KLAUS SCHULZE

Electronic MUSICIAN

AUGUST 1987 A MIX PUBLICATION U.S. $2.50/CANADA $3.50

Computers and Music:

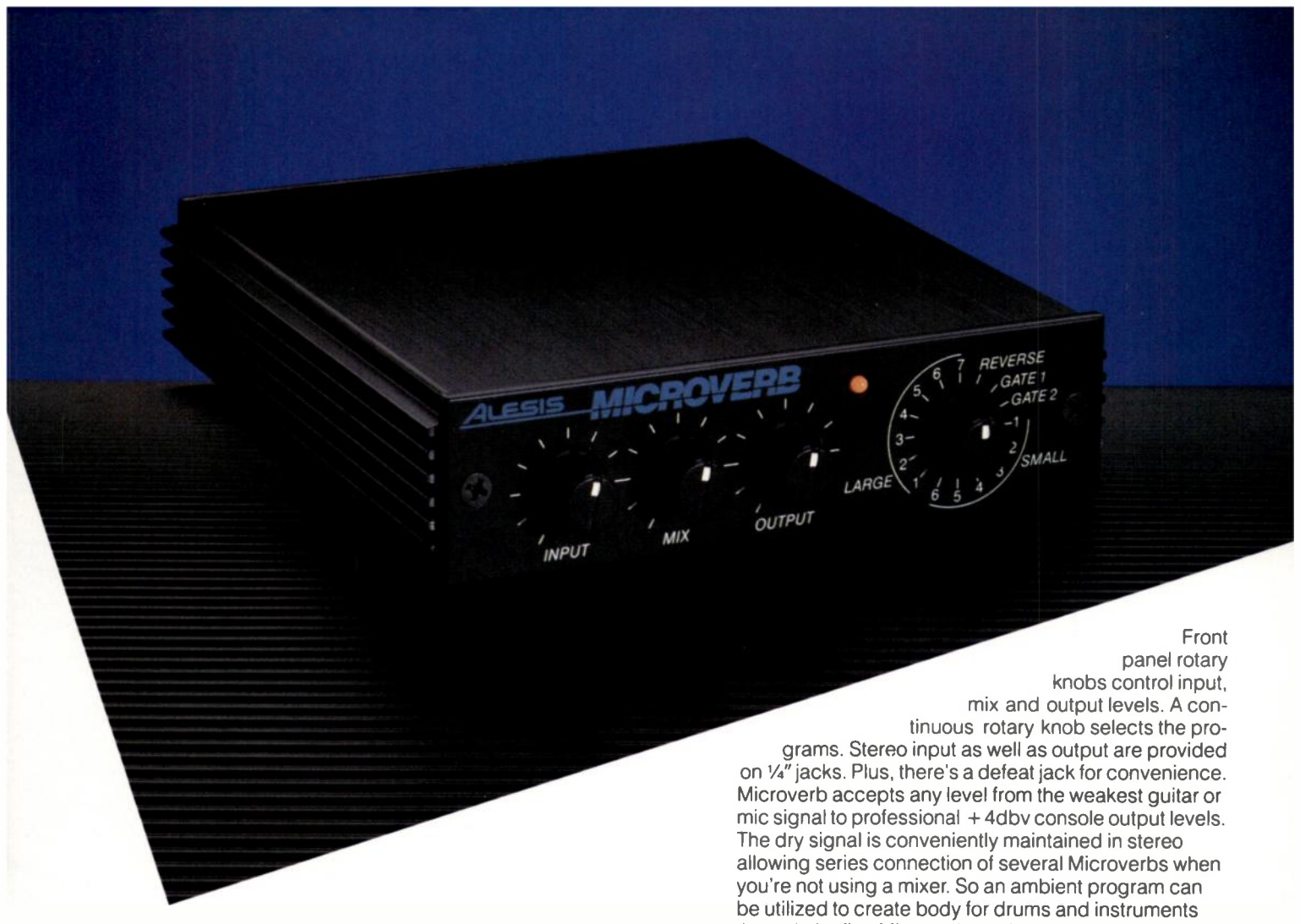
CHOICE MEETS CHANCE

MUSIC LAWYERS:
What You Need To Know

BUILD A MIDI SWITCHER

DO-IT-YOURSELF SOFTWARE

IEWS: Passport Master Tracks for the Mac • Kawai R-100
m Machine • JL Cooper MSB+ • Sonus FB-01 Design •
ıge Multi-temperament Disk • Korg KME-56 EQ



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

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

Bold statements need factual support. How about these facts:

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

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

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

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

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

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

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

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Alesis Corp. PO Box 3908
Los Angeles, CA 90078

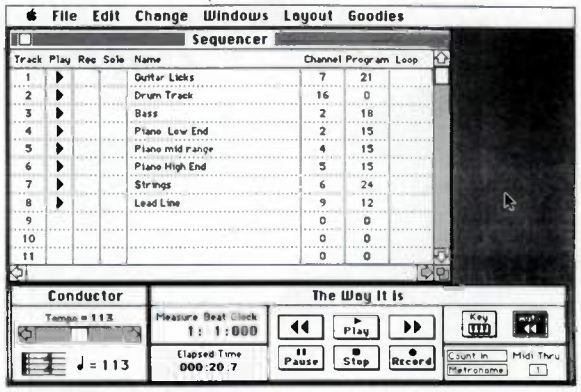
LONDON:
6, Letchworth Business Center,
Avenue One, Letchworth,
Hertfordshire SG6 2HR

ALESIS
STUDIO ELECTRONICS

"Your song sounds great, but . . .

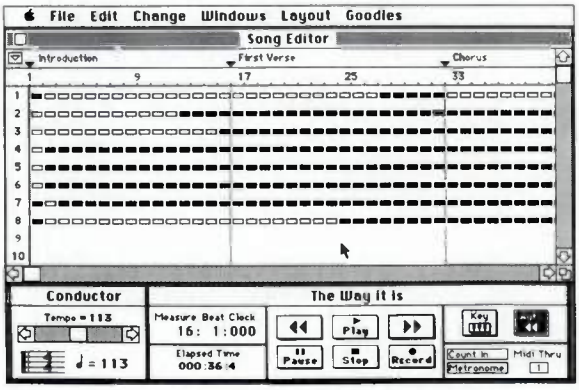
I'd like you to change a few things. The bass needs to be doubled or thickened up a bit, and repeat the horn-fill on guitar in bar sixty-eight. You went a little overboard with the pitch-bend in the middle of the solo, but I think it'll sound fine if you bring up the velocity on each chorus. Oh and by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

Demanding response like this from conventional Macintosh™ MIDI sequencers will guarantee you an all-night session. With Passport's MASTER TRACKS PRO™ for Macintosh™ you can tackle complex sequencing problems in *minutes,* not hours. That's because MASTER TRACKS PRO™ provides you with fast, visual control over your music unrivaled by any other sequencing system.



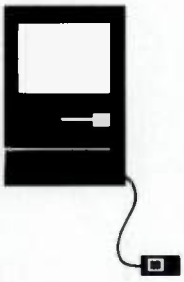
Multi-Track Sequencer

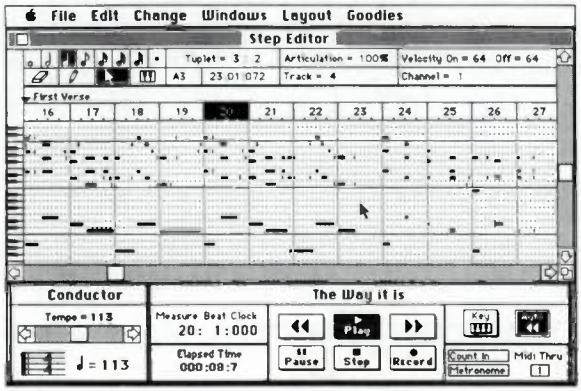
- Record or play from any point in the song
- Control sequencer using on-screen transport
- Sync to SMPTE via MIDI song pointer



Song Editor

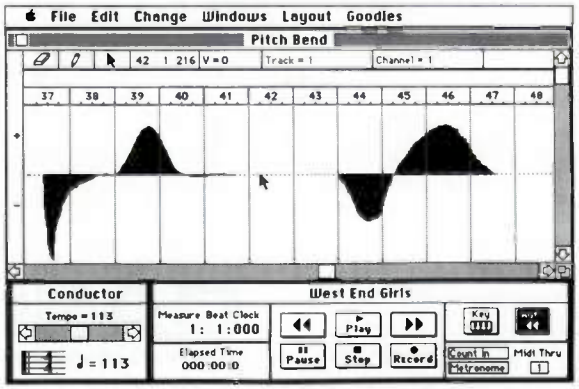
- See the structure of your song over time
- Select meter, tempo and beat for each measure
- Use cut, copy, paste and mix editing to build songs





Step Editor

- See and edit tracks of MIDI data
- Step input notes using mouse or MIDI controller
- Edit individual events or entire phrases



MIDI Data Editor

- Plot Pitch Bend, Aftertouch, Modulation MIDI data
- Zoom in and out on individual events
- Draw changes on screen to edit MIDI data

- 64 tracks for real-time or step-time recording
- Complete implementation of all standard sequencer features
- Extensive control over all MIDI events
- Visually display MIDI events over time
- 240 clocks per quarter-note resolution
- SMPTE sync via MIDI song pointer
- Independent track looping
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- Change duration, velocity, channel, continuous, transpose
- Cut, copy, clear, paste and mix editing of all data
- Insert or remove time anywhere in a piece
- Display elapsed time of a given section
- Rebar any section to any meter
- Automatically adjust tempos to fit a given time
- Quantize while recording or editing
- Sysex librarian for MIDI system exclusive data
- Store presets, sounds, samples, drum patterns on diskette
- MIDI keyboard can control sequencer
- Windows scroll automatically on playback

This is only a sample of MASTER TRACKS PRO's innovative and powerful MIDI sequencing capabilities. Check it out at the Passport Dealer nearest you or call (415) 726-0280 today to receive a complete catalog of Passport products.

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Requirements:
Macintosh 512K, 512Ke, Plus or SE, MIDI interface and MIDI instruments.

MASTER TRACKS PRO™

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But what really takes the shackles off your creativity is the Casio DZ-1 translator they hook into. The DZ-1 accepts up to eight pad inputs, one of which can alternate between two sounds. Each pad can be assigned different MIDI Channel, Program and Note Numbers so it can control different pitches and timbres from any MIDI sound source. This could be a drum machine, like the Casio RZ-1; or a synthesizer, like our CZ-1; or a sampler, like our new FZ-1.

In addition, a total of four different set-ups can be stored in the DZ-1's memory, accessible immediately with a push of a button. So you can blend any combination of sounds that MIDI offers, for unlimited playing potential.

And the DZ-1 isn't limited to inputs from electronic pads. It accepts trigger inputs from mixing boards or from pickups attached to acoustic drums as well. This means you don't have to throw out the old acoustic kit you love to benefit from the incredible creative freedom that MIDI now offers.

Another nice touch is that the DZ MIDI drum system, with all it offers, is roughly $200 less than the nearest comparable model. If you feel like you're stuck playing the same old drum sounds, get your sticks on a Casio DZ drum system and play the whole band.

CASIO®
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VOL. 3, NO. 8 AUGUST 1987

Electronic MUSICIAN

A MIX PUBLICATION

DEPARTMENTS

COVER

A computer can create strings of numbers at random, or from an algorithm. With the right software, it can apply these numbers to composing music. Our cover, by artist Robert Kopecky, is a graphic fantasy suggesting this month's theme: composing by algorithmic and random number generation. Can the right algorithm cajole a coy muse into action? The answer may lie in today's intelligent instruments.

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We are interested in receiving unsolicited manuscripts but cannot be responsible for them and cannot return them unless they are accompanied by a stamped, self-addressed envelope. We urge you to send for our "How to Write for EM" guidelines.

Display advertising rates, specs and closing dates are available upon request.

ARTICLES

COMPUTERS AND SOFTWARE

RECORDING

DO-IT-YOURSELF

APPLICATIONS & BASICS

INTERVIEW

REVIEWS

Editor's Note

A reader recently wrote in and asked how we will be able to retain our objectivity and integrity now that we have more and more advertisers. It's a good question that deserves an answer.

First of all, **EM**'s editorial directive has always been to serve the readers first. One of the reasons manufacturers buy ads in the magazine is that they value the service that we provide to the music community, and want to support those efforts. Some advertisers have indeed been quite upset over reviews and stories we have run, but they have the foresight to recognize that canceling their ads would only hurt their cause, not help it. In fact, if we complain about some aspects of a product, what better place is there to advertise an improved version of the product that fixes the bugs we complained about?

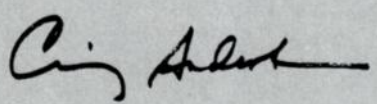
Actually, advertiser pressure has been surprisingly subdued. Part of that, I think, is because we strive for *fairness* in our equipment reviews. Clever little nasty one-liners may be good for the writer's ego, but they don't convey a lot of information. I consider it good that some people will read an **EM** review and consider it negative, while other people will read the *same* review and think it was positive. All this means is that the product doesn't suit the needs of the first group, but does fit the needs of the second. Our goal is not to tell you how to think—we'll tell you what we know about something, and you can decide whether it sounds good to you or not.

Credibility works both ways, too. If we run a negative review that accurately portrays a piece of gear, then if the company comes out with a vastly better version and we give that a good review, the company will benefit. Had we said their first effort was great, people would have no reason to believe the second review either.

Another reason we probably don't get much pressure is that we don't publish all that many unfavorable reviews (though some manufacturers might disagree). The reason for this is pragmatism. We don't have enough space to review every electronic music product that is released, and we'd rather tell people about something nifty than spend the same space on some dumb product that might be pulled from the shelves before the magazine hits the street anyway. Another reason is that, quite simply, products are getting better. Many companies are made up of musicians who struggle with the same problems we do. They put their hearts and souls into their work, which tends to produce superior products. Those are the ones we want to spotlight.

Paradoxically, having more advertisers gives more independence because if an advertiser withdraws its financial support—which is one method of indicating displeasure—it doesn't make as much difference as if you had only a couple of advertisers. Frankly, we reach people who represent *the* prime market for electronic music and computer equipment. It doesn't make sense for an advertiser to pass up an opportunity to address this audience.

You, the reader, are the reason why we put out this magazine. If we maintain our integrity, we retain our readers. And if we retain our readers, the advertisers will keep buying ads in order to reach those readers . . . which gives us the freedom to maintain our integrity. That's the kind of circuitous reasoning I like.



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and another.

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PC MAGAZINE EDITOR'S CHOICE

After three years of refinements, **Sequencer Plus** has become the most **powerful**, most **professional** and most **versatile** MIDI sequencing software available in the world today.

So how could we improve it? By making it both **more powerful** and **more accessible.**

Introducing, the **Sequencer Plus Series: Three new versions,** each with differing levels of sophistication offering a system that will *grow with you* instead of being outgrown.

Sequencer Plus Mark III (Sp3) is a *"No Compromise" powerhouse!* 64 music tracks with independent offsets, tempo track, song position pointer, chase mode, extensive and selectable MIDI Filtering, 17 transform functions, block editing of multiple tracks, 11 memory buffers and a list of additional features that reads like a computer musician's wish list!

Sp3 also transmits patch files created with **Patch Master,** our unique *MIDI network organizer/universal librarian* program that supports virtually every major synthesizer.

Sequencer Plus Mark II (Sp2) is the perfect production tool for just about all of your most demanding musical creations. 32 music tracks, tempo track, 6 memory buffers, programmable play range, Song position pointer, intricate MIDI data editor, individual track load/save, and more!

Sequencer Plus Mark I (Sp1), at $99.00, is the *least expensive PC sequencer on the market* and is the perfect way to ease into computer music. 16 tracks, each with cut and paste operations, merging, looping, quantizing, transposition, independent MIDI channel, MIDI program and solo/muting! Complete freedom of time signatures and polyrhythms, 3 memory buffers, extensive punch-in capabilities and more! *Enough music-making power to satisfy even a seasoned pro!*

The **new Sequencer Plus series** is the choice of demanding musicians, composers, producers, and recording studios around the world- backed by a company with over a decade of experience in producing quality electronic music products. Best of all, it doesn't demand that you be a computer programmer, just a musician...and isn't *that* a relief!

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Letters

MIDI Studio Synchronization Problems

Thank you for Paul Lehrman's fine "20 Tips for a DIY MIDI Recording Project." One of the tips uncovered a real problem for people like myself.

I operate a MIDI studio for the purpose of composing only. I sequence on a Mac with Total Music, using low-cost sound generators such as the FB-01 and Ensoniq Mirage to get a rough idea of the arrangement and voicings. Then I take my data disk to another studio, plug it into their Mac, and plug in some high-rent sounds from the Kurzweil, Oberheim, and Emulator for playback.

Taking into consideration that there should normally be a difference in attack times between, for instance, a string patch recorded from my FB-01 and a string sample played back on their Emulator, there still seems to be something rhythmically amiss.

In Tip #4, are you saying that the MIDI routing schemes (meaning what synths are connected from what other synth's Out or Thru ports and so on) must be identical at both *my* studio and any studio at which I want to play back my sequences? Is there any other way to make this mess kosher?

B.J. Leiderman
New York, NY

B.J.—There are several ways to overcome this problem. First is to identify if any particular instruments significantly lead or lag the others. One way to check this is to program percussive patches on all your synths, then trigger them simultaneously and see which ones are out of time with the others. Even if only one instrument is a little out of sync, the whole tune suffers. Total Music, and many other software programs, offer a track-shifting feature where tracks can be delayed or advanced one clock pulse at a time to tune out timing differences.

Also, the Emulator II is known to typically have a 10 ms delay before the onset of a note. Note that there is now a hardware mod that significantly reduces this; having this mod done might solve one problem immediately. And don't forget that patches usually have to be tweaked for each instrument so that sounds fall "in the pocket."

If all else fails, you can use audio delay lines to tune out timing differences, or try the trick of flipping a tape over so that it plays backwards and then recording the sync track (usually SMPTE) into an empty track. Re-flip the tape, and the newly recorded sync track will be ahead in time compared to the original sync track. Now use a delay line to delay the SMPTE for each sequencer track that you layer on to the tape, and adjust the amount of delay to tune out timing differences. To accurately check timing differences, feed a metronome click into one input of an oscilloscope and feed a synth (set for a percussive patch) into the other input. This allows you to check for phase differences between the two signals. For more information on using oscilloscopes to check phase, check your local library for books on using electronic test instruments.

Yes, Women Like Tech Toys Too

Wow. What a breath of fresh air to read your April editorial, encouraging professionals to treat each other as just that regardless of their sex. As a female computer professional newly interested in the MIDI side of the coin, I encourage and welcome a 20th century, non-sexist attitude by men in the music industry. Men are starting to realize that yes, things have indeed changed in the last few decades, and that their outdated perception of women singularly as "sex sells" marketing tools must change also.

Guys, all women are asking for is fairness: the opportunity to be judged for talents and abilities on the same scale as anyone else, and to have the opportunity to apply and prove these abilities. Face it, a job well done is a job well done, regardless of who accomplished it. As far as I'm concerned, competence speaks volumes in itself. Technical ability is not, and should not be envisioned as, belonging solely to the male of the species.

I feel that my biggest hurdle in getting into the MIDI and music arena has nothing to do with the spec sheets, the programs, and the tech talk (that's second nature for me)—it's simply the attitude of some people still clinging to the dark ages. I hope that more people take an enlightened attitude like the one in your editorial. Keep up the great work, I love your magazine!

Michelle Dunford
Toronto, Canada

Dare to Service

We read with great interest Alan Gary Campbell's article "Dare to be Serviced" (April) and, as to be expected, found it not only interesting but entertaining as well. From time to time, I have the opportunity to swap stories with Jim Mothersbaugh at Roland and Dan Ramsauer at Sequential and not surprisingly, we all seem to share the same colorful experiences if not the same service customers. Here is one of our favorite tales from the annals of Oberheim Customer Services:

Several years ago, I received a distress call from a DMX Drum Machine owner from the East Coast whose month-old instrument was displaying several uncommon symptoms all at the same time. After much deliberation with the owner, we decided that it was best that the unit be returned directly to the factory. Accompanied by the sales receipt and a lengthy list of the malfunctions, the DMX arrived emanating a rather foul smell. Opening the unit revealed the circuitry to be encrusted with some sort of crystallized liquid. I called the owner and, after grilling him for more information, he finally admitted that his cat had urinated into the unit while powered on (not that the damage would have been that much less severe had the unit been off at the time). Servicing requirements included massive component and sub-assembly replacement plus an additional 30 minutes of labor as Lead Technician Tom Dunn took the chassis out into the parking lot and literally washed down the metal work with a garden hose. *Moral of the story: The Manufacturer's Warranty does not cover the acts of domesticated animals either, nor will most insurance policies for that matter.*

David M. Bertovic
ECC/Oberheim Customer Services

Additions & Corrections

Credits: In "The Evolution of a Musical Art" (May, 1987) all the photos of Emmett Chapman are by J. Daniel Chapman; the photo of Tony Levin is by Armando Gallo; the photo of The Stick™ tailpiece is by Randy Fugate.

In "First Take" (June,1987) the photos of the *Coda* book and the Enharmonik C-64 Patch Librarian screen displays are by Bill Kinneman.

In "First Take" (June, 1987) the credited patches in Volume 1 of the Maartist CZ Ram Cartridges were created by Michael Aaron Becker, not Tom Becker.

Tips (May): Alan Campbell writes "I'd like to correct an error on page 74; the sample Conquest MIDI cable that I tested was a *ten-foot* unit, misidentified as a 20-foot unit. (Obviously, I wasn't word-processing near the service bench!) The correct average measured capacitance should be *16* pF per foot, not 8 pF; the total cable capacitance is correct. Even considering this correction—a twofold increase—the cables still exhibit remarkably lower capacitance than any others I've tested."

Random Rhythms (April): The Commodore version of the listing has two bugs. Line 140 currently reads:

```
140 DIM R$(16).P(16):CL$=""
```

Replace the period with a comma so the line reads:

```
140 DIM R$(16),P(16):CL$=""
```

Also, Line 680 currently reads:

```
680 FOR DBEAT=1 TO 16
```

The variable "dbeat" should be "beat" and the line should read:

```
680 FOR BEAT=1 TO 16
```

These fixes should make things work properly.

CZ Patch Librarian (Feb.): Line 80, which reads:

```
80 DS=34816:DE=DS+4096
```

should read:

```
80 DS=34816:DE=DS+4112
```

This is due to the fact that although there are 4096 "data" bytes present in the block of data that constitutes a bank, there are also 16 End-of-Sysex bytes (F7) imbedded in this block, which brings the total number of bytes to 4112. Our thanks to reader William Steidtmann for hunting down and exterminating this bug.

You Asked For It

Professional musicians like to call 360 Systems to talk about their projects, and to tell us how they've used our Midi products. We've been particularly interested in what they had to say on Midi Bass, because after all, they use it every day in studio work, and we don't.

So 360's Design Group made up a musician's "wish list" with all the new ideas that our studio friends suggested for a new generation of Midi Bass.

Here's What the Pros Wanted:

- **Make it rack mount.** We did. 1¾" high, AC powered, no "wall adaptor."
- **It should hold more sounds.** We agree; now it holds 16.
- **Make the filter and loudness programmable.** We did.
- **How about "zones" for different sounds on the keyboard?** Good idea. Pro Midi Bass has two programmable zones, with two sounds on each.
- **Velocity Crossover™ from one sample to another?** Absolutely. Now choose any two samples, and change at the velocity of your choice.
- **A "pro" product needs a good display of all its settings.** So we've included a full two-line LCD display that tells all. It even looks great.
- **Decay and Release should be programmable too.** And now they are.
- **Keep the price down! I've got enough $1,800 samplers.** We've done better than that. You could buy *three* Pro Midi Basses for the price of a sampler.

A Good Idea Gets Better

Professional Midi Bass keeps the best features of the original. Like being able to play the instant a patch is called—no disk loading time, no lost disks, and no waiting. And multiple-sample bass sounds, with the realism of the original instrument on every note.

You don't have to be a professional musician to use all the new features on Pro Midi Bass. But we think you'll agree that the concept is entirely professional. We can't show you everything on Pro Midi Bass here, so visit your favorite music store and see the next generation of a classic.

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360 Systems

It's Here

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▶A series of **carrying cases** (prices range from $44.95 to $64.95) are available for anything related to electronic music that is rack-mountable or smaller. The cases are of double-wall polyethylene construction and the foam interiors are custom die-cut to fit the customer's particular unit.

Angel Case Co.
9 S. Quarantina St.
Santa Barbara, CA 93103
☎ 805 / 966-9682

▶**MIDI Direct** ($2,700 for 28 inputs; $4,400 for 64 inputs), a microprocessor-based console automation system (designed in cooperation with JL Cooper) for any NEOTEK console, will mute through the MIDI bus, communicate with MIDI sequencers and editors, support Song Position Pointer, and offers two types of editing modes for changing up to 64 automated mute switches. Simultaneous mute/unmute can automate changes in level, EQ, efx sends and routing.

NEOTEK Corporation
1154 West Belmont Avenue
Chicago, IL 60657
☎ 312 / 929-6699

▶The **Universe of Sounds™ Volume Two** CD-ROM sound library ($995; single floppy disks are $19.95) for the Emulator II™ and Oberheim DPX-1™ holds samples of acoustic instruments, synths, electric guitars and basses, orchestral hits, ethnic instruments, Foley, and SFX. All are processed by Digidesign's Sound Designer for sound and loop quality. Customers with Macintoshes and Sound Designer can receive samples via modem, and for those who already own large libraries, Optical Media will record them on custom CD-ROMs.

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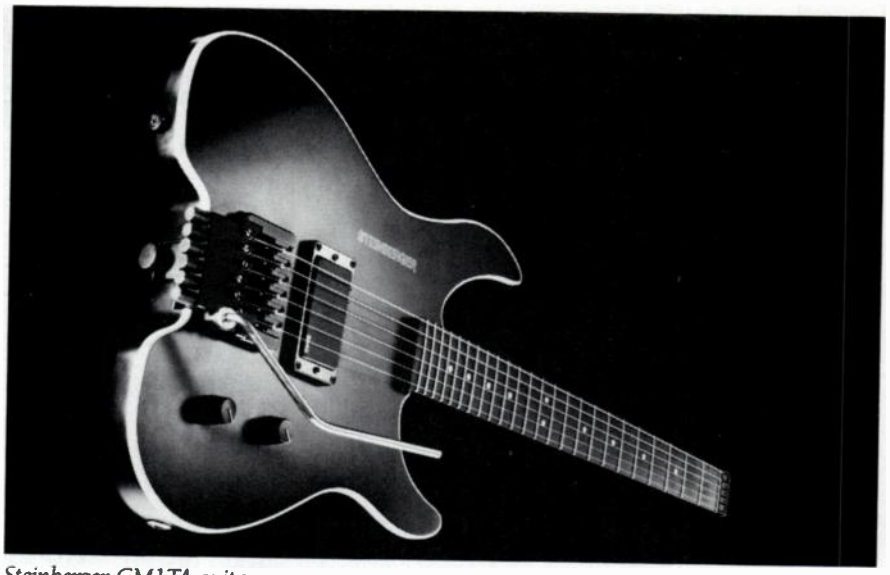
Los Gatos, CA 95030
☎ 408 / 662-1772

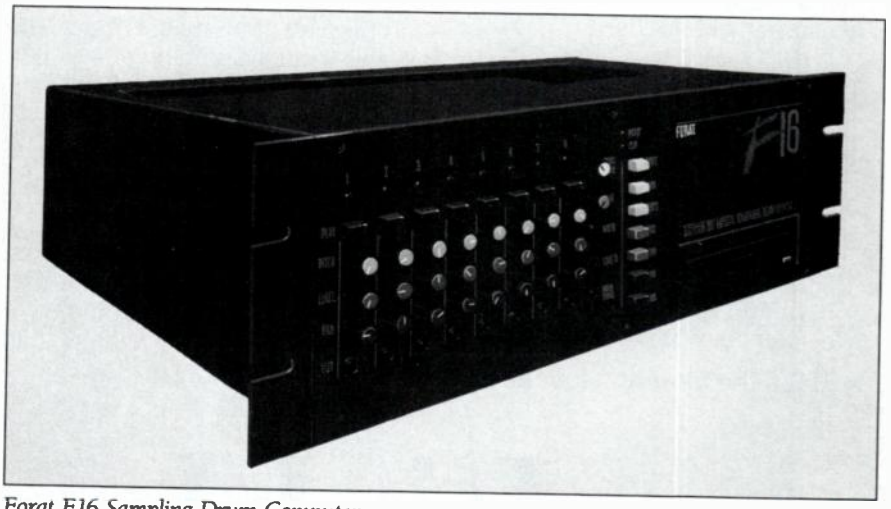
COMPUTERS

▶**Bandwagon** ($1,595) is a road-ready, portable, MS-DOS microcomputer configured for the needs of the performing musician. Features include 640K RAM; 8 MHz processing speed; two drives; Hercules graphics compatibility; 9-inch amber monitor; six expansion slots, three half-height drive slots; locking AT-style keyboard; padded carrying case; and a one-year warranty. Also available are a 3.5-inch 760K microdisk drive and a 20 MB hard disk drive. The unit measures 7½ inches high, 17 inches deep and 18¾ inches wide, and weighs 35 pounds.

RPMicro, Inc.
4 North Shore Center
Pittsburgh, PA 15212-5805
☎ 412 / 231-5500



Steinberger GM1TA guitar



Forat F16 Sampling Drum Computer

ELECTRONIC GUITAR

▶The **GM1TA** guitar ($1,470) is a full-body model collaboratively designed by Genesis' Mike Rutherford and English designer Roger Griffin. The neck is made from Steinberger Blend™ (a proprietary fiber-reinforced composite) for ultra-rigid construction that is said to maximize brilliance and long sustain. The TransTrem™ vibrato tailpiece can transpose to six different keys to create radical changes in string tension, chord voicing and harmonics.

Steinberger Sound Corp.
122 S. Robinson Avenue
Newburgh, NY 12550
☎ 914 / 565-4005

ELECTRONIC PERCUSSION

▶The **F16** 16-bit sampling drum computer (prices start at under $2,500) provides individual tune, volume, and pan controls (along with direct outputs) for each of up to 16 voices. Half a megabyte of memory is provided for *each* sound, thus allowing full-bandwidth six second samples. The unit can be dynamically

ave goodbye to one-color sound

The full-color sound of the ESQ-1 Digital Wave Synthesizer makes other synths sound . . . well . . . black and white by comparison.

After all, a broad pallette of sound is your first criterion for a synthesizer. And the major international music magazines who've reviewed the ESQ-1 seem to agree.

The tone colors possible with 3 digital wave oscillators, 4 envelopes, 4 DCA's, 3 LFO's and 15 routable modulation sources for each ESQ-1 voice impressed KEYBOARD magazine's Jim Aikin. "The ESQ's voice offers far more than what you'll find on a typical synthesizer—even on some instruments costing twice as much".

