 22K samples obtained with, for example, the \$150 *Impulse Audio Digi-*

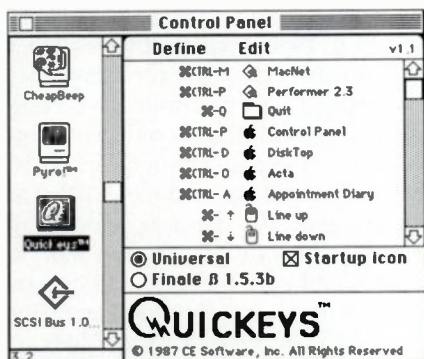


FIG. 1: QuickKeys' "Quick Panel" is available from the Mac control panel or an assigned Quick-Key to set up mini-macros.

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tizer or the pricier MacRecorder).

While many entertaining INITs provide start-up and shut-down sounds, or "Macintalk" the time and date, real power-user INITs are far from frivolous. Last month we mentioned the *Suitcase* INIT that runs more than 15 desk accessories, but if you are running Suitcase and Ap-

written over the sector of the drive containing the "erased" files).

QuickFolder, another useful INIT, adds a "New Folder" and "Move into New Folder" button to all "save file" dialog boxes. Speaking of folders, the *SFGetFile* INIT memorizes your folder location in each "GetFile" dialog box (that's the box you see when you choose "Open File" from the menu). With *SFGetFile* installed, every time you want to open a file from within any program, you'll be at the exact same level in Apple's Hierarchical File System (HFS) folder hierarchy as the last time you used that specific program. Unfortunately, though, *SFGetFile* interferes with the copy protection schemes employed by several popular music software packages. Finally, *Ask.INIT* lets you choose (at boot-up) which additional INITs you want loaded into your system, and which should be temporarily disabled.

MOUSE AND KEYBOARD SHORTCUTS

FKeys are the Macintosh answer to the popular "function keys" used in IBM PCs and other text-oriented computers. The Macintosh comes with four pre-defined FKeys accessed by the key combinations Shift-Command-1 through Shift-Command-4. These are, in sequence: eject internal drive disk; eject external drive disk; copy screen contents to a MacPaint file; and print screen (if you have a LaserWriter, you must get a special, non-Apple version of the print screen FKey). There are FKeys that use the Shift-Command-Number combination to perform just about any function a desk accessory can do, and Suitcase automatically loads FKeys on boot-up so you no longer have to use the Resource Editor to install these in your system file.

Since the majority of Mac users have only six additional number keys to use for FKeys (the numbers 5 through 0), here are my six all-time favorite FKeys. FKey 5 (CacheToggle) toggles the RAM Cache on and off (only takes effect on next power-up); FKey 6 (AntiFreeze) will often rescue you from a "stuck cursor" without having to re-boot; FKey 7 (CopyScreen) turns the cursor into a selection rectangle which will transfer a full or partial screen dump to the clipboard (useful for programs that don't have printing capabilities); FKey 8 (UnStuffit) can "unstuff" downloaded files which have been compressed and packed with the *Stuffit*

.....

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and Servant to
keep my sequencer and
notation programs open
simultaneously, and cut
and paste between the
two domains. With
enough memory, you can
keep your patch editors
and librarians open at the
same time too.**

.....

ple's new *MultiFinder*, you will want to have the *MFMENU* INIT. While running *MultiFinder*, the names of currently open applications appear at the bottom of the DA menu. That's fine if you observe Apple's 15 DA limitation, but if you have close to a hundred DAs installed with Suitcase, you won't want to scroll down to the bottom of the menu to switch applications. *MFMENU* INIT gets around this by providing a duplicate *MultiFinder* menu at the far right end of the menu bar whenever the mouse cursor moves into the "hot spot" between the far right edge of the screen and the *MultiFinder* icon.

PopKeys is similar to *MFMENU*, and uses the far upper-left corner of the screen as a "hot spot" to trigger a menu through which all installed FKeys may be accessed with the mouse (more on FKeys later). The *CPS SaveDeletes* INIT is part of the *Copy II* Mac package; this INIT keeps track of where the last 360 deleted files were located on your hard drive, so inadvertently erased files can be recovered using *MacTools* (provided you haven't



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utility; FKey 9 (IconMover) allows Icon manipulation in *HyperCard* and elsewhere; and FKey 0 (OpenTempo) turns on the Tempo macro-making utility (we'll talk some more about these last two in next month's installment).

QuickKeys is a cdev that lets you create a nearly unlimited amount of additional keyboard shortcuts, both universal and program-specific. Once you start using this cdev, you'll wonder how you ever got along without it. QuickKeys lets a single keystroke perform actions that normally take many mouse clicks, mouse drags, or typing. There are 11 different types of QuickKeys:

1. **Text:** up to 71 characters can be typed automatically with one key-press.
2. **Files:** files and documents can be opened without returning to the finder. This will be a "safe launch" with the old program properly quit and with the option to save files.

3. **Menus:** select any menu option, including all suitcase DAs.

4. **Aliases:** transform any key into any other key.

5. **Clicks:** all mouse clicks and drags are recorded, relative to specific windows or the entire screen.

6. **Buttons:** QuickKeys will look for any dialog box button, radio button, or check box by name and click in its center.

7. **Mousies:** this implements special actions which would normally require a mouse movement and click (line up and down, page up and down, column and page left and right, zoom window, close window etc.).

8. **Specials:** select rear or second window, transfer (to another program), shutdown, restart, etc.

9. **Date/Time:** QuickKeys looks up and types the current date or time in any of ten formats (useful for appending a date/time suffix to file saves).

10. **FKeys:** triggers any installed FKey.

11. **Sequences:** this creates a sequence of other QuickKeys, with optional literal keystrokes and pauses. This last item is very powerful. For example, for each project I'm working on, I have a QuickKey sequence that with a single keystroke finds and loads all the patches, sample files, and setups into my various synths (Fig. 1) while I go refill the coffee cup.

Because QuickKeys can switch between programs, and even launch a pre-selected document during the transfer, it can function a bit like the quasi-multi-

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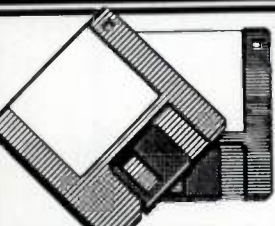
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EQ Bias Sens.	0	0	0	0																																																																																								
Amp. Mod. Enable	off	off	off	off																																																																																								
Key Veloc. Sens.	0	0	0	0																																																																																								
Output Level	90	80	78	77																																																																																								
Frequency	0.50	0.50	0.50	1.00																																																																																								
Detune	0	0	0	0																																																																																								
Frequency mode	ratio	ratio	ratio	ratio																																																																																								
Fixed Range	255Hz	255Hz	255Hz	255Hz																																																																																								
Fine Freq. Range	0	0	0	0																																																																																								
E.G. Shift	off	off	off	off																																																																																								

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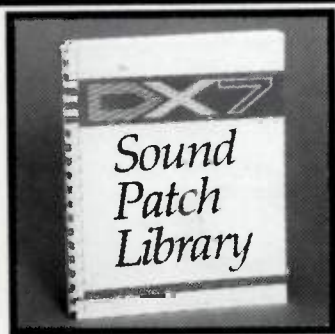
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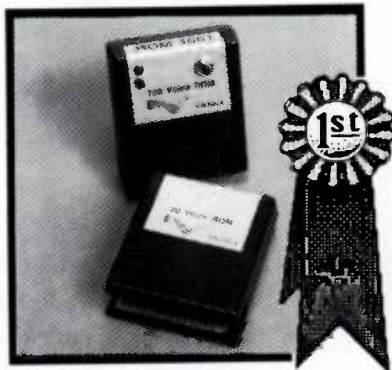
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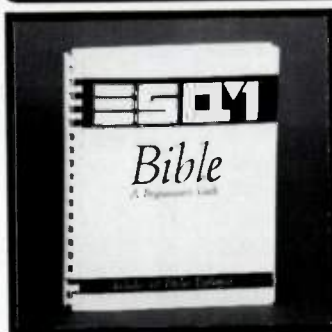
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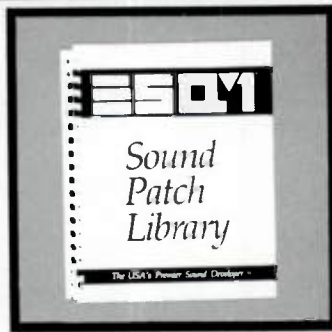
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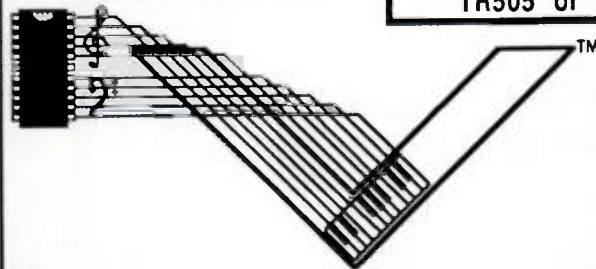
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tasking utilities *Switcher* and *Servant*, as well as Apple's new *MultiFinder*. The difference is speed: with *QuickKeys*, each program is officially closed when a new program is opened and this takes a bit longer (unless you have enough memory for a rather large RAM disk); *Servant*, *Switcher*, and *MultiFinder* all allow separate documents and programs to remain open simultaneously, for instantaneous switching. With *MultiFinder* and *Servant*, other program windows can remain visible while in a new program, but are inactive until clicked on. I am among the multitude who use this method to keep my sequencer and notation programs open simultaneously, allowing cut and paste between the two domains. With

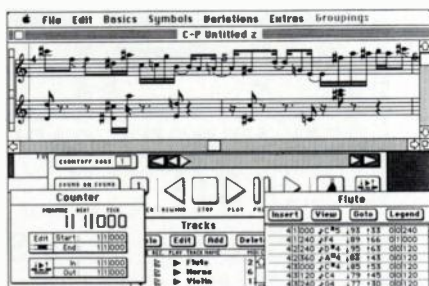


FIG. 2: *Servant* or *MultiFinder* can keep several different program windows open simultaneously, ready to be activated by a click of the mouse.

enough memory, you can keep your patch editors and librarians open at the same time, too (Fig. 2).

FINDING A BETTER FINDER

Speaking of the finder, bona fide power users rarely visit the finder and its slow desktop environment—there are much faster alternatives. If you have a small hard disk, you may be able to get by using the finder substitutes *Oasis* or *WayStation*, but for a hard disk of power-user propor-



FIG. 3: One of *Power Station*'s pages. Buttons can be linked to desk accessories, programs, documents, or a collection of files.

tions (80 Megs or more), there is no alternative to *Power Station* (Fig. 3). *Power Station* can superimpose an alternative mega-productivity-oriented hierarchy upon HFS. Applications and documents can be launched in record time from any one of *Power Station*'s 12 "pages," allowing the logical grouping of files and applications; these actually may be organized in separate HFS folders for reasons that are valid only when operating within the context of specific software.

OPTIMIZING HARD DISK ORGANIZATION

Concerning hard disk organization, we must also be concerned with the physical location of files and applications on the hard disk. After many reads and writes, a hard disk will begin to slow down owing to fragmentation of data; the extra milliseconds it takes the drive head to jump from sector to sector, reading or writing the various portions of a fragmented file, add up. Use *Fedit* to check your hard drive's fragmentation index—anything above 0.05 means unacceptable seek times. To remedy this situation, you could back up your hard drive (power users are almost always completely backed-up), erase it, then copy the files back to the hard disk. When you copy, start with files that don't change (system files and applications) so these will be grouped together on the disk, leaving a large contiguous block for documents and files that are modified regularly. Better yet, the *Disk Express* utility will both defragment the disk and optimize the layout while you sleep or take a lengthy break (be sure to de-install any copy-protected software before you do this, because in defragmenting your drive, *Disk Express* will move these files to new locations and render them inoperable).

SOMEDAY MY PRINTS WILL COME

With print spoolers, you can continue to use your Macintosh while printing goes on in the background. Apple's new *MultiFinder* even has a built-in print spooler called *Backgrounder*. I use *SuperLaserSpool*; it's extremely fast in spooling off all the files to be printed, and includes desk accessory control of print order, suspension or cancelling of spooling, and a preview function. (Note: It's also a good idea to install the *Preview INIT* in your system folder; this lets you select on-screen print

preview from the *Chooser* desk accessory for programs that don't have built-in preview options.) Using *SuperLaserSpool*, files that take hours to print can be spooled off in minutes (music notation is notorious for long print times), quickly returning your Mac to you so you can get back to work. All printing takes place in bursts during available moments of inactivity (Fig. 4).

It is possible to use one port for MIDI I/O while print spooling on the other port, but most power users need both serial ports to access two complete sets of 16 MIDI channels (for a total of 32 MIDI channels, or 64 MIDI channels if you are slaving two Macs together with true power user dedication). It is also possible to

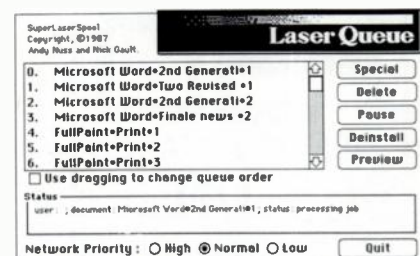


FIG. 4: The *LaserQueue* DA controls the print order of documents spooled to *SuperLaserSpool*, previewing and removing documents from the queue.

telecommunicate while print spooling with imperceptible losses of speed. Last, but not least, while you are spooling off files to the printer, you may also use the *BackDown* DA (described last month) to download files in the background and continue working on your Mac (although MIDI I/O isn't possible since in this case, both serial ports are used for the printer and modem). Now we're doing *three* things at once! That must mean it's time to move on to advanced techniques, and realize your full power user potential by "training" your Mac to do a variety of tasks while you sleep at night. See you next month.

EM

Christopher Yavelow is a computer-assisted composer who has become well-known as a writer on this topic. He received graduate degrees in music composition from Boston University and Harvard, diplomas from several noted European conservatories, and his works have received some three dozen international awards and fellowships.

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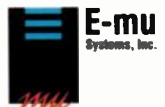
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Since its birth, MIDI has undergone some unexpected personality changes. Read about its turbulent childhood here and you'll be ready for its next stage of development as...

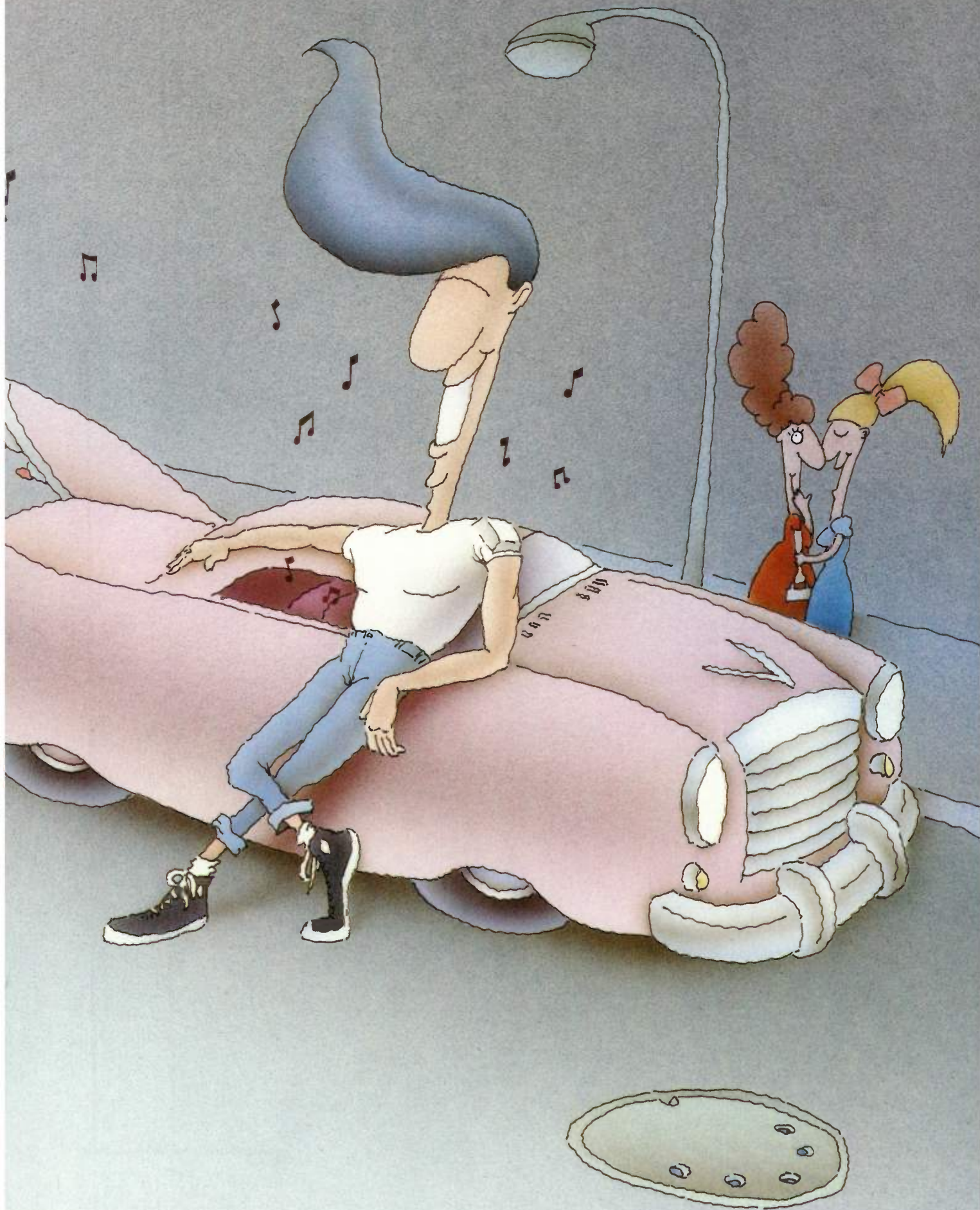


MIDI Reaches ADOLESCENCE

We are rapidly approaching MIDI's fifth birthday. Officially adopted as version 1.0 at the 1983 summer NAMM Expo, the specification has undergone many enhancements since it first appeared (although it retains the same version number). These addenda to the specification greatly increase MIDI's scope, as well as point the way to increasingly sophisticated applications.

The first and most essential "enhancement" was to make MIDI work as a truly universal interface between *all* instruments. The

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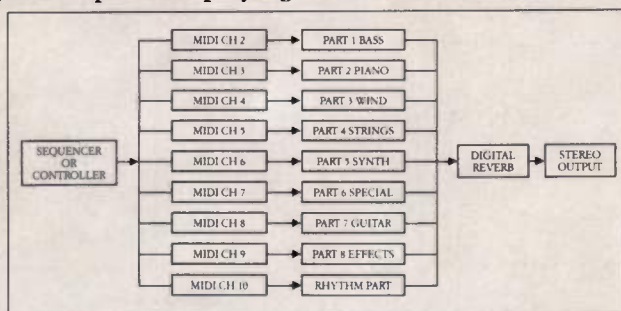
nuance that gives each patch life other digital synthesizers simply can't touch.

