Biggest Issue Ever!

Reviews: Studio Vision, Notator 3.0, Cubase 2.0 and More

Electronic Musician

U.S. $3.50/Canada $4.50
February 1991

Beyond Sequencing

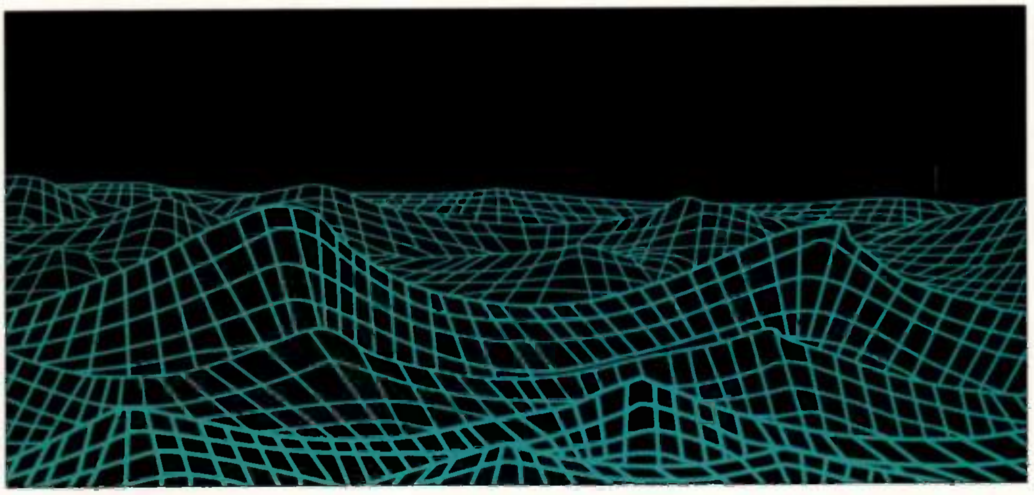
Interactive Performance

Buyer's Guide: Expander Modules

Wiring a MIDI Studio

"HARDWARE INNOVATION OF THE YEAR"
—Voted by the Keyboard Readers' Poll.

MAKE WAVES.



Korg Wavestation is the first synthesizer that actually lets you control the essential building blocks of sound — waveforms.

Its extraordinary power comes from three unique and highly sophisticated technologies: Wave Sequencing, Advanced Vector Synthesis and Dynamic Digital Multi-Effects.

A 32-voice ROM based synth, the Wavestation is equipped with over 350 on board waveforms. Multi-sampled instruments, attack transients, digital waveforms, fat analog sounds, time slices and PCM loops.

Plus important new ways to connect those sound sources.

Wave Sequencing

Because any one sequence can consist of up to 256 different sound elements all linked in succession, you can create a completely original Wave Sequence that constantly changes over time.

Advanced Vector Synthesis

More powerful than Vector Synthesis, it lets you crossfade and mix four combinations of samples, attack transients, complex waveforms or Wave Sequences. You've got ultimate control.

Dynamic Digital Multi-Effects

The Wavestation has 46 dramatic new digital effects and a stunning variety of Real Time Dynamic Controls to modify those effects using wheels, pedals and MIDI controllers.

Its open ended system architecture means you can always bring new sounds in from Korg's extensive library of ROM and RAM cards.

Korg Wavestation. Make sounds that change the shape of music with the synthesizer that makes waves.

KORG®
WAVESTATION

For a catalog of Korg products, send your name and address, plus $1.00 for postage and handling to: Korg USA, 89 Frost St., Westbury, NY 11590

THE S3
IS AT YOUR KORG DEALER NOW.
CHECK IT OUT!

All the drum sounds, effects and sequencing power you'd expect from a MIDI Studio.

Without the studio.

The Korg S3 is more than the world's most advanced drum machine. It's a complete rhythm workstation. Combining all the features of a drum synthesizer, digital multi-effects unit, SMPTE generator, and 8-track sequencer into a single, compact module.

The S3 not only contains great drum sounds, it can split those sounds into attack and decay components, letting you mix and match them separately. This unique "composite synthesis" feature results in more realism, as well as an unlimited variety of drum sounds.

To put the finishing touches on those sounds, the S3 has two stereo digital multi-effects processors. The same as those used in our renowned M1 keyboard.

With the S3's sequencer section, you've got all the power of a stand-alone MIDI sequencer. And all the overdubbing capabilities of an 8-track recorder. With four pattern and four linear tracks. The ability to set up work loops. Variable soft quantizing. And 192 pulse per quarter note resolution.

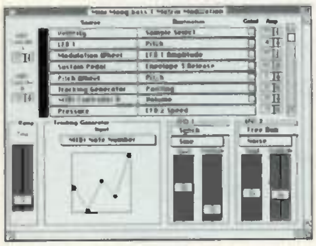
The S3 even reads and writes SMPTE time code, so you can sync to multitrack and video recorders. Or use it as a central time code device for other equipment.

If you want to put together studio-quality drum tracks – without putting together an entire studio – check out the new S3 Rhythm Workstation. It's at your local Korg dealer now.

KORG® S3
MUSIC POWER

For a free catalog of Korg products, send your name and address, plus $1.00 for postage and handling, to: Korg USA, 89 Frost St., Westbury, NY 11590

Grand Sample Station



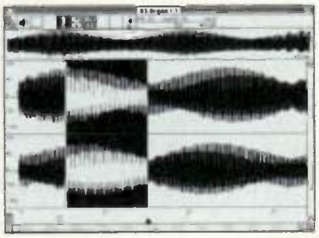
Matrix modulation gives you dozens of creative options for sound. Try doing this on a tiny LCD.

Introducing SampleCell

You say your music is going places but you're getting nowhere with samplers? We've got just the ticket—SampleCell,™ a revolutionary new 16 bit RAM-based stereo sample playback card for the Macintosh® II. With 16 dynamically allocated CD quality voices, 8 polyphonic outputs, and up to 8 megabytes of standard Mac II RAM, SampleCell delivers all the great sound and performance of a pro machine and adds easy to use features only possible on the Mac. Like point-and-click sample mapping. Visual editing. On-screen MIDI and modulation routing. And a mammoth 600 megabyte CD-ROM sound disc featuring everything from shimmering synths to screaming guitars.

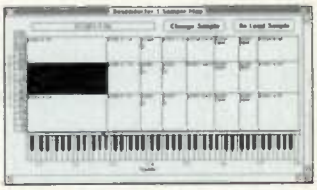
But there's more to SampleCell than meets the ear. Lots more. SampleCell's vast musical potential can be summed up in two words—total integration.

A special version of our industry-standard Sound Designer II software is included for powerful visual sample editing.



Total Integration

Total integration means that you can combine up to five SampleCell cards to create a mighty audio workstation with 80 voices, 40 outputs, and as much as 40 megabytes of RAM. It means that you can import and export samples to and from virtually any sampler, or work with any MIDI Manager™ compatible sequencer such as Vision™ or Performer.™ And most importantly, it means that SampleCell works in perfect harmony with Digidesign's Sound Tools™ or Audiomedia™ hard disk recording and editing systems to create the first completely self-contained direct to disk digital recording and sampling system that you don't have to sell your house to afford.



With visual sample mapping you've got a window into your sampler for fast, easy set ups.

So call us today at 1-800-333-2137 for the name of your local Digidesign dealer and get ready to transport your music to new horizons.

Suggested U.S. List Price:
$1995 (0Mb RAM) $2995 (8Mb RAM)

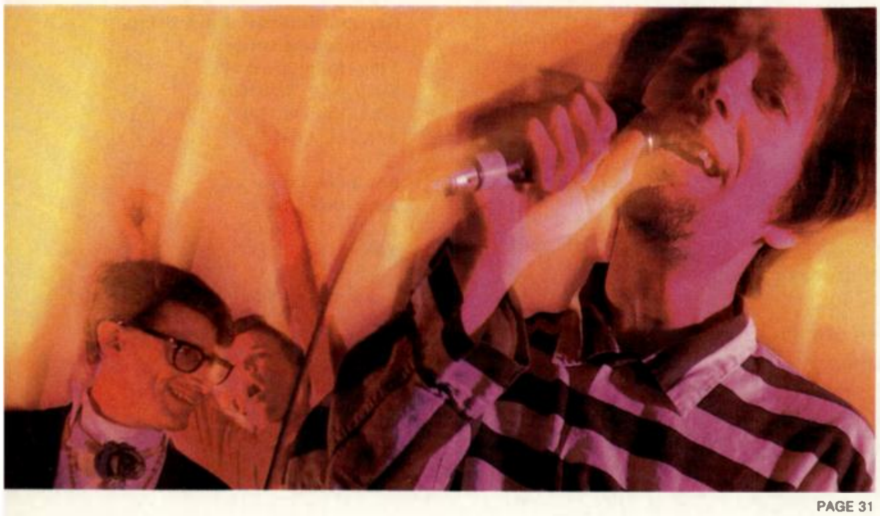
digidesign
1360 Willow Rd. #101
Menlo Park, Ca 94025
415.688.0600

Electronic Musician

AN ACT III PUBLICATION
FEBRUARY 1991 VOL. 7, NO. 2

features

columns



PAGE 31

PAGE 43

reviews

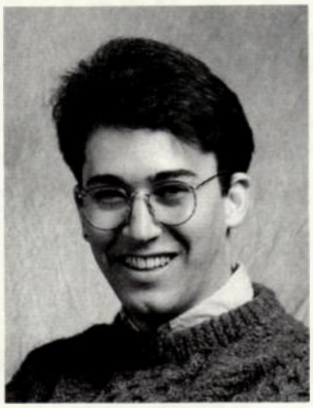
departments

Cover: Photo of Voice Farm by Anne Hamersky.

Electronic Musician: (ISSN: 0884-4720) is published monthly by ACT III Publishing, 6400 Hollis St. #12, Emeryville, CA 94608. This is Volume 7, Number 2, February 1991. One year (12 issues) subscription is $24; outside the U.S. is $44. Second Class postage paid at Oakland, CA, and additional mailing offices. POSTMASTER: Send address changes to Electronic Musician, PO Box 41094, Nashville, TN 37204.

The Personal Touch

Personalizing high-tech tools will become increasingly important as we move into the future.



I really love the concept of a "personal" computer. Not just the device, but the idea that you can take a plastic box full of chips and other electronic components and, by selecting the appropriate applications, utilities, etc., turn it into a tool that reflects your personal needs, interests, and tastes—something you can call *your* computer.

I'm obviously not alone in these feelings because graphics-based computers, which offer many more options for personalization than their character-based counterparts, have become the popular standard. And though people talk about how graphics-based systems are much easier to use, the primary feature that makes these systems so popular is their ability to personalize. In the PC world, for example, Microsoft apparently has sold around 1,000,000 copies of *Windows* to existing PC users. The main reason users purchased the program was not, I believe, to make their computer easier to use, but to easily add their personal touch.

The trend toward customization is becoming important in all areas of technology because, on the surface, technological tools have an impersonal, almost dehumanizing character to them that needs to be offset. Many people still don't feel as comfortable working with a computer or synthesizer as they do a typewriter or acoustic piano. By making a device reflect an individual's preferences, however, the tool becomes more closely related to the person and much less intimidating. This need for custom-tailored features is particularly important in creative tools like those discussed in this month's cover story ("Beyond Sequencing: Interactive Electronic Music" on p.30).

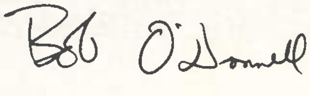
Even those at ease with technological tools feel the need for personalization; they want to feel their equipment is closely tied to their particular work environment or creative methods. In addition, a system set up according to an individual's preferences generally allows them to be more productive.

In the world of electronic musical equipment, the need for greater personalization also exists, though with music hardware it sometimes plays a different role. In a sense, a programmable synthesizer is completely "personalizable," but the effort required to create one's own sounds is generally more than most people want to make. The key is to make sound programming more accessible. I believe programming macros—such as those on Yamaha's V-50 and Roland's D-70 synths that allow you to make quick, but significant, changes to a sound—point the way to the future in synthesizers.

More encouraging developments are occurring in music software. Several programs have added "convenience features" that allow you to do things like create a customized list of synths and available patches so you can easily pick the appropriate voice for a sequencer track. In the near future, these features won't be considered a convenience; instead, they'll be one of many ways that you can customize software to fit your particular needs. Other programs, like *Cakewalk Professional*, allow ambitious users to add their own extensions via built-in programming languages.

Even greater opportunities for personalization lie in the realm of specialized software "languages" designed for non-programmers. Products like *HyperMIDI 2.0* and Opcode *Max* allow individuals to make various types of software components and create entire customized systems, a capability certain to be common in programs of the future.

To some, personalization may seem unimportant or even irrelevant. But as technology continues to evolve in both capacity and complexity, the ability to hide unnecessary details behind a well-designed, customizable interface will earn its place near the top of a product's important characteristics.



Electronic Musician

Publisher Peter Hirschfeld

Editor Bob O'Donnell
Technical Editor Gary Hall
Associate Editor Steve Oppenheimer
Editorial Assistants Alex Artaud, Jeff Forlenza, Anne-Marie Praetzel
Contributing Editors Alan Gary Campbell, George Petersen

Art Director Andrew Faulkner
Assistant Art Director Frankie Winter
Art Assistant Linda Birch

Computer Illustrator Chuck Dahmer

Eastern Advertising Manager Carrie Anderson
Western Advertising Manager Dennis Gray
Market Research Manager Elise Malmberg
Sales Assistant Tina Spinelli

Director of California Operations and Production Anne Letsch
Production Manager Ellen Richman
Advertising Traffic Coordinator Donna Burriston
Promotion Manager Annie Jenkel
Sales Administrator Jean Mahon
Assistant Controller Ronald LeRouzic
Accounting Therese Wellington
Classifieds Manager Robin Boyce
Classifieds Assistants Mary Cosola, Hugh Swarts
Office Manager Barbara Kochiovelos
Receptionist Bettye Gardner

ACT III PUBLISHING
President Robert C. Gardner
Sr. Vice President, Operations and Planning Martha Lorini
Vice President, Finance and Administration Sam Schecter
Director of Marketing and Communications Jennifer P. Ware
Director of Circulation Steve Wigginton
Director of Manufacturing Craig Balick

ELECTRONIC MUSICIAN OFFICES
National Editorial, Advertising, and Business Offices
6400 Hollis Street #12
Emeryville, CA 94608
tel. (415) 653-3307
FAX (415) 653-5142

Southern California Advertising Office
tel. (818) 709-4662
FAX (818) 709-6773

Subscription Services Office
PO Box 41094
Nashville, TN 37204
tel. (800) 888-5139
or (615) 377-3322

There's No Place Like Home

SampleCell puts musical muscle into Studio D with 16 bit RAM-based stereo sample playback.

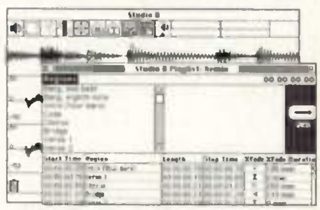
We call it *Studio D*. You call it home. It's actually an idea whose time has come—a personal digital recording and music production studio that seamlessly integrates digital audio and MIDI. And it's going to completely change the way you make music. Sound like a tall order? Listen and believe.

It starts with a Macintosh® II computer and Digidesign's Audiomedia,™ DECK,™ and SampleCell™ software and hardware.

You get CD-quality sample playback with a stereo, 16 bit, 16 voice, multi-timbral sample player for laying down your MIDI tracks. CD-quality digital multitracking with unlimited overdubbing and track bouncing for recording vocals and acoustic instruments on top of your MIDI tracks. Automated fader-type mixing for consistently perfect mixes. And last, "non-destructive" digital editing for creating flawless stereo remixes—all on a single, easy to use, Macintosh desktop.

DECK gives Studio D four tracks of digital recording, MIDI file playback, and automated mixing.

Enjoy total creative control of your music in the digital domain at a level of sonic clarity never before available in personal recording. Experience life without tangled cables, crowded patchbays or tape hiss. In short, make music in an environment that *inspires* you to make music. Because that's what Studio D is all about.



Audiomedia provides Studio D's direct to hard disk recording and two track digital mastering power.

Studio D Starts with:

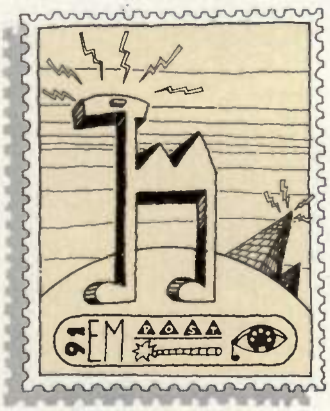
- A Macintosh II computer and hard disk
- SampleCell, 16 bit, 16 voice, sample playback card with 630 megabyte CD-ROM sound library
- DECK, four track digital recording, mixing, and MIDI playback software
- Audiomedia, direct to disk digital recording hardware and two track mastering software
- Options include additional SampleCell cards and Sound Tools professional digital recording and editing system

Call us today at 1-800-333-2137 for more information. Better yet send us $5.00 and we'll send you our Studio D video. See it and believe.

digidesign
1360 Willow Rd. #101
Menlo Park, CA 94025
415.688.0600

LETTERS

This month, readers remind us of analog's blessings, help with MIDI cul-de-sacs, dash interface myths, lament the death of music, and respond online.



HI-FI VCRS

A recent response to a letter (September 1990 **EM**) regarding PCM encoders states that PCM adapters are not the only alternative. Some relatively inexpensive Hi-fi VCRs offer excellent audio quality.

I have been told by a qualified technician that most Hi-fi VCRs offer excellent signal-to-noise, but high distortion makes them unacceptable as mastering machines.

I am on a tight budget and cannot currently afford a DAT machine, but I could probably scrape up $400 or $500 for one of these machines.

R. Livingston
New Hampshire

Your technician friend is right. The AFM (Audio Frequency Modulation) scheme used in Hi-fi VCR recorders can offer impressive signal-to-noise specs (up to 90 dB in some cases). However, some distinctly audible distortion often remains, particularly as a "ghosting" hum that basically is heard when listening to a quiet passage that follows a transient signal (i.e., a single drum beat). Presently, a PCM adapter or a DAT machine is your best alternative in terms of cost and performance. We've seen ads recently listing consumer DAT recorders for as little as $599, so one of these may be just the ticket for the budget-conscious electronic musician.—George Petersen

MUSIC, ANYONE?

I am writing this letter with hopes you will allow me to use your "letters" department to ask fellow **EM** readers a most important question.

My question is simple: Is music and art slowly dying in our country? I ask this question knowing it will create yet another controversy over aesthetics; but, as a composer of electronic music, I feel it is most appropriate to survey my peers.

So how about it, all of you children of Stockhausen...Let's get metaphysical.

Vincent Euppolo
Delaware

You certainly step right up to the plate with the big questions, Vincent. The tone of your letter makes me think that you believe the answer is "yes." But what, exactly, do you mean? Is it that you dislike what's popular on the radio? Or that musical technology is squeezing the soul out of music? Or something else? The "Death of Music" has been a popular subject in almost any age, and many breast-beating essays have been written about it. The funny thing is, most of these bemoan some trend that either came and went, or came and stayed. Either way, somehow or other, music kept trucking along.

It seems to me that we may actually be in a major peak period for music. Because of rock 'n' roll and the glamour and wealth of successful pop artists, a lot of talented people were drawn to music. At the same time, recording vastly raised the technical standards of music performance. Yes, most who take up music never get to be all that good, but a small percentage become truly virtuosic. I've been blown away by the technical chops and creativity of players all over the country. These could be the days when Monsters Roamed the Earth. Are most of them on MTV? No, but then you never hear about Beethoven's mediocre comtemporaries, either.

Yeah, readers, what do you think? Is this the End of Time, or the Dawn of a Golden Age, musically speaking. Controversy? Hah! We can handle it, so send us your steaming missives now! —Gary Hall

MIND YOUR MIDI

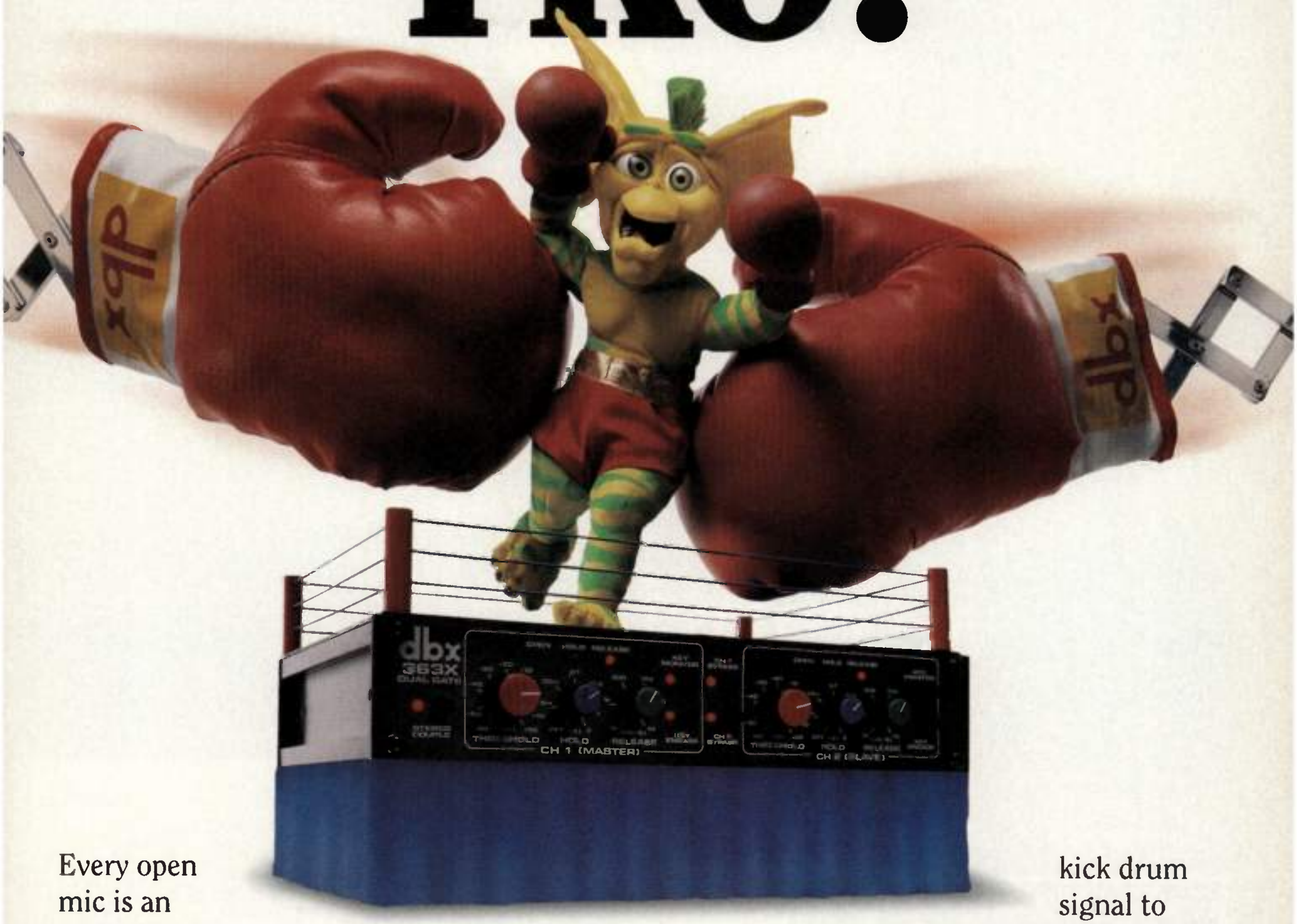
The article on MIDI troubleshooting software ("Put a MIDI Service Technician in Your Computer" in the December 1990 **EM**) might have included some mention of at least three other neat MIDI monitors: The MIDI Analyzer in Voyetra Technology's *Sequencer Plus* is very full-featured, includes three views of incoming data, the ability to send user-defined MIDI strings, and a history buffer that can be saved and downloaded; the Yamaha MEP4 includes a monitor utility that can be switched between views of data going out that device (though it doesn't display sysex messages; too bad); and for owners of the Yamaha C1, there is an excellent MIDI monitor program that displays any MIDI messages and provides the ability to send any message typed in at the command line.

In addition, I'd like to say how much I've enjoyed the series of articles exploring digital signal processing ("Signal Processing Today" which ran from July 1990 through December 1990). The writers are to be commended for providing a wealth of hard-to-find information and putting it into practical terms for the practicing musician.

Dave Phillips
Ohio

DAVID POVILAITIS

TKO!



Every open mic is an invitation for unwanted noises to jump into the ring and trash your audio. Put dbx®—the World Heavyweight Champion of signal processing—in your corner with our new 363X. This dual noise gate will protect your audio with a staggering one-two punch!

"I give up!"

The pro-featured 363X will knock out those unwanted background sounds around your vocal and instrument mics. Send the kick drum signal to the Key input, gate the bass, and put **EXPLOSIVE** punch in your beat. Press a button to switch it from dual gate mode to perfect stereo tracking. Use the Hold and Release to sculpt a winning sound.

The new dbx 363X. It'll put the sound gremlins down for the count!

dbx PROFESSIONAL PRODUCTS

INDUSTRY STANDARD

A division of
AKG Acoustics, Inc.
1525 Alvarado Street
San Leandro,
California 94577, USA
Tel: (1) 415/351-3500
Fax: (1) 415/351-0500

COMPRESSOR/LIMITERS • NOISE REDUCTION SYSTEMS • EQUALIZERS • MODULAR PROCESSORS

• LETTERS

I'm very confused about Voyetra's new VAPI (Voyetra's Application Program Interface). They say this will be a new standard in interfaces, taking over MPU programming. What does the future hold for VAPI, and what do other software companies think? Most of all, will everyone eventually need to upgrade to VAPI?

Rich Collier
Pennsylvania

Rich—VAPI is Voyetra's new, non-MPU device driver for IBM PC MIDI interfaces. (Voyetra makes VAPI interfaces that are optionally MPU-compatible.) Although the MPU-401 standard is eroding, it's premature to say anything has replaced it. No company or committee can proclaim a successor; a driver's use by the majority of software developers is the only thing that can create a new, de facto *standard. Currently, some developers are sitting on the fence, while others work jointly on a driver of their own.*

Microsoft just released a MIDI device driver spec for Windows *that, if widely used, could make things easy for* Windows *users. Other users would benefit from a single standard to replace the MPU, but market competition makes the chance of this pretty slim. As far as upgrading is concerned, if your existing interface does what you need, save your money; the MPU will be supported for some time. However, if you're looking for extra features, consider your options. For more information, see the September 1990 and this month's "Computer Musician" columns.—Rudy Trubitt*

MODULAR BLISS

In Gary Hall's Korg Wavestation review (November 1990 EM), he mentions that modular analog synths have gone the way of the dodo. This is mostly true; however, I wish to alert your readers to the fact that Serge Modular Music is still building incredible analog modular systems to customers' specifications. They offer an incredible amount of timbral versatility and "sonic dynamism" that is still unparalleled in MIDI hell. Do your readers a favor and let them know that this guy still exists for all the true electronic musicians out there. Serge can be reached at Serge Modular Music, 572 Haight St., San Francisco, CA 94117; tel. (415) 621-6898.

Andrew Schlesinger
Synthetic Productions
New Jersey

● LETTERS

PC MIDI REVISITED

I'd like to clarify a few points raised in recent issues of **EM** concerning interrupts in IBM and compatible computers. This is an oft-discussed subject that merits attention since it can affect musicians who use MIDI interfaces and other equipment in these computers.

The sidebar in David Trubitt's "Computer Musician" column in the September 1990 **EM** was most useful in highlighting the significance of interrupts. Unfortunately, Greg Hudgin's letter of November 1990 could leave the incorrect impression that there is an inherent conflict in using a MIDI interface in a '286, '386, or '486 computer. This notion arises because of ambiguous nomenclature, an unfortunate part of PC history. Interrupt "IRQ2" in PC and XT class machines, and as referred to by add-in card manufacturers, is actually the same physical interrupt as IRQ9 for '286s and above. There is no direct relationship between this interrupt and the "IRQ2" cascade interrupt for '286s and above. Consequently, the "IRQ2" used as the default for MIDI interfaces has nothing to do with the cascade interrupt, so there is no inherent conflict.

I/O address conflicts can occur between MIDI interfaces and other equipment, although this is a less-frequent condition. We have seen such conflicts with SCSI hard drive controllers, some scanners cards, and a few other devices.

The open architecture of IBM compatibles in large measure accounts for their power and wider acceptance but also leads to some degree of complexity. Interrupt and address conflicts with MIDI interfaces for these machines can be a problem, but our experience shows that, by following a few simple rules, the musician can avoid such problems. First, know what kind of equipment is in the computer and identify potential conflicts. Installation manuals should highlight these. Second, make sure the MIDI interface allows flexibility in configuration settings so that conflicts can be resolved. Finally, if changes in interrupts or addresses are anticipated, make sure your software can accomodate these changes so that proper communication with the interface can occur.

Thanks for calling attention to this significant issue for many IBM MIDI users.

David Rowe
Music Quest, Inc.
Texas

PAN MAIL

I'm happy to report that we've received an excellent response to the announcement of the **EM** *SIG and our offer in the November 1990 issue to sign up for the PAN network. In case you missed that,* **EM** *now has an online meeting point for readers and editors in its own dedicated forum. Every month we upload the Table of Contents and "What's New" for upcoming issues; and we also offer a variety of downloadable software to support DIY projects and other articles. We encourage more of you to introduce yourselves to the world of telecommunications via this continuing offer.*

The following two letters are representative of some of messages we've received so far.—BO'D

From: COOKSTER
To: EMEDITORIAL
The sequencing article ("Sequencer Workout" in the December 1990 **EM**) was fascinating because it really was written from the basis of a sequencer being a musical tool, not a crutch. For readers who were musicians before sequencing began and have been seeking alternative approaches to composition, the sequencer is a vital tool that expands our capabilities. The article reinforced my belief that electronics is really the logical step, regardless if your background is exclusive to acoustic instruments (mine is an upright piano). As always, good job!

From: PELLESTRINA
To: EMEDITORIAL
Thanks for the peek at the January 1991 issue. Looking forward to it.

I just want to add that I appreciate the way you folks cover the "leading edge" stuff so well. This way, I can continue to follow the discussions here on PAN without having to embezzle a lot of money to buy the stuff to find out for myself (e.g. *Studio Vision, SampleCell, et al.*).

Your October 1990 issue was particularly excellent in this regard. The articles by Jeffrey Borish ("Keeping it Digital: Digital Audio Interfacing") and Rudy Trubitt ("Computer Musician: Conversing with Your Printer") were especially helpful in filling in a few more of the missing pieces for me. Keep up the goodies!

ERROR LOG

December 1990, "40 Great Gift Ideas," p.42: The Breakaway Vocalizer is now being supported and distributed by Tascam. The correct number to call for information is (213) 726-0303.

We discover that MIDI is blowin' in the wind (controller), interfacing with the ivories, and marching to the beat of a different drum (module). Then, we seek software and sync.

Akai EWI3000 and EWI3000m

MIDI CONTROLLERS AND PROCESSORS

Akai is offering an enhanced MIDI wind controller and sound module, the **EWI3000** and **EWI3000m** ($1,399.95/system). Like the EWI2000, the EWI3000 controller uses recorder fingerings, but the controller has been redesigned and, unlike the older controller, has a tube to vent the air so you don't have to let air escape from your embouchure. (Earlier EWI-series woodwind controllers were discussed in "MIDI For Horn Players" in the February 1988 EM.) The EWI3000m, an analog synth module, lets you layer two sounds and features MIDI in/out/thru, four VCOs, two VCFs, two VCAs, and four EGs. The unit has 50 preset and 50 user memory locations. An audio input lets you use the breath controller to process external signals and mix them with the internal sounds. A Chord function lets you generate chordal harmonies on external MIDI sound sources.

Akai Professional
1316 E. Lancaster
Ft. Worth, TX 76102
tel. (817) 336-5114

Buchla & Associates, manufacturer of the unique MIDI controller Thunder, unleashed **Lightning** ($995), a MIDI controller that senses the movement of hands in space and transforms this information to MIDI data. Housed in a small box, Lightning is mounted in front of the performer and, using infrared triangulation, tracks tiny light-emitting transmitters that are built into handheld wands, or into rings worn on the performer's index fingers. The wand is preferable for conducting or performing with Lightning alone, while the rings let you play other controllers simultaneously. Lightning senses horizontal and vertical location and the rotation of each hand for a total of six independent coordinates. From this, it extracts velocity and acceleration and performs elementary analysis of gesture. Additional features include intelligent MIDI merging and a complete sysex implementation. Bolt, Lightning's user interface language, lets the user define relationships between gesture and musical response. Bolt includes a conducting program that can analyze a conductor's gestures, display deviations from a preset tempo, and signal errors such as missed beats, while transmitting a synchronous MIDI clock and programmed note data for each beat within a measure.

Buchla & Associates
PO Box 10205
Berkeley, CA 94709
tel. (415) 528-4446

Gulbransen/Crystal announced the **KS20** (est. $1,500, installed), a MIDI retrofit/control system for the acoustic piano. The KS20 features aftertouch—a first for piano-to-MIDI systems—and programmable sliders for volume, attack rate, tempo, tuning, pitch bend, etc. You can use the 64 presets to send multiple commands (such as program changes and controllers) over multiple channels simultaneously. Like its predecessor, the KS2 (discussed in the September 1990 "What's New"), the KS20 uses an "opto-electronic" triggering mechanism that goes under the keyboard and can be installed by a piano technician.

Gulbransen/Crystal Corp.
3600 Rider Tr. South
Earth City, MO 63045
tel. (800) 677-7374
or (314) 739-0090

Kawai released the **MM-16** ($349), a MIDI remote control box that offers seventeen front panel faders. When used as a MIDI mixer, the unit gives you sixteen channel faders and a master fader. In Controller mode, the faders are assigned to MIDI controllers such as modulation, breath control, pan, chorus, etc. In Velocity mode, the faders create velocity curves

Having Mixed Emotions about Channeling Your Audio Budget?

Look no further, peace of mind is close at hand with the new BK-42 series by Electro-Voice. What you see is what you get — a full-featured, professional sound reinforcement console that delivers exceptional performance with a straightforward functional layout. What you don't see is the unsurpassed value and industry-leading factory support. The BK-42 series provides the most popular options demanded by audio professionals. New features include a hum-bucking ground design and active servo-balanced outputs, eliminating hum and noise even in the most hostile environments.

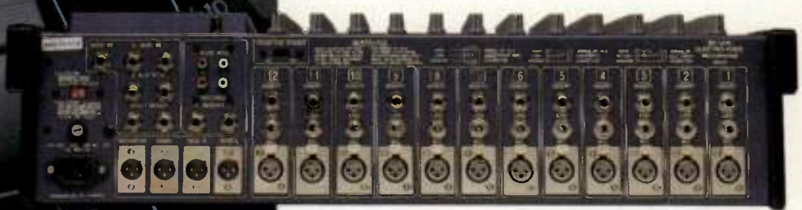
Further enhancing the BK-42's performance is a three-band EQ with sweepable parametric midrange. Great tonal variations are possible with a 15-dB boost or cut from 300 Hz to 5 kHz.

The BK-42 series utilizes many of the same electronic components, typically found only in the most expensive mixers, including the high-speed TL072 op-amp. This attention to design gives the BK-42 series the sonic quality that rivals any mixer on the market regardless of price.

Available in 8-, 12-, 16- and 24-channel configurations, the versatility of the BK-42 series makes it adaptable for any application from rock-n-roll bands to institutional installs to keyboards and production.

No other mixer can meet such diverse mixing needs with the performance, value and flexibility of the BK-42 series.

Electro-Voice
EV
a MARK IV company



Electro-Voice, Inc. 600 Cecil St. Buchanan, MI 49107 616/695-6831 Mark IV Audio Canada, Inc. P.O. Box 520 Gananoque, ON K7G2V1 613/382-2141

for revoicing an instrument across a keyboard—for instance, for smoothing out uneven multisamples—much in the way graphic EQ sliders create EQ curves. The MM-16 can be used to program synth parameters via sysex and comes with programming setups for many popular instruments, including the Kawai K1, K4 and XD-5, with four empty programmable locations for user-selected instruments. Its 64 setups can send a program change and MIDI volume level on all sixteen channels. The unit has two merging MIDI ins. Its two MIDI outs let you split a MIDI signal by channel, key number, or velocity, or alternate between outputs to create "spillover."

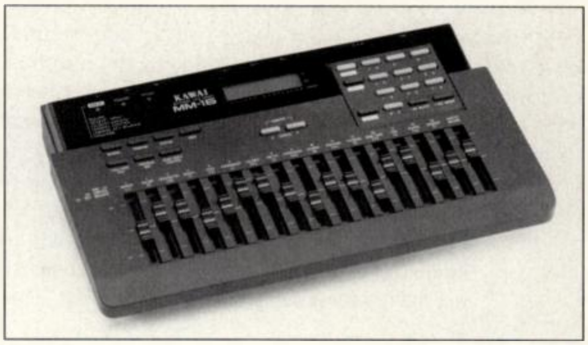
Kawai America Corp.
2055 E. University Dr.
Compton, CA 90224
tel. (213) 631-1771

SYNTHESIZERS

E-mu announced **Procussion** (est. under $995), a 1U rack-mount, percussion module. The module features 4MB (expandable to 8) of 16-bit Emulator III percussion samples, with 500 sounds in ROM and 500 user-programmable sounds, organizable into 128 kits. Also new from E-mu: an expander for the E-III that boosts RAM to 32 MB, expands the unit to 16 stereo/24 mono voices, and adds digital I/O and a 48kHz sample rate. The device reads all E-III data.

E-mu Systems
1600 Green Hills Rd.
Scotts Valley, CA 95066
tel. (408) 438-1921

Yamaha is shipping the **TG33** ($595), a rack-mountable sound module that uses the same vector synthesis technology—mixing samples with FM—as the SY22 (reviewed in the November 1990 **EM**). The synth offers 32-note, 64-element polyphony and 16-voice multi-timbral operation. It comes with 128 AWM sampled waveforms, 256 preset FM voices, and 128 preset vector synth voices, and has user memory for 64 more voices and sixteen Multi setups. An onboard, digital signal processor supplies sixteen effects, including reverbs, delays, and distortion. The unit has dual stereo outs (four outputs), a 16 x 2 backlit LCD, memory card storage, and headphone jack. A free rack-mounting kit is included.



Kawai MM-16

Yamaha Corp.
SGD Division
PO Box 6600
Buena Park, CA 90622
tel. (714) 522-9011

DIGITAL RECORDING

Plasmec unveiled the **ADAS D2D** stereo, direct-to-hard disk recording system, available in versions for the Atari ST computer ($1,199) and the Macintosh SE ($1,899). The system, which is designed for time-synchronized audio (post-production, remixing, cueing effects, etc.), supports 16-bit recording and playback at 32, 44.1, and 48 kHz. Audio files can be played from a cue sheet that can be triggered by MIDI time code—files are recorded stamped with MIDI Time Code—or an internal clock, and can be non-destructively edited. Times are shown in SMPTE time code format, and a scrubbing feature is included.

In the Atari version, which runs on a 520, 1040, or Mega ST, the stand-alone system (with power supply) connects to the ST's hard disk port. It records and plays back directly to and from disk and doesn't use the computer's RAM to buffer the audio, leaving RAM free to run other applications (such as a sequencer). A desk accessory permits recording and replay of hard disk files, cued by MIDI note and channel numbers, from within several sequencers, including Steinberg's *Cubase* and *Cubeat*, C-Lab's *Notator* and *Creator*. An optional S/PDIF interface ($399) allows transfer of digital audio data at 44.1 and 48 kHz.

Yamaha TG33 Vector Tone Generator

The Macintosh version is a card for the SE's expansion slot and allows recording and playback to and from hard disk or RAM. The software also allows the unit to function as a 4-voice, MIDI-controlled sampler with looping, velocity, and aftertouch.

Digital I/O (U.S. distributor)
2554 Lincoln Blvd., Suite 122
Marina del Rey, CA 90291
tel. (213) 398-3993

VIDEO PROCESSING

The **Video Toaster** ($1,595) from NewTek looks like the ultimate desktop computer-video toy for 1991. It's a plug-in card for the Amiga 2000 or 2500 that performs a wide range of real-time graphic, animation, processing, and switching functions for video, all with full broadcast quality. (They said it couldn't be done.) The Toaster accepts up to four external sources, either cameras or VCRs. Individual video frames may be stored in two onboard frame buffers (something like a video sampler), and the user can mix and process images from any of these sources, using a huge range of processing effects. The Toaster also provides a very capable color paintbox, 3D animation with textural shading, and character generation with full color font selection, effects, and variable scrolling. Vidiots are chewing their knuckles over this one.

NewTek
215 SE Eighth St.
Topeka, KS 66603
tel. (800) 843-8934
or (913) 354-1146

SOFTWARE AND SAMPLES

IBM PC users can convert standard MIDI files into readable text documents, edit them, and convert them back to Standard MIDI File format with Spartan Software Systems' ***MidiFile Reader*** ($25; 3.5 or 5.25-inch disk). You can edit the text files within *MidiFile Reader* using your own text editor. The software can be customized with a "profile" feature and runs on any PC-compatible (or PS/2) with DOS 2.0 or higher. Mouse support is provided.

Spartan Software Systems
PO Box 7405
Endicott, NY 13760
tel. (607) 748-9491

AMPLIFIERS

Morenz Development's **Model SA-1000** power amplifier ($2,500) delivers 500W per channel into 4 ohms, 250W per channel into 8 ohms. In bridge mode, it provides 1,000 watts into 8 ohms and has a 70V distribution system without output-matching transformer. A 10-segment LED indicates signal levels. The amp's pulse-width modulation (PWM) technology is said to provide excellent linearity, low distortion, and fast transient response. The SA-1000 is designed to use less juice (less than 12A input current) and produce less heat than most amps and so requires no cooling fan. The 2U rack-mount unit weighs 18.5 pounds. It accepts balanced XLR and ¼-inch inputs, and output is via binding posts. The manufacturer claims frequency response of 10 Hz to 30 kHz ±3 dB; THD 0.1% (4Ω load); and S/N -105 dB.

Morenz Development Corp.
2790 Loker Ave. West #105
Carlsbad, CA 92008
tel. (800) 878-7967
or (619) 431-8077

MIDI PROGRAMMING TOOLS

EarLevel Engineering is shipping ***HyperMIDI 2.0*** ($195), a set of tools and commands for *HyperCard* on the Mac. These external commands make it easy to write short programs (called scripts) in *HyperCard's* embedded programming language, HyperTalk, to transmit, receive, store, and process MIDI information. Special capabilities include sliders with built-in tables for displaying values, complete time-stamping and playback scheduler, extensive data formatting (so helpful with those churlish sysex implementations), data filtering, and transposition. *HyperMIDI 2.0* uses Apple's *MIDI Manager*.

EarLevel Engineering
21213-B Hawthorne Blvd.
Suite 5305
Torrance, CA 90509-2881
tel. (213) 316-2939

SIGNAL PROCESSING

The Sabine **FBX Feedback Exterminator** ($449 to $549) is a microprocessor-controlled filtering device that automatically finds and eliminates feedback in P.A. systems. The unit senses the feedback's frequency and assigns one of six independent, narrow-band notch filters—three fixed and three dynamic—to reduce the offending frequencies. The three fixed filters control the strongest feedback, while the three dynamic filters control intermittent feedback. The filters are automatically reassigned to new frequencies as needed.

Sabine Musical Manufacturing Co., Inc.
4637 NW 6th
Gainesville, FL 32609
tel. (904) 371-3829

MODS

E-mu Proteus/1 and /XR users can add 128 new ROM presets and double the waveform memory to 8 MB with the **Protologic** expansion board ($495) from InVision. New sounds include Steve Winwood-style rock organs with both fast

Sabine FBX

and slow Leslie settings (mapped to pressure), a gritty sax section, fretless bass (with pressure mapped to pitch bend), rock guitar (with pressure mapped to vibrato, and pitch bend and chorus on the mod wheel), assorted percussion, digital and analog synths, and more. The Proto-logic board is installed at authorized E-mu service centers, fits directly into existing circuitry, and does not affect the original Proteus warranty. InVision is offering user (RAM) presets on a quarterly basis to all registered owners at no charge.