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

There are hundreds of ESQ tone colors available on cartridge, cassette and disk. And now, each ESQ-1 includes an Ensoniq Voice-80 Program Cartridge. Added to the 40 internal programs, that's 120 great keyboard, acoustic, electronic, percussive and special effect sounds right out of the box.

MUSIC TECHNOLOGY's Paul Wiffen had a great time mixing colors with the ESQ-1's 32 on-board waveforms and 3 oscillators per voice. "After a few minutes of twiddling, you can discover that, for example, an analog waveform can make the piano waveform sound more authentic, or that a sampled bass waveform can be the basis for a great synth sound. Fascinating stuff!"

Even though its flexibility is unmatched in its class, creating sounds on the ESQ-1 is simple and intuitive. Mix a little blue bass with some bright red vocal and pink noise and get a nice deep purple tone color.

But there's one color you won't need a lot of to get your hands on an ESQ-1—long green. The ESQ-1 retails for just $1395US.

There are sound librarian programs for the ESQ and most personal computers, so you can save and sort your creations quickly and easily. If you'd rather just plug it in and play, there are hundreds of ESQ sounds on ROM cartridges, cassettes and disks available from Ensoniq and a host of others.

The easiest way to see the possibilities for yourself is to follow the wave to your authorized Ensoniq dealer for a complete full-color demonstration.

For more information and the name of your nearest Ensoniq dealer call: **1-800-553-5151**

ensoniq®

ENSONIQ Corp, Dept. E, 155 Great Valley Parkway, Malvern, PA 19355 □ Canada: 6969 Trans Canada Hwy. Suite 123, St. Laurent, Que. H4T 1V8 □ ENSONIQ Europe BV, Domplein 1, 3512 JC Utrecht, Holland □ Australia: Electric Factory, 188 Plenty Rd., Preston, Vic. 3072

Fostex Model 460 multi-track cassette deck/mixer

AMR SyncController

triggered using drum pads, prerecorded drum tracks, or a drum machine's trigger outputs; the trigger response time is 100 microseconds.

Forat Electronics
11514 Ventura Blvd., Unit 1
Studio City, CA 91604
☎ 818 / 763-3007

▶**Acoustic Drum Triggers** (set of six for $199.50), surface-mounted electronic triggering devices, use high voltage piezo-type sensors for dynamic sensitivity, an aluminum alloy housing to withstand drumstick hits and reduce interference with head vibration, rubber double-sided adhesive, shielded cable and Switchcraft connectors. Also available is a fact sheet, *Triggering Tips for the Modern Drummer.*

Phi Tech
4605 North Stiles
Oklahoma City, OK 73105
☎ 405 / 521-9000

RECORDERS

▶**The Model 460** ($2,495) is the first

multi-track cassette deck/mixer to sync to video or audio recorders using SMPTE/EBU and the updated (3.0 software) Fostex 4030 synchronizer. Features include Dolby B and C; 1⅞ and 3¾ ips operation with separate EQ circuits for each speed; auto-locate; zero return and auto repeat.

Fostex Corporation of America
15431 Blackburn Ave.
Norwalk, CA 90650
☎ 213 / 921-1112

SIGNAL PROCESSORS

▶The **GP-8 Guitar Processor** ($995), which uses chips from BOSS effect boxes, includes Delay, Chorus, EQ, Distortion, Turbo Overdrive, Phaser, Compressor, Dynamic Filter, memory for 128 programs, and MIDI control. The effects can be programmed in any order, with any setting, into any memory location. One button calls up an entire sound and displays which effects are used and their total volume. MIDI In allows control by sequencer or any MIDI controller. The optional FC-100 Foot Controller ($295) and EV-5 Expression Pedal ($79.50) allow real time editing of any parameter.

RolandCorp US
7200 Dominion Circle
Los Angeles, CA 90040-3647
☎ 213 / 685-5141

SOFTWARE

▶**TURBO TXZ** ($79) is a memory-resident, non-copy-protected editor/librarian for the Yamaha TX81Z that works with the IBM PC/XT and compatibles. All voice parameters are edited from one screen and sent immediately to the TX for playback. Two voice banks are displayed to allow voice and voice bank creation and editing. Performance mode allows the editing of performance data. Effects, microtunings, system data, and program change data can also be changed and saved. A demo disk without MIDI functions is available for $5.

Poshek Productions
838 Van Dyke Dr.
Laguna Beach, CA 92651
☎ 714 / 497-7210

SYNCHRONIZATION

▶The **SyncController** SMPTE-based controller/synchronizer ($999.50) locks two machines and also derives MIDI time

code and Song Position Pointer from a master SMPTE track to allow synchronizing MIDI sequencers and instruments to SMPTE. As a transport controller, the unit offers 99 programmable events for punching, looping etc., and works with a wide range of both master and slave machines.

AMR
PO Box 1230
Meridian, MS 39301
☎ 601 / 483-5372

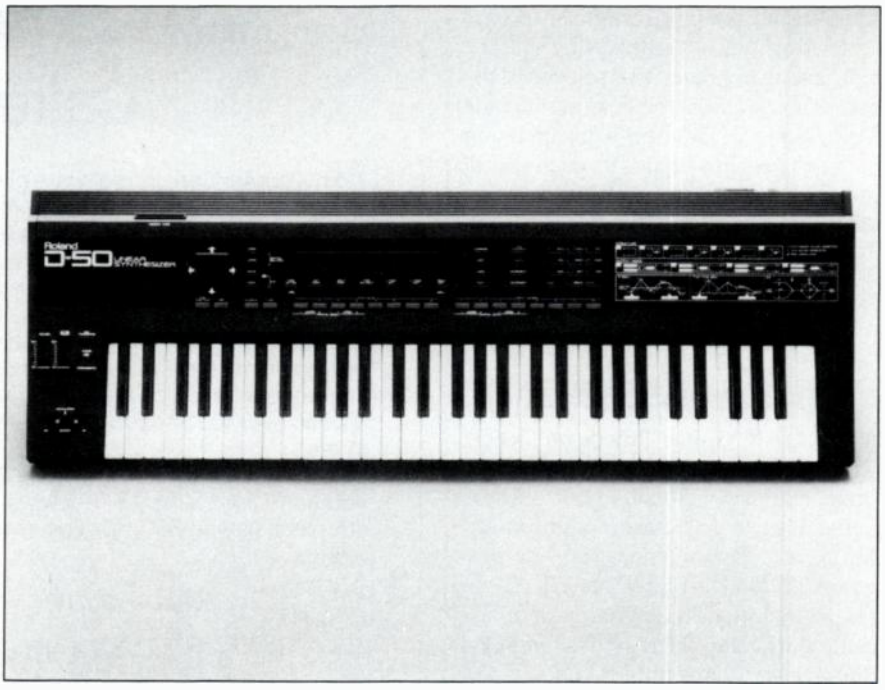
▶**Poor People's SMPTE (PPS-1)** ($199.50) syncs equipment that accepts Song Position Pointer (such as sequencers and drum machines) to multi-track decks, and has them "chase" the tape to eliminate the need to start at the beginning of a sequence each time the tape is started. PPS-1 reads MIDI sync and stripes the tape with a special FSK tone that, on playback, syncs the MIDI device to the tape. PPS-1 also supports such MIDI time code-driven packages as the Auricle *Time Processor* and Digidesign's *Q-Sheet*.

JL Cooper Electronics
1931 Pontius Avenue
West Los Angeles, CA 90025
☎ 213 / 473-8771

Sound & Vision Micro-1 tape machine controller

▶The **Micro 1** tape motion controller (introductory price $249) is a microcomputer-controlled hand-held unit that works on all reel-to-reel decks. The unit provides direct search-to-cue, auto punch-in/out, tape and record loop with pre-roll, rehearse mode, full transport controls, and trigger out.

Sound & Vision
689 Benson Way
Thousand Oaks, CA 91360
☎ 805 / 496-1518



Roland D-50 digital synthesizer

SYNTHESIZERS

▶The **D-50 Digital Synthesizer** ($1,895) uses Linear Arithmetic (L/A) Synthesis, which combines digitally synthesized waveforms with over 100 PCM samples and then processes them to produce sounds. On-board digital processing, which can be programmed differently for each patch, includes ring modulation, parametric EQ, chorus, and reverb. Other features include choice of eight or 16 voices; two split keyboard modes (sending on one or two MIDI channels); and sound storage on new IC magnetic cards.

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

OTHER NEWS

▶This summer, the **Juilliard School** will install a complete Electronic Music Studio in Juilliard's Lincoln Center building, using state-of-the-art equipment loaned by **Yamaha**. The studio's equipment will include several workstations, each consisting of a DX synthesizer, QX sequencer, and related equipment. The primary users will be composition students at the undergraduate, as well as graduate, levels. Yamaha expects the installation to provide feedback that will help develop better products in the future for both educational and performance applications.

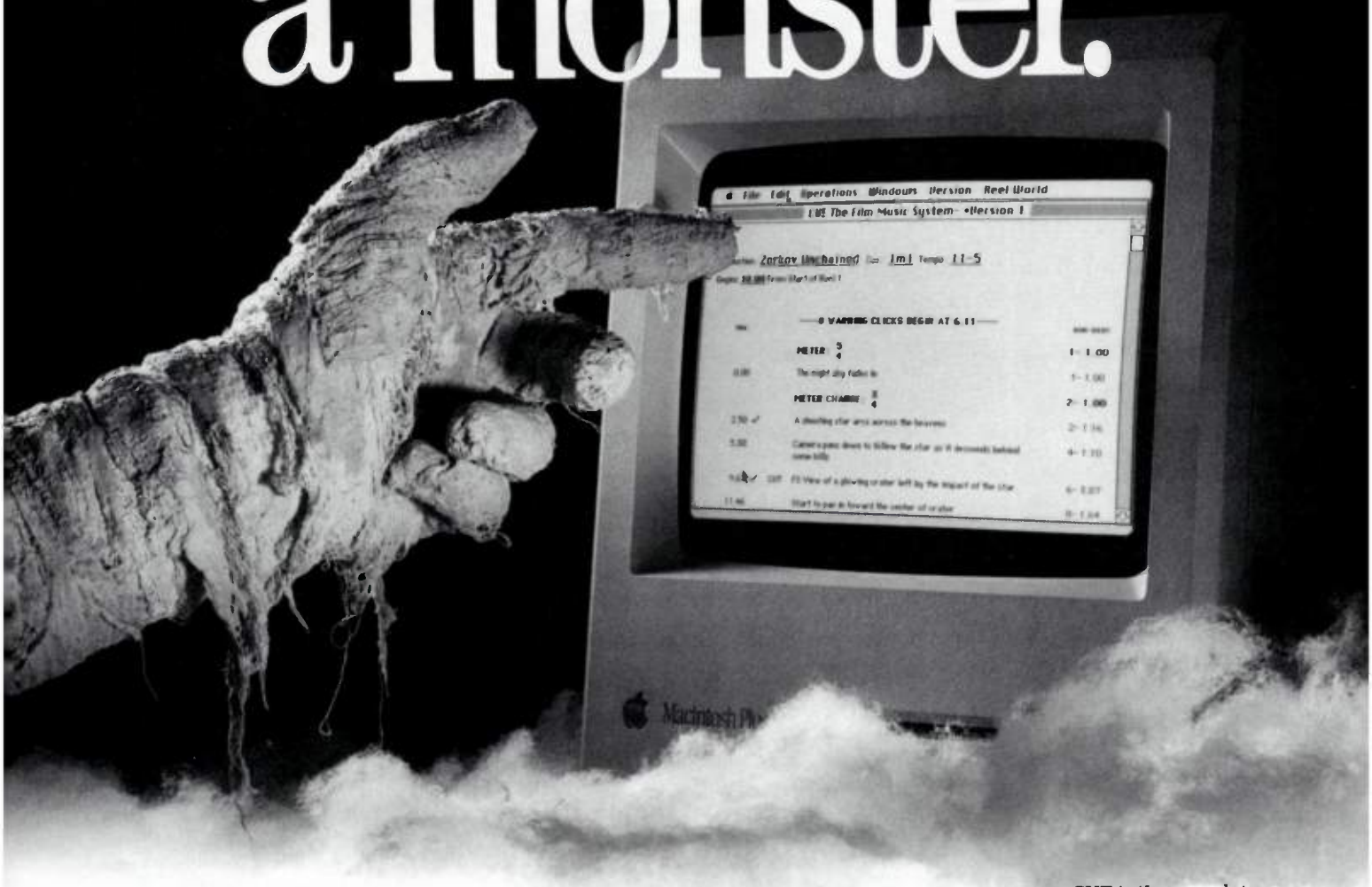
Yamaha will also supply a complete live performance system for the school's 933-seat Juilliard Theater to facilitate the school's ability to include live electronic music performance as part of the regular schedule of concerts and special events, and plans to continually update the studio and theater equipment to reflect the state of the art.

▶Composer **Ivan Tcherepnin**, Director of the Harvard Electronic Music Studio, will teach Electronic Music and Composition at the Dartington International Summer School (England) from July 25 to August 8, 1987. The school offers a comprehensive program of master classes, workshops, discussions, and concerts, covering a wide range of musical styles. Mr. Tcherepnin's compositions will be given in concert, with himself as featured performer.

Partial scholarships are available to qualified students. For application information, write: Dartington International Summer School, Administration, 54 Old Steine, Brighton BN1 1EQ, England.

EM

We've created a monster.



Introducing CUE™—the monster Macintosh program for film music scoring.

CUE automates every time-consuming paperwork and calculation task that occurs when you create film music.

That means you'll be looking at one terrific picture of productivity on your Macintosh screen.

You can make a cue sheet that toggles between feet/frames, minutes/seconds, 24, 25, 30, and drop frame SMPTE; it can even show you two of these time formats at once.

You can calculate and display beats for each cue point, in addition to displaying up to 100 meter changes and 100 tempo changes in several common formats.

You can make short work of calculating tempos because CUE instantly searches up to 36 tempos at once and shows you which cue points are hit within two frames. And if no tempo works, you simply use accelerando/ritard to land on the beat you want.

In addition to CUE's ability to print score paper with your instrument names and clefs, with beat times, bar numbers, click numbers, abbreviated cue point descriptions and tempo changes printed at the top of each system, you can print out master cue lists and performing rights cue sheets.

Also, an audible click track or MIDI clock output plays all meter and tempo changes in your cue sheet—or you can dump them into your SBX-80. And you can watch streamers and punches so you can conduct without a click track.

As you can see, CUE is the complete program that'll keep those doomsday deadlines from squeezing your creative time down to nothing at all.

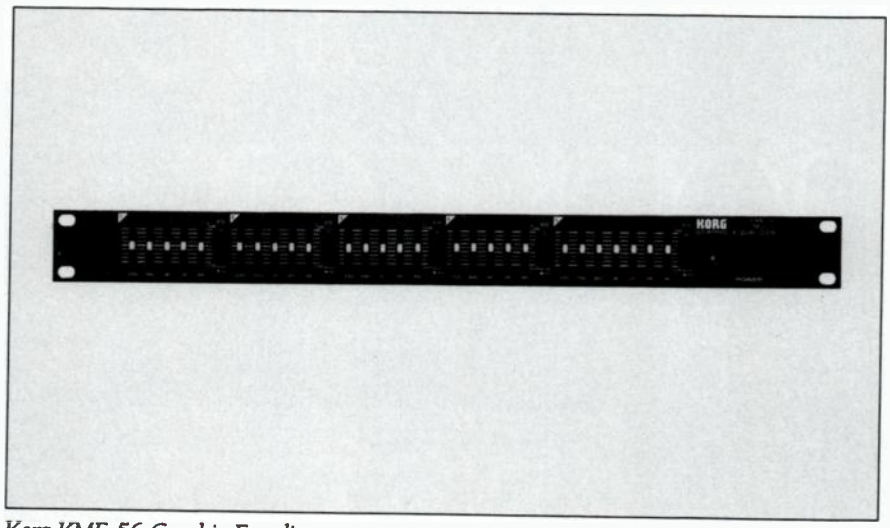
For more information on CUE, contact the music dealer nearest you or call Opcode and ask where you can preview a screen test.

Then start creating some monster hits of your own.

Opcode systems

444 Ramona
Palo Alto, California 94301
(415) 321-8977

CUE is a trademark of Opcode Systems. Macintosh is a trademark of Apple Computer Inc.



Korg KME-56 Graphic Equalizer

First Take is just that—people's first impressions of some of the latest products. Ratings are provided by each reviewer according to the following standards:

★★★★★ *The cream of the crop—offers exceptional value or vision*

★★★★ *Very good product with few, if any, flaws*

★★★ *Solid, workmanlike product but not particularly exciting*

★★ *Below-average for its field; often flawed in some way*

★ *Has serious problems—try before you buy!*

We would like to remind you that these are opinions, not gospel, and as always, **EM** *is a communications medium and we welcome opposing viewpoints.*

▶Korg KME-56 Multigraphic EQ ($299) ★★★★

The Korg *KME-56 Multigraphic Equalizer* provides flexible operation, on stage or in the home studio, for a low price. In one 19-inch rack space, Korg packs five graphic equalizer blocks: four mono and one ganged stereo. Band centers on the mono EQs are at 250 Hz, 500 Hz, 1 kHz, 2 kHz and 4 kHz. Band centers on the stereo block are at 125 and 8 kHz. Each block can be switched in and out independently, as shown by individual red in/out status LEDs.

Live, instruments can be patched through at either -10 dBV (unbalanced line) or -35 dBV (preamp) level, as set by a rear-panel switch for each block. The KME-56 seems ideal for keyboards, especially when combined with Korg's companion Keyboard Mixer, but works equally well with other instruments.

In PA work, a KME-56 connects right into mixer channel or submaster patch points, depending on your console's configuration. You can achieve some great effects on voices and percussion by presetting something like a "telephone voice" EQ curve, and popping it in at the appropriate place during a song. In this situation (as in most), *cutting* to create the tone is better than *boosting* because boosting can lead to channel clipping and/or monitor feedback when the EQ is engaged.

You can also add EQ to outboard processors like DDLs, tape echo units and the world's many reverb boxes. The KME-56 is not however a room or system equalizer; five to seven bands does not give enough resolution to get rid of rings and screeches.

Anything the KME-56 can do live, it can do in your studio. The wide bandwidth filters contribute to a unique EQ "signature" unlike the mixing board "semiparametric" EQ sound so very common today. I experimented with a number of prerecorded synth and drumbox sounds and found it very easy to get several distinctive tonalities from each. Considering the price, the KME-56 is excellent for fine-tuning tape tracks so they don't fight for the same location in the mix: for separating a couple of rhythm guitars, for instance, or kick drum and bass synth.

Don't forget the possibility of inserting the KME-56 in the loop jacks of processors such as limiters and gates. By sending an EQed signal to a processor's detector loop (usually called the "key input"), and a dry (un-EQed) signal to the regular audio input, the processor will alter the dry signal according to the nature of the EQed signal. For example, suppose you want to limit the loud, bright right-hand on a DX7 without affecting the punch of darker, lower-register runs. This implies that you would want to limit a specific range of frequencies, say around 2 kHz, and leave the others alone. By inserting the KME-56 into the limiter's detector loop and boosting the 2 kHz band all the way, the limiter will react the most to signals in the 2 kHz range and ignore the others. Professional units with this capability are known as duckers and de-essers. Although they're more sophisticated and can be configured to supply psycho-acoustically transparent processing on critical tracks, they're costly. Whether you need to drop hundreds on a box you may use four times a year is really your choice; for me the fun's knowing I can take a shot at something akin to it using my motley accumulation of cheap-o companders and gates.

I highly recommend the KME-56. At $299 list it's a steal, and I've seen it on the street for considerably less—check your favorite dealer.

—Craig O'Donnell

Korg USA
89 Frost St.
Westbury, NY 11590
☎ 516 / 333-9100

▶Upward Concepts Mirage Multi-Temperament Disk ($29.95 plus $2.50 shipping) ★★★★★

Since Ensoniq Mirage's operating system (OS) is in software (it's loaded from disk when the instrument is first turned on), the OS can be easily examined and modified by hackers. Take an infinite number of hackers combined with an infinite number of Mirages (well, close), and you get this product, a modified version of Ensoniq's OS version 3.2 that implements alternate temperaments. The hacker in question is Dick Lord, who has been detailing his voyages deep within the Mirage in a series of articles in the newsletter *Transoniq Hacker*. Specifically, he discovered the frequency table the Mirage uses and learned how to change it.

This OS disables sampling in order to squeeze in the temperament tables. (You should be sampling with MASOS anyway, so this is not a problem.) Parameter #74 now selects which of the 15 pre-programmed scales to use; parameter #73 sets the base key for the scale. Fourteen of the 15 temperaments are from historical sources. In addition to equal temperament (which dominates today), the disk contains Pythagorean; Can Zwolle; Meantone; Silbermann I and II; Rameau; Wekmeister III, IV, V, and VI; Kirnberger II and III; and Italian 18th Century. The documentation includes a brief sketch of the history of temperament, background notes on the scales, diagrams for each scale showing how the Pythagorean Comma is distributed around the octave, and a frequency table listing the notes of each scale using a starting note of C=261.6256 Hz. One final scale is "Inverted equal temperament" in which the notes within each octave are reversed (higher pitches to the left, lower pitches to the right).

Parameter #76 controls keyboard transposition, a feature not in the standard Mirage OS. Two octaves of transposition (one above, one below) are included. Unfortunately, one cannot change the scale, base key, or transpo-

sition parameters over MIDI, which limits sequencer applications—ideally, one could alter base key or transposition with a MIDI command to instantly retune the scales during a song. The Mirage OS used to let you assign System Exclusive functions from the front panel, but these routines have been removed from versions 3.0 and higher to make room for other functions. Still, the fact that any sort of OS with alternate tunings exists is a step in the right direction.

In addition to the OS, the disk contains one harpsichord and two pipe organ samples. The harpsichord is simply the best sampled one I've ever heard. The pipe organs are samples of a small tracker organ, a nice contrast to the usual giant instruments one hears. The stops—Diapason and Koppelflote—are smooth and intimate. There are five sequences of baroque material that can be used to

Upward Concepts Mirage Multi-Temp Disk

demonstrate the differences between the scales on the disk.

The scales on this disk are not user-programmable, nor are they necessarily just intoned, but they whetted my appetite for alternate temperaments. The transposition feature is useful to anyone, even if you use only equal temperament. Besides, you get three solid samples with the disk. Perhaps the most exciting news is that Dick Lord is developing another OS (that may even be available by now) for implementing user-definable microtonal scales. I think that many of us hope that he gets around to creating a just intonation OS that allows the user to define the relationships between the notes and has MIDI-controllable base key and transposition parameters. For First Take reviews, the definition of a five star rating is that the product "...offers exceptional value or vision." This product does indeed offer exceptional value *and* vision—so five stars it is. —*Walter Daniel*

Upward Concepts
Bennett Road
Durham, NH 03824
☎ 603 / 659-2721

▶JL Cooper MIDI Switch Box Plus ($499) ★★★★★

The *MIDI Switch Box Plus*, enclosed in a 1U (single rack space) all-steel gray rack mount enclosure, is an eight-in, eight-out, programmable MIDI switcher with data filtering, merging, and processing features. The front panel contains two LED displays—a two-digit program number display, and an eight-digit alphanumeric display—and various switches and indicator LEDs. The rear panel includes eight MIDI In jacks, eight MIDI Out jacks, a ¼-inch footswitch jack, and a 3/32-inch subminiature jack for the included AC adapter.

The simplicity of the MSB+ front panel belies its real abilities (inside is a Z80 microprocessor, and *three* UARTS). Each digit of the eight-digit display has a corresponding programming switch below it. The display and switch functions vary with each of the MSB+'s seven operational modes, which are selected via the Mode switch and a column of indicator LEDs to the left of the display.

In *Patch* mode, the display shows the input/output routing. For example, a "3" in position 1 indicates that Output 1 is patched to Input 3, a "7" in position 2 indicates that Output 2 is patched to Input 7, and so on (a "0" indicates that a given output is disabled). You can scroll through the possible connections by simply pressing the switch underneath the corresponding display segment. An "A," "B," or "C" in the display indicates that an output is assigned to one of the internal data processing circuits (Processor A, Processor B,

This is great.

Model **450**, 8 x 4 x 2 Mixer, features phantom powering for professional condenser mics, in-line monitoring, solo, a dedicated stereo mix buss, stereo effects send and four switchable LED bar graph meters. More routing flexibility and performance gusto than anything in its price category. **$1095.00***

This is even greater.

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

And these are the sonic equivalent of duct tape.

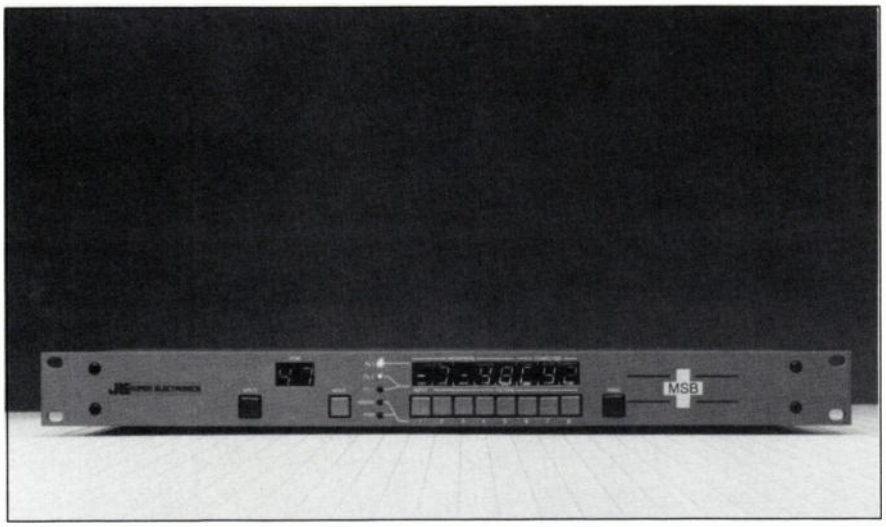
Model **2050**, 8 x 2 Line Mixer, will save your day when you suddenly need: another cue mix; a keyboard sub-mix or drums sub-mix; a separate monitor feed; a quick vocal reference (there's a mic preamp input, front panel). For just about any conceivable signal routing problem, latch onto a Fostex 2050 or two, and the problem is solved. These little sonic lifesavers are **$260.00*** Each. No audio tool kit should be without one.

FOSTEX®

Great mixers at great prices, the best of both.

 15431 Blackburn Ave., Norwalk, CA 90650 (213) 921-1112

*Suggested retail prices are subject to change without notice.



MSB Plus

or the Merger, respectively).

The MSB+ has two processors that provide identical but separately programmable functions, selected via the display and switches. Since each processor has two "pages," there are a total of four processing modes. On Page 1 of each processor, you can select the input port assigned to the processor, and selectively filter Note On/Off, Pitch Bend, Performance Control, Aftertouch, Program Change, System Exclusive, and System Realtime data. On Page 2, you can "channel bump" incoming MIDI data to retransmit on a different channel, and transpose MIDI note numbers over a range of ±5 octaves, in semitone increments.

The Merger inputs are permanently connected to the Processor outputs. This is somewhat of a limitation, since it would be useful to be able to merge data and still have at least one processor free. On the plus side, the Merger is *fast;* with reasonable amounts of input data, processing delay is virtually undetectable.

All MSB+ functions are programmable, including the program change receive channel (which can also be set globally). Sixty-four programs can be stored, and program data can be transferred over MIDI.

There is also a front panel "Panic Button" that instructs the MSB+ to send various All Notes Off commands, followed—if that doesn't work—by individual Note-Off commands for all notes on all channels. This function can be activated by a footswitch (on power-up, the MSB+ automatically senses whether the footswitch is a normally open or normally closed type).

Additionally, the owner's manual is quite lucid. It provides well-illustrated, step-by-step tutorials of all operating modes; a "Theory of Operation" section; and complete documentation of the MSB+ System Exclusive format. My only real quibble is with the unit's drab gray color scheme—even basic black would be an improvement.

The MSB+ is a workhorse. Aside from the obvious applications, with a little creativity you can even program complex processing effects, like octave doubling and transmission on up to three MIDI channels at once. The "Plus" isn't inexpensive, but you get the features of a switcher and merger in one box—which is very convenient—for less than you'd pay for equivalent separate devices. If you're in the market for something that's a little more than just a switcher, this is well worth looking into. *—Alan Gary Campbell*

JL Cooper Electronics
1931 Pontius Avenue
West Los Angeles, CA 90025
☎ 213 / 473-8771

```
BANK A: FACT CFG        BUFFER:  USER 16
SYSTEM CHAN: 1  Q=C3    V: 5  PLAY CHAN: 2
1:LOSTRIG 2:LOSTRIG  3:LOSTRIG 4:LOSTRIG
5:LOSTRIG 6:LOSTRIG  7:LOSTRIG 8:LOSTRIG
LFO WAV: TRI  AMD:   0      COMBINE: ON
    FRQ: 101  PMD:  60      RECEIVE: ALL
INSTRMNT #1  #2  #3  #4  #5  #6  #7  #8
NOTES     1   1   1   1   1   1   1   1
MIDI CH   1   1   1   1   1   1   1   1
BANK      3   3   3   3   3   3   3   3
VOICE     4   4   4   4   4   4   4   4
OCTAVE    0   0   0   0   0   0   0   0
DETUNE    0  -5  +5 -10 +10 -15 +15 -20
STEREO   LR   L   R   L   R   L   R  LR
LEVEL   127 127 127 127 127 127 127 127
KYLIMHI  G8  G8  G8  G8  G8  G8  G8  G8
KYLIMLO C-2 C-2 C-2 C-2 C-2 C-2 C-2 C-2
LFO      ON  ON  ON  ON  ON  ON  ON  ON
KBDMODE POLYPOLYPOLYPOLYPOLYPOLYPOLYPOLY
P/B RNG   7   7   7   7   7   7   7   7
PORTA     6   7   8   9  10  11  12  13
PMDCTRL MODWMODWMODWMODWMODWMODWMODWMODW
```

Sonus FB01 Design, Configuration Edit Screen

▶Sonus FB01 Design ($139.95) ★★★★
(For C-64/128 with Sonus, Passport, or Sequential compatible interface.)
This program offers full editing power—and some extras—for the Yamaha FB01. *Design* simultaneously holds two complete banks of 48 voices and two complete banks of 16 configurations. Thanks to extensive swapping commands, you can move voices/configurations to and from the FB01 (either individually or in banks), as well as swap or move voices/configurations within the two internal banks, to create custom banks.

Two independent edit buffers are available for voice and configuration editing. All voice parameters, including an algorithm diagram, are listed on a single page; likewise, all configuration parameters are listed on a single page (the advantage of this approach is that you can view and compare all pertinent information at a glance). You can also add a 16-character statement next to the configuration within the configuration bank listing, which is helpful in reminding you of the use or structure of that particular configuration.