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original 1983 MIDI 1.0 document was a bit unclear in certain areas, and some manufacturers inevitably interpreted different fine points in different ways. To forestall further incompatibility problems, MIDI product manufacturers got together and published a book of guidelines detailing the correct methods of implementing the MIDI specification. In creating this document two organizations were formed, the MIDI Manufacturers Association (MMA) and the Japan MIDI Standards Committee (JMSC). These groups are essentially the watchdogs of the MIDI specification, and are responsible for enhancing and developing MIDI.

The MIDI 1.0 Detailed Specification was published by the International MIDI Association in September of 1985 (this document is available for \$35 from the International MIDI Association, 5316 W. 57th St., Los Angeles, CA 90056—Ed.), and since that point, compatibility problems between manufacturers have been the exception, not the rule. The first addendum to the MIDI specification was published in September of 1986 to reflect enhancements in two specific areas: continuous controllers, and Universal System Exclusive codes.

CONTINUOUS CONTROLLER AND DATA SLIDER ENHANCEMENTS

The largest change with respect to continuous controllers (modulation wheel, breath controller, etc.) was simply the definition of more of them (Fig. 1 shows the current list of defined controller numbers). In addition, the definitions of the data entry slider and increment/decrement buttons were expanded through the use of *parameter numbers*. Parameter numbers identify specific instrument parameters to be changed; if you've programmed an ESQ-1, Poly-61, DX7, D-50, etc., you're probably familiar with the idea of changing the values of specific numbered parameters in order to create changes in sounds or functions. With MIDI-accessible parameter numbers, we can now alter parameter values over MIDI. The process is simple: send a parameter number that corresponds to a particular synthesizer function (such as Master Tune); the Master Tune parameter now becomes "active," and will respond to changes coming in over MIDI from another instrument's data entry slider and increment/decrement buttons, just as if its own editing buttons were being used.

This means that ideally, you could use a master controller not just to drive expanders, but to program them (or at least modify patches) as well.

There are two types of parameter numbers, *registered* and *non-registered*. Registered parameter numbers are agreed upon by the MMA and JMSC, and are common to all instruments. The only two currently defined registered parameters numbers are Fine Tuning (RPCN #1) and Coarse Tuning (RPCN #2). Non-registered parameter numbers are specific to each instrument

and defined by the manufacturer; the listings are usually printed in the instrument's manual, and generally include all voice functions on an instrument.

GLOBAL CONTROLLER INFORMATION

Primarily as a result of the development of MIDI guitars, it was also decided to devise a method of communicating controllers globally to all voices in an instrument operating in MIDI Mode 4 (Mono mode). Mode 4 is usually the most effi-

CONTROL NUMBER		CONTROL FUNCTION
Decimal	Hex	
0	00	Undefined
1	01	Modulation wheel or lever
2	02	Breath Controller
3	03	Undefined
4	04	Foot controller
5	05	Portamento time
6	06	Data entry MSB
7	07	Main volume
8	08	Balance
9	09	Undefined
10	0A	Pan
11	0B	Expression Controller
12-15	0C-0F	Undefined
16-19	10-13	General Purpose Controllers (#'s 1-4)
20-31	14-1F	Undefined
32-63	20-3F	LSB for values 0-31
64	40	Damper pedal (sustain)
65	41	Portamento
66	42	Sostenuto
67	43	Soft pedal
68	44	Undefined
69	45	Hold 2
70-79	46-4F	Undefined
80-83	50-53	General Purpose Controllers (#'s 5-8)
84-91	54-5B	Undefined
92	5C	Tremolo Depth
93	5D	Chorus Depth
94	5E	Celeste (Detune) Depth
95	5F	Phaser Depth
96	60	Data increment
97	61	Data decrement
98	62	Non-Registered Parameter Number LSB
99	63	Non-Registered Parameter Number MSB
100	64	Registered Parameter Number LSB
101	65	Registered Parameter Number MSB
102-120	66-78	Undefined
Channel Mode Messages		
121	79	Reset all Controllers
122	7A	Local Control
123	7B	All Notes Off
124	7C	Omni Mode Off
125	7D	Omni Mode On
126	7E	Mono Mode On (Poly Off)
127	7F	Poly Mode On (Mono Off)

FIG. 1: Defined MIDI controller numbers as of January 1, 1988.

cient mode for a MIDI guitar, as each string can send data on a separate MIDI channel. However, this means that all controllers, as they are sent on a single MIDI channel, are specific to one and only one string; and because each voice is assigned to a single channel in Mode 4, a controller sent on one channel will affect only one voice on the receiving synthesizer. This is generally acceptable for pitch-bending on individual strings, but effects such as LFO modulation are usually intended for *all* the voices on the receiving synthesizer. To affect all voices while in Mode 4 would require sending six copies of the controller message out over MIDI; and since controller messages tend to be "data-intensive," MIDI data "clogging" is a possibility. For this reason, the MIDI specification now states that controller data sent on *one channel number* less than the instrument's basic channel would go to all voices in the synthesizer. For example, if a guitar synth is sending data over channels 4, 5, 6, 7, 8, and 9 (one channel for each string), controller messages sent on channel 3 would affect all synthesizer voices.

THE SAMPLE DUMP STANDARD

The Sample Dump Standard, developed as a method of transferring digital sample data between devices (computers or musical instruments) via MIDI, is included in the first addendum to the MIDI specification. This standard makes it fairly easy to exchange samples between instruments of different manufacturers, and provides software developers with the ability to write "generic" sample storage and editing programs. The standard provides enough flexibility so that samples from dissimilar machines can be readily exchanged, and includes both *open loop* (no handshaking) and *closed loop* protocols (with handshaking) for efficiency in transmission.

The Sample Dump Standard uses one of the three defined *Universal System Exclusive ID Numbers*, so let's explain what these are. The current crop includes:

7DH Non-commercial

7EH Non-real time

7FH Real time

The *non-commercial* number was set aside for in-house use by companies or institutions working on products that will not be released to the public, and thus not conflict with other products using

the same number. The *non-real time* number is used for the Sample Dump Standard, and any other bulk data transfers developed in the future. The *real time* ID number is reserved for time-specific messages (such as some of the MIDI Time Code messages discussed later).

INQUIRING MINDS (AND COMPUTERS) WANT TO KNOW!

One of the more recently defined Universal System Exclusive messages is the *inquiry message*. This is sort of a "who are

.....

The sample dump standard provides enough flexibility so that samples from dissimilar machines can be readily exchanged.

.....

you?" request; when an instrument receives an inquiry message, it will respond with information such as manufacturer ID number, instrument ID number, software revision level, etc. This will be very useful in large MIDI systems, and will allow a transmitting device to configure itself to best address the specific instruments in the system.

MIDI TIME CODE

The most recent and perhaps the most significant enhancement to the MIDI specification is *MIDI Time Code* (MTC). Published in the second addendum to the MIDI specification in February of 1987, MTC is a method of communicating absolute time, as represented by SMPTE Time Code, over MIDI. By way of background as to why this is significant, remember that MIDI's synchronization method sends software timing messages every 1/24th of a quarter note, and the rate of the timing messages (clocks) depends on the tempo of the device sending them (for example, clocks being issued at 60 beats per minute will occur half as often as clocks being issued at 120

beats per minute). This is fine when dealing specifically with music, where all timing is relative to rhythm. But now MIDI has expanded into the world of film and video, where events are referred to by their absolute time (e.g., a door slam might occur at 1 hour, 20 minutes, 3 seconds, 14 frames) as opposed to musical time (e.g. 32nd measure, 3rd beat). MTC provides a method of addressing absolute time via MIDI in a film/video situation without having to use costly synchronization devices that translate absolute time (standard SMPTE on tape) into relative time (MIDI timing clocks).

The most obvious use of MIDI Time Code is to trigger sound effects recorded on a sampling keyboard. This normally requires synchronizing a MIDI sequencer to film; the sequencer is then programmed to send out a MIDI Note-On command upon reaching a certain beat and measure, and this will correspond to a specific frame in the film. By using an MTC-equipped sampler (such as Sequential's Studio 440), all that needs to be done is program the sampler to trigger a specific sound when a particular frame is reached. The current frame (i.e., time) is constantly being sent to the sampler or other device via MIDI Time Code, and directly corresponds to the frames on the film. Thus it is very simple to link a sound with a specific event on film. Similarly, MIDI sequencers can trigger non-MTC instruments by sending standard note or clock information when specific frame times are received via MTC.

In addition to the absolute-time aspect of MTC, there are provisions for defining lists of events (called *cue lists*) and sending them to a device over MIDI. Assuming we have a sampler that responds to MTC, we could set up the specific times for various sounds to be played in a cue list. The construction of the cue list could be handled by a cue list editor software package that could trigger many different elements in a system—anything from samplers playing sound effects, to sequencers playing music for the film, to multi-track tape recorders or video recorders being set up to record or play back at specific times. Automatic punch-in and punch-out could also be greatly simplified. The possibilities really are endless, and we are just now starting to see instruments that take advantage of MTC.



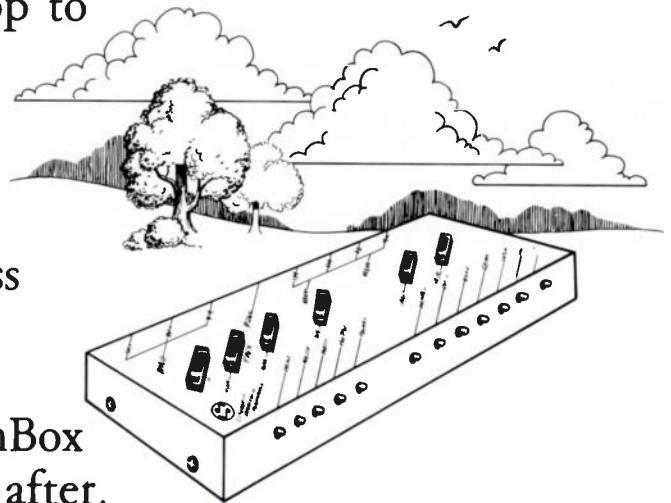
nce upon a time, Southworth Music Systems invented the JamBox/4™. Never before had a synchronizer done so much and cost so little. Not only did it let you SMPTE lock your MIDI sequencer to tape, but it let you position anywhere on your tape and lock up in less than a second, and stay locked for hours. As if that weren't enough it came with a built-in MIDI merger that let you record four MIDI instruments at the same time. And it let you filter out the MIDI you didn't want.

Everyone said the JamBox would only work with a fancy professional tape deck. They were wrong. It worked great with any tape recorder, even a home VCR.

But, alas it only worked with the Apple Macintosh™. The people using Performer™, and Q-Sheet™, and Cue™ and MidiPaint™ were all happy. But the people using the IBM PC, Commodore, Atari and hardware sequencers were all sad because they still had to spend thousands of dollars for a sync box that couldn't do nearly as much as the JamBox.

This made the people at Southworth sad too. So they worked night and day in their workshop to find a way to make a new JamBox that could work with any computer or hardware sequencer. They invented the JamBox/2. And it cost even less than the JamBox/4.

Pretty soon everyone had a JamBox and they all lived happily ever after.



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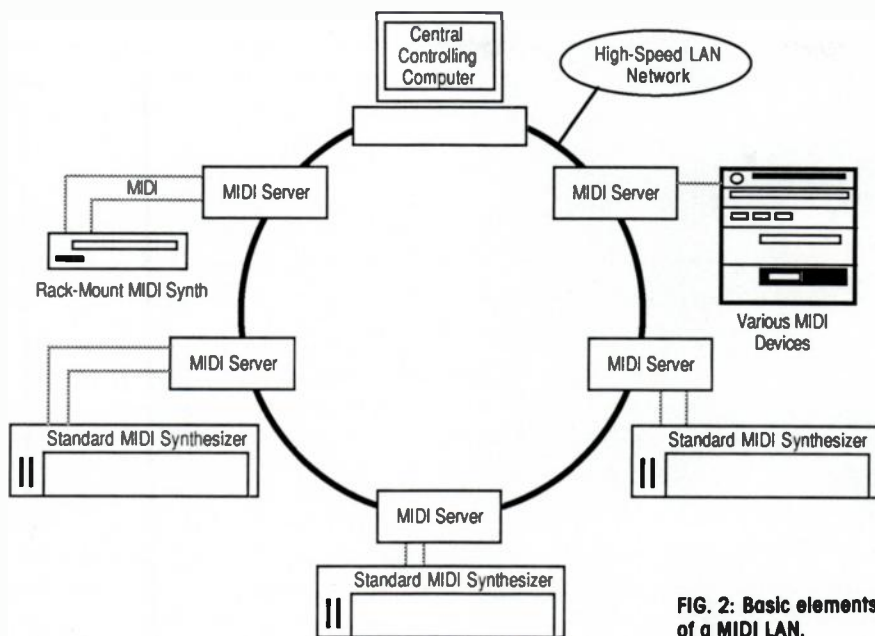


FIG. 2: Basic elements of a MIDI LAN.

THE FUTURE—MIDI 2.0?

This brings us up to the current state of the MIDI interface, and the never-ending rumors of a MIDI 2.0. Well folks, it's not on the drawing board and, as evidenced by the amount of room left in MIDI 1.0 as well as the growth that has already taken place, it's not really needed. Sure, a much faster interface with many more channels and bidirectional communication would be great, but it would only come at a great cost. The large number of MIDI 1.0 instruments would quickly be obsolete, and the cost of an instrument with such a sophisticated communications port would put the "home MIDI studio" out of the reach of most musicians.

But MIDI is still on the move. We are now very close to having a standard method of storing sequencer files and transferring them to other sequencers via MIDI. This proposal has grown out of Opcode's MIDI Files that have been embraced by most Macintosh MIDI software developers. As of this writing, this part of the specification is still at the proposal stage, but we expect to see a standard sequencer file format added to the MIDI specification by the middle of this year.

As always there are many new ideas being bantered around, the most notable being the development of MIDI Local Area Networks (LANs). A LAN could distribute very large amounts of information quickly to many instruments in a MIDI system, thus alleviating many of the re-

strictions found in the MIDI protocol (Fig. 2). The high-speed communications language used by a LAN would be translated into MIDI by devices called *MIDI servers* which would talk to specific MIDI instruments. LANs would facilitate the construction of systems that could have true bi-directional communication, as well as be able to auto-configure themselves by polling (via the MIDI inquiry message) the instruments connected to the system, and finding out how they want to be connected to the system.

These are, of course, just ideas at this point and the future of MIDI is still wide open. But one thing is certain: MIDI will continue to grow, as it has over the nearly five years since it made its formal debut. It's a cliché, but MIDI has indeed revolutionized the way in which we make music—and now the movement of MIDI into the film/video arena will open many new doors, the implications of which are just starting to be realized. Add all this to the development of increasingly powerful personal computers that can simultaneously handle multiple MIDI data streams, and MIDI will prove to be a viable tool for music systems for a number of years to come.

EM

Lachlan Westfall is a Los Angeles-based musician, freelance writer, and Macintosh fanatic. He is president of the IMA, and currently, the secretary of the MMA.

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Questions & Answers

BY ALAN GARY CAMPBELL

Q. How can I obtain a service/owner's manual for my _____ (fill in the blank)?

A. In "Operation Help," I often see requests for manuals produced by manufacturers that are *still in business*. C'mon, folks! Determine the model and serial numbers for the gear in question, and contact the manufacturer *first*. Most companies have manuals available for even their obsolete gear.

Q. How can I obtain service manuals for Electro Harmonix products? They're out of business.

A. Electro Harmonix is out of business, though for a while a company called Broadway Computer Corporation sold and supported some of their products. Your best bet is to contact an established regional service center; I've found that many have acquired miscellaneous schematics (usually rather low-quality photocopies) from EH, and are often happy to allow you to copy them. Failing this, you have a legitimate entry for "Operation Help." Incidentally, some of the schematics do include alignment data, but EH never published service manuals *per se*.

Q. I'm getting ready to tour overseas; can I have my _____ (fill in the blank) converted to run on different voltages?

A. Some instruments are switchable (check the owner's manual), and only require a new line cord (if it's detachable)



or a plug adapter. For other gear, many manufacturers sell conversion kits to allow their instruments to work with different voltages. Electrically, this usually requires only a replacement line transformer; however, we're talking dangerous voltages here—transformer replacement is a job for a qualified technician.

Unfortunately, if you tour in several countries, even those with contiguous borders, you may find that voltage requirements differ widely. You can often obtain information regarding international voltage requirements from local appliance repair shops, since they sell voltage adapters for electric razors and the like.

Q. Someone spilled a drink into my synth. I turned it off immediately, but when I tried it after it dried out, it was dead.

A. Through an outlet wiring error, some of my gear was hooked up to 220 V, instead of 110 V. Smoke poured out of my DX7IIDF and keyboard amp. I turned the equipment off immediately; should I turn

it back on to test it? If I have it repaired, will it be reliable?

A. The never-to-be-broken rule is: if your instrument becomes damaged or contaminated, turn it off *immediately*, and obtain qualified service as soon as possible, *before* it is powered up again.

If your job is on the line, you'll probably break this rule, but it's very risky to do so. For example, if a drink is spilled into a synth that's powered up, any of the liquid that contacts the circuit boards will conduct electricity (most beverages, including tap water, are ionic solutions) and short out a large number of components, which can cause catastrophic damage. What's worse, if the unit is allowed to run for any length of time, an electro-chemical reaction can occur: the liquid will "boil" away, "etching" the compounds that were in the solution into the surface of the PC boards. It can be difficult or impossible to remove the "etched-in" contaminants and restore the unit to normal operation (see Tona Ohama's "Of Mice and Emulators" anecdote in the De-

cember '87 EM "Letters" column). In my experience, the reparability and future reliability of such units is inversely proportional to the length of time that they've been allowed to run post-contamination and pre-service, and to the interval between contamination and first service. Obviously, powering one up to "see if it works" can make matters worse.

Fortunately, if you catch the problem early (or avoid it entirely—keep the audience away from equipment, and put the band's drinks in squeeze bottles), successful repair is likely. The usual service procedure is to scrub the boards many times with denatured alcohol, followed by a final wash of Freon™-113.

The number one source of synth/effekt trouble is power supply failure, often caused by line transients (Have you renewed your surge suppressors lately?), but occasionally by excessive line voltage from miswired outlets or utility company transformer failure. Excessive line voltage can: exceed the working voltage of power supply filter caps, causing them to leak or burst; burn up any current-limiting resistors in the rectifier/filter stage; damage IC voltage regulators by causing them to dissipate excess heat; and even melt the internal insulation on line transformers. This said, it's comforting to know that IC regulator-based supplies are somewhat tolerant of overvoltage conditions; if the problem is discovered quickly, and the unit turned off, the damage will probably be limited to the power supply board/components, and future system reliability won't be affected. (I recently serviced the DX7IIFD in question. The power supply board was a bit trashed, and due to the high cost of individual parts, it was cheaper to replace it than to rebuild it. However, the musician's quick thinking saved the day—when I powered up the repaired unit, it worked perfectly; even the internal memory was okay. It's a good thing he didn't power it up to test it; he would have been pushing his luck.)