InVision
111 Bean Creek Rd., Suite 151
Scotts Valley, CA 95066-4100
tel. (408) 438-5530

REV UP

Passport Designs (tel. [415] 726-0280) released an enhanced version of *Alchemy* ($695), its sample-editing program for the Macintosh. Version 2.23 adds support for the Akai S950, E-mu Emax II, and Digidesign's Audiomedia digital audio recording card. Upgrade price depends on the version you have; contact Passport for more information...**Twelve Tone Systems** (tel. [617] 273-4437) announced version 4.0 of its *Cakewalk* and *Cakewalk Professional* ($150 and $249, respectively) sequencers for the IBM PC. Enhancements include support for a wider range of MIDI interface boards, including interfaces from KEE, Optronics, Yamaha, Roland, and Music Quest. The new, installable port drivers let *Cakewalk* work with different interfaces much as a word processor works with a printer. *Cakewalk Pro* can access a combination of interface boards concurrently. Other new features include a redesigned playback "engine," programmable MIDI metronome, 480 ppqn resolution, fractional tempos, and enhanced real-time controls. A MIDI Thru Auto Mapping feature lets you reroute MIDI input to any track, sending the data to whatever channel, port, or key and velocity offset designated by the track's parameters. This lets you audition parts on various instruments without revising the basic track settings or reprogramming the instrument.

BACK ISSUE INDEX

Tired of searching through back issues looking for articles or product reviews? You already know that **EM**'s online index on PAN can end this frustration. Now, those who are not yet online can get the index on disk for the computer of your choice. The index includes all issues through December 1990, stored in a convenient, tab-delimited ASCII file. Each version comes with a simple search program and is available for PC (text only), Mac (*HyperCard* stack), or ST (color or monochrome) for just $10. Please write for Amiga availibility. Be sure to specify computer type and floppy disk format, and send your check or money order (international orders must also include a self-addressed, stamped disk mailer) to:

David (Rudy) Trubitt
PO Box 9289
Stanford, CA 94309

THE YEAR OF MIDI QUEST.

To thank all our customers who made the first year of MIDI QUEST such a great success, we're offering VERSION 2.0 for Macintosh, PC/AT/PS2/C1 Windows, Atari and Amiga computers. They're completely set up with even more features, so all you do is play. We're dedicated to your satisfaction, so we support everything we sell with our own BBS and technical support line. From Sound Quest, thanks again for a fantastic year!

THE UNIVERSAL EDITOR

- To edit sounds or other data
- Integrated Graphic Editing
- Cut, Paste & Swap
- Mix, Mix All & Blend
- Intelligent Single Voice Randomization
- Growing Library of Templates

PLUS!

- **Optional Paging of Templates**
- **MAC – Optional Font Sizes**

THE UNIVERSAL LIBRARIAN

- To store and retrieve sounds
- Configure to suit MIDI needs
- Automates Patchbay control
- "MIDI Thru" Rechannelization
- Views SysEx as Edit, Database or Raw MIDI Data
- Special Interpret Features

PLUS!

- **Sound Libraries for Patches**
- **Compare Style Search & Key Search**

THE DATABASE

- To create Setup Files
- Multi-instrument Filing or Snapshot Capabilities
- Add and Remove Data Types
- Sort and Swap between different Databases

PLUS!

- **Key Search & Style Search**

THE DRIVER CREATOR

- To create new MIDI Drivers
- Uses Sound Quest Macro Language
- Can view SysEx as Raw Data

THE SOUND CHECKER

- To audition sounds
- Standard MIDI File Player to Edit and Audition Sounds while the music plays
- MIDI Monitor
- Tones Controller & MIDI Controller

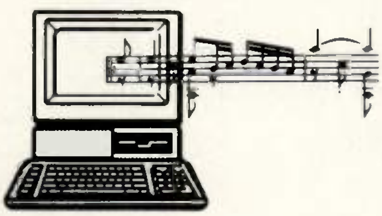
PLUS!

- **Standard MIDI File Type 0 & 1 Supported in Sequence Player**

NOW SHIPPING

TECH QUEST

- To create Editor Templates
- Available to Registered MIDI QUEST users for $100
- Can modify existing Templates



CALL TODAY!

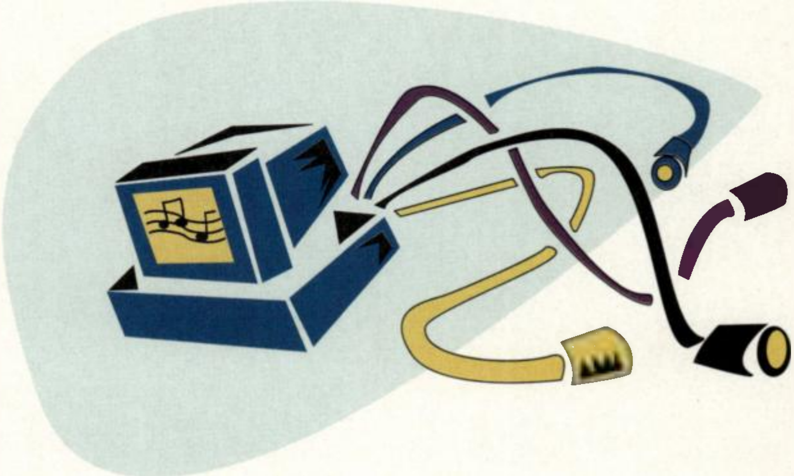
1-(800)-387-8720
1-(416)-256-0466
BBS 1-(416)-256-7951

SOUND QUEST
1573 Eglinton Avenue West, Ste. 200
Toronto, ON, Canada M6E 2G9

Multi-Port MIDI for Your Computer

By Dave (Rudy) Trubitt

MIDI bandwidth limitations? No hay problema. All you need is an intelligent interface to multiply your data paths.



WALDRON STANDISH

Here's a troubling observation: Everything will be stretched to the limit sooner than anyone dreamed possible. Take the California highway system (please!). Or, closer to our hearts, take MIDI's sixteen channels. Once they seemed like *so many.* So what's the problem? Can't more channels just be added to the MIDI spec? To explain why it's not so simple, let us take a brief trip to the land of...(danger music)...*binary arithmetic!* (Shriek! Slam!)

When the MIDI messages were defined, four binary bits were set aside for channel number. It turns out that there are exactly sixteen unique combinations of four bits. In short, more channels require more bits. Unfortunately, adding even one extra bit to any standard MIDI message would confuse every piece of MIDI equipment in the world today. So what else can be done? I thought you'd never ask. Let's talk about... (drum roll) *multi-port MIDI interfaces!* (Wild applause!)

Basic MIDI interfaces have one MIDI input and output "port." In contrast, multi-port interfaces have more than one MIDI out and often have extra MIDI ins. These additional ins and outs can each carry a full load of *unique* MIDI data; in other words, their own set of sixteen MIDI channels. This extra MIDI capacity can improve the performance and convenience of your MIDI system. However, multi-ports are more expensive than basic MIDI interfaces and are best suited for larger MIDI systems.

Note that while many basic interfaces provide multiple convenience outputs, identical data is sent from each. Don't mistake these devices for multi-port interfaces; what we are talking about is *independently addressable* MIDI ins and outs.

THE BENEFITS

- **More Channels:** Sixteen channels are enough in many cases, but even modest setups can stretch the limits, especially if you use MIDI to control effects units or other non-synth equipment.
- **Higher Speeds:** Although each cable carries data at the standard 31.25 kHz rate, two cables have twice the capacity of one. This can help prevent "MIDI logjams," which occur if your computer sends data faster than MIDI can carry it, or faster than receiving equipment can process it. Logjams cause timing inaccuracies and lost data; this isn't a problem for everyone, but it's more likely if you're using lots of continuous controllers, working with dense music, or synching to MIDI time code. Remember that there will *always* be a bottleneck somewhere. Adding a multi-port interface might reveal that your computer was barely fast enough to keep up with your old interface.
- **Greater Integration:** An interface with enough ins and outs can eliminate the need for a MIDI patch bay. This helps keep your MIDI routing in one place and under your computer's control, rather than spread out between different boxes. Some interfaces (Mark of the Unicorn's MIDI Time Piece, and Lone Wolf's MidiTap, for example) can act as comprehensive MIDI control centers, routing data from any input to any output; complete with merging, filtering, and re-channelization.

Many of these interfaces also include SMPTE or other tape sync capability. Besides the advantage of fewer little boxes, putting SMPTE on the interface has other benefits. Placing the interface under computer control saves you from worrying about frame rates, etc.; your software should

GUIDE TO MULTI-PORT MIDI INTERFACES

COMPANY	MODEL	INS	OUTS	CONNECTIONS	SMPTE	PRICE	NOTES
Atari ST Interfaces							
Steinberg	MIDEX	2	4	cartridge	-	$599	
Steinberg	MIDEX+	2	4	cartridge	Y	$699	4 external key slots
Steinberg	SMP24	2	4	parallel	Y	$1,295	
Hybrid Arts	Midiplexer	1	3	hard disk	Y	$299	Works with Atari MIDI ports
C-Lab (Alexander Pub.)	Export	0	3	serial	-	$195	Works with Atari MIDI ports
	Unitor II	2	2	cartridge	Y	$575	Can be used with Export for 3 in, 6 out
Dr. T's Software	Phantom	0	1	serial	Y	$250	Works w/*KCS Omega, Realtime 1.21*
Macintosh Interfaces							
Mark of the Unicorn	MIDI Time Piece	8	8	serial	Y	$495	Expandable via network connector
Opcode	Studio 3	2	6	serial	Y	$379	
Opcode	Studio Plus Two	2	2	serial	-	$199	
Lone Wolf	MidiTap	4	4	serial	-	$1,595	Expandable into fiber-optic MIDI network
IBM PC Bus Interfaces							
Computer Music Supply (CMS)	CMS 102	1	2	bus	-	$89	Works w/ *64 Trk PC, Maestro, LMP, MIDI Concepts, Winsong*
	CMS 104	1	4	bus	-	$99	"
	CMS 401-2	2	2	bus	-	$129	"
	CMS 444-2	2	2	bus	Y	$249	Works with *Cakewalk Pro*
	CMS 444ex	4	4	bus	Y	$399	External 1RU connector box., works with *Cakewalk Pro*
	CMS 444c	4	4	bus	Y	$299	Connectors on cable from card
Music Quest	MQX-32M	2	2	bus	Y	$349	Works with *Mastertracks Pro, Cakewalk Pro ,Seq Plus, Cadenza, Texture, Forte II, 64-Trk PC*
Voyetra	V-22	2	2	bus	-	$130	
	V-22m	2	2	bus	-	$220	MPU-compatible
	V-24s	2	4	bus	Y	$300	
	V-24sm	2	4	bus	Y	$390	MPU-compatible
KEE Electronics	MIDIATOR MS-103	1	3	serial	-	$180	Works with *Cakewalk Pro*
Generic RS-232 to MIDI							
KEE Electronics	MIDIATOR MS-114	1	4	serial	-	$230	

MIDI Interface Manufacturers

Alexander Publishing	tel. (805) 499-6200
CMS	tel. (800) 322-6434
Dr. T's Software	tel. (617) 244-6954
Hybrid Arts	tel. (213) 841-0340
KEE Electronics, Inc.	tel. (800) 533-6434
Lone Wolf	tel. (213) 374-7653
Mark of the Unicorn	tel. (617) 576-2760
Music Quest	tel. (800) 876-1376
Opcode	tel. (415) 369-8131
Passport	tel. (415) 726-0280
Steinberg/Jones	tel. (818) 993-4091
Voyetra	tel. (914) 738-4500

take care of it. It also means that sync information is kept off your MIDI cables, reducing logjam potential.

• **Smaller Headaches:** Finally, multiple MIDI outs make it easier to work with both high- and low-end equipment. For example, most inexpensive home keyboards are MIDI-compatible, but some have fixed channel assignments. This can be inconvenient, especially if you have two instruments stuck on the same channel. At the other extreme, some instruments receive notes on all sixteen channels at once, requiring you to disable channels used by other instruments. In both cases, dedicating a separate MIDI line to each of these instruments lets you concentrate on music, not channel assignments.

PICK OF THE LITTER

Okay, you've decided you've got to have one, and you've picked the perfect interface off our stunningly helpful chart. But wait! There's the question of compatibility (a particularly important one for the PC and Atari interfaces). Unless the software vendor specifically supports the interface, the extra in and out ports can't be used. In some cases, one company's interface is unusable by any other company's software. As always, it's up to *you* to verify the compatibility of

Sequencer Plus

THE POWER OF A LEGEND™

PC MAGAZINE EDITOR'S CHOICE

Version 4.0 Features Include

Jr	Classic	Gold	
64	500	2000	Tracks
■	■	■	*Multiple MIDI Port Support*
■	■	■	*Multiple meters on multiple tracks*
■	■	■	*Mute/ Solo while playing*
■	■	■	*Enhanced Hi Res Video Modes*
■	■	■	*QWERTY Keyboard window*
■	■	■	*Hardware Configuration Window*
■	■	■	*MIDI merge & Thru w/ auto mapping*
■	■	■	*Mouse Support*
3	6	11	*Memory Buffers*
□	47	52	*Transforms*
□	■	■	*Metronome as MIDI notes*
□	■	■	*Tap Tempo (Fit Improvisation)*
□	■	■	*Beat Learn mode (with V-24s)*
□	■	■	*Keyboard Step Entry Mode*
□	■	■	*On-Screen Vol and Pan per track*
□	■	■	*On-screen Velocity offset per track*
□	■	■	*Input Velocity scaling*
□	■	■	*Block Moves across tracks*
□	■	■	*Block paste with replace*
□	■	■	*Matrix-style Port Assign Window*
□	■	■	*Advanced File Sorting functions*
□	■	■	*Play list (jukebox) feature*
□	■	■	*Multiple Programmable Tempo Tracks*
□	■	■	*SMPTE/ MTC w/ tick interpolation*
□	■	■	*Supports all 5 SMPTE fps rates*
□	□	■	***True Universal Librarian***
□	□	■	***MIDI Network Organizer***
□	□	■	***MIDI Data Analyzer***
□	□	■	*Generic Sysex upload and download*
□	□	■	*Sound Blaster/ AdLib FM Voice Editor*
□	□	■	*Full-Screen MTC Monitor*
□	□	■	*Full-Screen SMPTE/ Bar Monitor*
□	□	■	*SMPTE/ Bar position Marker list*
□	□	■	*Digital Delay Length Calculator*
□	□	■	*Super Quantize/ Swing*
□	□	■	*Advanced Track Grouping*

...and much more!

Supported MIDI Interfaces

- Voyetra V-22/ V-22m dual port, V-24s/ V-24sm quad port with SMPTE and V-400x series
- IBM PS/1 with Audio/MIDI option
- IBM Music Feature Sound Card
- Sound Blaster/ AdLib Sound Cards
- Yamaha C1
- Roland MPU-401/ MPU-IPC/ MPU-IMC
- Music Quest PC MIDI/ MQX-16/-16s/-32/-32m

NO COPY PROTECTION!

Introducing Sequencer Plus Version 4.0

Since we released Sequencer Plus in 1984, the task of selecting a PC sequencer has been complicated by the growing number of competing programs. Now, the choice is clear. Sequencer Plus Version 4.0 has arrived.

No other sequencer matches Sp's features. No other sequencer fulfills the needs of such a broad range of users. And above all, *no* other sequencer can match the rock-solid reliability that comes from *7 years of rigorous use by the most demanding professionals.*

Creative Investment

Our entry level **Sp Junior** is priced at an unbelievable $69.95. And its full value can be applied towards an upgrade to **Sp Classic** or **Sp Gold**.* With an investment like that, why settle for less?

The Total Solution From a Single Source

You can combine Version 4.0 with our new **V-22/-24s** interface to get multiple MIDI ports, a professional SMPTE reader/generator, audio click detector, and optional MPU-401 compatibility. They're designed to work together, so you can exploit the state-of-the-art and avoid the state of confusion.

The Choice is Yours

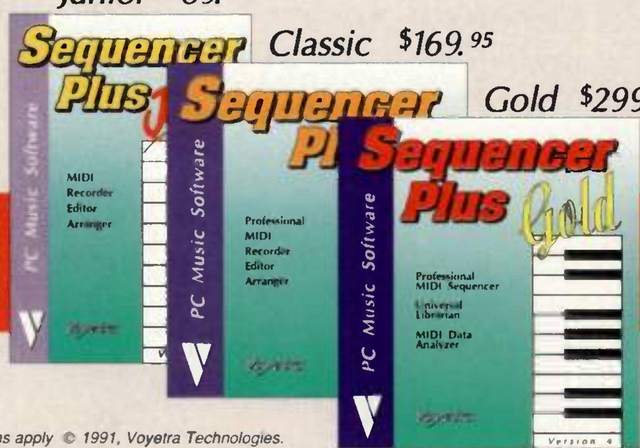
Don't compromise your creative potential. Harness the power of the program that helped pioneer the PC MIDI industry. **Sequencer Plus** – *the power of a legend.* ™

Trade in your old PC Sequencer and move up to Sp Gold!
Trade in your PC sequencer, *regardless of manufacturer*, and we'll deduct the full retail price (up to $100) when you purchase Sp Gold directly from us. Please call for details and restrictions about this limited time offer.

Junior $69.95

Classic $169.95

Gold $299.95



Voyetra
333 Fifth Ave, Pelham, NY 10803
(914) 738-4500 Fax: (914) 738-6946

ORDER TOLL FREE!
CALL FOR OUR FREE CATALOG!
1-800-233-9377

your computer purchases (though the Notes column on the chart points out a few important examples).

IBM users are reminded to consider the benefits of MPU-401 compatibility, a subject covered in our September 1990 column. Device drivers were also explored in that column, and here's the latest: Voyetra has released an update for *Sequencer Plus* that contains device drivers for their own, and other company's MIDI interfaces (including Music Quest's MQX-32M). These drivers, called VAPI, allow Voyetra to support non-MPU MIDI interfaces easily. Although Voyetra would prefer that all companies adopt VAPI, another group of manufacturers, including Twelve Tone Systems, Music Quest, and others, is trying to develop an alternative device driver specification, with no release date set. Each group has their own technical and marketing goals to consider. (Speaking for the user community, I urge all concerned to agree on a *single* specification. Thank you.)

All *Atari ST* interfaces are made by companies who also provide software. You're probably best off buying your software and interface from the same company. Note that ST multi-ports allow you to use the ST's built-in MIDI interface as well. The number of ins and outs on the chart does not reflect this, so add one to each in and out.

On the *Macintosh*, things are a little bit simpler. Basic 1-in, 1-out Mac MIDI interfaces work with any MIDI program, and many programs can work with two basic interfaces hooked up to the same computer. As far as multiports are concerned, Opcode and Mark of the Unicorn want their sequencers to fully support each other's interfaces. Today, you can't use the extra ports on MOTU's MIDI Time Piece while running Opcode's *Vision* (that is, beyond the two *Vision* will support), but you should be able to soon. Call before you buy.

That's all for this month's thrilling episode. Be sure to tune in next month when Rudy faces the peril of... (timpani roll)... MIDI multitasking (ta-daa)!

David (Rudy) Trubitt *wants a sampler so he can make his own radio drama sound effects. Of course, that will require more MIDI channels.*

Questions and Answers

The equipment doctor explains how to avoid AC line transients, upgrade a VFX^{SD}, clean DAT heads, and more.

By Alan Gary Campbell

JACK DESROCHER

Q. What are the most common causes of equipment failure, and what preventive measures can help to avoid them?

A. Line transients and damage from contamination (usually liquid) are by far the most common causes of equipment failure. Damage from either source is often preventable.

Line transients, or "spikes," on the AC line have numerous sources, including lightning; "dips" and "rebounds" caused by heavy equipment; and accidents that damage utility-company equipment. Transients can damage equipment power supplies and other circuitry. Also, they can easily scramble the memory of anything with RAM in it.

To prevent equipment damage, purchase and use the best AC line conditioner that you can afford. Repeat. To prevent equipment damage, purchase and use the best AC line conditioner that you can afford. Even a simple cube-tap surge suppressor offers significant protection. However, no affordable technology can fully protect against the powerful surges caused by a direct lightning strike on the local power lines. Ideally, equipment should be turned off during electrical storms, but you can hardly tell that to a club owner on Friday night with a full house.

Contamination most often is caused by drinks accidentally spilled into equipment. This can produce severe damage. If the equipment is on at the time of the spill, there may be considerable (and even spectacular) short-circuiting, depending upon the type and amount of liquid spilled and the point of entry. Moreover, when liquid contaminants conduct electricity, the solid components (sugar, salt, colorings, flavorings, etc.) undergo electrochemical changes that permanently etch them into the surface of the circuit boards.

The longer the equipment runs with the goop inside, the more destructive the effects will be. Turn off contaminated equipment *immediately*, and have the equipment cleaned and inspected by a qualified technician *as soon as possible*. Even if the equipment is turned off, contaminants become much harder to remove when they are allowed to stand. In analog and hybrid synthesizers, even a small amount of contamination can produce leakage currents that cause tuning instability.

When it comes to food and drink around equipment, just say *no*. Put up a barricade to keep fans back, if necessary, and drink from leakproof squeeze bottles during performance.

Solid objects—screws, washers, paper clips, etc.—also can get inside equipment and wreak havoc, hence the "shake" test prior to service. (Is there anything loose in there?) Less frequently, insects, especially cockroaches, can infest equipment (see the January 1989 "Service Clinic"). Once, I serviced a receiver contaminated with pine needles, apparently from a nearby Christmas tree.

Q. Can I upgrade my Ensoniq EPS sampler to the new EPS 16+ spec?

A. Sorry, Charlie. Although the 16+ resembles the older EPS from the outside, it is a completely new design; to "convert" an older EPS to a 16+ would amount to building one from scratch. Because of this, Ensoniq has no plans to retrofit older units to the 16+ specs and features; however, the 16+ does read sample and sequence files from the older units.

Q. Is there a way to install the Ensoniq VFX^{SD} "Mega Piano" sample, included on newer instruments, in my older VFX^{SD}?

A The VFX^{SD} *can* be upgraded to the "Mega-piano" version, but it requires a new mainboard. (There simply is no way to address the new sounds with the old circuit.) The work must be performed by an authorized Ensoniq repair station. The suggested retail cost for the board is $550, including installation. It might be a better investment to purchase an external, sampled-piano MIDI sound module, which is likely to cost less.

Aside: a new VFX^{SD} operating system, Version 2.1, is available on diskette, (no new EPROMs required), from Ensoniq dealers and repair stations, at no charge. Version 2.1 improves the MIDI-clock sync so that the unit will locate correctly and fixes a glitch that caused the click track to disappear in certain song steps.

Ensoniq VFX^SD

Q. I'm using a DAT recorder as a mastering deck, and I'm concerned about head cleaning. What is the recommended interval for cleaning? Are commercial cleaning cartridges safe and effective? Should the heads be cleaned manually?

A. No absolute recommendation for head-cleaning frequency can be given, since this varies with the type of tape used, the condition of the tape and heads, and the vagaries of use. Some manufacturers suggest that cleaning is not required until the observed error rate climbs appreciably; others recommend cleaning after approximately 100 running-hours of use. The analog practice of frequent, preventive head cleaning is misapplied with DAT systems.

Cleaning cartridges produce some head wear when used, but offer convenience. If you elect to use cleaning cartridges, use only those from major manufacturers; avoid off-brand cartridges.

Manual cleaning allows thorough visual inspection of the condition of the heads and generally yields better results; but the DAT recorder must be partially disassembled.

Caution: Manual head-cleaning requires special skills and special materials; the use of incorrect procedures or materials can permanently damage DAT heads. Refer DAT head-cleaning to a qualified technician.

Q. I prefer to use black screws and other hardware on my home-built projects, as this really adds class to the appearance; but black hardware rusts easily. This happens even on commercial gear. What's the best way to protect hardware from oxidation?

A. The simplest method of protection is a thin coat of light machine oil applied to the hardware, in place, but this creates a potential contamination problem when the equipment is handled. In particular, storage media such as diskettes and cartridges, do not take kindly to oil.

If you want clean protection, you can remove the hardware and coat the normally exposed portions (dip or spray) with matte or semi-gloss lacquer (Testor's Model Master No. 1959, or equivalent); this process is simplified for equipment that has not yet been assembled or is partially disassembled for service. Note that it is inadvisable to allow the paint to contaminate close-fitting surfaces or fastener threads.

Controllers Revisited: In the October 1990 "Service Clinic," we discussed the conversion of 76-note keyboard controllers of E to G range to an alternate, A to C range by removing, rearranging, and substituting the appropriate keytops. An alert reader wrote to suggest that it would be much simpler to buy a vintage Prophet T-8 synth, which already has an A to C range and an excellent keyboard action (with release velocity) that is also used in the Synclavier. If the size and weight of the T-8 are not problematic, and an instrument can be found in good condition, at a fair price, then this seems reasonable.

Hello, Oberheim? Oberheim, the pioneering synthesizer manufacturer that is now owned by Gibson, has a new toll-free help line, with Richard Bugg at the helm, for questions regarding Oberheim products and service (and Gibson Max products): tel. (800) 765-4629. Also, Tom Dunn, former Service Manager for ECC/Oberheim, then employed by Paul Morte Technical Services, has gone independent. Tom currently provides the only authorized service for in-warranty Oberheim products and provides service and service manuals for older, out-of-warranty gear: Tom Dunn, TCD Electronics, 13345 Saticoy St., North Hollywood, CA 91605; tel. (818) 765-8290. Paul Morte still provides service for out-of-warranty Oberheim products: Paul Morte Technical Services, 946 North Main St., Orange, CA 92667-7718; tel. (714) 532-9540.

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

TUESDAY, DECEMBER 18, 1984

Price Of Sampling Plummets!

ENSONIQ Introduces Low-Cost Mirage.

FRIDAY, APRIL 8, 1988

Workstation Discovered!

ENSONIQ EPS Combines Sampling and Sequencing.

STUDIO TIMES

SEPTEMBER 1990 — Cutting Edge News For the Contemporary Musician — VOL. 16 NO. 9

SAMPLING REVOLUTIONIZED!

ENSONIQ Introduces the First Sampler with Digital Effects.

The new ENSONIQ EPS-16 PLUS Digital Sampling Workstation is the latest milestone in the history of sampling—a history defined by ENSONIQ. For the first time ever, 24-bit dynamic effects are integrated into a sampling instrument. Add reverb, chorus, delay, distortion, and other dynamic effects to your sounds and enjoy creative possibilities that make other samplers yesterday's news.

The EPS-16 PLUS also features true 16-bit resolution, an upgraded 16-track sequencer and ENSONIQ's unique FLASHBANK™ memory option, allowing you to keep your favorite sounds in backed-up memory. Best of all, the EPS-16 PLUS is compatible with the huge library of sounds and software that have been developed for the ENSONIQ EPS, giving you extensive support for your music.

For the full story on the ENSONIQ EPS-16 PLUS, call 1-800-553-5151 for a dealer near you.

SQ-1

SQ-R

VFX^{SD}

From synthesizers, to samplers, to complete workstations, ENSONIQ has an instrument that's right for you.

Yes, I want more information about the following:
(Check as many as you like.) ☐ EPS-16 PLUS ☐ SQ-1/SQ-R ☐ VFX^{SD}

Name ______________________________

Address ______________________________

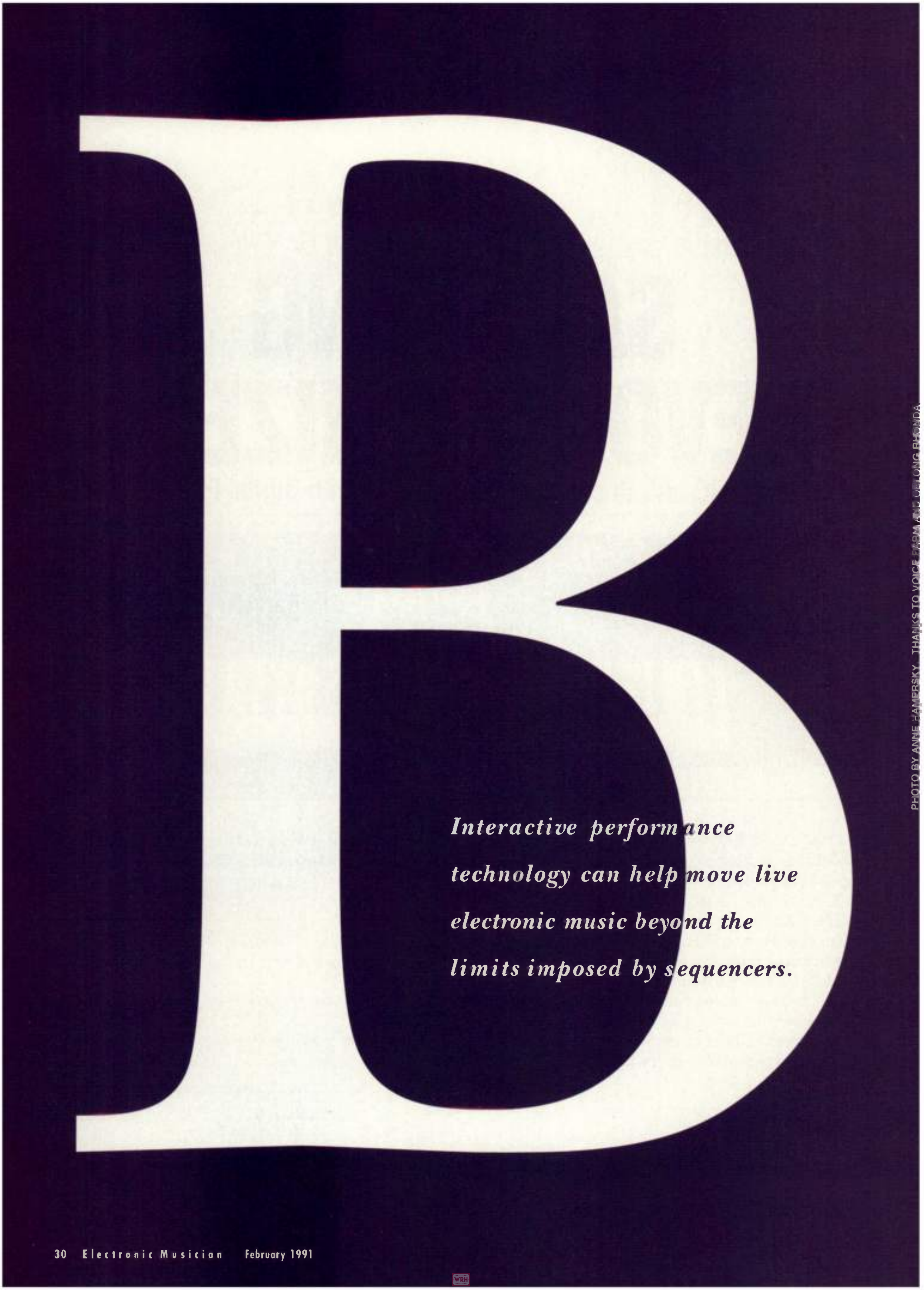
City ______________ State ________ Zip ______________

Phone Number ( ) ______________________________

Mail To: ENSONIQ Dept. E20 155 Great Valley Parkway Malvern, PA 19355

ensoniq®

THE TECHNOLOGY THAT PERFORMS



Interactive performance technology can help move live electronic music beyond the limits imposed by sequencers.

PHOTO BY ANNE HAMERSKY. THANKS TO VOICE FARM AND OF LONG RHONDA

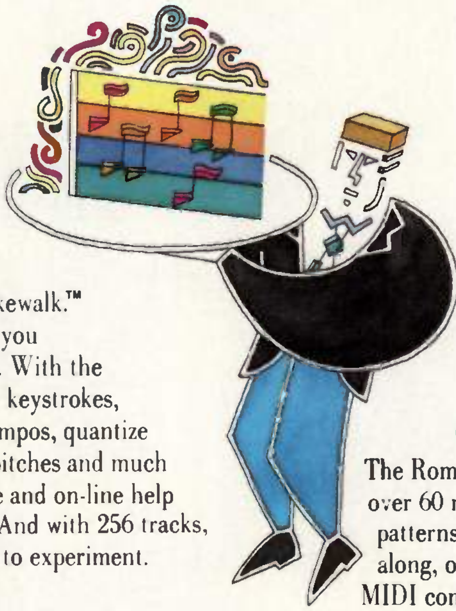
EYOND SEQUENCING

By Robert Rich

INTERACTIVE ELECTRONIC MUSIC

Play It. Stretch It. Squash It. Clone It. Loop It. Punch It. Patch It. Drag It. Zoom It.

It's A Piece Of Cake.



Take hold of your music with Cakewalk.™ The Cakewalk MIDI sequencer lets you shape musical ideas into new forms. With the click of your mouse or a few simple keystrokes, you can change velocities, adjust tempos, quantize rhythms, extend tracks, transpose pitches and much more. Cakewalk's intuitive interface and on-line help get you up and playing in no time. And with 256 tracks, Cakewalk gives you plenty of room to experiment.

Cake For Pros.

If you're making a living making music, take a look at Cakewalk Professional.™ Don't let the low $249 price fool you. Cakewalk Professional is loaded with features that you would expect only from higher priced sequencers, like support for all SMPTE formats, over 32 MIDI channels, and multiple interface boards. Professional also comes with the powerful Cakewalk Application Language (CAL) that lets you create your own program commands and editing routines.

It's a LIVE!

Build a playlist of up to 128 songs for your live performances. Play along to your own tracks without delays between songs. Cakewalk LIVE! loads and plays standard MIDI files, so you can use it with any MIDI software package. Lists for $49.

Oh Romeo.

The Romeo Music Cakewalk Series is a three-disk set loaded with over 60 multi-track song files of classical, jazz, pop, and drum patterns. Just load the songs into Cakewalk and start playing along, or "sample" any of these sequences for use in your own MIDI compositions. Commissioned by Romeo Music Inc. exclusively for Twelve Tone Systems. Only $29.95.

Get a Piece.

For more information on the full line of Cakewalk MIDI software products, give us a call at **800-234-1171**. Ask about our free catalog. Order the Cakewalk demo diskette for only $10.00.

Cakewalk is also served at finer music and computer software stores everywhere.

The #1-selling MIDI sequencer for IBM PC-compatibles. Only $150!

PC MAGAZINE EDITOR'S CHOICE

Cakewalk 2.0 Nov. '88.

Cakewalk Highlights

- 256 tracks
- MIDI/SPP with Chase Mode
- *NEW!* MIDI metronome
- Multiple sequence views, including piano roll, event list, measure and track view
- *NEW!* Enhanced real-time controls
- Step record
- *NEW!* Fractional tempos
- Event filters
- Standard MIDI File formats
- On-line help
- Mouse support
- Extensive edit commands
- No copy protection!

Cakewalk Professional Highlights

All the features of Cakewalk, plus:

- Direct SMPTE/MTC
- *NEW!* Built-in fit-to-time command
- Percentage quantization
- *NEW!* 48-480 pulses per quarter note
- Cakewalk Application Language (CAL)
- Powerful keyboard macros
- *NEW!* Supports multiple MIDI output ports
- *NEW!* Supports over 16 different interface boards
- ...and more

Cakewalk™

Prices are subject to change without notice. Cakewalk and Cakewalk Professional are trademarks of Twelve Tone Systems, Inc. Other products mentioned are trademarks or registered trademarks of their respective manufacturers.

Twelve Tone SYSTEM
P.O. Box 760
Watertown, MA 02272

For artists who base their music around computers and technology, live performance can pose a difficult challenge. On one hand, we want the music to sound as polished as it did in the studio, but on the other, we want the excitement of an honest live performance. The growing use of sequencers by musicians working alone merely compounds the problem. Indeed, sequencers are great compositional tools in home studio environments, but what do you do when you want to perform this music live?

Some musicians use the time-tested approach of playing everything by hand. In addition to this method's obvious benefits, it is guaranteed to make us think hard about our music and how it needs to be arranged or adapted for live performance. However, it does require the solitary MIDI musician to climb out of the basement, find musicians to perform all the requisite parts, and rehearse them until the music meets his or her expectations.

The solution for other electronic musicians is to walk out on stage and push the start button. In fact, lots of musicians do just that, offering completely predictable music every time. But in this post-Milli Vanilli age, do you think anyone will go to the trouble of seeing live performances if the music is completely pre-programmed? Would you pay $15 to see your favorite musician push the play button on a CD player?

Fortunately, there is a third approach offering many techniques that combine elements of the previous two. Interestingly, they use technology to bring life back to the music from which technology originally stole it. For lack of a better description, I'll use the phrases "interactive performance technology" and "interactive performance techniques" to describe these ideas. This approach asks us to rethink the way we interact with our musical machines. It invites us into an intimate collaboration with our computerized partners and encourages us to move beyond the boring monotony of pre-programmed sequences. The results could redefine the way we perform electronic music.

WHAT IS IT?

Interactive performance technology includes a vast range of tools and ideas, most of which share the goal of increasing the performer's creative control over electronic instruments. Many of these ideas are as old as electronic music, but now we are seeing interactive techniques filter down into commercially available instruments and software.

A typical interactive performance system begins with one or more musicians playing their instruments. A computer monitors what each performer does and reacts to these gestures with information of its own. The computer might generate music in response to the human performance, or it might somehow modify the music being played by humans.

These systems offer many benefits. Interactive performance tools can add an improvisational element to MIDI music and allow us to avoid the "start-button mentality" of most sequencers. These tools can give us quick access to parameters that may otherwise be inaccessible to a musician with only two hands and one brain. Furthermore, they may suggest new musical vocabularies using previously impossible techniques. Interactive technologies also can facilitate new kinds of group musical interaction, where the actions of one musician affect the performance of another.

The true potential of many alternate MIDI controllers also can be realized with the help of interactive tools. Manufacturers of MIDI controllers have promised various instrumentalists access to "any music that's in your head." There is a limit, however, to the sounds you can control with a given playing technique. Many percussionists, for example, have purchased pad controllers with the hopes of being able to play "any music" only to find that the techniques of percussive playing still prove limiting. How much of a drummer's technique is relevant to playing orchestral harmonies? For that matter, how much of a trumpeter's solo technique can be applied to playing piano chords?

You can use interactive performance technology to help bridge the gap between instrumental techniques, translating among various sets of expressive parameters. This new technology invites us to stretch our technique on a MIDI controller in much the same way as some keyboard synth players have learned to emulate the playing styles of guitarists or horn players. One of the ironies is that we have to rethink much of our traditional playing technique in order to make full use of interactive technology. The software itself becomes a new instrument.

EVALUATING NEW TOOLS

When we consider the results of interactive performance, we should ask whether the music comes from us or the machine. Many systems that seem easy to use (and sound good) often prove to be the most difficult to modify and personalize. Instant gratification does not always lend itself to expressive depth. As an interesting example, consider Laurie Spiegel's *Music Mouse*, a program with such a characteristic sound that Laurie asks users of the program to give her some of the compositional credit. I consider *Music Mouse* to be an exciting breed of extended composition, using a form of indeterminacy that allows every user to realize his or her own version of Laurie Spiegel's music. Indeed, the program makes the line between an algorithmic performance "enhancer" and an extended composition become rather gray.

To better understand how various interactive techniques fit in with our own musical goals, think of a graph with two dimensions (see **Fig. 1**). The first dimension is the depth of "personalization." At the low extreme, we have tools that provide instant gratification but no room for tweaking. At the other extreme are tools that are completely customizable, the *tabula rasa* of interactive technology. The second dimension

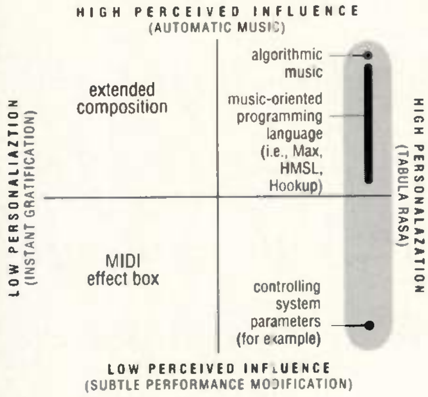


FIG. 1: The two most important elements of an interactive system, perceived influence upon the music being generated and the degree of personalization available, can be mapped out on a quadrant graph to provide a framework for understanding the similarities and differences between systems.

is the amount of "perceived influence." At the low extreme, an interactive tool might perform such subtle changes to our music that neither we nor the audience notice that it's doing anything. At the other extreme, we sit back and let the computer do all the work. Our tools lie somewhere between these extremes.

To illustrate our spectrum, let's look at some real-world examples. (We'll delve a bit deeper into these examples shortly.) I would put Laurie Spiegel's *Music Mouse* in the upper left-hand corner of the grid: It produces lots of notes from simple user input, and it provides little user-programmability. A MIDI-controlled effects box, such as the Lexicon LXP-1, might fit somewhere in the lower left quadrant: It is a specialized device that can react to your performance by changing certain parameters, and its effect upon your music is fairly subtle. (It won't, for example, generate new notes based on what you play.) As products become more customizable, we move to the right half of our graph, and our evaluation gets a bit trickier. We could use a musical programming language, such as *Max* or *HMSL*, to create subtle, or drastic, modifications to our performance. At that point of generality, we really have to compare each application of the programming language rather than the language itself.

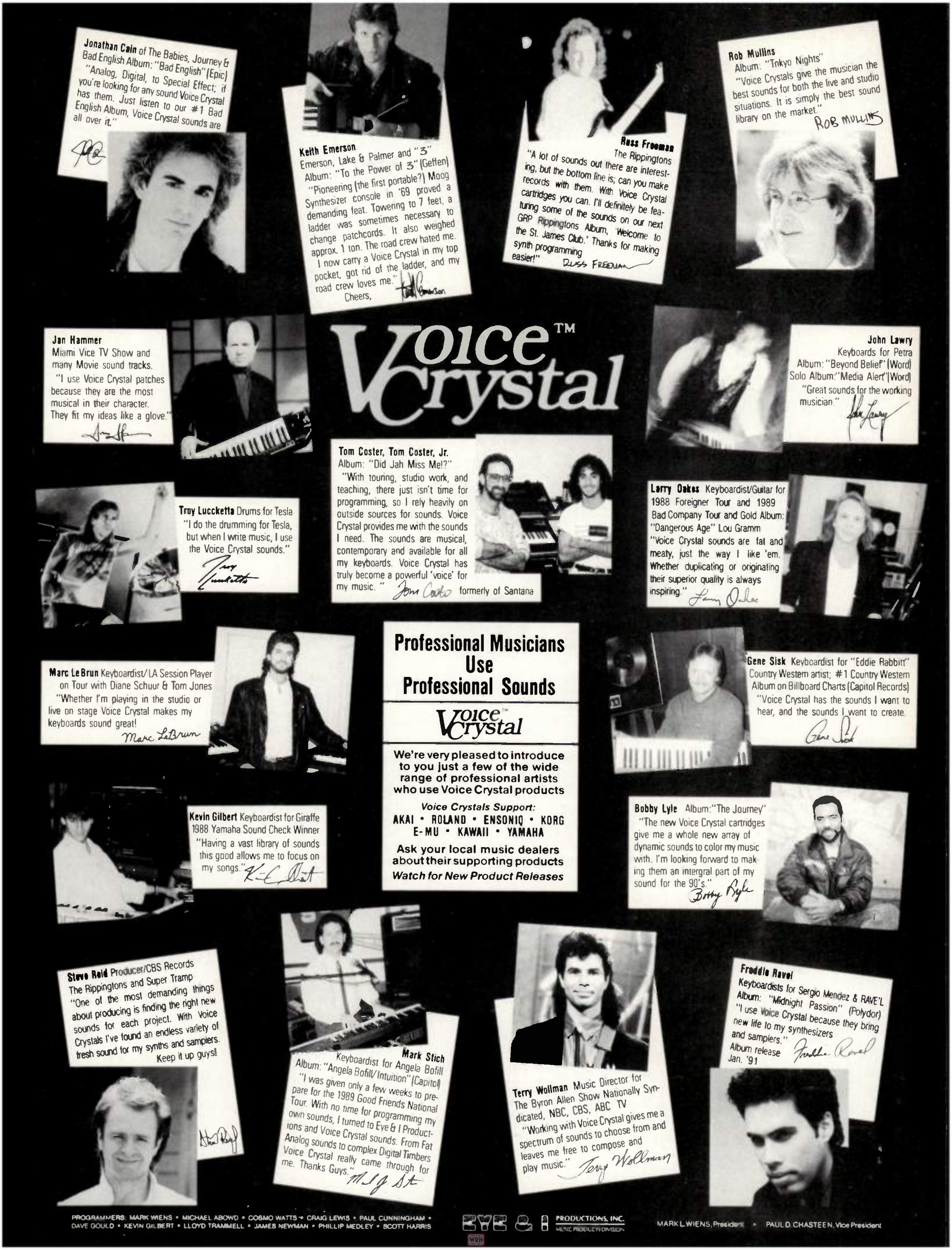
PIONEERS

Interactive performance tools have been around for a while. Many of today's products derived from the work of composers and experimenters spanning at least 30 years. Space won't permit a fair discussion of these pioneers, but a brief glance at their work can reveal some avenues for exploration and put some of the recent products in perspective.