Editing is straightforward. Listings for carriers and modulators appear in different colors, and inactive instrument data is listed in black, which keeps you from being distracted by nonessentials. Color change is also used for the listing of configuration parameters that are affected by the Combine Mode status. The program supports an edit/compare function (but extends it further to allow comparing the edit buffer to any voice or configuration within the computer's internal two banks).

Concerning "extras," the program can print out the screen displays for the voice banks, configuration banks, voice edit, and configuration edit pages. A full line of disk commands is also available (including file delete and disk initialize). Design addresses the system and voice play modes independently via separately assignable system and play MIDI channels; this feature supports addressing more than one FB01 by simply changing the MIDI system channel number. You can also play the FB01 voices either through the computer or from the keyboard of your computer (with settable key velocity and MIDI play channel). The program does not include any free voices, but this is hardly surprising considering that the program made its debut almost simultaneously with the FB01 itself.

In my opinion, though, perhaps the most outstanding feature of this program is the manual. The FB01's manual gives no help in understanding the voice structure, but Sonus has more than picked up the slack; I usually found myself referring to the very clear Sonus manual whenever I had a question about the FB01.

All in all, this is a strong package that speeds the learning process so you can spend your time being creative instead of punching keys. With easy editing, straightforward displays, and double banks to facilitate voice/configuration assembly, the program rates an easy four stars. (p.s. Sonus makes a similar program for the DX7/TX7 that includes ten banks of sounds.) *—Steve Smith*

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Sometimes the best way to learn is by example—so here's an example of how one musician tackled the job of sampling a piano.

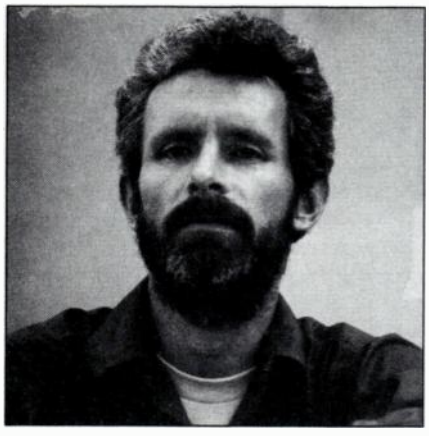
A Grand Sample

BY MIKE DWYER

I got into sampling mainly because I wanted a good piano voice—the way a piano note's timbre changes over time is too complex to be synthesized, and the stiffness of the piano wire causes the overtones to be *inharmonic* (i.e. they get sharper the higher you go in the overtone series; see *Scientific American*, Dec. 1965, "The Physics of the Piano").

After using my Korg DSS-1 for a few weeks, the factory piano started to sound thin and perhaps overly processed—good enough for one track in a multitrack recording, but not for slow ballads played live. So I decided I would try to put together a grand piano sample myself.

Mike Dwyer, founder and president of the West Coast Yamaha CX5M Computer Club, lives in Torrance, CA. In his 4-track home MIDI studio, he studies sampling techniques, produces contemporary pop/rock/R&B/jazz tapes, and is putting together a Korg DSS-1 sample library. He has also played and taught guitar.



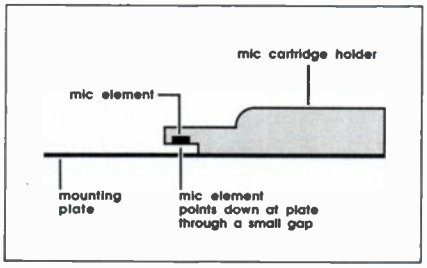


Fig. 1 *Side view of PZM microphone*

MIKING

First I tried sampling a nine-foot Bosendorfer. The output of the Electro Voice PL881 microphone I was using wasn't hot enough, so I added a mixer/preamp to the setup to boost the signal. This added too much noise, so I tried putting the mic up high under the piano, almost touching the soundboard. However, to get an adequate level, I still had to hit the piano so hard that the samples ended up sounding terrible.

I then experimented at home with different microphones and mic placements. Moving the mic just a few inches noticeably changed the sound quality, since sounds coming from more than one direction are to some degree out of phase with each other, thus causing partial (or sometimes complete) cancellation. (To hear this effect for yourself, hook a mic up to some kind of audio meter, and play a sine wave over the speakers. Watch the meters as you move the mic up to, and then away from, the speaker; the meters will rise and fall according to the wave shape, standing waves, and other phase summation/cancellation effects.) This phase cancellation effect, caused by sounds coming from more than one direction, is one of the reasons why a small change in mic placement can be so important and also suggests the use of a PZM (Pressure Zone Microphone). A PZM mounts the mic element over a small gap, facing a broad plate (see **Fig. 1**); this mounting arrangement makes the mic relatively insensitive to receiving multiple out-of-phase signals from an acoustic sound source. Traditional microphones are more prone to picking up these various out-of-phase signals.

Every recording engineer I asked had some unique idea of how to mic a grand piano. It was suggested I put my head inside the piano (with the lid propped up) and listen in different locations while someone played, then try the mic in the locations that sounded the best. The location that finally worked for me was one of the most popular of the recommendations I'd gotten. When I mounted a Crown PZM microphone a few inches above the round holes in the cast iron frame, its output was so high I not only needed no mixer-preamp, but I could play the piano key with medium velocity and *still* have enough level that I had to turn down the gain on the DSS. (By the way, I tried Radio Shack's PZM, and although it sounded all right, its output was not as hot as the Crown's.)

Continuing my research, I tried sampling some synthesizers directly into the DSS-1. Samples taken at the lowest sampling rate (16 kHz) sound surprisingly good, except for some grittiness on the lowest octave of a sample. Sampling a Prophet T8 at 24 kHz produced samples that were difficult to distinguish from the original. The highest rate (32 kHz) was needed only for the brightest voices at the highest pitches, where there is a lot of high frequency content to the sound. Interestingly, the same general rules held for samples of four-operator FM voices.

SAMPLING

Armed with this knowledge, and using the PZM mic setup described previously, I sampled a Baldwin seven-foot grand at three different sample rates (16, 24, and 32 kHz) and tried different mic placements. The 16 kHz sample sounded surprisingly good, except for the grittiness in the first octave. The 24 kHz sampling rate worked fine, except for a slight grittiness to the sound on the first two or three notes with the filter wide open (however, I do not generally open the filter all the way, as the sound is too bright for most purposes). The 32 kHz samples were great, except of course that the higher rate reduces available sampling time. The 256K sample memory in the DSS-1 is barely enough for a good piano sample, and at the higher sampling rate I had to start looping a little sooner than I would have liked. Since the high notes of a piano are of much shorter duration, I could truncate the ends of the upper samples, saving the memory for longer samples at the low end of the keyboard, where they are needed.

"The (hammer) thump sounds fine on an acoustic piano, but on the sampler, the pitch changes with the sample and this sounds unnatural"

I covered five octaves with four samples by stretching the first sample down for the first octave and up for the second octave; the other three samples cover one octave apiece. Using more than four or five samples results in samples that are too short. Korg is promising a memory expansion update for the DSS which will allow the luxury of larger average samples in multi-sample keyboard setups. (In fact, the new rack mount version of the DSS includes ½ megabyte of memory.)

My Baldwin samples sounded great, except for an audible hammer thump in the top two octaves. In the lower octaves,

this thump is masked since the tonal component of the sound is much louder. The thump sounds fine on an acoustic piano, because the pitch of the thump stays constant as you play up the keyboard; but on the sampler, the pitch changes with the sample and this sounds unnatural. I am experimenting with parametric equalization and more varied mic placements to reduce the hammer thump down to a tolerable level in the two highest samples, but I will probably have to go to a program such as Digidesign's Sound Designer to eliminate the thump sound completely. As an experiment, I replaced the top two octaves with samples I took from a different, high-end sampler; the sound was quite adequate, but my Baldwin samples had a first-generation clarity that I wanted all across the keyboard.

Looping

The timbre of a piano changes constantly over time. The overtones decay at different rates, and, referring to the *Scientific American* article once again, some overtones actually *increase* in volume during part of their "decay" periods. In addition, these timbre changes are not as complex in a piano's high notes as in the low ones. (This makes it easier to loop the high notes, but still complicates matters overall.)

To save memory and simplify looping, a short loop consisting of a single cycle works well. However, the location of the loop is very important. If you take a single cycle loop from a place in the sample where the prominent harmonics (which are changing constantly) are at a high or low point in their cycle, the looped portion will sound brighter or duller than the unlooped portion. Because of the abrupt transition between unlooped and looped sections, even a small timbre change will be apparent. If you are lucky, you'll extract a loop that has an "average" timbre, and your loop will sound more natural. Either way, as soon as looping starts, the timbre becomes static and sounds like a synthesized piano. The main reason looped piano samples work is that you rarely hold a single note long enough for the loop to come into play.

Processing

The DSS-1 has a very comprehensive synthesizer built right into it (DSS stands for Digital Sampling Synthesizer) and its analog-type parameters can ameliorate the effect that looping has on the overall sound. Using the amp and filter envelopes to make the looped portion of the sample decrease in volume and brightness over time lends realism; what we have, in effect, is a sound that starts out as a digital recording of a piano, followed immediately by a synthesized decay portion. By using a reasonably short decay, the loop will be at a relatively low level by the time it comes in, thus making it less noticeable. By that time you will have probably played some other notes as well, which would also help mask the loop. Finally, external signal processing, such as digital reverberation, can help sweeten the overall sound and smooth out some of the "rough edges."

Many musicians have a hard time getting good-sounding samples, but usually the key has more to do with persistence than anything else. Keep listening to the sample, and if you hear room for improvement, try to figure out what would solve that particular problem. Fortunately, the more you sample, the more you'll be able to apply those experiences to other instruments—a lot of the tips mentioned above will also work well when sampling other acoustic instruments, such as guitars. In any event, don't give up—and good luck. EM

What's a Korg DSS-1?

The Korg Digital Sampling Synthesizer (DSS-1) is a 12-bit sampler with a built-in 3.5-inch disk drive and sampling rates of 16, 24, 32 and 48 kHz. It will sample up to 16 seconds of sound at its minimum rate and up to 5.5 seconds at its maximum. It is also a synthesizer, generating five on-board waveforms that can be precisely altered by an additive synthesis feature, or by hand-drawing waveforms on its LCD screen. The DSS processes both samples and waveforms with a full complement of two-oscillator-per-voice, analog-style synthesizer controls including two digital delays, hard sync, white noise, six-stage envelope generators (VCF and VCA), two-band digital EQ and more. It has a 5-octave keyboard that sends velocity and after touch information. There are two audio outs and MIDI In, Out and Thru.

—Tim Tully

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Switch off that cable clutter and blow away those repatching blues—here are the circuit building blocks you need to build your own MIDI switcher.

MIDI Switcher Primer

BY PAUL SCHMIDT

The increasingly complex environment of today's small studio necessitates a way to repatch MIDI cables quickly and cleanly. To satisfy this requirement, several manufacturers have produced MIDI switch boxes (see "MIDI Switch Boxes," Nov. '86 EM), into which every MIDI device plugs permanently and where all signal routing is done either passively (via switches) or actively (via digital logic and/or microprocessors). A MIDI switch box lets you simply throw a switch or two to reconfigure an entire MIDI setup without the hassle, mess, and connector wear of manual repatching.

Since many modern musicians with small studios tend to be interested in building their own accessories, I've developed a formula approach to constructing inexpensive, custom MIDI switchers, and offer a simple switcher project as an example.

Transmitting and Receiving Basics

First, let's look at the hardware side of transmitting and receiving MIDI (see **Fig. 1**). MIDI signals are sent as a series of digital, on/off pulses. To avoid picking up noise, the pulses are sent in a *current-loop* through a twisted pair of wires that carry current for a logical 0 and don't carry current for a logical 1. The current travels from a transmitter to a receiver, through an LED (part of an opto-isolator), and back to the transmitter. The current in the loop turns the LED on. Any inductive noise can generate voltage spikes in the cable, but they have insufficient power to light the LED and are therefore ignored. Primarily to prevent the high frequency pulses in the cable from inducing noise into nearby audio cables, the cable is shielded, with the shield grounded at the transmitter end only.

Typically, two resistors (R1 and R2) placed in series with each line of the loop protect the MIDI transmitter against short circuits. Series resistor R3, located between the MIDI In connector (pin 4) and the opto-isolator, protects the receiver against spurious voltages and reversed inputs. Diode D1, connected in reverse across the opto-isolator inputs, protects against reverse polarity.

The current in the loop is typically set at about 5 mA (0.005 Amp), although the MIDI specification says that as little as 1.5 mA should work. This current is a function of the LED in the opto-isolator, the logic circuit power supply voltage, and the values of the three series resistors in the loop. To calculate the proper resistor

Parts List

Resistors *(¼ Watt, 10% tolerance)*	
R1-R16	220Ω
R17-R21	330Ω
R22-R25	1k
Capacitors	
C1-C8	100 nF (0.1 μF), 50V disc capacitor
C2	1000 μF, 25V electrolytic capacitor
C3	1 μF, 16V tantalum capacitor
Semiconductors	
IC1	74244 (74LS244) octal line driver
IC2	7408 quad AND gate
IC3, IC4	7432 quad OR gate
IC5	7414 hex inverter
IC6-IC8	6N137/138/139 or similar opto-isolator
IC9	7805 +5V regulator
D1-D3	1N4148/1N914 diode or similar
D4-D6	1N4001/1N4002 diode or similar
D7-D11	LEDs
Other parts	
S1-S4	SPDT switches
S5	SPST power switch
T1	12.6 Volt center-tapped 500 mA transformer, Radio Shack #273-1365 or equivalent
F1 0.1	Amp slow-blow fuse
Misc.	Line cord, fuse holder, IC sockets, DIN jacks, hardware, case, etc.

Paul Schmidt *is a full-time electronics engineer, as well as part-time consultant and college instructor. Musically, he runs a small recording studio, plays tuba in a brass quintet, doubling on euphonium and sax. He also sings and plays recorder with a Chicago area early music group.*

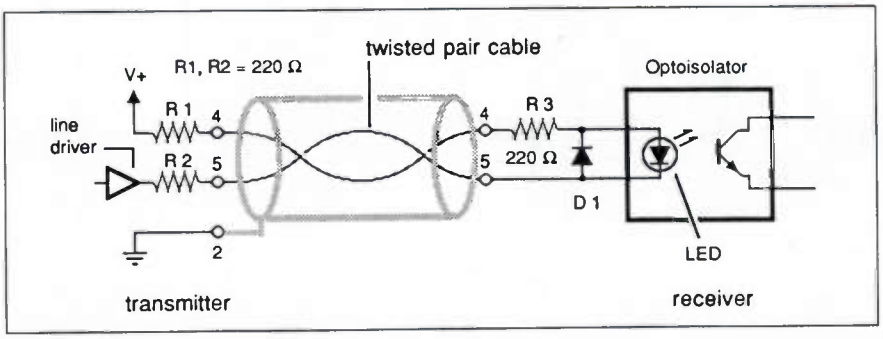


Fig. 1 *Transmitter*

values, use the following procedure.

First, determine the voltage drop of the opto-isolator's LED. The opto-isolator data sheet lists this as "Input Forward Voltage," typically between 1.4 and 1.6 Volts. This value can be considered a constant that does not significantly change with changes in supply voltage or current. Next, subtract this 1.6 Volts from the transmitter's logic supply voltage, usually 5 Volts. Divide the resulting voltage (in this case, 5V - 1.6V = 3.4V) by the loop current (3.4V / 0.005 mA = 680Ω). The result is the total series resistance (not counting the LED). Divided equally among the three resistors, this comes to 226Ω; the closest off-the-shelf resistor value is 220Ω. Examination of most MIDI equipment shows these values to be pretty much standard.

Fig. 2 shows an equivalent circuit for the MIDI interface. Essentially, we have a number of devices connected in series between the power supply and ground. The line driver output transistor turns on and off in response to the pulses that represent MIDI data. When on, the transistor pulls current through the three resistors and the opto-isolator LED. The opto-isolator then couples these pulses into the receiver.

The transmitter's output requirements are straightforward. The output should be able to switch currents of about twice the loop current (i.e., 10 mA) at rates of 32 kHz (the approximate MIDI data rate), without problems due to slow switching. For this reason, a line-driver type of integrated circuit (IC), such as the 74244 or 7407, works well. The driver can be either *push-pull* (74244) or *open-collector* (7407); (these terms refer to the design of the output stages), but must be able to control the current reliably.

The receiver is more complex, due mostly to the popular wisdom that the Sharp brand of opto-isolator is the best

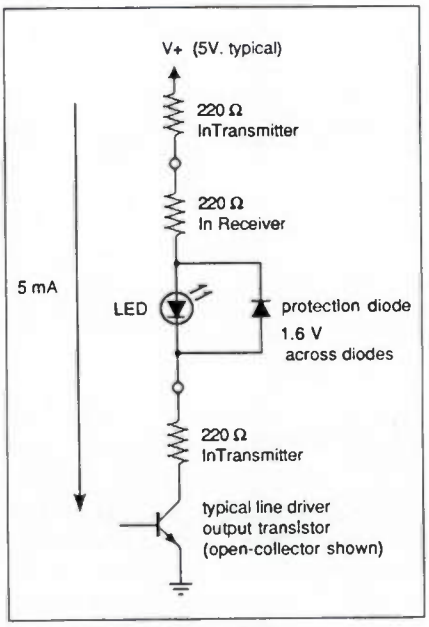


Fig. 2 *Current loop analysis*

choice. Actually, there are several suitable, readily available, and inexpensive devices. Hewlett-Packard, for example, makes the 6N137 (5 mA), and the 6N138/139 (recommended for 1.5 mA, but workable at 5 mA). Though the MIDI specification says 1.5 mA should be nominal, every unit I've examined operates at about 5 mA. Even so, if the 5 mA opto does not receive properly in a given application, one of the 1.5 mA units can be used. All three devices are pin compatible, except that the 6N137 pin 7 should be connected to pin 8, and the 6N138/139 pin 7 should be left unconnected. The output of the 6N137 is a TTL/CMOS compatible push-pull driver, while the 6N138/139 output is open collector. In either case, the output pin should be connected to supply voltage V+ through a *pull-up* resistor, typically between 220Ω and 330Ω. The resulting logic signal source can be fed directly to other logic circuits.

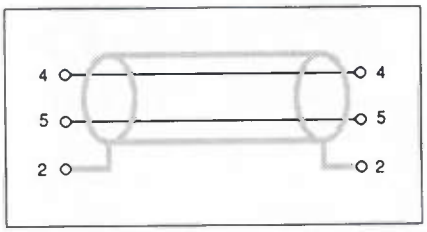
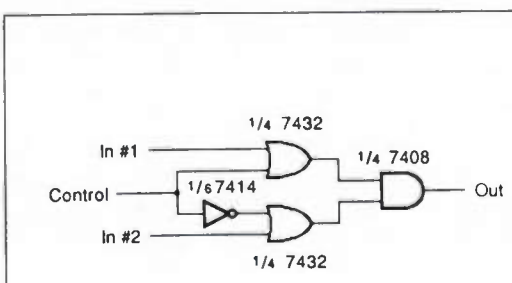


Fig. 3 *MIDI cable wiring*

MAKING THE RIGHT CONNECTIONS

MIDI connectors are intimidating to many, but are the simplest part to select and obtain. MIDI uses the same 5-pin DIN connectors as the popular stereo DIN system. As a matter of fact, a standard DIN cable can be used as a MIDI cable for *short* hookups (DIN cables do not, however, meet all MIDI specs and the use of non-MIDI spec cables is not advised; also, be aware that there are two types of 5-pin DIN connectors—see below). Radio Shack carries a chassis-mount female jack (#274-006) and a cable mount female jack (#274-020). Their microphone cable (#278-1275/1276) works well for MIDI, although the shield is less than ideal. The proper cable plug is #274-003. To make a cable, wire one connector to each end of the cable. For each connector, connect pin 2 to the shield wire braid, pin 4 to one of the twisted pair of signal conductors, and pin 5 to the other (**Fig. 3**). Most connectors have the num-



IN #1	IN #2	Control	Out
0	0	0	0
0	1	0	0
1	0	0	1
1	1	0	1
0	0	1	0
0	1	1	1
1	0	1	0
1	1	1	1

Truth Table

Fig. 4 *Switch schematic*

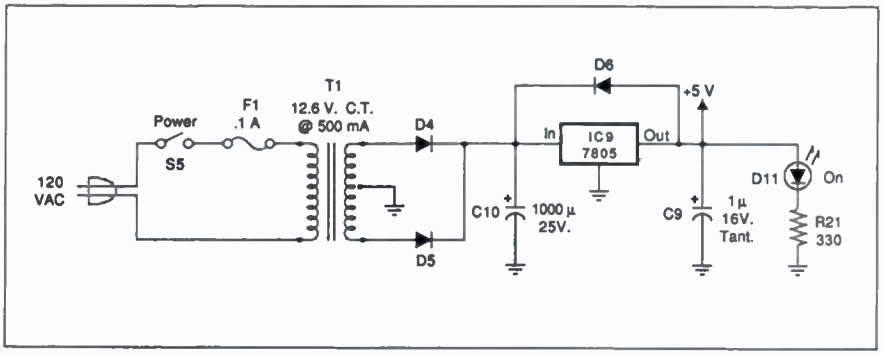


Fig. 5 *Power Supply*

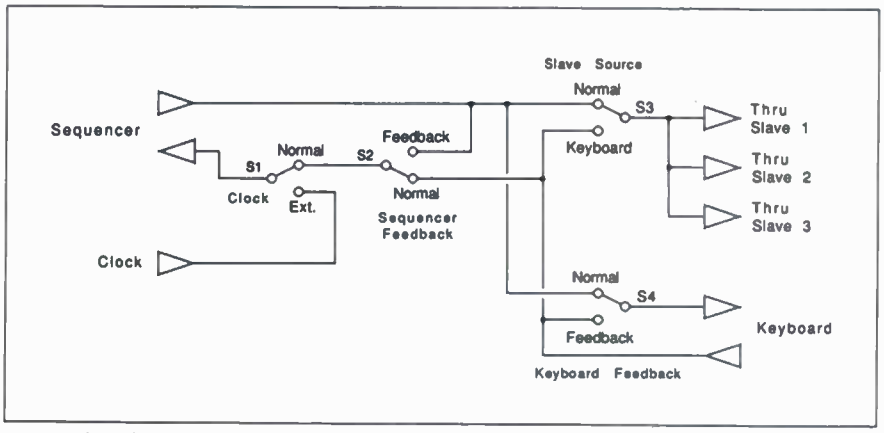


Fig. 6 *Flow diagram*

bers embossed next to the pins; confirm the pin numbers before you do any soldering. For MIDI applications do not purchase 270-degree 5-pin DIN connectors, which sometimes show up surplus and trap the unwary. The standard 180-degree 5-pin DIN connector has all five pins arranged in an exact, 180-degree half circle; with the 270-degree kind, the pins cover a 270-degree arc.

The Switching Circuitry

The actual switching circuit (**Fig. 4**) is quite simple and consists of two popular TTL logic ICs, the 7408 quad AND gate and the 7432 quad OR gate. The switch circuit has a simple job—to accept two MIDI signals but allow only one to pass through to the output. Referring to the switch circuit schematic and the corresponding truth table, we see that when the "control" input is at logic "0," the output follows the signal at input #1. When "control" is at logic "1," the output follows input #2. The inputs can either come directly from the output of a receiver opto-isolator, or from the output of another switch stage. The control can come from a manually operated selector switch, from a computer peripheral port (such as a Commodore 64 user port), or from a preset memory circuit. Whatever the configuration, this switch circuit can be replicated as often as required to perform the desired switching.

"A MIDI switch box (can) reconfigure an entire MIDI setup without the hassle, mess, and connector wear of manual repatching"

Quest For Power

To determine the power supply requirements of a switcher based on these circuits, add 20 mA for each IC package

(including opto-isolators) and 5 mA for each MIDI output. Multiply by 1.5 for a conservative result. If the result is less than 500 mA (0.5 Amp), the power supply in **Fig. 5** can be used with a small aluminum heatsink. For currents of up to 1000 mA (1 Amp; the regulator's recommended maximum rating), a large heatsink of about 10 square inches, made from 1/16-inch metal painted with black enamel, is required. (Black objects radiate heat better. Metal painted with black enamel radiates heat twice as well as bare aluminum and half again as well as bare steel.) Select a transformer with a 1 A or greater secondary rating. Because we are powering TTL circuitry, 100 nF capacitors should be connected across the power supply pins of each IC (as well as the opto-isolators).

CONSTRUCTION

Wiring is not critical, as we are not dealing with very high frequency signals compared to most TTL circuits. Wire wrap, point-to-point, and circuit board techniques are all satisfactory. Be careful to leave pin 2 of the MIDI **In** jacks disconnected, but connect pin 2 of the MIDI **Out** jacks to ground (circuit common, not power line ground). Remember to use a heatsink on the 7805 voltage regulator,

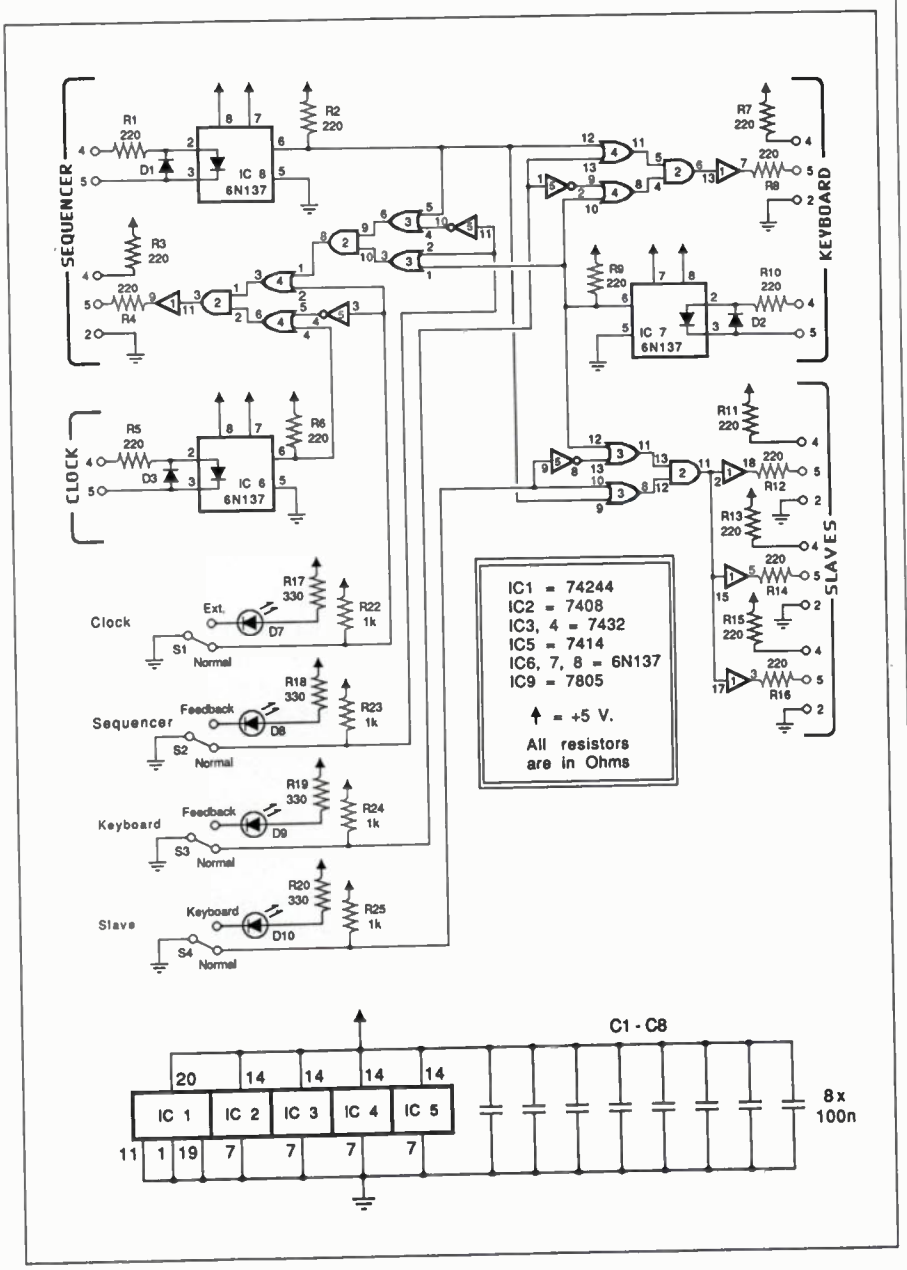


Fig. 7 *Schematic*

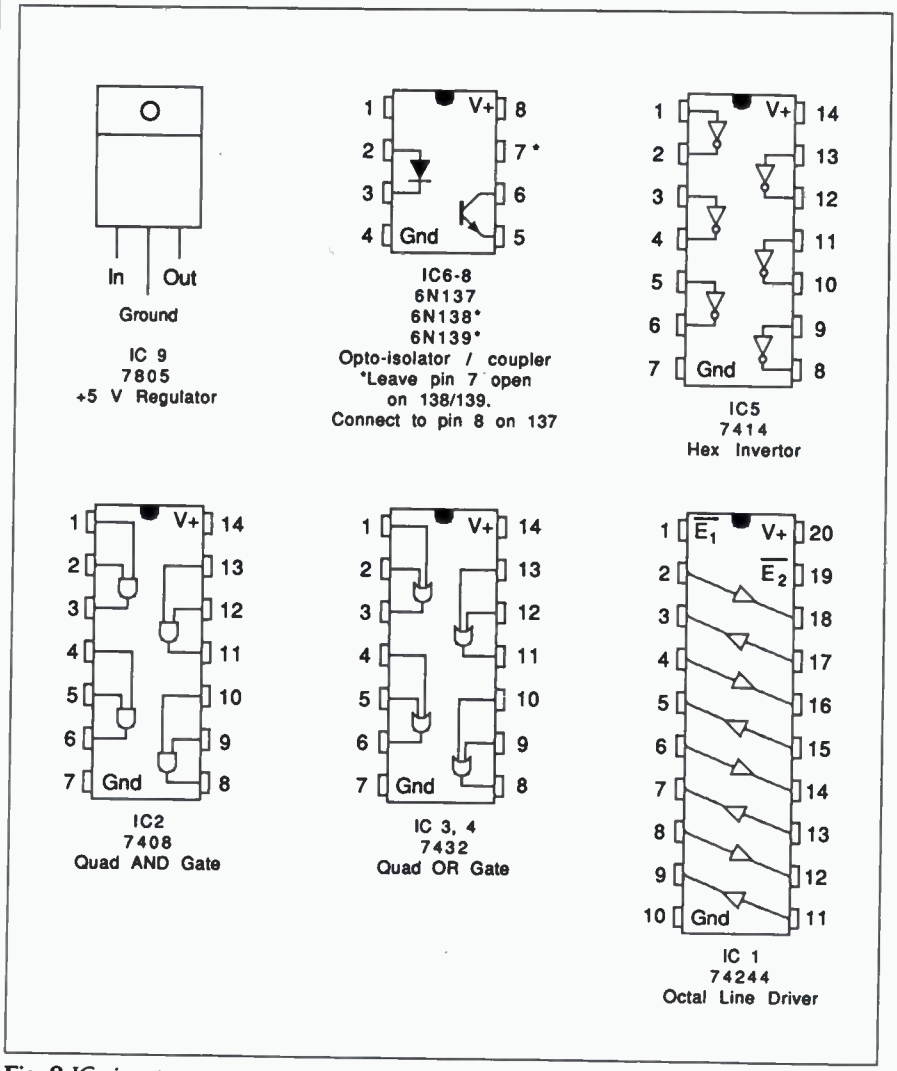


Fig. 8 *IC pinouts*

and properly insulate all line voltage (120V) connections. Radio Shack does not carry 0.1 Amp slow-blow fuses, so a trip to a better stocked supplier will be required.