I've said it before and here it is again: *Use surge suppressors with your gear! Test outlet wiring and line voltage before you plug in anything!* Radio Shack offers a safe, inexpensive, and easy-to-use outlet tester, catalog number 22-101. You can measure line voltage with a VOM, but be careful—some test leads have exposed contacts that pose a shock hazard. The preferred method is to plug in a *line monitor*, such as the Viz Model WV-120B

analog monitor or Model WD-121 digital monitor, available from Fordham Radio, 280 Motor Parkway, Hauppauge, NY 11788 ☎ 800 / 645-9518; (in New York State ☎ 800 / 832-1446); write or call for a catalog and ordering information.

Q. My Casio FZ-1 is dead. It worked fine for a while and wasn't exposed to any line surges or mishandled. Help!

Q. My FZ-1 reads factory disks just fine, but won't write to any of my disks.

Q. I can't read my FZ-1's LCD when the unit is up on my stand. I've heard you can adjust the display contrast; is this an internal adjustment?

Q. My FZ-1 has intermittent noise and garbage in the outputs. Sometimes rebooting will clear this up. Is this a disk or drive problem?

Q. The envelopes on my FZ-1 don't work properly. Rate values below about 93 have little effect, then it jumps abruptly.

Q. My FZ-1's keyboard has gone haywire. You have to hit it really hard, and the MIDI velocity data is screwed up.

Q. Is there any way to use the memory expansion slot on the FZ-1 to add more memory than that provided by the MB-10 board?

Q. How can I get my FZ-1 to work like a CZ?

A. For dead FZ-1s, before you panic, turn off the unit and check the AC voltage selector switch (bottom of the unit) to make sure it is firmly seated in the correct (110V, U.S.) position. If this proves to be the problem, reset the memory (page 101 in the owner's manual) and you should be in business. Otherwise, contact an authorized service center.

Current FZ-1s require double-sided, high-density 3.5-inch diskettes. Early units would write to the more common double-density disks—but no more. If your FZ says "DISK ERROR" when you try to save, check your disks.

To adjust the LCD contrast: from the Main Menu, press and hold the Display button, and move the Value slider. (This one's *not* in the manual.)

Some early FZs exhibit excess noise on the Gate Array S Ready line, which can cause timing errors on the Row Address Strobe and Column Address Strobe lines, and decreased noise immunity on the Clock line, resulting in incorrect RAM data and output "garbage." Rebooting will sometimes cure this, but it is not a disk- or drive-related problem. The fix: add a

20-picofarad bypass capacitor between the Gate Array S (GAS) Ready line (pin 75) and ground; and a 1SS254 diode between the Clock out (pin 68) and ground, with the anode to ground. This warranty update is described in detail in Casio Technical Note Number 107. As we went to press, all untampered-with FZs sold in the United States were still in warranty, so this is *definitely* a job for your regional Casio Authorized Service Center.

If your envelopes are weird, check the ROM version in your unit: with the power off, hold down the Display button and turn the FZ on. Call up System Tools from the Main Menu; if the LCD shows only FLOPPY CHECK and LCD CHECK, you need the two-ROM Version II software, with corrected envelopes. This is *not* a warranty update; *have* your service center order the ROMs, part numbers 20104214 and 20104221, at \$22.90 *each* (less installation). Fortunately, few FZs were shipped with Version I.

FZ keyboard and MIDI velocity problems are usually related to loose keyboard circuit board-mounting screws. The CZ-1 uses the same keyboard design, but in the FZ, as it comes from the factory, not all of the mounting holes contain screws. For intermittent keys, Casio recommends inserting an extra-small spacer (part number 00008687) between the key actuator and the membrane switch housing, but this is probably unnecessary if you simply add the "missing" screws and tighten the existing ones.

RAM-wise, there aren't as yet any multi-megabyte alternatives to the MB-10; but bank-switching is theoretically possible, so no doubt someone will come up with something. (But think of the load time! WORM drive, anyone?)

To get the FZ to emulate a CZ you need an alternate disk operating system (DOS) that no one's created yet, but since everybody seems to want it, someone probably will. Watch this space.

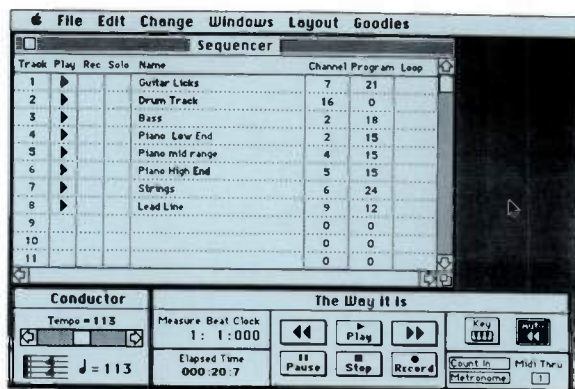
Q. The tuning trim pot on my Casio MT-82 is broken. It's a hard-to-find 20 k Ω value. Can I use the Radio Shack 25 k Ω trim pot as a substitute?

A. Several Casio mini keyboards use the 20 k Ω trimmer, and the 25 k Ω (catalog number 271-336) is an acceptable substitute. Also pick up the Radio Shack two-piece "TV Tool" set (catalog number 64-2223); it includes a flexible white nylon alignment tool that can be used to

"Your song sounds great, but ...

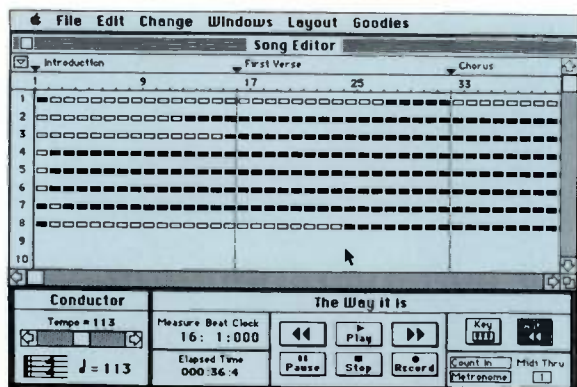
I'd like you to change a few things. The bass needs to be doubled or thickened up a bit, and repeat the horn-fill on guitar in bar sixty-eight. You went a little overboard with the pitch-bend in the middle of the solo, but I think it'll sound fine if you bring up the velocity on each chorus. Oh and by the way, I need it three seconds shorter, but don't cut anything... and I'd like to hear the changes by morning."

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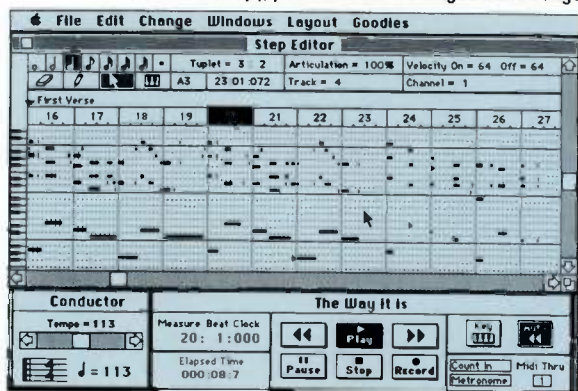
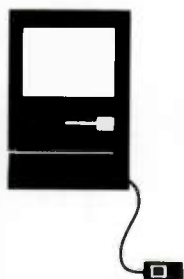
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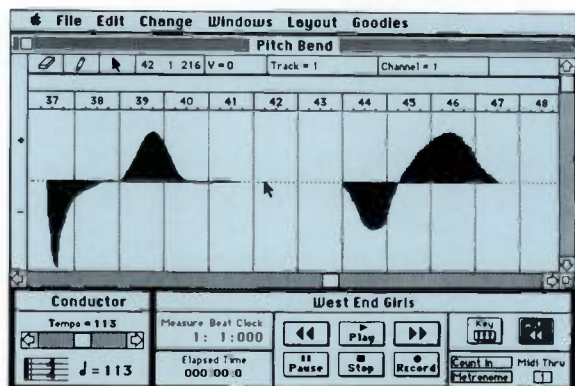
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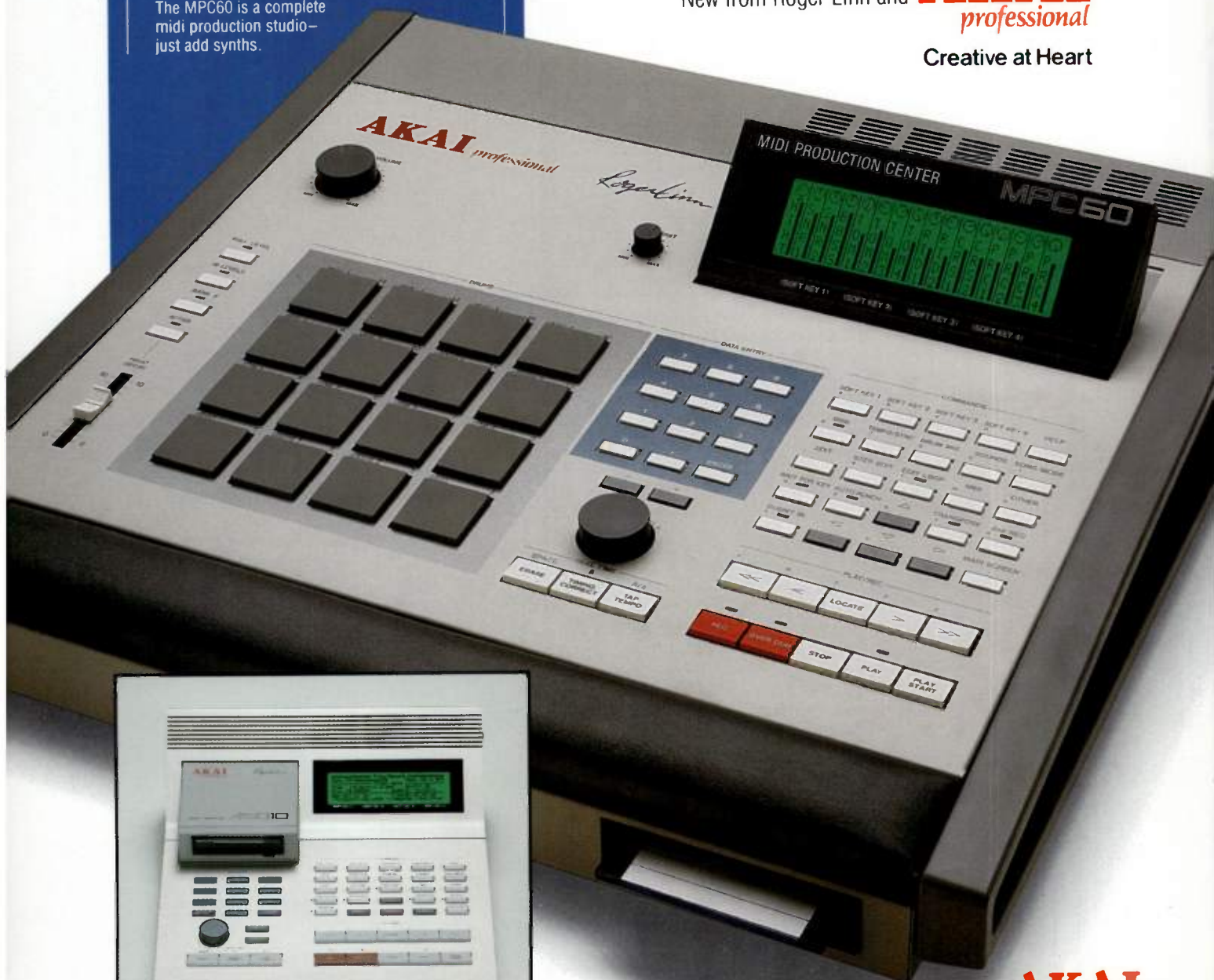
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adjust the trim pot, to help to insure that it doesn't get broken again.

Q. What is "stretch" tuning, and when do you use it?

Q. Can I tune my electric grand with a strobe tuner? I've heard that you can't, but I tried it to touch up a few strings, and it seemed to work.

A. In acoustic pianos and electric grands, the strings are so massive (especially the bass strings) and taut that they behave more like rods than strings, and their harmonics are sharp relative to each fundamental. When the fundamental of each string is tuned to strict equal temperament, the lower-string harmonics beat clangorously with the middle-register fundamentals, and the middle-register harmonics beat similarly with the higher-register fundamentals. To avoid this, a piano tuner will tune the lower strings slightly flat, and the upper strings slightly sharp, hence the term "stretch" tuning.

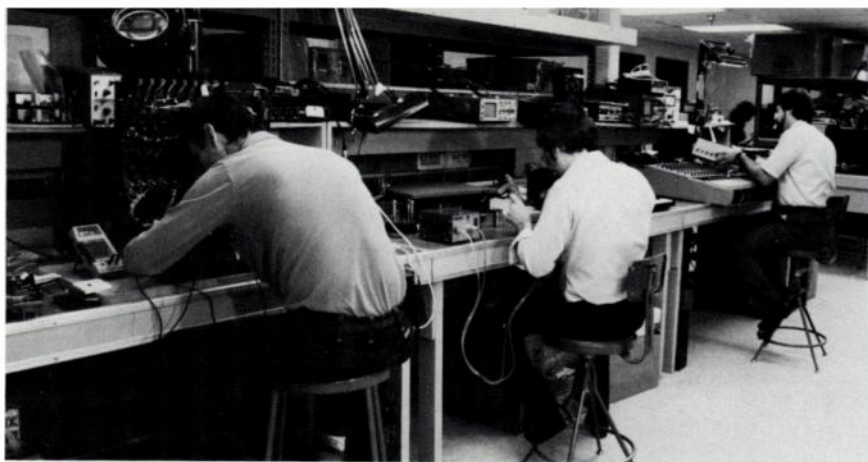
A strobe tuner will try to lock onto the fundamental, so while it might be used effectively in the middle register, the remaining notes are best tuned via other methods.

Incidentally, using a tuning tool incorrectly can result in a piano that won't stay in tune at all. If you're interested in piano tuning, consider an apprenticeship with an established piano technician; alternatively, a correspondence course is offered by the American School of Piano Tuning, 17050 Telfer Drive, Morgan Hill, CA 95037.

Q. How can I get a service manual for my Akai AX80 synth? The dealer says it's not available.

Q. I have an Akai AX80 synth; one voice goes dead intermittently—no pops or noise, it's just dead.

A. Unfortunately, consumers and independent technicians can't purchase Akai service manuals. To protect what they consider to be proprietary circuit designs, Akai makes them available only to Akai Authorized Service Centers (and then only upon receipt of a signed non-disclosure agreement). Thus, your sole recourse is to attempt repair without a manual (!)—or to take the unit to an Authorized Service Center, if there's one nearby. Perhaps if EM readers made the urgent need for access to critical service data more clearly known to Akai, the company would reconsider its position.



National service center for Akai products at International Music Company in Fort Worth, Texas.

For dead-voice problems, first determine which voice is failing. The AX80 assigns voices in first-in/first-out order; when you turn on the unit, the first key you depress is assigned to voice 1, the second to voice 2, and so on until all eight voices have been used.

Next, turn off the unit; remove the four front-panel screws and five rear-panel screws that secure the front panel, and hinge it back into its open position. Note the row of Curtis CEM 3372 signal processor ICs just behind the keyboard. Locate the 3372 for the affected voice (there are eight ICs, corresponding to voices 1 through 8, from left to right). Remove it from the socket and clean the leads with an ink eraser, then wipe them with a paper towel moistened with Freon (Radio Shack Cleaner/Degreaser, catalog number 64-2322). Reinstall the IC.

If that doesn't solve the problem, swap the 3372 with one from another voice, to determine if the IC is bad. (New 3372s can be ordered from Akai, but note that there are B, C, and D versions of the 3372, and they are *not* interchangeable. Be sure to get the right version. Note too that the current D version is available from Curtis and its distributors.) If *that* isn't the problem, you might want to refer the job to a service center, since the other ICs on the main board are not socketed and can be easily damaged if you try to remove them. Note that attempted self-service will void your warranty.

Service Notes

In the October '87 "Service Clinic," I gave a source for hard-to-find Commodore 64 ICs, but forgot to mention that a bunch of them are available from Jameco Electronics, 1355 Shoreway Road, Belmont, CA 94002 ☎ 415 / 592-8097; write for a catalog.

In the January '87 "Service Clinic," I described the most difficult repair I ever had: a Memorymoog with an intermittent cold solder joint (that masqueraded as a

bunch of other problems) on the +10 V reference supply to the panel pots. But a recent Juno 106, with a similar problem, has superseded it in terms of sheer hair-pulling frustration. The unit would intermittently self-edit, especially when played vigorously or tapped on the front panel, and lose programs. I opened it up, and found one of the Channel Board mounting screws roaming around in the case. Apparently, it was accidentally left uninstalled at the factory; the mounting hole had never been tapped. I installed it, and thought, "That's it." Wrong. Next I replaced the lithium back-up battery on the CPU board, and grounded the inputs of an unused CMOS gate (a factory-recommended, and necessary, modification), and thought "That's it." Nope. Then I touched up numerous suspect solder joints on the panel board. Nope. Then I noticed that one of the leads to the AC line cord sockets was completely broken off, and making contact merely by resting against the terminal! That *had* to be it. But it wasn't.

To shorten a long story, I dropped the panel board, flexed it, froze it, hit it, cursed it, and swapped about every component I could without appearing incompetent (I also cleaned the pots)—no go. Finally, as I was about to give up, it went into failure mode and I was able to make some voltage measurements that indicated there was nothing wrong with the Panel Board. Jeez.

I finally got the unit to fail predictably by pulling on certain cables, and found three cracked solder joints (affecting the +5 V reference and +9 V supply, and the Reset line) on a connector on the CPU board. I'd checked the connector before, when I installed the battery, but when the board was upside down, they worked perfectly, of course. Life in the MIDI lane.

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Alan Gary Campbell is owner of Musitech,TM a consulting firm specializing in electronic music product design, service, and modification.

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Opto-mum MIDI

So what's an opto-isolator, anyway, and why do I have to get the right kind for my MIDI project? This article describes your options.

PROBABLY ONE OF THE LEAST understood aspects of MIDI hardware is the opto-isolator/current loop part of the system. This doesn't have to be the case since it uses concepts that are easy to explain and understand.

The function of an opto-isolator is to allow the transfer of current without a direct electrical connection. In the case of MIDI, this prevents ground loops. Since data can be transferred between instruments without having a hard-wired ground connection, using an opto-isolator eliminates the chance of getting ground loops from

MIDI cable connections.

A basic opto-isolator (also called *optical isolator* or *photo-coupler*) actually comprises two main components. The first element is a light source such as a

BY JACK ORMAN

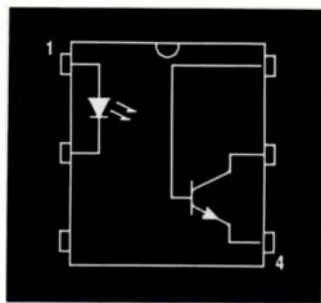


FIG. 1: The pinout for a typical LED/photo-transistor opto-coupler.