The earliest work with interactive electronics pre-dated the use of computers in real-time music. Alvin Lucier used brain waves to trigger solenoids that struck percussion instruments. Similarly, David Rosenboom used brain waves for the live control of analog synthesizers. Rosenboom and Don Buchla later pioneered the use of real-time sequencing in performance, collaborating over a period of many years. These collaborations fueled the evolution of Buchla's unique electronic instruments, which explored new approaches to the man-machine interface.

Perhaps the first real-time computer performance system was Max Mathews's GROOVE, developed around 1970. GROOVE was based on a mini-computer equipped with fourteen D/A converters that controlled an assortment of analog synthesizer modules. A performer could make music with many programmable knobs, a joystick, and small keyboard. A composer could program the computer to interpret the performer's input in a variety of ways. Laurie Spiegel used GROOVE to realize several interactive compositions whose techniques bear a striking resemblance to Intelligent Music's *M*, providing a global control over looping, melodic cycles that permutate slowly over time.

Mathews, now at Stanford's CCRMA, since has developed several variations on an electronic conducting "baton," most recently the Radio Drum. A program called the *Conductor* monitors the tempo, physical location, and velocity of the performer's strokes—which needn't actually strike the Radio Drum's surface—and maps these gestures to parameters such as tempo, timbre, and volume for playing back a score. (Several MIDI products, such as the Aphex Studio Clock, can perform similar tricks when combined with a percussion controller and some careful programming. Devices such as the Studio Clock can synchronize a MIDI sequencer to a hand-played rhythm, allowing the sequencer to follow the subtle tempo variations of a human performance—definitely an improvement over the "start button" approach.)



Jonathan Cain of The Babies, Journey & Bad English Album: "Bad English" (Epic)
"Analog, Digital, to Special Effect; if you're looking for any sound Voice Crystal has them. Just listen to our #1 Bad English Album, Voice Crystal sounds are all over it."
Keith Emerson
Emerson, Lake & Palmer and "3"
Album: "To the Power of 3" (Geffen)
"Pioneering (the first portable?) Moog Synthesizer console in '69 proved a demanding feat. Towering to 7 feet, a ladder was sometimes necessary to change patchcords. It also weighed approx. 1 ton. The road crew hated me. I now carry a Voice Crystal in my top pocket, got rid of the ladder, and my road crew loves me."
Cheers,
Russ Freeman
The Rippingtons
"A lot of sounds out there are interesting, but the bottom line is; can you make records with them. With Voice Crystal cartridges you can. I'll definitely be featuring some of the sounds on our next GRP Rippingtons Album, 'Welcome to the St. James Club.' Thanks for making synth programming easier!"
RUSS FREEMAN
Rob Mullins
Album: "Tokyo Nights"
"Voice Crystals give the musician the best sounds for both the live and studio situations. It is simply the best sound library on the market."
ROB MULLINS
Voice Crystal™
Jan Hammer
Miami Vice TV Show and many Movie sound tracks.
"I use Voice Crystal patches because they are the most musical in their character. They fit my ideas like a glove."
John Lawry
Keyboards for Petra
Album: "Beyond Belief" (Word)
Solo Album: "Media Alert" (Word)
"Great sounds for the working musician."
Tom Coster, Tom Coster, Jr.
Album: "Did Jah Miss Me!?"
"With touring, studio work, and teaching, there just isn't time for programming, so I rely heavily on outside sources for sounds. Voice Crystal provides me with the sounds I need. The sounds are musical, contemporary and available for all my keyboards. Voice Crystal has truly become a powerful 'voice' for my music."
formerly of Santana
Troy Luccketta Drums for Tesla
"I do the drumming for Tesla, but when I write music, I use the Voice Crystal sounds."
Larry Oakes Keyboardist/Guitar for 1988 Foreigner Tour and 1989 Bad Company Tour and Gold Album: "Dangerous Age" Lou Gramm
"Voice Crystal sounds are fat and meaty, just the way I like 'em. Whether duplicating or originating their superior quality is always inspiring."
Professional Musicians Use Professional Sounds
Voice Crystal
We're very pleased to introduce to you just a few of the wide range of professional artists who use Voice Crystal products
Voice Crystals Support:
AKAI • ROLAND • ENSONIQ • KORG
E-MU • KAWAII • YAMAHA
Ask your local music dealers about their supporting products
Watch for New Product Releases
Marc Le Brun Keyboardist/LA Session Player on Tour with Diane Schuur & Tom Jones
"Whether I'm playing in the studio or live on stage Voice Crystal makes my keyboards sound great!
Marc LeBrun
Gene Sisk Keyboardist for "Eddie Rabbitt" Country Western artist; #1 Country Western Album on Billboard Charts (Capitol Records)
"Voice Crystal has the sounds I want to hear, and the sounds I want to create.
Kevin Gilbert Keyboardist for Giraffe
1988 Yamaha Sound Check Winner
"Having a vast library of sounds this good allows me to focus on my songs."
Bobby Lyle Album: "The Journey"
"The new Voice Crystal cartridges give me a whole new array of dynamic sounds to color my music with. I'm looking forward to making them an intergral part of my sound for the 90's."
Steve Reid Producer/CBS Records
The Rippingtons and Super Tramp
"One of the most demanding things about producing is finding the right new sounds for each project. With Voice Crystals I've found an endless variety of fresh sound for my synths and samplers. Keep it up guys!
Mark Stich
Keyboardist for Angela Bofill
Album: "Angela Bofill/Intuition" (Capitol)
"I was given only a few weeks to prepare for the 1989 Good Friends National Tour. With no time for programming my own sounds, I turned to Eye & I Productions and Voice Crystal sounds. From Fat Analog sounds to complex Digital Timbers Voice Crystal really came through for me. Thanks Guys."
Terry Wollman Music Director for The Byron Allen Show Nationally Syndicated, NBC, CBS, ABC TV
"Working with Voice Crystal gives me a spectrum of sounds to choose from and leaves me free to compose and play music."
Terry Wollman
Freddie Ravel
Keyboardists for Sergio Mendez & RAVE'L
Album: "Midnight Passion" (Polydor)
"I use Voice Crystal because they bring new life to my synthesizers and samplers."
Album release Jan. '91
Freddie Ravel
PROGRAMMERS: MARK WIENS • MICHAEL ABOWD • COSMO WATTS • CRAIG LEWIS • PAUL CUNNINGHAM • DAVE GOULD • KEVIN GILBERT • LLOYD TRAMMELL • JAMES NEWMAN • PHILLIP MEDLEY • SCOTT HARRIS
EYE & I PRODUCTIONS, INC.
MUSIC PRODUCTS DIVISION
MARK L. WIENS, President • PAUL D. CHASTEEN, Vice President

In the late 1970s, a group of composers in the San Francisco area began a unique approach to interactive electronics. The League of Automatic Music Composers included John Bischoff, Rich Gold, Jim Horton, and Tim Perkis. Each of these composers programmed his primitive KIM 1 microcomputers to generate notes, using simple algorithms that responded to incoming messages from another computer. Then they hooked their computers together in a ring and let them go crazy. This represents a different kind of interactive performance, where the humans step aside and allow several electronic systems to interact with each other. Simple human interventions can resonate down the chain to create drastic and unpredictable changes.

Also in the late 1970s, David Behrman recorded several beautiful compositions ("On the Other Ocean," 1977, on the Lovely Music label) using computer-controlled, phase-locked loop circuits to generate justly tuned drones. Soloists playing flute and bassoon triggered chord changes in the electronics whenever they played certain pitches.

More recently, Tod Machover at MIT has been promoting what he calls "Hyperinstruments." A typical Hyperinstrument consists of a MIDI controller or pitch-to-MIDI converter connected to a computer that processes the performance data before sending notes out to several MIDI synths. The software for such a system (written in Common LISP for the Mac by Ph.D. student Joseph Chung) is closely tied to the composition being performed. Hyperinstrument software can act as an intelligent arpeggiator during one section of a piece; it might map prerecorded sequences to various keys on a keyboard, allowing the performer to change timbre or tempo with velocity and aftertouch; or it might synchronize a sequence with real-time playing, in much the same way as Mathews' Radio Drum.

Machover also has been pushing the Hyperinstrument concept beyond the typical "one-man band" approach, allowing multiple instruments to interact in some unusual ways. For example, a keyboardist could interact with a percussionist such that chords played on the keyboard determine the notes available to a MIDI percussion controller (see **Fig. 2**). Machover himself has composed a lot of music using Hyperinstrument software, including *Valis*, the 1987 science-fiction opera based on Phillip K. Dick's last novel. A brief listen to Machover's music may convince you that interactive performance technology does not have to sound inaccessible or obscure. Much of his music has an unmistakable "progressive-rock" feel that would fit well into a mainstream context.

INTERACTIVE PRODUCTS

Let's examine some commercially available MIDI products that fit the description of interactive technology. Please note that this is a small sample of what is available (see the accompanying "List of Products" sidebar for more). We'll focus on products that allow expressive control in real-time, especially those that specialize in interactive live performance. Then we'll explore some techniques to get more life out of devices you may already have.

I've already mentioned Laurie Spiegel's *Music Mouse*, one of the first

EVEN ON PAPER, THIS CAN SOUND VERY CONVINCING.

The effects bypass is right where you need it, to instantly turn off the 4 internal DSP's.

Technically it's called the "user interface." It's the same large LCD and user-friendly operating system as the Yamaha SY77.

Two sets of stereo outputs plus eight individual polyphonic outs.

Data entry slider and two keypads for complete, accessible realtime programming and editing.

Dual concentric volume controls for instant mix between group one and group two outputs.

Eight function buttons, for quick selection of programming and set up menus.

Up to 8 digital filters per voice for powerful programming and real-time timbral control.

Card slots for additional wave and voice data, allowing the TG77 to have up to 256 voices instantly available.

Every so often, something comes along that represents, instead of a step, a leap. With that in mind, we introduce you to the Yamaha TG77.

The remarkable story of this tone generator starts with one word. More.

More outputs (12 instead of the typical 4 or 8). More audio quality, due to the 22 bit output DAC's (compared to the usual 16 bit), for better than CD quality sound. More new voices, using Yamaha RCM synthesis, first introduced in the SY77. More realtime control of dynamics. More digital signal processing, with four effects devices and 44 types of effects.

Not surprisingly, these mores add up to very real advantages. Like more mixing flexibility. Editing power. And a combination of AFM and Advanced Wave Memory that leads to true variation dynamics.

All of which leads to a leap in creativity and expressiveness altogether unexpected from a tone generator.

Which should give you even more of a reason to make the leap as well.

YAMAHA®

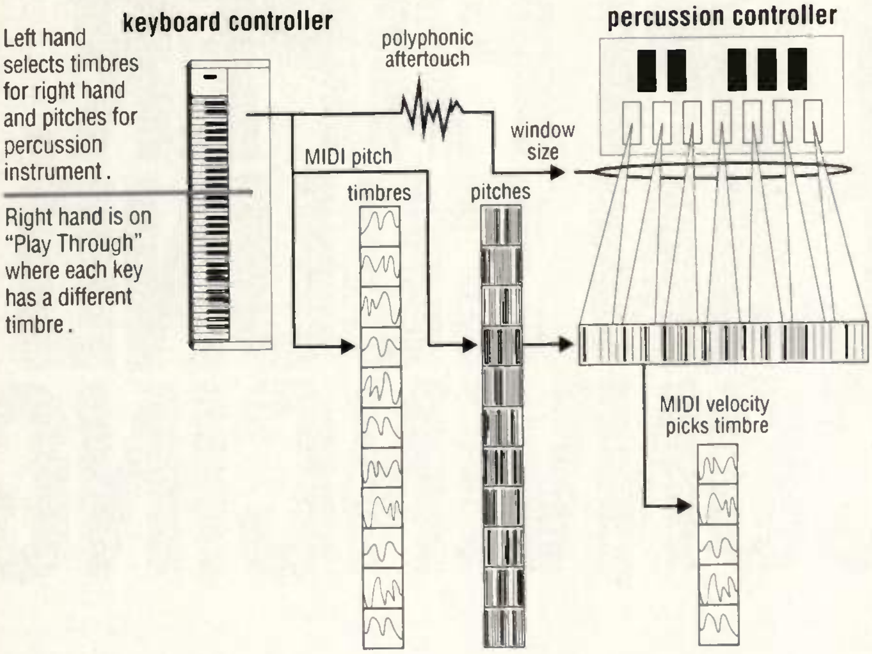


FIG. 2: In this Hyperinstrument system, a keyboard player can both play new timbres with every note and affect which notes are available to a MIDI percussionist. Polyphonic aftertouch generated by the keyboard player's left hand determines how large the "window" of available pitches is to the percussionist.

available MIDI programs to focus on interactive live performance. By simply moving the mouse across a grid on the Macintosh, Atari ST, or Amiga screen, the user can generate melodies and harmonies that always sound good. *Music Mouse* comes closer to a composition than to a composing environment, ranking high on instant gratification and low on depth. However, it's a lot of fun.

Another good program for instant gratification is PG Music's *Band-in-a-Box* (reviewed in the October 1990 **EM**), which runs on Mac, IBM PC, and Atari computers. This essentially is a software version of "Music Minus One": The user types in chords and song structures, and the computer generates a skeletal song. Optimized for jazz comping, *Band-in-a-Box* is only marginally interactive. There are, however, some interesting improvisation and live-performance features that promise to be quite versatile, if enhanced. Another similar program on the Mac is *MiBAC* jazz improvisation software (reviewed in the September 1990 issue).

Taking more of a "pattern music" approach, *M* (see "Interactivity in Action: M Meets the Amiga" in the April 1989 issue) and *Jam Factory* (both originally published by Intelligent Music and now distributed by Dr. T's) allow the user to record several independently looping sequences, then apply a range of random and cyclic transformations to these loops. These programs excel at generating polyrhythms and syncopated grooves. According to Tony Widoff, who worked with Intelligent Music, *M* was originally intended as a sort of "Steve-Reich-in-a-Box" but soon came to reflect the compositional interests of its authors, David Zicarelli and Joel Chadabe. *M*, which is available for the Mac, Atari, and Amiga from Dr. T's and for *Windows*-equipped PCs from Voyetra, straddles the blurry line between extended composition and interactive composing tool. It's a complicated program that invites exploration, yet it definitely imposes a "sound" to the music. *Jam Factory*, which is only available for the Mac, provides a bit more instant gratification with a bit less depth, but an otherwise similar approach.

For the experimentally minded, Cool Shoes Software has created an IBM program called *Sound Globs* that takes an entirely probabalistic approach to music making. The user draws curves to represent the probability distributions of pitches, durations, and velocities, as well as harmonic and melodic density. A performer then can modify these probabilities live via MIDI controllers to create an interactive form of stochastic music. *Sound Globs* is not likely to generate your next hit single, but it can provide a fascinating new way to create textural music.

Scorpion Systems' *sYbil* (reviewed in the December 1989 **EM**) takes the opposite approach from *Sound Globs*, eschewing randomness completely. Basically, *sYbil* is a dynamic, real-time, MIDI mapping program (for Mac, IBM, or Atari computers) that is optimized for interactive performance. The user can assign up to sixteen MIDI notes (keys or drum pads, for example) to be processed by *sYbil*. When *sYbil* receives a note-on from one of these keys, it performs a transformation upon that note, then sends the result out on any of sixteen MIDI channels. At the simplest level, for example, a single key could trigger a chord. Another key could start up a chain of transpositions that become a short riff when the key is played repeatedly. Keys also can step through program changes, trigger velocity cross-switches, or sustain the notes generated by other keys. Everything *sYbil* does is initiated by a specific action from the performer; it only can generate an event when it sees an event, which adds to its live appeal. The program can be used with any MIDI controller and takes on different characteristics with different controllers, but it seems best-suited to the techniques of a MIDI percussionist. It allows a pad player to sustain chords and play complex melodic riffs with ease. The program suggests a riff-oriented style of playing but provides considerable flexibility within that context.

Don Buchla's touch-sensitive controller, Thunder (reviewed in the August

Introducing the DigiTech Super Harmony Machine

The DigiTech IPS-33B Super Harmony Machine lets you create 1- and 2-note harmonies that are crystal pure and correct to scale. And that's just the beginning.

Check this list of super features:

- 1 and 2 note harmonies; above, below or either side of the note played
- 7 superb effects—harmonies, stereo pitch detune, up to 1.5 ms of digital delay, stereo chorus, up to 2 octaves up or down note and chord pitch shifting, volume modulation, pitch correction
- Harmonies smoothly follow note bending
- 24-bit processor ensures you can't outrun your harmonies
- User-programmable harmonies
- 80 different arpeggiations
- 128 presets, 128 user-definable programs
- Harmony shifting in real time
- 128 user-definable memory locations
- Chromatic harmonies in any interval up to two octaves up or down in any key
- Intelligent scallic harmonies in 59 different scale types, in any interval, in any key
- Choose chordal harmonies that fit chords
- Create special harmonies
- Make key and preset changes from the IPS-33B, the optional footswitch or your instrument
- Independent left and right effects mixing
- Adjust to MIDI keyboard chords
- MIDI continuous control of programs, patches and parameters
- 42.5 kHz sampling rate
- Tune instrument to IPS-33B or vice versa
- String synthesis
- Two continuous controller inputs
- 32 character backlit LCD display
- Remote hand controller included
- 20 Hz to 20 kHz bandwidth
- 90 dB signal-to-noise ratio
- Less than 0.03% THD

Rent the Super Harmony Machine demo video for $10.00 refundable deposit. Send deposit to the address shown below.

DigiTech
5639 South Riley Lane
Salt Lake City, Utah 84107

DigiTech
The Sound of the 90's

A Harman International Company

1990 issue), also implements several of the mapping approaches explored by *sYbil.* Thunder adds to these features a wide range of time-based and random functions. Unlike *sYbil,* Thunder requires a completely new playing technique that puts an immense range of expressive control in the performer's hands. Thunder's playing surface neatly fits the shape of the hand, with over three-dozen force-sensing membranes spread out under the fingertips. The user can configure these pads to respond to velocity, pressure, and fingertip position. Each of these pads can spew out a flurry of programmed or random melodies, start a sequencer, crossfade between timbres, or modify the behavior of other pads. Thunder is a deep device that takes time to learn and master. Although it seems optimized for the avant-garde, it has the qualities of a lasting and flexible musical instrument.

The Hotz MIDI Translator, from Atari Computer, is another deep and flexible alternate controller, but with a different attitude than Thunder. While Thunder encourages explorations on the fringe, the Hotz Translator lets you maintain your grip on traditional harmony and chord structures. The Hotz box uses force-sensing membranes laid out in several different groupings on a large, rectangular playing surface that connects via MIDI to an Atari ST. The Hotz software consists of three banks that process the performer's gestures before spewing forth notes.

The Upper Bank consists primarily of a chord computer, complete with a database of 256 chord types available in any key with any altered note. The user also can create and save custom chords, although there is rarely a need for this. The Lower Bank plays notes from any of 256 scales, with a database full of standard musical modes, ethnic modes, and user-programmable scales. The third bank is dubbed the Zoom Bank and allows the performer to switch quickly among configurations, scales, chords, and timbres. Various groups of pads are assigned to each bank, allowing the performer to play complex chord changes while soloing, letting the software keep track of specific note placements within the harmonic framework. Craig Anderton has adopted the Hotz Translator as his main MIDI controller, characterizing it as

(continued on p. 116)

Confused About "Exciters"? Read the Facts.

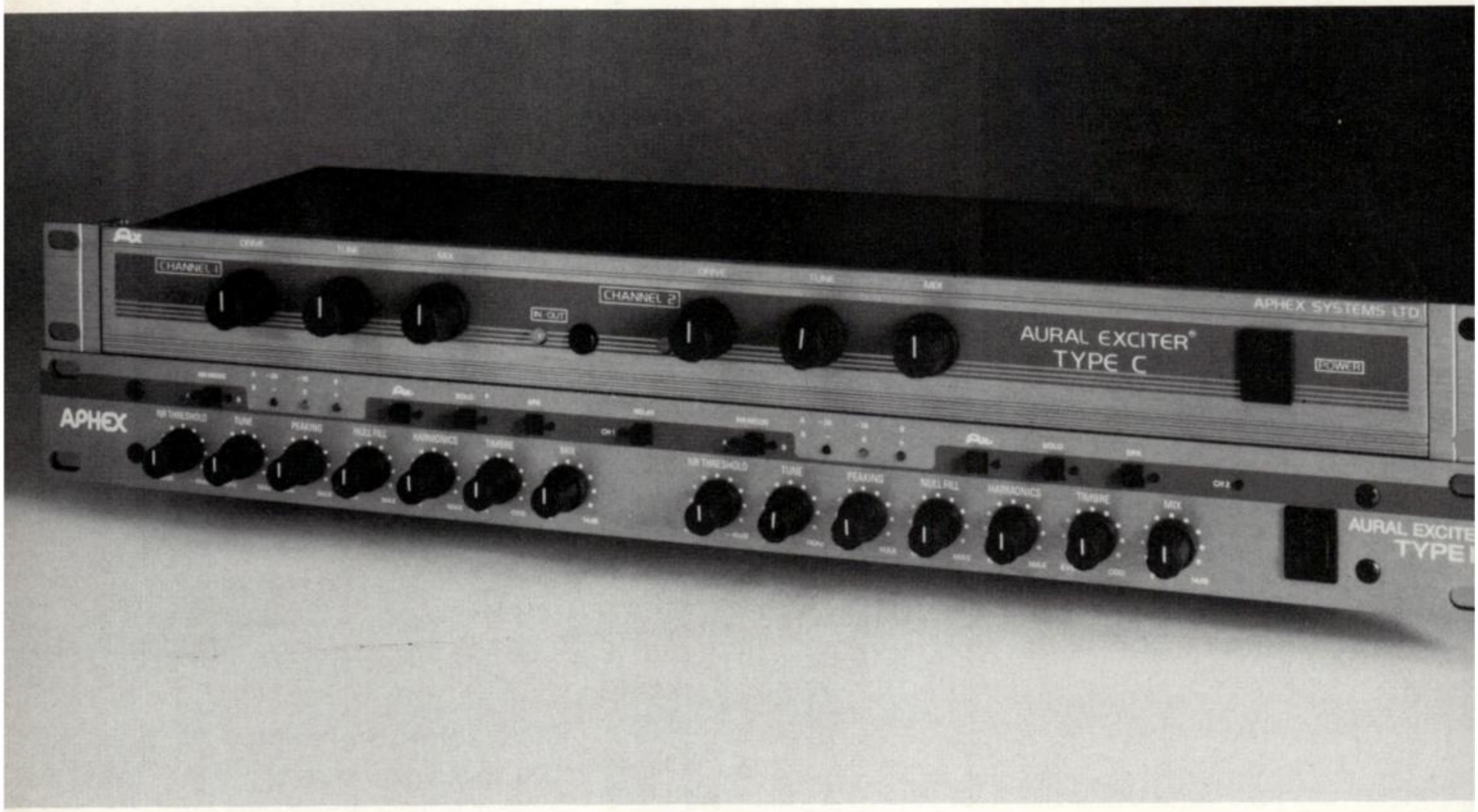
Seems like a good thing always leads to imitators. Which is why there seems to be a rash of so-called "brightness enhancers," "phase correctors" and "exciters."

The Aphex Aural Exciter® is a *patented* audio process that will recreate and restore missing harmonics. When added, they restore *natural* brightness, clarity and presence, and actually extend audio bandwidth. All without adding any appreciable power to the signal.

As a result, the Aural Exciter has become a standard tool in the recording, film, broadcast and sound reinforcement industries around the world. It has been licensed for use in products sold by Yamaha, Numark, AKG, Proton, Gentner Engineering, MacKenzie Labs, and Vestax.

Other "brightness enhancers" only boost existing high frequencies, pumping as much as an additional 12dB, which can distort the amp or even blow your speakers... in addition to sounding unnatural. In fact, you could probably achieve the same effect more flexibly and economically by using any equalizer.

Don't be confused by hype. Listen to any device claiming to do what only an Aphex Aural Exciter does, then listen to the real thing. Your ears will hear the difference.



APHEX
SYSTEMS

All Aphex products are designed and manufactured in the U.S.A.

11068 Randall Street
Sun Valley, CA 91352
(818) 767-2929

MONSTER *Synth Stacks*

Add new life to your instruments by learning how to combine them into massive new sounds.

JOHN HERSEY

BY LORENZ RYCHNER

For centuries, composers, orchestrators, and arrangers sought methods of producing huge, powerful sounds that let the listener *feel* the music as well as hear it. Orchestras and jazz big bands achieve this through ensemble playing, combining related families of instruments into sections, then layering sections to produce the desired sonic "muscle." Rock bands utilize a combination of ensemble playing, effects processing, and amplification to move the audience. A long time ago, layering techniques that used pipe organs led to the coining of a phrase that remains part of the English language: "All stops pulled" describes the rich sound effect of an organ with all pipes playing in all registers.

As synthesists interested in creating new timbres, we can learn a great deal from these traditional ways of layering sounds. The key in all these cases, and in the electronic analogy of programming effective combinations, is to use a variety of sonic "colors."

There are three approaches to sound layering, all of which can be mixed and should be taken into account when planning a complex sound. You can layer oscillators within one instrument (i.e., one synth or sampler) voice, layer several multitimbral voices within one instrument, and trigger independent instruments that are amplified and heard simultaneously. When you combine these methods, sounds of staggering power and complexity can be created. Let's examine these ways of layering sounds to augment our palette of colors.

OSCILLATOR LAYERING

Most instruments have two oscillators, each of which can produce a different waveform. This is where layering starts: two sound colors for the price of one keystroke. Depending on the instrument's voice architecture, you may have a lot of options.

The oscillators can be tuned separately, either by entire octaves for a spread, or by intervals in half-steps for parallel tracking (e.g., oscillator 2 always a fifth above oscillator 1 for the perennial "brass-in-fifths" patch), or out of tune by small increments for a chorus-like, richer sound.

If both oscillators share a common filter and amplifier, you're limited in the way you can shape the layer over time. Still, you can assign a looped, sustaining waveform to one oscillator, while giving the other oscillator a non-looped, short, percussive waveform.

If each oscillator has its own filter and amplifier, you can create layers with independent changes over time that are introduced by the independent filter and amplifier envelope generators. There are many possibilities here, so let your imagination soar.

Don't forget pitch envelopes. If each oscillator has its own, try to introduce a gradual detuning effect on sustained notes by starting both oscillators at the true pitch level, then modulating one sharp and the other flat at the second stage of the envelope, using slow modulation rates. This leaves short notes perfectly dry and in tune, but longer notes develop an interesting life of their own.

MULTITIMBRAL LAYERING

The multitimbral mode opens up more possibilities. Just calling up several programs from within the same instrument, triggered from the instrument's own keyboard, can make huge sounds. If one, or several, of those programs already use layered oscillators, the sound can be even bigger.

You even can use each oscillator (with its unique filter and amplifier envelope) in each multitimbral voice for a different part of a sound. In **Fig. 1**, the amplifier envelopes are programmed such that oscillator 1 in voice 1 provides the

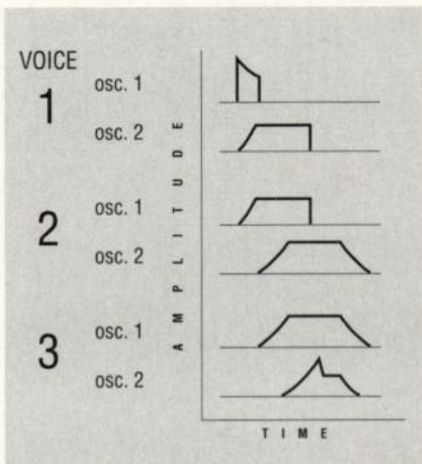


FIG. 1: Complex timbres can be produced using layers of oscillators with overlapping amplifier envelopes within a multitimbral stack.

If You Want Something Done Right, Do It Yourself!

Peavey's New DPM 3se Combines 16-Bit Sampling Capability With All The Power And Features Of The DPM 3 Composition Center

In the world of digital synthesizer technology, there are many voice/program packages offering the player a variety of sounds. However, complete control of your music requires complete control of the sounds you use to create it.

With the new DPM 3se from Peavey Electronics, you can add your own sounds. All the power and flexibility of the original DPM 3 are still at your fingertips, but we've added new features that give you the edge you need at a price you can afford.

With 4 megabytes of internal factory samples and 16-bit sampling capability, the DPM 3se blows away the competition with features like:

- A full complement of sampling and sample editing features including rate, length, looping, trimming, and multi-sample mapping
- Up to 1 megabyte of custom user samples
- 32-oscillator, 16-voice polyphony with dynamic voice allocation
- Two programmable 24-bit dual effects processors
- 9-track 20,000 note sequencer with independent track looping
- Four 16-instrument multi-timbral locations
- MIDI controller features
- MIDI sample dump send and receive

Add the affordable DPM™SX Sampling Expander and you have an unbeatable combination of power, technology, and originality.

- 16-bit sample resolution
- Selectable sample rate up to 48 kHz
- Armed and manual sampling
- Phantom-powered XLR input
- Standard 1/4" input
- 256K RAM memory, expandable to 16 megabytes with standard SIMS

The DPM™ SX

DPM 3 OWNERS

REMEMBER... YOUR DPM 3 WILL NEVER BE OBSOLETE! YOU CAN UPDATE YOUR DPM 3 TO A DPM 3se FOR ONLY $49.95. CONTACT YOUR LOCAL AUTHORIZED PEAVEY DEALER OR

CALL THE DPM HOTLINE: 601-483-5370

PEAVEY

Peavey Electronics Corporation / 711 A Street, Meridian, Ms 39302-2898 / U.S.A. / Telephone 601-483-5365 / Telex: 504115 initial attack. Oscillator 2 of voice 1 is paired with oscillator 1 from voice 2 (which uses an identical envelope), providing just the first portion of the sustain. Oscillator 2 in voice 2 and oscillator 1 of voice 3 attack just before oscillator 2 of voice 1 releases and include the main sustain and release portions of the sound. Finally, oscillator 2 of voice 3 adds some extra color in the middle of the sound. The final result in **Fig. 2** might sound terrible—it's not intended to be taken literally—but the point is that this type of multiple-envelope technique, especially when extended and applied to several layered synthesizers, can yield complex synthesized sounds that appear nearly as dynamic as natural sounds.

Watch for polyphony restrictions, though. When you layer several patches, the advertised number of simultaneously playable notes shrinks, particularly if they are two-oscillator patches.

If your instrument allows you to set the velocity response independently for each patch, give that some thought. (We'll discuss velocity switching later.)

Pitch range restrictions are another thing to keep in mind. For example, assigning a deep-sounding program to play only in the lowest octave while all others play across the entire range will make sure that your low notes are extra beefy.

There also are control considerations when creating multitimbral layers. Unless you're controlling the multitimbral instrument with its built-in keyboard, you need to make sure that all the sounds used in the multitimbral layer are set to receive on the same MIDI channel.

LAYERING MULTIPLE INSTRUMENTS

The third way of achieving layers uses several independent instruments that are connected to the same sound system. This may seem like the rich man's solution, as it uses the most hardware, but when you keep in mind how the two previous techniques can be used to build big layers, you can see that you don't need a room full of synths to get a monster stack.

This technique is your best ally in the losing battle against obsolescence. What do you do with an old synth that doesn't have onboard effects, isn't multitimbral, and only produces a few sounds you really like? If you think in terms of layering, you'll find many instances where the old dog can contribute a new trick or two.

Pay particular attention to short, percussive sounds. They can come off quite successfully, even on synths that don't speak with a mighty voice. Pick a square wave with the filter three-quarters open, give the amplifier attack the fastest value, make all amplifier envelope levels (except the attack level)

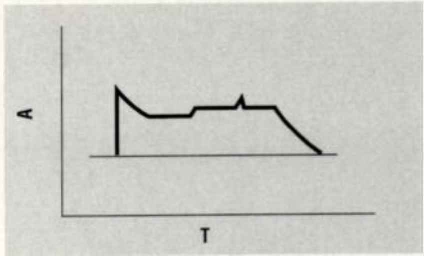


FIG. 2: The composite amplitude envelope of the stacked sound.

zero, and pick a quick decay rate and an equally quick release rate. Bingo, you have the kind of clunky, percussive sound that lends itself to reinforcing weak string attacks, adds impact to the beginning of all kinds of layers, and if you tweak it with a bit of filter resonance, it'll even make the sound of clave sticks for your Latin grooves.

Noise—white or pink—can be elicited from semi-retired synths either for noise bursts (using the same settings as in the previous example), or for slightly pulsating, sustaining sounds (using an LFO modulating the filter with a triangle or sine wave). Another sound that's most welcome from less-than-glorious older synths is the narrow pulse wave, with its harsh, nasal quality. As unpleasant as it can be on its own, you may welcome it when it's blending in, at a soft volume, with low strings, low brass, or even in unison with bass lines. It really can give some overly chorused, mushy sounds a helpful definition.

If you have a sampler, you're in a position to create some seriously mind-blowing stacks. Create a synth stack, using the previously discussed techniques, and sample the stack. If you have enough sample memory, you can take a long sample to capture as many dynamics as possible. Now your synths can be reprogrammed to create a new stack that includes the sampled stack. If you have enough memory in the sampler, you can layer your synths with several sampled synth stacks. (A fully expanded Ensoniq EPS, with its flexible envelopes, built-in layering features, patch-select buttons, and polyphonic aftertouch—you can use the latter to trigger, or modulate, selected layers—is a good choice for this job.) The possibilities are mind-boggling.

GENERAL LAYERING TECHNIQUES

Because of the lack of a common language outside of traditional orchestral instrument terminology, I'll keep referring to those, but don't think this stuff only works when you imitate orchestral sounds. It's the concept that counts, so try to translate the concepts to your own music, no matter what style you're working in.

Layering low, percussive sounds with low, sustained or slow-fading sounds: Low strings often sound best when the attack speaks slowly, but that may not feel right against the rhythm of the piece. By reinforcing the attack with a

How Much Incentive Do You Need To Start Your Own SampleNET™ Library?

What is SampleNET anyway?

SampleNET puts the most popular samples from the Prosonus CD library into your hands through a unique user's group just for musicians. When you join SampleNET you'll get a terrific new member's package. Plus, you'll receive monthly opportunities to dramatically expand your SampleNET library with more hassle-free, time-saving, ready-to-use, pre-edited, pre-looped, pre-mapped and pre-patched samples. Based on product demand, SampleNET supports samplers from Akai, Roland, Ensoniq, E-mu, Korg, Casio, Dynacord, Sequential Circuits and Yamaha.

What's the new member package?

It's real simple. Here's what you get:

Prodisk DDD- The only true all digital samples, originally captured using the remarkable Sony PCM 1630 two track digital recorder. You get two complete sets, special editions loaded with percussion and effects samples *plus* a Prosonus signature synth stack.

Studio Reference Disc (SRD) - A full 70 minute CD with virtually every diagnostic test and reference tone you could need to keep your system in top running condition.

SampleNET Newsletter - A quarterly publication with articles by noted authors like Craig Anderton, Jeff Rona, Mike Marans and Tim Tully, designed to keep you up to date on the latest sampling trends and technology. And every month, you'll receive a complete listing of all new Prodisk sets - *available only through SampleNET*.

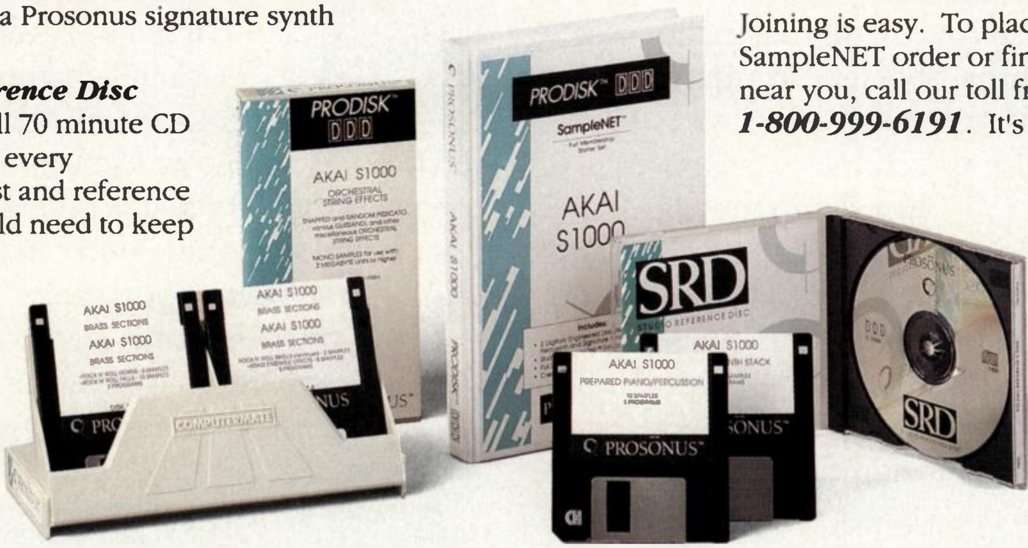
Big Discounts - Up to 10% on each additional SampleNET Prodisk you purchase, and every 6th Prodisk is absolutely free.

Bigger Discounts - Up to 40% on sampler peripherals, like blank diskettes and 44-Meg removable hard disk cartridges.

What's it cost and how do I join?

With a suggested retail value of $225.00 on just the Prodisks and Studio Reference Disc alone, the membership price of $149.95 immediately saves you over 30%. Combined with the newsletter's up-to-the-minute information, new Prodisk introductions and added discounts, the bargain should be obvious.

Joining is easy. To place your SampleNET order or find a dealer near you, call our toll free number, ***1-800-999-6191***. It's that simple.



PROSŌNUS™

11126 Weddington Street / North Hollywood, CA 91601 / (818) 766-5221 / Fax (818) 766-6098

A FEW STEPS FORWARD. AND ONE STEP BACK.

The Yamaha SY77 was just released last year and already it's been improved. But not the kind of improvements that make most synths obsolete. It's quite the opposite.

Because as technology advances, so does the SY77. Just slip in the latest voice card or floppy, and you've got the newest sounds available. Like sax waves, drums, strings or latin percussion. Even if you long for the good old DX7 days, the SY77 can take you there.

And that's in addition to everything else it can do. The SY77 is not like any other synth. In fact, it's more like several. It functions as an FM synth, a sample playback synth, a hybrid synth capable of layering both FM and AWM samples together, and an RCM interactive synth.

Add to that 22-bit Digital to Audio Converters, a full-featured 16-track sequencer, four independent effects processors and more options for more programmability and you've got a synth that will do anything you can think of. And a lot of things you can't.

So if you're looking for a synth today that will still be what you want tomorrow, visit your nearest Yamaha dealer.

YAMAHA®

compatible tone, such as a square wave, that rhythmic problem often can be solved.

If you have low, fat, sustaining sounds that are bigger than strings, maybe with a brass-like attitude, try mixing in a low-pitched tom-tom and a noise burst. They'll make sure that the entrance of every note is heard.

Some sounds that are too clean, or too realistic, can benefit from this technique. For example, on the Korg M1, there is a sample called "Pole" that sounds like a metallic flag pole being struck; pitched, but definitely weird. I've used it to mark the attack of piano sounds when I didn't want a pure, "real" piano. In the same vein, try a cymbal sample at a drastically lower pitch than its sampled pitch, softly in the background of low notes of a sampled piano.

Layering together old instruments is your best ally in the losing battle against obsolescence.

Velocity switching: Let's say you have three different brass sounds, all velocity-sensitive, but none covering the full range from mellow to extra bright and punchy. Set up the most mellow-sounding program to play across the entire range of pitches and respond to the entire range of velocity, from 0 to 127. Then set up the same program, with the same pitch range, but with a velocity response from 60 to 127, and detune it just a little bit sharp. So far, when you play very softly, you get a regular, soft version of your mellow brass sound. When you play a little harder, the sound gets louder, richer, and warmer because of the detuning. Now set your medium-bright program for a velocity range of 80 to 127 and your extra-bright, punchy program for a velocity range of 110 to 127. When you play firmly, you hear a layer of the detuned, mellow programs and the medium-bright sound, and when you need maximum punch from your fingertips, the third program is waiting to respond. The exact velocity numbers are, of course, variable; adjust them to fit your needs.

Midrange sustaining programs with high-pitched layers: Set up a program to play G5 when you play C3 on your controller. In other words, have an instrument tracking your fingers (and all the other sounds in your layer) in parallel harmony, at an interval of two octaves and a fifth. Select a sound that fades quickly, even when you hold notes down, and don't make it too loud; otherwise, it becomes obnoxious. It should come across like a high shadow, and it works best on medium and slow songs with simple chords. When you play a C triad, you'll hear a faint, high G triad, which makes your C chord into a C major 9th. It's almost like adding high harmonic overtones. If you have a DX7, transpose one of those glittery electric piano sounds for this purpose and add gentle amplitude modulation (LFO wave saw down, frequency = 35).

Midrange and high solo with occasional low sustain: Create a layer where all but one or two sounds have a quick fade built into their envelopes, so that your fast solo runs consist only of short, barely ringing notes, even when you hold keys down. Tune one or two instruments one, or even two, octaves lower, with sustaining envelopes. Control the volume of those instruments from a pedal and bring them in whenever you pause in your solo runs. The result can be quite dramatic, but it requires that you have a way of controlling the volume of the sustaining instrument without affecting other instruments.

There are at least two simple ways to do this. If your mixer has pre-fader auxiliary sends, keep the channel fader at zero, crank up the channel's aux send pot, and wire the aux output to a volume pedal, sending the signal back to the mixer's aux return. If you're dedicating a synth exclusively for the sustaining sound (or are using several sustaining voices in a dedicated multitimbral instrument), you can use a MIDI pedal (or a regular volume pedal that sends MIDI messages via an Anatek Pocket Pedal) to send MIDI volume messages directly to the sustaining instrument. This gives you a cleaner signal by removing the pedal from the audio signal path, and you don't have to tie up a mixer bus.

Single-note runs with surprise chords: You can take the previous approach a daring step further by tuning all instruments in your layer, except your solo instrument, so that they form an interesting chord. For something a bit different, try this: Put five synths (or patches in a multimbral instrument) in monophonic (unison) mode; Synth 1 is your jamming axe. Synth 2 is master-tuned downward by a semitone, Synth 3 by six semitones (a tritone), Synth 4 by eight semitones (a minor sixth), and Synth 5 by an octave. The result: When you play a C on Synth 1, the other synths form a Cmaj7#11 chord that consists of, from the top down, B, F#, E, and C. Control all the volumes via pedal, except for the solo synth, and when you feel like playing impossibly fast chordal runs, or punctuating a note in your solo with the chord, step on the pedal to bring in Synths 2 to 5.

LAYER ON

Now that you have the basic idea, these cautionary tips can help you avoid pitfalls and create satisfying layered sounds:

• Beware of layering too many heavily chorused sounds when recording; they might work fine onstage, but on tape, they can sound like accordions or Swiss cheese (trust me, I grew up over there).

• Give higher-pitched sounds in your layers quicker envelope release times than you give to lower pitched sounds; Mother Nature does it that way.

• Combine velocity layering with stereo panning. Pan the brightest/loudest instrument differently from the others, so that your punchiest, loudest notes seem to come from unexpected quarters.

• Do your homework with the program numbers, setting all the programs for a given layer to identical numbers so that one program change on your controller can call up all the right sounds in all the contributing synths.

Once you get started, you'll come up with plenty of ideas. The orchestral composer thinks of an orchestra as one huge instrument, and you can approach your setup the same way. You'll benefit from carefully planning your layering schemes, but by all means experiment freely. Happy blending.