Putting The Modules Together

Now let's connect these building blocks into a real-world project and design a switcher that connects a computer/sequencer, master keyboard, external clock/drum machine, and up to three slave devices. **Fig. 6** shows how these patches are normalized. With S1-S4 in the *normal* position, the sequencer drives the keyboard and the slaves; the keyboard drives the sequencer input. This is a configuration recommended by many computer/sequencer manufacturers. With S2 in the *feedback* position, the sequencer output can be routed back to its input for diagnosis; with S4 in the *feedback* position, the keyboard output can be routed back to its input (for example, to set multitimbral voices on CZ synths); and with S3 in the *keyboard* position, the slave outputs can reflect keyboard output instead of the sequencer output. Also, depending on how S1 is set, an external clock can be selected as a sequencer input.

Fig. 7 shows the complete project, while **Fig. 8** shows the IC pin configurations. The pin numbers for AND gates, OR gates, and inverters shown in the schematic are those I used on my prototype. Any other pin arrangement that conforms to logic function is acceptable. Note the LEDs to indicate the functions selected by the four switches, and the power-on indicator added to the power supply.

Of course, much of the fun in doing-it-yourself is modifying a project to suit your own needs. Hopefully the above has given you a good reference with which you can start—happy experimenting.

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COURTESY OF KLAUS MUELLER

KLAUS SCHULZE

BY BEN KETTLEWELL

Klaus Schulze is legendary among electronic musicians around the world. Although Klaus has recorded 27 albums over the past 15 years, and sells out huge arenas and concert halls across Europe, he remains little-known in the U.S. This is changing, though, because American label Gramavision recently released seven of his albums here in the States on LP and CD. His 1975 album Timewind *won the prestigious French Grand Prix Du Disque award as a classical recording. Schulze has been a major influence on many recording artists for close to two decades; if you listen to the music of Kitaro, Jean Michel Jarre, and many others you will find much of the ideas and techniques of Klaus Schulze incorporated into their music. His trademark hypnotic drones and complex sequencer lines have become an institution, a compositional format used by hundreds of synthesists who have jumped on the new age bandwagon over the last ten to 12 years.*

However, Schulze's musical career actually began back in the mid-'60s. The psychedelic era opened up a whole new world of experimentation for Klaus. Groups like Pink Floyd, The Doors, Jimi Hendrix, and Jefferson Airplane laid the groundwork for the first wave of German musicians who combined a classical tradition with rock and electronic influences. A number of groups that began back then are still going strong today, including Tangerine Dream, Kraftwerk, Popul Vuh, and Ash Ra Temple. In 1968 Schulze formed an acid-rock trio called Psi Free, an experimental group inspired by the Jimi Hendrix Experience. One night during a Psi Free performance, Edgar Froese, the founder of

He's idolized in Europe, and has been a major influence on many of today's electronic musicians. In his first U.S. interview in several years, a pioneer shares his observations based on over two decades of experience.

Tangerine Dream, saw Schulze playing drums and was impressed enough to sign him up with the newly formed Tangerine Dream. In 1970 they recorded their first album, Electronic Meditation, which consisted of Froese playing guitar through myriad effects, Conrad Schnitzler on organ, and Klaus on drums. The album sounded like a cross between the avant-garde works of Karlheinz Stockhausen and the cosmic sounds of Pink Floyd.

Electronic Meditations was followed by a couple of quickly produced albums from the "Berlin school." These consisted of recordings of jam sessions/parties recorded under the name Cosmic Couriers. Klaus looks back at these albums, Galactic Supermarket and The Cosmic Jokers as an embarrassment, but part of the growing process. In 1970 Schulze began a transition from drums to keyboards and formed the group Ash Ra Temple with Manuel Gottsching. It was during this period that Klaus's work started becoming more introspective.

A year later he released his first solo album Irrlicht, on the Brain label. This album and its successor, the 1973 release Cyborg, were simple but out of these a sense of identity was formed. On later recordings like Picture Music and Timewind, he became more involved with tonalities and textures. His compositions became long pieces which slowly evolved from simple drones to dramatic classical tapestries with a dramatic ambience.

Unlike many of Schulze's electronic colleagues, Klaus has always been a advocate of live performance, and has toured throughout Europe frequently during the past 15 years. He performed solo until 1981 when he started touring with Rainer Bloss. Occasionally his performances include other artists such as drummers, guitarists, and cellists. In 1976 he collaborated with percussionist Stomu Yamashta on a grand scale performance piece called "Go." The ensemble included Steve Winwood, guitarist extraordinare Al Di Meola, and former Santana drummer Michael Shrieve. The group embodied all the elements which became known as jazz fusion and produced three albums, Go, Go Too, and Go Live. While working in this group, Klaus started playing synth tapestries that created a strong rapport between himself and the soloist.

In 1979, Klaus created the Innovative Communications record company. The label was first picked up and distributed by Warner Bros. in Europe, and by 1982 became independent. After some financial difficulties and artistic differences with the staff at IC, the company was sold to Mark Sakautzky, who is still operating IC today. Recently IC was licensed in the U.S. and Canada, and also in much of Europe. This will make Klaus and other artists on IC much more accessible to the public. After Klaus sold Innovative Communications, he and composer/synthesist Rainer Bloss established Inteam early in 1984. Inteam is now distributed by Brain Records which is, in turn, distributed by Metronome, a company that produced and distributed many of his earlier albums.

Klaus Schulze has been pretty mysterious with the press for the past four years, especially in the States. However, thanks to the diligence of our interviewer, Klaus was willing to respond to specific questions in writing. Therefore, EM is pleased and proud to present this candid discourse with a space age musical pioneer, still one of the more innovative electronic composers in the field today.

EM: *Klaus, what kind of musical background do you have?*

KS: My family actually hated the idea of me becoming a musician. I did get some help and encouragement from my brother; he played drums a little bit, mostly as a hobby. Actually, I started as a guitarist in 1953 and studied classical music from the age of seven till I was 15. This kind of education didn't allow me to play rock music, which is what I really wanted to do. So, I switched to drums and played drums for about ten years, although after I worked with Michael Shrieve I would never say that I really played drums! What I got from drumming that really helped me when I started using synths and sequencers was the rhythmic feel. I think every musician should play drums for a couple of years to get a true sense of rhythm.

EM: *What made you switch from drums to synthesizers?*

KS: I wanted to create a new music, so I chose an instrument that I had never played before. My first contact with a synthesizer, an EMS Synthi A, was in a studio in Strassburg; I still have the EMS here in my studio. The EMS was the first synth manufactured in Europe. With the synthesizer you could change the scales of a keyboard so you wouldn't be locked into the half steps of a standard keyboard. And, you could create sounds from scratch.

EM: *Electronic instruments have changed a lot since you first started using them. As a composer, do you think that the advent of digital synthesis and computer music instruments have affected your musical ideas?*

KS: I always try to use the newest technology. This isn't always easy. I often had to explain to journalists why there was, and still is, a fear of computers and unknown instruments. One of my jobs during the '70s was to get rid of people's prejudice, especially when the majority of those people knew nothing about a synthesizer, sequencer, or computer... of course, my *way* of producing music changed with the technology, but not my musical *ideas*.

My family actually hated the idea of me becoming a musician.

EM: *Your most recent album* Dreams *was a real departure from the two previous albums; you seem to be going back to a more classical feeling. How did you go about creating this album?*

KS: I recorded the album with a complete set of new instruments. I used a lot of rack-mount synths—Roland MKS-80/MPG-80, Super Jupiter, Roland MKS-30, Planet S synthesizer, Korg DW-8000, and Akai S612/MD280 sampler—going through a Korg DVP-1 digital voice processor and also Publison's Infernal Machine 90, and a Korg SQD-1 MIDI recorder. The only instruments on the album that I had used previously were the Fairlight and the Oberheim DMX. It was fun to try out something new. Hard core fans really want to hear the old instruments, but I enjoy each new instrument that I get.

EM: *How do you use the Fairlight and your MIDI setup in performance?*

KS: Using computers in live performance gives me a lot of freedom. I can program

the background material and blend it in with any one of the 32 channels on my mixing console, so I have a background that can change with every situation. During performance, it is not always possible to change tonalities on the computerized instruments. That is also why I still use analog synths like the minimoog on stage. Computers are excellent and variable tools; a chip for me is not something sacred, but a commodity. The fear of computers disappears if one works at it and works with affection.

EM: *On* Miditation *and your new album* Dreams, *you combined traditional acoustic instruments with synths and computers. Will you be doing more with acoustic instruments?*

KS: Actually I have used acoustic instruments on earlier albums—saxophones, a voice, a cello, or a small orchestra. I do not compose the sections for these instruments; I use them on the recordings as long as they fit my music, according to my tastes.

EM: *How do you compose your songs? Tell us how you develop an idea.*

KS: I do not write a composition. It's in my head and during work it all comes together. Sometimes it happens in a night, and other times it takes a few weeks, even months. In the early days I mostly improvised. Little by little I learned to form my music. I do not write on pieces of paper; I play it on tape, and play it in my head. Because I play music most of the time, I have many tapes full of musical ideas.

EM: *Did you compose the music for the film* Angst *in this way?*

KS: Yes. The film people cut their film to the finished music. Normally, it's vice versa.

EM: *A lot of people consider your compositions as classical. You have even received an award in Paris for this. Do you consider yourself a classical composer?*

KS: The Beatles are classical too. My part in the contemporary music scene is ambiguous. My records are sold on the pop market; they have to compete with Santana and the Scorpions on the record shelves. But if one listens to them, they are definitely not pop music. Neither are they classical music in the sense of a Mozart or Beethoven, or a Henze or Penderecki. Actually this labeling is not my problem, but I have to deal with it. These days, marketing people have found a new label for this type of music, "new age" music, but I haven't met any musician who is happy with this label.

EM: *Do you find that listeners are more sophisticated about electronic music today than they were ten years ago, and if so, what does that mean for you as a composer?*

KS: Oh yes, certainly yes. But only those who always had an interest in this kind of music, and of course, musicians today know a lot more about electronic instruments than when I started. Today it is very easy and affordable to go into a store and buy a synthesizer, effects, and a cheap 4- or 8-track and make a good recording. For me all this means that I

I think every musician should play drums for a couple of years to get a true sense of rhythm.

Klaus Schulze Selected Discography

SOLO WORKS

Irrlicht (1971) Brain 1077
Drive Inn 2 (1986) Inteam 20.010
Dreams (1986) Brain 831.206
Interface (1985) Brain 827.673
Angst (1984) Brain 20.003
Drive Inn (1984) Brain 20.002
Dziekuje Poland (1983; 2 LP) Brain 817.620
Audentity (1983; 2 LP) Brain 817.194
Trancefer (1981) Brain 823.605
Dig It (1980) Brain 60.353
Live (1980; 2 LP) Brain 80.048
Dune (1979) Brain 60.225
X (1978; 2 LP) Brain 80.023
Body Love Vol. 2 (1977) Brain 60.097
Mirage (1977) Brain 60.040
Body Love (1976) Brain 60.047
Moondawn (1976) Brain 1088
Timewind (1975) Brain 1075
Blackdance (1974) Brain 60.406
Picture Music (1973) Brain 40146
Cyborg (1972; 2 LP) Brain 21.078

WITH OTHERS

Time Actor (1979) Racket 15.027 *(Under the name Richard Wahnfried, with Arthur Brown and Michael Shrieve)*
Tonwelle (1981) Racket 15.028 *(with Manuel Goettsching)*
Megatone (1984) Inteam 20.006
Miditation (1986) Inteam 20.009 *(with flutist Steve Jolliffe)*
Klaus also plays on Michael Shrieve's LP *Transfer Station Blue* (1984), Fortuna Records 023.

have to be better, more sophisticated. Some people today immediately hear if I use an old instrument on a new album. Fans are strange sometimes. On one hand they demand "new music," and on the other they prefer the "old Schulze."

EM: *In the 18th and 19th centuries, composers spent a lot of their time working with notes, but today we have to create the sounds as well. How much time do you spend developing sounds as opposed to getting the notes down the way you want them?*

KS: In the days when composers had no tape recorders or MIDI sequencers, the distribution of music was quite different. To get your music played, you had to physically write down music and get it printed. Today we put a sound on a tape or disk and there it is, ready for manufacture. I have been composing electronic music now for 17 years, I know exactly what sound fits here or there, and how to create it.

EM: *Are there any specific considerations when you are composing a part for a certain instrument?*

KS: I generally do not compose a part for a specific instrument. I have a sound idea, or a theme or melody in my head, and I play it. I have my own style and this limits me a bit, if limit is the right word, because I'm happy with it. My fans would be disappointed if I suddenly would do, for example, a blues or a "normal" piece of music with a song structure, a piece of pop music.

EM: *Did learning on modular instruments have a lasting impact on your work?*

KS: Oh, sure. That is my greatest advantage. With modular instruments one had to learn the logic of a tone, of a sound, how it's built and what it means. It's a lot easier for a newcomer today, but how will that person know what goes into the sound the keyboard is making? These old modular analog synths are very important. Handwork!

EM: *When a new instrument comes out, how do you go about investigating it? What do you look for in deciding whether or not to use it?*

KS: There are always people trying to convince me to try or buy a new instrument. Sometimes I try it, and sometimes I buy it. The main feature I look for is the ability to produce my own sounds. I have no interest in preset instruments.

EM: *What projects are you currently working on?*

KS: Normally, I try not to plan things very far ahead. My next project is to do a 40-minute piece for an American ballet company from New York, the Elisa Monte Dance Company. They already use a piece from *Audentity* called "Spielglocken," and they asked me to do a special piece for them. I met them in Amsterdam and we liked each other. I did like and I still like to play alone, but I am free to work with others as I have done in the past, and will continue to do.

EM: *What about the future?*

KS: In my career I've seen musical waves come and go. A musical fashion is short, and I'm lucky that I have never made fashionable music. I will go on.

(Acknowledgement: Thanks to Klaus D. Mueller for his help in making this interview possible.)

Ben Kettlewell *has produced a radio series for the Massachusetts Council on the Arts on the evolution of electronic instruments and music, which has been broadcast in 23 cities in the U.S. and Canada. He is also a veteran disc jockey, author, and electronic musician with six releases to date. As a painter, he has had shows in Miami Beach, Baltimore, Boston, Provincetown, and Toronto, and describes himself as "totally left-brain oriented."*

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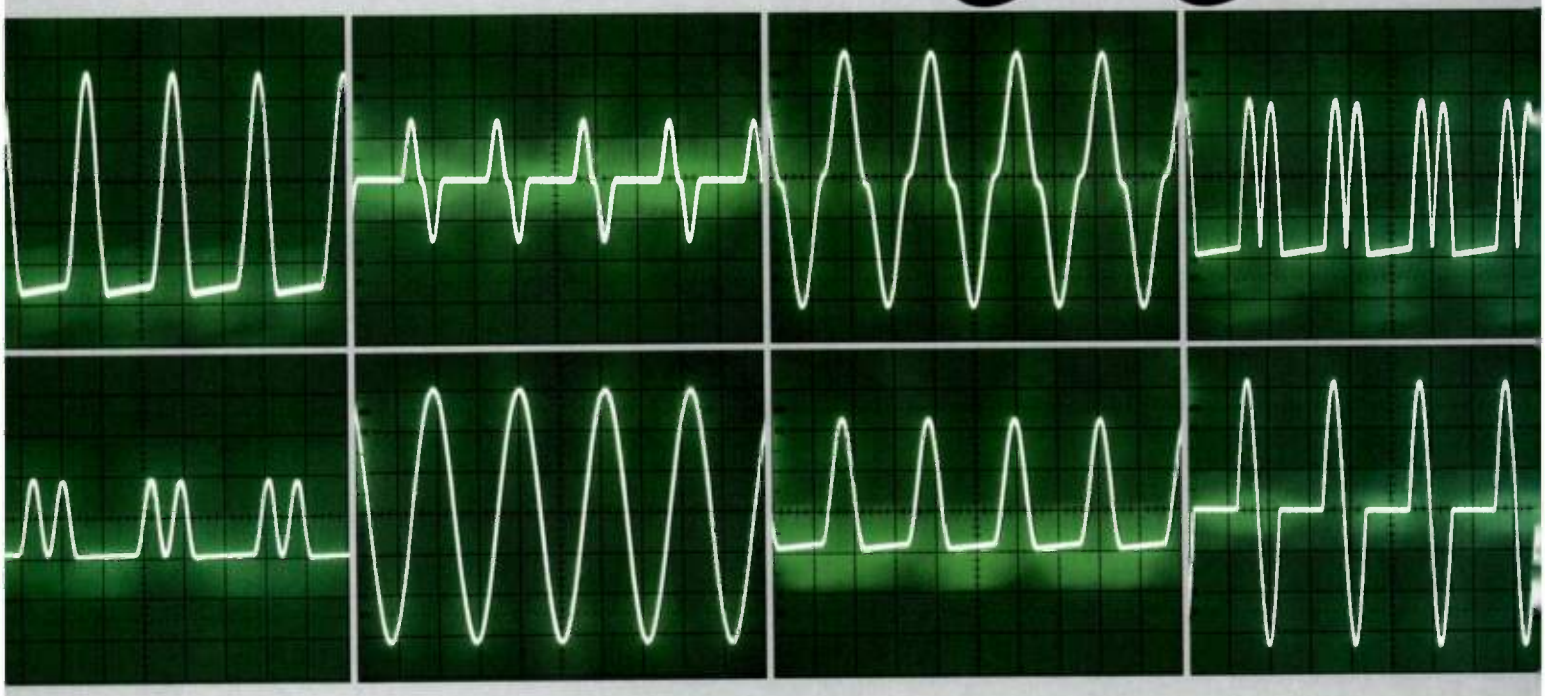

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THE ARRIVAL OF INTELLIGENT INSTRUMENTS

BY LARRY OPPENHEIMER

ALGORITHMIC COMPOSITION IS ONE OF THE HOTTEST TOPICS IN MUSIC TODAY. THIS ESSENTIAL OVERVIEW INCLUDES COMMENTS FROM JOEL CHADABE AND LAURIE SPIEGEL, TWO OF THE MOST EXPERIENCED PIONEERS IN THE FIELD, AND MINI-REVIEWS OF SOME AVAILABLE PROGRAMS.

TRACK ONE TRACK TWO TRACK THREE TRACK FOUR/ REWIND PLAYBACK PUNCH IN RECORD

This is the legacy of the multi-track recording process that we have all grown to know so well in the last 20 or 30 years. Since Ampex introduced the 8-track audio tape recorder in the late 1950s, musicians have learned the process of composing music through the creation of successive layers. Early synthesizers, which required a great deal of patience and meticulousness to use, fit well into the multi-track environment and allowed composers to realize entire compositions with a single multi-track recorder and synthesizer.

When MIDI appeared in 1983, it allowed the equivalent of an orchestra to be controlled by one person. Around the same time, sophisticated personal computers became accessible and offered the greatest potential for control of MIDI instruments. With these developments, the stage was set for a new era in music composition using software-based compositional tools that were far more powerful than anything that had previously existed.

SEQUENCERS RULE

Given the nearly three decades of multi-tracking and the familiarity most music-making professionals have with the concept, it was quite natural to create sequencing software that emulated multi-track operation. The strength of the multi-track approach is that one can compose by recording ideas in successive passes, building the composition vertically by applying horizontal layers. Each part can be precisely fashioned in response to previously articulated ideas. But as useful as they are, sequencers only represent one method of composition which may or may not be everyone's cup of tea—and it's certainly not the compositional tool of choice for composer and computer music pioneer Laurie Spiegel, creator of the popular algorithmic composition program *Music Mouse*.

"Sequencers are compositional tools up to a point, but they also have real limitations and biases," Spiegel points out. "If you want to deal with sufficiently complex harmony and timing, you practically need to work it all out beforehand and then put it into a sequencer. I want to compose directly in the computer itself—not work stuff out—and be overwhelmingly immersed in all parts of the sound at each moment of the piece.

"Sequencers provide forward and backward access within each channel more easily than they give you simultaneous access across the channels. I prefer simultaneous access to all parameters of everything going on at each moment. In traditional orchestration, of course, you put down, say, all of the pitches in time throughout the piece, and then go back and do the orchestration, articulations, interpretations, dynamics and the like. But I do everything at once. To me that feels the most spontaneous, and I like to use computer logic to automate parts so that I can control that many parameters at once in real time. *Music Mouse* works this way.

"Everybody's talking about synchronization, but my approach to sync is also completely different. I like having all parts synchronized with respect to each other as I compose them, rather than making them independently and then having to go back and synchronize them later. I don't post-synchronize, I co-generate all of the parts. I sometimes record into a sequencer and edit and sometimes even overdub, but my primary method is really to compose for the whole orchestra at once, the same way I would on paper, but live, in real time and then go back and touch up things."

Larry Oppenheimer is a musician, sound engineer and consultant. His company, Toys in the Attic, is based in San Francisco, where he is also affiliated with Russian Hill Recording.

ROBERT KOPECKY

Automating Music Composition

The idea of "automating" composition may sound to some like the Brave New World of the late 20th century. But *algorithmic composition*, using a defined set of compositional rules coupled with computer logic to aid music composition, and experimentation with alternatives to the traditional harmonies of piano-based composition, have been taking place in the "avant-garde" and "serious" music communities for quite some time. Back in the '50s—long before Robert Moog invented his voltage-controlled modules—Max Mathews was making musical baby-talk with computers while Harry Olson and Herbert Belar were making their analog synthesizer at RCA. And at the University of Illinois at Champaign-Urbana, Lejaren Hiller created the genre of algorithmic composition by experimenting with using computers as compositional aids. The connection with academia is no coincidence; in today's sequencer/computer-laden world, it's sometimes easy to forget that until relatively recently, only academic institutions could afford the computing power required to experiment with intelligent compositional aids.

Nowadays, it seems everyone who can scrape together some discretionary income is working with MIDI instruments, and the computer of their choice, to run sequencing software. But there is alternative compositional software, and it's no longer solely the domain of academics cloistered with large computer systems. As of this writing, commercially available MIDI music composition programs outside of the sequencer category are: *M* and *Jam Factory* from Intelligent Music; *Music Mouse* distributed by Opcode; and the *Algorithmic Composer* for the Commodore 64 from Dr. T's Music Software. Opcode System's *Sequencer 2.5* for the Mac and Dr. T's *Keyboard Controlled Sequencer* for the Commodore 64 both contain features that do not fit the mold of multi-track sequencing, and Total Music's remap tables provide primitive algorithmic capabilities; but the basic structures of these three programs still fall squarely in the realm of traditional sequencing.

Random vs. Deterministic

What approaches to computer composition are there? "One criterion is the use of *deterministic* versus *random* methods," explains Spiegel. "When something is totally logically structured by rules, or is fixed data—where under a given set of circumstances you can only do one thing—it's deterministic. The random approach is usually a means of creating variety. When your purpose is to create, randomness or structures based on probability work really well. They can sometimes simulate human decision-making processes better than deterministic processes can. Suppose you're working at the piano and somebody outside honks their horn at a note relative to what you're working on. Your piece subconsciously begins to take a different direction because you heard this relationship against it. That's quite random; the traffic jam on West Broadway is the randomnest one.

The composer in algorithmic composition does not specify the details of the composition, but creates a computer algorithm to create the details—it's stepping back one level of decision making.

"I think randomness is valid and most of the software I've written over the past 15 years works that way. But *Music Mouse* is completely deterministic. If you do the same thing with the same variables, you'll always get the same results. It's completely controllable and predictable because of that. The distinction is important, because systems that use deterministic logic usually tend to start with a basic preconception, and are often designed to test out hypotheses about how we work, to see if we've described our aesthetic well enough in rules. Of course, nothing is ever complete or absolute, and you are always refining the rules. The random approach tends to be used more often to create more variety, get new ideas, and create repertoire, or even to study the processes of doing that."

Musical composition (and performance) is a process, and computers are good at processes. A process, whether deterministic or random, can be described with an *algorithm* ("any mechanical or recursive computational procedure" so says *The American Heritage Dictionary* from Houghton Mifflin Company). In the case of a sequencer, the algorithm is more or less unalterably defined: a performance is recorded the way it is played (within the limits of the hardware/software system in use), and is edited and reproduced in a very exact manner. Sequencers are at least as much recording and reproducing instruments as they are composing instruments, and as such are completely deterministic. But the sequencer approach is not normally thought of as algorithmic composition.

According to Joel Chadabe, whose company, Intelligent Music, produces *M* and *Jam Factory*, "The composer in algorithmic composition does not specify the details of the composition, but creates a computer algorithm to create the details—it's stepping back one level of decision-making. There were many non-computer versions of this process; John Cage's work with randomness is a notable example. Cage created an algorithm that made certain kinds of compositional decisions. In a situation like that, incidentally, the composer is not giving up any authority whatsoever, or any control over the music. It's just that the nature of the composing act is changed a little bit. The composer is not composing the decisions—the yesses and the nos and the numbers—so much as asking the question 'what are the musical variables that will be controlled by these processes?'"

Why Algorithmic Composition?

"There are several distinct reasons for algorithmic music," Laurie Spiegel feels. "For hundreds of years, people have had a tendency to try and see what it would sound like to express extramusical or non-musical relationships—like mathematics, visual imagery, or even physical movement—in sound. As it so happens, algorithms are good at translating other kinds of structures into sound. Another reason is to extend the boundaries of music and find new ways to give us new materials and get us out of any ruts we've fallen into, to keep music alive and exciting and irresistable.

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"There's also the desire to overcome the limitations of human beings in performance. There are limits to what one human being can do, and when you compensate by synchronizing a bunch of human beings, you are limited to certain methods of handling time to keep them together. You end up with certain time concepts and other structures. Using algorithms can amplify the power of an individual beyond what one player has ever been able to do before. This also helps overcome the need for certain traditional divisions of musical labor.

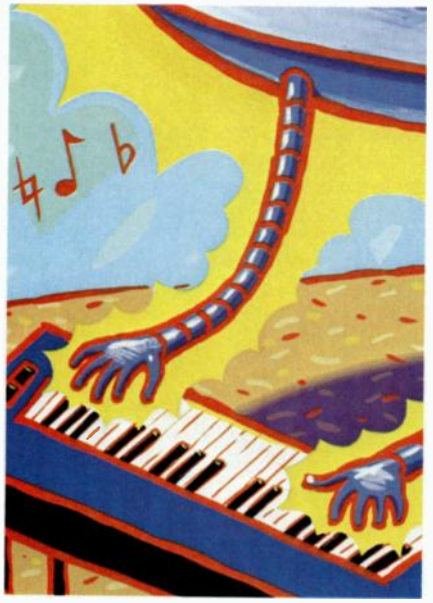
"There's another reason that people do algorithmic composition, and that's to study traditional music by simulation to understand how we work and make musical decisions; to define the deep, underlying structures and develop a creative language based on that understanding. The 'Iliac Suite,' an early Lejaren Hiller and Leonard Isaacson composition, was that kind of thing.

"Then there are the AI (Artificial Intelligence) goals, where the fundamental purpose is to add to our self-knowledge and our capabilities—as opposed to, say, generating repertoire—and then to add to our personal self-understanding outside of that. Science and art have different goals, but they're compatible."

Two Flavors—Generative and Transformational

Many kinds of algorithmic composition require no Artificial Intelligence, applying programmable and often random but fixed processes to expand on materials supplied by the composer. The first MIDI algorithmic composition package to enter the market, Dr. T's *Algorithmic Composer* for the Commodore 64 (written by EM author Jim Johnson and *Polyphony* author Jack Deckard), falls into this category. Actually a group of three separate algorithmic programs, the *Algorithmic Composer* clearly illustrates two main kinds of algorithmic composition: *generative* and *transformational*. The Phrase Generator and Stochastic Algorithm Composer are *generative* programs. What this means is that the composer (the human one) enters a series of pitches and variable values, and the programs apply probablistic weighting schemes to them, thus generating a sequence. The programs are fed *information about music*, not music, and from it they generate something that hopefully resembles music.

The Series Generator is considered a transformational program because it performs manipulations on previously recorded material. It allows the composer to specify independent event series of differing lengths for a number of different musical parameters (pitch, velocity, etc.). These are played back in loops, creating a phasing effect as the series of



different lengths cycle through their values. This is an extension of a feature found in several sequencers, including the *Keyboard Controlled Sequencer* and *Sequencer 2.5*, which allows tracks of different lengths to be built and looped.

Independent control of compositional variables—pitch, duration, loudness, timbre—is a common characteristic of algorithmic composition. More sophisticated programs such as *Music Mouse* (which is generative) and *M* and *Jam Factory* (which are transformational) give control over even higher level parameters, like event density or harmonization. The Generated sequence feature of Opcode's *Sequencer 2.5* illustrates some other common transformational techniques, particularly reordering (such as playing a note series backwards or, in some algorithmic programs, with all the intervals inverted) and parameter ranging, where a particular parameter is varied over a range of values specified by the composer. The other programs mentioned here contain some of these same elements in their own forms; *Jam Factory*, in fact, appears to be an elegant expansion on the concept of the Generated sequence.

Intelligent Instruments Arrive

But the *Algorithmic Composer* is not alterable while it's running and Opcode's Generated sequence function is limited in scope. To break these barriers, it is necessary to make the computer (and the programmer) work considerably harder. The form that this takes is commonly called an "intelligent" instrument, which employs the logic power of the computer to relieve the composer of some of the musical decisions, allowing greater concentration on others. Artificial Intelligence techniques are a natural for this situation, and are often applied at some level.

Chadabe and Spiegel have both worked extensively with intelligent instruments. Chadabe experimented with real time interactive composing schemes on an early Moog modular synthesizer, which had been extensively customized for these kinds of applications; on a DEC PDP-11 computer; on the very first Synclavier; and, like Spiegel, on the Macintosh.