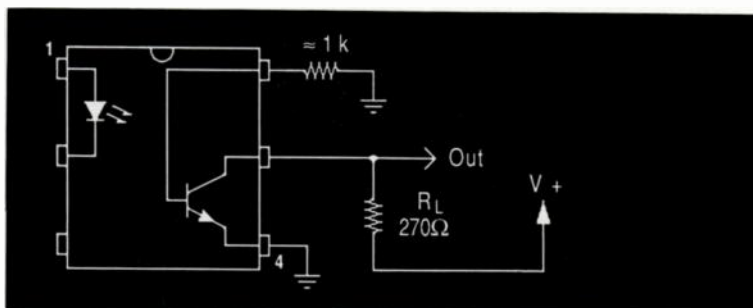


FIG. 2: Using a bleed resistor to leak off accumulated charge and increase response time.



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lamp or light emitting diode (LED), and the second is an associated light-sensitive element (photo-transistor, photo-diode, or light-dependent resistor). Both components are sealed in a closed package that prevents ambient light from interfering with the function of the system. The light source is usually current-controlled, where more current gives more illumination, and is driven by the MIDI Out part of the MIDI interface. As the amount of light shining on the associated light-sensitive element increases, resistance drops (in the case of photo-resistors) or conduction increases (in the case of photo-transistors). Thus, the signal has been transferred from the light source to the light receiver without wires, and the receiver provides the gateway to the receiving instrument's MIDI In.

The TIL-111 is a typical example of an LED/photo-transistor pairing (Fig. 1), and is commonly used in MIDI systems. This opto-isolator style is inexpensive and easy to find; however, for MIDI applications, care must be taken to select a part that meets MIDI's high-speed requirements. Rise and fall times of two microseconds or less are necessary, and a current transfer ratio (CTR; a measure of efficiency) of 100% is recommended.

Since the base of the photo-transistor is made as large as possible to increase its sensitivity to light, this also increases the capacitance and therefore allows a charge to be built up on the base junctions. For the best reaction times, this charge should be leaked off through a small resistor from the photo-transistor base to ground (Fig. 2) or by using an NPN transistor as a load for the photo-transistor (Fig. 3). In the latter example, the accumulated

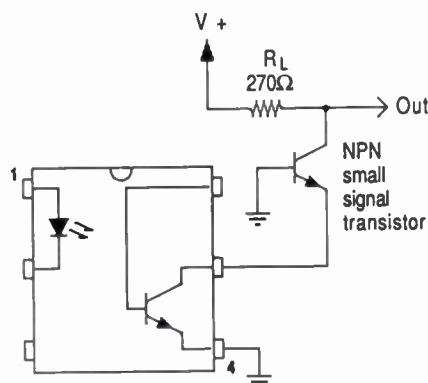


FIG. 3: How to use an NPN transistor to leak off accumulated charge and increase response time.

charge leaks from the base-emitter junction through the small emitter resistance of the load transistor. Either method will speed up the reaction time of a simple photo-transistor.

A second type of opto-isolator for MIDI has, instead of a single photo-transistor, a pair of transistors connected in a Darlington configuration (Fig. 4). Hew-

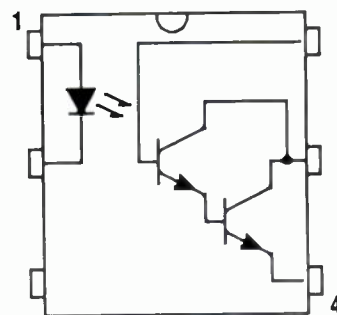


FIG. 4: Typical pinout for a Darlington-type opto-coupler.

lett-Packard's 6N138 is an example of this type of opto-coupler, and can be used in MIDI interfaces. The two-transistor Darlington arrangement has much greater gain, so less current is required through the LED to switch on the output device; however, the tradeoff is often a slower reaction time.

The Sharp PC-900, probably the most commonly used opto-isolator for MIDI interfaces, is an entirely different type of coupler. It has an LED driver but the receiver is a photo-diode which is connected to a Schmitt trigger circuit in the chip (Fig. 5). This circuit is relatively immune to noise on the incoming line, and because of the "snap action" (hysteresis) of the Schmitt trigger, it will square-up rounded or slow-rising pulses. This type of opto-coupler has the advantage of fast reaction times, and certain ones have sufficient speed to be used in video interfaces (for example, the 6N137).

Finally, a fourth style of opto-isolator has a photo-FET as the receiving element. Since this type of coupler is not used in MIDI interfaces, we will not describe it here.

Note that the pin designations for the different opto-isolators are not the same, and therefore they cannot be used interchangeably. If you must use a different IC from the one specified in a circuit, carefully check the substitute's data sheet and

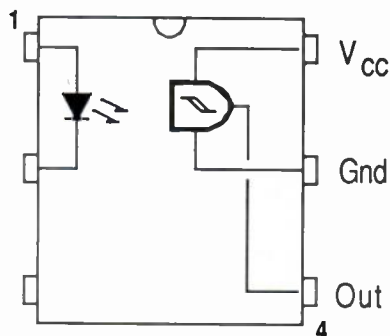


FIG. 5: Typical pinout for a Schmitt trigger-type opto-coupler.

pinout diagram. A non-functional or damaged circuit can result from an improperly wired substitute.

We'll close out with a chart of MIDI-capable opto-isolators so all of you do-it-yourselfers can select a suitable device. Several companies make opto-isolators; if you're going to an electronics store, take the following chart with you so the dealer can cross-reference a suitable replacement from the parts they carry. Happy experimenting, and I hope to have clarified this aspect of the MIDI interface.

Photo-transistor types (Fig. 1): TIL-111, SK2040, SK2041, 4N35, 4N36, 4N37, 4N38, H11D1.

Photo-Darlington types (Fig. 4): 6N138, SK2083.

High Speed Logic Isolator (Fig. 5): PC-900, H11L1, SK2087 (not pin-compatible with the PC-900), MOC5007. **EM**



Jack Orman—when not writing articles for EM and other publications—plays guitar, directs local television programs in Memphis, Tennessee, and writes IBM PC programs for profit. He has an overwhelming desire to make solid state electronics sound like tubes.

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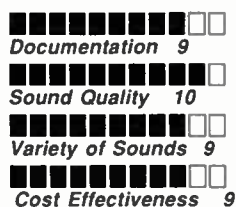
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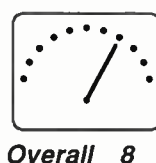
THE RATING SYSTEM: *First Take* is just that—people's first impressions of some of the latest products. Two different sets of ratings are provided by each reviewer according to their particular standards. The 11-step "LED meters" show a product's rating in a *specific* category (ease of use, documentation, construction, etc.; categories are chosen by the reviewer), while the 11-step "VU meter" shows the *overall* rating. The latter is not a mathematical average, since the reviewer may judge some specific categories as having more weight than others. For example, if a guitar synth is well-constructed, has great documentation, is easy to use, but doesn't track worth a hoot, it could have several very high LED meters but a low overall rating.

We would like to remind you that these are opinions, not gospel, and as always, **EM** is a communications medium that welcomes opposing viewpoints. We urge you to contact manufacturers for more information and, of course, tell them you saw it in **EM**.

Prosonus CD Sound Library (\$89.95 each)



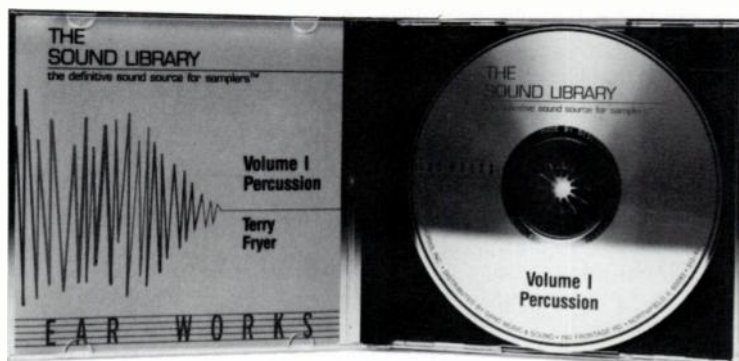
Ear Works CD Percussion Sound Library (\$49.95)



Buying sound disks for samplers can run into a lot of money, and besides, very few manufacturers want to put out a zillion different disk formats for a zillion different samplers. Why not, some clever folks reasoned, put *audio* sounds on compact disc that you could record directly into *any* sampler?

Creating this kind of CD is tricky, though. All recorded sounds should be in tune, recorded at several notes on the scale to allow for multi-sampling, well-documented, fairly consistent in level, and *sound great* to help compensate for the fact that sounds always seem to lose a little bit in the sampling process.

The Ear Works *Percussion* CD, by producer/EM author Terry Fryer, is a collection that leans towards ethnic/esoteric percussion instruments: Chinese tom-toms, dumbek, log drums, multiple Javanese drums, crotales (recorded chromatically over two octaves for multi-sampling), lots of cowbells, triangles, bell trees, Chinese temple bowls, tambourine hits,



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orchestral crash cymbals, gongs, tamtams, and several unusual effects (thundersheet, car horns, rain stick, etc.). The recording quality is relatively clean, and sounds are allowed to decay naturally (although as the signal fades into nothingness, you can definitely hear some noise start to creep in). Documentation consists of a short, printed description of each track (the instrument used, and if pertinent, pitch); no timings or voice IDs are present. The total elapsed time is about 19 minutes, and there are over 150 different sounds.

Prosonus (not related to Sonus, the software/hardware company) sent three CDs for review: *Percussion 2*, *Electronic 1*, and *Brass 1*. *Percussion 2*, at around 63 minutes, includes literally hundreds of different sounds. Don't expect gated snare drums or other "pop" sounds; these are pure, *extremely* well-recorded examples of mostly orchestral percussion. The 21 instruments include bass drum, some excellent snares, bowed and straight gongs, tambourines, temple blocks, lots of timpani, cymbals, castanets, and several (multi-sampled roughly every four semitones) pitched instruments: celeste, marimba, glockenspiel, and xylophone. Documentation for all Prosonus CDs includes timings, which are very helpful when trying to reconcile sounds with your sampler's memory limitations; a one-line description of the instrument, the pitch at which it was sampled, and pertinent charac-

teristics (muted, soft or loud hit for percussion, and so forth); and a recorded voice ID for each sound. Neither Ear Works nor Prosonus includes a short (one paragraph) *subjective* description of each sound, which I would find useful when trying to pick likely sampling candidates out of the hundreds of possibilities.

The 59-minute *Electronic* CD consists of 39 different multi-sampled sounds, mostly of the string/pad variety. Sounds typically have between 11 and 13 multi-samples, starting at E1 and moving up five semitones per sample. While this is not enough to give a sample for each key, it's certainly enough for me. The *Brass* CD packs just about every variation on trombone and bass trombone you could ever want—sustained, swelled, muted, and so on, at a variety of dynamic levels—into its 42 minutes, all recorded with the same peerless quality as the other two CDs.

To give the Prosonus CDs the acid test, it was time to do some serious sampling. I had no trouble recording some lovely tympanis into E-mu's SP-1200 drum machine, and even after sampling, some of the snares I recorded *really* cracked. The synth sounds, despite being lush, rich, and huge, were surprisingly easy to loop. Within the sample, level variations after the initial attack are kept to a minimum (additionally, all synth sounds last exactly four seconds, giving enough time to

As I needed some log drums and other esoteric percussion for a particular recording project, I also did some sampling with the Ear Works CD; the sound quality was good, but a bit "drier" and "flatter" compared with the Prosonus sounds, especially when going into 12-bit linear machines.

—Craig Anderton

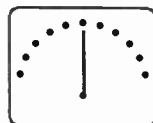
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Feature	Model 1 (Black)	Model 2 (Black/White)	Model 3 (White)
User Interface	10	9	8
Sound Quality	6	5	4
MIDI Capabilities	1	2	3
Cost Effectiveness	7	6	5



Overall 6

The sounds are made with two-operator FM synthesis, and they are made well—the presets on the AdLib disk are carefully crafted and surprisingly diverse, especially considering the limits of two-op FM.

The card comes bundled with *Jukebox*, a music player (with a few dozen ready-to-play pieces); *Visual Composer*, a sequencer; and *Composition Projects #1*, a booklet which, in its 72 pages, tries to explain how to compose ballads, blues, jazz, bossa nova, ragtime, boogie-woogie, and classical music. As you can

Visual Composer uses a player-piano-roll display—a grid with pitch marked vertically and time horizontally. You can draw notes in the grid with a mouse or the cursor keys. Editing functions are of the cut, paste, and copy variety, and include octave and semitone up and down. There are nine tracks; track notes not being edited are still visible, but grayed-out. Each track includes a conducting track to vary volume, instrument, and “pitch accuracy” (which introduces various degrees of random detuning on a voice); tempo can be varied globally within a piece.

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er (\$49.95), a voice editor/librarian for the card, and *Music Championship #1* (\$39.95), a game for one or two players which tests one's musical acuity by playing a phrase followed by a variation, then asking you to identify which aspects of the phrase have changed (octave, key, mode, instrument, tempo, rhythm, or volume).

AdLib's MIDI capabilities are virtually nonexistent, as it has no MIDI interface of its own. With a Roland MPU-401, you can sound notes via MIDI while using Instrument Maker, and play monophonic parts into Visual Composer via MIDI (though I was unable to get Visual Composer to accept MIDI input from my DX7). Visual Composer does not produce MIDI data, and the card doesn't respond to velocity, pitch bend, or controllers.

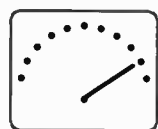
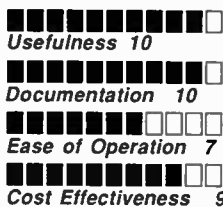
Perhaps the most interesting aspect of the AdLib programs is the user interface, which emulates a Macintosh screen so closely it's uncanny. You can use a mouse (or function and cursor keys) to pull down menus, click on items, draw notes, and so on. In fact, the user interface is slicker, more useful, and more intuitive than that of any other IBM music software I've seen at any price.

Overall, AdLib represents a decent value—there's no less expensive way to get into computer-controlled music. But the system is decidedly limited; if the beginner gets sufficiently inspired to go on to build a more complex studio, AdLib will have a hard time finding a place in it. (At press time, an AdLib representative told us that an upgrade will soon be available for Visual Composer that will provide polyphonic MIDI input and output, and compatibility with MIDI velocity and pitch bend.—Ed.)

—Carter Scholz

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Tandy Computer Cassette Recorder CCR-81 (\$59.95)



Overall 10

Cassette data interfaces are a lot like fast-food restaurants: nobody admits to liking them, but everyone uses them. Cassette interfaces have a reputation for being slow, clumsy, and extraordinarily picky about recording levels and the type of tape they use. However, the typical poverty-stricken musician who buys that great-sounding synthesizer usually doesn't pay attention to such mundane details as its methods of storing

programs and sequences, and since affordable MIDI disk drives are still pretty rare, about the only other option is to carry a full-blown computer to gigs just to load a few sets of tunes.

There's an innocent-looking device at your local Radio Shack that helps make cassette data storage relatively painless. The Tandy CCR-81 computer cassette recorder has been optimized for storing and loading digital data—forget about critical level settings, and even cassette type and EQ switches. While you wouldn't want to play your latest demo on the CCR-81, it does its basic functions extremely well.

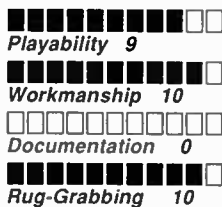
I use the CCR-81 with my Ensoniq ESQ-1 and Roland TR-505 beat box. The ESQ-1 is notorious for its highly temperamental tape interface, but it works very well with the CCR-81. The only problems occurred when loading cassettes recorded on other tape decks, but once I managed to load the cassette using a hi-fi deck, and then re-saved the data to the CCR-81, the trouble disappeared. The CCR-81 also works great with the TR-505, although the 505 seems to work with anything. One caveat: all tape interfaces are touchy about the type of cassettes used for storage, and the CCR-81 is no exception. Cheapoid tapes from a local software house performed badly, but I have yet to have a problem using Radio Shack's computer cassettes.

Because the need to adjust levels carefully has been eliminated, this box is fast enough for some live performances (although it always helps to have a good rap or another musician who can take a solo while you're loading). I only wish that Radio Shack would install a switch between the output jack and the internal speaker so I could find the start of a particular data dump without having to remove and repatch cables. But for the price, the CCR-81 (catalog no. 26-1208A) is an effective storage device for the musician on a budget.

—C.R. Fischer

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Engineered Percussion E-Pedals (\$269)

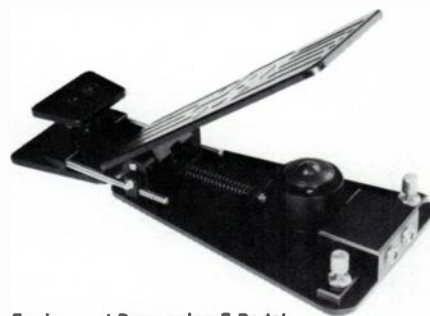


Overall 10

For a number of reasons, I have never been a fan of electronic bass drum pads. First of all, I have yet to find a pad that even comes close to resembling the snap and rebound of

an acoustic kick drum, despite several years of experimenting with every type of beater imaginable—wood, hard rubber, plastics, cork, felt. You name it, and I've probably already tried it at one time or another.

Another thing I'm not entirely excited about is the superfluous size of most electronic drum pads. Since the beater is striking an area of only a few square inches, it's odd that drummers are forced to use a pad whose size and general dimensions are the rough equivalent of a garbage can lid. I'm sure the notion of a large bass drum pad appeals to those who think that drums need to look big, but this seems about as sensible as using a grand piano body as a synth stand.



Engineered Percussion E-Pedal

Fortunately for electronic percussionists everywhere, a number of alternatives to large bass drum pads have gained popularity recently. Drum Workshop was on the right track when it introduced self-contained pedal/trigger units, and the compact kick pads included with the Dynacord and ddrum systems provide drummers with yet more relief from the bulky bass pad syndrome.

The latest entry in this field is the E-Pedal, from Engineered Percussion/RAFCO of Torrance, California. Like the DW trigger pedal, the E-Pedal is a self-contained unit, but takes an entirely new approach. To my knowledge, the E-Pedal is the only bass drum triggering system that does not use a conventional drum pedal. It doesn't even use a beater. It consists only of a hinged, spring-loaded footboard that directly contacts a sealed trigger element. Two ¼-inch output jacks (wired in parallel) connect the E-Pedal to your pad-to-MIDI converter or drum machine trigger inputs. Its dual output jacks can be used for double-bass applications (with two pedals daisy-chained together) or for simultaneously triggering two different sources.

The first time I saw an E-Pedal, I was shocked, amazed and utterly razzle-dazzled by its absolutely first-rate design and construction. The unit is built of thick slabs of machined aluminum, and has a solid, quality feel. Even the non-critical parts, such as the housing for the trigger out jacks, are hefty and designed for long-term use. There's no plastic or flimsy sheet metal enclosures here. The

liberal use of recessed Allen-head bolts attaching the components to the bottom plates adds to the unit's overall feel of quality; this sucker will keep right on working, gig after gig, for years to come.