While **Lorenz Rychner** *was watching* Twin Peaks, *The Meaning Of Life revealed itself to him during a commercial, but now he can't remember what it was.*

Take Control

When factory presets alone are just not enough. When you know it's time to exercise more control over the sound of your music. Move up to **MIDIVERB®III.** The powerful simultaneous multi-effects processor that's the latest incarnation of the award winning* MIDIVERB from Alesis.

We know better than anyone else how to make great sounding digital effects. That's why MIDIVERB III has 200 programs in 16 bit stereo with 15kHz bandwidth. And features the kind of programmability you need to create powerful mixes. All this and 4 effects at the same time make MIDIVERB III the first choice in digital processing.

For the ultimate in creativity, MIDIVERB III's extensive MIDI control lets you alter effects in real time while you're mixing or performing. Control reverb decay time with aftertouch. Alter the modulation speed of the chorus with a foot controller. Record the changes into your sequencer for an automated mix. This is the kind of control you need to make a personal statement with your music.

It's time to stop compromising. Get on the inside of your effects processing. Take control of a MIDIVERB III at your Alesis dealer now.

** Midiverb II won the prestigious 1988 TEC Award for technical achievement.*

ALESIS
STUDIO ELECTRONICS

LOS ANGELES: Alesis Corporation • 3630 Holdrege Avenue • Los Angeles, CA 90016

LONDON: 17 Letchworth Point • Letchworth, Hertfordshire SG6 1ND

Great & Small

Bring order out of chaos by planning a flexible MIDI system that can grow with your needs.

PAMELA PRICHETT

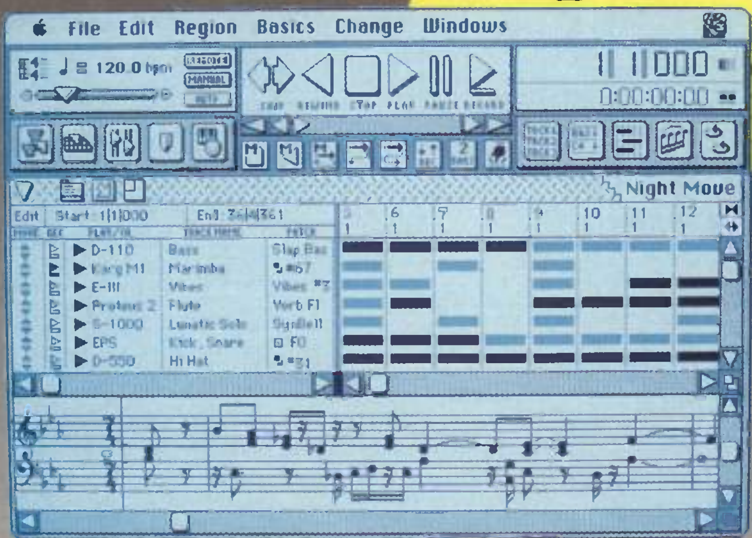
Back in the early days of MIDI, we were hard put to think of stuff to do with all sixteen MIDI channels. Of course, that was before multitimbral synths, MIDI-automated mixing boards, MIDI-driven effects, and other channel-chomping gear came along. Now, no one so much as cocks an eyebrow at the mention of 32 MIDI channels, and many folks use 128, or even 512 channels, not to mention all the other data formats slipping and sliding around inside those interface cables.

This explosion of MIDI channels and cables can lead to an interconnection nightmare. We're still in the infancy of interconnecting MIDI devices, but fortunately, we seem to be hitting the easygoing side of the development curve when it comes to equipment for interfacing MIDI gear; one box can often do all the jobs you used to need six boxes to do. Even with improved equipment, however, it's not always a simple matter to ensure that MIDI data flows only to the desired gear.

Fortunately though, MIDI is still MIDI. If you're familiar with older MIDI equipment, you'll discover that all the old data routing and processing moves are still valid, although the possibilities have been expanded, especially in large systems. (If MIDI is a complete mystery to you, the January 1991 "From the Top" column will get you started.) Armed with an understanding of MIDI signal-flow basics and a logical approach, you can *configure* a MIDI system—route cables and assign channels—without an interconnection nightmare. I'll show you how by walking through some basic,

BY ALAN DI PERNA

We Interrupt the Sequencer Wars to bring you this Special Update



Performer Version 3.5's new Tracks Overview, Consolidated Controls and Notation Editing.

Performer Version 3.5 is here!

Arrange your music with a bird's-eye view of all your tracks using the new Tracks Overview. Select patches by name, in real time. Audition sounds or recall complete setups by simply clicking. Then add our music notation editing window—another Mac sequencer first. You can edit your sequence as *music*, not just numbers or dots.

Performer's new Consolidated Controls panel gives you an all-in-one command center. No more distracting trips to the menu bar or searching through overlapping windows. Our enhanced Transpose feature can transform your music in a single keystroke, from big-band voicings to avant-garde experiments. Or save transpose maps to instantly re-map drum machine assignments.

And while other sequencers force you to march to the *computer's* tempo, Performer's new Untempoed Recording lets you record rubato and then place beats and barlines where *you* want. We've also added on-line help and support for standards like MIDI Time Code and Apple's MIDI Manager.™

TEC 1990 WINNER

When it comes time to *play* your masterpiece, try the perfect interface. Our MIDI Time Piece is a combination interface, SMPTE synchronizer and patchbay that handles an unmatched 128 MIDI channels. With 8 MIDI in's and 8 MIDI out's, including two on the front panel, you'll never have to crawl behind your rack in the middle of a session. And for video production, Performer offers exclusive SMPTE synchronization features, including lock to slow video-tape shuttling with our new Video Time Piece™ VITC/SMPTE synchronizer and character generator.

With breakthroughs like graphic sequence Chunking,™ animated sliders, full SMPTE support and 128 MIDI channels, Performer places you at the leading edge in sequencer technology.

Mark of the Unicorn, Inc.
222 Third Street, Cambridge, MA 02142,
(617) 576-2760, FAX (617) 576-3609.

See us at NAMM booth #2313.

Convert Your Acoustic Piano into a MIDI Keyboard Controller with the...

SPEED OF LIGHT

CRYSTAL
by Gulbransen

NOW, the incredible new Crystal KS-20 MIDI Keyboard Controller brings your piano into the "21st Century" with the addition of "AFTER TOUCH" and "Speed of Light" continuously variable Opto-Electronic Scanning.

This easy to install device converts any standard 88 note acoustic piano into a "state of the art" full velocity, 16 channel MIDI keyboard controller, and includes a sleek hideaway control panel.

Features:
■ 88 Piano-Key sensors ■ 3 Pedal sensors ■ 4 Programmable sliders for Volume, Attack rate, Tempo, Tuning, Pitchbend, etc. ■ AFTER TOUCH ■ 64 Presets with chaining ■ Preset/patch can be set to send on single or multiple channels program changes and multiple control changes, as well as redefine keyboard zones, sliders and control buttons ■ 2 Pedal/external controller inputs for pitch bend, modulation, volume/expression pedals etc. ■ Transpose ■ Each preset has 4 reconfigurable keyboard zones with up to 16 MIDI channels per zone ■ Programmable via SYS-EX + RPN ■ Preset/patch storage ■ Plus additional features

Orders/Information
Toll Free (800) 677-7374

GULBRANSEN/CRYSTAL
3600 Rider Trail South • Earth City, Missouri 63045
(314) 739-0090

Control Panel

intermediate, and advanced model MIDI setups.

But first, we're going to a mad, MIDI dance party. While we're there, we'll learn all the settings you have to make on synths and other MIDI gear to get them to function as part of a system.

CONGA TIME!

Back in 1983, when MIDI was invented, the original plan didn't include any MIDI routing boxes. A typical sequencer system was supposed to be laid out something like the system in **Fig. 1**. Picture this nostalgic array of gear as the set for one of those mid-1960s, teenage dance TV shows. Welcome to Le Discotheque Data!

Since MIDI is a serial protocol (i.e., the datapass in a single, unidirectional stream), it's helpful to imagine the MIDI datastream as a big, long, conga line weaving in and out of the MIDI devices. The individual data bytes are the dancers. Dig 'em now: Note-Ons, Note-Offs, Program Changes, and those Long Tall Continuous Controllers. Moving in tightly coordinated rhythm, they line up and pass single-file from the sequencer's MIDI out into the MIDI in port on Synth 1. They reappear at Synth 1's MIDI thru port, shimmy on into Synth 2's MIDI in port, and continue on to the end of the line: MIDI thru to MIDI in, all the way.

See those number placards the MIDI Byte Dancers are wearing? Those are their channel numbers, and they're very important. All MIDI messages except system messages (which take care of things like timing) have to have channel numbers. That's how they find their partners, the synth voices with whom they'll be making beautiful music. As we saw, all the MIDI Bytes pass through all the devices in the setup. But if the devices are all set up correctly, each one will have its own channel number (or numbers) and will only be interested in those MIDI Bytes that have the same number (or numbers). "Channel 5? May I have this dance?" This is why it's possible for one synth to play a bass line while another plays a lead part and another plays chords and so forth.

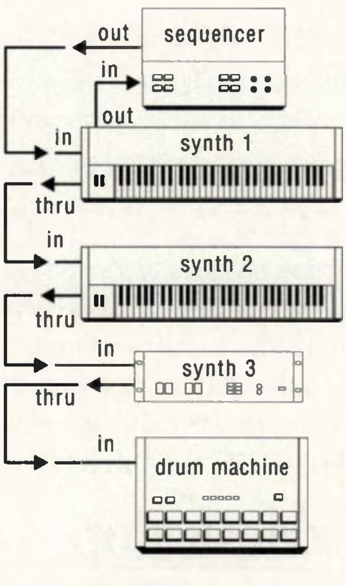


FIG. 1: The simplest MIDI connection scheme is "daisy-chaining," in which the data flows through each unit in series, MIDI thru to MIDI in.

What does it all mean? Only that the first thing you have to do in configuring any MIDI system is to make sure all your MIDI devices are tuned in to the proper channels. It doesn't matter if it's a synth, sampler, reverb unit, or MIDI mixer. The basic routine is the same, although individual operating systems differ.

What you're usually looking for is the button or software page that says "MIDI," "Master," "System," or words to that effect. Once you find it, your first task generally is to choose a MIDI mode. As a rule, you'll want to set the device in Omni Off (Poly) mode. (Unless it's a multitimbral synth, which we'll get to in a moment.) If you set it to Omni On, it will try to play every part in the song and respond to every controller message. That will never work. Once you've averted this catastrophe by choosing the proper mode, the next step is to select a channel number for the device. You're pretty much free to choose any one you want, although Channel 10 has become the unofficial standard channel for drum data.

So much for ordinary MIDI devices; for the moment, anyway. It's time to talk about multitimbral MIDI synths, samplers, and tone modules. (For an explanation of "multitimbral" and other fundamental terms, see "Unveiling the Mystery of Electronic Music" in the January 1991 **EM**.) These can respond to messages with several different channel numbers, play a bunch of separate parts with separate sounds and voices, and never get confused once. But to get them to do this, you have to select Multi mode (which is not a "true" mode, but is in common use on many instruments), rather than Omni Off. From there, you can select the channels on which you want the machine to operate. Some multitimbral machines can operate on eight MIDI channels, others on a full sixteen, which does a lot to explain why it's so easy to run out of MIDI channels these days.

After you've made these basic settings, the "Master" page on most MIDI devices will usually start asking you a lot of probing questions, such as "Patch Change On or Off?" and "Controllers On or Off?" This is your chance to disable any data you won't need to send or receive. If your tune doesn't call for a synth or multitimbral channel to change patches, disable Patch Change. If you're not using a sustain pedal, switch off that controller. Why make the synth strain itself looking for data that you know isn't going to come down the wire?

THE BASIC SYSTEM: MORE WAYS TO DO THE THRU

Hmmm, not a bad layout (see **Fig. 2**). We have everything we need to throw a nice little MIDI dance party: synthesis, sampling, a drum machine to lay down a groove, an effects processor that can change presets via MIDI program change commands, and a sequencer to drive the whole rig.

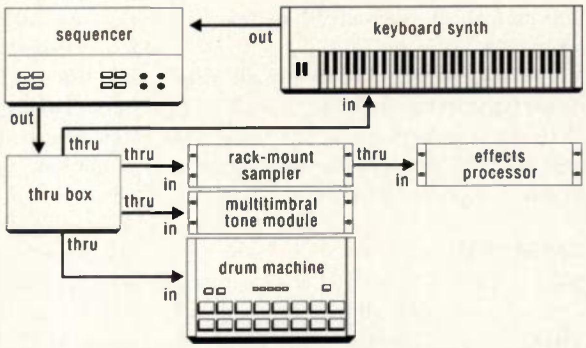


FIG. 2: A MIDI thru box simplifies cabling and avoids clogging the datastream by providing a separate MIDI cable for each machine.

Right smack in the middle of it all is an important system-enhancing tool: a thru box. It's inexpensive and ridiculously simple in its operation. You put in one MIDI line and out come four MIDI lines, all identical to the one that went in. Each line goes out to a separate machine. There's no need to send a single datastream through every machine in the system, where it can get messed up. A common MIDI thru box configuration is 1-in/4-thru (although you can get bigger ones). Since we have five tone-generating/effects- processing devices in this setup, we've routed one MIDI line through the sampler and out to the effects unit. These days, many computer MIDI interfaces have built-in MIDI thru boxes.

This brings us back to an earlier point: More and more of the little boxes that once went to make up a MIDI system are now moving into one, big centralized box. If you're using hardware sequencers or the Atari ST (which has its own built-in MIDI ports) for sequencing, and you have a relatively small system, a separate thru box is still a good way of routing the sequencer's MIDI out to a number of devices.

Let's take one more peek at **Fig. 2.**

The keyboard synth's MIDI out is connected to the sequencer's MIDI in, enabling us to use the keyboard as an input device. But what happens when you're recording a part for the rack-mount sampler or tone module to play? If the keyboard's MIDI out is going to the sequencer, how can it also "play" the tone module? This once was a problem, but virtually all sequencers today have a "MIDI echo" feature—also called "Play Thru" or "Patch Thru"—that takes the MIDI signal coming in from the keyboard and passes it, via the appropriate MIDI channel, to the tone module.

Should you find yourself using a sequencer that doesn't have MIDI echo, you can always resort to the ancient solution: Get another thru box, connect the keyboard's MIDI out to the thru box's MIDI in, and run one thru line to the sequencer and the other to the tone module. It's one more use for our old pal, the thru box.

If you are using MIDI echo on a sequencer, shut it off when you're recording a part for a keyboard synth. If you don't, you'll set up a MIDI feedback loop (and the ol' *loop-de-loop* is one data dance you definitely want to avoid). Here's how it goes: You press down a key on the synth, and one of its internal voices is triggered. At the same time, a MIDI note message is sent to the sequencer. MIDI echo sends the note out of the sequencer and right back into the synth. The note plays a second time, a few milliseconds later than when you first struck the key, so all kinds of strange phase cancellations go on between the two notes. Suddenly, your synth has half as many voices as you thought it did, whole-step pitch bends become two-note bends, and...

Why suffer? You can avoid all this grief by remembering to switch off the MIDI echo. Alternatively, set your synth to Local Off so the keyboard sends data out via MIDI but doesn't trigger the onboard voices. The data goes to the sequencer, returns from the sequencer's MIDI echo, then triggers the synth voices. But enough of this setup. Ready for something a shade wilder?

THE INTERMEDIATE SYSTEM: PATCH BAYS AND PROCESSING

We're really moving uptown now. Take a look at **Fig. 3**. We have some more tone modules, a few more effects, and a multitrack tape machine. Tape, or some other audio storage medium, is the only way

AUTHORIZED BROTHER DEALERS

See your Authorized Brother Dealer before March 1, 1991 for up to $80 in incentives when you purchase a Brother MDI-40.

ALABAMA

Birmingham	Music Alley
Mobile	MMI
Muscle Shoals	Counts Brothers Music

ALASKA

Juneau	M&M Music

ARIZONA

Phoenix	Axe Handlers and Company
	Synthony Music
Tucson	Rainbow Guitars
	Workshop Music

ARKANSAS

Little Rock	Music City
	Musicmakers

CALIFORNIA

Alahambra	Pedrini Music
Chula Vista	The Music Mart
Corona	Tril Music Center
Downey	Downey Music Center
Dublin	Custom Music
El Cajon	The Music Mart
Long Beach	Goodman Music
	Whittaker Music
Los Angeles	Goodman Music
	Westwood Music
North Hollywood	American Music
	Goodman Music
Oceanside	Liers Music
Reseda	Kaye's Music
Riverside	Liers Music
	Tril Music Center
Roseville	Steve's Music
Sacramento	K&K Music
San Bernardino	Liers Music
San Diego	The Music Mart
	JA-AM Systems
San Francisco	K&K Music
San Jose	K&K Music
San Rafael	Bananas at Large
Santa Barbara	Sound Advice
	Castle Music
Santa Monica	Merrill's Music
Santa Paula	McCabes Music
Sherman Oaks	Goodman Music
Simi Valley	World Music
Studio City	Valley Arts Guitar
Ventura	Musician's Choice
West Covina	Goodman Music Covina

COLORADO

Denver	Onofrio Music
	National Speaker Company
	Keyboard Exchange
Englewood	Melody Music
Lakewood	Rockley Music

CONNECTICUT

New Brittain	Daddy's Junky Music
New London	Caruso Music

FLORIDA

Leesburg	Tune Town
Maitland	Ace Music
North Miami	Ace Music
Sarasota	Thoroughbred Music
Tallahassee	Scott Tennyson Guitar
Tampa	Thoroughbred Music

GEORGIA

Atlanta	Rhythm City
	Atlanta Discount Music
Rome	The Music Room
Smyrna	American Music Center
Valdosta	Rutland's Music

ILLINOIS

Lansing	MusicLab
Orland Park	MusicBiz
Roselle	Roselle Music
Collinsville	AAA Swing City Music

INDIANA

Indianapolis	Synthesizer Music and Audio
Noblesville	Vic Zinn Music
South Bend	Woodwind and Brasswind

KANSAS

Wichita	Phil Uhlik Music

MAINE

Portland	Daddy's Junky Music

MARYLAND

Rockville	Veneman Music Co.
Wheaton	Wheaton Music

MASSACHUSETTS

Boston	E.U. Wurlitzer
	Daddy's Junky Music
Framingham	E.U. Wurlitzer
Hyannis	Charlie's Cape Cod Audio
Norwood	Daddy's Junky Music
Peabody	Daddy's Junky Music
Pembroke	Hub Music
Shrewsbury	Daddy's Junky Music
S. Yarmouth	Gott's Music
Teaticket	Hub Music
Worchester	E.U. Wurlitzer
W. Plymouth	Hub Music

MICHIGAN

Canton	Arnoldt Williams Music Inc.
Dearborn	Wonderland

MISSISSIPPI

Gulfport	Tippit's Music
Jackson	Morrison Brothers Music
Tupelo	Professional Concert

MISSOURI

Hazelwood	Dale's Music
Manchester	Fazio's Frets & Friends
Springfield	Palen Music

NEVADA

Las Vegas	Midnight Music

NEW HAMPSHIRE

Keene	Cheshire Music
Manchester	Daddy's Junky Music
Nashua	Daddy's Junky Music
Portsmouth	E.U. Wurlitzer
	Daddy's Junky Music
Salem	Daddy's Junky Music

NEW JERSEY

Edison	Sam Ash Music
Ledgewood	Keyboard World
Paramus	Sam Ash Music
Parsippany	Long and McQuade
Trenton	Russo Music

NEW MEXICO

Albuquerque	Grandma's Music

NEW YORK

Brooklyn	Sam Ash Music
Commack	Focus II
Forest Hills	Sam Ash Music
Hempstead	Sam Ash Music
Huntington Station	Sam Ash Music
New York City	Alex Music
	Sam Ash Music
	Manny's Music
	Dr. Sound
North Bellmore	Focus II/Music Emporium
North Bronx	Palomba Music I
Portchester	Palomba Music II
Potsdam	Northern Music and Video
Poughkeepsie	Vincitore's Music
White Plains	Sam Ash Music

NORTH CAROLINA

Asheville	Dunham's Music
Carrboro	Music Loft
Charlotte	McFadyen Music
Durham	Music Loft
Fayetteville	McFadyen Music
Granite Falls	Fantasy Music
Monroe	Holloway's Music Center
Raliegh	Music Connection
	Music Loft
Wilmington	McFadyen Music
Winston-Salem	Music Loft

OHIO

Akron	Lentine Music
Berea	Jobes Electronic Music
Boardman	New York Music Shop
Bridgeport	Moore's Music Emporium
Cincinnati	Midwest Music Distributors
Columbus	Roadshow Sound
Fairborn	Absolute Music
Kent	Woodsy's Music Inc.
Toledo	Music and MIDI Technology

OKLAHOMA

Broken Arrow	Saied Music Company
Oklahoma City	Rawson Music
Stillwater	Saied Music Company
Tulsa	Saied Music Company

OREGON

Beaverton	Portland Music
Eugene	Keyboard Associates
Gresham	Portland Music
Portland	Portland Music
	Brownell Music

PENNSYLVANIA

Blawnox	Pianos & Stuff
Feasterville	George's Music IV
Franklin Mills	Keyboard Palace
King of Prussia	Keyboard Palace
North Wales	George's Music II
Philadelphia	Tek-Com
	Eighth Street Music
Pittsburgh	Swissvale Music Store
Spring City	George's Music I
Springfield	George's Music III

SOUTH CAROLINA

Anderson	Stan Hinton Keyboards
Columbia	Sim's Music
Myrtle Beach	McFadyen Music
Spartanburg	Express Music

TENNESSEE

Hixon	The Music Store
Memphis	Amro Music
Nashville	Music Man Country
	Sam's Music

TEXAS

Austin	MusicMakers
Irving	Munselle Piano and Organ
San Angelo	Guitar's Etc.
San Antonio	MusicMakers

UTAH

Centerville	Guitar Center Studios
Murrey	Wagstaff Music

VIRGINIA

Lynchburg	Leeds Music
Martinsville	Leeds Music
Norfolk	A. L. & M.
Richmond	Don Warner Music
Roanoke	Leeds Music
Springfield	Veneman Music Co.
Virginia Beach	KBD Systems

WASHINGTON

Bellevue	American Music
Seattle	Petosa Music
	Evan's MIDI City
	American Music
Tacoma	Ted Brown Music
	Music World
Tukwilla	American Music

We're at your side.
brother®

BROTHER PROFILE:
IATT HAHN
IME: Piscataway, NJ
GE: 35
ROFESSION: Weekend warrior in the New Jersey club
ars with his band "Innocent Eyes". Has a day job.
ATEST ACCOMPLISHMENT: "Getting more than
hours of sleep one night last week."
HY I DO WHAT I DO: "I don't really like sleep all
at much anyway."
ROFILE: Lives to compose and play. "Music is great.
here else can you find a hobby that pays 50 cents
hour."
IS DATA FILER/SEQUENCER: The Brother MDI-40 for sysex
umps and taking computer-created sequences to the club.
compose on a Mac† and then download the songs to the MDI-40,
ong with all my setups. Having the ability to put everything on disk
ves hundreds of dollars on RAM cards. Plus, I don't have to drag
e Mac to the dungeons we play in."
rother MDI-40 Disk Composer
Best alternative to expensive RAM cards
Built-in 3.5" floppy drive
Downloads data from software sequencers
Simultaneous operation on all 16 MIDI channels
Stores up to 30 sequence or sysex files (240K) per disk
We're at your side.
brother®
rother International Corporation, 200 Cottontail Lane, Somerset, NJ 08875, 201-981-0300
Brother Industries, Ltd., Nagoya, Japan
ac, in this case, is short for Macintosh, a trademark of Apple Computer. But you knew that.

to get continuous vocals, guitar lines, and other non-electronic sounds onto the recording (that is, unless you want to get into hard disk recording, but we'll ignore that option for now). Most tape decks aren't MIDI devices, but you can combine the MIDI data tracks in the sequencer with the audio tracks on tape using the other little box in **Fig. 3**, the synchronizer (see sidebar "Reviewing the Basics: Synchronizers").

Perhaps the most significant connectivity advance from our basic system is that a MIDI patch bay has taken the place of a thru box at the hub of the system. This gives several advantages, including the ability to reconfigure the whole system instantly. A MIDI patch bay is a box with a bunch of MIDI ins and MIDI outs. Sizes range from little 2-in/8-out jobs to behemoths such as J.L. Cooper's 16-in/20-out Synapse (reviewed in the November 1990 **EM**), and if that's still not enough MIDI ports, you can cascade a few Synapses together. Any MIDI in can be routed to any MIDI out, and a number of these settings (anywhere from three to 64 of them) can be stored in memory. So you can have a few different setups for recording sequences, a few setups for playing live, etc. Congratulations: We've progressed beyond doin' the Thru.

Most MIDI patch bays do a lot more than just provide flexible routing of MIDI signals. They can *process* the MIDI data. That's when those little MIDI Byte Dancers really start doing some fancy steps, such as the Channel Bump, where the dancers have to switch channel numbers; all the channel 16s switch to channel 1, those on channel 1 switch to channel 2, and so on. Then there's the Transpose, where every note message that enters the patch bay's processor is shifted up or down a fixed interval: C becomes E, and E becomes G-sharp; anything goes! Maybe you just want to take every C-sharp in the data line and turn it into an C-natural. You can also do the Filter, where you can take any type of data out of the chorus line. "Aftertouch commands? You sit this one out. Program Changes? Take five." This really helps slim down the MIDI datastream and get things zipping along.

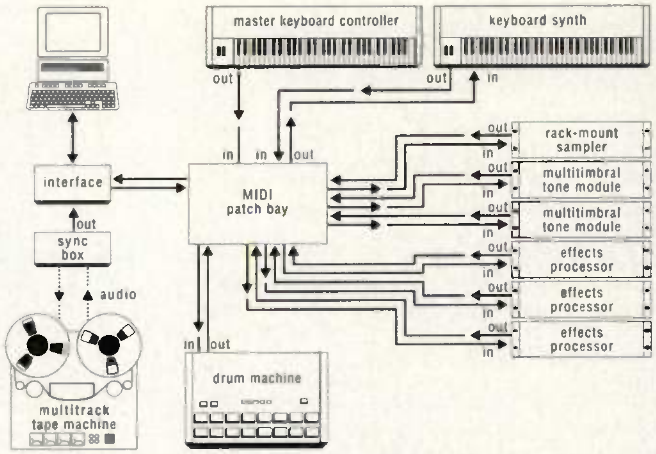


FIG. 3: MIDI patch bays provide a superior connection scheme with flexible cable routing (multiple ins mapped to multiple outs) and MIDI data processing.

"The VFX^{SD} has the best performance sequencer I have ever laid hands on—it is so intuitive it's like a MIDI mind probe!"
Peter-John Vettese
Keyboardist, producer-Simple Minds, Pet Shop Boys, Jethro Tull, The Bee Gees

"Compared to other hardware sequencers, the SD's event-editing features are stunning. This is one of the most complete synth/sequencer systems we've ever seen."
Mark Vail
Keyboard Magazine

"The VFX^{SD} is the perfect writing tool . . . I would have lost a lot of those '3 AM compositions' had it not been for this wonderful machine!"
Richard Souther
Narada/MCA recording artist

"The VFX^{SD} has replaced a lot of my old synths in my setup. It sounds original, and the layout makes total sense."
Philippe Saisse
Producer, Windham Hill recording artist

"Very unique, one-of-a-kind sounds!"
Michael Boddicker
Synthesist, composer

"I was told you always have to wait for something special. I'm recording the second ABWH album and I'm using the VFX^{SD} constantly. All I can say is it really was worth waiting for."
Rick Wakeman
Keyboardist, composer

What more could we say?

"We're using the VFX^{SD} as the master keyboard for all the production work we do. The performance parameters are *very* happening, and there are so many sounds that are just right for our music."
David Frank/Mic Murphy
The System

"It's bloody marvelous—it does everything!"
Tony Hymas
Keyboardist, composer-Jeff Beck's Guitar Shop, PhD

"The VFX^{SD} is the perfect road companion. It allows me not only to perform, but to compose new material and have it at my fingertips whenever needed."
Oscar Peterson
Jazz pianist, composer

Plenty. As you can see, many musicians have already found the ENSONIQ VFX^{SD} Music Production Synthesizer to be the most versatile keyboard available today. But we didn't stop there. At ENSONIQ, we're committed to making the best even better.

TOP TEN April 1990

KEYBOARDS ($1,400 and up)	Rank
Ensoniq VFX-SD	1
Korg M1	2
Roland U-20	3
Roland D-20	4
Yamaha SY77	5
Ensoniq EPS	6
Kurzweil K1000	7
Korg T3	8
Roland D50	9
Yamaha V50	10
Yamaha X4500	(N)

Reprinted with the permission of THE MUSIC & SOUND RETAILER

Announcing the VFX^{SD} Version II. Now we've added the features you requested the most. Like all-new "Mega-Piano" waves to give you the definitive acoustic piano sound. New sequencer features include Multi-Track Record, so you can transfer sequences from outside sources in a single pass. And an advanced Step-Entry mode for greater flexibility when you want to record difficult or non-real-time passages.

The right instrument can help your talent and music grow. With the ENSONIQ VFX^{SD}, your instrument will keep growing with you. Enough said. Check out a VFX^{SD} today. Call 1-800-553-5151 for an Authorized ENSONIQ dealer near you.

EPS

EPS-M

SQ-1

VFX

From synthesizers, to samplers, to complete workstations, ENSONIQ has an instrument that's right for you.

The above artists are not paid endorsees. They *use* ENSONIQ products.

Yes, I want more information about the following:
(Check as many as you like.) ☐ VFX^{SD} ☐ VFX ☐ SQ-1 ☐ EPS ☐ EPS-M

Name ______________________

Address ______________________

City ____________ State ________ Zip ____________

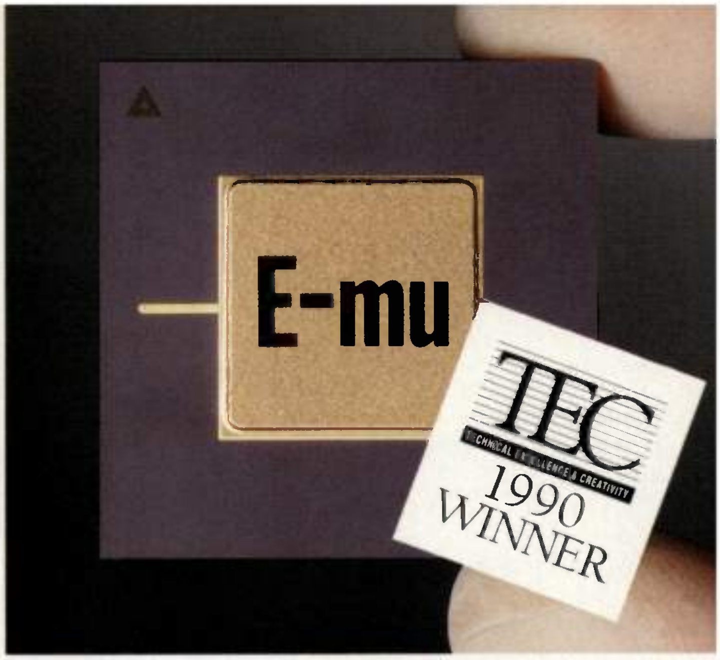
Phone Number (   ) ______________________

Mail To: ENSONIQ Dept. E 155 Great Valley Parkway Malvern, PA 19355

ensoniq®

THE TECHNOLOGY THAT PERFORMS

THIS WILL CHANGE THE TUNE OF THE MUSIC INDUSTRY.



They're already singing the praises.

"The cleanest, clearest, quietest electronic instrument I've ever heard," reports *Electronic Musician*. A top contender for "Technological Innovation of the Year," says *Keyboard*.

What's elicited this chorus of raves is Proteus™—

How can we deliver the uncompromised sound quality of the EIII for under $1000? That's the $10,000 question.

E-mu's new 16-bit digital multi-timbral sound module.

And what makes Proteus such a noteworthy achievement is our G chip. A sliver of silicon that combines the legendary sound quality of the Emulator™ III with total, unfettered creative freedom.

For under $1000.

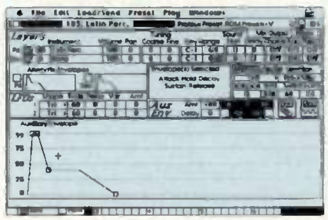
An undeniably modest price to pay for 4 Megabytes (internally expandable to 8 MB) of multi-sampled acoustic and electronic instruments selected from the EIII library. Plus a rich palette of digital waveforms. All stored in ROM and available simply at the touch of a button.

With 192 different presets, you can toot your own horn and then some. Our Proteus XR version has an additional 192 user presets.

With Proteus' extensive programmability, you can reshape and reassemble sound endlessly. Our unique MidiPatch™ modulation system provides real-time access to over 40 performance parameters. So you'll never have trouble expressing yourself again.

To handle your most complex compositions, Proteus' 32-voice polyphony responds multi-timbrally to all 16 MIDI channels simultaneously. There are also six programmable stereo polyphonic outputs with integral effect send/returns for on-board mix-down.

Designed and supported in the U.S. by the people who pioneered sampling, Proteus is incredibly easy to use. Yet will satisfy even the most power-hungry programmer.



For the serious programmer, Opcode Systems has created a graphic Editor/Librarian for Macintosh™ and Atari™ computers.

To hear the new sound of music, simply visit your local E-mu dealer.

Where Proteus is available for a song.

E-mu Systems, Inc.
applied magic for the arts

Proteus is your library card to the world's most revered sound library: the Emulator III.

See us at NAMM booth #2114 and room #2006.

When you have a patch bay with processing, it's just one non-stop, masquerade ball.

There's just as much fun to be had on the data input side. Notice we have two controllers going into the patch bay: a dedicated keyboard controller and a keyboard synth. (Of course, we could just as easily have had percussion, guitar, wind, or more exotic controllers.) On most patch bays, at least two MIDI ins—and therefore the two controllers—can be merged.

Merging's an interesting phenomenon. Two MIDI lines become one, but each message, in both lines, retains its channel identity. Thanks to merging, you can have both your controllers online all the time. If your patch bay can't merge, you can always buy a little stand-alone merge box, another one of those inexpensive but eminently useful contraptions.

You can use patch bays to enhance a MIDI master controller, too. High-end, dedicated "motherboards" such as the Yamaha KX88, Roland A-80, and Cheetah MS7P (reviewed in the December 1990 issue) have a lot of MIDI-processing power. You can divide the keyboard up into multiple zones, assign different channels to each zone and get a whole slew of sliders and footpedals to modulate each zone a million different ways. But what if you want to go beyond even this, or if you're using a controller with more rudimentary zoning and processing capabilities? You can use a MIDI external processor/patch bay, such as Digital Music Corp.'s MX-8, to get extra zones out of a keyboard. Or, you can use a MIDI mapper to make data sliders, mod wheels and footpedals do everything but take out the garbage by reassigning them to different controller numbers. Mapping is especially useful in live playing, where you need to get your hands on several sounds and controls at once. But it has its moments in sequencing applications, too.

CHANNEL ASSIGNMENTS AND CABLE ROUTING

At the intermediate level, most MIDI systems (particularly studio systems, as opposed to live rigs) use a personal computer to handle sequencing duties. The great advantage of this is that a computer can run a hoard of system-related programs besides sequencers. Chief among these are patch editor/librarians for all the synths and MIDI effects devices in the system. This is why **Fig. 3** shows the MIDI outs of all the devices in the system connected to MIDI ins on the patch bay. Each device can send patch files to the computer via MIDI system exclusive (sysex) messages, and the computer can send edited files back to the devices. Routing each device back into the patch bay, of course, greatly increases the potential for MIDI loops.

In theory, such loops are easy to avoid: Just make sure that no device is ever simultaneously sending and receiving on the same channel. But in real life, this often proves trickier than it sounds. Your best defense is to be methodical in setting things up. A bunch of MIDI boxes wired together is like a classroom full of unruly kindergarten kids: The little buggers are sure to act up given the slightest opportunity. So, you've got to play teacher and keep each device orderly in its assigned MIDI seat. This means always keeping instruments on the same MIDI channels.

Devise a system that makes sense to you; it doesn't matter what the organizing principle is. You can assign devices to channels based on their musical roles (if you have a synth you always use for bass, for instance, you might want to keep it on channel 1), or you might want to assign channels to modules based on where they sit in your rack (uppermost on channel 1, second down on channel 2, etc.). You can arrange your synths by color, favorites, or the order you bought 'em in, just so you have some mental construct you can appeal to for a quick answer to that ever-recurring MIDI question, "Who's on channel 4?"

It's helpful to keep the active voices in multitimbral instruments on consecutive sets of channels (some multitimbral instruments offer no alternative). If you use an Ensoniq EPS on 8-part multitimbral pieces, assign it to channels 1 through 8, 2 through 9, etc. Keep lists of your instruments and their channel assignments in your frequently used setups.

Be just as methodical in cabling the patch bay. Try to cable devices to the patch bay's ins and outs in a way that reflects your most frequently used set of channel assignments. You can buy an assortment of colored cables to help you keep track of "who's on first," and again, keep a list. Cables also can be marked with masking tape at some easily readable point near the cables' terminations. Any way you do it, the point of the exercise is to be able to track down the culprit in a hurry if you have a problem such as a loop or a bad cable. There also are quite a few MIDI test/troubleshooting devices and computer programs on the market that can tell you if a good MIDI signal is reaching any given destination within your system (see "Put a MIDI Service Technician in your Computer" in the December 1990 **EM** and the review of the Musonix MIDI Beacon and Tech 21 MIDI Checker in the June 1990 issue).

One final point about the intermediate system: We have a total of five non-multitimbral, tone-generating and effects-processing devices. Allowing one MIDI channel for each of these, we're left with eleven MIDI channels for the two multitimbral tone modules to divide (assuming we're in a traditional 16-channel MIDI system). Those eleven channels probably will be enough for most applications. But even if the two tone modules are just 8-part multitimbral devices, we're still five channels short of being able to use them both to their full potential. If they're 16-channel multitimbral, well, we'd better see what we can do about getting some more channels going.

ADVANCED SYSTEM: CHANNEL RIOT

Here's the answer. As you can see in **Fig. 4**, this is no puny system. We've added a sophisticated drum controller, something along the lines of the KAT DrumKat, which has two MIDI outs. Make room, Mr. Patch Bay!

Not only have we added more tone modules and effects to the system, we've incorporated a MIDI-automated mixer. Now, all aspects of the mixdown, as well as tone-generation, are under the sequencer's control. Clearly, it's going to take more than sixteen MIDI channels to run all this stuff.

The additional channels are provided by the MIDI interface box. The system you see here is based on Opcode's Studio 3 interface for the Mac, which provides 32 MIDI channels; if you use an IBM PC, you can get 32 MIDI channels using the Music Quest MQX-32M MIDI interface. Atari ST owners can add C-Lab's Export or Steinberg's MIDEX for even more channels (see this month's Computer Musician column on p.21 for even more options). But wait a minute; how can that be? Doesn't the MIDI spec clearly specify sixteen channels? It does, but you can have multiple sets of sixteen channels each, which is exactly what these types of interfaces provide. In the case of the Studio 3, as an example, one 16-channel MIDI line runs from the Mac's modem port, and a second comes off the printer port. According to Opcode, you should be able to address all 32 channels with any Mac sequencing program. If you use Opcode's *Vision* sequencer, you get a MIDI Instruments window that lets you combine different instruments on different channels and ports in all kinds of novel ways.

MIDI interfaces with multiple outputs *can* be used without a MIDI patch bay. But patch bays provide extra routing and processing power, and with the number of devices in our advanced system, a patch bay is advisable. In addition, it's advisable to keep a few MIDI ins and outs available for "guest" equipment, such as a borrowed tone module or digital reverb, or another controller that a musical collaborator brings to your studio.

To add even more MIDI channels and incorporate a patch bay at the same time, we can substitute Mark of the Unicorn's MIDI Time Piece for the Studio 3 in our system. With this Mac interface/synchronizer/MIDI patch bay, you get eight separate MIDI lines, each with

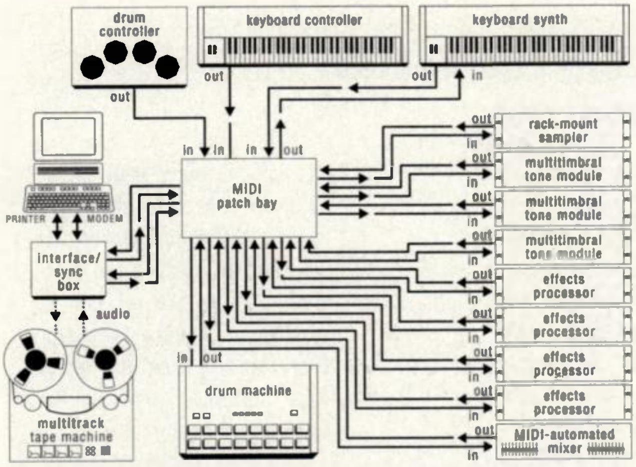


FIG. 4: This well-integrated MIDI studio's computer based sequencer is synchronized to a multitrack tape machine, and we've added a percussion controller. The MIDI patch bay is still the heart of the system.

sixteen channels. Used with Mark of the Unicorn's *Performer* sequencer (Version 3.4 or higher), this adds up to a whopping 128 MIDI channels. (With other Mac sequencers, though, you're back down to 32.) If that's not rococo enough for you, link four MIDI Time Pieces together for a grand total of 512 channels. Since the MIDI Time Piece is also an 8 x 8 MIDI patch bay, you can go back and white-out the stand-alone patch bay in Fig 4. If you need heavy-duty processing, you can always patch in a device like the Axxess Mapper, instead.

One big advantage of having multiple MIDI lines is that you can balance the flow of data to help prevent MIDI data stream overloads. For example, if you have two tone modules that you favor for big, data-intensive chords and controller moves, you could put each one on a separate line, combining each with "lighter use" modules that generally only get program changes or monophonic parts. Another strategy would be to group all your drum gear on a separate line, with perhaps a monophonic bass part, to keep your rhythm from getting "lagged out." A big, 16-part multitimbral machine could have a line to itself.

As always, the best approach is to visualize the grand data dance flowing through your system. Follow it through, step by step, and you'll be able to anticipate where the dance floor is going to get the most crowded. That's where you want to add a spacious, new MIDI line.

CHANNELS TO GO

Channels, channels, channels! Where is it all heading? A company called Lone Wolf has sketched out one future direction: Local Area Networks (LANs). A LAN, in brief, offers a shell for numerous types of data that can be shared among interconnected devices. Lone Wolf has devised a LAN protocol called MediaLink and developed a product, called the MidiTap, that allows MIDI to travel along MediaLink. They are planning to release boxes that will allow SMPTE time code, digital audio, and even digitized video to be incorporated

Reviewing the Basics: Synchronizers

In principle, all synchronizers work the same way: They generate a series of audio blips, called sync code, that are recorded onto one track of a multitrack tape. When the tape is played back, the synchronizer "reads" the blips and uses them to regulate the timing of the sequencer's playback.

Maybe we should call in the MIDI Byte Dancers to illustrate one last time. Only now, the scene shifts from a 1960s teen dance show set to an elaborate Busby Berkeley musical. Our chorus line of data bytes has to walk gracefully across the stage while, behind them, a wooden backdrop painted with clouds parts to reveal a huge flag. The MIDI Bytes have to time their walk just right: If it's too fast, they'll be off the stage before the clouds have finished parting, and if they're too slow, the whole stunning effect will be ruined. Of course, they can't look behind them and watch the wooden backdrop; that would louse the number up just as badly.

Luckily, they can watch their choreographer, who is standing in the wings. The choreographer, for his part, is watching the massive metal cogwheel that is moving the wooden backdrop. Every time a fixed number of cogs slip past—let's say, ten cogs—the choreographer waves a red flag. That's the signal for the MIDI Bytes to take one more step. Thus, the choreographer acts as a synchronizer, carefully locking the march of the MIDI Bytes to the movement of the tape reels.