Spiegel has worked in generative compositional software and interpretation of gestural controllers. She also wrote software and music on the GROOVE system at Bell Laboratories, the Apple II, the ill-fated Syntronics Amadeus system, the Macintosh and the Amiga.

"The distinction of intelligent instrument approaches is that computers 'think' in some way," says Chadabe. "Actually, they simulate the results of thinking. You could call one approach the 'soft' approach, where the computer simulates the result of intelligent thought processes through selective use of, for example, random number generators that simulate the unpredictability of human behavior or activity.

"The 'hard' approach would be where the computer actually simulates the *processes* of thought. I don't know any musical program that does this, but it's a goal we'd like to attain in the future, and which will require some considerable development in AI as it applies to music.

"If an ordinary instrument is a device that makes a sound while it responds to a performer's controls, then an *intelligent instrument* is a device that composes simultaneously with making a sound as it responds to a performer's control. The whole process happens so quickly that it's virtually like *composing* in real time, as against performing in real time, or creating the sounds in real time. It is improvi-

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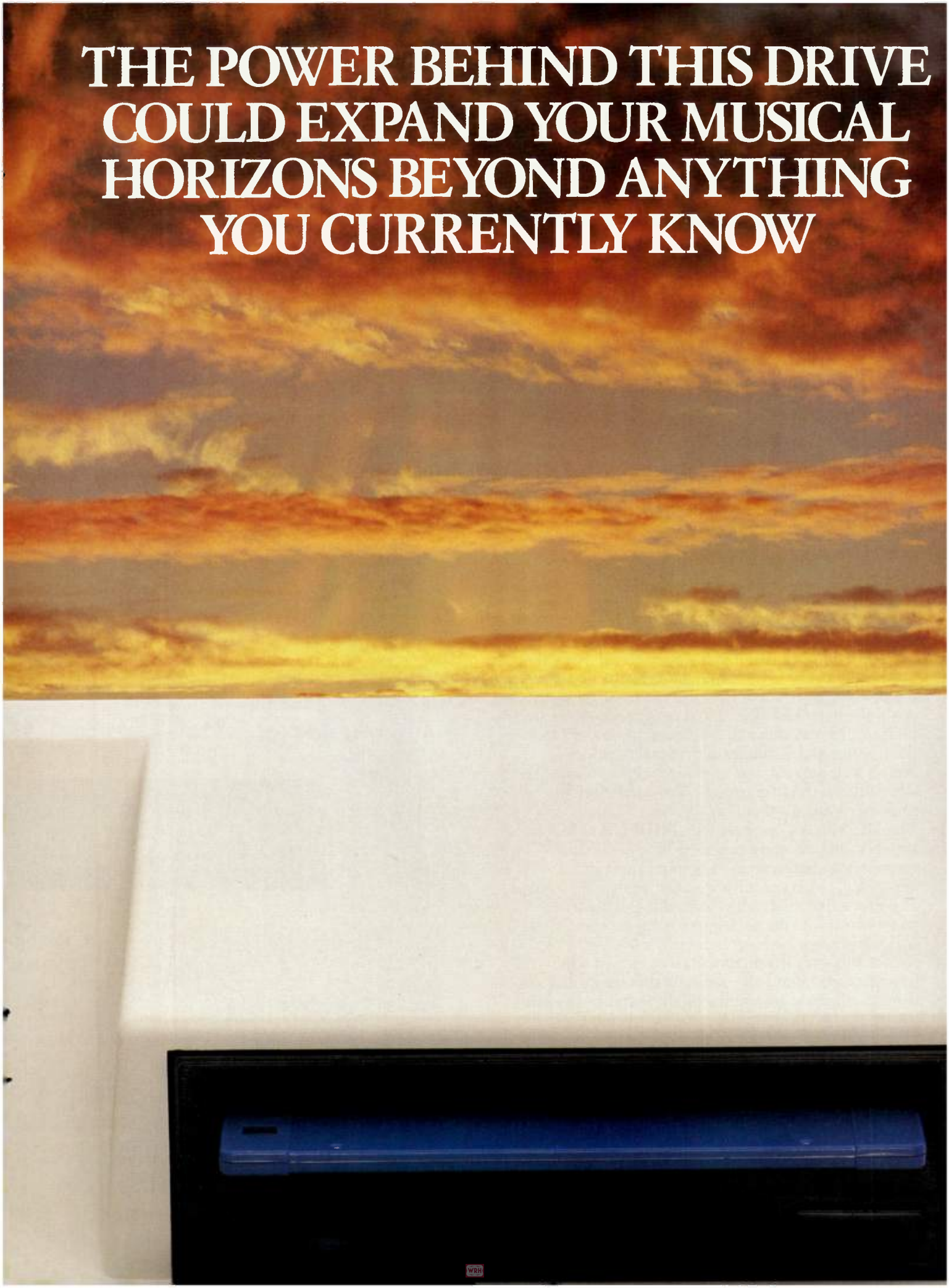

INTRODUCING THE MC
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The Goal: Total MIDI Control/We'd like you to spend a few minutes reading this ad. Because what we have to tell you takes a little time—but your time will be well spent. Because no matter what kind of music you play, you could play it better with the help of the amazing new MC-500 MicroComposer. The advent of MIDI has made incredible progress possible for all kinds of musicians—giving them power they never had before. But in order to harness that power, musicians need the proper tools. The MC-500 was created to fill that need—to harness the power of MIDI and give all musicians the power to control and use MIDI to their best advantage. In recent years, there have been various alternatives to controlling MIDI music systems. Some people have used personal computers equipped with MIDI software and interfaces. Some have turned to dedicated sequencers. Each has had its disadvantages. For all the power they offer, PC's are built for the businessman's environment, not the musician's, and as such they don't take well to life on the road. Also, they can be quite slow in performing MIDI functions, and as we all know, interfacing a computer to a MIDI system is often clumsy at best. Dedicated music sequencers are built for the musician's environment, but usually lack the features and flexibility of personal computers. Simply put, they can't be upgraded with new software, which means they can become obsolete before you've finished paying for them.

MC-500 BACK PANEL

The MC-500: A Computer with MIDI Jacks/To solve this dilemma, Roland's engineers have created an engineering masterpiece—a powerful personal computer, with more memory capacity than the average PC, that is designed inside and out (from the front panel controls to the back panel jacks) for the MIDI musician. Like a computer, the MC-500 MicroComposer has no functions of its own—its functions are loaded off a software disk via its disk drive. In this way, depending on the software you load into it, the MC-500 MicroComposer can become almost any type of MIDI control device you require: a sequencer, a sound librarian, a live performance system controller, and a MIDI interface system—all in one compact, roadworthy unit.

In the Creative Process/The benefits of this type of engineering become apparent almost immediately, as the MC-500 MicroComposer allows you to create and control music with seemingly effortless keystroke commands. In many ways it's more like working with tape recording than computer sequencing, because the MC-500 MicroComposer is laid out in much the same logical manner as an advanced digital tape recording system. The beautiful ergonomics of the MC-500 MicroComposer make it apparent that you are working with an instrument that was designed for musicians, from such easily-understood controls as Record/Load, Pause, Play, Stop, to the Alpha dial which speeds you through tasks which might otherwise slow down your creativity, to the speedy 3.5" disk drive, to the back panel—full of MIDI and tape interfaces, as well as footswitch jacks for those tasks too important to tie up your hands.

MRC-500 Software/The MRC-500 Software Disk is the first in a series of software products for the MC-500

500 MICROCOMPOSER
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MicroComposer. It offers the ability to perform highly advanced MIDI sequencing, editing, disk storage of programs, as well as system exclusive control over patching and assigning your MIDI instruments. Simply load the MRC-500 Software Disk into the MC-500 and you're ready to create music exactly as you've imagined it. The MC-500 can hold performance data for roughly 25,000 notes—up to eight songs—in its internal memory, with additional storage of up to 100,000 notes on the Disk. The MRC-500 allows musical data to be entered from either your MIDI instruments, the ten-key keypad or the alpha-dial, which are then played back through your MIDI set-up. Songs can be named, and linked together, while the 40-character LCD prompts your next command. The accuracy with which the MC-500 records your performance nuance is simply breathtaking. No glitches, no weird or unnatural error-correction, just simply what you've played. The faithful re-creation of your performance is truly one of the hallmarks of this amazing tool. In fact, so good is the quality of the recording, that you'll probably notice aspects of your technique that you never noticed before.

SOFTWARE DISK

Recording Tracks/At first glance, you will see that the MC-500 MicroComposer has four polyphonic recording tracks plus a rhythm track. But, as is the case with most of the MC-500, there is a lot more here than meets the eye. A special Merge function allows you to combine the information on one track with the information on another (similar to "bouncing" tracks on a multitrack recorder). Using this function you can record up to 256 musical parts (16 MIDI channels times 16 voices) and MIDI channel information is retained for each merged track. Later, if you desire, you can un-merge tracks using another function called Extract. The MC-500 allows you to merge and un-merge as many times as you like, and because it is all digital information, none of your performance is ever lost.

The Rhythm Track/The rhythm track gives you the programming power of the most advanced rhythm machines, by creating individual rhythm patterns and then organizing them onto a track. In this way you can control sound sources such as Roland Rhythm Composers, Digital Samplers and Drum Modules, as well as most other MIDI-equipped drum machines. Up to ninety different Rhythm patterns can be created in step time, and then combined at will by using the MC-500's Copy, Insert and Delete functions. And, for the first time, you can not only create, but store your rhythm tracks along with the rest of your performance data—all on the convenient disk drive. No more separate loading of rhythm and program data.

Tempo Control/The MC-500 MicroComposer allows you to modify freely the tempo of any recorded performance. Using the alpha dial it is easy to change in real time, the tempo of the entire piece (which is displayed in beats per minute). But the MC-500 MicroComposer also contains a separate Tempo Track, which is capable of altering the tempo over the course of the piece. In this way, it is possible to create continuous tempo changes such as accelerando (a gradual increase in speed) ritardando (a gradual decrease) or even immediate abrupt tempo changes.

Recording a Performance/The MRC-500 Software allows a performance to be recorded in Real time or in Step time. Overdubs on additional tracks can be made within a few keystrokes of recording the original track, so you can never lose the feel for the music due to complex record set-up. If you make a mistake, the Punch In/Out feature can fix it with minimal fuss (just like on tape) but faster and more reliably than on any tape machine. For sequenced parts or others that are hard to play in Real time, the MC-500 allows Step programming—and since Roland invented this method of programming, you can be sure that it is done here in a manner that is both easy and precise.

FIGURE 1 EDIT FUNCTION CHART

Performance Editing	Track Editing	Merge		Disk Editing		Rename
		Extract				Delete
	Measure Editing	MIDI Channel Reassignment				Transfer
		Transpose				Back-Up
		Change Velocity		MIDI Message Editing	Note	Micro-Scope Functions
		Quantize			Polyphonic After-Touch	
		Erase			Control Change	
		Delete			Program Change	
		Insert			Channel After-Touch	
		Copy			Pitch Bender	
	Note Editing	Note Name	Micro-Scope Function		Exclusive	
		Note Strength			Tune Request	
		Note Length (Gate Time)				
		Delete				
		Insert				
		Timing (CPT)				

Precision Editing/The distinction between a good and a great program comes in the attention to detail, and it is in the editing process where the MC-500's detail shines clearly through. Any performance, whether recorded in Real or Step time can be fully edited down to the most precise detail. (Figure 1) An exclusive feature built into the MC-500's controls is the Microscope function. By entering the Microscope, you can then manually walk through your performance (event by event, forward or backward) simply by turning the alpha-dial. Microscope can be used to isolate any unwanted notes or MIDI events, and then they can be easily deleted, corrected or re-written.

Advanced MIDI Implementation/In its MIDI implementation, the MC-500 is perhaps the most advanced MIDI control device ever made. It can receive or send MIDI messages on any or all of the 16 channels, and can receive or filter polyphonic aftertouch, pitch bend, channel aftertouch and system exclusive (even for instruments not made by Roland). (Figure 2) The MC-500's system exclusive features alone could save you hundreds of dollars in the cost of memory cartridges.

FIGURE 2 MIDI MESSAGE TRANSMISSION CHART

Setting of Output Assign	Both MIDI Out connectors transmit MIDI messages on all MIDI channels			MIDI channels can be assigned individually for each MIDI Out connector			MIDI Out 1 connector transmits MIDI messages on all MIDI channels and MIDI Out 2 connector transmits only MIDI clock message		
Functions	Timing Clock	Exclusive	Soft-Thru	Timing Clock	Exclusive	Soft-Thru	Timing Clock	Exclusive	Soft-Thru
MIDI Out 1 Connector	On/Off	On/Off	On/Off	On/Off	On/Off	On/Off	On/Off	On/Off	On/Off
MIDI Out 2 Connector				Off	Off		On	Off	Off

In the Studio/On the Road/The MC-500 is designed to be at the heart of any MIDI system, and as such it is equally at home in the studio as well as on the road. Because of its flexibility, edits can be made to stored programs with breathtaking ease. Does the producer want you to change your song to drop one verse and add another chorus? It only takes a second. For film work there has never been anything in this class before. By synchronizing the MC-500 to Roland's SBX-80 Sync Box, SMPTE sync is perfect. Plus, the ability of the MC-500 to allow parameter editing in real time means that you can change parameters while you are watching your performance. On the road, the MC-500 can handle as many keyboards as you can throw at it. Need to change programs and parameters on all your instruments eight times for eight different songs? With the MC-500's Chain play ability, you can string eight different songs together for access in three keystrokes. And with the speed of the MC-500's disk access, you won't ever wait long for new material.

The Result: Total MIDI Control/If you need to control a MIDI system, there is no better choice than the MC-500 MicroComposer. For not only will it fill your needs today, but it will fill your needs in the future through software updates and new uses. Plus, at only $1395.00* the MC-500 must also rank as one of the world's greatest computer bargains, especially when compared to the cost of a personal computer, software and interfaces. If you think it's time you mastered MIDI, rather than the other way around, the best way to do that is with the incredibly versatile, amazingly affordable MC-500 MicroComposer. The MIDI Computer. RolandCorp US, 7200 Dominion Circle, Los Angeles, CA 90040 (213) 685 5141.

*Suggested retail price.

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sation in that one's actions are improvisatory, but it's not like traditional improvisation. The instrument you're playing is the improvisation itself and your performance gestures are control gestures, so it's a higher, more powerful level.

"You can imagine how interesting and complex that is, and how powerful that can make a performer. But the output of an intelligent instrument can vary within a wide spectrum of unpredictability on one hand and predictability on the other. Relatively predictable intelligent instruments are extremely useful for professionals in performance, because it makes them far more powerful; they really can control a lot of automatic processes. In general, these instruments tend to generate a lot of detail for the composer, while the composer determines the more structural aspects of the music.

"An unpredictable intelligent instrument puts its user in a truly improvisatory situation. There the main interaction is not between the performer and the audience, but between the performer and the instrument. So that's great for working in the studio or at home."

Breaking Out

Aside from the control issue, intelligent instruments also help composers to go in new directions. With *Music Mouse*, asserts Spiegel, "one of the things that it does is lead you into directions that you might not go if you were just continuing to play on your keyboard or thinking in your usual concept space. It's a good idea generator, it forces you to deal with music in a completely different way. If you're a professional you develop a bag of tricks, a set of habits that it's wonderful to be able to get out of, or call into question. You get to a space where you have to discover things all the time because a lot of stuff that you did before just doesn't apply."

One factor that distinguishes Spiegel's and Intelligent Music's programs is how much they represent the personal compositional visions of their authors. (*M* was coauthored by Chadabe, David Zicarelli, Tony Widoff, and John Offenhartz. *Jam Factory* was authored by Zicarelli and *Music Mouse* by Spiegel, both working alone). Spiegel believes that the personalized aspect of *Music Mouse* is a strength.

"Every instrument created has a set of biases and things it's good at," she begins. "You write for the instrument and use what's in it; you can't do the same things with a harp as with a violin. There is an aesthetic territory for each of those instruments, which is somewhat different, and each quite wonderful. *Music Mouse* is like that; it's just that its territory, aesthetically, is expressed more in terms of what we call higher level compositional parameters, rather than just sonic characteristics. *Music Mouse* is a compositional method; it's a creative method, in the form of an instrument, but what each individual brings to it determines what they get out of it.

You are creating the details by telling the machine exactly how to do them for you.

"One of the important points to consider is that if a program does represent an individual's viewpoint, then there exists at least one person for whom the program is really valid, as opposed to some general theoretical design that may not exactly fit anybody, or, because it tries to be all things to all people, may be too cumbersome to manipulate."

M and *Jam Factory* reflect a very different viewpoint from Spiegel's, as Chadabe elaborates: "People prefer to work in a variety of ways. Some like very precise editing and they'll want to use Performer. Others like high predictability and a lot of interesting performance controls, so they might use the Opcode Sequencer. Other people like to feel that performance is an organic process, and want to make powerful controls or get more out of what they're doing. They'll gravitate towards *M* and *Jam Factory*.

"Everyone, in composing, tries things out. Sometimes you try it in your mind and write out the details of the score; one complication is that in many cases there's a time lag before you can hear a realization of the piece. You redo the score, learn some more, redo the score, and so on. You get a little bit better at predictive knowledge, but you always build slowly on what you knew before.

"An intelligent instrument creates an environment where that learning process happens much more quickly. You're composing on an *orchestra*, and you're able to control many things simultaneously, and quickly try out different kinds of rhythmic, melodic, or harmonic juxtapositions; tempo changes; sounds; transformations of sounds—because the instrument is generating all of these controls for you.

"You get into an environment where musical results come far faster, more productively, and more enjoyably, while you learn more than doing it the traditional way, without giving up any sense of creating the details. *You* are creating the details by telling the machine exactly how to do them for you. The best analogy is to composing for an orchestra and telling each instrumentalist what you want and how to do it, but without having to explain every detail because the instrumentalist is an intelligent person. The instrument becomes like a super orchestra that's simultaneously following all of your directives and adding in a lot of its information.

"*M* is intended to be an intelligent instrument for professional composers, creating a largely predictable production environment and giving a composer immense control over details, a lot of structural control, and the separation of musical variables so that velocity can be controlled separately from pitch, orchestration, and so on. There are several different approaches to rhythm. In short, we tried to create a composing/performing environment that was very general-purpose, quick to use, powerful, and effective for professional musicians.

"If *M* is a composing environment, *Jam Factory* is a performance processor. I've seen *Jam Factory* used in dramatically different ways: to process an already-written piece, for example, making it richer, more full of variation in terms of timbres and composing ideas. I've also seen it used with short patterns in active performance, where people are constantly reading things in and out of the program's 'players.' While you're adding to it or working on something else, you can go back to the first pattern and alter it, clear out the fourth player and change that around, etc., while the piece continues. It

becomes a dazzling performance tool in that way."

Laurie Spiegel elucidates the two approaches: "Intelligent music software provides interactive options for manipulating recorded material for the purpose of creating variety. In order to free moment-to-moment self-expression, *Music Mouse* provides a fairly complex transfer function that establishes a particular, consistent relationship between what its player does and what it plays.

"*Music Mouse* takes a 'let's create it pretty much from scratch' kind of approach. The interesting part of it is the nature of the relationship between the user input and the stuff that comes out."

Chadabe sees more similarities. "All three programs are performance-oriented. There are more automated processes in *Jam Factory* and *M*. The intelligence in Laurie's program has more to do with interpretation of a performer's gestures—moving the mouse, specifically. So the intelligence in *Music Mouse* is an interpretive intelligence, in the sense that Laurie builds up different scales, or different ways of reading a vertical motion of the mouse. *M* and *Jam Factory* produce a high level of somewhat unpredictable detail that they generate themselves."

Intelligent instruments are already powerful and inexpensive (none of the programs in this article costs over $200), but are they mature? One prominent computer music pioneer remarked that acoustic instruments have hundreds of years of musical evolution behind them, whereas intelligent instruments are created by design and have far less evolutionary development. Chadabe says "That's entirely true; we're at the infancy of the field, and we're all learning day by day how to make intelligent instruments work. Naturally, over time these programs are going to evolve enormously. All of the people closely involved with Intelligent Music are musicians that perform. Our programs came about through musical, rather than programming, ideas, and they're going to evolve continually along those lines.

"It's hard for me to see beyond the next step at this particular moment. These steps involve a lot of musical concepts, but sort of general as opposed to specific concepts, that will always allow a greater and more rewarding access to the musical process for any composer or performer. Or, for that matter, for anyone that wants to make music."

Some Currently Available Algorithmic Composers

M and Jam Factory From Intelligent Music

Both programs are written for the Macintosh. The idea behind *M* ($150) is to give a composer simultaneous and sophisticated interactive control over a

number of instruments in real time, allowing "large-scale" experimentation with an entire ensemble. There are three basic processes involved in using M: *entering* note data, *configuring* compositional variables (setup), and *performing*.

Note data is entered into four *Patterns*, which can be thought of as series or sequences. There are five ways to do this, two of them real time and three step time. Fewer manipulations are possible on real time patterns, but they maintain duration information, which step time patterns don't. For each pattern, the Patterns window displays information about the pattern's nature and status and what division of the system time base is used for playback. When all four patterns are filled, they may be stored collectively as one of six *Groups*.

Approximately nine independent playback variables can be set for each pattern, three of which are cyclic series (including durations for step time patterns) and the other six which are static values or ranges. The parameters run from conceptually simple—like scaling velocity range and setting accent patterns—to more abstract, like note order or density. Predictably, parameters on the order of velocity and transposition are pretty easy to grasp and use, while the more abstract ones take more work. The note order parameter, for example, allows proportions of total determinism, total randomness, and a stored random function to be mixed in different proportions for aggregate control of the order in which pitches are replayed.

When a variable has been set up for all four patterns, it constitutes a *Box* (for lack of a better word), which is sort of a micropreset. For each variable there are six boxes. (The *Sound Choice* variable is an exception.) Switching among the presets changes the value of that variable for all four patterns. There is an enormous range of transformations that can be achieved with the variables. In learning *M*, I found it most useful to work with very conservative, largely (but not totally) predictable settings so that I could understand their influence and uses. Macropresets, called *Snapshots*, that store a given selection of boxes can also be created.

Performing typically consists of changing variables and pattern information. Variables are changed by selecting different boxes individually (with the mouse or from a MIDI controller) or in groups (with the *Hold/Do* function or with snapshots), or by using the *Baton*, which can conduct any number of variables linked to its two-dimensional movement. Other features include the ability to capture an *M* performance, export and import note data to/from other programs, and synchronize with MIDI clock as a master or slave.

My experience with *M* started with a feeling of being boggled with possibilities. After studying the well-written manual and the screen display, which is logical and abides by Macintosh conventions, I began to understand what each feature did. Nonetheless, I only made sense out of the program when I started with something I completely understood and then forayed slowly into more remote areas. It would be easy to play with this program and have fun without being so serious about it, but my feeling is that you would soon begin to think that all the music the

What Does The Human Clock Do? T.M.

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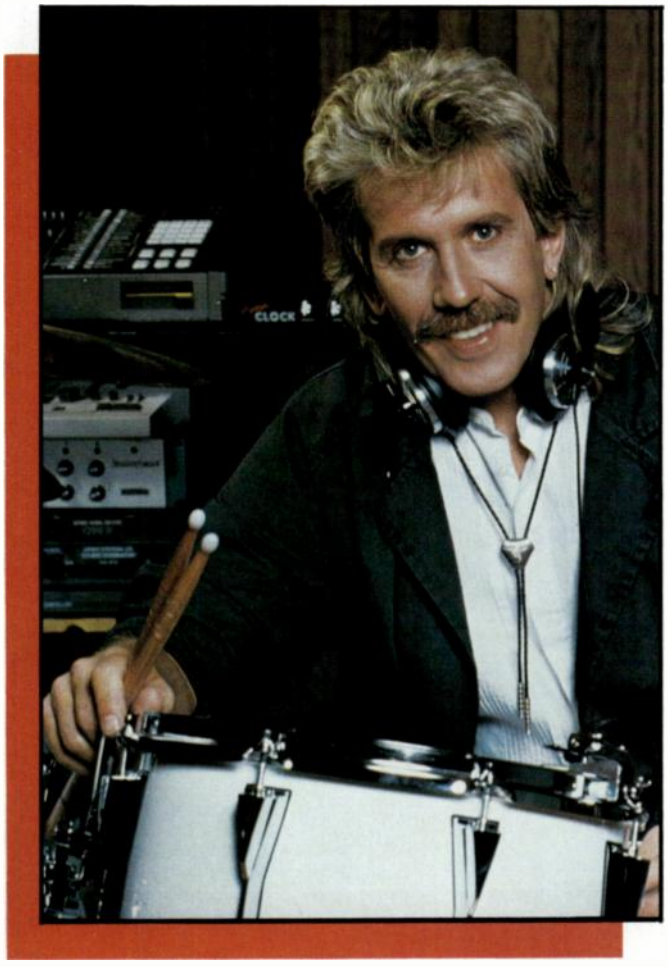

Craig Krampf is one of the busiest session drummers in Los Angeles. He has worked with such artists as Steve Perry, Little Richard, Kim Carnes, Santana, Jane Wiedlin, The Motels, Dwight Twilley. Craig is also a Grammy winner for Best Original Score as co-writer of "Where The Heart Is" in "Flashdance".

"A drummer in today's recording and performing environment must be prepared for anything – playing, programming, triggering, sampling, syncing – and also the unexpected as it occurs."

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program produces sounds the same, which is far from the truth. The ability to record and export performances means that only one good theme need be generated to make the whole thing worthwhile. Although this is a fun toy, it is more importantly a serious tool upon which a compositional career could be based.

Jam Factory ($120) has several distinct similarities to *M*: it is transformational (works on material you record into it); it treats variables such as pitch, duration, and velocity separately; it can be largely controlled in real time from a MIDI controller; it can record performances; and it can import/export files of note data to *M* and Opcode's *Sequencer 2.5*.

The ability to record and export performances means that only one good theme need be generated to make the whole thing worthwhile.

Jam Factory differs from *M* in that it is more set up for live performance: it can do more with real time entry and it shows more specific information onscreen. *Jam Factory* provides a more flexible link between pitch and duration information, and makes use of a probability scheme called *Transition Tables*.

Jam Factory is set up with four *Players*, which each has variables for note order, duration, accent, articulation, phrasing, timing, and so forth. The status of the players (record, play, transpose, etc.) can be changed independently and all have user-defined note ranges to which they respond. Durations can be based on performed durations or a constant pulse which is a division of the system time base. When durations are based on the system clock, it is possible to specify that a percentage of notes are silences or skipped notes from the sequence. When original durations are used, they may be replications of what was played in or manipulated by the Transition Tables.

Transition Tables show the probability of a given event (in this case, duration or pitch) occuring, as referenced to past events. Let's say you're analyzing a blues lead in G. Whenever a C# occurs in this lead, it's acting as a passing tone in one direction or the other. If you started playing in the middle of the solo and hit a C#, you might be on your way up to D or down to C. On the other hand, if you start on C and then hit C#, you're most probably going to play D next. This roughly describes the functioning of first- and second-order Transition Tables. The more past history you look at (higher order tables), the more it narrows the possibilities of what is likely to come next. By the time I've said, "Larry Oppenheim," you know that I am almost certainly going to say, "er" next (unless you confuse me with Opcode's Dave Oppenheim), while if I only said "Larry" I could just as easily say "Fast" or "Bird" next.

Anyway, *Jam Factory* allows you to use first to fourth order tables or a weighted mix of tables for pitch and duration. This makes it very easy to go smoothly from deterministic to random. Again, I had my greatest satisfaction when I entered something and used very small amounts of randomness (high order tables) to create variations that came recognizably from the original. The *Lead* and *Follow* features allow either the pitch sequence to restart the duration sequence when it restarts itself, or vice versa. There is also a tap tempo feature for setting the tempo live. Presets of variables can be set up, as can control presets that allow players to be switched in and out of record, and so forth, in performance.

Jam Factory, like all the rest of the programs described here, was so different from any commercial software that I'd used that I learned by playing until I got bored, then starting over and changing things very slowly until I understood what was going on. Both *Jam Factory* and *M* performed flawlessly for me and never acted weird . . . well, at least not in any way they weren't supposed to. They respond more quickly in MIDI than screen graphics sometimes, which is as it should be in a real time music program. Kudos to David Zicarelli, who coded both programs.

Intelligent Music
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Albany, NY 12208
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Laurie Spiegel's Music Mouse From Opcode

Besides the deterministic nature of this program, one important distinction between *Music Mouse* ($60) and Chadabe's Intelligent Music programs is that *Music Mouse* does not receive MIDI information, it only generates it. This means that control is exercised completely through mouse movement and Macintosh or Amiga keystrokes (the program is available for both computers; the Amiga version, written by David Silver and Laurie Spiegel, has several enhancements, particularly with respect to graphics). Some may see it as a limitation, but in fact, the mouse is not quite so bad a controller as Mac track ball fans have claimed. It is, however, another technique to be learned.

The screen shows a grid with keyboards around the edges and a four-voice (polyphonic) cursor that moves on the grid. Moving the mouse along the X and Y axis produces two melodic lines, and the software adds two more lines.

The four voices may be grouped two-and-two or one-and-three. With one-and-three, the three voices provide harmony that moves as the mouse travels along the X axis; with two-and-two, two voices follow each axis.