The next thing I noticed was the apparent lack of documentation. I admit the E-Pedal is easy to set up and fairly simple to figure out, but over the decades I've developed a certain fondness for reading helpful hints like "Do not immerse the unit in water," "No user-serviceable parts inside," and "If cleaning is required, wipe the outside surfaces with a clean soft cloth and a mild detergent solution." But I was entirely on my own when I began exploring the E-Pedal.

User adjustments include the height and fore/aft placement of the heel plate, and the tension of the footboard spring. The amount of spring compression is controlled by a drum key adjustment beneath the footboard, allowing action to be set to one's own needs and playing style. The drum key is not included, although they are easily obtainable at better music stores everywhere, and most drummers, electronic or acoustic, usually have one or two drum keys lying around anyway.

I set the E-Pedal on a carpeted surface and tried different foot positions, but when I bent to pick the unit up and adjust the pedal spring tension, I discovered the E-Pedal had sunk its two rows of molded Velcro teeth deep into the carpet, and lifting it required two hands and a hearty tug. Bass drum "creep" will not be a problem with the E-Pedal, and now I know why the unit's designers eliminated the two adjustable spurs from the prototype.

After a few turns of the spring tensioning rod, the E-Pedal felt pretty good, and I connected it to my Octapad. The barely audible click of the pedal disappeared when I triggered a favorite disk of kick drum samples. The unit didn't resemble the feel of an acoustic bass drum, but was easy getting used to, and its action is excellent. I was soon playing 16th notes with ease. Tracking is extremely accurate, much tighter than any of the bass drum pads I've used. I was impressed!

The \$269 price may seem high, but is actually reasonable compared to the cost of a \$200-plus bass drum pad and a pedal. The bad news is that the E-Pedals have been in short supply and may be somewhat hard to find. This situation should improve soon: at press time, the manufacturer was gearing up for a large production run. These pedals are a worthwhile addition to almost any electronic drum kit, and are well worth checking out.

—George Petersen

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BY JIM JOHNSON

PRODUCT SUMMARY

Product:
HR-16

Type:
Drum Machine

List price:
\$449

Manufacturer:
Alesis
PO Box 3908
Los Angeles, CA 90078
☎ 213 / 467-8000

Value 10
Ease of Use 8
Sound Quality 11
MIDI Implementation 9



BY NOW, everyone knows that the hit of the 1986 summer NAMM show was Alesis' new drum machine, the HR-16. No wonder—in a relatively lackluster show, the HR-16 stood out all that much more with its 48 CD-quality drum sounds (since augmented to 49 sounds), velocity-sensitive pads, lots of nifty recording features, and a price that made everyone who had just bought a new drum machine more than a little envious (including a certain freelance musician/programmer/writer).

I immediately went to EM's editors and staked my claim on a review. Then, flushed with excitement, I presented my EM credentials to an Alesis representative, who assured me that they would get in touch as soon as review units were

available, probably in September.

Next came that period of my life I think of as the Great Winter of 1987. I had seen the duct tape on the side of the unit that Alesis was demonstrating, but I refused to believe it: the HR-16 wasn't ready yet. October came and went, November, and then December. Finally, in January, I got my hands on one of these babies, and I'm here to tell you it was worth the wait.

THE SOUNDS

Without a doubt, the HR-16's main attraction is the *sounds*—those wonderful, juicy, 16-bit, 47-kHz sampling rate sounds that everyone's been talking about. Specs don't always tell you everything there is to know about an instrument, but here the

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numbers don't lie. Every one of the 49 sounds makes you feel the real thing is right there in the room. There is no audible looping in any of sounds, including the cymbals (which makes sense, since they aren't looped), and many of the sounds have built-in room ambience.

The HR-16 includes a broad range of percussion instruments (see sidebar, "The HR-16's Sound Arsenal"), with plenty of variations in each category. Mercifully, there isn't a single orchestra hit, grunt, dog bark, or other novelty sound—just solid percussion. Each sound can be tuned to one of 32 increments over a quoted range of an octave and a fifth. The tuning steps are close to a chromatic scale, but not close enough that you could play legitimate melodies on the cowbells (a simple arrangement of "Mary Had a Little Lamb" is probably the best that can be done with this). The sounds retain their quality when transposed to either tuning extreme. There is a little noise present when the crash is tuned to its highest setting, though this is more of an breathy analog hiss than nasty digital aliasing; and the click of the stick hitting the ride cymbal becomes a little too prominent when that voice is tuned too high. But overall, the instruments are useful at all tunings (keeping in mind, of course, that not everyone will need a 22-inch gated kick drum tuned to a subsonic pitch).

Each of the 16 pads, as well as the click, can be assigned its own drum sound, along with individual tuning and mix settings. The mixer allows you to set for each pad: level; one of seven pan positions; and an assignment to either of the two pairs of stereo outputs. This arrangement is the next best thing to separate outputs for those in well-equipped studios, or the ultimate setup for people who can't afford to use 16 channels of their mixer just for drums. The most obvious way to use the two stereo outs is to use one pair as a general stereo drum mix, and the other two as individual outputs suitable for processing.

PROGRAMMING

The HR-16 has all the expected programming functions (quantization, event erasing, swing, and more), plus a few extra goodies. Note memory is about 20,000 events, and the usual 100 patterns and 100 songs are available, although you'll probably run out of mem-

ory before filling all of them. Timing resolution is 96 clicks per quarter note, or 384 steps per measure.

In the special features department, the HR-16's offset button can shift an individual drum or an entire pattern, backward or forward in time. This is an editing function only, so it can't be adjusted while the drum machine is playing; it's also difficult to undo (more so be-

.....

**Mercifully,
the HR-16
doesn't include a single
orchestra hit, grunt, dog
bark or other novelty
sound—just solid
percussion.**

.....

cause there is no post-record auto-correct, as is found on many sequencers). Still, the ability to offset individual drums is welcome in any form. A copy feature can copy one drum's rhythm to another drum—either in the same pattern or a different pattern—as well copy entire patterns and songs. The step editor is especially easy to use, though it would be nice to be able to step through a pattern backward as well as forward.

The panel layout is straightforward and easy to use, though less so than larger machines like the SP1200 (no surprise). The amber LCD is downright ugly, especially against the gray packaging (the combination is somehow reminiscent of surplus air force communications gear) and, like all LCDs, it's impossible to read if you're not pretty much directly in front of the machine. There are two slick white plastic strips above the pads, for temporary labeling with a felt-tip pen.

THE PADS

The velocity-sensitive pads on the HR-16, while not the ultimate drum entry device, are a real treat in a budget drum machine, and have a better feel than some multi-kilobuck sampling drum ma-

chines. You can either assign one of eight fixed levels to all 16 pads, or set one of three sensitivity levels to allow sensing of eight different velocity levels. The step-editing function mentioned earlier provides an immediate read-out of how hard you've struck a pad, making it much easier to calibrate the pad sensitivity to your fingers.

You can think of each pad as somewhat analogous to a physical instrument. Each has its own MIDI key assignment, as well as the settings mentioned earlier. As a rule, each of the 16 pads is assigned to one of the instrument's 16 tone generators, with no layering of sounds onto a single pad—except for the crash cymbal pad, which has two voices assigned to it. The other exceptions are the three hi-hat pads, all of which share a single tone generator so triggering the *closed* hi-hat can cut off the sound of the *open* hi-hat. Given the clutter of programmable software widgets in the typical MIDI studio, this is an acceptable alternative to some form of programmable assignment.

MIDI IMPLEMENTATION

The HR-16 has the most impressive MIDI implementation of any MIDI drum machine I've seen. In fact, it's the first drum machine I've seen that is optimized for use as a MIDI drum expander unit, rather than as a simple remote-controlled drum box. The reason? Patch changes! Yes, at long last, someone has come out with a beat box that lets you select a different drum kit with a MIDI program change command, just like synthesizer manufacturers have been doing for the past five years.

The way this works on the HR-16 is just a tiny bit roundabout, but it does work. Basically, each MIDI program number between 0 and 99 calls up one of the HR-16's patterns, each of which can have its own tuning, mix, and voice assignment. At 24 pulses per quarter note and 120 BPM (as measured here at Jamos Laboratories), patch changes only require about one clock pulse to settle down, so you can send multiple patch changes within a sequence to select different drum kits from one moment to the next, without glitching any of the sounds.

There are a couple of quirks, though. Before you can save a drum kit in a pattern location, you have to record at least one note in that pattern, or change the pattern length from the default. This

makes sense when you look at the HR-16 as a drum machine, but it does interrupt the flow a bit when you're using it as a "tone module." And while it appears that the voice, mix and tuning settings can be saved only in the current pattern, you can get around this by going into manual mode (which you had better do if you want to make some changes to the current drum kit and not erase your original kit when you save the changes to a new location).

The HR-16's MIDI utilities menu has a number of switches for changing the machine's response to MIDI data. The MIDI channel can be adjusted, of course; in addition, the transmission and reception of MIDI note data, reception of program change data, and transmission of MIDI clock can be turned on or off individually. Each of the 16 drum pads, as well as the click voice, can be assigned to any note number. (Unfortunately, the click cannot be played remotely via MIDI,

The HR-16's Sound Arsenal

The 49 sounds in the HR-16 are:

Kick drums: 24-inch and 22-inch Power Kicks, 22-inch Deep Kick, 20-inch Swift Kick, 22-inch Double Head Kicks A and B, 22-inch '60s Kick, 22-inch Gated Kick, Electronic Kicks 1 and 2.

Snares: 8-inch x 14-inch Wood Snare, Ambient Wood Snare, 13-inch Brass Piccolo Snare, Gated Snare, Electronic Snare, Rimshot Snare, Side Stick Snare, Brush Hit Snare.

Toms: 10-inch and 16-inch Power Toms, 10-inch and 14-inch Double Head Toms, Electronic Tom.

Hi-hats: Closed Hi-Hats A and B, Half-Open Hi-Hat, Open Hi-Hat, Foot-Closed High Hat.

Cymbals: Ride Cymbal 1, Ride Cymbal 2, Bell, Crash Cymbal.

Miscellaneous Percussion: Timbale High and Low, Conga Slaps, Large and Small Woodblocks, Cabasa, Maracas A and B, Shaker, Agogo Bell, Large and Medium Cowbells, Triangle, Tambourine, Handclaps, Finger Snaps, Drum Sticks.

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Dr. T's Music		A
KCS	at,c	L
MRS	at	L
Magnetic Music		
Texture 2.5	am,l	F
Mark of the Unicorn		O
Performer 2.0	m	R
Opcode Systems		
Sequencer 2.5	m	L
Passport Designs		A
Master Tracks Pro	a,c,m,at	T
Master Tracks PC	l	E
MIDI 8 Plus	a,c	S
Midisoft Studio	l	T
Sonus		P
Masterpiece	at	R
SST Super Sequencer	at	I
Voyetra		C
Sequencer Plus Mk III,		E
Mk II, Mk I	l	S

SCORING and COMPOSITION

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Q-Sheet (SMPTE/MIDI)	m	A
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The Copyist	at,l	L
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Deluxe Music Construction Set	m,am	O
Great Wave Software		R
Concert Ware+ MIDI	m	
H.B. Imaging		L
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Impulse		T
Studio Session	m	E
Intelligent Music		S
Jam Factory	m	T
"M"	at,m	
Upbeat	m	P
Jim Miller		R
Personal Composer	l	I
Mark of the Unicorn		C
Professional Composer	m	E
Opcode Systems		S
Music Mouse	am,m	
Cue 2.0	m	C
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Digidesign

Sound Designer (all)		C
FX Designer (PCM 70)	m	A
Softsynth (digital synthesis)	m,at	L
Dr. T's Music		L
CX Patch	at	
CZ Rider	a,c	F
VDS	at,c	O
4-OP Deluxe	at,a,c	R
DX Patch (DX/TX7)	a,c	
DX Heaven (DX/TX7)	at	L
Magnetic Music		A
Pyramid (DX, TX)	l	T
Opcode Systems		E
Yamaha DX/TX w/DX7	m	S
Oberheim Matrix 6	m	T
FB-01, CZ, K-3	m	
Passport Designs		P
MIDI Voice Librarian	m,a,l	R
MIDI Voice Editor	a,l	I
MIDI Voice Editor (IBM music feature)	l	C
Sound Quest		E
CZ, D50, MT-32, DX7, more	am	S

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MSS-1	l	T
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and since the click is permanently assigned to one of the HR-16's voices, this reduces the number of simultaneously available voices in the machine to 15; pity.) The sync source selector has a nice touch—you can select MIDI & INTERNAL as the clock source, which means you can sync the drum machine to an external device *and* still use the internal clock when you want to work with the drum machine by itself, without changing click sources. MIDI merging, or echo, can also be toggled from this menu.

The machine's System Exclusive implementation doesn't provide any of the nifty remote control features that some other drum machines have, but what is there is very straightforward and easy to use. The HR-16 can receive Sys Ex messages as soon as it's turned on—no Sys Ex channel to set, no "System Exclusive on/off" switch buried in an obscure menu somewhere, no silly hand-shaking protocols. *Other manufacturers, are you listening?* The only System Exclusive feature mentioned in the manual is the manual bulk dump, which sends the contents of the HR-16's memory to some MIDI recording device. As near as I can tell, every setting on every menu is saved with the bulk dump, so if you are using the machine as an expander and need to change more settings than those stored in the individual patterns, you could simply store a separate Sys Ex dump with each piece that you do, and load it into the machine with each new song (the bulk dump is only about 2K bytes long when no patterns are recorded).

THE DOCUMENTATION

The preliminary version of the manual I received was very complete—so much so that at first, I thought it was a poorly done, finished manual, rather than a well-done, temporary document. Everything is covered quite thoroughly, but the manual is definitely aimed at the experienced drum machine user—no applications hints are given, and if you don't know your way around a drum machine, you may have a tough time finding specific sections. Alesis says a MIDI implementation chart and discussion of the Sys Ex code will be included in the final version—which should, as they say, be available by the time you read this (*Editor's note: A print-out of the final manual arrived at our offices as we went to press; it is very complete.*) In addition to the regular manual,

all the pertinent information on using the HR-16 is reproduced on two reference cards under a panel on the top of the machine—very handy.

APPLICATIONS

The HR-16's MIDI implementation allows electronic musicians working on a budget to do many of the sonic tricks that were only available in expensive studios last year (or the year before, anyway), without any external processing gear. Most of this involves layering different drum sounds, either through MIDI, or within the drum machine itself. If you use the drum machine as a stand-alone unit, you can layer two drums by copying one pad's part to an empty pad, and assigning the second pad to a new voice. If you're using an external sequencer as the controller, you can layer two sounds either by assigning two pads to the same key, or better yet, by copying the sequence for that drum, transposing it to the other drum's key number, and merging it with the original. Once the sounds are layered, you can set a separate mix, pan, and level for each half of the layer. This can be used to create flanged drum sounds (by using identical settings on two voices), or to mix a little gated snare sound in with a straight snare sound for depth.

CONCLUSIONS

Reviewing a machine like the HR-16 is tough. No self-respecting reviewer wants to gush over an instrument, so something as good as the HR-16 creates a tendency to pick nits. For me, though, the bottom line is the quality of an instrument's sounds, and the ability to control those sounds within the context of the instrument's typical use. The HR-16 gets top marks in both categories, and I can recommend this device to anyone in need of a drum machine, on any kind of budget, small or large. If you don't need sampling, and if you can live without separate outputs for each drum (hey, if you really need 16 outputs, at this price you could buy four of them), this is definitely the box to beat. **EM**

Until recently, Jim Johnson was an engineer drone for a major electronics company. Then the example set by Craig Anderton convinced him to toss it all away for the freewheeling lifestyle of a freelance musician/writer/programmer. Currently, Jim is saving for a new pair of shoes.

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Performer 2.2

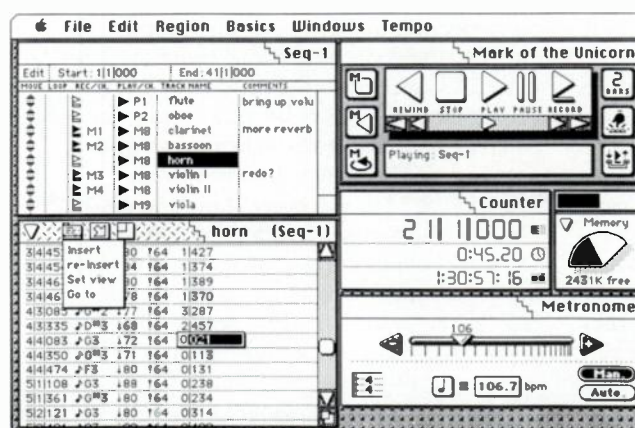


FIG. 1: Upper-right controls emulating a normal analog tape recorder; also Tracks and Event List windows. Notice new interface conventions in the "designer" title bar of the active window.

BY CHRISTOPHER YAVELOW

MARK OF THE UNICORN'S *Performer* is currently one of the most powerful MIDI sequencers available. Like any sequencer, it can record and play back music performed on a synthesizer, sampler, or other MIDI-compatible device. But this is where the similarities end. Performer's editing and synchronization capabilities, coupled with its ability to convert performance data into conventional music notation (using Mark of the Unicorn's companion program, *Professional Composer*), put it in a class by itself. The words "high end" simply don't do justice to Performer's power.

Performer 2.0 is a complete rewrite of the extremely popular Performer 1.22. Registered version 1.22 users were provided with an upgrade path to 2.0 by paying the price difference between versions 1.22 and 2.0 (\$95). Since version 2.0 was released, there have been two additional free "bug-fix" updates, resulting in version 2.2.

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FORMATS:

- ☐ 3.5 DX7 IIFD DISK (CRT FILE)
- ☐ 2.8 MDF-1 DISK
- ☐ DATA CASSETTE
- ☐ RAM4 CART* (must be 256 version)

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DIGITAL PROGRAMMABLE ALGORITHM SYNTHESIZERS

The DX11 utilizes enhanced 4-operator tone generation with EG bias and aftertouch. Included are D-50™ type sounds, and compositional templates for multi-timbral sequencing.

- ☐ DX11 'Designer Series' version 1.0

FORMATS:

- ☐ 2.8 MDF-1 DISK
- ☐ RAM4 CART*
- ☐ DATA CASSETTE

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Check the box next to the item(s) you want. Each disk, or set of data is \$24.95, or select any five items for only \$99.95! (California residents add applicable sales tax). Send this ad, or a photocopy with money order, cashiers check or personal check - do not send cash - to the address below. Allow 2 weeks (3 weeks for personal checks) for delivery. Return postage paid by Sound Source Unlimited.

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PUSHING ALL THE RIGHT BUTTONS

Anyone who can operate a cassette tape recorder will have no problem running Performer; the "Motion Controls" window (Fig. 1) contains familiar rewind, stop, play, pause, and record buttons. Other buttons set AutoStop, AutoRewind, AutoShuttle ("Auto" refers to the ability to set points where the sequencer will automatically stop or rewind, or in the case of AutoShuttle, automatically shuttle between two points, like the "block markers" on Tascam and Fostex tape recorders), CountOff, Wait-for-Note, and AutoRecord (punch in and out). The Counter window provides counters for measures, beats, and ticks (1/480th of a beat); real time in minutes, seconds, and hundredths of a second; or SMPTE hours, minutes, seconds, and frames. (Rates of 24, 25, or 30 frames per second are supported.) A memory-use window displays the amount of free memory and a metronome window displays the current meter signature and tempo. Sequences may be recorded in step time as well; in this case, the mouse or keyboard specifies the rhythmic value of every note, and a MIDI keyboard enters pitch.