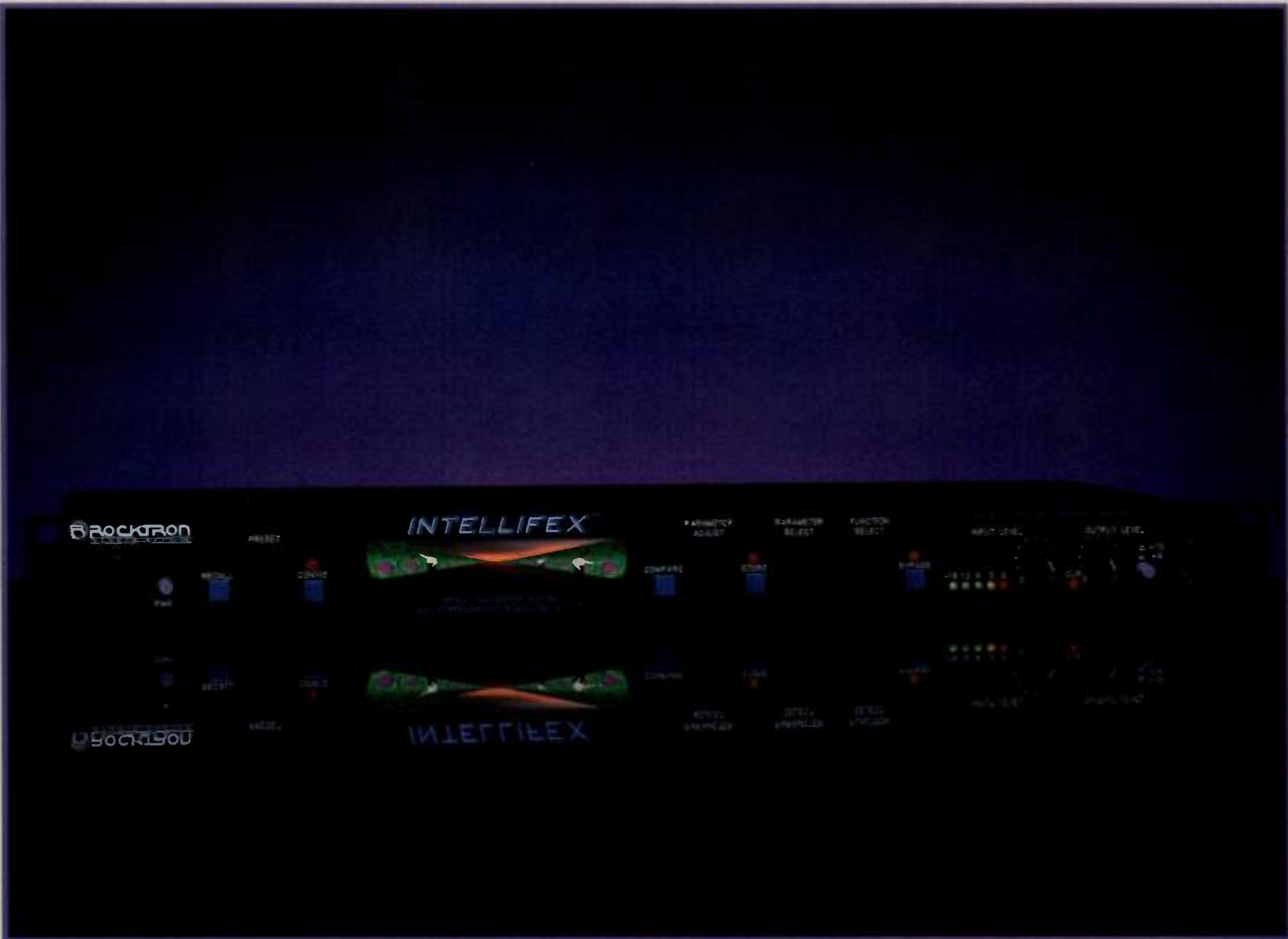
The world is full of different sync codes, but the basic principle of synchronization remains the same. Many MIDI interface boxes have built-in synchronizers. This includes interfaces such as Opcode's Studio 3, Mark of the Unicorn's MIDI Time Piece, Music Quest's MQX-16S and MQX-32M, C-Lab's Unitor II, and Steinberg's MIDEX. (For more on time code and synchronization, see "Sync or Swim" in the January 1991 EM.)

into MediaLink. (Lone Wolf's motto: If it's data, it can be included.) MediaLink is a fiber-optic-based protocol and has the advantage of much greater bandwidth capacities than MIDI. One network, unlimited devices. (For more on MediaLink, see "The Local Area Network: MIDI's Next Step?" in the November 1989 issue.)

The future? More electronic music systems that really are systems. With the advent of hard disk-based digital multitrack recording, maybe the next contraption to go will be our old pal the synchronizer, that ever-awkward contrivance for yoking together two things that weren't originally intended to be mated. Opcode's *Studio Vision* (reviewed on p.124) already has shown that we can have digital audio and sequencing in the same environment, and digital audio workstations of the near future will combine digital audio with sequencing, mix automation, and effects processing. Does this mean an end to MIDI-cable linguine and the Leaning Tower of Converter Boxes? Maybe, at least until someone comes up with some bizarre new way of encoding musical data and a new song-and-dance for lashing it up to existing electronic music gear. While we wait for that day to come, go configure!

Alan di Perna *spent much of his adolescence playing in garage bands and reading* Mad *magazine. As penance, he now writes about music and technology for* Musician, Rolling Stone, *and numerous tech magazines.*

WHO NEEDS ANOTHER DUMB PROCESSOR?



At Rocktron, we think the current trend to stuff as many effects into a box as possible at the expense of tone and sound quality is, well, sort of dumb.

That's why we've designed our new **Intellifex**™ effects processor with a decidedly "old" idea in mind: that the purity of the original signal is as important as the purity of the effects that process it.

Intellifex is a true 24 bit intelligent DSP effects processor with a 64 times oversampled "high purity" Sigma-Delta A/D converter. And while most processors squeeze the entire signal through a single converter, Intellifex uses *three* true 16 bit data converters for maximum linearity and a 24 bit data path throughout the processor and memory circuits to maximize the dynamic range.

Due to this advanced signal path technology, the stunningly beautiful sounds of our unique eight tap chorusing, stereo delays, reverbs and pitch shifting are virtually noise free. And thanks to our new software programmed *digital* HUSH™ circuitry, this absolute sonic integrity will not be compromised by typically noisy input signals.

So if you're looking for an effects processor that will satisfy your need for higher intelligence, audition Intellifex at your local Rocktron dealer.

Who said brains can't be beautiful?

ROCKTRON
STUDIO SERIES

Rocktron Corporation 2870 Technology Drive, Rochester Hills, MI 48309 (313) 853-3055

EM

GUIDE TO EXPANDER MODULES

If you already have a MIDI controller and need more sound sources, you can save both space and your budget with a dedicated sound module.

Over the door of New York City's late, fondly remembered Lone Star Cafe, there was a sign that read: "Too Much Ain't Enough." (They ought to know. For years, they kept a giant 35-foot long sculpture of an iguana on their roof, and every Christmas they would deck out this Fifth Avenue Texzilla with antlers and a red lightbulb for a nose.) Too much ain't enough? I'm in sync with that sentiment every time I go looking at expander modules. My critical judgment flies out the window; I want them all, from worst to best, from most primitive to voted-year's-most-likely-to-lead-synthesis-into-tomorrow. There's no synth or sample-playback module to be had, new or old, that I can't use.

Clearly, I am a man in love with a concept.

It's an old, old concept, dating back before electronic music to the first instrumental ensembles. Does one drum sound good? Hey, make it two drums, and you've got new patterns, new textures, polyrhythms, and call and response. Do you like the melancholy voice of a single horn? Stir together a dozen of them, shining in the sun, and you've got a clarion that inspires the heart. The history of instruments is precisely this constant increase in composing and arranging options, culminating—prior to the existence of electronic instruments—in large groupings like the Javanese gamelan and the classical western orchestra. Not that these large groupings invalidated the power and beauty of a single instrument. But they made it possible for composers to create an entirely different kind of music, one with a far wider range of timbres and dynamics than had ever before existed.

It's simple. A great artist can make a great painting using one brush and a single tube of red paint. But he or she can't create all great paintings that way. One brush and one color just aren't enough.

The electronic version of this metaphor is provided by MIDI control over various sound sources. There are hundreds of MIDI devices that fill this bill, including keyboard synths, samplers, signal processors, and drum machines, but in this article we're only concerned with sound expansion, or "expander," modules.

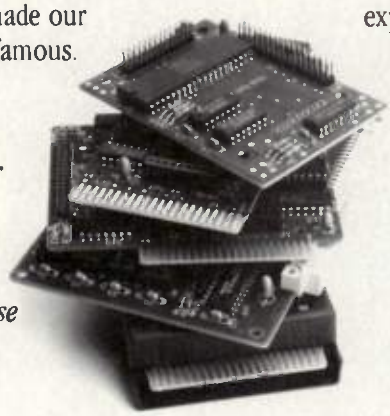
What is an expander module? Simply put, it is any device without a keyboard that will sound notes when triggered over MIDI. That's still a little too broad for the purpose of this product comparison, however, so we are narrowing the field even more by excluding three product categories: (1) samplers (though sample *playback* boxes are included); (2) drum-only modules; and (3) sound expansion devices designed as peripheral cards for a personal computer. These expanders are sufficiently specialized that they should only be compared to other products of the same type, which EM will do in future articles.

By Connor Freff Cochran

The Musician's Drive.

PS Systems is proud to announce our SCSI Rackmount Disk Drive System. Designed with the professional musician in mind, our dual bay unit holds up to two removable hard drives, fixed drives or CD ROM drives in any combination. Manufactured to the same high-quality standards that have made our sampler memory expansion famous.

- *High performance*
- *Shock mounted*
- *Custom-made twisted pair cabling*
- *Exclusive air convection cooling*
- *Lightweight aluminum case*
- *Uses only two rack spaces*
- *Full one-year warranty*



Our SCSI Rackmount Disk Drive System is compatible with *Akai S-1000, Dynacord ADS, EMU Emax II, E III, Mac SE/IICX, Ensoniq EPS, EPS 16 Plus, Roland W-30, S-550, S-770, Soundtools by Digidesign* and others . . .

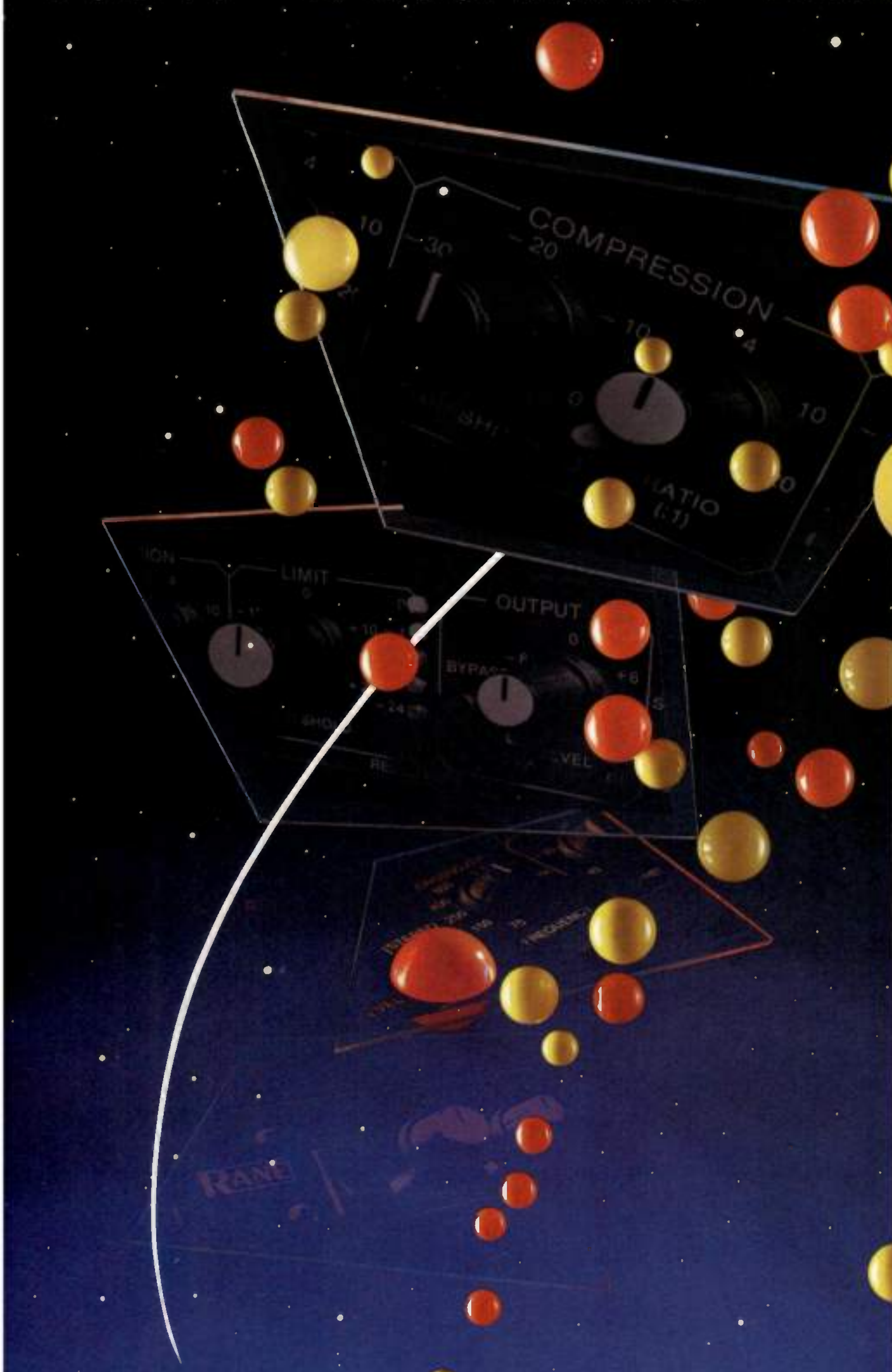
PS Systems also manufactures memory expansion for *Akai, Ensoniq, EMU, Roland, Yamaha* and *Dynacord* samplers and keyboards.

PS Systems . . .
The Professional's Choice.

PS SYSTEMS
music technology products

9265 Activity Road, Suite 102, San Diego, CA 92126 • (619) 578-1118 • (800) 446-8404 • FAX (619) 578-8851

NEW DYNAMIC DIMENSION.



The DC 24 Multi-Functior Dynamic Controller.

Other designs give you "either/or." The DC 24 gives you "AND": Two limiters AND two compressors AND two gates AND a built-in crossover, all in one compact unit.

A NEW SERVO-LOCK LIMITER DESIGN mear more transparent limiting no matter how drastically the program material changes from moment to moment. Our servo-locking circuit is smart enough to continuously maintain just the right ratio necessary to guarantee flawless contr

SEPARATE COMPRESSION CONTROLS allow you to dial in the perfect amount of dynamics yo want, independently of the limiter. Extremely low-noise, low distortion VCAs guarantee a level of performance that will satisfy the most demandin recording or broadcast requirements.

THE INDEPENDENT EXPANDER/NOISE GATE can be adjusted to tighten percussion or turn off background hum and noise, without effecting any of the other dynamic control operations.

A BUILT-IN 4TH ORDER CROSSOVER transforms the DC 24 into a bi-amp crossover/ processor all-in-one. You can minimize feedback, maximize speaker protection and save considerably on equipment costs. Or use the DC 24 as a band-split mono controller to obtain mor consistent broadcast or recording signal strength with less "pumping" and "breathing."

Why put up with the expense and bulk of handling 3 or 4 conventional units? Get greater precision and more versatility with fewer side effects, all packed into a single compact unit. Experience a whole new dimension in dynamic control from Rane.

RANE

Rane Corporation
10802-47th Ave. W. Everett, WA 98204
(206)355-6000

• EXPANDER MODULES

A LITTLE HISTORY, MAESTRO

Back in the 1950s and 1960s, the first synthesizers were all sound expansion modules in that they had no keyboards, or were physically separate from the keyboard and connected only by direct electrical cable. In those days, this was neither convenient, nor inconvenient. Both components were so heavy and fragile that they weren't moved around very much, if at all, after being installed and made to work.

In the early 1970s, companies such as Moog, Oberheim, and ARP changed that situation by combining keyboard and synth in one box that was lightweight enough to lug from home to studio or from show to show. Mobility, along with roadworthiness, quickly became a major issue as keyboard players started carrying one synth, then two, then more. (In the heyday of mid-1970s "keyboard machismo," I counted 32 keyboards in one major band's touring setup.) By the middle of the decade, except for a few leftover modular systems, there was no such thing as a synth without a keyboard.

In 1981—two years before MIDI—a company called Octave Plateau bucked the trend and produced one of the best analog synths ever, the Voyetra 8, as a sound module with separate keyboard. Even more innovative was the fact that the sound-producing part of the Voyetra 8 could be mounted in a standard, 19-inch equipment rack. It was the first synth designed to do so; prior to that, the only sound equipment sold in rack-mount form consisted of power amps, patch bays, and miscellaneous pro audio gear.

Other music manufacturers did not exactly rush to follow Octave Plateau's lead. In fact, when MIDI was sprung on a fairly moribund industry in 1983, the Voyetra 8 was still the only synth of its type. But MIDI changed that, as it did so many things (including company business plans; Octave Plateau eventually dropped out of the synth business and evolved into Voyetra Technologies, now a popular MIDI software house).

With MIDI, synths no longer had to have keyboards in order to be played. Since a synth without a keyboard is radically smaller, lighter, cheaper, more roadworthy, and easier to integrate into a studio than its more-encumbered counterpart, it was only a matter of time before consumers questioned the need to lay out big bucks on redundant "ivories," and manufacturers designed products to meet the new demand.

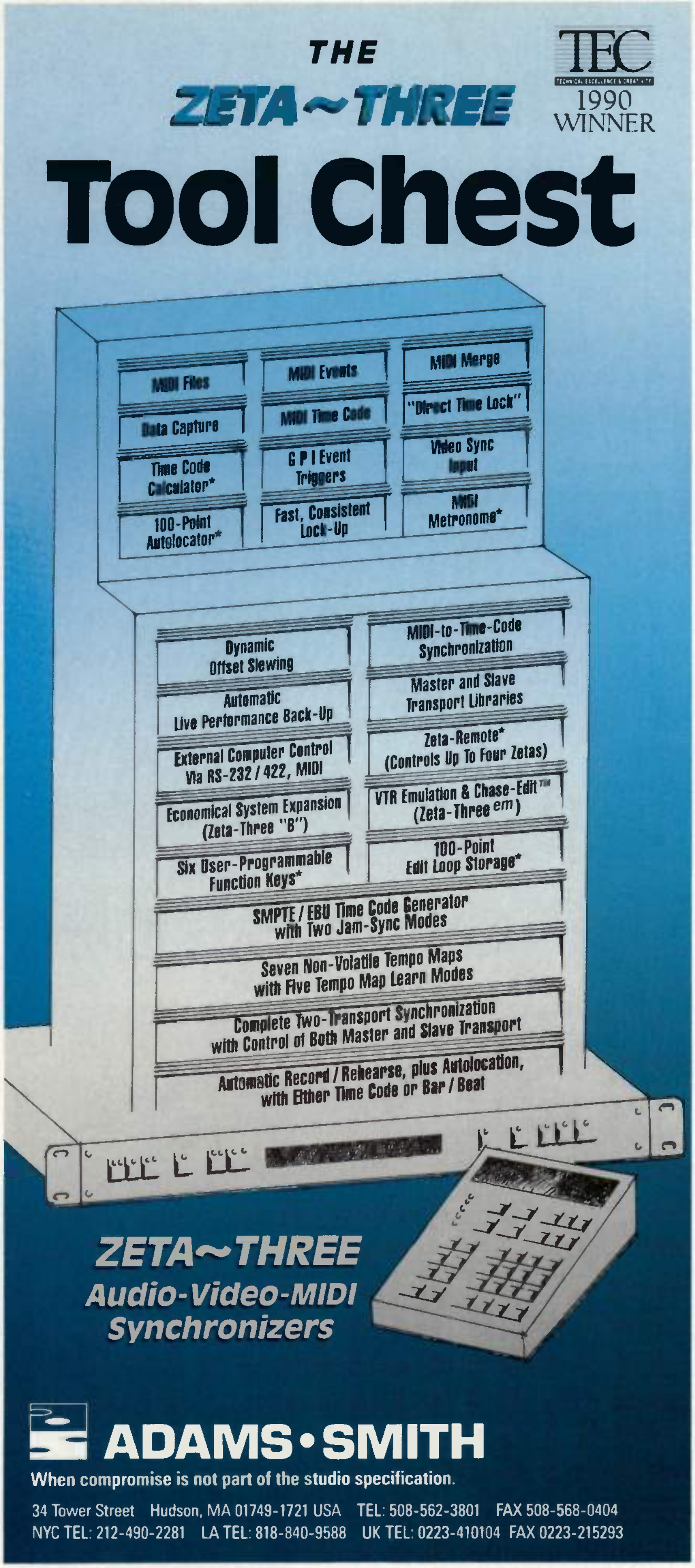
(continued on p.78)

PRODUCTS	SYNTHESIS METHOD	# OF PRESETS (ROM/RAM)	# OF COMB. (ROM/RAM)	WAVEFORM MEMORY	WAVEFORM RESOLUTION	# OF SAMPLES (DRUM SAMPLES)	ALTERNATE TUNINGS	MICROTUNING (KEYBOARD/OCTAVE)
AKAI S1000PB	Sample Playback	—/100	—	2 MB	16	Up to 200	100 (programmable)	Octave
CASIO VZ-10M	IPD (Interactive Phase Distortion)	64/64	64/64	—	16	—	—	—
CASIO VZ-8M	IPD (Interactive Phase Distortion)	64/128	128/64	—	16	—	—	—
CASIO CSM1	PCM Sample Playback	30/—	—	—	12	100 (49)	—	—
CASIO CSM 10P	PCM Sample Playback	5/—	—	—	12	5 (0)	—	—
CHEETAH MS6	Analog Subtractive	320/96	0/64	—	—	—	—	—
E-MU PROTEUS 1	Sample Playback/Waveform	128/64	Presets*	4 MB	16	125 (56)	6	Keyboard
E-MU PROTEUS 2	Sample Playback/Waveform	128/64	Presets*	8 MB	16	139 (13)	6	Keyboard
E-MU PROFORMANCE 1	Sample Playback	16/—	—	1.6 MB	16	16 (0)	—	—
E-MU PROFORMANCE 1+	Sample Playback/ Waveform	32/—	—	2 MB	16	50 (0)	—	—
ENSONIQ SQ-R	Dynamic Component	100/80	—/80	1 MB	12	121 (23)	—	—
KAWAI K4R	PCM Sample Playback	—/64	—/64	1.5 MB	16	256 (43)	—	—
KAWAI K1RII	PCM Sample Playback	—/64	—/32	0.5 MB	8	256 (32)	—	—
KORG M1REX	AI (Advanced Integrated)	—/100	—/100	8 MB	16	275 (85)	5	Octave
KORG M3R	AI (Advanced Integrated)	—/100	—/100	3 MB	16	135 (45)	5	Octave
KURZWEIL PRO I	Sample/Waveform	163/64	Presets*	6 MB/24K	12	152 (39)	17	Keyboard
MARQUIS MIDIA MUSICBOX	FM/Analog/ Sample Playback	240 FM, 240 Analog, 37 Samples/240 FM, 240 Analog	16/16	—	12 (FM/sample)	—(37)	—	—
OBERHEIM MATRIX 1000	Analog Subtractive	800/200	—	—	—	—	200 (programmable)	Keyboard
PEAVEY DPM V3	DPM (Digital Phase Modulation)	—/200 (Presets can be combinations)	See previous	4 MB/64K	16	110 (36)	5 (2 programmable)	—
ROLAND U220	RS/PCM	128/128	—/64	3 MB	16	164 (37)	—	—
ROLAND D110	L/A (Linear Arithmetic)	128/64	—/64	—	16	—(64)	—	—
ROLAND CM32P	RS/PCM	64/—	—	3 MB	16	64 (0)	—	—
ROLAND CM32L	L/A (Linear/Arithmetic)	128/—	—	—	16	—(64)	—	—
ROLAND CM64	L/A (Linear/Arithmetic) & RS/PCM	128 L/A & 64 PCM/—	—	3 MB	16	128 (64)	—	—
ROLAND MT32	L/A (Linear/Arithmetic)	128/—	—	—	16	—(34)	—	—
VOCE DMI 64 MKII	Additive/Wavetable	99/99	—	28K/4K	8	—	—	—
WALDORF MICROWAVE	Dynamic Spectral Wavetable	32/12/12 card	—	n/a	n/a	—	3 (2 programmable)	—
YAMAHA TG77	RCM (Realtime Convolution and Modulation)/AFM/AWM2	128/64	16/16	4 MB	16	132 (20)	66 (2 programmable)	Keyboard
YAMAHA TG55	AWM2 (Advanced Wave Memory 2)	64/64	16/16	2 MB	16	121 (47)	—	—
YAMAHA TG33	Vector/AWM/FM	128/64	16/16	2 MB	12	189 (61)	—	—
YAMAHA WT11	FM (4 operator)	112/32	96/32	—	12	—	—	—

Footnotes: * Presets can be combinations ** 4 per voice for 16 voices

CARD SLOTS (W/P)	EXPANSION MEMORY	# OF VOICES	SPLITS & LAYERS	# OF MULTITIM. PARTS	# OF OUTPUTS	# OF LFOs PER VOICE	# OF ENV. PER VOICE	MIDI NOTE RESPONSE	AFTERTOUCH (TYPE)	RELEASE VELOCITY	CONTROL PEDALS AND/ OR OTHER INPUTS
—	32 MB	16	128/4	16	11		2	24-127	Channel	Yes	Footswitch
1 (P)	—	16	4	8	4	1	3	6-127	Channel	—	—
1 (P)	—	8	4	8	2	1	3	0-127	Channel	—	—
—	—	16	—	4	2	—	—	36-96	—	—	
—	—	16	—	—	1	—	—	21-108	—	—	—
—	—	6	6	6	1	1	2	24-119	Channel	—	
—	4 MB	32	8	16	6	2	3	0-127	Channel/Poly	Yes	—
—	—	32	8	16	6	2	3	0-127	Channel/Poly	Yes	—
—	—	16 stereo	1/—	—	2	—	—	21-108	—	—	—
—	—	16 stereo	1/—	—	2	—	—	21-108	—	—	—
1 (P)	—	21	8	8	2	1	3	0-127	Channel/Poly	—	Pedal/CV input
1 (P)	—	16	8	8 (plus drums)	8	2 (per patch)	8	0-127	Channel	Yes	—
1 (P)	—	16	8	8 (plus drums)	5	1	8	0-127	Channel	—	—
2 (W/P)	—	16	8	8	4	2	3	0-127	Channel	—	2 pedal/switch inputs
2 (W/P)	—	16	8	8	4	2	3	0-127	Channel	—	—
—	—	24	4	16	2	8	1 per layer	1-127	Channel/Poly	—	2 pedal/switch inputs
—	—	12 FM, 6 Analog, 8 Sampled drums	—/1	26	6	18	2 (Analog only)	0-127	—	—	—
—	—	6	—	—	1	2	3 (plus 4 tracking)	0-127	Channel/Poly	Yes	—
1 (P)	1 MB	16	4	16	6	2	4	21-127	Channel	—	—
2 (W)	—	31	6	6 (plus rhythm)	6	1	1	24-127	Channel/Poly	—	—
1 (P)	—	up to 32	8	8 (plus rhythm)	8	1	3	12-108	—	—	—
1 (W)	—	31	6	6	2	1	1	24-127	—	—	—
—	—	up to 32	8	8 (plus rhythm)	2	1	3	24-127	—	—	—
1 (W)	—	63	14	14 (plus rhythm)	2	1 (L/A partial), 1 (PCM tone)	3 (L/A partial), 1 (PCM tone)	24-127	—	—	—
—	—	32	8	8 (plus drums)	2	1	3	24-127	—	—	—
—	—	64	16/— (1 split per MIDI channel)	16	2	2	2	36-97	Channel	—	—
1 (P)	—	8	8	8	6	2	3	0-127	Channel/Poly	Yes	—
2 (W/P)	—	32	64	16**	12	8	36	0-127	Channel	—	—
2 (W/P)	—	16	64	16**	4	4	4	0-127	Channel	—	—
1 (P)	—	32	64	16**	4	4	4	0-127	Channel	—	—
—	—	8	32	8	2	4	8	0-127	Channel	—	Inc/Dec inputs

PRODUCTS	RESPONDS TO MIDI CONTROLLERS (NUMBERS)	HEADPHONE JACK	DISPLAY SIZE	# OF EFFECTS PROGRAMS	# OF SIMULT. EFFECTS	SEQUENCER	RACKSPACE	PRICE	EM REVIEW
AKAI S1000PB	1 7,64,67	Yes	8 x 40	—	—	—	3	2,699	—
CASIO VZ-10M	1,4,5,6,7,12-31,38, 64,65,100,101	Yes	64 x 96 dot matrix	—	—	—	2	1,199	—
CASIO VZ-8M	1,4,5,6,7,10,12-31, 38,64,65,100,101	Yes	2 x 16	—	—	—	1	699	—
CASIO CSM1	64	—	—	—	—	—	Tabletop	249	—
CASIO CSM 10P	64	—	—	—	—	—	Tabletop	399	—
CHEETAH MS6	1,7,64	Yes	4-Digit LED	—	—	—	1	669	12/89
E-MU PROTEUS 1	0-31, 64-79	Yes	2 x 16	3	3 (—)	—	1	995	10/89
E-MU PROTEUS 2	0-31, 64-79	Yes	2 x 16	3	3 (—)	—	1	1,495	12/90
E-MU PROFORMANCE 1	1,7,64,65,66	Yes	—	—	—	—	Tabletop	495	11/90
E-MU PROFORMANCE 1+	1,7,64,65,66	Yes	—	—	—	—	Tabletop	595	11/90
ENSONIQ SQ-R	0,1,4,6,7,32,38, 71,72,100,101	Yes	2 x 16	13	3 (1)	—	1	995	10/90 (SQ-1)
KAWAI K4R	1,7,64,100,101	Yes	2 x 16	—	—	—	2	995	3/90 (K4)
KAWAI K1RII	1,7,64,100,101	Yes	2 x 16	—	—	—	1	695	9/89 (K1II)
KORG M1REX	1,2,6,7,38,64, 96,97,100,101	Yes	2 x 40	33	4 (2)	Yes	2	2,499	11/88 (M1)
KORG M3R	1,2,6,7,38,64,80, 96,97,100,101	Yes	2 x 16	33	4 (2)	—	1	1,275	11/88 (M1)
KURZWEIL PRO I	0-121 (programmable response)	—	2 x 16	2	2 (0)	Plays uploaded MIDI files	2	1595	—
MARQUIS MIDIA MUSICBOX	7,64	Yes	2 x 16	—	—	—	Tabletop	995	—
OBERHEIM MATRIX 1000	0-121	—	3-Digit LED	—	—	—	1	599	11/88
PEAVEY DPM V3	1-31(programmable),40,45	—	2 x 20	39	4 (2)	Demo only	1	1,099	3/90 (DPM-3)
ROLAND U220	0-121	Yes	2 x 24	13	2 (1)	—	1	1,095	—
ROLAND D110	1,6,7,10,11,64,100,101,121	Yes	2 x 16	8	1 (1)	—	1	995	—
ROLAND CM32P	1,6,7,10,11,64,100,101,121	Yes	—	4	1 (1)	—	Tabletop	795	—
ROLAND CM32L	1,6,10,11,64,100,101,121	Yes	—	4	1 (1)	—	Tabletop	650	—
ROLAND CM64	1,6,7,10,11,64,100,101,121	Yes	—	4	1 (1)	—	Tabletop	1,395	—
ROLAND MT32	1,6,7,10,11,64,100,101,121	Yes	20 Character	2	1 (1)	—	Tabletop	595	—
VOCE DMI 64 MKII	1,7,64,69,70,71, 72,91,92,93,95	—	4-Digit LCD	5	3 (0)	—	1	795	—
WALDORF MICROWAVE	0-120		2 x 16	20 Modulation macros	0 (0)	—	2	1,995	4/90
YAMAHA TG77	0-121	Yes	8 x 40	44	4 (4)	—	3	1,995	6/90 (SY77)
YAMAHA TG55	0-121	Yes	2 x 16	34	2 (1)	—	1	795	—
YAMAHA TG33	0-121	Yes	2 x 16	16	2 (1)	—	Tabletop	595	11/90 (SY22)
YAMAHA WT11	0-121	Yes	16 Character	10	2 (1)	—	Tabletop	540	—



• EXPANDER MODULES

Nowadays, an instrument that is not available in both keyboard and rack-mount forms is relatively rare, and some only exist in rack-mount, or stand-alone, module form.

CHOOSING AND USING

The benefits offered by expansion modules are pretty obvious. Choosing which ones to work with, however, is not. To help you figure that out, the chart on pp.74 to 76 compares the important features between the various expansion modules that currently are being manufactured.

I'll repeat that last item, because it is important. The only expander modules you'll find on the chart are those that currently are being built. Not just sold; *built.* That distinction leaves out a bunch of great instruments that are still available, either used or new, but are no longer being made by their respective manufacturers. Roland's D-550, Yamaha's TX81Z, and the Kurzweil 1000 series are examples of terrific expander modules that have been discontinued but still can be found in stores—and at great prices, too. Don't ignore them when doing your research and making your decisions.

Please note that the chart does not offer any kind of subjective comparison. Instead, it lists a total of 34 major features across the top of each page, with individual device specifications for these features running in columns from left to right. The rest of this article will discuss the features that were selected for comparison, and help you understand their importance.

SYNTHESIS METHOD

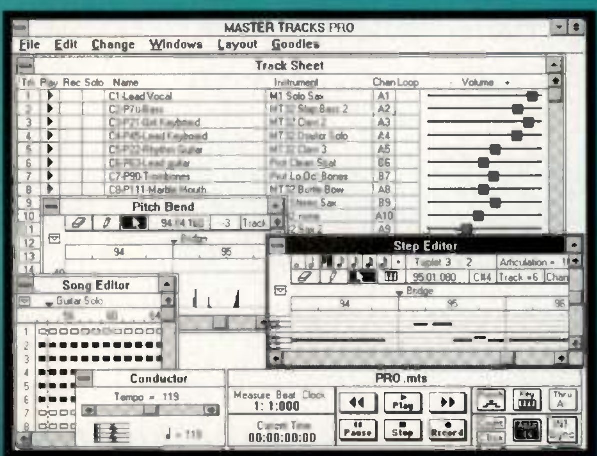
This may be the key feature for first-level comparison, because it determines the basic sound (or range of sounds) of the module in question. The Oberheim Matrix-1000 and the Cheetah MS6 are the only examples of analog (albeit digitally programmable) synthesis on the chart. All other units are based on digital technology, from additive synthesis (see "Synthesis Techniques for the 1990s and Beyond" in the February 1990 issue), to long-established FM, to sample playback. Some, like the Yamaha TG77, offer a combination of methods (in this case, sample playback and advanced FM).

Don't let the marketing jargon confuse you. There's a big difference between analog and digital, and a definite, but lesser, difference between sample playback and true digital synthesis, but there

Rattle Your Windows!

Whether you're cutting a hit record, scoring a film or jamming for fun, Master Tracks Pro™ for Windows™ is the fastest, easiest and most productive way to make music with your IBM® PC. Its intuitive graphical user interface and state of the art features have made it a must for recording studios, professional musicians and computer hobbyists alike.

Master Tracks Pro offers sophisticated features to powerfully edit virtually any nuance of a musical composition and synchronize it to film, video, multimedia presentations or multi-track audio tape. Easily add more dynamic expression, alter pitch bend, cut and paste to repeat a part and step input passages you are unable to play live. Increase tempo with the click of a mouse, "fit time" to film or video or transform any section of music at will.



With the powerful combination of Master Tracks Pro and Microsoft® Windows™, you'll have access to up to 15 megabytes of memory for lengthy compositions, enhanced multi-tasking capabilities for multimedia presentations and beautiful 3-D graphics. Experience the power of a sophisticated recording studio right from your desktop!

Also new for Macintosh, Pro 4.5 — all the features of Master Tracks Pro for Windows, plus many of the functions you've been asking for, like enhanced event list editing, independent track looping, real time editing capabilities, support of MIDI Manager™, overdub and loop record modes, volume faders and more.

Master Tracks Pro and other Passport music software products can be found at fine music and computer stores worldwide. Call or write for a free catalog and the dealer nearest you. Demo disks available.

Master Tracks Pro™ for Windows

PASSPORT

625 Miramontes St.
Half Moon Bay, CA 94019
phone:415-726-0280
fax:415-726-2254

Master Tracks Pro is now available for IBM® PC, Macintosh®, Atari ST®, Apple IIgs® and Amiga® computers.

CLIMB UP TO TOA

Climb up to a Toa speaker for every conceivable application. From a compact SM Series personal monitor to a thundering SE system with an 18-inch woofer. All incorporating Toa's latest breakthroughs in high power, smooth dispersion speaker technology.

Scale new heights with Toa's SL and SD Series of reinforcement speakers and stage monitors. To keep them—and you—looking exceptional on the road, they now feature a rugged covering and lower profile. And the constant directivity horn gives you ultra-smooth, total sound coverage.

Style, quality and price make them the ideal choice when you want clear, commanding sound in a compact enclosure.

Rise above lackluster sound with Toa's premier high-performance 380SE and 480SE systems. Specifically designed for critical applications, the powerful SE Series units are equally at home in sound reinforcement as in making your keyboards 'synthable.'

Reach a new level of sonic accuracy with the ME Series of shielded near-field studio monitors. To reinforce ultra-low frequencies with outstanding realism, rise to the occasion with Toa's power-packed subwoofer systems.

Whatever your needs, there is a Toa speaker system that's perfect for you. You can't show 'em how good you really are unless your speaker sound is 'rock solid.' Climb up to Toa. Call us today.

Toa Electronics, Inc., 601 Gateway Blvd., South San Francisco, California 94080. Telephone 415/588-2538 or 800/843-4750, in California 800/632-2157. FAX 415/588-3349.

are far fewer types of digital synthesis then there are proprietary company names for them. Advanced Integrated, Dynamic Component, RS-PCM, AWM2, and other terms you encounter are just fancy names for wavetable synthesis.

Wavetable synthesis—in which the basic waveform component of a sound has been stored as a numerical table in the instrument's memory and is spit out and processed on your cue—is the most common synthesis method. (For an explanation of wavetable synthesis, see the sidebar on p.112 of the April 1990 **EM.**) Yamaha's FM and Advanced FM create sound by modulating waveforms with other waveforms. Roland's L/A (Linear/Arithmetic, discussed in the May 1988 issue) is a meaningless name for a very effective method that combines wavetable-type sample loops and PCM-sampled attacks with analog-style filtering and envelopes.

Korg and Yamaha recently resurrected vector synthesis (discussed in the November 1990 reviews of the Korg Wavestation and Yamaha SY22), which essentially uses several simultaneous wavetables, programmed for greater variety and intermodulation over time. Of course, there also are straight sample-playback machines.

Unless you have an absolute fixation on a single kind of sound, a good rule of thumb to follow concerning synthesis method is to work toward having one module in each major category.

NUMBER OF PRESETS (ROM/RAM)
NUMBER OF COMBINATIONS (ROM/RAM)

This category tells how many sounds are available in each expansion module. I'm following the lead (if not the precise terminology) of several different module manufacturers by breaking sounds up into two categories: *presets,* which are actual sounds, and *combinations,* which are programmed groups of presets. The first number in both categories represents sounds that are built into the unit's ROM (read-only memory). The second number indicates how many are kept in RAM (random access memory) and therefore can be programmed by the user.

I like big numbers in both categories. Whether you want more of your sounds in ROM or in RAM depends on how much you want to personalize your music through tweaking your sounds or buying third-party programs.

WAVEFORM MEMORY (ROM/RAM)
WAVEFORM RESOLUTION
NUMBER OF SAMPLES (DRUM SAMPLES)

These three categories mainly apply to sampled-based instruments such as the Korg M1R. The memory column reveals how much memory, in megabytes, is used for storing the unit's samples. There are figures for both ROM and RAM. The amount of waveform RAM is particularly significant for the Akai S1000PB and Peavey DPM-V3, as these instruments allow you to download new samples directly to onboard (battery-backed, in the V3) RAM, using MIDI sample dump.

The resolution column refers to how many bits are used in each sample; generally, 16-bit resolution is considered excellent. The "Number Of" column tells how many individual samples there are in the unit, total, with a separate number for drum samples.

Theory holds that better, in these categories, equals more memory, finer resolution, and more samples. But theory is not the whole story. First, no sample-based instrument can sound better than the original sample it is playing. Second, a great sample can be ruined by weak processing and playback circuitry, the same way a great slide looks pretty bad if you blow it up with a cruddy projector.

When comparing sample-based instruments, try and listen to as many raw, sampled sounds as you can. Shut off any built-in effects and listen carefully, getting a sense of the sample's tonal and edit quality. Is there noise at the beginning or end of the sample? An obvious loop? Muddy coloration or muted high frequencies? These are important things to know.

Some sample-based instruments have no waveform RAM, only ROM. When buying these, be sure you really like the sounds they offer, because they will be more limiting to work with than modules that allow you to load in samples of your own.

ALTERNATE TUNINGS
MICROTUNING (KEYBOARD/OCTAVE)

The first column here refers to how many alternate tunings are available in this module, if any. The second column refers to whether you can retune the module on a note-by-note basis, or only by octaves. Microtuning capability is critical if you want to explore the non-Western tunings that are popular in various kinds of world music. Other things being equal, players and composers who are turned on by microtuning want modules that can be retuned note-for-note *and* by octave.

CARD SLOTS (WAVEFORMS/PATCHES)
EXPANSION MEMORY (YES-NO/HOW MUCH)

Nature abhors a closed system. So do customers, it seems. These categories are concerned with routes to expanding a module's base of raw sounds or programs. The external way to do this is to provide some kind of slot for RAM and ROM cartridges or cards. The internal way to do this is to have available slots or connectors for additional memory.

Which approach is better depends on the instrument and your needs. Sample-playback modules are better off with room for expansion memory, since memory cards big enough to hold full-blown sampled sounds are still hideously expensive ($700 and up for half a megabyte—ouch!). Sample-*based* (e.g., wave-table) instruments, however, can get away with using memory cards because the samples in use are much smaller.

There is no question that cards are more convenient than expanded memory. It's far easier to pop in a new card when something changes at a gig than it is to open up the box and replace memory chips. The flip side to that, of course, is that an installed memory chip is kind of tough to lose. Not so, memory cards. I speak from experience.

The best modules, from the point of view of flexibility, come with both card slots and room for expanded memory.

NUMBER OF VOICES
SPLITS AND LAYERS (NUMBER OF EACH)

In the first category, "voices" does not refer to patches or programs, but to the total polyphony of an instrument; that is, how many notes it can play at one time. This feature can be another fooler. Many instruments that offer large numbers of voices also use more than one voice for

NOW SHIPPING
PC VERSION 2.0
Mac VERSION 2.5

More Power To You.

IBM® OR MACINTOSH®, FINALE® IS THE MOST POWERFUL MUSIC NOTATION SOFTWARE YOU CAN BUY.

In 1988 we debuted Finale, the most powerful piece of music notation software ever. And since then, we've had only one thing on our mind: MAKE IT BETTER.

If you haven't seen Finale lately, take another look. Finale now has more features than ever, letting you produce publisher-quality music faster, easier, and with more creative control.

New features include an intuitive menu-driven interface, a powerful multiple voice implementation, direct MIDI-editing capabilities, and faster playback. Plus a host of notation features and easy-reading documentation that tells you how to use them. All of which means one thing—more power to you.

And we don't plan on stopping there either.

At Coda, we believe in our products strongly enough to make them better and better. Which keeps the power right where it belongs—at your fingertips.

Call 1-800-843-2066 for information, and for the name of your nearest Finale dealer. (Demo disks available.)

More power to create with your MIDI Instrument, Macintosh or IBM AT Compatible, and PostScript, non-PostScript, or dot matrix printer.

THE LEADER IN MUSIC NOTATION SOFTWARE.

Finale® Coda®

In Minnesota call Coda Music Software at 1-612-854-1288.

each note in a given patch, reducing the true polyphony. For example, a 24-voice instrument playing a patch that builds a note out of three voices will only be able to play eight simultaneous notes.

The "Splits and Layers" column tells you how many different MIDI-note response zones can be accessed at one time. Splits let you trigger different patches from different regions of the controller (for instance, a bass patch can be assigned to keys at the bottom end of a keyboard, a pad or lead patch in the middle range, and effects at the top). By layering multiple patches together, you can create huge synth "stacks" (see "Monster Synth Stacks" on p. 43).