Various Macintosh keys vary compositional parameters such as harmony, transposition, parallel/contrary motion, tempo, and loudness, as well as MIDI preset, velocity, aftertouch, portamento, mod wheel, breath and foot controllers. The new Amiga version adds RGB color controls, two drawing modes, color cycling, rhythmic treatments for chords and other musical features. Because of the Amiga's high quality sound, this version is a much more useable musical instrument—regardless of its lack of MIDI—than the Mac version. A pattern generator with ten patterns from which to choose can also be switched in. According to Spiegel's manual, these patterns are not pitch or interval information but simply contours which, presumably, are eventually pitch-quantized to fit the harmony and other pitch variables selected at a given time. Holding down the mouse key or pressing the space bar silences the program. *Music Mouse* is capable of gener-

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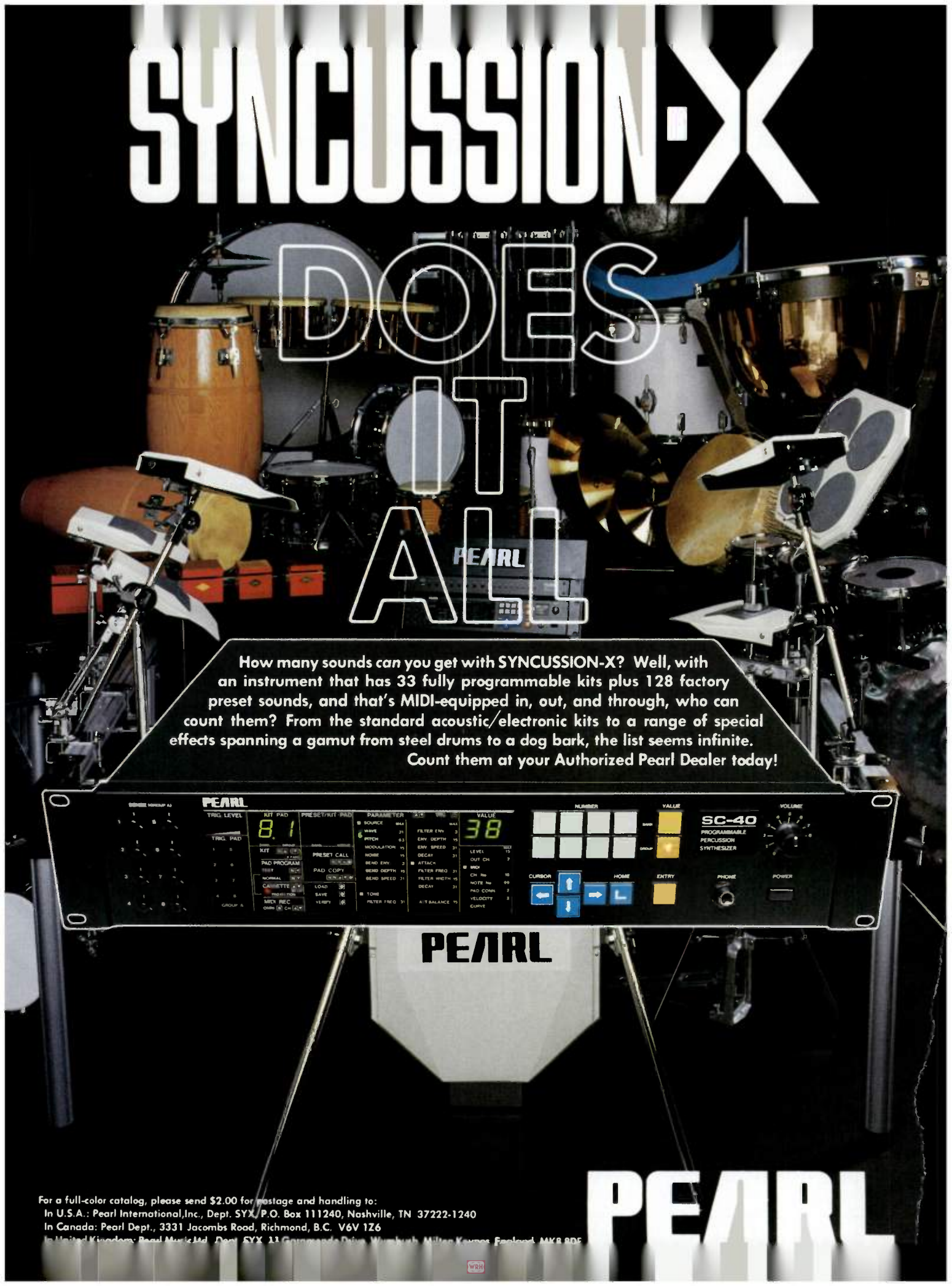

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PEARL

ating a great many notes (over 120 per second) which I found particularly fun when playing without pitch quantization (an option only available when playing through the Mac speaker).

Using this program is a challenge not only because of the conceptual aspect, but the physical technique as well. Unlike most acoustic instruments that only require precise hand-to-eye coordination when reading music, *Music Mouse* uses the Mac screen to show you what you're doing, and keeping an eye there is helpful, though not imperative. Having a good sense of what you're doing on the Mac's keyboard is important as well. Even without looking, making sensitive mouse movements with one hand while executing well-timed keystrokes with the other is quite a dance. Nevertheless, it can certainly be done, as Spiegel's impressive demo tape clearly demonstrates.

Although it is possible for *Music Mouse* to use the Mac's internal speaker, I recommend using MIDI instruments when you first try the program. Remember that the sounds—that is, the orchestration—can make the difference between mildly entertaining and downright fascinating. After all, even Beethoven sounds silly when played on kazoos.

Perhaps *Music Mouse's* best traits are its immediate accessibility and the ease with which one can get carried away in it. The last words that Spiegel offers in her manual are in the largest, boldest type she could find, and they say: "ENJOY THE PROGRAM!!!!"

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Dr. T's Algorithmic Composer

Algorithmic Composer ($99) is actually a package of three fairly classic examples of algorithmic composition. Jim Johnson's *Series Generator* allows the specification of independent series of values for pitch, timing (rhythm), duration, velocity, and MIDI channel. These series run synchronously, but will typically have different lengths, yielding a phasing effect as they cycle. This was the easiest of the three programs to not only grasp, but also obtain useful results. It would have been even easier if Johnson's manual wasn't so appallingly bad. Several features are not explained at all and others are described hazily at best—this on top of Dr. T's typical microscopic print (I kept feeling like I was reading a contract; if the manual's nine pages were expanded to 15 to accommodate larger print, it would be no tragedy). The Series Generator can generate MIDI Start, Stop, and Timing Clock messages to sync other instruments, and also contains several useful MIDI utilities.

Johnson's *Phrase Generator* is a little more complex but offers some wonderful possibilities. The composer specifies a progression of scales, then sets several compositional parameters. The program takes this information and generates a *theme* (a sequence based on scale positions) and then, from the theme and scale information, a *phrase*. The significant functional difference between a theme and a phrase is that one or more scales can be changed while the theme remains the same, resulting in different phrases from the same theme. It is also possible to scramble the theme. Some of the interesting parameters are probability of a rest occurring, and weighting by

"harmonicity" (consonance, consonance and length, chord tones) towards the occurrence of certain scale degrees.

One exciting aspect of this program is in the idea of specifying a scale and a length of time that it is used. This is perfect for generating soloing ideas for a given chord progression, e.g. jazz improvisation. Most of the standard modal scales are already there and there is room for two user-defined scales. The manual is a little better than for the Series Generator, but still not up to snuff.

Lastly is Jack Deckard's *Stochastic Algorithm Composer* (SAC). This program generates notes for four voices using two random number generators with different weighting for pitch and duration. The source material used is entered in pitch and duration tables. Another random number generator can control velocity. Several options allow looping of the resulting sequence, with variations in the repetitions if desired. Of course, tempo, transposition, articulation, and the like can also be varied. The SAC can be a master or slave to MIDI clock.

The detail with which the pitch and duration tables can be edited is one of my favorite points about this program. Again, setting up pleasing sounds from my MIDI instruments helped me appreciate the music that resulted.

All three of the programs can store information in a form compatible with Dr. T's Keyboard Controlled Sequencer. I had several hassles with the *Algorithmic Composer* (after getting a bad disk replaced): getting from one program to another required a complete reboot (mostly a problem because of the Commodore's abysmal slowness), the documentation was lousy, and the user interfaces so-so. These programs could not be considered to be interactive.

In spite of all this, even though *Algorithmic Composer* is not as powerful as the other programs reviewed it is by no means a toy; in fact, I enjoyed using it far more than I initially thought I would. I was able to get music out of it that excited me within a relatively short period of time, and with a little thought and experimentation, *Algorithmic Composer* can be a comfortable and productive tool.

Dr. T's Music Software
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Chestnut Hill, MA 02167
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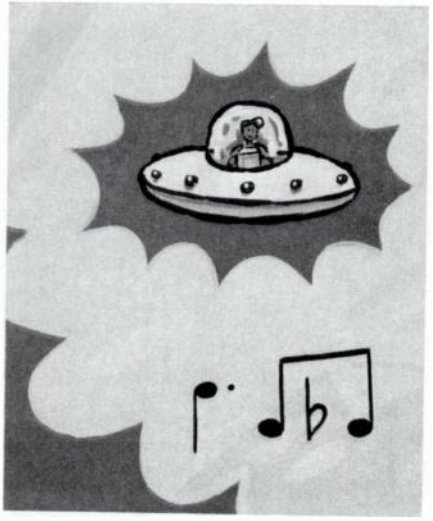
—Larry Oppenheimer

What Can Be Done With A Music Mouse?

BY DON SLEPIAN

Aside from illustrating the principles of algorithmic composition, let's not forget that *Music Mouse* is primarily a cookin' little musical instrument. One of my favorite applications is to use *Music Mouse* for accompaniment. Its melodies can be recorded on the small built-in sequencer, sent to an



external sequencer, played on to tape, or, as mentioned later, you can roll the mouse around on a clean surface with your foot (yes, it really does work!).

Music Mouse is set up to be a self-contained player, typically generating four-voice polyphony. Since it is often easier to jam with someone playing one note at a time, I suggest setting your synth to "Unison" mode (if possible). On some synths, like the CZ-101, FB01, or ESQ-1, try going into Omni Off/Mono MIDI Mode and specifying only one voice for MIDI channel one. After working with a single note melody line for a while, it becomes easy to expand out to the Mouse's full capabilities.

Start by pressing the "T" key for pentatonic modal harmony, select a slow tempo, and use the mouse to generate a relaxed pentatonic bass line. Then choose your lead instrument and improvise a matching melody. As long as you stay in the same pentatonic scale, any note you play will harmonize with the Mouse bass line. This lets you work on both the rhythmic aspects of your playing and the phrase-by-phrase timbre-changing of your synth technique. After you get a feel for that, try reversing the roles, letting the mouse play melody to your bass line.

TRADING LICKS

Select a timbre or group of timbres that slowly evolve over time. Set up a long melodic repeating pattern (using the "A" Mac key) that inspires you to want to trade riffs with the Mouse. Take off your left shoe (your right will do, if you prefer) and put the Mac and its keyboard on the floor next to the instrument you have chosen to play. Tap the Mac's space bar with your left big toe to practice starting and stopping phrases of four-, eight-, or 12-bar lengths. If you want the notes to decay and not cut off instantly, use the "A" key to toggle the sequence on and off. Once you're comfortable with that, try trading four-bar phrases with the Mouse. Watch your rhythm during your solos, and make sure your left toe starts and stops the phrases cleanly.

Practice trading licks where the last note the Mouse plays and the first note of your solo happen at the same instant. The challenge here is to make our first note the same as, or a harmonization of, the last Mouse note. This technique, called "elision" in music theory texts, adds excitement to your solos. When you've mastered it, while soloing reach over with your left big toe and press one of the number (0 through 9) keys, then place your toe back in position over the space bar. With that technique the mouse can change patterns each time it has a solo. Make your phrase structure asymmetric and unpredictable. To build excitement, start by trading 12-bar phrases, then eights, then fours, then notes or measures—just don't get so excited that you stomp your poor Mac's keyboard! Most people are not as foot-oriented as I am, but you can still use the Mac in a conventional table-top-level, single-handed manner and achieve these results.

Another interesting technique is to take extended solos in the form of theme and variations. Let the Mouse play a few bars and then improvise a solo of extended variations of the Mouse's theme. Before you run out of ideas, have the Mouse come back in with a new theme. Remem-

ber to mix your meters; themes of five and seven beats duration add spice to an overall duple or triple meter feel. Have the Mouse play at a tempo slow enough so that your starts and stops are clean. Those few of you who are contrapuntally inclined will find the Mouse an excellent source of unique fugal subjects. If you find some musical gold in all this riff trading and want to try this on stage, I suggest you carefully modify the Mac's keyboard to allow for a long cable going to conventional footswitches that remotely activate as many keys as is practical.

Laying Mouse Tracks

I've found the Mouse very useful in creating textures on tape. Running the tempo at high speed with the appropriate sounds creates beautiful, dense clouds of notes. Electronic music composers might want to record and catalog these effects. I would be very interested in seeing how the Mouse would control the new generation of MIDI-controlled effect devices! A most natural application for the Mouse is as an input to any sort of MIDI sequencer. A good Mouse session can easily be captured in real time by any MIDI sequencing program. The possibilities then are very broad, including global and specific sorts of editing, overdubbing, music printing, and SMPTE synchronization.

If your Mouse tracks end up on vinyl, it seems only right to credit the Mouse like you would any good player. A statement like "Music created using Laurie Spiegel's Music Mouse" would suffice.

Mouse Mix

One of the most attractive features of Music Mouse is that it restores to digital instruments some of the qualities and feel of analog synthesizers. The letter keys give the user smooth continuous control over the MIDI parameters for Breath Controller, Foot Controller, Modulation Wheel, and Velocity Sensing. You could set the Mod Wheel on a Yamaha DX7, for instance, to control the Envelope Generator bias of the FM carriers, yielding a sound highly reminiscent of the sweep of a low-pass filter (How sweet the sound!). Another interesting possibility is timbre rotation. Organize a bank of closely related timbre presets, and use the "u" and "i" keys to travel through these timbres as you play the Mouse.

The Mac's internal speaker is also under the program's control. By itself the sound is rather raw, but processed through a good delay line, some fine sound effects are possible.

A Mouse Is Better Seen Than Heard

At the January '87 Anaheim NAMM show, the Mouse program was used to control a MIDI-driven stagelight system. What I saw made *me* want to let a mouse loose in my dimmer pacs. Algorithmic stage lighting, for example, could hold some illuminating possibilities.

Using one of the standard MIDI-to-control-voltage interfaces opens up the entire world of video-to-Mouse control. The video world hasn't even discovered MIDI sequencer-controlled video, though; better let them earn their Status Bytes before they tangle with a *Music Mouse*!

Last but hardly least, Tom DeWitt's innovative Pantograph video 3-D tracking system has been successfully inter-

faced to an Amiga's Mouse port. The report from Music Mouse Headquarters in lower Manhattan is of an all-night session packed with bursts of 6502 assembly code and smoking Mouse whiskers. The result for us "normal" folks is the complete retirement of the mouse as we have known it. First point a video camera at a dancer, actor, or any brightly lit moving object in a scene. The dancer then becomes a "virtual mouse," instantly translating any movements into Mouse coordinates. The suit-and-tie folks might not run to hire dancers to move around their spreadsheets, but the intimate connection between the worlds of dance and music has just gotten even closer. Those readers who share my advanced age might remember a dance, popular in 1966, called "The Mouse." It could be due for a revival.

The dancer is a virtual mouse. The intimate connection between the worlds of dance and music has just gotten even closer.

Remember that the ability to build a convincing alternate musical reality comes from your musical skill and a lot of practice with the program. Music Mouse is only the conductor; it's up to **you** to build the orchestra from your carefully organized and cultivated group of appropriate timbres. Under the command of a competent Mouse Master, I've seen even the least expensive MIDI synths bend my musical reality powerfully. Make the most of what you've got, and remember, as with the Dungeonmasters in "Dungeons and Dragons," some of the most potent Mouse Masters are under the age of ten.

EM

Don Slepian has recorded the album Reflections *on the Audion Label, distributed by JEM records. When he is not surrounded by Mirages, he plays alto recorder and classical guitar.*

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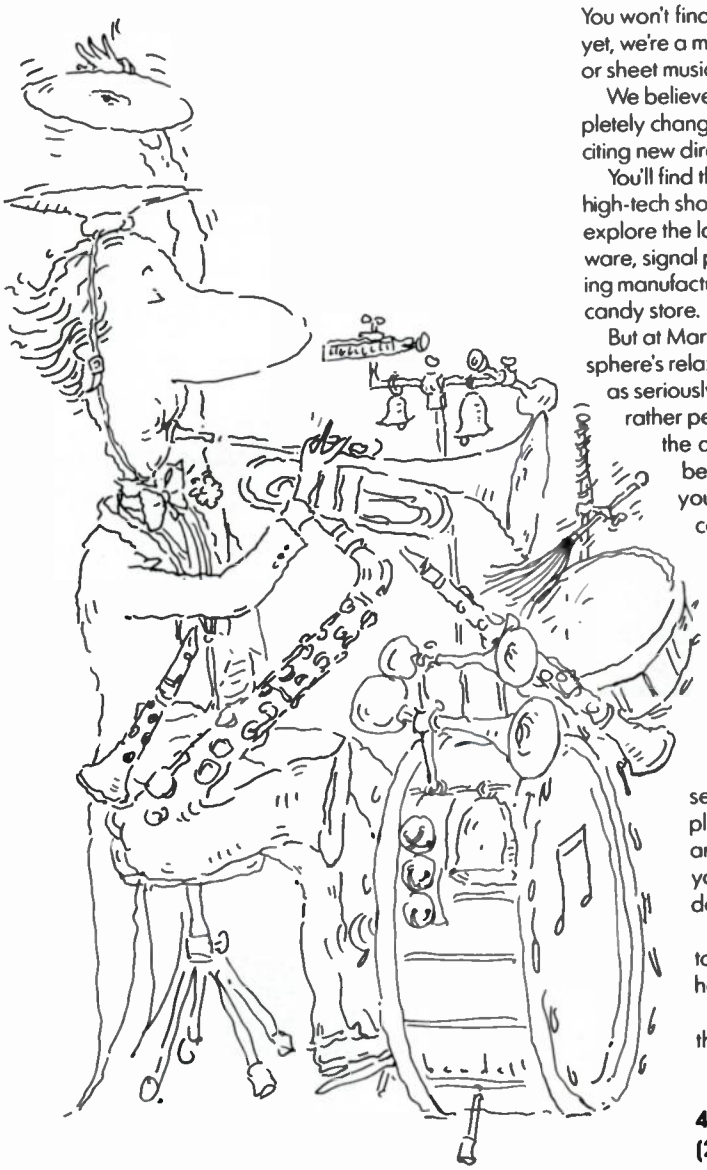

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Random Patch Roundup

BY TIM DOWTY

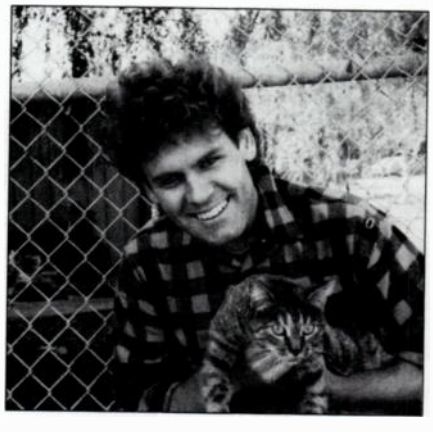
I hate to admit it, but I've never sat down and, starting from scratch, built a CZ sound I truly liked. I've always had much better results editing and tweaking sounds built by someone else than I have starting from sonic ground zero. And that's not a good position to be in if, like me, you've had a hard time finding lots of different patches to experiment with. Aside from the stock Casio patches and an occasional published patch, where do you turn?

My solution to these timbral tribulations is a simple random patch generator program. The program, which runs on a Commodore 64, not only pumps out CZ patch after CZ patch, but is integrated with another useful CZ program you may already have typed into your computer: *CZPL*, the patch librarian published in the Feb. '87 EM (back issues are available for $3.50). We'll look at the program in a minute, but first let's cover what makes random patch generators tick (and squawk, and bleep, and grunch).

THE GENERIC PATCH GENERATOR

Conceptually, all random patch generator programs are pretty similar. The computer generates a set of random numbers, then sends them to the synth via MIDI System Exclusive messages. The relative position of each number in the set determines which of the synth's sound parameters it controls. For example, in the CZ, numbers 10 through 15 determine the vibrato delay time; numbers 28 and 29 control the selection of the DCO1 waveform; and likewise, each of the other numbers in the set determines the setting of a specific sound parameter. Generating a new patch simply involves generating a new batch of random numbers, which correspondingly changes the sound parameters.

Tim Dowty lives in San Diego where he works as a design engineer, plays his Stratocaster, and seldom misses a Padre game. Why the big smile? He married the girl of his dreams in May.



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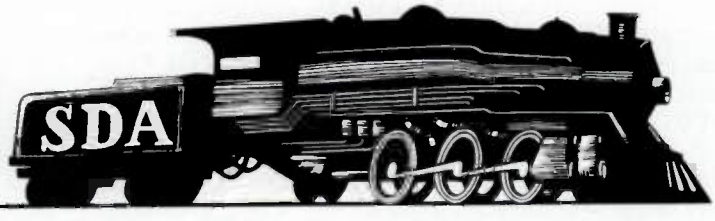

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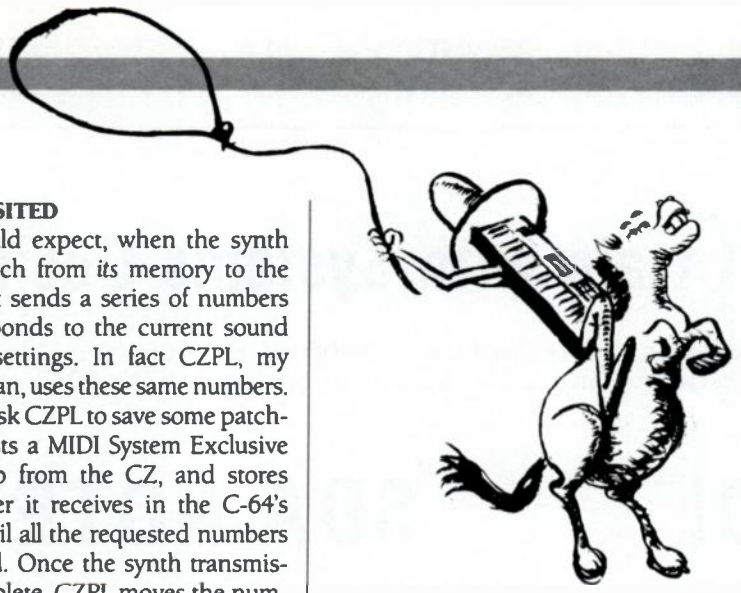

CZPL Revisited

As you would expect, when the synth sends a patch from its memory to the computer, it sends a series of numbers that corresponds to the current sound parameter settings. In fact CZPL, my patch librarian, uses these same numbers. When you ask CZPL to save some patches, it requests a MIDI System Exclusive patch dump from the CZ, and stores each number it receives in the C-64's memory until all the requested numbers have arrived. Once the synth transmission is complete, CZPL moves the numbers over to the C-64 floppy disk for long-term storage.

Later, when you call on CZPL to restore the patches, it retrieves the original numbers from the floppy disk and transmits them back to the synth. What has this got to do with generating random patches? The gyrations the computer goes through to do a CZPL patch restore are almost *exactly* the same as those used for our patch generator. The only difference is that we want to send *randomly generated* numbers to the synth instead of the "old" numbers that just reconstruct a previously saved patch. So, most of the code we need for a random patch generator *already exists* in CZPL! Therefore, instead of starting from scratch, I've just expanded the original CZPL program to include the extra stuff needed by the patch generator. The result is a single program that retains the capabilities of the original patch librarian and also does some nifty new tricks—sort of a "Son of CZPL." As if there weren't enough acronyms in the world already, I've dubbed the new program "CZPLUS:" CZ Patch Librarian, Usefully Stretched.

Program Requirements

The new program requires the same set of equipment that CZPL did: a Commodore 64 (or C-128 in C-64 mode), a 1541 or 1571 disk drive (if you intend to use the patch librarian features), the EM MIDI interface card (plans in the May '86 EM; also see corrections in the July and September '86 issues), and a Casio CZ-101 or 1000 synthesizer.

You will also need to have the original CZPL program entered into your C-64 and saved as a disk file. A Passport (or compatible) MIDI interface card works as long as you make the program changes described in the Feb. '87 issue; you will also need to change line 9010 in Listing #1 to read: TDR=56841.

If you missed the CZPL article the first time around, back issues are available from EM, or a complete BASIC and commented assembly language listing is available from: Xerbitron, 5644 Kearny Mesa Rd. Suite R, San Diego, CA 92111, for $3.50. Please include a letter-sized, self-addressed-stamped-envelope with 39¢ postage.

Entering The Program

To "PLUS" your CZPL, first LOAD CZPL into your C-64 from the disk drive. Now, instead of RUNning the program, type in each line in Listing #1 exactly as shown. As you type in the new lines, your C-64 adds them to the BASIC program code already in memory. If a line number matches that of a line that already exists, the new line replaces the old line.

Notice (hooray) there are no additional lines of machine language op codes in those long DATA statements. Just so there are no misunderstandings, let me clearly state that *the program lines shown in Listing #1* do not *comprise a complete computer program.* These lines are to be added to the CZ Patch Librarian program given in the Feb. '87 issue of EM. Once all of the Listing #1 lines are in, save the resulting file to disk under the name CZPLUS before you RUN it. This saves a lot of time if a typing error causes the program to overwrite itself in memory or otherwise self-destruct.

Operating Czplus

The new program operates exactly like CZPL except for the new (G)ENERATE RANDOM PATCHES selection offered by the main menu. If you choose this option (by typing G), a second menu appears, asking which CZ memory bank you'd like to randomize: Preset, Internal, or Cartridge. After you've chosen a bank, CZPLUS first loads the bank's patch data into the C-64's RAM via MIDI System Exclusive. The screen shows "WORKING..." while the program randomizes the patch data and sends a never-before (but soon-to-be) heard patch back to the synth. (More on "randomization" later.)

Once CZPLUS has done its handiwork, it does something kind of cheezy on account of the way my studio is set up at home. My CZ isn't within reach of my C-64, so I have the program send out MIDI note information so I can get an idea of what each random patch sounds like without walking across the room and fingering the keyboard.

CZPLUS plays a chromatic scale across the MIDI reception range of the synth at a fairly quick tempo. This has the advantage of giving a taste of the sound over its entire range in just a couple of seconds, but doesn't begin to sound patches with long attack times. It also makes a murky mud pie out of any sound with a long release time.

And, as you'll no doubt discover, a scale like this also sounds *incredibly* dorky, even with the coolest sounds. If you're the type who says things like: "Wanna come upstairs and see the etchings next to my MIDI setup?" you'd better either change this part of the program or else go out and buy yourself some art.

After playing the scale, CZPLUS puts up a third menu from which you choose between creating a new random patch and returning to the main menu. At this point you can either set CZPLUS back to WORKING... and generate a brand new patch, or else you can go back to the main menu and choose between doing patch librarian stuff or randomizing a new CZ memory bank.

If the random patch CZPLUS just sent to your synth is at all interesting though, you'll probably want to move over to the CZ keyboard and explore the possibilities presented by the new sound. If you like the sound as is, you can save it as one of the patches in the CZ's Internal or Cartridge memories. If it's not quite right, but shows some promise, you can fiddle with it until you have something you do want to keep, then save it. Of course if the sound has no redeeming social value whatsoever, then to the slime pit it goes! It takes just a few seconds to generate and transfer another random patch.

Don't forget that all of the functions of the original CZPL patch librarian are still at your command along with the new patch generating capabilities. This makes it possible to save your "keepers" to disk without leaving the program. Sounds like fun, doesn't it?

The First Cut

My first try at CZPLUS didn't work out so well. I followed the "generic patch generator" strategy given above, but I was unpleasantly surprised by the results. The effort wasn't a total disaster since the *mechanics* of the program functioned beautifully; I was generating legions of random numbers and shipping them off to the CZ without a hitch.

The problem was with the sounds. They were horrible. If you want to see what I mean, add the lines in Listing #2. Oh, yes: if you live with others and you'd like to continue your present living situation, I suggest headphones here. The real difference between my first cut and the final CZPLUS program is in the *way* the random numbers are generated. My first try simply used the C-64's BASIC RND(x) function and scaled the resulting numbers to fit within the CZ's allowed range. There was no checking of any kind to insure that the numbers, taken as a set, represented "legal" values, let alone desirable or even usable ones.

The awful sounds were the result of things like multiple sustain points in DCO, DCW, and DCA envelopes, and end points that didn't return to zero. The patches weren't musical in that the individual sound parameters didn't work together. In order to generate useful sounds, the random numbers had to be "reined in" somehow.

My first ideas for doing this turned out to be insanely complicated and in-

```
15 C$=CHR$(147):Z$=CHR$(18)+"CZ-101 PATCH LIBRARIAN+"+CHR$(146)
35 G$="[G]ENERATE RANDOM PATCHES":WO$=CHR$(18)+"WORKING..."+CHR$(146)
37 CR$="[C]REATE NEW RANDOM PATCH":RT$="[R]ETURN TO MAIN MENU"
55 RN$="BANK TO RANDOMIZE [?]"
75 INIT=32768
80 DS=34816:DE=DS+4096+16
123 PRINT:PRINT TAB(5);G$
173 IF A$="G" THEN 800
800 GOSUB 1000:SB%=-1
810 PRINT:PRINT TAB(5);P$
815 PRINT:PRINT TAB(5);I$
820 PRINT:PRINT TAB(5);K$
825 PRINT:PRINT:PRINT RN$;
830 GET A$:IF A$="" THEN 830
835 IF A$="P" THEN SB%=0
840 IF A$="I" THEN SB%=32
845 IF A$="C" THEN SB%=64
850 IF SB%<0 THEN 800
855 POKE 32783,SB%
860 SYS SV
861 IF PEEK(253)<>16 THEN 855
862 IF PEEK(254)<>152 THEN 855
865 GOSUB 1000:PRINT TAB(15);WO$
870 GOSUB 8000
875 GOSUB 1000:GOSUB 9000
880 PRINT:PRINT TAB(5);CR$
885 PRINT:PRINT TAB(5);RT$
890 PRINT:PRINT:PRINT Y$
892 GET A$:IF A$="" THEN 892
895 IF A$="C" THEN 865
897 IF A$="R" THEN 110
899 GOTO 875
8000 REM ********************************
8001 REM * SUB GENERATES "RANDOM"     *
8002 REM * PATCH AND WRITES IT TO CZ  *
8003 REM * SOUND AREA.                *
8004 REM ********************************
8010 FOR I=0 TO 256
8020 A%=INT(RND(0)*16)
8030 POKE DE+I,PEEK(A%*257+DS+I)
8040 NEXT I
8050 POKE 32790,96
8060 POKE 253,16:POKE 254,152
8070 SYS 32902
8999 RETURN
9000 REM ********************************
9001 REM * SUB XMITS MIDI INFO FOR A  *
9002 REM * CHROMATIC SCALE.           *
9003 REM ********************************
9010 TDR=56833
9020 POKE TDR,144
9030 FOR I=36 TO 96
9040 POKE TDR,I:POKE TDR,I:REM *YES, POKE TWICE!*
9050 FOR J=0 TO 20:NEXT J
9060 POKE TDR,I:POKE TDR,0
9070 FOR J=0 TO 20:NEXT J
9080 NEXT I
9999 RETURN
```

IMPORTANT

THIS IS NOT A COMPLETE PROGRAM!! These lines are to be added to the CZPL program presented in the February 1987 issue of *Electronic Musician*. A complete BASIC/Assembly language listing of CZPL is also available from Xerbitron at the address given above. The cost of the listing is $3.50 + a standard letter-sized stamped, self-addressed envelope with 39¢ postage.

Listing #1 Random patch generator addition to Tim Dowty's CZ Patch Librarian (note: this is not a complete program—see text).

volved—obviously no good for a magazine article. Discouraged, I was about to lay this project aside and begin work on a MIDI beer keg, when a simple solution hit me. I reasoned that the stock CZ sounds I already had in my synth are themselves made up of "reined in" numbers, and using *them* in some way might cut down on the programming I'd have to do. The idea became even more attractive when I realized that the program I was expanding into a patch generator, CZPL, already had in it the program code I'd need to pull the patch data in from the CZ. A little more thinking, a little more tweaking, and I came up with the following method of "randomizing" existing patch data to create new coherent patches.