Four additional types of windows take Performer's capabilities far beyond those of an analog tape recorder. A Sequence window holds as many sequences as desired in a single file and allows you to play them in any order (although only one sequence can play at a time). Each sequence in this window has its own associated Tracks window (with up to 300+ tracks) that displays every track's name, comments, MIDI In and MIDI Out channel or channels (16 assigned to the modem port and 16 from the printer port), record mode, and loop information. Double-clicking on a track's name brings up its Event List window that shows the events (notes, pitch bend, etc.) in that track, and a View Filter is available to visually isolate specific parameters from the general data stream (this is helpful to find, for example, a spurious Program Change command located somewhere in the middle of a bunch of pitch bend data). A typical display includes timing (in measures/beats/ticks, real time, and/or SMPTE frames), type of event, note name, octave, key-on and key-off velocity, and duration. Finally, each sequence has an associated Markers window. Markers can be "locked" to a specific frame or

beat, and insulated from global tempo or meter manipulations. They can be used to indicate "hit points" for film and video scoring.

MAC INTERFACE IMPROVEMENTS

Performer's user interface was initially very Mac-ish, but 2.2 has some new features that are surprisingly effective. Each window's title bar includes three new items: a Mini-Menu, that accesses window-specific functions; a Send-to-Bottom button, that, when you have several windows open, sends the top one to the bottom of the pile; and a Zoom box to enlarge the window to its maximum size. Mac purists may be shocked to see a triangular "close" box on these "designer" title bars. Digging deeper, one discovers

PRODUCT SUMMARY

Product Name:

Performer, version 2.2

Type:

MIDI sequencer software

System Requirements:

Minimum 512K Macintosh (old or new ROMs), minimum of 800K or two 400K drives. Compatible with Mac+, SE, Mac II, and Multifinder

List Price:

\$395

Copy Protection:

Key disk at each boot (note: version 2.3 requires key disk at initial boot only)

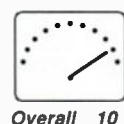
Main Features:

32 MIDI channels, multi-channel record, flexible SMPTE implementation, tempo and meter changes, non-contiguous editing regions, independent and multiple nested loops, many "humanization" features, conversion to notation via Professional Composer

Manufacturer:

Mark of the Unicorn
222 Third Street
Cambridge, MA 02142
☎ 617 / 576-2760

■■■■■■■■■■■
Reliability 10
■■■■■■■■■■■
Ease of Use 8
■■■■■■■■■■■
Documentation 10
■■■■■■■■■■■
Suitable for Pros 11
■■■■■■■■■■■
Comprehensiveness 9



Overall 10

that everything has a "three-dimensional" flavor—buttons are animated, too—and some of the dialog boxes are truly works of art. Mark of the Unicorn has set a new precedent: after considerations of functionality have been resolved, a user interface *can* be artistic.

EDITING

Compared to other sequencers, Performer's editing options are very powerful. Edit regions (the parts of the composition to be edited) can be as small as a single note and as large as an entire sequence, and include any grouping of tracks. It's even possible to select discontinuous regions, a feature sorely missed in all other sequencers. One can isolate, for example, a selected group of downbeats or all the occurrences of a specific musical phrase, and then apply edit operations to this musical subset.

To the standard cut, copy, paste, and erase functions, Mark of the Unicorn has added *Merge* (which pastes without erasing underlying data), *Snip* (a cut that

shifts musical material to close up the empty space caused by cutting), *Splice* (which opens up a space into which the pasted material can be inserted), *Shift* (shifts the selected region backwards or forwards in time), and *Repeat* (executes a specified number of pastes, merges, or splices after the copied region).

Most other editing is accomplished via the *Regions* menu. Options include transposition, inversion, retrograde (backwards), scaling time (augmentation or diminution by any ratio—a ratio of 1:2, e.g., would turn eighth notes into quarter notes), editing note duration, key velocity, and continuous controllers. These last three allow for similar types of editing operations. For example, velocity values may be set to a constant, increased by a percentage, added to or subtracted from, or changed gradually using either a linear or logarithmic curve (permitting crescendo and decrescendo). In addition, all this may take place within the context of user-defined minimum/maximum limits. A new feature that allows for gradual

changes from one percentage to another permits (when applied to velocities) adding a crescendo to a passage while maintaining a metrical structure or accent pattern. This adds a new dimension to the range of humanization options currently in fashion.

Split Notes is another powerful item on the *Regions* menu for "peeling off" layers of music based upon a variety of considerations other than mere consecutiveness. Individual melodic lines may be extracted from polyphonic textures and moved from one track to another (to be played by a different instrument perhaps), notes within a certain duration or loudness range may be copied or cut, and the right and left hands of a piano part may be isolated. The Boolean logic "AND" function is available to zoom in on material. A typical application might be "copy all the notes of a velocity greater than 86 AND a duration between a dotted eighth note and a half note from the bass line of a chordal passage."

Performer 2.2 has even more flexible

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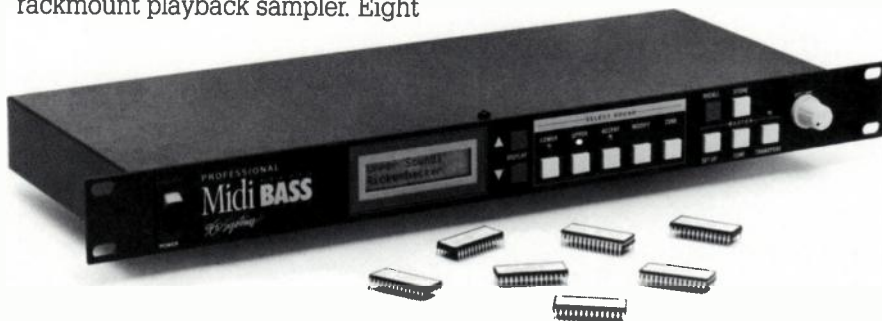
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quantization options (automatic rhythmic correction) than its already elegant predecessor. Besides quantizing attacks and/or releases and/or durations to any rhythmic value (any triplet too), Performer provides control over the *sensitivity* and *strength* of the quantization algorithm. "Sensitivity" defines how far off-beat a note must be before it is corrected, and "strength" defines how much closer to the correct metric grid a note will be moved. Finally, an *offset* option, used together with sensitivity, can selectively quantize particular beats in each measure. All these features work together to retain a human flavor with quantized passages.

YOU HAD TO ASK...

Mark of the Unicorn has added to Performer 2.2 many of the features that users of earlier versions requested (although installing it on a hard disk is still a problem). First and foremost is the capability of recording simultaneously on as many tracks as desired, with each track "listening" to a different MIDI channel. Among other things, this permits whole sequences to be dumped in one pass from another sequencer to Performer, and is especially useful for guitar controllers that send out individual data for each string over a different channel.

Performer also allows for independent, multiple nestable loops on each track, and lets the user specify how many times a loop repeats. In the Event List window, loops are represented by in-

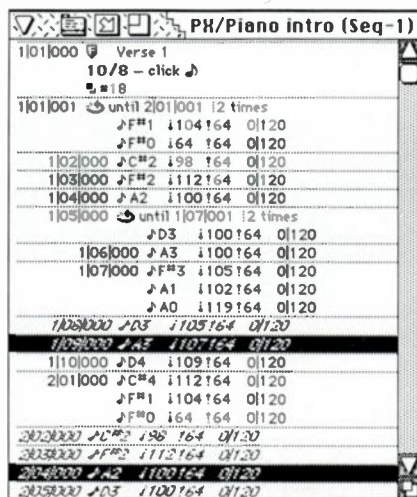


FIG. 2: Indentations indicate looped passage; loops within loops indicated by sub-indentations. Italics indicate loop causing subsequent material to be unplayed.

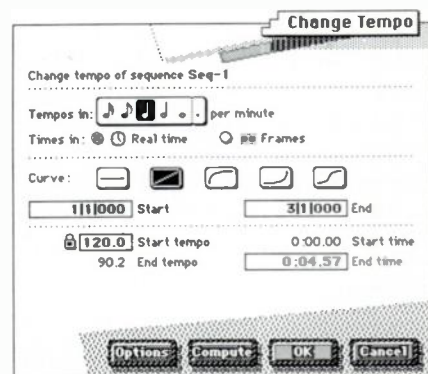


FIG. 3: Dialog boxes show the "user interface as art form" approach. Change Tempo box with built-in Time Calculator, calculating end tempo for a gradual, linear change of tempo.

dents, nested loops are indicated by indents within the indents, and material that won't be heard (because a loop is playing) is conveniently shown in italics (Fig. 2).

Tempo changes have been long awaited by Performer users, and version 2.2 includes as many tempo changes as you desire, both abrupt and gradual. The tempo dialog box is sort of a mini "time calculator"—you may enter a start and end tempo and see how long the passage will be, or enter a final temporal location (real time or SMPTE), or total duration with a start tempo, and see what the tempo will be at the end (Fig. 3).

In response to the needs of film and video composers, Performer's developers have added two types of synchronization, *Indirect Time Lock* and *Direct Time Lock*, to the traditional MIDI sync. MIDI sync is a common protocol for synchronizing sequencers with other hardware devices. Indirect Time Lock (basically a Song Position Pointer-related function), lets Performer lock with another device via any SMPTE-to-MIDI converter (in this case, rewinding or fast forwarding on the "real" tape recorder will cause Performer to move to the same spot in the RAM-based sequence). Direct Time Lock is a special lock-up supported by Southworth Music Systems' "Jam Box" and Opcode's "Timecode Machine." Direct Time Lock offers the full 24-hour range of SMPTE and the time code data rate is lower, freeing up more of the sequencer for processing.

Last but not least, the most serious drawback of version 1.22 has been corrected. The new version can insert changes in meter signatures, and meter changes can now cause changes in the metronome click, which Performer outputs

through the Mac speaker. For example, switching from $\frac{3}{4}$ to $\frac{3}{8}$ could force the click output to beat first in quarter notes and then eighths; you could just as easily specify that the $\frac{3}{8}$ section clicked in 16th notes, or any other duration for that matter.

If you've been using Performer as a

.....

Performer is easy enough to be used by people at all levels, from all walks of musical life.

.....

way to get music into conventional notation using Mark of the Unicorn's Professional Composer (which now supports Adobe's PostScript music font, *Sonata*), you will be overjoyed to discover that Performer 2.2 communicates meter signature changes to Professional Composer! A minor annoyance is that when the conversion goes in the other direction, from Professional Composer to Performer, the process no longer adds velocity weight to measure downbeats and other accented notes, as did version 1.22.

ARE YOU POWER HUNGRY?

Performer is easy enough to be used by people at all levels, from all walks of musical life, and furthermore encourages the development of good musical habits. However, users familiar with symbolic graphic views of note data such as those of *Master Tracks Pro* (Passport Designs), *Sequencer 3.0* (Opcode Systems), or *MIDI-Paint* (Southworth), may need some time to adjust to Performer's alphanumeric display. Desirable too would be a graphic overview at the measure or phrase level (or beyond), permitting the point-and-click manipulation of musical ideas as separate "chunks" (such as that offered by *Master Tracks Pro*).

There is still a good deal of fine tuning, polishing, and bug repair going on at Mark of the Unicorn; additional planned (and free) upgrades may soon be reality. (Editor's note: Since this article was written, version 2.3 has been sent free

of charge to all registered owners. The most noticeable change in this version is a speed-up by 50% to 60% of MIDI data transmission during MIDI playback and record; other changes include Mac II support and MultiFinder compatibility.)

As far as I'm concerned, the gulf between Performer and most other sequencers is about as wide as the distance between an IBM typewriter and a Macintosh running Microsoft Word 3.0. Performer is a powerful compositional

tool that will greatly improve the time/productivity curve in any studio, no matter how big or small.

EM

Christopher Yavelow is a computer-assisted composer who has become well-known as a writer on this topic. He received graduate degrees in music composition from Boston University and Harvard, diplomas from several noted European conservatories, and his works have received some three dozen international awards and fellowships.



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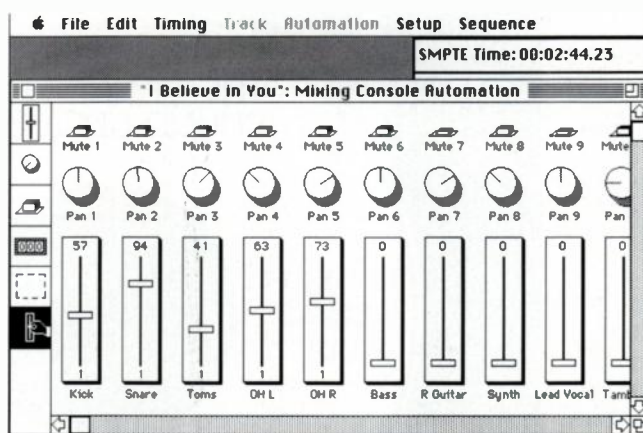
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Q-Sheet



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Yes, Ginny, there really is a *Q-Sheet*: Digidesign's MIDI event-sequencing program for the Macintosh. It's intended primarily to automate studios doing audio for video, but it's also useful in other situations where synchronization and automation are needed. *Q-Sheet*'s two main applications are automated mixing and effects cueing. You can record and edit any MIDI

command at specific SMPTE code points, and sync to tape via MIDI Time Code (MTC). These days, a MIDI command can encompass anything: it can tell a sampler to go *Splooth* when the hero of the movie is slimed by the alien house pet, or it can pull down a fader on a MIDI-controlled mixer at just that instant between the end of the hook and the grotesque and noisy demonstration of failed personal hygiene habits.

AUTOMATED MIXING—A POOR MAN'S MASSENBURG

In the area of automated mixing, *Q-Sheet* is software that is just a clock pulse or two ahead of its time. Although it has many of the sophisticated features previously seen only in expensive state-of-the-art systems like SSL, Necam, and Massenburg, *Q-Sheet* only works with MIDI-ready mixers

Michael Levine
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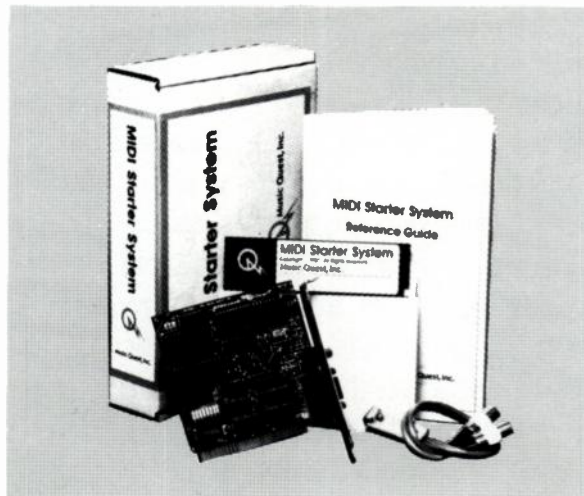
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add-on mixer automation devices or MIDI effects units.

Assuming you have one of these devices, Q-Sheet can set up a graphic representation of a large variety of faders and knobs, all of which will send and receive MIDI commands to and from the mixer fader or knob to which they've been assigned. You can do your own layout with the elements provided (i.e., drawings of faders, pans, and mutes), or use one of the preset layouts provided for

some of the most popular mixers.

One of the presets in Q-Sheet is for perhaps the most fully implemented MIDI mixing board today: the Yamaha DMP7. I set up my copy of Q-Sheet with a DMP and a variety of sync controllers, including the Southworth Jam Box and the Sequential Circuits Studio 440. Of course, even without Q-Sheet, the DMP is capable of a "snapshot" type of automation in which it can be changed from one preset setup to another by means of a footswitch

or MIDI Program Change command. With Q-Sheet, however, it can do everything from time code-cued mutes to complex multiple crossfades.

Once the DMP was set up properly, Q-Sheet's operation was so smooth it was boring, and that, honestly, is one of the highest compliments I can give a product. It recorded every move I made, played it back perfectly, overdubbed without complaint, gave me a complete but uncluttered list of events only when I asked for it, rearranged them when asked, ironed the shirts, and walked the dog.

Group submixes, crossfades, rapid-fire mutes and unmutes, outboard effect changes... it did them all without glitches, freeze-ups, or threats of violence. The scariest thing was watching the sliders on the DMP being moved up and down by the Phantom of the Mac.

IMPORT SEQUENCES WITHOUT PAYING TARIFF

For those of us who own but one computer and need it for mixdown and music sequencing, one of Q-Sheet's most useful features is its ability to play back music sequences created by any sequencer that can store its sequences as Format 0 MIDI files (currently the most commonly used MIDI format for dumping sequencing information) or Opcode 2.5 files. These include programs by Opcode, Southworth, Passport, and Intelligent Music, but *not* Mark of the Unicorn (pooh!). Effectively, you can have up to 32 MIDI information channels by sending your music out one port and your mix out another.

Even if you have a second sequencing device (i.e. a drum box or a Roland MC-500) that doesn't store its data in Format 0, you may still want to dump its MIDI data to Q-Sheet in real time so that you can move around the music start-time in relation to things like...

SOUND EFFECTS

Q-Sheet is a dream for synching sound effects to picture. If it were free I'd call it a gift from God; at \$495 (list price) this is money very well spent. The program does exactly what I expected it to do and, as usual for Digidesign, seems to be bug-free.

THE OBVIOUS

Q-Sheet is an event sequencer, not a music sequencer, and a very capable one

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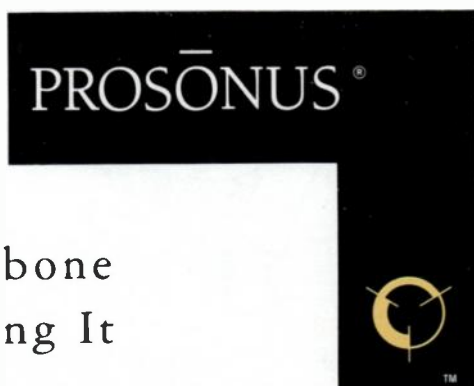
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B R A S S I

at that. It records all types of MIDI data on multiple tracks using two sets of 16 MIDI channels (one via the printer port and one via the modem port) to trigger sound effects with 1/4-frame accuracy. Samplers with slow response times are accommodated by the "nudge" button that moves events and/or tracks forward or backward in frame-by-frame increments. The program displays the SMPTE start and end times of events, MIDI note-on and -off velocities, and channel assigns for various parameters associated with each track for easy editing. The program locks to MIDI Time Code flawlessly.

THE NOT SO OBVIOUS

The program is exceptional for sound effects work largely because of its user interface, including features such as Pop

Up Menus, Keyboard Mapping, Align, Adjust Length and Event Backtiming.

Pop Up Menus let you edit using graphics of faders or piano keyboards that you move or play by dragging the mouse, then changing values with a click.