NUMBER OF MULTITIMBRAL PARTS
NUMBER OF OUTPUTS

The multitimbral parts figure is simply the number of different programs that the module can sound at one time. (A dash here means the unit is not multitimbral.) Multitimbral devices are tremendously powerful when combined with intelligent sequencing because they become mini-orchestras. As noted earlier, however, using multitimbral instruments limits the number of notes you have available for any one sound. They also require you to pay a lot more attention to your sequencing work and may strain the hardware limits of your MIDI system, since a single multitimbral module typically can eat up eight MIDI channels all on its own.

The outputs column refers to the number of audio out jacks on the module. Stereo pair outputs are finally commonplace, and some modules have even more, which is a great help if you want to process different sounds on a multitimbral instrument in different ways.

NUMBER OF LFOS
NUMBER OF ENVELOPES

These features all have to do with sound-shaping. The LFO and envelope counts tell you something about how much control the module offers over your raw sound. For preset mavens, this probably will be unimportant. Serious sound designers live by this stuff, however, and should use the data in this column as a cue to start asking even more serious questions about the number of available LFO waveforms, the number of segments in the envelopes, how many different parameters can the LFOs and envelopes be applied to, and so forth.

MIDI NOTE RANGE

MIDI's note range covers ten-and-a-half octaves (128 semitones). Not all modules can play the entire range, however. This column tells you what notes each module can sound, from lowest to highest, without any transposing.

AFTERTOUCH (TYPE RECEIVED)
RESPONDS TO RELEASE VELOCITY

Most, though not all, MIDI keyboards send channel aftertouch, which lets you affect a sound by pressing harder on the keys after they are all the way down. Channel aftertouch doesn't discriminate: It alters all notes equally. A much more rare feature is polyphonic aftertouch, which controls each note separately. A keyboard that can send poly aftertouch allows you to hold down a chord and use finger

Personal computers are great for editing notes and sorting out the MIDI spaghetti in a complex composition. But when it's time to play your latest song they often miss the beat.

There's a reason. Personal computers have to deal with many tasks simultaneously. The notes in your composition have to fight for time on a computer that's busy updating a screen, checking a mouse, and doing other non-musical tasks. Even if you quantize your music, this results in random timing errors during playback, which is readily perceived as a loss of feel. We call it *MIDI slop*. You wouldn't accept sloppy playing from a triple-scale studio band, so why accept it from your computer?

The MMT-8, on the other hand, is the best sequencer you can own because it was designed to perform only one task: making music. It plays back notes exactly as you played them in, or exactly how you want them quantized. All with pin-point accuracy, so your songs will have the exact rhythmic feel you intended. The same *meaning*.

At less than the price of the average sequencer software, you can't afford not to add the MMT-8 to your MIDI studio. Plus, its logical 8-track layout and tape recorder style controls will keep you gravitating to the MMT-8 for all your songwriting. And some astonishingly comprehensive editing too.

And now your work can be stored and retrieved instantly on 3.5 inch floppies with the Alesis Data Disk. It's a direct MIDI to disk, 800K capacity, universal data storage medium for the MMT-8 and virtually any other MIDI hardware — like Alesis drum machines and progammable effects processors.

The Alesis Data Disk

The Alesis MMT-8 MIDI Sequencer won't do your taxes or spreadsheets, but it *will* play your music in the pocket. And that's the *musical* bottom line.

ALESIS
STUDIO ELECTRONICS

New DATADISK SQ
Ask Your Dealer

LOS ANGELES: Alesis Corporation • 3630 Holdrege Avenue • Los Angeles, Ca. 90016
LONDON: 17, Letchworth Point • Letchworth, Hertfordshire SG6 1ND.

Our Mac/MIDI experts give you the perfect mix.
Knowledge. Price. Service.

Mac Classic System
- Macintosh Classic w/50 Mb Microtech HD, Apple SuperDrive, Keyboard, Mouse, & 4 Mbs of RAM
- HyperCard Software
- MultiFinder Software
- Virex Software
- Adobe Type Manager
- 10 Diskettes
- Diskette Storage Case
- 6 Outlet Surge Protector
- Mouse Pad

CDA Price $1,599
Ask for Package #9102

Call or write for our latest catalog featuring Mac, MIDI, & more!

One CDA Plaza, P.O. Box 533,
Califon, New Jersey 07830

The MIDI experts at CDA know Macintosh *and* music. They can provide you with the latest information, the best price, and excellent service on *both* computer equipment and music gear. If you haven't found the right mix from computer or music stores, come to CDA.

CDA provides the support you would expect from a local dealer, along with the convenience and economy of direct-order, by mail, fax or phone. Our ten years in the computer industry have earned us a rock-solid reputation for providing superior service and support on the finest hardware, software and accessories available.

Whether you're just getting started or you're an old pro, we will give you good sound advice. So, give us a call, toll free, and ask for Steve, Barb, Scott Dave, or Al.

CDA is your easy-access source for today's finest Mac & MIDI hardware, software & accessories from manufacturers such as AE, Altech, Apple, CMS, Coda, Digidesign, Dr. T's, Electronic Arts, JL Cooper, MIDIman, Mark of the Unicorn, Music Quest, Opcode, Passport, Pygraphics, SoundQuest, and Sound Source Unlimited.

30 Day Money Back Guarantee
If you're not 100% satisfied with your purchase you may send it back for a hassle free refund or exchange.

CDA Performance Guarantee
We Guarantee everything we sell to be free of defects for one full year. CDA will repair or replace the item free of charge.

Free Freight
CDA will ship your order Free via Federal Express® Two Day Standard Air. Orders must be over $100, items must be under 15 lbs.

Mon-Fri 9am-10pm EST
Saturday 9am-6pm EST
Fax: (908) 832-9740

Ad #48-02

US/Canada
800-526-5313

The Magic of Mac, The Power of People
CDA Computer Sales

NJ/Outside US
908-832-9004

pressure to individually modify any note in the chord, without affecting the others.

But sending is one thing and receiving is another. Since modules have no keyboards, what concerns us is whether or not the module in question can respond to channel aftertouch, poly aftertouch, or both. If you don't have a controller that sends poly aftertouch, you probably don't care about this feature. But if you do—or like to add it in directly from your sequencer—then a module that can't respond to poly aftertouch probably is less attractive.

Release velocity is even more rare than poly aftertouch, in both controllers and expansion modules, despite its usefulness as an expressive tool. In a keyboard that sends it, release velocity is a measure of how fast you lift your fingers from the key. In a module that responds to it, that response is usually programmable, so that any number of different sound parameters can be selected for control with this technique. As a rule of thumb, MIDI implementations containing release velocity are quite complete, reliable, and "by the book." I think of it as a sign of devoted engineering.

CONTROL PEDALS AND/OR OTHER INPUTS

Keyboards often have jacks for additional control pedals such as sustain, modulation, volume, sequencer start/stop, program advance, and so on. In modules, these jacks tend to be rare, since module designers tend to think of everything in terms of MIDI control alone. (Besides, designing with fewer jacks means lower costs across the board.) Still, some modules have such control inputs—particularly those that are stand-alone, instead of rack-mounted—and they can be very useful, especially in live performance.

RESPONDS TO MIDI CONTROLLERS (NUMBERS)

This column refers to the module's ability to receive MIDI continuous controllers. A few modules also can send MIDI controllers, particularly those with built-in sequencers. In Yamaha's new TG33, the Vector Control sends two MIDI controllers. After actual sound, dynamic control is the biggest issue in MIDI composing, performing, and recording. I think of it as the key to personalizing your work and bringing it to life.

Can you imagine a fine acoustic guitar solo without an expressive and carefully controlled vibrato, or a good woodwind or brass part that didn't make use of volume swells and fades during held notes? I can't. Continuous controllers are how you coax similar expression out of sound expansion modules, so the recommendation here is clear: A good module should respond to as many controllers as possible. Better still, it should enable you to program its response so you can choose what parameter (or parameters) a given controller will affect.

HEADPHONE JACK
DISPLAY SIZE

Headphone jacks are useful for hearing your sounds when the world around you is too loud or when you can't afford to let anyone else (such as the landlord, or a kibitzing producer) hear them.

Displays, of course, are how you understand what's happening inside your module as you work with it. In recent years, displays on keyboards have been getting much larger and more sophisticated. Some even have graphic displays for editing parameters in a more intuitive fashion. This trend is only slowly coming to modules, however.

A big display is no guarantee of a slick, easy programming interface, but it *does* say that someone in the company, somewhere along the line, remembered that there was a customer out there. That's important.

In the end, the virtues of big vs. small displays depend mainly on how complicated a module is. A sample playback box with no programmable control parameters doesn't need a great display (in fact, it might not need any display), but a powerhouse product will.

NUMBER OF EFFECTS PROGRAMS
NUMBER OF SIMULTANEOUS EFFECTS
(NUMBER OF PROCESSORS)

Earlier, I suggested you listen to the "raw" samples in certain modules. The reason is that almost all modules these days contain some form of built-in effects processing: reverbs, delays, equalizers, exciters...it's a long list. The first column here deals with how many different kinds of effects are available in a module. The second column deals with how many of these effects you can have operating at the same time; the number in parentheses indicates how many separate processors there actually are.

Manufacturers are sometimes prone to draw lines that confuse the issue, and the number of processors can be one of them. Some devices may have only one DSP

Expander Module Manufacturers

Akai
International Music Corp.
PO Box 2344
Fort Worth, TX 76113-2344
tel. (817) 336-5114

Casio
570 Mt. Pleasant Ave.
Dover, NJ 07801
tel. (201) 361-5400

Cheetah
Jessico (distributor)
11230 Grandview Ave.
Wheaton, MD 20902
tel. (301) 949-9314

E-mu Systems
1600 Green Hills Rd.
Scotts Valley, CA 95066
tel. (408) 438-1921

Ensoniq Corp.
155 Great Valley Pkwy.
Malvern, PA 19355
tel. (215) 647-3930

Kawai
2055 E. University Dr.
Compton, CA 90224
tel. (213) 631-1771

Korg
89 Frost St.
Westbury, NY 11590
tel. (516) 333-9100

Kurzweil
1432 Main St.
Waltham, MA 02154
tel. (617) 890-2929

Marquis Music
144 Front Street West, Suite 460
Toronto, Ontario M5J 2L7
tel. (416) 595-5498

Oberheim (Gibson Labs)
13345 Saticoy Street
North Hollywood, CA 91605
tel. (818) 894-9369

Peavey Electronics
711 A St.
Meridian, MS 39302-2898
tel. (601) 483-5365

RolandCorp US
7200 Dominion Circle
Los Angeles, CA 90040-3647
tel. (213) 685-5141

Voce
111 10th St.
Woodridge, NJ 07075
tel. (201) 939-0052

Waldorf
Steinberg-Jones (distributor)
17700 Raymer St., Suite 1001
Northridge, CA 91325
tel. (818) 993-4091

Yamaha SGD Division
6600 Orangethorpe Ave.
Buena Park, CA 90620
tel. (714) 522-9265

(digital signal processing) chip, yet still sport a manufacturer claim for multiple signal processors because the DSP can handle more than one effect at a time. The "processors" being referred to in these cases exist strictly in software. This chart draws a harder line: The number of processors listed here is a DSP chip count, plain and simple.

How many real, or virtual, processors are at hand is less important than how flexibly they can be applied. Are you limited in how many different effects are available at once? Can you change their order? How many parameters do they have? Can you make real-time adjustments to the sound? These are things you should check out when you begin to research a purchase.

In the end, the most important aspect of effects is how they sound. Here we come full circle. All reverb algorithms are not created equal, and a module that is terrific in all other respects may also be one with built-in effects that don't excite you. If so, all is not lost: just shut the effects off and use whatever outboard signal processing you like.

SEQUENCER
RACK SPACE

The only module on the chart that includes a sequencer is Korg's M1R. That makes it a singular exception to the general trend for manufacturers to remove sequencers from the module versions of keyboard instruments (as can be seen in Yamaha's SY77 keyboard and TG77 expander module).

"Rack Space" tells whether a module is a stand-alone, or rack-mount, unit. If the latter, it also indicates how much rack space the module requires.

PRICE
EM REVIEW

The price quoted here, of course, is retail list. Intelligent shopping probably will allow you to pay less.

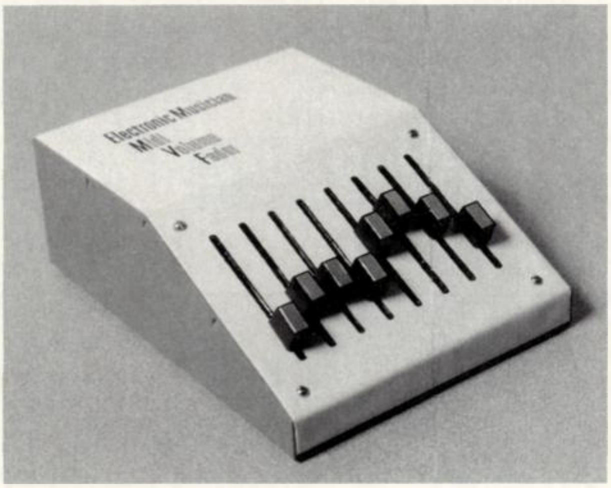
The last column lists the issue of **EM** in which the module was last reviewed (if at all). If you want more information you can start by looking there. Then contact your local retailer, or contact the manufacturers directly; you'll find their addresses and phone numbers in the sidebar.

Good luck in your search and remember, in some cases, more is better.

Connor Freff Cochran *agrees with the Lone Star Cafe's operating philosophy and misses his favorite iguana.*

The EM MIDI Fader

The long-promised, completely redesigned EM MIDI Fader uses microcomputer technology to deliver performance and flexibility.



BY KENT CLARK

*In March 1990, **EM** published plans for the MIDI Volume Fader, a box to transmit MIDI volume control messages while merging incoming MIDI data. After publication, we discovered that this design had some serious flaws. It fact, it didn't work as presented and could not easily be fixed. As a result, the editorial staff at **EM** has taken a long, hard look at the way we approach and present our DIY projects. We know that there are many readers who build, or attempt to build, the construction projects we present, and still more who read these articles for insights into the technology. We feel it is our responsibility to ensure, to the best of our ability, that the designs are accurate, complete, and known to work.*

*This month, we bring you a completely new design for a MIDI fader box, developed by Kent Clark (who also designed the Integrated MIDI Processor presented in the November 1990 issue), in close collaboration with the **EM** staff. This design has been built and carefully checked at the magazine's offices. Best of all, new features have been added, and hooks are provided to let the MIDI Fader serve as a central control module for future projects.—Gary Hall*

As synth setups continue to grow and multiply, they become harder and harder to manage. A MIDI fader box can be a powerful and flexible aid in keeping creative control in your hands. This article describes the **EM** MIDI Fader (EMMF), a circuit that can digitize the position of eight faders or rotary pots (or the level of external voltages) and send these out as MIDI continuous controller messages.

A MIDI fader box can be powerful when used with a sequencer. You can "mix" up to eight tracks in real time, assigning each track its own MIDI volume fader, or you can use the faders to input other kinds of expression information. With a multitimbral synth, or a group of voice modules, you can easily adjust the relative volume of each "layer" of a performance combination. By assigning

Good Sound Advice.

Here's an easy way to figure out which software will help you get the most out of your MIDI setup: call the MIDI software experts at Soundware and get the kind of reliable service and support that our customers have come to rely upon. Simply dial (800) 333-4554. Orders gladly taken at the same number.

MACINTOSH

Sequencers
Dr. T's
Beyond
Mark of the Unicorn
Performer
Passport Designs
Master Tracks Pro
Master Tracks Jr.
Passport Pro 4
Opcode Systems
EZ Vision
Vision
CUE-The Film Music System
Electronic Arts
Deluxe Recorder

Integrated Sequencing and Printing
Coda
Finale
Passport Designs
Encore
Coda
Music Prose

Scoring and Printing
Mark of the Unicorn
Professional Composer
Passport Designs
NoteWriter II
Music Software Plus
Music Publisher 2.0
Electronic Arts
Deluxe Music Constr. Set

Interactive Composition
Dr. T's
Jam Factory
M
Ovaltune
UpBeat
Coda
MacDrums

Editor/Libs-Samplers
digidesign
Sound Designer
Turbosynth
Softsynth
Passport Designs
Alchemy 2.0

Education
Ars Nova
Practica Musica
Coda
Perceive

MIDI Interfaces
Opcode Systems
Professional Plus
Studio Plus Two
Timecode Machine
Studio 3 (SMPTE)
Mark of the Unicorn
MIDI Time Piece

IBM PC

Sequencers
Passport Designs
Master Tracks Pro
Master Tracks Jr.
Voyetra
Sequencer Plus Mark I, II, III
Twelve Tone Systems
Cakewalk
Cakewalk Professional
Magnetic Music
Texture
Prism

Integrated Sequencing and Printing
Personal Composer
Personal Composer System/2
Dynaware
DynaDuet
Temporal Acuity
MusicPrinter Plus
Musicator
Musicator

Scoring and Printing
Dr. T's
The Copyist (all levels)
Passport Designs
SCORE

Interactive Composition
Twelve Tone Systems
Sound Globs
Voyetra
M/pc

Editor/Libs-Samplers
Turtle Beach Software
SampleVision

MIDI Interfaces
Roland
MPU-IPC, MPU-IMC, LA PC-1
Voyetra
V-4001
Music Quest
PC MIDI Card
MQX-16, MQX-16S
MQX-32, MQX-32M

ATARI ST

Sequencers
Dr. T's
MIDI Recording Studio
KCS with MPE
KCS Level II with PVG
Midisoft
Midisoft Studio
Passport Designs
Master Tracks Pro
Master Tracks Jr.
C-Lab
Creator
Steinberg/Jones
Cubit
Pro-24 III
Twelve

Integrated Sequencing and Printing
C-Lab
Notator

Scoring and Printing
Dr. T's
The Copyist Level I, II or III
Hybrid Arts
EZ-Score Plus
Steinberg/Jones
Masterscore

Interactive Composition
Dr. T's
M

Editor/Libs-Samplers
digidesign
Softsynth
Sound Designer
Dr. T's
Samplemaker

Education
Take Note Software
Take Note

AMIGA

Sequencers
Dr. T's
MIDI Recording Studio
KCS with MPE
CUB

Scoring and Printing
Dr. T's
The Copyist I, II

Interactive Compostition
Dr. T's
M

APPLE II COMMODORE

We carry many of the same fine products for these great systems, too. Please call.

Editor/Libs to Synths
We carry all the most popular packages for all systems: Sound Quest, Opcode Systems, MIDImouse Music, Digital Music Service, Sonus, Dr.T's, Big Noise, and Voyetra. Please call.

OUR POLICY
FREE "MIDI by Mail" catalog available. Just call or write and we'll be happy to send you a copy.
No question too dumb. MIDI systems are great. But the software can be a little confusing when you're first starting out. We understand. That's why we try our best to answer any questions you have before you order. Just call us at (800) 333-4554. **Institutionalize us.** Attention buyers in professional studio facilities, schools and universities: Soundware is the perfect place to buy your MIDI software. We not only have the products, but also the knowledge to help make sure you get the right ones. And we'll happily accept your PO.
We accept VISA, Mastercard, and American Express with no added service charge. Your credit card will not be charged until we ship your order. Personal and company checks accepted. Please allow one week to clear. California residents please add local sales tax to your order.

SHIPPING
For foreign orders and Next-Day-Air, please call. For all others, add $4 per item to cover UPS 2nd-Day-Air.

Best Sellers

Cakewalk - IBM	Performer - MAC
Vision - MAC	Voyetra Seq. Mk. II&III- IBM
Copyist Pro - IBM	Opcode Editors - MAC
Encore - MAC	PC MIDI Card - IBM
Music Printer Plus - IBM	MQX-16 - IBM
Master Tracks Pro - MAC	Studio 3 - MAC

Soundware
Your MIDISource

Call to order:
(800) 333-4554
Good anywhere in the U.S. and Canada
Monday thru Friday 9-5, Saturday 10-4 PST

All items subject to availability. Defective software and hardware replaced immediately.
 200 Menlo Oaks Drive Menlo Park, CA 94025 (415) 328-5773 FAX (415) 328-0611

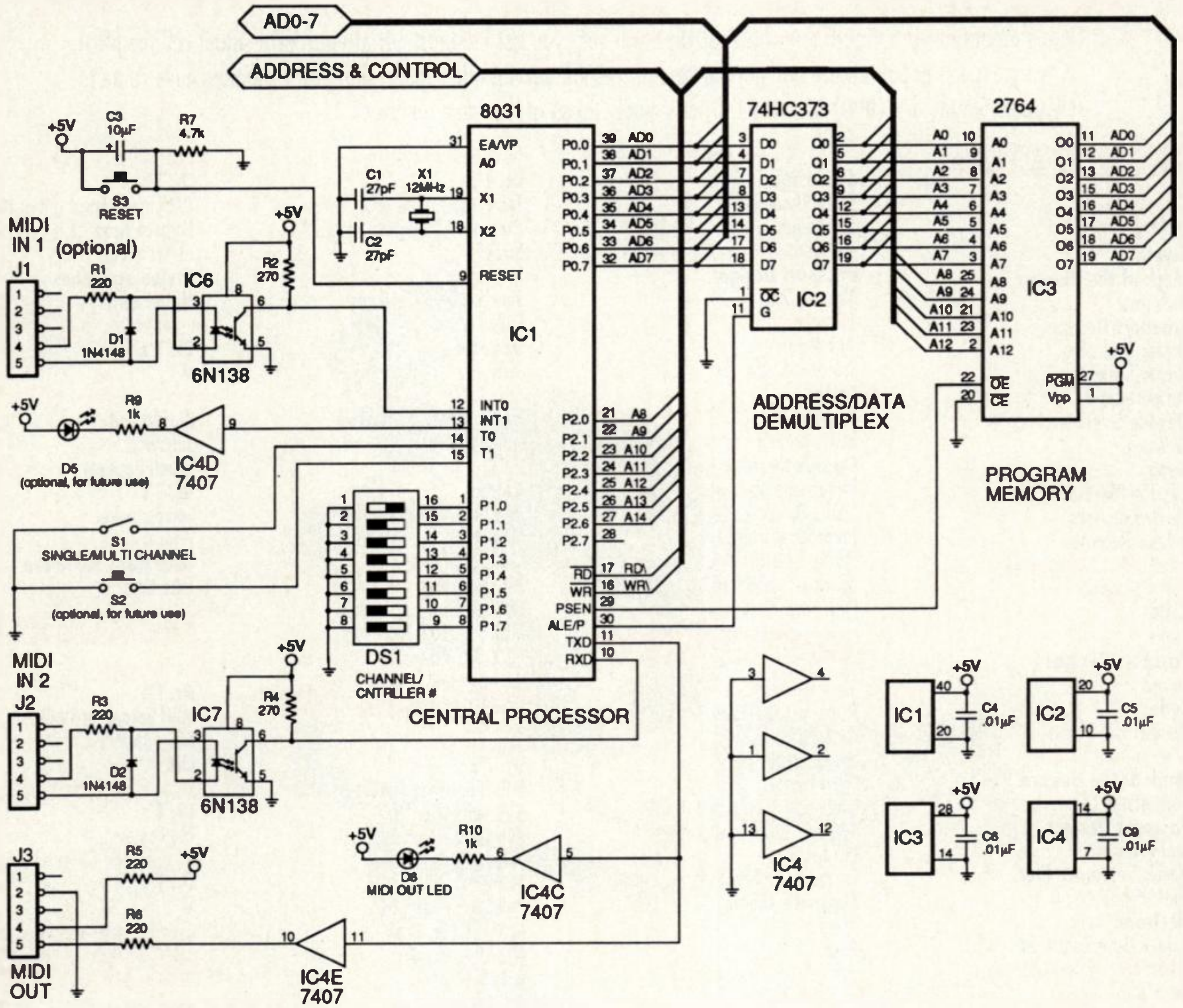


FIG. 1: CPU, program memory, and I/O ports for the MIDI Fader.

each fader to transmit a different controller, a MIDI fader box can be used as a kind of "MIDI programmer." If your synth or digital effects processor responds to continuous controller messages, you can adjust many of its parameters in real time. If each fader is assigned to a different parameter value in your synth patch, you can save much of the time spent going through all those menus, sub-menus, and sub-sub-menus. It's amazing how much control of a sound you can achieve when you can tweak several of its parameters at once.

HARDWARE AND SOFTWARE

A MIDI fader box needs the intelligence of a microcomputer for two reasons:

Fader Motion Detection: If the values of the pots are transmitted continuously, the MIDI datastream will be clogged with controller messages, many of them superfluous. What you really want to do is detect when a slider has moved and only transmit messages that represent *changes* in fader position. To do this, the position of each slider is stored in memory. When a new reading is taken, this is compared against the stored position. If the new value is different from the stored value, the stored value is replaced by the new value, and the new value is transmitted. The actual situation is a little more complicated because there always is an uncertainty of one bit in the value read by the analog-to-digital converter (ADC). The program has to look for a change in value of *greater than* one, or the design will be prone to *dither states,* in which one or more faders constantly flip between two adjacent values. This logic can be implemented in hardware, but the circuit is a little bit complex.

MIDI Merging: To successfully merge incoming MIDI data to the slider data, the program must recognize status bytes and know the length of every legal MIDI message. Otherwise, it might attempt to transmit controller messages in the middle of other messages. In the case of *sysex* messages, the program must interrupt transmission completely until the *EOX* (end of sysex) message is seen. This logic could be implemented in hardware, as well, but would require an awesome array of comparators and counters.

Microprocessors and microcomputers let us implement complex logic in a simple and inexpensive circuit. Better yet, they allow us to experiment with and

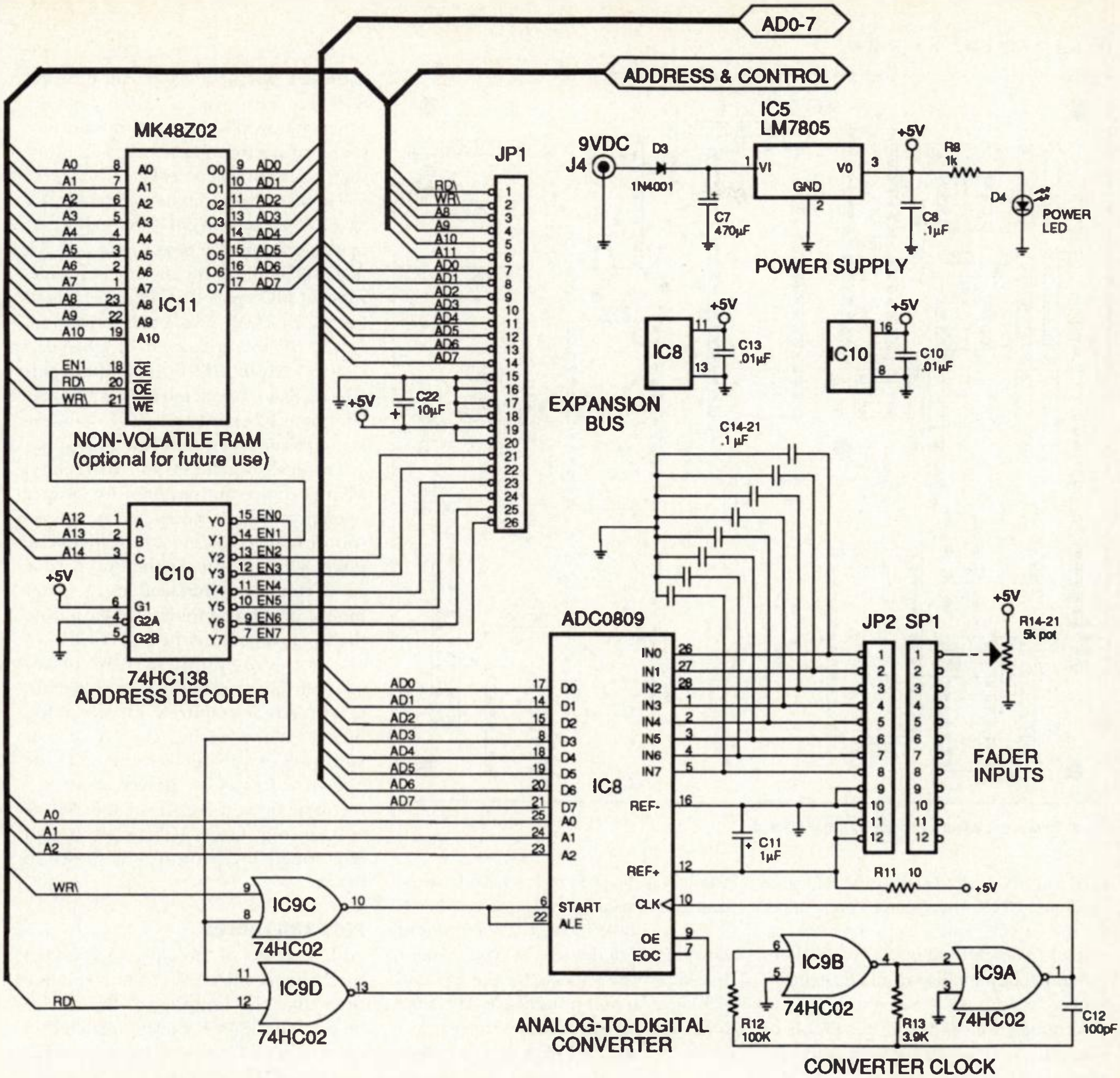


FIG. 2: Address decoding, A-to-D conversion, power supply, and optional static RAM for the MIDI Fader.

change that logic at will. The price we pay for such flexibility is having the most interesting parts of the design "hidden" within the system software burned into an EPROM chip. Software skills are today's big "enabling technology" and are indispensable to the serious hacker.

THEORY OF OPERATION

The EMMF uses an Intel 8031 microprocessor (IC1) as its *central processing unit* (CPU). The design of the processor section is similar to that of the IMP, presented in the November 1990 issue (see schematics, **Figs. 1 and 2**).

The EMMF's CPU has more "peripherals" (program memory, analog-to -digital converter, and optional RAM memory) than the IMP (which had program memory only). A 74HC138 (IC10) is used as an *address decoder*. As the 8031 changes address lines A12, A13, and A14, a corresponding "enable" line (EN0 to EN7) is selected. Two of these lines (EN0 and EN1) are used to select the "digitizer" (IC8) and the optional non-volatile RAM (IC11). The other six enable lines are brought out to an "expansion bus".

Apart from the CPU, the most important part on the EMMF is IC8, an ADC0809 analog-to-digital converter. The ADC0809 is a handy part that converts voltages from eight potentiometers (or external voltages in the range of 0 to 5 volts) into 8-bit linear values. To start conversion, the 8031 CPU writes a 3-bit "address" to the ADC. This address selects one of the eight voltage inputs for conversion. After allowing time (a fraction of a millisecond) for the conversion, the CPU reads an 8-bit value from the converter.

The ADC0809 requires a separate clock in the range of 300 to 500 kHz for proper operation. This clock is generated by a CMOS "gate" oscillator, formed by two NOR gates from IC9A together with resistors R12 and R13 and capacitor C12.

The pots, faders, or external voltages are brought in on pins 1 through 8 of connector JP2. Also on the connector is *ground* (JP2 pins 9 and 10) for connection to one end of the faders. The other terminal of all faders is connected to +5 volts

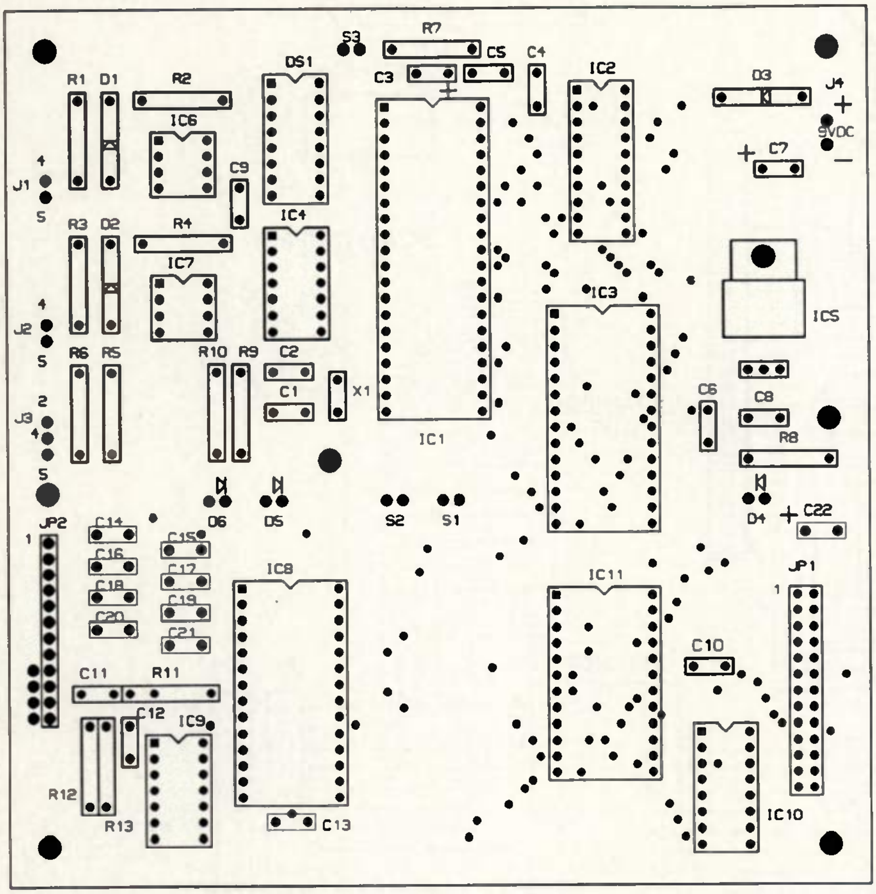


FIG. 3: Component layout for the MIDI Fader PC board.

(JP2 pins 11 and 12). Resistor R11 and capacitor C11 form a simple noise filter for the +5 volt power. Capacitors C14 to C21 (0.1µF) are used on each analog input to decouple noise from adjacent inputs.

Although not needed for the EMMF as it stands, there is provision for non-volatile RAM memory. IC11 is an MK48Z02, a 2 KB RAM chip, with a built-in battery to save the data after power is turned off. This package is convenient to use, but it's a little pricey (currently about $11 mail order), so you may wish to leave it out for now. I would recommend putting in a socket for it, however, as I expect to use it for future projects that build on the EMMF hardware.

You also may have noticed connector JP1 on the schematic, labeled "expansion bus." This bus is not required for the EMMF, but it gives the project board more versatility. For example, this bus could be connected to a VCA board to make a MIDI-automated mixer.

BUILDING THE MIDI FADER

The electronic part of the EMMF is easy to build, especially if you use the printed circuit board (see Parts List). The component placement for all parts on the PC board is shown in **Fig. 3**. I recommend socketing all of the ICs, but you certainly should provide a socket for the EPROM, IC3. Several components on the schematic are for future use and are not needed for the EMMF to run. In particular, you may wish to delete the non-volatile RAM, IC11, if you want to save money. You can install a socket for it so that you'll be ready when the time comes.

You can also build the EMMF using wirewrap or other prototyping technique. In this case, you could tighten up the layout and delete some, or all, of the optional components. This would let you get the circuit board into a smaller enclosure.

As with any microprocessor- or microcomputer-based project, you need to have the operating software in EPROM form to make the board operate. Pre-programmed EPROMs may be purchased from the author (see Parts List). If you have a computer with modem (and an EPROM burner to program the parts), you can get the source and object code from EM's SIG on the PAN Network (see "Sources" for details). Because of the 8031 processor, the EMMF is capable, when equipped with an appropriate program, of performing many tasks other than transmitting controllers.

The parts list and schematic show IC1 as an 8031, but a CMOS part (80C31) may be used to save power (at a cost of a few dollars more for the micro). Likewise, a CMOS part (27C64) can be used for the EPROM. Two words of caution: Don't try to replace the high-speed CMOS 74HC02 (IC9) with another part (the oscillator would most likely not oscillate); and IC4 must be a 7407 open-collector driver to drive the MIDI outputs.

The Reset switch (S3) and MIDI Out A LED (D6) are not required for proper operation but may be useful for troubleshooting (or just to know that the power's on). If you use the PC board, a connector can be installed at JP2 (fader input), or you can solder the wires from the faders directly to the PC board.

A wall-mount, 9 VDC power adapter that can supply at least 300 mA of current is required to power the board. When wiring the DC power jack, *make sure* the polarity matches the polarity of your DC power adapter. I recommend you use a heat sink on the voltage regulator, IC5. A picture of **EM**'s "open-air" prototype is shown in **Fig. 5a**.

POTS AND FADERS

With a project of this type, it's common for the mechanical aspects to take more time than the building of the circuit board. The EMMF can be installed in many kinds of boxes. (The printed circuit board is approximately 5 1/2 by 5 1/2 inches.) You can use any style of pot or fader and mount them as desired. Rotary pots are far easier to mount, as you only have to drill a hole in the panel. How-

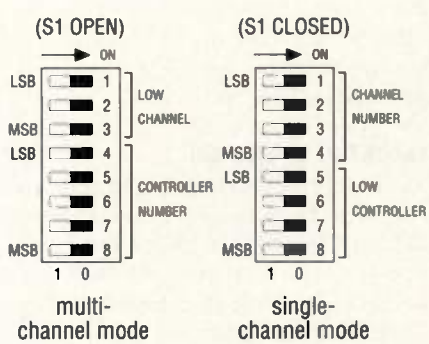
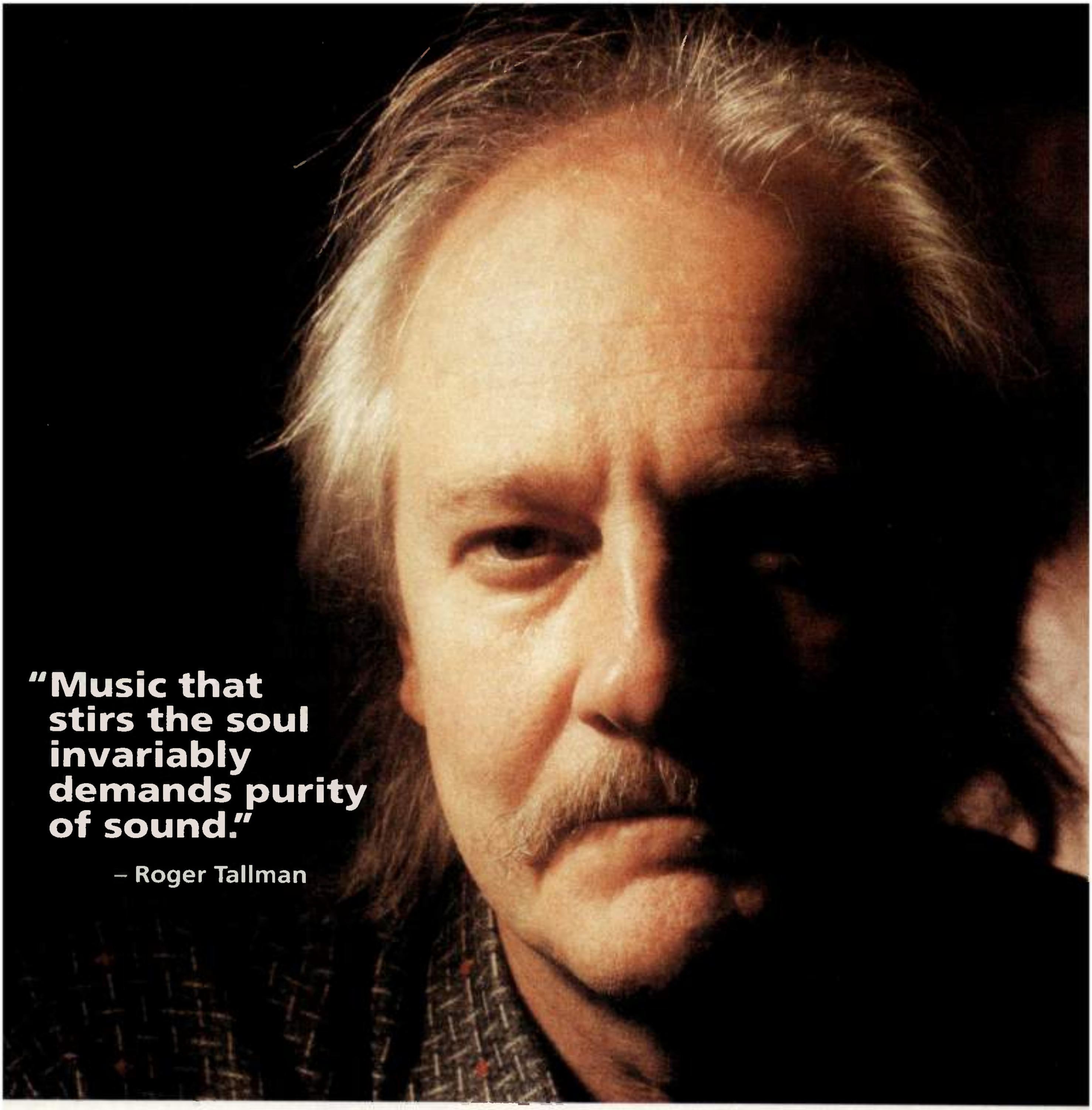


FIG. 4: Setting mode, channel, and controller numbers on the MIDI Fader.



Emmy-laden composer Roger Tallman. His signature sound has infused drama and emotion into everything from network television, the Olympic Games, and the Super Bowl to major advertising campaigns.

And he depends on the unparalleled technology of Kurzweil to create that sound. Kurzweil instruments stand alone in their ability to reproduce acoustic instrument sounds with every nuance intact.

You'll find our new line of instruments more powerful than ever, with advanced features for studio and stage, extensive editing capabilities, and impressive new synth sounds.

For more information visit your nearby Kurzweil dealer. Or write to us at Kurzweil Music Systems, 13336 Alondra Blvd., Cerritos, CA 90701.

KURZWEIL™

Kurzweil is a product line of Young Chang America, Inc.

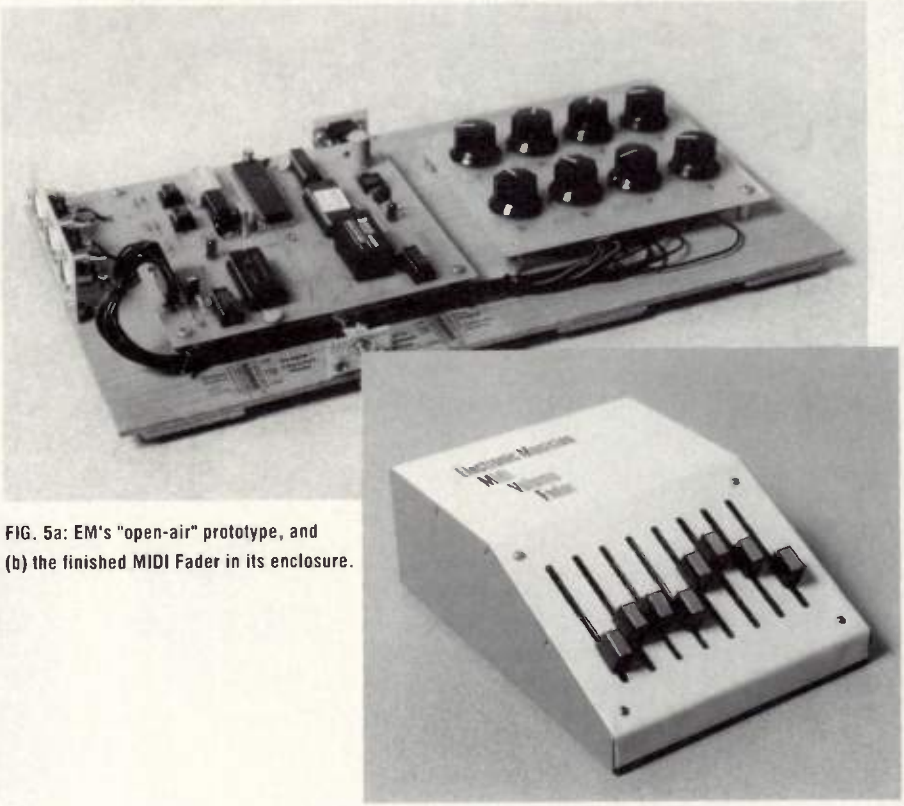


FIG. 5a: EM's "open-air" prototype, and (b) the finished MIDI Fader in its enclosure.