The Randomization Algorithm

The randomizing goes like this: first CZ-PLUS loads in any CZ bank (Preset, Internal, or Cartridge) of 16 patches from the synth. The program then creates a workspace, directly above the patches in the C-64's RAM, for building the random patches.

Once all of the patches have been received, a random number is generated. In our old scheme this number would have gone straight into the random patch workspace, there to be sent to the synth as soon as the workspace was full. In this new algorithm, we get a little sneaky and use the number indirectly, scaling it to fall between 0 and 15, then using it to select *from which of the 16 patches we'll take the first parameter.*

If the first random number happens to be say, six, we'll grab the first parameter from the seventh program and write it to the first position of the workspace. (Remember, the random number is between 0 and 15 so that 0 means the first program, 1 means the second, etc.)

Next we generate a second random number, scale it, and use it to select from which patch we'll get the second parameter. This process continues until all of the random patch's parameters have been selected and moved. We end up with a patch that's a "scrambled" version of the patches in the bank we started with.

Let's Discuss The Plus

The Listing #1 code contains both brand new program lines and changes and fixes to old lines. First off, line 15 adds a "+" to the program name. This is among the stuff that comes up in reverse video when

you start the program. Lines 35, 37, and 55 add new strings that get called up in new selection menus having to do with the randomizing capabilities. Line 75 sets the variable, INIT, equal to the address of an assembly language subroutine that wasn't explicitly called before.

The "+16" gets tacked onto the end of line 80 to correct a goof in the original program. We didn't use DE before (this is the address of the first free RAM location above the patch storage space and the beginning of the randomizing workspace), so the mistake had no effect on the patch librarian's operation.

Lines 800 to 899 comprise the meat of the plus addition. 800 to 865 or so are an unabashed ripoff of the CZPL SAVE code, starting at line 500 in the original program. This makes sense since in this new module, part of what we want to accomplish is exactly what the SAVE does—to put a group of 16 patches into the C-64 memory. Line 870 calls the subroutine at 8000 which does the job of creating the new patch and sending it off to the CZ. This is where the randomizing takes place. Lines 8010-8040 contain a FOR/NEXT loop that accomplishes the scramble.

```
8000 REM ******************************
8001 REM * REPLACEMENT SUB TO GENERATE*
8002 REM * !COMPLETELY RANDOM! PATCH  *
8003 REM * AND WRITE IT TO SYNTH.     *
8004 REM ******************************
8010 FOR I=0 TO 255
8020 A%=INT(RND(0)*16)
8030 POKE DE+I,A%
8040 NEXT I
8045 POKE DE+256,247
8050 POKE 32790,96
8060 POKE 253,16:POKE 254,152
8070 SYS 32902
8999 RETURN
```

***Listing #2** Sub-listing for completely random patch generation.*

Subroutine 9000 sends over MIDI the data to play *The Scale*. As I mentioned above, you may want to change the chromatic scale code to play something more pleasing. This is easily done within subroutine 9000. If you believe silence is golden, delete the GOSUB 9000 from line 875.

While we're on the subject, since you're generating random patches, why not generate random tunes in place of the scale? You might try to extend the randomizing algorithm to a harmonically related group of notes.

Further Exploration

The fact that CZPLUS scrambles a bank of patches retrieved from the synth can be exploited in a couple of subtle ways. First, suppose you have somehow created a patch that's "almost there," but find yourself stuck in trying to add the precise touch you're looking for. CZPLUS can automate the process of gently tweaking the sound. To begin, use the CZ's WRITE button to fill the whole internal bank (16 programs) with the sound you're touching up. Then, overwrite one (or more) of the programs with another patch that maybe has some of the qualities you're looking for. Now use CZPLUS to randomize the internal bank and generate new patches.

Some of the random patches now provided by CZPLUS will contain only the original patch data, but others will have small bits of the contrasting patch data mixed in. The exact recipe is unpredictable; it depends on both the ratio of

—continued on page 79

LANEE LA'SHAGWAY

When, How, and Why to Consult a Music Lawyer

After years of struggle, the magic moment arrives in the form of a record contract. Before you start celebrating though, you'd better get a lawyer; and before you get a lawyer, you'd better read this.

BY TERRY KENNEDY

"There's some good news and there's some bad news...." It's an old joke, and you've heard it before. But good-news-bad-news situations really do happen, and if you're a musician, you'll be best off if you have at least *some* preparation when you hear the punch line: "The good news is that you've got a record contract. The bad news is that you have to see a lawyer."

PART 1: PREPARATION

Yes, you will need to consult a lawyer once you are offered a recording contract. If you are working with a manager and/or a producer on the basis of an "oral agreement" (colloquially called a "verbal agreement"), you should procure a written agreement from them as well at this time. For the purposes of this article, "Company" refers to *them* (recording company, manager or management firm, publishing company, producer, etc.) and "Artist" refers to *you*. Once you are presented a contract, make sure you take the time to:

✓ Sit down and get yourself in a legal frame of mind. (If you're in a state of semi-shock from landing a contract, expect aftershocks when you try to understand it.)

✓ Read and reread (and reread) the contract you've been given. Unlike a science fiction novel or EM, these "stories" are not always enjoyable reading and will require a great deal of concentration. Take it slowly.

✓ Reserve one "clean" (unmarked) copy for reference and make your own notes on a photocopied version.

✓ Question anything you don't understand. If a sentence does not make sense to you, perhaps it is because it is poorly written and needs to be revised. Jot down what you think it should say. Ask the party who presented you the contract to give you his or her interpretation of it, and compare this with your own. If the two versions do not jibe, make a note to ask the lawyer(s). Don't be intimidated and don't ever think you're "illiterate" if you don't understand 100% of a contract. Many contracts are made to sound like double-talk to purposely confuse the reader into thinking, "It sounds complicated, therefore it must be official." This, however, does not encourage a mutually trusting relationship between the two parties. In order to dispel your suspicions, it's time to...

✓ Seek legal counsel.

PART 2: LEGAL CONSULTATION

Make an appointment with an *entertainment* lawyer (not the guy down the street who handles divorces; artist contracts are specialty documents and as such require a specialist to review) for a consultation the minute you receive your contract. If you're expecting the contract to arrive by mail, as soon as you've been alerted to this by the Company, make your legal appointment. The important point here is to not waste time. The more popular lawyers are usually booked some weeks

Terry Kennedy is a singer, writer, and electronic musician who has a new album available on Fortuna Records entitled Nature's Fantasies, *with co-writers Manfred Saul and Steve Mecca. Together they are known as Malaysian Pale. Terry also writes and sings future-dance music with Steve as the group Chemistry Set. Their song "Gambit" was on the* Best of NJ Rock *album in 1985.*

in advance and the more lead time you save by reserving early, the sooner the contract can be finalized.

Finding a lawyer may take a little research. Start by speaking directly by phone with the lawyer you're intending to consult; you can ask certain general questions without incurring a fee, and then weed out anyone who seems inappropriate for your case. Ask a friend or music associate to recommend lawyers they have consulted in the past, and the outcome of those consultations.

The important criteria are whether the attorney can comprehend and interpret the legal document precisely, and then have the time and desire to follow through on your case with negotiations or rewrites, if necessary. Mail the lawyer a copy of both the clean contract and one with your questions and notes. To use everybody's time more efficiently, give the lawyer a few days to review your contract before your personal consultation.

The consultation itself will generally last ten minutes to an hour depending on

Case Histories

Over the last few years I've conversed with at least a dozen lawyers by phone and consulted four different lawyers in person for various entertainment contracts. What follows are one consumer's experiences and opinions.

The cast of characters: Lawyer A was located in suburbia and charged $25, Lawyer B in a large city in New Jersey ($45), Lawyer C from a volunteer New York City law firm ($25), and Lawyer D from an uptown New York City private practice ($75 per trioca contract or $225 total; a trioca contract is a three-part agreement that covers management, production, and publishing).

Lawyer A admitted to not being strictly an entertainment lawyer, although he had reviewed music business contracts previously. He was able to answer most of my basic questions, consulted the ASCAP/BMI book for a publishing reference, and made a couple of research calls on the Company in question. He then referred me to...

Lawyer B, who turned out to be quite a character, saying that for a mere $750 she could rewrite the contract, which she called "amateurish." She made several degrading comments in order to shake our confidence with the Company. When asked about a specific clause, she just answered, "I didn't read that far in the contract because it was so poorly worded. I would prefer to write my own." Okay, so the contract wasn't a Dostoevsky masterpiece, but it was all we had to work with, and all we wanted to do was make sure we weren't going to get ripped off. Be careful of this kind of lawyer; they might have their, not your, financial interests at heart.

Lawyer C was consulted from a referral by an arts organization. The fee, for uptown NYC, was well below average, but unfortunately, so was the service. The main problem here was waiting, waiting, and more waiting. The premise at this organization was that you pay a fee for a consultation (which in this case was a brief session solely for the purpose of filling out an application to be eligible for service). The organization refers your case to an entertainment lawyer "within two weeks." We followed up regularly by phone, but after three months with no lawyer referral, we were quite dismayed. Needless to say, in the interim we consulted another lawyer! Of course this meant more headaches and *more* money out of our pockets. No fun.

Lawyer D was approached because of his "clout" (a big buzzword in the industry. For the mathematically-minded, here's a simple equation: Reputation + High Fees = Clout). Lawyer D looked, talked, and breathed with authority. If my case ever had to go into an arbitration session with a major record company, I would choose Lawyer D over the others, if nothing else for his intimidating demeanor. This is important if battle lines are ever drawn (hopefully they won't be, though).

As the above shows, there can be a great deal of difference between lawyers and the services they offer. As always, it's best to shop around.

the number of questions you have, the length of the contract, and your lawyer's style. The consultation fee will be anywhere from $25 (bargain basement deal) to $150 or more per contract. Note that you don't necessarily get what you pay for here. These consultation "chats" are brief introductions to the lawyer and concern your contract as interpreted by the lawyer. At the higher price levels, expect and demand that the lawyer read *all* of the contract and answer your questions. The closer you get to urban centers like Los Angeles and New York, and the more established you are in the business, the more money you can expect to be charged per consultation.

PART 3: EVALUATING A LAWYER

Look for indications in a lawyer's behavior that you are employing someone professional. As a legal specialist, a lawyer should:

✓ Show respect to you as a client.

✓ Be knowledgeable enough about the entertainment industry to answer almost all (90%) of your general questions and a majority (65-70%) of your specific ones.

✓ Admit any lack of familiarity with a subject—whether it's a clause, issue, agreement, or music industry procedure. As the client, it is your responsibility to ask, point blank, whether the lawyer has ever encountered a situation similar to yours and the nature of the outcome.

✓ Be able to refer you to someone who can help you if they can't.

On the other hand, there are some behavior patterns that should make your feet itchy, such as:

✓ If your lawyer makes you wait for an extended period of time in his office and/or has many distractions while talking to you—even though you have an appointment—this is a bad sign. Don't let yourself be rushed through your consultation time. You're the client and are paying for someone's full attention.

✓ If the lawyer balks at explaining any questions you have that concern legal wording, beware.

✓ If your lawyer explains in the consultation that "for a mere $ _____ (fill in the blank) I can rewrite or perform arbitration services, since the contract you have been given is inadequate," *be wary*. The ploy is simple: make the Artist feel so insecure about what they might be getting into that any trust is broken between the Company and Artist. In the process, the lawyer can make a lot of money. As long as you

don't see anything in your contract about signing away all your rights and ownership (copyrights) or your first child or pet, and the agreement is not for an extended period of time, you'll be off to a reasonable start. You and your lawyer can mold something useable and legal for both sides with certain raw material, and you shouldn't have to pay several hundred dollars for it. If a contract greatly dissatisfies you because of its "legalese" (legal jargon), you can either offer the Company to have your lawyer rewrite the contract at the Company's expense, or ask the Company to rewrite and resubmit the contract to you based on your notations. Be prepared in either case for a long wait. Weigh the advantages of resolving binding clauses against the disadvantage of a delayed release date of your record.

Of course, if the lawyer performs such services as extensive research of the Company, does rewrites or makes changes to contracts, or performs negotiations for you, you must pay for this expertise; but you don't want to pay for work that's not needed. Sad to say, artists are sometimes perceived by industry personnel (not only lawyers) as uneducated, lazy drug addicts who wouldn't know if they were being ripped off or not. Your common sense will prevail here.

Part 4: Follow-Up

Often, one of the least-practiced areas of a business deal is the follow-up. Yet it is one of the most important. You can pay your money, go to a lawyer's office and be impressed by the surroundings and jargon—but if you don't ask questions, resolve your fears, and clarify the major issues, you are just ripping *yourself* off. Ideally, all (or most) of the issues can be resolved, or at least clarified, in the initial consultation. Unfortunately, life doesn't always work that way. Try to be patient yet persistent with your lawyer and Company. Be able to compromise on the lesser points in order to focus on winning the greater issues.

Most good lawyers have an excellent command of the English and legal languages, and can intimidate a novice. If you don't feel comfortable verbalizing in your attorney's office, take a chance and call the next day (you might get lucky and find the lawyer in the office and not "in conference") or, if you have the time, write a letter indicating your follow-up requests.

If your lawyer's interpretation of a clause varies drastically from the Company's, then the possibility arises that something is cloaked in jargon or that someone is trying to snow you. Either way, resolve the point diplomatically or delete the offending clause from the contract altogether.

If the Company that originally sent you the contract won't budge on an issue that is essential to your signing the document, ask the lawyer to write a letter addressed to the Company stating that he or she is representing you and, for a fee, will rewrite the contract or clauses in question to the mutual satisfaction of both Artist and Company. Be sure to review this letter before the lawyer sends it; one lawyer prepared such a letter to a management company for me, but the wording bordered on threatening. *You want to avoid antagonism.* Most lawyers love to debate, and this is healthy, but some lawyers lack finesse and tend to argue. Be able to distinguish the diplomat from the bully. Ask yourself, "Do I want this person representing me to an established record company that is giving me an opportunity?" You are hiring a lawyer to communicate on your behalf—to represent you, so make sure the lawyer's image is professional, positive, and diplomatic.

As struggling musicians who scrimp and save for our next piece of musical gear, it is sometimes difficult to fathom how one person can demand so much money for such a short period of time. Don't be sucked into the cycle of debt if you don't need a lawyer, but do use legal services if negotiations with recording companies involve substantial dollar amounts or involve tying you exclusively to that company for a significant period of time. Seek legal consultation if it will clarify your questions, educate you in contract law, or give you peace of mind. Learn more about law by reading (see the suggested reading list), talking to other musicians, going to law school or night school, attending a music business seminar on law, and generally keeping your ears open all the time. Once you learn some of the basics of contract law and form, you can prepare your own simple contract and submit it to an entertainment lawyer for review (that's another story, though).

The silver lining to all this is that once the contract is signed, you become motivated to continue what you do best: write music and create dreams. But take whatever time it takes to know what you're signing. You'll be well rewarded. EM

Suggested Reading

Hammond, R. *Working in the Music Business.* Blandford Press, 1983. (General introduction to the business, includes chapter on lawyers.)

Monaco, B., and Riordan, J. *The Platinum Rainbow.* Swordsman Press, 1981. (Highly recommended practical information on the music business of musicians by musicians.)

Shemel, S., and Krasilovsky, M.W. *This Business of Music.* Billboard Publications, 1971. (An industry classic with specific information and samples of actual contracts.)

Siegel, A. *Breakin' In to the Music Business.* Cherry Lane Books, 1983. (Written by an entertainment lawyer for artists.)

Weissman, D. *The Music Business: Career Opportunities and Self Defense.* Crown Publishers, Inc., 1979. (Good general advice on lawyers and others in music business.)

Reference Material

Biede, D. *Legal Business Aspects of the Music Industry.* New York: Practicing Law Institute, 1980. (Sounds like a good title, have not been able to locate this book.)

Careers in Music. American Music Conference, 1980. (List of music associations and periodicals for reference.)

Field, S. *Career Opportunities in Music Industry.* Facts on File Publications, 1987. (Has good appendix and extensive bibliography.)

Gruber, K. *Encyclopedia of Associations-1987,* Vol. 1, Section 3. Gale Research Co., 1987. (Assortment of legal and cultural associations among others.)

The Guide to American Law, Vol. 3. West Publishing Co., 1983. (Section on music copyrights.)

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SONG	CALL SONG	BUILD	INSERT	DELETE	LEVEL CHANGE	T
CHAIN	CALL CHAIN	BUILD	INSERT	DELETE	LEVEL CHANGE	
FUNCTION	OVER DUB	MIDI CH	MIDI IN COMMANDS	MIDI OUT COMMANDS	MIDI DATA DUMP	

MULTI

LEVEL
SENS
TUNE
PAN

INST. SELECT /FLAM

BD 1	SD 1	TOM HI	TOM MID	TOM LO
BD 2	SD 2	COWBELL	CLAPS	SHAKER
BD 3	SD 3	AGOGO	CONGA	TAMB

CALL PATTERN REAL
CALL SONG BUILD

ERASE

ACCENT

PAD 1

PAD 6

The next generation of Mac software is on the way, and Passport wants to be one of the main players. Thanks to Master Tracks Pro, it looks like they have the goods to back up that desire.

Master Tracks Pro for the Mac

BY CRAIG ANDERTON

Master Tracks Pro is Passport's first Mac offering. On the surface, the program seems very much like a hybrid of *Total Music* (similar graphic note editing) and *Performer* (similar degree of precision and access to raw MIDI data); those who are familiar with either program should find it fairly easy to figure out what's going on with Master Tracks Pro. But some additional features—particularly the modulation windows—are unique to the program, and these are the features that truly make Master Tracks Pro a serious contender in the Mac sequencer field.

Product Summary

Product: Master Tracks Pro
Type: Multi-track MIDI sequencer
Retail price: $299.95
Hardware requirements: Macintosh or Mac Plus, Passport or compatible MIDI interface; second drive recommended.
Number of tracks: 64
Sequencer architecture: Tape recorder simulation
Resolution: 240 ticks/quarter note
Manufacturer: Passport Designs, 625 Miramontes St., Half Moon Bay, CA 94019; ☎ 415 / 726-0280

DOES IT DO WINDOWS?

Master Tracks Pro has five main "windows," each of which accesses a different program function. These are:

✓ *Transport* (located in the lower right-hand corner of **Figs. 1-3**). This sets your position in the sequence and includes "tape deck" control icons (*Play/Stop/FF/RW/Pause/Record*), counters for number of measures/beats/ticks and elapsed time, MIDI Thru on/off and channel selection (for driving expanders from a master synth), metronome on/off, countdown on/off, and an optional *Auto* function which, as soon as you press Stop, returns you to where you started playing or recording (like the "return-to-marker" function on tape decks). Although usually I'm not much of a fan of the tape transport approach to sequence control, Master Tracks Pro is relatively painless to use thanks to the Auto function, the option to use the scroll bar instead of the Transport, and—best of all—the ability to type in directly where you want to go. If you're at measure 214, measure 12 is only a click and two keystrokes away. (Yes, mice are good for learning programs, but it's those keystroke equivalents that really save time once you know a program.) Couple these features with the markers available in the Song Editor window (see below), and it's very easy to get from Point A to Point B with this program.

✓ *Sequencer* (**Fig. 1**). This is the "house-

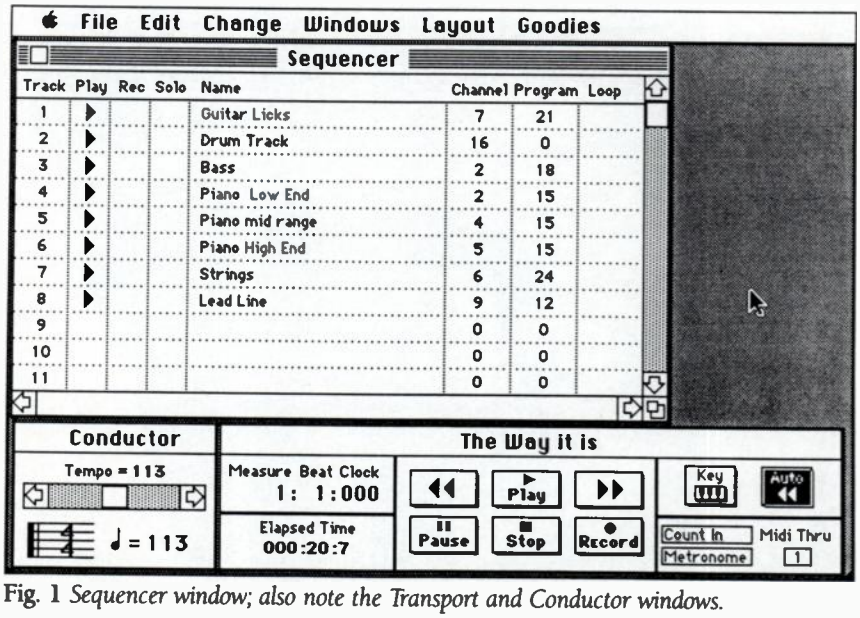

Fig. 1 *Sequencer window; also note the Transport and Conductor windows.*

In addition to editing this magazine, ***Craig Anderton*** *is the author of* MIDI For Musicians *and seven other books. His next book, a glossary of electronic and computer music terms, will be published by Music Sales in the fall.*

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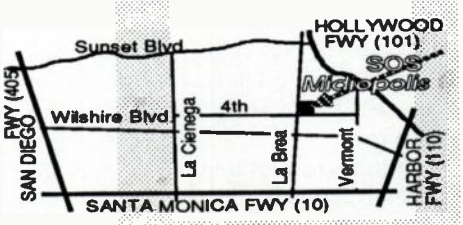

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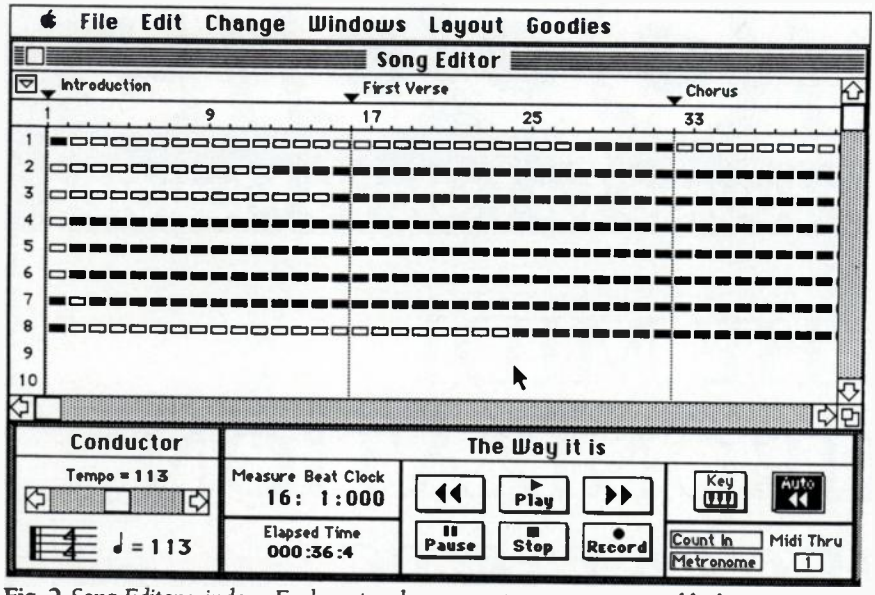


Fig. 2 *Song Editor window. Each rectangle represents one measure; a black rectangle indicates data is recorded in that measure.*

keeping" module for the 64 available tracks. Tracks can be put into record or play modes, soloed, turned off, named, looped, and set for a specific MIDI channel. Additionally, a Program Change message can be sent upon sequence start-up (Program Changes that occur *during* the sequence have their own window).

✓ *Conductor* (located in the lower left-hand corner of **Figs. 1-3**). This window lets you specify the time signature, tempo, and create tempo changes (during either record or playback).

✓ *Song Editor Window* (**Fig. 2**). This is similar to Total Music's main screen. Each recorded track is represented by a horizontal line of rectangular segments, each of which represents a measure. The rectangles are black if data has been recorded; otherwise, they are empty. Markers (a la MacWrite or Performer) can be set at various points in the song for rapid zooming from section to section of a piece. This is the window where large changes are done, usually on a measure (or groups of measures) basis—cut, paste, splice (cuts data and splices together the data on either side of the cut), clear (removes data but doesn't put the data on the clipboard), merge with existing data, and insert measures.

Concerning ease of editing, the Song Editor screen is fast and powerful—you can copy and paste entire groups of measures, spread across multiple tracks, in a matter of seconds. For pop music arrangements and quick song sketches, this screen is a delight. To define a region for editing, you click at the beginning (or end) of the region, and drag to the end (or beginning) of the region. If the region continues off-screen, just hold down *Shift* and the mouse will be free to scroll around to where you want in the song, whereupon you can continue your drag.

✓ *Step Editor Window* (**Fig. 3**). This is Master Tracks Pro's "microscope." There are six levels of "magnification"; the highest level stretches out a single measure across the width of the screen. Notes are displayed as rectangles of varying width (duration) and position (pitch). Removing notes is a two-click process (click on eraser, click on note to be erased), while adding a note is usually a three-click process (click on note duration, click on pencil, click where you want the note). To help you get your bearings, there are: a vertical keyboard graphic on the left side of the screen that correlates to a (hideable) grid of dotted lines; displays that show the note name under the cursor as well as location in measures/beats/ticks (I found this far more useful than the keyboard, incidentally); and a measure ruler along the top, which also displays the names of any markers that have been entered. There are some additional parameters that usually need to be set for any notes you might want to add with the "pencil" function—Note-On Velocity, Note-Off Velocity, MIDI channel and articulation (duration). I should add that Master Tracks Pro handles tuplets and all those other fun time games.

For those who like to do things on a raw MIDI basis, double-clicking on a note while in the Step Editor window pops up another window that reveals the note's MIDI data—starting time, note letter name, Note-On and Note-Off Velocities, duration, and MIDI channel. Any of these parameters can be individually edited.

The Step Editor screen is somewhat more tedious to use than the Song Editor; specifying individual note parameters, grabbing a note, clicking a pencil, and positioning the note is time-consuming. And if you make a mistake, then you have to go grab the eraser and deal with that. One compensation is that you can easily enter notes in step time (or of course, real time) using a MIDI keyboard. Generally, I prefer the Total Music approach of "painting" notes by clicking and dragging, and double-clicking to remove—it seems a lot faster. Still, you can use the Mac's "constrain" feature to rapidly move a note along a fixed vertical or horizontal line, or use the *Option* key to copy a note as you move it. The high point of this screen is the *detail*, not so much the *speed*, with which you can work with notes.

"The high point of (the Step Editor) screen is the detail, not so much the speed, with which you can work with notes"

Going Through Some Changes

So far, we've talked about commands on the *Edit* menu that move, delete, or copy regions of notes. The *Change* menu likewise works on a region of notes (or a single note, if that's your preference), but deals with manipulation of data within the region. These manipulations include:

✓ *Change channel.* Change the channel of the specified region.

✓ *Change duration.* Set the duration to a percentage of its former value, or to a specific rhythmic value.

✓ *Change velocity.* This works with Note-On and/or Note-Off Velocities. Velocities within a region can all be set to the *same*

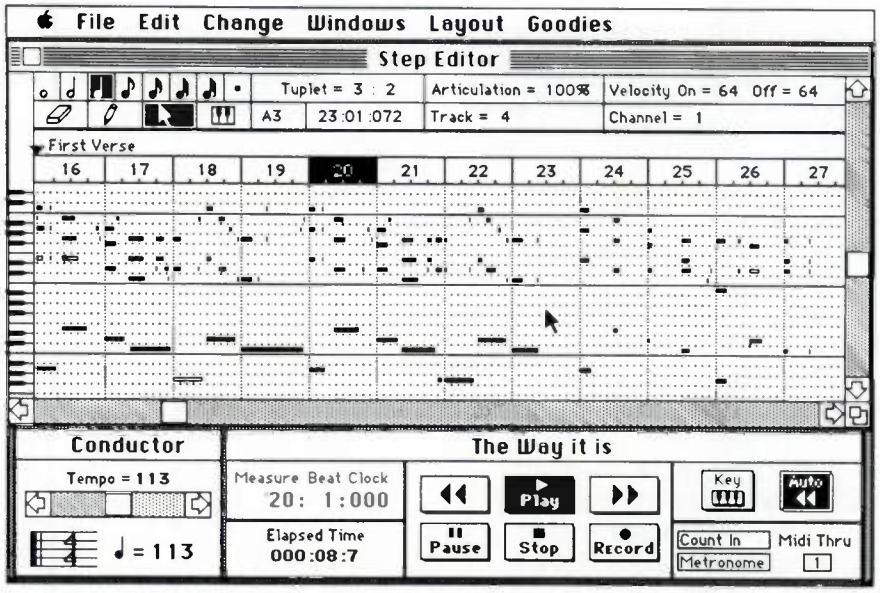


Fig. 3 *Step Editor window, zoomed out to lowest resolution.*

value, set to a *percentage* of their current values, have a *constant* added to each value, or—my favorite—*change smoothly* from one value at the beginning of a region to another value at the end of the region. The latter feature greatly simplifies fade-ins, fade-outs, and dynamic changes.

✓ *Change continuous controller.* Alters data for Pitch Bend, Modulation, Aftertouch (Channel Pressure), or the Continuous Controller number of your choice; you can do all the same variations as discussed under change Velocity (set to same value, percentage, add constant, change smoothly). This is a great feature for taming the occasional excessive mod wheel change. You can also remap data from the above controllers to other controllers—have Pressure control Pitch Bend, for example.

✓ *Change conductor.* Accesses the sequence-long master timing track. You can change the tempo with the same four options as the last two screens, set the meter (meter can change within a single sequence), and alter the value of a beat.

✓ *Strip data.* Removes Pitch Bend, Channel or Polyphonic (Key) Pressure, Modulation, Program Change, Continuous Controller data of your choice, and/or notes within a specified pitch range. This stripped data can be sent to the clipboard and pasted elsewhere if desired.

✓ *Transpose.* Does what you'd expect.

✓ *Humanize.* Introduces random variations in start times, durations, and/or Velocities within limits you specify. It's a "dumb" humanizer—it doesn't know, for example, to speed up the tempo before

going into the bridge and then pull back—but used sparingly, it does help eliminate the "clockwork" effect.

✓ *Quantize.* Auto-corrects your playing to various rhythmic values, but also, you can offset the start time of the quantized notes by a specified number of clocks before or after the start time—just the thing for track-shifting time experiments.

✓ *Fit time.* Should that 27-second jingle be stretched out to 30 seconds? Or cut back to 25 seconds? No problem.