Keyboard Mapping lets you type a name into the Mac for each sample in the sampler. When you play the sample while locked to picture, the software produces an event list with the names and appro-

priate SMPTE and MIDI data. Upon playback, these data scroll across the screen as the video rolls, and Q-Sheet follows.

Align is a command that sets the start or end time of a selected group of events to the same value, so that, for instance, you can cut off all sounds at the end of a scene or other visual event.

Random Repeating is great for setting up background ambience. You can make a street background, for example, with ran-

—continued on page 114

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W O O D W I N D 1

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PRODUCT SUMMARY

Product:

Q-Sheet

Type:

Software SMPTE/MIDI event sequencer

Price:

\$495

Hardware requirements:

512 Macintosh (external 800K drive or hard drive recommended), Macintosh Plus, Macintosh SE or Macintosh II; MIDI Interface; SMPTE to MIDI Time Code device (JL Cooper PPS-1 & SAM Automation controller, Opcode Timecode Machine, Adams-Smith Zeta 3, Akai Linn ADR-15 or ASQ-10, Garfield Time Commander, Sequential Studio 440 and Prophet 3000, Southworth JamBox/4 or /2)

Features:

Event sequencer using SMPTE/MIDI Time Code sync (number of events and tracks limited only by computer memory).

Uses:

MIDI/SMPTE automation, Sound effect sequencing for video and film post production.

Manufacturer:

Digidesign inc.,
1360 Willow Road, Suite 101,
Menlo Park, CA 94025
☎ 415 / 327-8811

Power 10
Ease of Use 10
Documentation 9
User Interface 10
MIDI Implementation 10



Overall 10

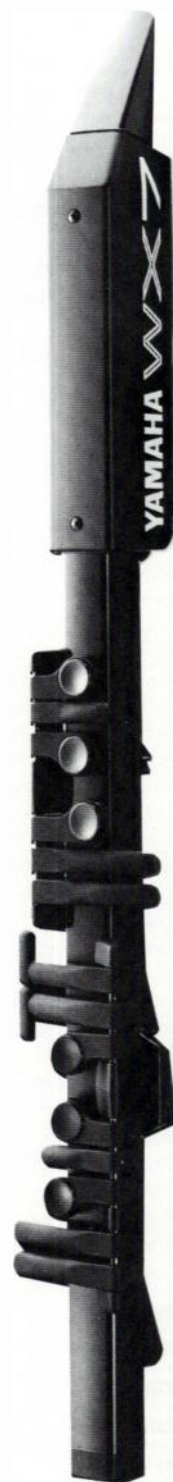
The Yamaha WX7 Wind MIDI Controller

It's not just keyboards anymore, kids; and not just guitar controllers either. Get ready to be blown away by the new MIDI wind controllers, like this one from Yamaha.

B y T i m T u l l y

YAMAHA'S OFFERING to MIDI-starved woodwind players is here: the WX7 Wind MIDI Controller. Priced at \$995, the WX7 will translate the ways you play sax, clarinet, flute or oboe—the breath, the lip and the fingerings—into MIDI note and controller information to play any synthesizer with a MIDI In port. It allows those of us with technique learned on the woodwinds to enter the realm of the synths.

Physically, the WX7 is a sleek, matte black affair of plastic and metal, tipped with a device that looks, feels and, to a certain extent, works like the mouthpiece of a saxophone. Visually, it would probably look more at home in the hands of Mr. Spock than Johnny Hodges, but this is the '80s, after all. Its keystack consists of a row of plastic keys that “open” and “close” with a very light action, somewhere between, say, a soprano and a B-flat clarinet. The fingerpads on the main six keys are slightly concave and feel pretty much like the real...uh, I mean, an acoustic instrument's. They even give out a little “pop” when you close them that sounds



uncannily like lambskin hitting ebony. Yamaha won't admit they did this on purpose as a subliminal hook, but I'm still suspicious.

There are only four fifth-finger keys: the low B-flat key is absent; and one key serves double duty as the G-sharp/low C-sharp key. These, the side B-flat, and two side (right-hand) keys for half-step and whole-step trills all have the same kinds of action, and overall, come across as comfortable and familiar.

When playing the octave around middle C, one's left thumb rests on a flat spot between two sets of octave keys, three above and two below. This gives the instrument a total range of six octaves. The octave keys— $\frac{1}{2}$ -inch by $\frac{1}{4}$ -inch beads that click in and out when pressed and released—work cleanly and are easy to feel your way around, although teaching a thumb that's used to a simple "octave or no octave" to go that distance takes a bit of practice.

The right thumb holds the axe up by a thumb-rest no more uncomfortable than every other thumb-rest I've ever pushed, though at 13½ ounces, the WX7 will put little strain or blister on even the most delicate thumb. Mounted on the left side of the horn, just below the thumb-rest, is a spring-loaded rocker switch (well, a rocker, at least. It doesn't click, it just rocks back and forth) that, in addition to the reed, acts as another pitch bender. (For reasons known only to themselves, Yamaha refers to this as a "pitch bend wheel." Is this what they mean by

PRODUCT SUMMARY

Product:

Yamaha WX7 Wind MIDI Controller

Type:

Breath-driven MIDI controller with woodwind-style fingering and sax/clarinet-style mouthpiece.

List Price:

\$995

Manufacturer:

Yamaha Music Corporation, USA
6600 Orangethorpe Ave.
Buena Park, CA 90620
☎ 714 / 522-9011

■■■■■■■■■■■
Natural Feel 9
■■■■■■■■■■■
Expressiveness 8
■■■■■■■■■■■
Innovation/Vision 10
■■■■■■■■■■■
MIDI Implementation 9



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"not reinventing the wheel?") At any rate, I haven't yet found a comfortable or facile way to use this feature and hold the instrument up at the same time with the same thumb. But then, I once believed I could never hit all those altissimos in Sigurd Rascher's *Top Tones for the Saxophone* either. Practice makes believers, I guess.

Below the thumb-rest are two buttons that, mechanically, behave just like the octave buttons. These are the *Hold* key and the *Program Change* key. The first will

be addressed fully in its own section below. By pressing the Program Change and any one of the octave buttons, you can select any one of five different programs (or "patches" or "voices," depending on your terminology) on the synthesizer you're playing.

When you blow into the WX7 mouthpiece, your air flows—with some resistance—through the instrument and out the "drain hole" on its end, emulating the feel of an acoustic horn to a reasonable degree. The mouthpiece itself is most like

its clarinet counterpart in size and shape, and the reed is a black plastic affair that acts about as much like a cane reed as one could expect. On the whole, I accustomed myself to the WX7's physical nature readily, but then I haven't spent the last five years in a conservatory. Only your personal preference will provide a judgement here.

SETUP

The WX7 is meant to be personalized to each player's own breathing and embou-

SAL GALLINA: SAX...AND VIOLINS

Sal Gallina has been playing and experimenting with electronic versions and modifications of the saxophone for over ten years. About three years ago, he met Ken Oda of Yamaha Japan, and for the next few years Sal consulted with Yamaha on the design and development of the WX7 and wrote the book, *Expressive FM Applications* (Yamaha Music Foundation and Hal Leonard Publications). Included with every WX7 sold, the book presents a number of TX81Z voices and performances developed specifically for use with the WX7. It also includes an audio cassette tape demonstrating music played on the WX7 and TX81Z together, as well as voice and performance data that can be loaded directly into the TX81Z. (You can also hear Sal on the soundsheet bound into copies of the February '87 EM.)

Sal started thinking about inventing an electronic sax when the first Moog and ARP synthesizers came out. He said, "I was playing saxophone with things like octave dividers, which I modified to do interval shifts so instead of just octaves, I had thirds, fourths, fifths, and sixths." He approached musical electronics with no formal education, and said, "I'm one of these guys that goes into the unit and if it blows up, I just bring it back and get another one. That's an expensive approach, but I got to the point where I would know which part I blew up and just replace it—basic street electronics."

The interim saw a number of interesting permutations. "I discovered a

technique using the regular acoustic saxophone as a guitar player would do with feedback. Using a pickup and the octave divider, I would get close to the amplifier with the saxophone, the saxophone would resonate and you would feel wind coming out of the mouthpiece. You could finger notes and get harmonics, or just press the reed and it would squeeze the airflow to get weird sorts of harmonics.

"From there, I got into synthesizer stuff. I wired a bunch of relays up to each key on the saxophone, hooked the system up to an ARP Odyssey and the octave divider stuff, and eventually stopped blowing into the saxophone—I'd just play the synthesizer with the sax keys. I ended up taking the neck off the sax and playing it that way.

"I developed my own plastic saxophone out of plexiglass and magnetic reed switches—the famous Cromulizer. Later, I got a Lyricon the day I had a recording session in Philly and I really didn't know the fingering system, but I knew if I blew into it I could get dynamic wind control. So here I am fingering my plastic saxophone device with this other thing between my legs, blowing into its control head with a wire coming out into my VCA and it worked great...and they're all looking at me like 'that's it, he's finally lost it, he's gone.' But eventually I totally got away from the instrument I made and just played Lyricon.

"I was looking for a compact system, a nice little thing you could take around with reverb, phasing, distortion, the whole setup. It becomes very

expensive, but you don't stop. Once the Lyricon people went out of business, I gutted it and redesigned the transducer section."

To do the development he wanted, Sal says he read "a lot of books and experimented with different materials suitable for making transducers. I did a lot of research on my own because musically I knew what I wanted: if I could find an easy way to translate my breath control—my sensitivity—into an electronic form, it would allow me to do what I am doing right now. With breath control you can really get into these tone modules and do a lot more than conventional keyboard controllers could do. As a horn player, you know from day one, you have to listen to dynamics. The creative voice for an expressive instrument like this has to be approached differently."

As far as the WX7 goes, Sal says, "I think Yamaha is really putting in everything that I wanted in this design. Yamaha will be coming out with some new, fantastic controllers in the coming years."

He feels, "The best thing about the instrument is the people behind it. I think they are a bunch of really great people from the standpoint of support with this product and all the other products. As a professional, they make you feel that your contribution is a major part of what they're doing.

"They have taken the instrument to a point where it's on a never-ending curve now. It's just going to keep going...it's never going to end."

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chure with a combination of eight DIP switches and four trim pots located on the back of the instrument, just below the mouthpiece. The DIP switches make overall adjustments concerning MIDI aftertouch, breath control or volume (to play synthesizers that may receive one of these MIDI controllers, but not another; most Yamaha synths receive both), whether it plays like a B-flat, E-flat, or concert C

.....

To get an instrument in tune with well-developed lip and breath habits should be allowed to require fine attention and application, otherwise the instrument might lack the potential to respond to the control of your hard-won chops.

.....

instrument, and how it responds to your breath and embouchure. In regard to this last category, the trim pots go beyond the DIP switch's general setting to fine-tune the instrument's response to your breath and lip.

Specifically, the Wind Zero and Wind Gain—the more straightforward pair—determine how much breath it takes to get a sound, and how much change (in volume or timbre, usually, though this is user-programmable) the breath will cause. The other two pots, Lip Zero and Lip Gain, control how lip pressure affects pitch. A player can bend the pitch of a note up, by putting lip pressure on the reed, or down, by taking it off. But there is a "dead zone" in the reed's throw—a spot where moving the reed does *not* change pitch—where the reed should be during normal, non-note-bending playing. The Lip Gain pot can set the placement of this zone at the very beginning of the reed's throw, so

a relaxed embouchure will find it easily, or at any other point, for tighter embouchures. The width of the dead zone is set by the Lip Zero trim pot, and controls how much pitch bend you get from a given amount of reed bend. These two controls interact to provide for widely different techniques and to such a fine degree that any kind of embouchure can be accommodated with very expressive results.

All this means that once the pots and switches are set, your breath can produce—from one correctly programmed patch on your synthesizer—slow swells and percussive attacks; it can cut a note off sharply or fade it as effectively as you can control your diaphragm. The reed—plastic or not—can get any pitch bend I've ever heard from any acoustic horn, and more if you'd like. You can play with a firm, tight, controlled clarinet embouchure, or the sloppiest, openest blues blaster bite, and bend up, down and get as wide or as subtle a vibrato as you want.

The problem is that getting these settings just right is not easy. It takes thought, ear, trial and error. Frankly, I wouldn't have it any other way. Considering the amount of time, money and trouble most reed players spend finding the right mouthpiece, neck, ligature and reed to get just the response they want from their instrument, spending a couple of hours apiece over two or three sessions to get your Lip Gain adjustment just right doesn't seem out of line, especially given the results. To get an instrument in tune with well-developed lip and breath habits *should* be allowed to require fine attention and application, otherwise the instrument might lack the potential to respond to the control of your hard-won chops.

The original WX7 manual had a couple of serious errors in this regard, by the way; the settings for DIP switch eight were reversed—it should be off for *Tight Lip Mode* and on for *Loose Lip Mode*—and the "Dual Play (use Breath)" section said the held note follows the lead line, when it is actually fixed. These have been corrected in separately released pages that also explain trim pot adjustment a little better. The text on this update makes more sense than the original, but the graphics are still obscure to me, even though I know how the settings work. Incidentally, the manual impressed me this way in general. Its text was really explanatory, considering the novelty and

complexity of some of the instrument's features, but the graphics were as often as not obscure. Anyway, make sure you get this update if you buy, or have already bought, the instrument.

The WX7 comes with a *MIDI Power Pack*, a black plastic box the size and shape, sans neck, of a half-pint whiskey bottle (often used at your more raucous gigs). The power pack is powered by six AA batteries and holds the instrument's power switch, MIDI Out port and a cable that connects to the WX7 itself.

THE HOLD KEY

The Hold key lies just below the right-hand thumb-rest, and activates one of four different modes, depending on how the DIP switches are set. In *Normal mode*, if you play a note, press the Hold key and let it go, the note you played first will play, bend its pitch, and change its volume and timbre along with anything else you play, until you hit the Hold key again. This is kind of cool for occasional effects, but really seems to have limited use. In *Follow mode*, you play and press as above, but then play a *second* note while still pressing the Hold key. The WX7 memorizes the interval between the two notes. Then, along with whatever you play subsequently, it plays a note the same interval away (until you press Hold again). This parallel harmony is also good for some applications. Playing in parallel octaves can fatten up a sound considerably, and a lead played in parallel fourths or fifths can really scream. If you've been jealous of all those demented, raunchy, electronic riffs coming out of keyboards and electric guitars for all these years, here's your chance to get in on the action.

It's the two *Dual* modes where things get really interesting. *Dual Play (no breath)* (not the most mellifluous name, but you won't mention it to the audience anyway) works just like Normal mode, except it sends on two different MIDI channels, and that's the kicker. The WX7 was designed, if not specifically to use the Yamaha TX81Z synth module, at least with it strongly in mind. One of the features of the TX81Z is its ability to receive MIDI information on up to eight channels at once; another is to play a chord when it receives just one MIDI note-on. What all this means is that if you put the WX7 in Dual Play, no breath (DPnb) mode, set the TX81Z to play a lead voice on MIDI channel one, and a chord with another

voice on channel two, you can play *full polyphonic accompaniment* along with your lead line. That is, in DPnb mode, you can play a note of, say, a trumpet patch, then press the Hold key and the WX7 will send a note-on via channel two that will play a full chord—in, say, a string patch. The chord will sustain as you then play whatever you want on the trumpet, until you press Hold again. Then you can do the same with the next chord, and so on.

The same effect can be achieved with two MIDI synthesizers, as long as one of them will play a chord when it hears a single MIDI note-on, or with two synths and some kind of a MIDI mapping device that will tell a synth to play a chord when the mapper hears a single note-on. The capabilities of the TX81Z, and its low price (\$495), make it a very useful companion to the WX7.

Dual Play (use breath) mode acts the same as DPnb mode, except the note or chord played over channel two does not just sustain, but is affected by breath pressure.

The Three Laws of Alternate Controllers

In evaluating alternatives to the piano-style keyboard as a way to play synthesizers, I've found three questions that seem to cover the situation:

First: does the controller allow a musician skilled in some non-keyboard instrument to use that technique to good advantage? This doesn't mean the controller has to feel *exactly* like a sax, violin or what-have-you; an instrument *should* have its own personality if it's to be taken seriously.

Second: does the controller let a musician produce music that could not be done (or could only be done with great difficulty and/or musical expense) with another controller?

Third: to what extent does the controller allow non-keyboard players into the universe of MIDI—including sequencing, multi-instrument playing and control of effects, mixers and other MIDI devices?

They aren't Asimov's Laws of Robotics, but if you ask these questions before evaluating a wind (or other) controller, you should get a good take on its capabilities.

MIDI

There is a problem with MIDI wind controllers in general—and the WX7 is no exception. To get their expressive control over volume and timbre, they send MIDI breath, aftertouch and/or volume messages continuously, even when fairly straight, undynamic, non-pitch-bent passages are played. This becomes a problem when you play into a MIDI sequencer: the sequencer's memory gets used up incredibly fast. (I've used up *all* the memory of a 512K Macintosh playing about 25 bars at 120 bpm into Mark of the Unicorn's *Performer*.) Until some kind of intelligent input filter is implemented that will only allow significant continuous controller changes to pass, or until computer memory gets so cheap it won't matter (don't hold your breath), wind players will be severely restricted in the MIDI sequencing world. After all, if I can't use my wind controller to sequence lead, bass, drum and even chord parts, I'm still a slave to the keyboard.

ACCESSORIES

The WX7 comes in a nifty, practical, hard carrying case that contains, in addition to the instrument and power pack, two MIDI cables, an extension to the power pack cable, an extra mouthpiece and a soft case (that clips to the player's belt) for the power pack. It's a handy and complete package that bespeaks of a genuine attempt to help the musician.

SUMMARY

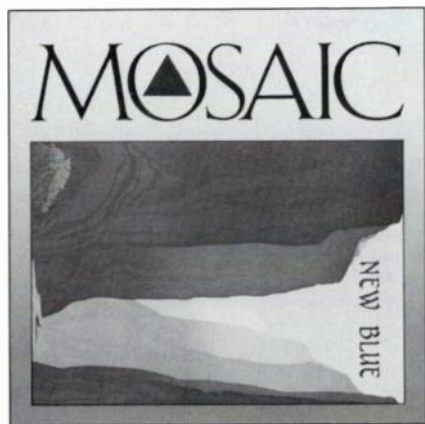
The WX7 does put synthesis in the hands of the woodwind player. It also allows that player to create expressive music in ways that are associated with (if not unique to) wind instruments. It does play only over MIDI, hence the smoothness of its pitch and dynamics control is limited by the resolution of MIDI controllers. There were times where I heard the "zipper noise" caused by this resolution, and there were times it was unnoticeable: depending, it seemed, upon the voice being played. Finally, aside from the need to tame the continuous controller situation, this device does let me blow synthesizers with my horn chops, and in some unique and powerful new ways. **EM**

Tim Tully is exploring the possibilities of life without winter, streets without muggers and work without end. It works for him.