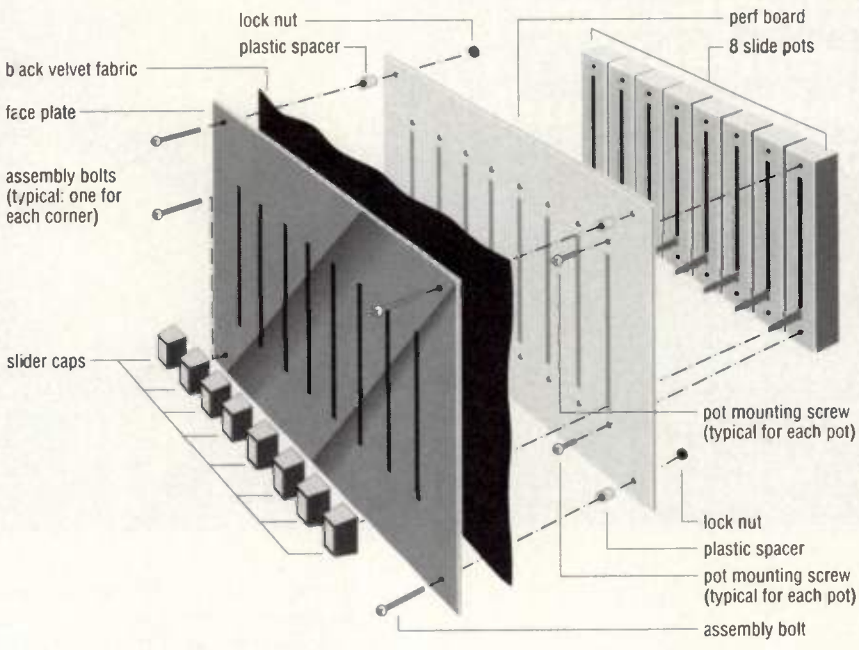
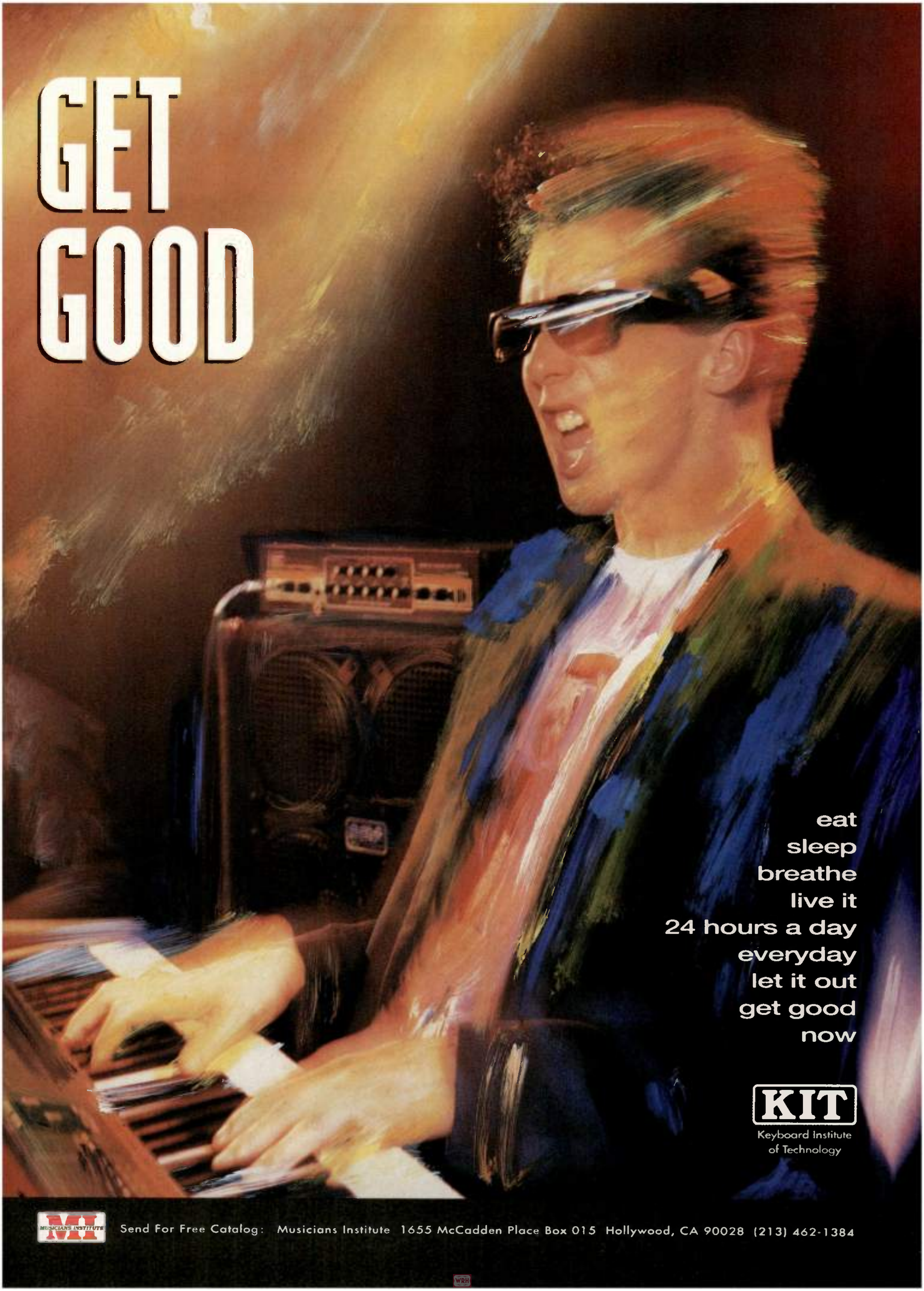


FIG. 6: Assembly details for mounting slide pots to a metal panel.

ever, there's no denying the attraction of slide pots (faders) for this project.

Slide pots, and the knobs to go with them, are a bit harder to find than rotary pots. Of the major mail-order parts-supply houses, only Mouser Electronics (tel. [800] 346-6873) has suitable parts listed. You may find assorted slide pots at a local outlet, but I've found that, for some odd reason, these outlets frequently fail to stock knobs for them. There are two main types of slider available: PC-mount and panel-mount. The panel-mount type is recommended. Panel-mount slide pots come in different lengths; I chose pots that are 3.15 inches (measured between


GET GOOD
eat
sleep
breathe
live it
24 hours a day
everyday
let it out
get good
now
KIT
Keyboard Institute of Technology
MI
MUSICIANS INSTITUTE
Send For Free Catalog: Musicians Institute 1655 McCadden Place Box 015 Hollywood, CA 90028 (213) 462-1384

the panel-mount holes). These have a nice length of travel, but you could choose larger or smaller sizes.

To mount the pots behind a panel, use a piece of perf board, as shown in **Fig. 6**. Carefully mark the locations of the mounting holes and slot for each slider. (Don't forget to provide enough space between faders for the knobs to slide past each other.) Using an electric drill, you can drill out all the holes along each slot, as well as the mounting holes for each pot. Use a small file to smooth out the slots. You then can mount the pots behind the board, with the tang of each coming through the slot.

If you're not overly particular about looks, you can let it go at that and just use the perf-board mounting (in some attractive arrangement). Of course, you may wish to install the project in a nice metal box, and that's where the fun begins. Cutting neat slots in metal is not easy with common hand tools. With a lot of time and care, you can do an adequate job by drilling out the slots and filing the edges. Be sure to measure, mark, and work carefully. Once you remove metal, you can't put it back.

A "nibbling" tool is probably a better option. (You just drill a starting hole, then progressively enlarge it using the nibbler.) However, this will give you a wider slot than you may have contemplated. Glue a piece of black velvet with slits cut in it to the back of the panel to keep out dirt and improve the appearance. Once the slots are cut, you can mount the perf board with the sliders, using ¼-inch standoffs, as shown in the exploded construction diagram. **Fig. 5b** shows the EMMF installed in a slope-top box made by LMB.

OPERATION

The EMMF has two modes of operation. *Multi-channel mode* is selected when switch S1 is open. In multi-channel mode, each fader sends the same MIDI controller number, but each on a different MIDI channel. The lowest channel is selected by entering a binary value on switches 1 to 3 of 8-position DIP switch DS-1. (Note that *switch open* on the DIP switch represents a binary "1," and *switch closed* corresponds to a "0.") The first fader will transmit on the channel selected, and the remaining faders will occupy the channels numbered continuously above that. Setting a value of "000" on these three switches, for example, transmits on channels 1 through 8. (Channels are conven-

WHY BUILD?

That's a good question and deserves an answer. The technology revolutions in integrated circuits and software have drastically changed the nature of do-it-yourself projects. Let's take a look at the most commonly given reasons for building projects:

- TO SAVE MONEY. This is the first reason that most people give, but it may not be the best reason. You can save *some* money building your own equipment, but probably not as much as you might think. In fact, if you don't shop carefully, a home-built project can end up costing you as much as the same product bought used or from a dealer. This is particularly true if you figure in the costs of your time, the potential for problems (I know I've built projects that ended up being less reliable than I could wish), and the "opportunity cost" of time spent soldering and drilling instead of playing music. Modern electronics manufacturing is highly automated and very efficient. It's difficult for home brew to compete with these economies of scale, and it's unlikely that you'll be able to build the *big* expense items (instruments, computers, and tape recorders) at home.

- TO GET SOMETHING THAT CAN'T BE BOUGHT. This is an excellent reason to build *if* you actually have this situation. The great majority of useful items are available commercially, but there are certainly opportunities to make creative tools that fall through the cracks (for instance, I've always wanted a MIDI-based vocoder). You also might balk at purchasing a large item when all you want is one of its functions. Watch out for the reverse situation, though. (For example, the EMMF works well, but it lacks many features found on the J.L. Cooper FaderMaster or the Lexicon MRC.) Of course, if you have an honest-to-goodness invention, you'll *have* to build it yourself, and you might even be able to market it if it proves useful enough. That's how Roger Linn, for one, got started.

- TO LEARN. This may be the best reason of all. Modern electronic music equipment is wonderful with its built-in features and functions, but real power comes from understanding. When you study the principles of electronics and software and build some of your own gear, you take a major step toward full command of your equipment's resources. When you know what's going on in a system, you often can accomplish things that seem, on the the surface, to be beyond the capabilities of the equipment on hand.

- CAREER DEVELOPMENT. If you are currently in a technical career, or if you want to get into one, building projects is an excellent way to hone your skills and demonstrate them to others. This was an important factor in my own career. In 1977, I went to work in Lexicon's manufacturing section. Around the same time, I started building a synthesizer with a microprocessor-driven keyboard of my own design. The project itself turned out to be overambitious (the one synth voice I built now decorates my office), but it taught me microprocessor programming and figured significantly in later moves into design, sales, service, and management.

- FOR FUN. For many (not all), electronic construction is a soothing hobby, a real relief from the pressures of the day. There's satisfaction in working out the details of a project and turning it into something useful and (hopefully) attractive. I enjoy working with electronics and software because they won't BS you. If something doesn't work, there's always a reason for it. Always.

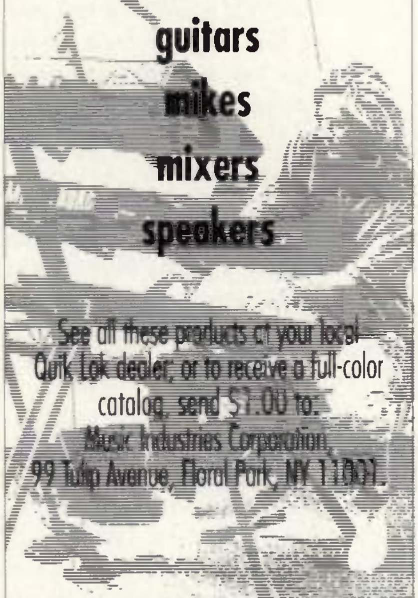
We at EM hope that you enjoy our build-it-yourself projects, even if you elect not to build them all. We have plans for exciting future projects designed to help our readers get a better grasp of the technologies used in today's equipment.

The more we know about your needs and wishes, the better we can serve you, our readers. If you have any comments on the direction of our DIY projects, or any questions or requests, please drop us a line by mail or modem. We can be reached on the PAN network, or by mail at: Electronic Musician DIY, 6400 Hollis St. #12, Emeryville CA 94608.—*Gary Hall*

tionally numbered as one more than the binary value.) Switches 4 to 8 on DS1 are used to select one of the first 32 MIDI controller numbers. A setting of "00111000" transmits MIDI volume (controller 7) on channels 1 to 8.

Single-channel mode is selected when switch S1 is closed. In single-channel mode, each fader is assigned to a MIDI channel number, selected using switches 1 to 4 on DS1. Each fader transmits a different MIDI controller number. The first fader is assigned to the MIDI controller number selected by switches 5 to 8 on DS1; the next fader transmits that controller number *plus one;* the third fader is that number plus two; and so on. Thus, if you select "0001 0000" on DS1, the MIDI Fader will transmit controllers 1 to 8 on MIDI channel 1. **Fig. 4** shows the selection of modes, channels, and controller numbers on the EMMF.

In either mode, remember that the MIDI Fader is programmed to transmit MIDI pitch bend in place of controller 0 and channel pressure instead of controller 3.



PARTS LIST

(Items in italic type are optional parts that are not needed for the basic MVF but are likely to be used for future, related projects.)

RESISTORS (1/4-watt, 5% tolerance)

R11	10 ohm
R3,R5,R6	220 ohm
R4	270 ohm
R8,R10	1K
R13	3.9K
R7	4.7K
R12	100K
R1	*220 ohm*
R2	*270 ohm*
R9	*1K*

POTENTIOMETERS

R14-21	5K linear taper, rotary or slide pot

CAPACITORS (15 working volts or greater)

C1,C2	27 pF mica
C12	100 pF mica
C4-6,C9, C10,C13	.01 µF ceramic
C8,C14-C21	.1 µF ceramic
C11	1 µF ceramic
C3	10 µF Al electrolytic
C7	470 µF Al electrolytic
C22	*10 µF Al electrolytic*

DIODES

D2	1N914 or 1N4148
D3	1N4001
D4,D6	red LED
D1	*1N914 or 1N4148*
D5	*red LED*

INTEGRATED CIRCUITS

IC1	8031 or 80C31
IC2	74HC373
IC3	2764 or 27C64 (250 ns), programmed*
IC4	7407
IC5	7805
IC7	6N138
IC8	ADC0809
IC9	74HC02
IC10	74HC138
IC6	*6N138*
IC11	*MK48Z02*

IC SOCKETS

(IC1)	40-pin
(IC3,IC8)	28-pin
(IC2)	20-pin
(IC10)	16-pin
(IC4,IC9)	14-pin
(IC7)	8-pin
(IC11)	*24-pin*
(IC6)	*8-pin*

OTHER COMPONENTS

X1	12 MHz crystal
J2,J3	5-pin DIN jacks
J4	DC power jack (Radio Shack #274-1563)
JP2	12-pin,single-row header, 0.1-inch centers
SP1	12-pin, single-row header socket (with pins), 0.1-inch centers
S1	SPDT switch
S3	momentary switch
DS1	8-section DIP switch
J1	*5-pin DIN connector*
JP1	*26-pin, dual-row header, 0.1-inch centers*

MISCELLANEOUS

Enclosure; 9 VDC power adapter; 22- or 24-gauge hookup wire; mounting hardware; perf board.

SOURCES

The double-sided PC board and preprogrammed 27C64 EPROM are available from the author. The price for the board is $36, and the programmed EPROM costs $12. You may send check or money order, payable to Kent Clark, to MIDI PCB, PO Box 322, Madison, AL 35758. A 26-page listing of the source software is available for $3.50 to cover printing and handling costs. Source and object codes are available for downloading by modem from EM's SIG area on PAN. (For information on joining PAN, see "Electronic Musician Goes Online" on p.32 of the November 1990 issue, or "Source and Object Code" on p.72 of the January 1991 issue. You also can call PAN directly at [215] 584-0300. Don't forget to say that you saw it in EM.)

The rest of the parts can be obtained from your local supplier or by mail-order. Several good sources for parts are: Jameco Electronics (tel. [415] 592-8097); Digi-Key (tel. [800] 344-4539); JDR Microdevices (tel. [800] 538-5000); and Mouser Electronics (tel. [800] 346-6873).

That's it. The MIDI Fader is simple to use. Now, it's up to you to see what ingenious applications you can find for it. Enjoy!

Kent Clark *is an electronics design engineer for ADS Environmental Services. He has been interested in electronics ever since he tried to figure out how his Fender guitar amp worked, about twenty years ago.*

DIY ERRATA

There are two small errors in the schematic for the Integrated MIDI Processor (IMP) on p.75 of the November 1990 issue. J3, the MIDI output connector, was depicted with pin 3 connected to ground. This should have been pin 2. Also, D6, a red LED, should have been labeled as a "MIDI out" indicator. The printed circuit board design is correct.

The Truth About Synthesizers

BY CONNOR FREFF COCHRAN
AND LORENZ RYCHNER

Don't let unfamiliar terms scare you. Synthesizers are not that difficult to understand.

To a beginner standing in the middle of a busy music store, synthesizers seem a great mystery, the central icons of a cult that mutters to itself in acronyms and technobabble. Behind the jargon, however, synths are almost embarrassingly simple to comprehend.

Synthesizers are musical instruments that create new sounds out of electricity.

That's it: Everything else is just split hairs and elaborations on a theme.

Synthesizers often take the form of keyboard instruments, but that needn't be the case. Many synthesizers without keyboards exist, most in the form of rackmount, black boxes called *expander modules* (see this month's buyer's guide to expander modules on p.70 for more). In either case, the synthesizer is the part of the device that actually generates sound.

The developments that led to synthesizers began in the early years of electronics. In the 1860s, Germany's Hermann von Helmholtz made the first significant musical use of electricity when he built a number of electro-mechanical oscillators to aid his research in human perception of sound. These devices generated simple sounds, but they were just pure tone generators and not yet true synthesizers.

The next hundred years saw the development of a number of electronic musical instruments; of these, only the electric organ was generally successful. Experiments in creative sound generation were continued mainly by hobbyist inventors, avant-garde composers, and corporate or university researchers. By the mid-1950s, these folks were generating bloops and bleeps galore, but nothing that seemed likely to stir the world.

In the late 1960s and early 1970s, that situation changed, thanks to the work of Bob Moog, Don Buchla, and others. These individuals developed modular synthesis systems consisting of components (see below) that could be hooked up in various combinations. They then put a selection of these together in a single box and called the result a synthesizer.

Development has exploded since then, and today we enjoy an incredible variety of instruments. The primary difference between synthesizers is the particular technique, or *synthesis method*, they use to create sounds.

SYNTHESIZER ESSENTIALS

Synthesizers work with three elements of sound: *pitch*, *tone color*, and *loudness*. Engineers have explored different ways of creating sound by manipulating these three elements, but one configuration of elements keeps coming back: An *oscillator*, or sound-waveform generator, is fed to a *filter*, or sound modifier, and the output of the filter goes to an *amplifier*, or loudness controller. This is called a *subtractive synthesis chain*. Today, most synthesizers use this basic chain, although there can be considerable elaboration in the basic elements (especially oscillators, as we will see). If you understand how these basic elements operate, then the various synthesis methods lose the mystery they conceal behind obscure abbreviations.

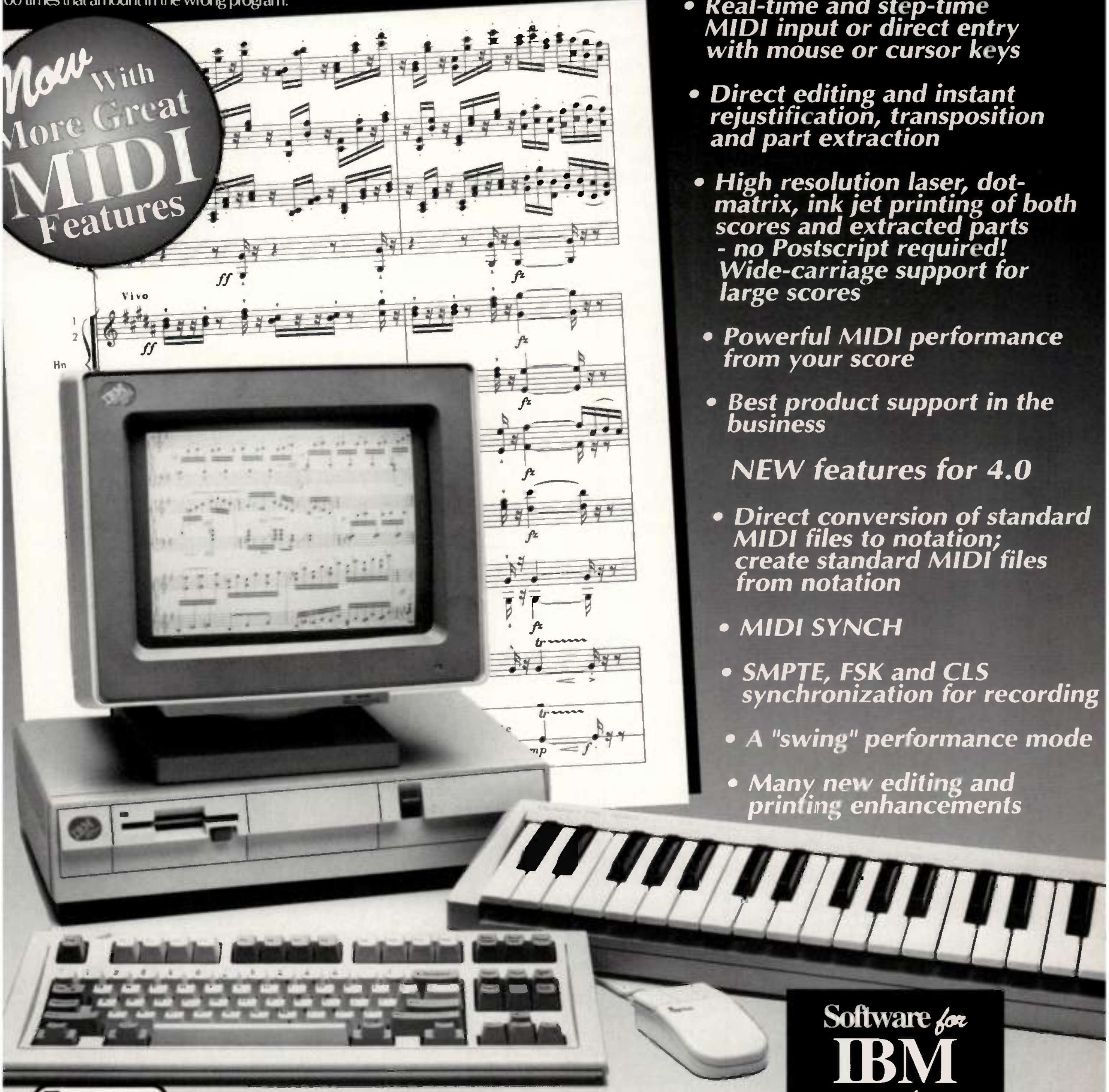
Oscillators: The Beginning of Sound. Oscillators are electronic devices that can produce a repetitive *waveform* that (when amplified) we hear as a pitched tone. The buzzer in your bedside alarm clock is an example of an oscillator. A synthesizer contains a number of oscillators that produce waveforms at the right pitches to let you play music. On some newer instruments, oscillators come under such disguises as "AWM element" (Yamaha SY and TG) or "source" (Kawai). But the basic function of synthesizer oscillators hasn't changed in twenty years; what has changed is the type and number of waveforms that oscillators produce. Today's digital oscillators generate highly complex sounds.

Filters: Where The Action Is. Whatever waveform you start with, you are stuck with that tone color if you don't have a way to modify it. Filters can be thought of as elaborate tone controls. With the help of *envelope generators* (explained shortly) and other *modulation sources* (synthesizer components that cause changes in a sound), filters animate sound by shaping tone color through time. Synthesizer filters allow a sound to go from bright to dark and back again as desired.

MUSICPRINTER® PLUS 4.0

The Musician's tool for the 90's

ECIAL NOTE **to Composers, Arrangers, Teachers and Students:**
sicPrinter Plus 4.0 is light-years ahead of other music notation/performance packages. You owe it to rself to call and get our $10 demo packet and try this outstanding package before you invest 50 00 times that amount in the wrong program.



- *Acclaimed power, elegance, speed and intuitive ease of use*
- *Real-time and step-time MIDI input or direct entry with mouse or cursor keys*
- *Direct editing and instant rejustification, transposition and part extraction*
- *High resolution laser, dot-matrix, ink jet printing of both scores and extracted parts - no Postscript required! Wide-carriage support for large scores*
- *Powerful MIDI performance from your score*
- *Best product support in the business*

NEW features for 4.0

- *Direct conversion of standard MIDI files to notation; create standard MIDI files from notation*
- *MIDI SYNCH*
- *SMPTE, FSK and CLS synchronization for recording*
- *A "swing" performance mode*
- *Many new editing and printing enhancements*

tap®

Temporal Acuity Products, Inc
300 - 120th Avenue N.E., Building 1, Suite 200
Bellevue, Washington 98005
1-800-426-2673 • (206) 462-1007

Software *for* IBM *and* Compatible Computers

Envelope generators (called "EGs" for short) automate the changes in timbre. Each time a note is played, one or more envelopes is triggered. Each describes a predetermined path that determines the way the note changes over its duration. Typically, one envelope controls loudness (see next section) and one controls the filter (or other tone modifiers).

Amplifiers: The Loudness Regulators. The amplifier (actually, the envelope that controls the amplifier) has a lot to do with the nature of the sound produced. Normally, a synthesizer remains silent until one or more notes are played. When a key is pressed, a note starts quickly (on percussive sounds, for example), or it starts more slowly (soft strings, etc.). The first portion of a sound is called its *attack*. The final portion of a sound, as it fades into silence, is called the *decay*. The combination of: (a) oscillator waveform (simple or complex? bright or dark?), (b) filter settings, and (c) the envelopes that control the filter and amplifier determine the basic nature of the sound produced on most synthesizers.

MAKING OSCILLATORS SING

The basic elements of synthesis have developed over the years, especially in the oscillator portion of the chain. The oscillators in the original modular synths were simple circuits that produced basic, simple waves. The synth programmer depended almost entirely on the filter and amplifier to bring character to the sound.

Scientists and engineers have worked out a number of methods for generating sound. These synthesis methods are used by themselves to create complete, synthesized tones; today, however, they are mostly used as oscillators in a subtractive synthesis chain. Because of this, the simple, raw waveforms of yesteryear have been supplanted by very rich signals. Synths make richer sounds from the basic subtractive chain because the first element, the basic waveform, can be an interesting, dynamic sound in its own right.

Sample playback is probably the most common form of waveform generation in synthesizers today. The principle is simple: A sound is recorded digitally, and that recording is played back. In most cases, all or part of the sample is repeated to create a continuous tone. This is called *looping*.

Sample playback is an extremely straightforward way to create sounds of arbitrary complexity. The limitation is that waves can not be changed easily, making it difficult to add expression and dynamics. Sample playback synths generally depend on filter and amplifier envelopes and other modulators to bring their sampled waves to life.

Vector synthesis is a way of blending multiple oscillators so that dynamic timbre changes can be created by altering the balance of the oscillator outputs. After a false start in the 1980's, vector synthesis has recently become prominent in new instruments from Yamaha (SY22 and TG33) and Korg (Wavestation). Conventional filters and envelopes are used to further shape the sounds before output.

Wavetable synthesis uses principles similar to sample playback, but with active modification of the waveform being played. This includes cycling through a series of stored *tables* (similar to short samples), gradually changing from one to another, or altering the number tables in response to some outside source. In a sense, all digital synthesis is wavetable synthesis because it is done by the numbers; over time, the term has come to describe a more limited, specific set of approaches.

L/A (Linear Arithmetic) synthesis is Roland's trademarked term for their own twist on the wavetable/sample playback principle. A sample of the beginning of a note (called the *attack*) is spliced onto a simpler oscillator waveform. The resulting output goes to a conventional chain of enveloped filter and amplifier. In acoustic instruments, the attack is usually the most complex part of the sound, and this approach provides an easy way to capture that complexity.

Additive synthesis harks back all the way to Helmholtz and his electro-mechanical oscillators. All sounds, even complicated ones, can be broken down and described as a series of simple waves at different pitches and levels. In additive synthesizers, a large number of *sine waves* are combined to produce a complex timbre. (Sine waves are the basic element of sound, the simplest possible pitched tone. See "Harmonics: The Basics of Sound" in the February 1990 **EM**.) Dynamic changes in tone are created by varying the relative levels of as many as several dozen of these simple waveforms.

Although most of today's instruments are hybrids, with various kinds of oscillators feeding a filter-amplifier that's usually pretty much the same, there are a couple of other synthesis methods that can be used to produce complete sounds with good results.

OTHER SYNTHESIS METHODS

FM synthesis. Championed by Yamaha in their ground-breaking DX7 and subsequent instruments, *frequency modulation* synthesis (FM for short) doesn't use oscillators, filters, or amplifiers. Instead, it is based around special constructs called *operators.* An operator has a digital (usually sine) waveform generator and an envelope. The output of one operator is routed to *modulate,* or change, the frequency of another operator. Modulation of one sine wave by another produces more complex tones that are related to the frequency and level of the sources. Envelopes vary the relative levels of modulator and target (called a *carrier)* to produce dynamic changes in timbre. When this process is cascaded, using more operators and increasingly complicated algorithms, the results are a characteristic, clean, bright sound.

Resynthesis (Digital Additive Synthesis). In resynthesis, natural sounds are analyzed and broken down into their individual sine wave components. The same sound then can be created by reproducing the same components that vary in the same ways over time. Resynthesis provides a way of capturing the complexity of natural sounds, while making it easy to alter the tone in creative ways (unlike sample playback). Only a few full-fledged resynthesis systems are out there, and most of them (such as the Lyre *FDsoft*) are built into personal computer platforms because of the heavy computation required by the technique. This area is one of the most promising for future exploration, and you should expect to see more true additive instruments in the next decade.

THE BOTTOM LINE

Is any one approach better than another? No. Each has its advantages. Pick your synthesizer based on the same two vital criteria you use to choose any musical instrument, from grand piano to kazoo: its sound and feel. In the end, those are all that matter.

Next month: samplers and sampling.

Connor Freff Cochran *still vividly remembers his 1975 epiphany in a little place called (no fooling) Ye Olde Synthesizer Shoppe.* **Lorenz Rychner** *preferred MINI to MIDI, but now he says he was too young to remember.*

For All Instruments

We guarantee <u>YOU</u> will hear in Perfect Pitch!

And we'll even make you this bet...

Perfect Pitch can be yours if you just listen!

TRY THIS:

Ask a friend to play a tone for you. Now, without looking, *can you name it?*

No luck?

Have your friend play a chord. Is it E major...D major...F# major?

Still stumped?

Don't worry! *Most* musicians are surprised to discover that they actually have little or no pitch recognition.

Yet with just a few ear-opening instructions, we bet YOU will begin to name tones and chords by ear—*regardless of your current ability*—and we can prove it!

Why YOU need Perfect Pitch

Your ear is *everything* to your music! Even with years of music lessons and the finest instrument, your success and enjoyment depend *most* on *your ability to hear.*

Why? Because music is a *hearing* art. Whether you play by ear, improvise, sight-read, compose, arrange, perform, or just enjoy listening, your skills are ROOTED in your command of the musical language—your ability to hear and evaluate *pitches.*

Perfect Pitch is the *only* hearing tool that gives you complete mastery of all tones and chords, with the ability to:

- Sing any pitch *directly from memory*
- Copy chords straight off the radio
- Hear sheet music mentally in correct pitch
- Find tones *by ear*—instead of searching by hand
- Identify keys of songs *by ear alone*

And much more!

Perfect Pitch *maximizes* your ear so your creativity can soar. Your performance automatically improves, your confidence grows, and every song you play takes on a whole new dimension of richness and enjoyment.

Shattering the Myths

Most of us have been taught that only a chosen few are born with Perfect Pitch (like Bach or Mozart). *Not true.*

Ground breaking research at a leading university has shown conclusively that you CAN gain Perfect Pitch—*using* **David L. Burge's** *simple Perfect Pitch method [see footnote].*

We've known this for years. Burge's #1 bestselling **Perfect Pitch® SuperCourse™** has already worked for thousands of musicians in over 60 countries: band and symphony members, pop artists, rock stars, jazz players, amateurs and professionals. People like *you.*

LAST CHANCE

to get the #1 bestselling ear-training method at the old price. Course has increased to $105 postpaid, *<u>unless you order from this ad!</u>*

The Secret to Perfect Pitch

According to David L. Burge, every pitch has a unique sound—a *pitch color*—which your ear can learn to recognize.

For example, F# has a different pitch color than Bb. When you can hear these pitch colors, you *automatically* know the tones and chords that are playing.

Join thousands of musicians who have already taken the Perfect Pitch® SuperCourse™

- "It is wonderful. I can truly hear the differences in the color of the tones." *D. Pennix*
- "In three short weeks I've noticed a vast difference in my listening skills." *T. Elliott*
- "I can now hear and identify tones and the key in which a song is played just by hearing it. When I hear music now it has much more definition, form and substance than before. I don't just passively listen to music anymore, but actively listen to detail." *M. Urlik*
- "I heard the differences on the initial playing, which did in fact surprise me. I think it is a breakthrough in all music." *J. Hatton*
- "It's like hearing in a whole new dimension." *L. Stumb*
- "Although I was at first skeptical, I am now awed." *R. Hicks*
- "I wish I could have had this 30 years ago!" *R. Brown*
- "A very necessary thing for someone who wants to become a pro." *R. Hicks*
- "This is absolutely what I have been searching for." *D. Ferry*
- "Learn it or be left behind." *P. Schneider...*

This is Perfect Pitch!

Perfect Pitch does *not* mean you think of tones as *visual* colors (like F# as red). Instead, you learn to hear the distinct *sound quality* of each pitch.

It's easy and fun—*and you don't even have to read music!*

Here's the Bet:

Order your own **Perfect Pitch® SuperCourse** and listen to the first two tapes.

We bet you will *immediately* hear the Perfect Pitch colors that David starts you on.

If you don't, we lose. Simply return your Course for a *full refund—and keep the valuable bonus cassette we'll send with your order FREE.*

Your bonus cassette introduces **Relative Pitch**—the ability to discern pitch *relationships*. David shows you how Relative Pitch and Perfect Pitch work together: Perfect Pitch tells you *exact pitches* by ear; Relative Pitch tells you how tones *combine* to create chords, melodies and a total musical sound.

Your 90-minute bonus tape is worth many times its $14.95 value, but it's yours FREE just for *trying out* the **Perfect Pitch® SuperCourse!**

The Bet Continues...

We bet you'll be *excited* when you hear the Perfect Pitch colors. But your first taste is just the beginning. With only a *few minutes* of daily listening, your Perfect Pitch will naturally unfold.

Try out the simple listening techniques in your **Perfect Pitch® Handbook** (included). You must notice a *dramatic improvement* in your sense of pitch within 40 days, or return the Course for a full refund, *no questions asked.*

If you choose to keep the Course, listen to your remaining three cassettes (included) for special follow-up instructions.

Whatever you do, you keep the bonus tape on Relative Pitch as your FREE gift!

Is this offer stacked in your favor or what?

How do we dare to make this guarantee?

We've guaranteed Burge's **Perfect Pitch® SuperCourse** for years—because IT WORKS!

Experience has shown us that 99% of musicians *do* hear the beginning stages of Perfect Pitch—*immediately!* The rest usually hear it after listening a little more closely (it's not difficult).

With this instant success rate, it's no wonder we get precious few returns.

Will YOU hear in Perfect Pitch?

We *guarantee* you will hear in Perfect Pitch—or your Course price refunded! But how will you ever know until you experience Perfect Pitch for *yourself?*

Call us now **(515) 472-3100** to order your **Perfect Pitch® SuperCourse** at NO RISK (and with FREE bonus tape). Or clip and mail the order form *NOW!*

Research reference: *An experimental investigation of the effectiveness of training on absolute pitch in adult musicians,* M. A. Rush (1989), The Ohio State University

School purchase orders welcome.

The **PERFECT PITCH® SUPERCOURSE™** is for all musicians/all instruments, beginning and advanced. *No music reading skills required. New:* Course now has 5 audio cassettes + easy handbook. *Free 90-minute bonus cassette on Relative Pitch with this special offer (not pictured).*

For fastest service:

Call our 24-hour Order Line NOW and charge your Visa/MasterCard:

(515) 472-3100

FAX: (515) 472-2700

Hear for yourself:

Burge's Perfect Pitch® SuperCourse™ is 100% guaranteed to work for you—*or your Course price refunded!*

☐ **O.K. YOU'RE ON!** ***Prove to me that I can hear in Perfect Pitch!*** **Send me David L. Burge's complete Perfect Pitch® SuperCourse™ with a full 40-day money back guarantee.**

I'll start with the handbook and first two cassettes. If I don't notice an *immediate and dramatic improvement* in my sense of pitch, I will return the Course anytime within 40 days for a full prompt refund, *no questions asked.*

If I choose to keep the Course and continue my ear-training, I may listen to the remaining three tapes (included) for additional instructions.

As part of this special offer, also send me Burge's 90-minute companion cassette on Relative Pitch as a FREE BONUS. This tape is *mine to keep,* even if I decide to return my **Perfect Pitch® SuperCourse** for a full refund.

Enclosed is $85 plus $4 shipping.*

Order now at old price!

☐ I need more info. Please send me a *free* Perfect Pitch Report with no obligation.

NAME

ADDRESS

CITY

STATE ZIP

*Please allow 3-5 weeks for delivery. For 1 week delivery from our studio add $2 (total $6 shipping) and write *"RUSH!"* on your envelope. Foreign orders (except Canada) send $3 shipping for complete FREE information, or $15 shipping for complete Course. U.S. funds only. Iowa residents add 4% tax.

Make check or money order payable to: **American Educational Music.** Canadians may remit bank or postal money order in U.S. funds.

☐ **Please charge my** VISA MasterCard

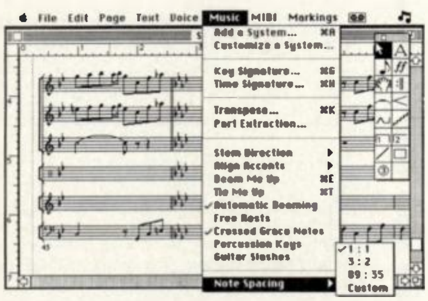
CARD #

EXP. DATE SIGNATURE

Mail to:
American Educational Music Publications, Inc.
Music Resources Building, Dept. MC24
1106 E. Burlington, Fairfield, Iowa 52556

First Takes & Quick Picks

A Mac notation program, audio switcher, wireless MIDI system, and pressure controller fill out this month's collection of short reviews.



Repertoire Music Publisher 2.5.1 ($495)

By Wheat Williams

M*usic Publisher* is the underdog of Macintosh music typesetting from down under. Although the program has never actually been unavailable, it dropped from American visibility in 1988, when its original publisher, Graphic Notes, went out of business. Now, *Music Publisher's* Australian creators have retrenched and re-formed as Repertoire, and under this banner have released a new version of the program.

Version 2.5.1 is not just an upgrade; it's a complete overhaul that fixes many of the inconsistencies that plagued earlier versions. Whereas before *Music Publisher* was slow and infuriatingly inflexible with text, it is now faster and has powerful text-typesetting capabilities. It also creates much smaller files. In my tests, it ran acceptably on a Mac Plus, SE, or Classic with at least two megabytes of RAM, though having a faster machine makes a big difference in performance. It requires System 4.1 or above and a PostScript-compatible printer.

Among Mac notation programs, *Music Publisher's* use of dedicated hardware for music entry is unique. The program comes bundled with a 36-key keypad called "Presto." This keypad plugs inline with, and sits next to, the Mac keyboard. (*Music Publisher* isn't copy-protected. Since the program won't run without Presto, illegal copies are useless.) You'll have to get used to working with both hands, because chords and notes are entered by typing pitches on Presto with your right hand, and durations, rests, and accidentals on the Mac keyboard with your left. All musical information is entered in one pass, and you see the results instantly.

The process of editing musical elements once they are on the screen works a bit differently than I expected. In *Music Publisher*, the mouse is used mainly for score layout and point-and-click selection of various tools. To actually edit, you must step through the elements on the screen, using the cursor keys, which is not Mac-like. Once you have learned the keyboard editing commands, however, it turns out to be amazingly fast and accurate (colored key-cap stickers are provided to help you remember the special symbols). Becoming comfortable with this approach does take time, but after you are over the hump, the usual Mac point-click-drag seems horribly slow by comparison.

The page layout interface, thank goodness, is completely Mac-like and easy-to-understand.

the EM rating system

EM reviews include 11-step "LED meters" showing a product's performance in specific categories chosen by the reviewer (such as ease of use, construction, etc.) and a "VU meter" indicating an overall rating. The latter is *not* a mathematical average, since some categories are more important than others. For example, if a guitar synth has great documentation and is easy to use, but tracks poorly, it could have several high LED meters and a low overall rating.

The rating system is based on the following values, where "0" means a feature is nonfunctional or doesn't exist, while a value of "11" surpasses the point of mere excellence (a rating of 10) and is indicative of a feature or product that is truly groundbreaking and has never before been executed so well.

Please remember that these are opinions, and, as always, EM welcomes opposing viewpoints. We urge you to contact manufacturers for more information, and, of course, tell them you saw it in EM.

Music Publisher includes its own excellent and comprehensive PostScript music font, Repertoire, from which the revived company has taken its name. Four different point sizes are available, and they can be intermixed as needed. (As a Type 3 font, *Music Publisher* does not benefit from Adobe *Type Manager*.) The program always displays music in page view. Documents can be of any length, and multiple documents (within the limits of available memory) can be opened and passages reliably cut, copied, and pasted between them.

The best way to work with *Music Publisher* is to lay your music out on paper first. This preparation is worth it, because even though *Music Publisher* can enter new systems on the fly and easily reposition the spacing of staves on a page, it is extremely difficult to do things like change the number of measures on a page, or repaginate documents after you have started. Barlines can be tweaked, however, and all musical elements are automatically reproportioned correctly.

Music Publisher allows you to create highly readable music, even if that music is of considerable complexity. The program has many outstanding features. It can align notation to any ratio of proportional spacing that is desired. Slurs and crescendos can be drawn with the mouse and resized or moved at will. You get automatic beaming and stem direction and can specifiy your own custom beaming rules (e.g., decide whether 7/8 time is phrased as 2 + 3 + 2, 4 + 3, or otherwise). Accidentals and articulation markings are placed automatically and correctly as they are entered, and you can manually reposition them later. Libraries of custom staff configurations can be created and stored for later use. Part extraction is reliable. Music can be transposed modally, moving up or down by scale degree, according to key and not just by parallel intervals. There are ruler guides for music and text that make it easy to combine the two. And the program's ability to align lyrics with notes (with the proper dashes between syllables) is exceptional.

BUT WHAT ABOUT MIDI?

Well, *Music Publisher* does offer MIDI playback of up to sixteen musical parts, with multiple parts per staff, including accurate interpretation of ties, crescendos, dynamics, and repeat signs (though it ignores tempo changes, and the screen does not scroll). And MIDI data can be entered successfully in step-time mode. But the program still can't read or write standard MIDI files, so you can't bring music in for notation from a sequencer, and the most important data-entry method of all (i.e., playing) does not work at all. *Music Publisher* accurately transcribes the first measure or so of what you play, then chokes and ignores everything else—assuming it doesn't crash.

The 210-page owner's manual is decent, but numerous errata and last-minute omissions make checking out the program disk's "Read Me" file a must.

Caveat emptor: Music Publisher has a spotty upgrade history. All the major bugs in the last version have been fixed in the current release, but users had to wait *two years* to get them. And telephone product support, at least in America, is poor. Even if you can reach the California support person without having to leave a recorded message, most technical questions must be referred to the Australian office. Getting a reliable answer can take weeks.

The bottom line is that *Music Publisher's* beautiful output makes it a good program for a professional music engraver/typesetter, but it is severely limited by its inability to import and export MIDI files. (According to the manufacturer, the product's main users are educators, music copyists, and publishers.) If you are not a professional engraver, or if all you want to do is compose music at the computer, you would be better off working with a program that offers more MIDI features and reasonable manufacturer support.