YOUR WINDOW ON MODULATION

You can open up individual windows for, and graphically view and edit, Pitch Bend, Channel Pressure, Key Pressure, Modulation, Program Change, and any Continuous Controller data (**Fig. 4**). Up to now, the Master Tracks Pro functions we've discussed have been fairly standard, albeit implemented in a quite complete way. But these graphic modulation windows are something new and different, and they contribute greatly towards the goal of more expressive music.

"You can also thin out controller data to avoid MIDI data clogging; it's amazing how much controller data is redundant"

This feature is especially useful for those using guitar synthesizers. The fact that Pitch Bend data is always enabled with most synths (that's how they translate string-bending) means that it's very easy to end up with extraneous Pitch Bend information that makes some parts sound out of tune. The solution? Find that part, define it as a region, and *look* at the Pitch Bend data. Erase at will, or pencil in new changes. (Speaking of guitar synths, with a guitar controller set to Mono mode, all channels are recorded in one sequencer track. However, you can then use the strip data command to assign the data for each channel to a different track.)

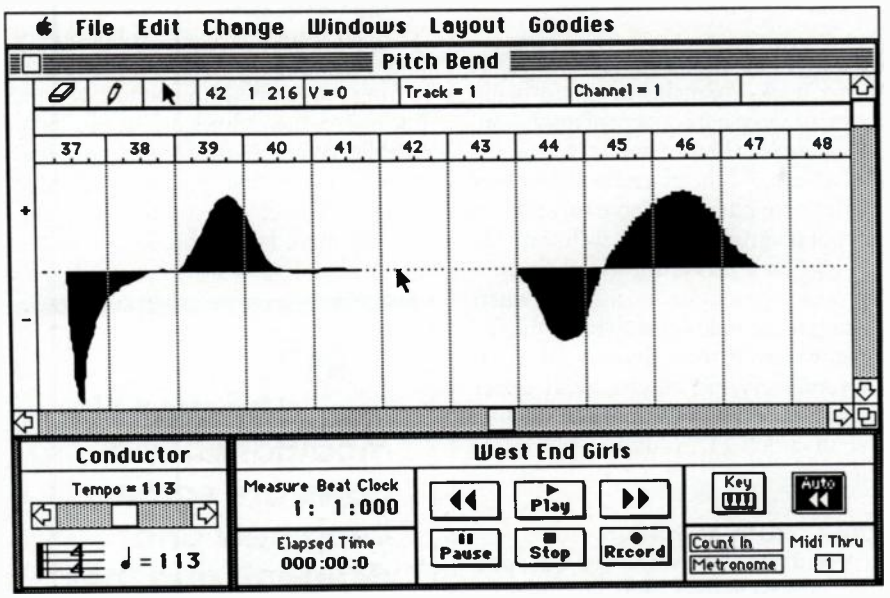


Fig. 4 *Pitch Bend editing window.*

I have to warn you about something: the modulation windows offer the opportunity for endless fussing over your music. When you can tweak things on this microscopic a level, it's very easy to get lost in fixing every little glitch. Yet the results can be well worth it. It's so easy to call up MIDI Controller 7 (volume), and *draw* the mix for your track. You can also use this screen to thin out controller data to avoid MIDI data clogging; it's amazing how much controller data is redundant. I do wish, though, that there was a "thin data" command that would automatically remove any consecutive pieces of data with the same value except the first of the series (maybe next rev).

There are still more program features. You can set whether or not the screen scrolls along with playback (although why anyone would not want to use this feature is beyond me), check remaining memory space, record System Exclusive data in individual channels (yup, run a sequence and load your MIDI gear with the appropriate patches), set up your keyboard keys to control the Transport or provide particular note values for step time entry, configure your MIDI port and set the clock (internal or external MIDI sync), filter out certain types of data (notes, Pitch Bend, Channel or Key Pressure, Controllers, Modulation, or Program Change) while recording, quantize while recording, and of course, all the standard file management features (save, save as, open, close, etc.—although I don't see

any import/export file options).

Zooming Right Along

Master Tracks Pro makes much use of the zoom in/zoom out concept of resolution. For example, when zoomed out, controller data can only be placed at 1/24th of a quarter note intervals. Zoom in, and you can put controller data on each individual tick—and this is a 240 tick/quarter note resolution system. Similarly, when placing notes in lower resolution modes you don't have to move the cursor through each and every tick, which makes it easier to place notes. If you really need to put a note in at tick 237, you can use a hi-res screen to do so.

Suggestions and Bugs

I received one of the very first production disks of Master Tracks Pro, and it had a few minor bugs. When I mentioned these to Passport, most had already been fixed, and I received a new disk within days. Actually, the program has been quite solid and crash-free, although I did experience one major problem when trying to merge lots of data with a track that also contained lots of data. However, I have not been able to make it happen again, and the problem might easily have been human or computer error rather than a bug in the software.

My major wish would be to somehow combine the Sequencer and Song Editor screens. The Song Editor is so powerful it would be nice to be able to solo, mute, loop, and set record/playback status without having to call up another window. You can view the two windows simultaneously to a certain degree, but only one or the other can be "active." Thus, if you've called up the Sequencer to mute various tracks so you can hear what parts are on which tracks, you can't follow the moving cursor on the Song Editor to see where you are . . . yes, you can look at the counter, but that's not the same thing. This is by no means a major complaint, but I found myself going back and forth between the two windows a fair amount, and would appreciate anything that simplifies that process.

Finally, regarding copy protection, this program uses a "key disk" technique where you must insert the master disk once after booting the program (and every time you re-boot). You can make as many copies of the master as you want, but only the master will operate as a key disk.

So Is It For You?

I've been using the inspired-but-ornery Total Music for some time now and was itching for something better; Master Tracks Pro has solved my needs for a reliable sequencer that offers more features than the first generation of Mac software. The more I use this program, and the more facile I become at it, the more I like it. Because I play lots of different types of music, I sequence tunes in both "linear" (i.e. tape recorder) and "modular" (i.e. drum machine style) modes; this program is well-suited to both. Although it lacks some of the "artier" features of other sequencers (it doesn't have, say, the "invert" and "reverse" note features of Performer, the random sequence generators of Opcode's Sequencer, or Total Music's extremely useful remap tables), Master Tracks Pro is a hard-working and efficient program that doesn't get in the way of making music—I particularly appreciate the minimal amount of Mac stopwatch-watching. In my quest for the ultimate Mac sequencer, I'll be looking at Midipaint next, followed by Performer 2.0, and by that time Opcode's 3.0 should be ready. I don't know which one will end up with a permanent home in my studio, but so far Master Tracks Pro is doing a great job for me and has set a high standard for the other Mac programs to match. One thing's for sure—once you've played with graphic modulation editing, it's hard to go back to any other method. Passport may have been one of the last companies to jump into the Mac software arena, but they've introduced a first-class product. EM

> **"The graphic modulation windows are something new and different, and they contribute greatly towards the goal of more expressive music"**

KURZWEIL™ Music Systems

RANDOM SAMPLING

Volume I | Notes and News from Kurzweil Music Systems | Issue No. 2

NOW HEAR THIS...Kurzweil 250 Sound Libraries 5 and 6 will be available soon! **Percussion, human voices, guitar strums, and more!** So hang in there. **THEY DON'T COME EASY...** We invested almost $25,000 just to sample pizzicato from the **Boston Pops** string section for our **Sound Block C. MAKE IT QUICK...** with the **Kurzweil 250's** built-in **QLS,™** our **"Quick Load System"** interface for the Macintosh™ computer. QLS lets you project a complete menu-driven sequence editor, keyboard editor or instrument editor on one screen, making the Kurzweil 250 even easier to use! Haven't checked out QLS? See your authorized Kurzweil 250 dealer. **GOT A ROBOT IN YOUR FUTURE?...** See **"Robots and Beyond: The Age of Intelligent Machines."** Produced by the **Boston Museum of Science** and sponsored by **Digital Equipment Corporation** in cooperation with the **Kurzweil Foundation,** the exhibit takes the mystery out of robotics and artificial intelligence...and features a **Kurzweil 250** on display with a computer—the system plays computer-generated compositions on a continuing basis. It just finished in Boston and will be at the **Franklin Institute** in Philadelphia through September 1. Then it's on to Charlotte, NC. More next month. BLAST OFF!...with Concerto for Astronauts on **New Frontier Records.** Composed by **Emile Sichkin,** Russian emigre and graduate of the **Moscow Conservatory of Music.** It's "a tribute to the heroes who go up in space and especially to the crew of the **Challenger,"** says **Alex Ayzin,** founder and president of New Frontier. "About 50% is performed on the **Kurzweil 250."** This one can put a tear in your eye. **A 150FS IN CHURCH AND ON TV?...** Yep, the **First Baptist Church of Spartanburg, SC,** which broadcasts live to 100,000 homes every Sunday on **CBS-affiliate WSPA.** According to **Minister of Music Ron Wells,** "We use the Kurzweil throughout our program." Why a 150FS? Tuning ease and accuracy. Good choice. **MORE 150FS...** It's easy to see why Ron Wells is so pleased with the 150FS—a true **multi-timbral** instrument with full sound layering, programmable graphic 8-band EQ, chorusing, velocity mapping...and that's only the beginning! Wait 'til you try the new additive synthesis **Sound Modeling Program™! NEW 2.2 SOFTWARE...** for the **Kurzweil MIDI-BOARD!** Version 2.2 adds **Parameter #45-Velocity Maps,** and **#46-Pressure Maps,** doubles the pressure update transmission rate to 50 per second, and provides even more MIDI enhancements. See your Kurzweil dealer. **NEW KURZWEIL 250 USER'S GUIDE...** Hot off the presses. Written by **David Mash, Chairman of the Music Synthesis Department at Berklee College of Music,** the 200-page Guide comes from the musician's point of view. "We're continuing to support all our products and our users," stated **Bob Moog, Kurzweil Vice President of New Product Research.** Ask your Kurzweil dealer. **KURZWEIL 250 IN RUSSIA...** with **Lyle Mays** and **The Pat Metheny Group.** Europe is next and then back to America. Watch for their new album "Still Life (Talking)" due out in July. Should be great! **REPRISE...** **Kurzweil owners,** let us know who you are so we can send you **bulletins** and **updates.** And tell us what you think about Random Sampling. Write to: Kurzweil Music Systems, Inc., 411 Waverley Oaks Road, Waltham, MA 02154. Maybe we'll print your letter. See you later!

Kawai created quite a stir when they broke into the world of MIDI synthesizers. Now they've decided to work on drum machines, and the results are impressive.

Kawai R-100 Drum Machine

BY JIM FIORE

It's always interesting to see how new blood formulates a product design. Kawai is a newcomer in the field of drum machines, but they certainly did their homework before designing the R100. This drum machine offers a number of desirable features at a very reasonable price.

OVERVIEW

The R100 contains 24 sampled drum and percussion sounds ranging from the typical snare, kick, and toms to china cymbal, agogo bells, and timbale. Versions of snare and kick sampled with gated reverb are included as well. The choice of sounds is thoughtful and the quality on a par with many popular machines. While there is a bit of background "grunge" noticeable at low volume setting, the overall sound is reasonably crisp (although a little EQ doesn't hurt). To conserve memory (and thus keep the price down), a few of the sounds are noticeably short; but if you're pleased with the bulk of what is offered today, I'm sure you'll receive the R100 warmly.

THE BOX ITSELF

The three banks of eight sounds are played from eight velocity-sensitive, front panel *Play* buttons that also program note/rest values in the pattern programming mode. Above the Play buttons, eight *Command Select* keys, when used in conjunction with the *Multi* and *Group Select* functions, set and program almost all the R100's functions. Above these, an LCD indicates pattern numbers, song titles, instrument levels, or whatever you happen to be interested in at the moment. Off to the right sit the customary *Start/ Stop* keys and a numeric keypad. There is also an *Auto Flam* key. Separate metronome and stereo output volume controls are provided, as is a memory cartridge slot.

The back panel has MIDI In, Out, and Thru jacks, sync in/out jack, tape recorder in/out jacks (for saving data and sync-to-tape), a headphone output, left and right stereo outputs (left used alone sends mono) and eight audio outputs. There are jacks for metronome out, clock out, trigger out and for remote start/stop and hi-hat sound switch (open/closed), the last being most useful for drummers using the R100 as a "brain."

Jim Fiore's present hobby is teaching his Amiga to sing all of President Reagan's State of the Union messages to the tune of "21st Century Schizoid Man" by King Crimson. Other than that, he's a pretty boring guy.

Product Summary

Product Name: R100 Drum Machine
List Price: $795
Drum Sounds: 24
Sampled at: 32KHz
Format: 12-bit PCM (compressed)
Outputs: 8 plus left/right
Song Programming: Up to 100 songs, with up to 999 patterns per song with response to velocity, Song Position Pointer, System Exclusive. Responds in modes 1 and 3 on all 16 MIDI channels.
MIDI: In, Out, Thru jacks
Warranty: One year, materials and labor
Manufacturer: Kawai America, 2055 E. University Dr., PO Box 9045, Compton, CA 90224-9045; ☎ 213 / 631-1771

SOUND SETUP

Each of the 24 available sounds can be altered by four different Multi controls that set a sound's volume, sensitivity (a sound's minimum volume), tuning, and L/R pan, each control with a resolution of about one part in 16. The LCD shows these parameter values. Tune and pan can be edited for each note in a sequence. Unfortunately, the eight outputs are not freely assignable to any sound; each is hardwired to one of the eight play buttons and always has the same three sounds associated with it. Also there is no provision for dynamic allocation of voices, so new sounds will cut off existing sounds assigned to the same software channel. However, you can route sounds to the stereo outs, the individual outs, or both. In this respect, the R100 could be thought of as a ten-output machine.

SONG PROGRAMMING

The R100 has a three-level song structure. The smallest unit is the *Pattern* (maximum of 100), each of which can be up to 99 bars long. The next biggest structure, the *Song*, consists of up to 999 linked patterns. Up to 100 songs can be linked to form up to ten *Chains*, and each chain is formed of up to 999 songs. Don't get the impression that you can program each of the ten chains with 999 songs, each containing 999 patterns of 99 bars each—you'll run out of memory long before that. At the fundamental level, patterns may be programmed in real time from the play buttons (or a MIDI drum kit) or in step time. Each bar can have up to 99 beats with a beat value of four, eight, or 16 (i.e. a measure of 23/16 is possible). The metronome can be set from ¼ notes through 1/32 notes or turned off, and error correct is adjustable from ¼ notes to 1/192 notes. There are also *Erase* and

Repeat keys if you need to edit the live performance.

Step time recording is a tad out of the ordinary, but works as well as any.

The *Reframe* function error-corrects patterns from ¼ notes down to 1/96 notes; this works on an individual instrument or all instruments simultaneously. *Swing* can also be added globally or to individual instruments, and can be varied from 50% to 75% in seven steps depending on note value. For the addition of fills and such, the R100 also supports a bar punch in/out feature that can be very handy for getting that "just right" drum fill. Finally, *Copy* lets you join patterns and edit the result.

> **"Step time recording is a tad out of the ordinary, but works as well as any"**

CHAINING

Build commands create and name songs and chains. Building the song or chain is a simple matter of piling up patterns in the desired order. *Insert* and *Delete* help simplify programming, as do the memory-saving *Repeat* commands. Their format is similar to the FOR/NEXT and GOTO functions found in BASIC (no small coincidence, I'm sure). There are *Volume* and *Tempo Change* commands at this level as well.

One very nice function at the song/chain level is the overdub function; one way to use this is when trying to program a solo part over a looping background, as the track holding the solo will *not* loop and therefore allow you to play a unique part over each repeat. Overall, song and chain programming is complete and relatively straightforward in use.

MIDI

The R100's MIDI capabilities are quite good. The unit can send and receive over all 16 channels and operate in modes 1 and 3. The R100 responds to Song Position Pointer and Song Select as well as Real Time Clock. Each sound can be assigned its own key number from 0 through 127 for MIDI In as well as MIDI Out. The R100 recognizes velocity, and each sound can also be given multiple values for Tune and Pan, so that one timbale sound, for example—tuned to three different pitches and panned to three different points in the stereo image—will sound like three different timbales. Each instrument can be assigned its own MIDI key number, allowing the R100 to function as the "brain" for a drummer looking to MIDIfy a kit. You can also program via MIDI In both real time and step mode from a master keyboard. To round out MIDI, a System Exclusive setup allows two R100s to be interconnected; one can control the other, or they can share data dumps.

ODDS AND ENDS

Any sound source programmed to appear at the R100's trigger out jack will trigger an external unit—another drum sound generator, for example, or possibly a synth arpeggiator clock input. For drum-

mers, there is a jack for a hi-hat footswitch to switch between the open and closed hi-hat sounds; a drummer using the R100 as a "brain" can then use a single pad to control the hi-hat. While modulation of the hi-hat sound is not possible, the switch idea is definitely a step in the right direction. By the way, if you are looking to use the R100 as a drum brain, you'll find appropriate adjustment of the sensitivity control to be very important for a life-like feel.

For those who use the R100 a lot and need to shuttle data in and out of memory, data may be offloaded to a RAM cartridge, or to cassette via the unit's cassette interface. The R100 also supports sync-to-tape and DIN sync, and has a relative timing adjust feature over a ± 9 step range with each step set to a 1/24th note.

"Having waded through some real monsters in the past, it's nice to see a manual that is complete yet doesn't give me a headache"

Conclusion

The R100 is a very capable device with many desirable features,. My main gripes involve the lack of programmable outputs and dynamic allocation of voices. Without these features sounds can "step" on each other, which can result in truncated cymbals, drum rolls that won't blend, and other sonic degradations. I think that these shortcomings can be "programmed around" in many cases by using alternate sounds, but the limitation still exists. Fortunately for the folks at Kawai, many machines in this price category don't have these features either. (Why can't we get all the features we want for only $9.95? After all, they do it on TV.)

The layout is clean and functional, and the unit is not difficult to program. One big plus that is often overlooked is the very logically laid-out and easy-to-read operation manual. Having waded through some real monsters in the past, it's nice to see a manual that is complete yet doesn't give me a headache. Keeping all of this in mind, the Kawai R100 presents good performance for the dollar. EM

—from page 61, RANDOM PATCH ROUNDUP

source patches in the internal bank, and CZPL's random selection.

Another interesting way to use CZPLUS is to control the type of sound it will generate by limiting the types of patches that go into it. If you're after some new percussion sounds, fill a bank with your favorite drums and gongs, and let the program scramble that bank. Surprisingly, the results of this aren't as predictable as you'd think.

If you try the purely random version of the patch generator in Listing #2, you're bound to discover a few jewels among the clinkers. You'll have to be incredibly patient though; the dreck is solidly in the majority. On the bright side, good patches generated this way are often strikingly unusual and surprisingly un-CZ like.

CZPLUS has a very high "hit rate," but the tradeoff is less unpredictability. That's not necessarily bad, though; rather than wading through lots of junk on a quest for original sounds, why not spend the time devising a way to add more "wildness" to the program, while maintaining generally good results? Several 20th-century composers have explored the effects random processes have on melody and harmony; their ideas could be transposed into the realm of timbre.

CONCLUSION

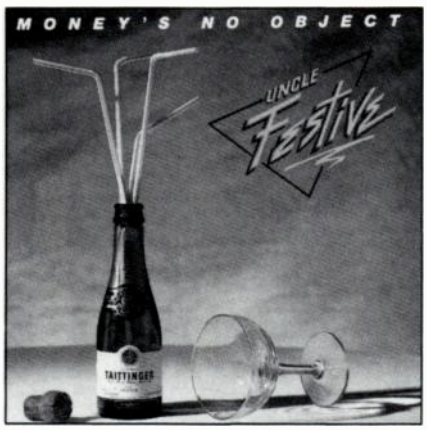
I hope you give CZPLUS a try. Many times it has given me the breath of inspiration I needed to escape from a musical rut. It's also taken me out to the limits of the CZ's sound generating capability and shown me what's possible. There's been an unexpected bonus, too.

I wrote this program as a way of dealing with "synthesist's block"—the uneasy feeling I used to get when I'd first sit down to begin to create new sounds out of the "blank canvas" of my CZ. Today, I don't mind starting from silence at all. Playing with CZPLUS has given me a natural familiarity with the CZ's hidden resources and has helped me build up a store of programming "licks" that make me think that I'm finally getting a handle on the art of CZ sound building. CZPLUS is still lots of fun to use, but as time goes by, I find that I'm relying less and less on its creativity, and calling more frequently on my own. I don't know about you, but this is the type of built-in obsolescence I'd like to see more of in the music world!

BY ROBERT CARLBERG

Send albums, tapes, CDs or music videos to Robert Carlberg, PO Box 16211, Seattle, WA 98116. The opinions expressed herein are not necessarily shared by the management or any other intelligent life form. When ordering, tell them you saw it in Electronic Musician!

Bill Berends, *Mastermind Vol. I* (Impact 32261; cassette). Fast and tight progressive rock with a heavy Emerson Lake & Palmer influence. Berends plays electric guitar and MIDI-guitar synthesizer controller, while brother Rich plays loud but authoritative drums and Phil Antolino plays bass. It wouldn't be possible for a trio to duplicate the power and flash of ELP unless they themselves were almost equally virtuosic. While Bill isn't quite the singer Greg Lake is, he doesn't sing often and his instrumental writing may actually be stronger than ELP's. It's more focused, has a sharper edge and benefits from Berends' scorching guitarwork. $7 from Trademark Music, PO Box 1259, Browns Mills, NJ 08015.



Uncle Festive, *Money's No Object* (En Pointe 0005). Barry Manilow's backup band sounds about like you'd expect them to sound doing fusion jazz—tight, happy, professional and not terribly original. No outside harmonies, no odd rhythms, no unusual sounds, just a good solid reading of today's hot style.

Bill Seper, *Therapeutic Maneuvers* (Blue Denim 86-1; cassette). Seper covers a lot of different guitar styles, from Norman Blake folk acoustic to Pat Metheny jazz electric to Robert Fripp volume pedal electronic. About half the tunes also see digital drums, programmed as a guitarist might play drums, a little stiff. $6, 512 South 11th St., Belleville, IL 62220.

Michael Robinson Denning, *Be Average* (cassette), ***Beginner*** (cassette). Intended or not, Denning's titles for his tapes are appropriate. Each C-60 has less than 13 minutes of electrock featuring Denning's guitar, synth, drum programming and two-note vocals. 224 East 2nd, Eugene, OR 97401.

Masqualero, *Bande A Part* (ECM 1319). This young Norwegian quintet proves there's still life in ECM's formula of suspenseful group improvisations. Standard quintet lineup: bass, drums, keyboards and two horns.

Jack DeJohnette's Special Edition, *Irresistible Forces* (MCA 5992). DeJohnette's been a drummer of choice in the jazz world for 20 years now, playing with Charles Lloyd, Bill Evans, Miles Davis and their calibre. He is also trained as a pianist, and his composing on this fifth Special Edition album shows him to be every bit as advanced harmonically as he is rhythmically. For the most part, these sextet pieces are carefully written out, with a lot of changes and only certain slots for solos. It does not come off as a typical drummer's bashathon.

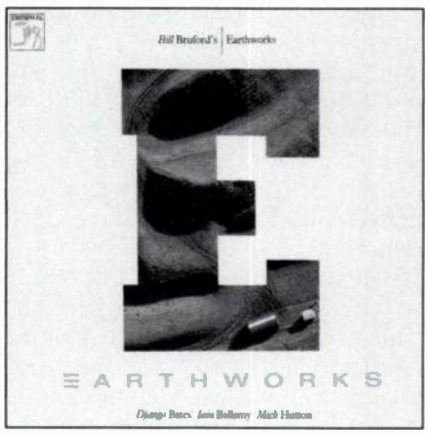
Robert Slap, *Atlantis: Crystal Chamber* (Valley of the Sun AM 138; cassette). Some of the smoothest meditational music this side of heaven, created on guitar, electric piano and digital synthesizer, with one of the best shakuhachi patches this side of Japan. Slap's "new age" orientation inspires him to write about crystals, rainbows and healing vibrations, but on a purely musical level it's on this side of tolerable. Box 38, Malibu, CA 90265.

Dennis Andrew, *Quest* (Day 03; cassette). For tape #3 Andrew adds a new element: singing. The background still consists of new age keyboard drones (or short-repeat percussive patterns) which go on too long, but the tonalities he pulls up are anywhere from fine to fabulous. Over about half of these he intones a high lilting tenor, usually wordless, sticking to three or four notes heavily reverbed. PO Box 284, Metuchen, NJ 08840.

Herb Ernst, *Dreamflight* (cassette). Some new age music is drones, and some is slowed-down tunes like "Dreamflight." Ernst plays Synergy II Plus synthesizers, and composes long modal melodies which he slows down and breaks apart, leaving them to hang suspended in midair, evaporating into the atmosphere like vapor trails. Mystic Visions, 6549 39th Ave., NE, Seattle, WA 98115.

Yellowjackets, *Four Corners* (MCA 5994). It's not always easy to explain why certain music affects you a certain way. Previous Yellowjackets albums have seemed cold and overly calculated to me: "corporate jazz" put out with all the right moves but the wrong motivation. *Four Corners*, though ostensibly similar, nevertheless seems entirely different. Perhaps because the playing is a bit more restrained, the energy level a bit more dignified, the writing a bit less predictable—for whatever vague reasons *Four Corners* joins with Skywalk, Group 87, Step Ahead, Thomas Almqvist and others to form a growing confab of heavily composed-instrumental-progressive-jazz-rock with frequent and sustained use of gorgeous digital synthesis.

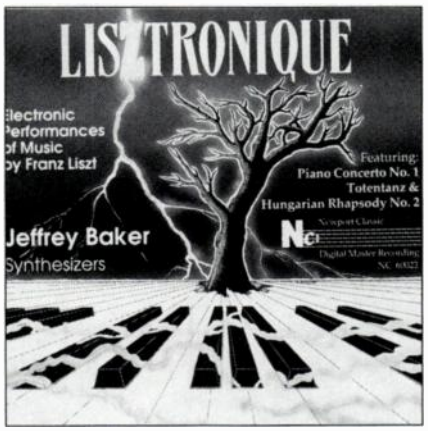
Penguin Cafe Orchestra, *Signs of Life* (Editions EG 50). Simon Jeffes' acoustic ensemble, made up of violin, viola, cello, piano, bass guitar and lots of percussion, breaks no new ground for their fourth album. Like the other three (&½), it's a collection of little chamber pieces, usually fairly repetitive, rhythmically, but unique to the PCO sonically. This ensemble's influence exceeds its musical importance.



Bill Bruford, *Earthworks* (Editions EG 48). Rock's best drummer turns his hand to jazz composing, with mixed results. As jazz, it's

Robert Carlberg is the national service manager for Audio Environments Inc., a nationwide supplier of original-artist music for restaurants and fashion stores. His hobbies are electronics and music, and particularly electronic music. He was co-founder of SYNEX, *a newsletter for electronic musicians published during the late '70s.*

pretty good rock—and as rock it's not bad jazz. Standard jazzband lineup (two horns, keyboards, acoustic bass and Bruford) but the music's a little stilted for jazz. It sounds like it would be fun to play live though, and that's the original reason for this group.



Jeffrey Baker, *Lisztronique* (Newport Classic 60022; CD). Somewhere between Carlos' reverent versions of Bach and Tomita's devil-may-care flaying of everyone else, lies Jeffrey Baker. His MIDI-controlled Kurzweil 250 is primarily used for its piano samples (Franz Liszt being a piano composer) and he sticks religiously to the notes as written. But some of the backup orchestral voices are anything but orchestral, ranging from pseudovibes to tuned wind, and even the piano strays into Rhodes or honky-tonk voicings. I suspect this recording would horrify Liszt purists, yet it may be too "classical" for the rock-raised general public.

Anschluss, *The Mobile Plumb Bob* (Swill Radio 007). Anschluss is a duo of Scott Foust and Rick Vrable, and to quote their press release, "The music on their debut LP is both composed and improvised as well as defying categorization. It is not rock nor pop, not industrial or ambient, not free jazz or computer music." It's also not very good. It relies on minimalist composing (lots of notes but no tunes) on ugly synthesizer, electric piano, guitar, bass and industrial tapes. If you're into musical slumming, Anschluss may be the debasement you seek. 1512 Goucher St., Johnstown, PA 15905.

No Dice, *Don't Pass Music By* (Whistlefield 101). A two-guitar rock quartet from Central Florida's tavern circuit. One of the guitarists doubles on keyboards and woodwinds, the other sounds a good deal like Carlos Santana, and everyone sings except the drummer. They sport the polish and easy fluency of a band that's played many long nights together, although their material must sound more exciting live after a few beers. 113-A Nelson Ave., Melbourne, FL 32935.

Bryce Wemple, *Mutual Amusement* (Roto 010; 45 rpm EP). Four evocative instrumentals on drumbox and synthesizers, pensive in mood and unhurried in fulfillment. His voicings are standard on all but one tune, but they create a rare impression through their understatement, something I can't recall hearing since John Foxx's solo debut. 1204 Green St., Ft. Collins, CO 80524.

James Jarvis, *Terranova* (Creative Ventures 1001; cassette). With backing by Emerald Web, as well as a violinist, saxophonist and several percussionists on selected tracks, *Terranova* is a colorful, uptempo new age jazz set, heavily orchestrated by Jarvis with attractive digital synthesis. $8.98 from PO Box 14644, Portland, OR 97214.

David Kempton, *The Primary Trigrams of the I Ching* (cassette). New age synthesizer instrumentals loosely based on the ancient Book of Changes. Kempton gets some nice little grooves going, either by sequencing a tuned percussion patch (using Texture on an Apple //e) or through a series of hand-played chords. Unfortunately, he usually lets them overstay their welcome before he sends them off to bed. $9.95 from The Soundsmith, Box 1567, Monterey, CA 93942.

Sussan Deihim/Richard Horowitz, *Desert Equations: Azax Attra* (Made to Measure Vol. 8). Some styles are so identified with their creators that it seems sacrilegious for anyone else to work the same lode. Thus it is that Deihim's and Horowitz's *Azax Attra* may at first seem like a crass rip-off of Jon Hassell. But wait—Hassell hasn't tried too hard to expand on his basic formula over his six albums, and Deihim, by substituting her own breathy vocals (usually wordless) for Hassell's trumpet, proves there's room for a little experimentation (even if not all of it works). Horowitz's Emulator work is nothing short of brilliant, and the percussionists lay a wonderful foundation. Don't be so quick to dismiss it.

Ships, *Ships* (cassette). Electric violin is a fairly new instrument, pioneered by Darryl Way, Jean-Luc Ponty, Ric Sanders, David LaFlamme, Simon House, Eddie Jobson, Jerry Goodman, David Cross and probably a few others. The new fusion rock band, Ships, adds another major contribution, being equal portions the electric violin of Reinhard Straub, the keyboard synthesis of David Merrill and the electric guitar work of Mark Lineberry (with various digital drum machines). It's a rocking fusion, perhaps best described as Private Music on steroids. The band's potential is awesome. Contact David Merrill, 47 Renwick Street #48, New York, NY 10013.

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