BY ROBERT CARLBERG

Every now and then a tape or record surfaces that is so out-of-the-ordinary that it seems to come out of nowhere. Such a tape is *Pantheon* by **Leigh Ann Hussey** (2240 Blake Street #308, Berkeley, CA 94704). She plays a bevy of unusual instruments: harp, conch, viola, bull-roarer, bones, rattles, zils, slide whistle, nose-flute, bailophone and CZ-101. She programs a Macintosh (using *Studio Session*) to emulate bagpipes, pan-pipes, cymbalom and various drums from around the world. She also sings on one track in a beautiful, clear alto voice. Each track is vastly unlike the last, each representing a different ethnic heritage: American Indian, Irish, Scottish, Arabic, African, Klezmer, and others I can't identify. The electronic instruments are interwoven with the acoustic, although the overall impression is of acousticity. Most of the tracks go on a bit longer than the variety within them would seem to support, but where else can you get a trip around the world in 90 minutes?

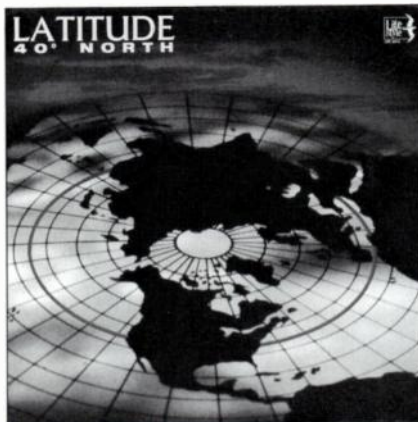
Duos seem to be making a comeback in electronic music, thanks to recent advances in technology. Brothers Doug Brody and Matt Brody collaborate as **Mosaic**. Their two albums on *Invincible*, *Invisible Landscapes* (068) and *New Blue* (083), feature 11 tuneful instrumentals on synthesizers, sax, guitar and digital



drums. It's hard to put a label on their music; the sax says jazz but the music is all composed, not improvised. The drum programs are too rock to be new age, but the keyboards are too progressive to be rock and roll. You don't need a label to appreciate fine music, so let's just call it good and leave it at that.

John Orsi (drums) and Manny Silva (guitar) are known professionally as **The Walters**—dumb name but quite accomplished musically. Their cassette EP (four tracks repeated both sides), called *So Far* (Lilith Music, PO Box 161, Forestdale, RI 02824 ☎ 401/762-1317 day; 401/762-1254 eves), includes two catchy pop vocals reminiscent of a-ha and two equally appealing guitar/synth instrumentals. The interesting thing about this band technologically is that there is no keyboardist. John Orsi plays all of the keyboard synthe-

sizer parts, of which there are many, as well as the bass guitar parts, from his electronic drum-kit. You'd never know it from listening. The Walters used to be a trio, but bassist Richard Toro tragically succumbed to Hodgkin's disease two years ago, and this tape is dedicated to his memory. Actually, the second instrumental, "Quiet," is a solo synthesizer piece by Toro, recorded before his untimely death. The music of The Walters is not outrageously in-



novative, but within the style it easily equals the majors—which isn't bad for a duo.

Yet another duo is **Latitude**, who have two albums: *Latitude* (Lifestyle 3104) and *40° North* (Lifestyle 6010). If Mosaic is jazz/rock/new age fusion, then Latitude must be classical/rock/new age fusion, since half of the group is Ben Verdery, a bona fide classical guitarist (also heard here on electric). His partner, Craig Peyton (former rock drummer), performs on vibes, Xpander, TX81Z and Fairlight III. With vibes and acoustic guitar, parts of it recall John Williams' similar ensemble, although the Fairlight adds bass guitar, pan flutes, keyboard sounds and, presumably, the charming percussion. Music which crosses boundaries can annex the individual strengths of participating disciplines; Latitude certainly makes another strong case for the value of collaboration.

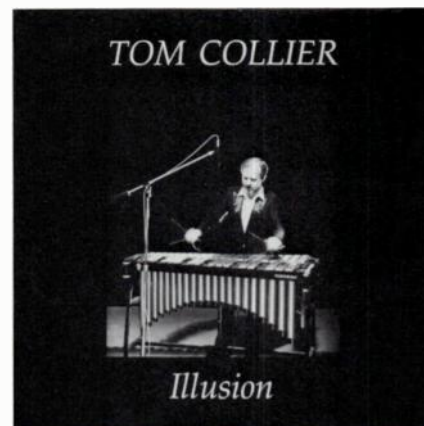
Another technological marvel (besides the Walters) is **Tom Collier's** new album, *Illusion* (T.C. Records, 4458 South 160th St., Seattle WA 98188). Collier, a vibist, triggers all of the synthesizer parts, of which again there are many, from a KAT mallet MIDI controller. The freedom he must feel, finally having access to all the great sounds lurking behind keyboards, is expressed in the joyful exuberance of his jazz. Like his last album, 1981's *Whistling Midg-ets* (with bassist Dan Dean), he makes vibes and marimbas the expressive equal of keyboards, now tonally as well as emotionally.

In *Ethereal Shaking Music* (Apieron Music 1001; cassette) **Joel Fairstein** (704 Sutters Mill Lane, Knoxville, TN 37909 ☎ 615/584-6922) uses his DX7 to create a complete band played back entirely by sequencer. Joel writes that the

point of doing this (he's an accomplished studio keyboardist) is to "avoid some common pitfalls in MIDI system projects: lack of variation in the grooves and lack of direction in the composition." He definitely succeeds. His light, fast-moving jazz gives no hint of the technological "interference," and the virtue and variety of the voices he programs make this less an "electronic music" album than a jazz album, even though it is all electronic. As Imo Phillips would say, "O-o-o-oo, a paradox!"

Nancy Thompson (302 New York Avenue, Providence, RI 02905), recording under the name One Human, establishes a strong persona with her debut tape *Darker Than Light*. She has written six songs which she sings in a darkly melodic voice reminiscent of Siouxsie (of Banshees and Creatures fame). She also covers the 1965 novelty hit "They're Coming To Take Me Away, Ha-Haa!," though she gives it an entirely Nancy Thompson interpretation. Her vocals are reverbed, double-tracked and placed well back in the mix, and for substantial portions she just lets the synthesizers carry the songs—which they do with aplomb. She doesn't name the synthesizer used ("One Machine?") but it's almost as individualistic as her voice. The analog bandpass-filtered sounds have a certain nasal quality, like the old EMS Synthi-AKS. The combination—her almost chant-like vocals and the fast repeating electronic patterns—complement each other perfectly. Add to this Nancy's tribal digital drum machine programming and you have a vigorous debut effort.

Progressive rock, as a style, is somewhat out of fashion these days, as I've lamented in these pages before. Still, there are a handful of practitioners left, barking at the gates of the music industry (from the outside). A new one



to me is **Kevin Leonard** and his band **North Star** (403 North Monroe St. #D1, Media, PA 19063), who released an album in Japan in 1984 entitled *Feel the Cold*. Leonard also has two cassettes available, a 1985 release by North Star called *Treskelion* and a 1987 solo album, *Crystal Influence*. The North Star material has all the trappings of great progressive rock:

snapping Rickenbacker bass, fast changes and odd time signatures, grand anthemic keyboards and a singer who sounds exactly like Fish (Marillion). These guys are fast, tight and extremely good. Leonard's solo material (evidently he's the keyboardist) updates the concept much as Bill Berends has done (see March). There's still strongly melodic writing and elaborate development, and a wealth of ideas presented nearly as fast as you can absorb them (I said he was out of fashion!). Using a digital drum machine, programmed well, but stiffer than North Star's powerhouse drummer, Leonard layers the keyboards into a rich Emersonian (Wakemanian?) tapestry. If I have one criticism, it's that he limits himself to the organ-ic voices too much. You can almost hear the B3 and Mellotron in his head—for a solo effort he needs to become the whole band, not just the keyboardist. Still, he's no slouch on the black and whites, and what he does, he does very well.

I did some traveling for my other job this month, which gave me plenty of time to delve into the box of cassettes I had been leaving aside. Why is it that certain music just doesn't grab you? Sometimes the differences are subtle between those and the efforts that lift off, that soar and speak to your emotions. All of the talk recently in EM about "feel in music" and quantifying emotion—it has to be more than just moving the accents in relation to the backbeat.

In *Real Time* is a cassette by **Charlie Esposito** (Audiolutions, Box 2018, Vineyard Haven, MA 02568, \$8 postpaid). His music consists of bell-like and marimba-like tones on a Siel DK600 in gently rolling compositions which rely less on melody than on the Zen tranquility of continuously cascading notes. It sounds rather like a slowed-down gamelan.

John Higham (100 Yale Road, Menlo Park, CA 94025 ☎ 415 / 328-1249) turns in a tape of four *Sample Compositions*, about 22 minutes, on TX7, TX81Z, JX-8P, D-550, and a pair of DrumTraks running on Mark of the Unicorn's *Composer*. "Triste," "Caliope," and "Synfonia" are new age-y, slow interweaving patterns on very synthetic-sounding, exaggerated filter voices. "Pastoral" is faster and uses more contemporary-sounding koto, bass guitar, and flute voices.

Thomas Kardas (930 Union St, Arcata, CA 95521) submitted *Right Action* for review. It contains 11 slow drones and/or repetitive patterns (I hesitate to call them tunes) on standard-sounding synthesizers and guitar with, occasionally, heavily echoed, wordless vocals. He includes some exotic percussion, but it hangs limp around the neck of this music.

Ken Neagle (Audio Lab, 2521 West LaPalma Ave #P, Anaheim, CA—no zip) sent a demo of three glib pop songs. For the recording he used an Emulator II, Matrix-12, TX416, RX11 and Atari 520ST computer running Hy-

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brid Arts software. The singing and programming are all very well done, though you may prefer to get your Barry Manilow directly from the well.

Michael Bordt (156 McGillvray St., Ottawa, Ontario K1S 1K6, Canada ☎ 613/233-3663) is calling his debut tape *One* for reasons known only to him. Bordt, born in Stuttgart, West Germany in 1954, says he emigrated to Canada in 1956 because he couldn't get a job and didn't speak the language. Played trombone in high school but switched to piano "after a frustrating weekend composing a string quartet using the trombone." Got interested in synthesizers and computers simultaneously 13 years ago. Now divides his time between composing and "writing patches, assembler programs, or re-doing everything I've ever done because I just got a new toy." Unfortunately his music isn't as breezy as his text. It tends to be a somewhat stiff (blame the computer) repetition of simple 4-track tunes on ordinary analog voices. This is deceptive (or perhaps imperceptive) since his equipment list includes DX7, DX100, EX-800, Poly-800 and CZ-101 running off Magnetic Music's *Texture* from an Apple IIe clone. Sorry Michael—I loved your liner notes and letter.



We Are Not A Number is the new tape from **No. 6**, a six-piece ("pure coincidence") combo from Edina, MN (c/o ACC, Pentagon Tower, Box 36186, 55435 ☎ 612/854-1829 to be exact). It costs \$6 (another coincidence). Keyboard, bass, guitar, drum, and vocal duties are shared almost equally, allowing "their full rich sound to approach that of many duos and singles." One member, described as a Great Improvisor, "believes that there are no such things as mistakes in music... just random improvisation." (Gee, it's great having the column written for you.) Musically, *No. 6* sounds like almost any number you hear on the radio—which probably is the goal of this "broke, unknown, original act" (well, two out of three anyway).

Mark Hollingsworth has a great title in *Lesson in Frustration* (\$6 from Roseworth Recording, 1415 East 2nd, Port Angeles, WA 98362

☎ 206 / 683-6851). With keyboardist Jim Rosand on Ensoniq piano, DX7IID and DX7, he churns out a dozen duets for sax and electronic piano (and sometimes drumbox) which, unfortunately, seem to have been hard work or something. They're rather labored and heavy-sounding and just don't seem to be able to escape gravity. Even listening to them is frustrating.

Last on the survey of near-misses (I'm leaving out the really terrible tapes) is *Nihon Dreams* by **Todd Ragland** (\$7 from PO Box 1188, Danville, CA 94526). Ragland is a bassist primarily, performing on a Roland GR33B bass guitar synthesizer, Casio CZ-101, Roland TR-505 drum machine, and Amiga 1000 computer with *Soundscape* and *Sound Sampler* software. Now bass can be a lovely lead instrument, as proven by Jeff Berlin, Stanley Clarke, Mark Egan, Brian Torff, Bunny Brunel and the godfather of them all, the late great Jaco Pastorius. However, Todd Ragland doesn't go off on flights of imaginative fancy. He tends to stay pretty close to a simple progression, over a continuous drum pattern, which is like a Music Minus One without the anchor. Even on side two (which features 22½ minutes of sampled sounds from the various Asian countries Ragland has lived in the last five or six years), the music seems to lack a clear direction. It's just more of the same (from side one) interwoven with some droning atmospheres. The sounds are certainly interesting, as indeed Todd's bass work would be in a fuller setting, but by themselves, as presented, they lack a center.

It's like Joel Fairstein said, "lack of variation in the grooves and lack of direction in the composition." There, in a nutshell, he seems to have defined what separates the near-misses from the efforts with which this column began. He answered my question on what makes a near-miss before I even asked it. Only after you have mastered the big question of direction in the composition does it make sense to worry about the little details like "human feel." This answer comes out in **Wendy Carlos's** new *Secrets of Synthesis* (CBS 42333), a narrated tutorial along the same lines as Beaver & Krause's 1967 *Nonesuch Guide to Electronic Music*. Carlos's comments and examples on hocketing, pointillism, varying the vibrato, entrance and envelope only make sense at the level at which she herself performs. She is as good as she is because she's willing to pursue perfection all the way down to the littlest details. But it wouldn't amount to a hill of electrons without good music from the beginning. Without music, after all, electronic music is just electronics.

EM

Robert Carlberg was faced with a choice, in the early '80s, of expanding his home 4-track electronic music studio or buying a house. He became a music critic.

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—from page 101, Q SHEET

dom car passings, horns, voices, footsteps and so on.

Event Backtiming cures one of the biggest headaches in synching sound effects from samplers: synching a critical center point in a long sample to a point on the picture. Anyone who's tried to sync a car passing, gears shifting, a jet flyby, or a screeching car crash to video with conventional sequencers, or by flying the sound in by hand, knows what a pain this kind of operation can be. Q-Sheet's backtiming feature makes these effects a breeze: just type the SMPTE number where things must line up, play the sampled sound and hit a Mac key when the align point occurs; Q-Sheet automatically sets the sound's start point. Having this feature a few years ago would have saved me from turning dozens of projects over to a film editor and countless hours of frustration synching up sounds myself.

The only addition to Q-Sheet I'd like to see is a way to get edit lists (EDLs) into the program. In many projects an edit decision list (the SMPTE addresses of sound effects) has already been made and logged when the sound effects person starts to work. Being able to read this list of SMPTE numbers and labels into Q-Sheet would make it unnecessary for me to enter this information by hand. But this very small complaint does not stop Q-Sheet from being yet another reason to buy a Macintosh. (Digidesign has announced that they are working on an updated version of Q-Sheet that will allow you to load video EDLs in a number of formats, including the widely used CMX.)

CONCLUSIONS

Q-Sheet is an exceptionally well-thought-out and carefully de-bugged program. It may be the best thing on the market for MIDI mixing and sound effect placement. It's pricey for a casual buy, but if you need it, buy it. Q-Sheet rates a hacker's grin from both of us.

Thanks to Bruce Samuels and Rick Stevenson at Manny's and Doug Wood of Martin Audio for their time, expertise, forbearance, and gear. **EM**

Michael Levine and Bob Kinkel are New York studio musicians who work on jingles, records and films. Although rarely seen together they pooh-pooh rumors that they are really the same person; Bob is taller and has a better studio—Michael wears glasses and has his own jingle house.

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*Suggested retail price.

Dedicate



Dedicating yourself to your music often means working long hours at your mixer experimenting with effects. But, sometimes this can be frustrating. Like when you get the urge to add reverb to a vocal and you find yourself running around the back of your mixer fumbling with cables. Getting confused. While your concentration and your music suffer.

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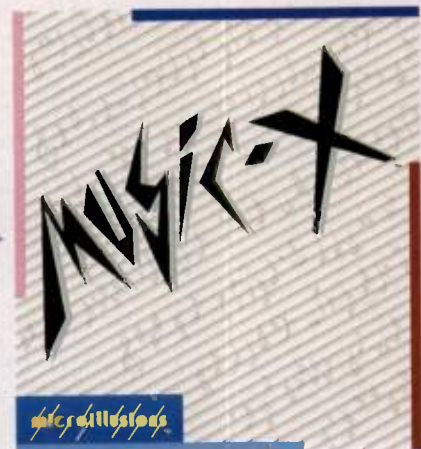
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SEQUENCER PAGE: Tape transport-type controls allow manipulation of up to 250 sequences; each contain 16 MIDI channels worth of data.

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LIBRARIAN: A configurable librarian is included with the program. You can teach the librarian how to communicate with any MIDI instrument which outputs system exclusive data.

EDITING: An impressive battery of editing features will be supported. In fact, new editing features are being added daily as we interact with our network of working, professional musicians whose input has greatly contributed to the quality of this program.

COMMITMENT: Our commitment to music production does not stop here. A future product, Patch Editor Construction Kit, will allow you to create graphical patch editors for virtually any synthesizer you may own. Some technical knowledge will be required, but since patch editors, once created, can be traded between users, you should have no problem getting an editor for your needs.

THE POWER: Part of the power of Music-X comes from the computer it was created for: The Amiga, one of the most powerful and inexpensive personal computers available. At



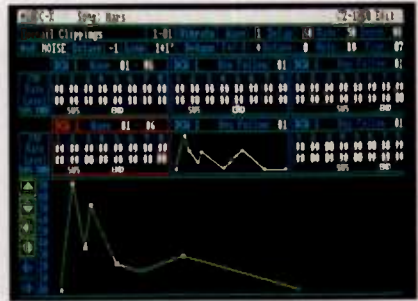
KEYMAP EDITOR PAGE: Create keymaps by dragging the mouse over a selected area of the keyboard. The highlighted region can then be redefined in terms of real-time behavior.

last you can run these many powerful applications in an environment that is a pleasure rather than a chore to use!

MICRO MIDI: Although Music-X will work with any of the many MIDI interfaces for the Amiga, we offer our own MIDI interface which we feel is a cut above. It features six outputs (each output switchable as OUT, THRU or OFF), two switch-selectable inputs, a channel loading indicator, and an external clock output (sync/start stop) for synchronizing older, non-MIDI drum machines, and a serial pass-thru!

MICRO SMPTE: This complete SMPTE Reader will allow Music-X to synchronize with video or audio tape decks. It connects to the Amiga parallel interface and includes a pass-thru so as not to interfere with printer operation. Our Micro SMPTE is compatible with all Amiga models (A500/A1000/A2000).

PHOTON VIDEO: Photon Video is a complete, integrated video animation system. It includes facilities for both 2-D and 3-D animation, as well as automatic tape transport control and real time playback of rendered images. Our 3-D rendering module supports variable light sources, shadows, transparency, and reflections in a 3-D environment. Other modules include Cel Animator, Object Editor and Transport Controller with SMPTE support.



PATCH EDITOR: A sample patch editor (CZ-1000) of the type that will be included with the product.



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