(Thanks to Nashville keyboardist/composer and *Music Publisher* user Keith Hyman.)

Repertoire U.S.
2-1645 E. Cliff Dr.
Santa Cruz, CA 95062
tel. (408) 476-1753

Repertoire Pty. Ltd.
49A Stephen Terrace
St. Peters, South Australia
5069
tel. +61 (08) 363-2600

Wheat Williams *is a concert critic for* Music Row *magazine. After six years living in Nashville, Tennessee, he has finally started listening to country music.*

OVERALL	6
Features	6
Ease of Use	7
Value	7
Support	5

● FIRST TAKES

Uptown Technologies Flash Audio Switcher ($500)

By Bob Hodas

Uptown Technologies' first product addresses musicians' and audio engineers' desire for noise-free, glitch-free, MIDI-controllable audio switching, layering, and muting. Flash is bidirectional, so a signal can be directed in through the Group A jacks (four stereo pairs, eight jacks total) and out via Group B (one stereo pair) for 4 × 1 stereo mixing and switching, or in Group B and out Group A for 1× 4 stereo splitting.

The 1U rack-mount device can be controlled via the front panel, an optional footswitch, and MIDI. It can route any signal up to 50 V and 0.1 W, including time code, control voltages, line-level or mic-level audio signals, and preamp outputs. Flash achieves its noise-free operation through the use of passive circuitry and opto-isolated switching resistors.

The front panel is simple, straightforward, and easy to operate. It includes a remote control jack, a trim in/out switch that provides electrical isolation, and a mute button with red LED. If trimming is required, as when layering, signal flow is restricted to the 4-into-1 direction, and the output level is lowered 10 dB. In Punch mode, you can select any combination of Group A pairs, while in Latch mode, the selection switch becomes an in/out momentary switch. An alphanumeric LED readout (with MIDI data indicator) indicates whether the left, right, or both channels are selected. Each of the four pairs in Group A has a gain pot, manual signal-routing switch, and indicator.

In addition to the eight in/out jacks for Group A and the Group B in/out stereo pair, the rear panel provides MIDI in/out/thru and another remote control jack. A tuner output sums all selected Group A left inputs. Twelve DIP switches are provided for setting MIDI channel, local control, merge, and response range. They also control the power-on default for ground-lift and several mute functions.

Flash has four signal-routing buttons on the front panel, so you're limited to sixteen possible routing combinations without MIDI. MIDI control allows more flexible routing, with 256 possible ways to route signals. Controllers govern the switching modes and mutes. You can control two Flash units on the same MIDI channel.

Up to six footpedals can be hooked up to control Flash. The footpedal gives you the same controls as the front panel, with the addition of a handy Punch/Latch mode switch. (It's tough to hit two footswitches at once, unless you're Jeff Baxter.) I found the footswitches difficult to operate; I had to stomp on them to do the switching, much more than any other footswitch I've encountered. *(An Uptown representative notes that the footpedal was designed for onstage stomping; an easier-to-operate version is promised.—SO)*

The unit's manual gives schematics, MIDI implementation charts, specs with graphs, and some good troubleshooting tips. It's easy reading and clearly explains all Flash operations. Numerous charts and figures clarify everything. Screened on the unit's top is a handy guide to the trim block-diagram and all of the DIP-switch settings, in case the manual is not within reach; a thoughtful touch.

The applications list is extensive and leaves little to the imagination. These are not the limits, but the beginnings, for the creative spirit. A few examples will give you an idea of what this unit can do:

- switching four stereo pairs, or eight mono items (instruments, tape, effects, samples, etc.), to the L/R output;
- layering with the same setup;
- multiple amplifier selection;
- expanding your console's effects sends by routing one send to several different effects;
- multiple guitar and effects selection with a single amp;
- channel or bus muting;
- running guitar effects in parallel instead of in series, providing much cleaner effects, in many cases; and the list goes on.

Some applications claims are a bit outrageous, though, and it's clear they have not been properly tested. Bitstream switching is really not in the realm of this unit. DAT editing is pushing it a bit; sequencing yes, editing no. By the way, Flash works in the analog domain only. But aside from a couple of overzealous claims, the device performs many extremely useful functions in true audiophile fashion. I found the switching to be absolutely glitch-free and the unit itself be extremely quiet, inducing no personality whatsoever into the program material. Flash has impressive specs, too: Claimed S/N on throughput is -108 dB, THD is less than 0.0008% (20 Hz to 20 kHz), and crosstalk is -96 dB at 1 kHz. Frequency response is stated at ±0.1 dB (20 Hz to 20 kHz).

For me, this is a handy tool for listening tests. I often compare several pieces of gear, such as mic preamps or DAT machines. Having a device like this allows me to select between different products straight from the source, through Flash, and out to the speaker amp. That's a clean way to go, uninfluenced by the often-noisy electronics of routing through a recording console. Flash is well-built, and I would have no second thoughts about taking it on the road.

My only gripe is that the unit operates unbalanced. This works for musical instruments, semi-pro recording equipment, and unbalanced effects; but in professional studios, the majority of equipment is balanced. I hope Uptown someday will build a balanced version.

Flash gives a quantum leap in flexibility and quality for the money. It's affordable and opens new territory for guitar and synth players and studios with console limitations. It eliminates many of your distribution nightmares with ease and, best of all, does it quietly.

Uptown Technologies, Inc.
PO Box 3111
Madison, WI 53704
tel. (414) 563-9932

10 OVERALL

Sound Quality 10
Documentation 10
User Interface 9
Value 9

Bob Hodas *is a recording engineer based in the San Francisco Bay Area. He has worked for Windham Hill, the Doobie Brothers, Barbara Higbie, Mickey Hart, and the Village People.*

Nady WML-50 MIDI Link Wireless MIDI ($499)

By Dan Phillips

You're wailing through your solo, your strap-on controller molded to your body. You leap, reaching for the peak of the melody...and your foot catches the MIDI cable, ripping it from your controller. The strap around your shoulders jerks your head down as your legs wonder what it would be like to be somewhere else entirely. You sound, look, and feel like a fool.

MAYBE IT'S TIME TO GO WIRELESS

For years now, wireless MIDI has been a reality, but only for those able to shell out the bucks. Nady Systems, famous for their wireless guitars and microphones, formerly offered such a product for a cool $4,500; their new WML-50 MIDI Link cuts the price of admission by about 80%.

The MIDI Link is meant to form half of a modular system, in conjunction with a normal audio wireless, such as Nady's own model 201 ($369). The MIDI Link "transmitter" converts your controller's MIDI data into an audio signal and sends it to the wireless audio transmitter. On the other end, the audio receiver passes the data to the MIDI Link "receiver," which converts the audio back into MIDI data. This design means the MIDI Link is really two separate systems, including two separate transmitters you carry on your body. The advantage of this is that you're not locked into a single choice for the audio wireless system. You can choose one that matches your specifications and budget, as long as it has a bandwidth of at least 15 kHz. For this review, I used the Nady 201.

Since the audio wireless system transmits the data, its quality will determine the range, and in part the consistency, of the MIDI Link. The Nady 201 has a range from a maximum of about 1500 feet in an unobstructed environment, down to about 200 feet when transmitting through walls, ceilings, or monolithic Marshall stacks. Naturally, the specs of other devices will vary. The 201 also features "diversity," which means that it constantly receives and transmits on two different channels; so if one becomes weak, the other takes over. This can be important when operating at the edge of the transmitter's range, and is generally considered to be preferable to non-diversity systems. The designer of the MIDI Link warns that some circumstances can cause the system to switch back and forth repeatedly between channels, which can result in discontinuities in MIDI communication. I never experienced this particular symptom, but *caveat emptor.*

Besides transmitting MIDI data, the

MIDI Link constantly sends a carrier signal. If the receiver loses the carrier (if the transmitter goes out of range, for instance), it shuts off all outstanding notes, zeroes out controllers, and generally cleans up any potential mess, an intelligent and appreciated feature.

The most common use for the MIDI Link will probably be with strap-on MIDI keyboards, and for this I found its performance exemplary. It transmitted note, aftertouch, pitch bend, and mod wheel data consistently, over considerable distance, through walls and floors. After expending so much energy (and duct tape) cleaning up my onstage wiring setup, it was a joy just to wander around without worrying about cables.

I tested the MIDI Link with a Yamaha WX7 wind controller with less than total success. The WX7 can send *huge* amounts of pitch bend and breath controller data, and during very fast runs, the MIDI Link occasionally would leave notes hanging. I'll stress that this was an acid test, and even heavy use of polyphonic aftertouch from a keyboard didn't replicate the problem.

To accomplish its job, the MIDI Link must squeeze MIDI's 31.25 kHz bandwidth into 15 kHz of audio (a reduction of greater than 2-to-1), limiting the amount of data that can be transmitted. Data compression and a number of "tricks" are used to minimize the real-life effects of this reduced bandwidth. When the controller data becomes too much for it, the MIDI Link preserves the overall contours of the data—the high and low points—while stripping out the parts in between. Because of these techniques, the manual claims, the 15 kHz audio signal usually can handle the full MIDI bandwidth, going down to a minimum of one fourth of full standard in the worst cases.

The manual doesn't recommend sending "MIDI timing," because of stress on the system's bandwidth, but it's not made clear what that means. At one point, it is implied that MIDI clocks would overload the system, but this doesn't make sense. Even at very high tempos, clock messages use only a few percent of MIDI bandwidth. If the reference is changed to MIDI Time Code, however, the warning is clear and reasonable.

MIDI Link's handling of system exclusive data is also somewhat limited (messages can be no longer the 128 bytes). Normally, real-time parameter changes would be the only use for sending sysex transmitting from a remote controller, and this would not stress the unit's capacity.

While the MIDI Link seems most suited for use with a remote controller, it has a feature aimed at alleviating bandwidth limitations when transmitting sequence data. Channel 10 is designated as a priority channel, data coming in on that channel takes precedence over everything else, and is passed through uninterrupted even if other data must be delayed. If you wanted to transmit both drums and strings, for instance, you'd send the drums, which demand precise timing, on channel 10, and the strings, whose slow attack can be fudged, on another channel. The MIDI link even has a second priority channel, which takes precedence over all channels but 10.


Nady wireless MIDI System

To test the effectiveness of MIDI Link's channel prioritizing and data compression, I played a *Performer* sequence on a Macintosh Plus, and found the MIDI Link could handle nearly as much data as the Mac itself before exhibiting delays, and this was a good deal more than any keyboardist is likely to send. The channel priority scheme worked as ad-

DON'T STOP THE MUSIC!

Unlike other Macintosh™ based Midi sequencers, Cubase has the facility to go on playing/recording when you edit, load and save to disk or even when you use other applications under Multi-finder.™ No greyed menu options. No inspiration lost.

In addition, Cubase offers all the features one would expect from the leaders in computer sequencing; 4 distinct edit windows, standard notation and user definable groove quantize are all standard.

The straight forward Graphic User Interface lets you forget you're using a computer in no time at all.

Not something that can be said of other Mac Sequencers.

NEW FEATURES Ver. 1.5

- **MIDI Mixer (Dynamic MIDI Manager).**
- **Interactive Phrase Synthesizer.**
- **Fully compatible with MOTU MIDI Time Piece.**
- **Apple MIDI Manager Compatible.**
- **MAC Fx Compatible.**

Cubase

STEINBERG DISTRIBUTORS

U.S.A.:
Steinberg/Jones
17700 Raymer Street, Suite 1001
Northridge CA 91325

GERMANY:
TSI Today's Instruments GmbH
Neustraße 9-12
D-5481 Waldorf

SWITZERLAND:
Jaques Isler AG
Badenerstraße 808-810
CH-8048 Zürich

ENGLAND:
Evenlode - Soundworks
The Studio
Church Street
Stonesfield
GB-Oxford OX7 2PS

BENELUX:
James B. International
Schinkelse Baan 15A
NL-2908 Le Capelle a/d Ijssel

FRANCE:
Saro Informatique Musicale
66 Blvd. Voltaire
F-75011 Paris

SPAIN:
Ventamatic - Una division
de Hypertech S.A.
c./Corcega 89 entlo
E-08029 Barcelona

ITALY:
Midi Ware S.R.L.
Via Pilo Albertelli 9
I-00195 Roma

DENMARK:
New Music
Teatergarden
Vestergade 48 K
DK-8000 Aarhus C

FINLAND:
Studiotec
Kuusiniemi 2
SF-02710 Espoo

SWEDEN:
Ab Greg Fitzpatrick
Hagagatan 10 / Box 19042
S-10432 Stockholm

NORWAY:
Applied Computer Science
Hoffsveien 10
N-0275 Oslo 2

GREECE:
Micro Music System
Melon S.A.
137 Solonos Str.
GR-10677 Athen

JAPAN:
Cameo Interactive, LTD.
10-8 Yocho-Machi
Shinjyuku-Ku
Tokyo, 162

AUSTRIA:
Nagler
Herrengasse 1
A-8720 Knittelfeld

Steinberg

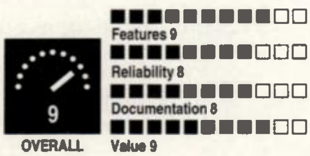
*Macintosh and Multi-finder are registered trademarks of Apple Computer, Inc. U.S.A.

Steinberg JONES PH: 818-993-4091 FAX: 818-701-7452 vertised, passing drum tracks through unhindered even when other channels were loaded with rather large amounts of data.

The MIDI Link receiver has two MIDI ins, so data from another source, such as a sequencer, can be merged with the controller's data. Since it's made to send and receive MIDI as audio data, the MIDI Link can record and play back MIDI to and from normal audio tape, provided the tape recorder has at least a 15kHz bandwidth.

All in all, I found the MIDI Link to be both fun and useful, and a great relief after years of being bound to my cables. The note-hanging with the WX7 shouldn't concern those who wish to use the MIDI Link with keyboard controllers; again, its performance with a strap-on keyboard was uniformly excellent. Nady has brought the price of wireless MIDI down to the point where those of us who aren't on world tours can afford it. For that, they deserve a salute...from the front of the stage, with no cables to trip on.

Nady Systems
6701 Bay St.
Emeryville, CA 94608
(415) 652-2411

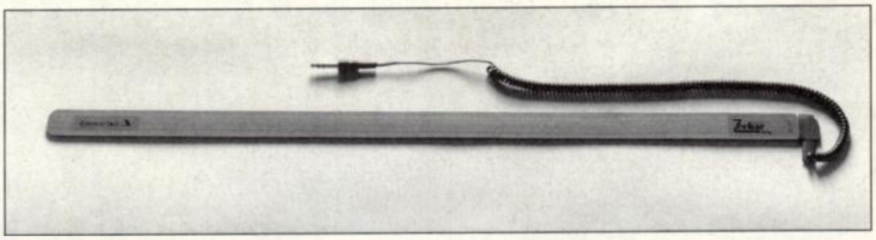


Dan Phillips *is a singer, keyboardist, and composer, and works as a product specialist for Korg Research and Development. He'd like to thank Gernot Huber, for the use of his Macintosh in time of need.*

ZimmerWorks Zeebar Fingerstrip ($149)

By Charles R. Fischer

It's a sad fact of life that most electronic instruments offer little in the way of comfortable, expressive, real-time controllers. Nonetheless, there is still an occasional glimmer of hope when a powerful, new product pops up. If the idea of adding expressive capabilities to your present equipment is appealing, I've got just the thing for you. The Zeebar Fingerstrip, manufactured by ZimmerWorks, Inc., is a pressure-sensitive strip designed to work (without any modifications) with products made by Anatek, Ensoniq, Roland, and Yamaha. The bar offers a number of unusual features for a very reasonable price.



Zimmerworks Zeebar Fingerstrip

The Zeebar is unusual both in appearance and function. A 33 x 1 ¼-inch strip of a gray, rubber-like substance with a coiled cord and a stereo phone plug, the Zeebar bears a slight resemblance to the original Moog ribbon controller. But the Zeebar definitely is not a ribbon controller. Instead, it responds to pressure applied from a finger or hand.

Originally, the device was designed to be mounted underneath the keyboard, providing pseudo-aftertouch for the Ensoniq ESQ-1 or SQ-1. While better than no aftertouch at all, the effect only works on the white keys. I much prefer the pressure-sensing mechanism on the SQ-80.

A broader range of capabilities can be obtained by mounting the bar on the instrument's front panel, directly behind the keyboard. You can control the action of the Fingerstrip with an unused finger from either hand. While hardly traditional, this technique can be very effective. By using the Zeebar for pitch bend or modulation, you are able to keep your hands on the keyboard without the inconvenience of reaching for the wheels.

The Fingerstrip works with Ensoniq keyboards and their rack-mount equivalents, including the EPS, SQ-80, SQ-1, and VFX/VFX^{SD}, with Yamaha breath controller inputs, and with the Anatek Pocket Pedal (reviewed in the May 1989 **EM**). It's easy to set up: Mount the bar, plug the cable into the pedal/CV jack, and you're done.

On Ensoniq instruments, the Zeebar replaces the CV pedal and can be set to send mod wheel data or MIDI volume. There is, however, a drawback to using the Zeebar to control volume; an instrument will send a level of zero whenever the sensor is untouched, which forces the player to lean into the keyboard at all times. On the other hand, I found that using the unit to control the volume of string parts gave the phrasing a much more realistic feel.

The Pocket Pedal and Zeebar combination worked exceptionally well, using an adapter cable available from Zimmerworks ($11.50, plus $2.50 s/h). Since the Pocket Pedal is designed to merge incoming data along with the data coming from the strip, the pair will work with your present controller.

I also experimented with placing the device on the floor and using it as a momentary footpedal. Used to control the release time of the envelopes in an E-mu Proteus piano patch, the Zeebar provided a far more subtle way of controlling the release time than the on/off operation of a footswitch could. By changing the way my foot came off the sensor, I could produce variations from phrase to phrase.

The Zeebar is capable of resolving finger pressure precisely, without generating unwanted glitches or irregularities. After a little practice, you can lean on the unit until the desired output level is reached. It only took a few minutes to get used to the feel of the sensor; the surface feels great and is designed to be responsive to slight variations in pressure.

As for construction, I couldn't help but admire the work that went into the Zeebar. It feels terrific; it's well-made, and it actually encourages the user to figure out new playing techniques. The Zeebar isn't for everyone (a lot of folks won't have a clue how to use it), but it can add considerably to the power of your instrument. If you are interested in the expressive side of electronic music, I strongly recommend the Zeebar Fingerstrip.

Overall Rating: 9. *ZimmerWorks, Inc., PO Box 12812, Lexington, KY 40583; tel. (606) 223-1888.* ■

Now! Experience the electronics behind the MIDI revolution as you build your own computer-controlled music center

Only NRI's innovative, at-home training in Electronic Music Technology gives you hands-on experience with the equipment that's revolutionizing the music industry—Atari ST Series computer with built-in MIDI ports, Casio HT-3000 synthesizer with advanced MIDI operations, and ingenious MIDI software that links computer keyboard to synthesizer keyboard—all yours to train with and keep!

This year, over $1.5 billion worth of digital electronic music instruments, from keyboards to drum machines, will be sold in the U.S. alone. Enthusiasts everywhere—professional musicians and recording technicians, even people who have never touched a musical instrument before—are discovering the excitement of today's electronic music technology.

At the heart of this excitement is MIDI (Musical Instrument Digital Interface), an innovation that's transformed musical instruments into the ultimate computer peripherals...and opened up a whole new world of opportunity for the person who knows how to use, program, and service this extraordinary new digital equipment.

Now NRI's breakthrough Electronic Music Technology course puts you at the forefront of this booming new technology with exclusive training built around a MIDI-equipped computer, MIDI synthesizer, and MIDI software you keep.

Dynamic new technology opens up new career opportunities

The opportunities are unlimited for the person who's trained to take advantage of today's electronic music phenomenon. Now you can prepare for a high-paying career as a sound engineer, recording engineer, or road technician... even start your own business selling and servicing today's high-tech musical instruments. Or simply unleash your own musical creativity with the breakthrough training and equipment only NRI gives you.

Only NRI gives you hands-on training with today's MIDI technology

The Atari ST Series computer included in your course becomes the heart of your own computer-controlled music center. With its tremendous power, superior graphics capabilities, and built-in MIDI interface, the 16/32-bit Atari ST has almost overnight become the computer of choice for today's most knowledgeable electronic musicians.

Your Casio HT-3000 synthesizer features a five-octave, MIDI-compatible digital keyboard with built-in monitor speakers, advanced tone editing and writing, pattern memory, keyboard split, tone and rhythm banks, chord memory, and dozens more state-of-the-art capabilities.

Plus you get ingeniously designed MIDI software that opens up amazing new creative and technical possibilities... you actually build your own 4-input audio mixer/amplifier...and you test the electronic circuits at the core of today's new equipment with the hand-held digital multimeter also included in your course.

*NRI training **includes** an Atari ST computer, Casio synthesizer, exclusive MIDI software, and much more—all yours to train with and keep! (TV not supplied)*

No previous electronics or music experience necessary

No matter what your background, NRI gives you the skills you need to take advantage of today's opportunities in electronic music technology.

With your experienced NRI instructor always available to help, you master the basics of electronic theory step by step, gaining the full understanding of electronics that's now so essential for technicians and musicians alike.

You move on to analyze sound generation techniques, digital logic, microprocessor fundamentals, and sampling and recording techniques... ultimately getting first-hand experience with today's explosive new technology as you explore MIDI, waveshaping, patching, sequencing, mixing, special effects, and much more.

Plus, even if you've never been involved with music before, NRI gives you enough basic training in music theory and musical notation to appreciate the creative potential and far-reaching applications of today's electronic music equipment.

Send today for FREE catalog

If the coupon is missing, write to NRI Schools, McGraw-Hill Continuing Education Center, 4401 Connecticut Avenue, NW, Washington, DC 20008.

NRI Schools
McGraw-Hill Continuing Education Center
4401 Connecticut Avenue, NW, Washington, DC 20008

☑ **Check One FREE Catalog Only**

For Career courses approved under GI bill ☐ check for details.

☐ **Electronic Music Technology**
☐ Microcomputer Servicing
☐ TV/Video/Audio Servicing
☐ Security Electronics
☐ Basic Electronics
☐ Computer Programming
☐ Desktop Publishing and Design
☐ Fiction/Nonfiction Writing
☐ Bookkeeping & Accounting

Name ______________ Age ______

Address ______________

City/State/Zip ______________

Accredited Member, National Home Study Council

#370-041

deep and thorough: "It does have some 'signature' sounds, such as 6-octave chord voicings or effortless 3-octave arpeggios, but it doesn't necessarily impose a sound of its own on the music," he enthuses. The Hotz Translator may appeal especially to guitarists, with its specific approach to a chord-based harmonic system. Though pricey, it may be one of the more flexible interactive performance interfaces available today.

If you yearn for flexibility without the high price, examine the recent crop of musical programing languages available for home computers. Custom software has become accessible to non-programmers with the advent of iconic programming languages such as Hip Software's *Hookup* and Opcode's *Max*, both for the Macintosh (see "Programming For the Rest of Us" in the July 1990 **EM**). *Hookup* is an enjoyable program that allows you to patch together a variety of modules that either generate or modify events. *Hookup* can read incoming MIDI notes and record, transpose, and echo them, then spit them back out. It even can use MIDI as the basis for controlling graphic animation. *Hookup*'s biggest drawback is its speed; real-time applications essentially require a Mac II.

Opcode's *Max*, though more expensive than *Hookup*, runs much faster. *Max* also contains a wider range of programming modules as well as hooks for adventurous programmers to add their own objects. David Wessel, a composer at UC Berkeley's CNMAT, has been using *Max* to perform real-time transformations of live, solo, acoustic instruments (see **Fig. 3**). He records melodic riffs from a pitch-to-MIDI converter as they are performed by a soloist and assigns these short note sequences to keys on a keyboard. He then transforms these riffs into chords, among other things, and plays them back via MIDI in a duo improvisation. Wessel's system characterizes one major approach to interactive performance techniques, where simple actions can trigger complex sequences of events. Typifying the more subtle approach to performance intervention, Carter Scholz used *Max* to design a real-time just intonation processor that monitors a DX7 keyboard and responds by sending microtuning data. This system allows a performer to improvise complex chords and key changes while maintaining the purest possible intervals.

TECHNIQUES AND TRICKS

Though new products are nice, they aren't necessary for getting involved with interactive technologies; you may already have what you need. The most important point to remember is that it's the approach to using equipment that makes the biggest difference.

For example, many of the products mentioned above do little more than transform one MIDI message into another. Several products have been available that do just that, including the Axxess Mapper and the Oberheim Perf/X Mapper. Admittedly, neither of these devices is particularly easy to program, but they contain the muscle to perform tasks very similar to programs like *sYbil*. Whereas *sYbil* is optimized to interact with the pitches of your performance, these other mappers are

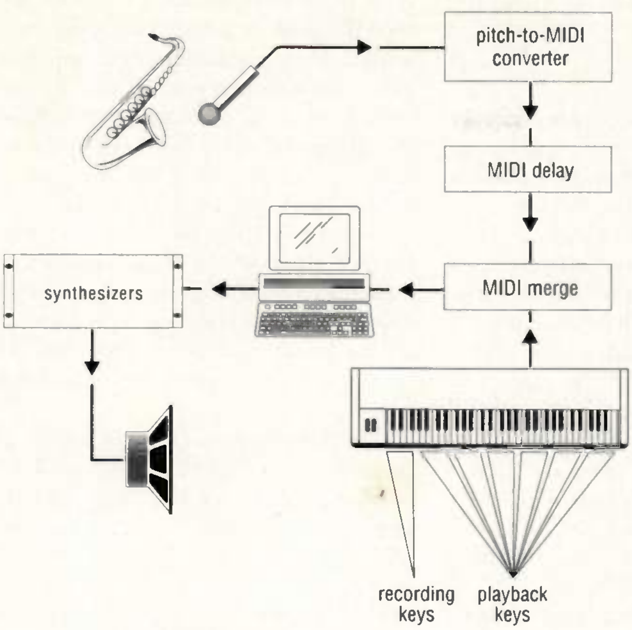


FIG. 3: Using the Max language for the Macintosh, composer David Wessel's system allows him to record short MIDI riffs generated by the saxophonist and then play along with them via his MIDI keyboard.

more general. It would be difficult to get a typical mapper to generate the riffs and cyclic transpositions that *sYbil* can, but with the ability to transform virtually any message into something else, a well-designed mapper can suggest different avenues for exploration.

Let us not forget one of the oldest and most abused interactive performance tools: the arpeggiator. The ill-fated Oberheim Cyclone took arpeggiation to a new level of sophistication. Its abilities harken back to the work of Rosenboom and Buchla, allowing the performer real-time interaction with parallel loops of notes.

For added musical expression, take a look at MIDI slider boxes like the J.L. Cooper FaderMaster (reviewed in November 1989), Lexicon MRC (reviewed in July 1989), and this month's DIY project, the **EM** MIDI Fader (see p.90). Besides the obvious uses, such as real-time effects modulation, these little gadgets can control anything that listens to a continuous controller. For example, try merging one of these slider boxes with sequencer note data, then program your synth to assign the proper MIDI controllers to voice parameters such as filter cutoff or envelope attack. You then can perform live, expressive changes on prerecorded material, adding an element of subtle continuous change unavailable within most sequencer environments.

Many computer sequencers let you do more than just push the start button. One of the very first MIDI sequencers, Dr. T's *KCS* (see "KCS Made Easy" in the September 1988 issue), still may be the best for these applications. With its ability to control sequences independently and simultaneously from the computer keyboard, it lends itself perfectly to interactive performance. Many people have upgraded from the Commodore 64, which originally ran *KCS*, and their old C-64 collects dust in the closet. Perhaps it's time to revive the old beast. Programs like *KCS* can perfectly augment more recent sequencers when the two are running in tandem. For example, *KCS* can store MIDI system exclusive, as well as notes and program changes. I use it to store microtuning data, allowing me to change tunings "on-the-fly" while improvising on a keyboard. I also use it to generate pseudo-random "critters" while performing other sequencing duties on a companion computer. Sequencers such as Opcode's *Vision* or Southworth's (now defunct) *MidiPaint* have similar capabilities to Dr.T's *KCS* and similarly can be turned to unusual duties. Many such sequencers allow you to trigger sequences from MIDI note-on messages. You can orchestrate complex sequencer improvisations by recording short riffs into the sequencer, assigning them to MIDI notes, then triggering them from a MIDI controller while you play.

CONCLUSION

Interactive performance tools may have been born from the avant-garde, but they quickly are entering the mainstream. Their ability to inspire us to infuse life into electronic music, add to our expressive vocabulary, discover new musical structures, and explore the range of human creativity should be of interest to musicians of all types. Nevertheless, we musn't forget that our musical intentions, not the equipment, should guide us through this new territory. It's tempting to view an interactive performance system as a gimmick to make us sound good if we lose our creative drive, but there is no such thing as a creative panacea.

Interactive performance tools present an irony: They promise to free us from a slavish relationship to technology while further blurring the boundaries between human and computer-generated music. Before we succumb to the hype that inevitably surrounds such complex developments, let us consider that the basic relationship between a musician and a musical instrument has always been interactive. A critical feedback loop exists from mind to muscle to instrument to ear and back to mind. Whenever we play a musical instrument, it also plays us. In performance, sequencers break this feedback loop. We become their slaves. While interactive tools may be pushing the definitions of a musical instrument, perhaps by freeing us from sequencers, they can return us to some of the basics of making music.

(Special thanks to Craig Anderton, Dave Levitt, Steve Lipson, Tod Machover, Dave Wessel, Tony Widoff, and especially Carter Scholz for all their help.)

Robert Rich *composes electronic music using only kazoos and whoopee cushions. No, really. Well...OK, he used a spring reverb once, but he only kicked it to make it go "boing." He also refuses to hype his latest album, "Strata," with Steve Roach, on Hearts of Space Records.*

List of Products

This is a list of some available MIDI products that can be used for interactive performance. Products are listed alphabetically by manufacturer. The shareware and public-domain programs listed can be found on computer bulletin boards, including the PAN network (see "Going Online: A Guide to Electronic Bulletin Board Systems" in the November 1990 issue for more details on a free sign-up offer for PAN).

Aphex
tel. (818) 767-2929
Aphex Studio Clock

Atari
tel. (408) 745-2000
Hotz Translator (Requires ST)

Buchla and Associates
tel. (415) 528-4446
Thunder

Cool Shoes
tel. (617) 229-9942
Drummer (PC)
Sound Globs (PC)

Dr. T's
tel. (617) 455-1454
Fingers (ST)
Jam Factory (Mac)
KCS (C-64/128, Apple II, ST, Mac, Amiga)
Keys (ST)
M (Mac, ST, Amiga)
Music Mouse (Mac, ST, Amiga)
Realtime (ST)
Tunesmith (ST)
Upbeat (Mac)

Frog Peak Music
tel. (415) 430-2191
HMSL (Amiga, Mac)

Hip Software
tel. (617) 661-2447
Harmony Grid (Mac)
Hookup (Mac)

HoloGramophone Research
tel. (212) 529-8845
Hyperchord Music Exploration Kit (Amiga)

Hybrid Arts
tel. (213) 841-0340
Ludwig (ST)

Iopherian Creations
tel. (914) 298-1710
Matrix Music Magic (C-64, PC)

Megalomania (shareware)
Written by Eric Huffman (Mac)

Music Box (public domain)
Written by John Dunne (PC)

MiBAC
tel. (507) 645-5851
MiBAC (Mac)

Opcode
tel. (415) 369-8131
Max (Mac), *Vision* (Mac)

PG Music
tel. (416) 528-2368
Band-in-a-Box (PC, ST, Mac)

Scorpion Systems
tel. (415) 864-2956
sYbil (Mac, ST, PC)

Voyetra
tel. (914) 738-4500
M (PC)

Hundreds of MIDI Sequences Just a Phone Call Away!

MIDI Records™ are pre-recorded MIDI sequences that you can use on gigs, for practice, learning to play and just having a lot of fun. Load them into your computer or MIDI sequencer, play them back and interact with the music. Recorded by studio musicians, MIDI Records are complete professional arrangements of the world's most popular music. Choose from Big Band, Rock, Jazz, Oldies, Top 40, R&B, Classical and more.

The songs come on computer diskettes that you play on your sequencer or MIDI software. Play MIDI Records with any MIDI gear. Conduct the band, arrange the parts, customize the sound, provide backup for rehearsal or performance, learn and interact with the music. Each song contains the original instrument parts on individual tracks. Most songs include vocal parts.

MIDI Records are available in Macintosh, IBM, Atari ST, and Roland MC series formats. If you use Cakewalk™, Master Tracks Pro™, Performer™, Pro 4™, Sequencer Plus™, Trax™, Vision™, MC-300™, MC-500™ or other MIDI sequencers, MIDI Records are for you!

ARTIST	TITLE	PART #
a		
Paula Abdul	COLD HEARTED	00296
	STRAIGHT UP	00052
Alabama	MOUNTAIN MUSIC	00166
	DAISY JANE	00497
Animotion	CALLING IT LOVE	00291
Association	ALONG COMES MARY	00460
	CHERISH	00489
	NEVER MY LOVE	00627
Rick Astley	NEVER GONNA GIVE YOU UP	00096
	TOGETHER FOREVER	00781
Atlantic Starr	ALWAYS	00123
Average White Band	PICK UP THE PIECES	00869
b		
Babyface	IT'S NO CRIME	00356
	WHIP APPEAL	00977
Anita Baker	BEEN SO LONG	00060
	GIVING YOU THE BEST THAT I GOT	00329
	SWEET LOVE	00059
Basia	PROMISES	00770
Beach Boys	CALIFORNIA GIRLS	00483
Beatles	A LITTLE HELP FROM MY FRIENDS	00952
	ALL MY LOVIN'	00157
	AND I LOVE HER	00960
	BECAUSE (THE SKY IS BLUE)	00964
	CAN'T BUY ME LOVE	00940
	CARRY THAT WEIGHT	00968
	ELEANOR RIGBY	00939
	FOOL ON THE HILL	00953
	GET BACK	00838
	GOLDEN SLUMBERS	00967
	GOOD DAY SUNSHINE	00950
	GOT TO GET YOU INTO MY LIFE	00158
	HERE COMES THE SUN	00962
	HERE THERE & EVERYWHERE	00951
	HEY JUDE	00937
	I SAW HER STANDING THERE	00151
	IF I FELL	00949
	LONG AND WINDING ROAD	00959
	MICHELLE	00936
	NORWEGIAN WOOD	00935
	REVOLUTION	00954
	SHE CAME IN THROUGH THE BATHROOM WINDOW	00965
	SHE LOVES YOU	00934
	SOMETHING	00933
	TAXMAN	00938
	THE END	00969
	TICKET TO RIDE	00948
	TWIST AND SHOUT	01242
	WE CAN WORK IT OUT	00961
	YESTERDAY	00946
	YOU NEVER GIVE ME YOUR MONEY	00966
Beegees	STAYING ALIVE	00682
George Benson	I JUST WANNA HANG AROUND YOU	00015
Marcie Blaine	BOBBY'S GIRL	00475
Michael Bolton	HOW AM I SUPPOSED TO LIVE WITHOUT YOU	00958
	HOW CAN WE BE LOVERS	00973
	THAT'S WHAT LOVE IS ALL ABOUT	00023
Booker T. & M.G.'s	GREEN ONIONS	00840
Boys Don't Cry	I WANNA BE A COWBOY	00565
Bobby Brown	MY PREROGATIVE	00003
	ROCK WIT'CHA	00778
c		
Cameo	BACK & FORTH	00286
Belinda Carlisle	HEAVEN IS A PLACE ON EARTH	00544
Eric Carmen	ALL BY MYSELF	00458
Cars	DRIVE	00139
	LET'S GO	00595
Ray Charles	WHAT'D I SAY	00759
Cher & Peter Cetera	AFTER ALL	00277
Neneh Cherry	BUFFALO STANCE	00274
Chicago	25 OR 6 TO 4	00815
	FEELIN STRONGER EVERY DAY	00524
	YOU'RE NOT ALONE	00118
Gavin Christopher	ONE STEP CLOSER TO YOU	00005
Petula Clark	DOWNTOWN	00516
Phil Collins & Phillip Bailey	EASY LOVER	00520
Creedence Clearwater Revival	BAD MOON RISING	00214
	PROUD MARY	00213
Coasters	POISON IVY	00196
Natalie Cole	PINK CADILLAC	00133
Contours	DO YOU LOVE ME	00176
Cream	BADGE	00468
	WHITE ROOM	00726
Jim Croce	BAD BAD LEROY BROWN	00466
Christopher Cross	RIDE LIKE THE WIND	00659
d		
Terence Trent D'Arby	WISHING WELL	00199
Dave Clark Five	ANY WAY YOU WANT IT	00463
	BECAUSE	00471
Spencer Davis	I'M A MAN	00990
Taylor Dayne	DON'T RUSH ME	00170
	TELL IT TO MY HEART	00051
El De Barge	SOMEONE	00047
Chris De Burgh	LADY IN RED	00016
Dead Or Alive	COME HOME WITH ME BABY	00297
Neil Diamond	LOVE ON THE ROCKS	00121
Dion	RUNAROUND SUE	00663
Dion & Belmonts	THE WANDERER	00207
Thomas Dolby	AIRHEAD	00457
Don & Juan	WHAT'S YOUR NAME	00155
Doobie Brothers	WHAT A FOOL BELIEVES	00723
Double	CAPTAIN OF HER HEART	00485
Drifters	UNDER THE BOARDWALK	00153
Duran Duran	ALL SHE WANTS IS	00278
e		
Eagles	ALREADY GONE	00202
Eighth Wonder	CROSS MY HEART	00299
Erasure	CHAINS OF LOVE	00294
Gloria Estefan	GET ON YOUR FEET	00771
	HERE WE ARE	00974
Betty Everett	SHOOP SHOOP (IT'S IN HIS KISS)	00152
Everly Brothers	BYE BYE LOVE	00169
Every Mother's Son	COME DOWN TO MY BOAT	00490
Expose	SEASONS CHANGE	00405
f		
Fine Young Cannibals	GOOD THING	00330
	SHE DRIVES ME CRAZY	00411
Roberta Flack	MAKING LOVE	00613
Fleetwood Mac	AS LONG AS YOU FOLLOW	00283
Foreigner	I DON'T WANT TO LIVE WITHOUT YOU	00084
Four Seasons	DAWN (GO AWAY)	00501
	DECEMBER 1963 (OH WHAT A NIGHT)	00632
Four Tops	BABY I NEED YOUR LOVIN'	00182
	I CAN'T HELP MYSELF	00181
Glen Frey	THE HEAT IS ON	00110
g		
Giant Step	ANOTHER LOVER	00280
Al Green	LET'S STAY TOGETHER	00596
Lee Greenwood	GOD BLESS THE USA	00078
h		
Hall & Oates	I CAN'T GO FOR THAT	00558
	KISS (IS) ON MY	00590
	PRIVATE EYES	00652

The Artists are listed for the sole purpose of assisting in selection of Music Data Sequences.
The Artists are in no way involved with the recording and/or production of Music Data products.

"If you're just starting out in the world of MIDI sequencing, this material could give you a big head start...They're very close, much closer than published sheet music when it comes to accuracy...MIDI Records are an unbeatable shortcut."

—Jim Aikin, Keyboard Magazine October 1990

The Only Thing Missing is You!

Order MIDI Records Today and get free sequences and free MIDI Software with your order!

For a limited time, the Music Data Company is offering free sequences and free software to first time buyers of MIDI Records. If you purchase five or more songs you receive an additional MIDI Record of your choice absolutely free.

Play music, make tapes, accompany carolers and entertain your friends. Experience what people are calling the future of music. If you are into MIDI sequencing, get into MIDI Records today.

MIDI Records have been nominated for a 1990 MacUser Eddy™ Award as best new data resource!

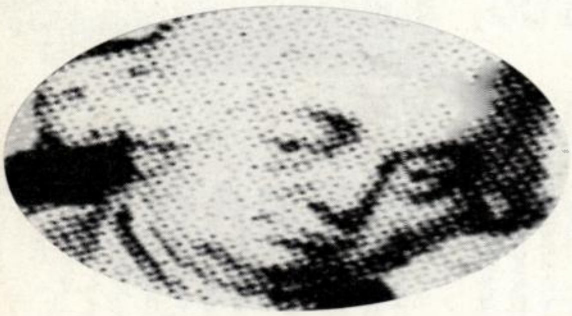
MIDI RECORDS™

ARTIST	TITLE	PART #
Wilbert Harrison	KANSAS CITY	00210
Heart	THESE DREAMS	00193
	WHAT ABOUT LOVE	00115
Heatwave	ALWAYS & FOREVER	00461
Don Henley	THE BOYS OF SUMMER	00108
Hollies	AIR THAT I BREATHE	00456
Buddy Holly	NOT FADE AWAY	00148
	PEGGY SUE	00150
	THAT'LL BE THE DAY	00149
Bruce Hornsby	MANDOLIN RAIN	00094
	THE VALLEY ROAD	00111
	THE WAY IT IS	00112
Whitney Houston	HOW WILL I KNOW	00172
	LOVE WILL SAVE THE DAY	00054
	ONE MOMENT IN TIME	00053
	SO EMOTIONAL	00055
	WHERE DO BROKEN HEARTS GO	00442
Huey Lewis & The News		
	HEART OF ROCK & ROLL	00007
	HIP TO BE SQUARE	00008
	I WANT A NEW DRUG	00086
	PERFECT WORLD	00006
i		
Billy Idol/Tommy James		
	MONY MONY	00212
Inxs	NEED YOU TONIGHT	00380
j		
Janet Jackson	MISS YOU MUCH	00375
	WHAT HAVE YOU DONE FOR ME LATELY	00198
Michael Jackson	BAD	00820
	BILLIE JEAN	00473
	THE WAY YOU MAKE ME FEEL	00021
Al Jarreau	LET'S PRETEND	00092
	MORNING	00046
	RAGIN' WATERS	00100
Jets	CURIOSITY	00496
Billy Joel	ALLENTOWN	00459
Elton John	BITCH IS BACK	01021
	CLUB AT THE END OF THE STREET	01023
	DANIEL	00500
	GOODBYE YELLOW BRICK ROAD	00536
Elton John & Aretha Franklin		
	THROUGH THE STORM	00048
Johnny Hates Jazz	SHATTERED DREAMS	00103
Howard Jones	THINGS CAN ONLY GET BETTER	00703
k		
Johnny Kemp	BIRTHDAY SUIT	00289
Ben E. King	STAND BY ME	00879
Kool & The Gang	CELEBRATION	00488
l		
Steve Lawrence	GO AWAY LITTLE GIRL	00533
Gary Lewis	COUNT ME IN	00494
Jerry Lee Lewis	WHOLE LOTTA SHAKIN GOIN ON	00271
Little Anthony & The Imperials		
	GOING OUT OF MY HEAD	00211
Little Eva	DO THE LOCOMOTION	00604
Kenny Loggins	FOOTLOOSE	00019
Loggins & Messina	YOUR MAMA DON'T DANCE	00745
Los Lobos	LA BAMBA	00206
m		
Madonna	BURNIN' UP	00068
	WHO'S THAT GIRL	00203
Barry Manilow	COULD IT BE MAGIC	00493
Richard Marx	ENDLESS SUMMER NIGHTS	00074
	HOLD ON TO THE NIGHT	00081
	RIGHT HERE WAITING	00395
Mary Jane Girls	IN MY HOUSE	00132
Johnny Mathis	MISTY	00189
Bill Medley & Jennifer Warnes		
	(I'VE HAD) THE TIME OF MY LIFE	00275
Paul McCartney	MAYBE I'M AMAZED	00941
Miami Sound Machine		
	ANYTHING FOR YOU	00281
	BAD BOYS	00065
	BETCHA SAY THAT	00058
	ONE TWO THREE	00057
	WORDS GET IN THE WAY	00116
George Michael	FAITH	00011
	FATHER FIGURE	00194
	ONE MORE TRY	00387
George Michael & Aretha Franklin		
	I KNEW YOU WERE WAITING FOR ME	00049
Bette Midler	THE ROSE	00204
	WIND BENEATH MY WINGS	00032
Mike & The Mechanics		
	SILENT RUNNING	00205
	THE LIVING YEARS	00120
Milli Vanilli	BABY DON'T FORGET MY NUMBER	00285
	BLAME IT ON THE RAIN	00914
	GIRL YOU KNOW IT'S TRUE	00327
Mitch Ryder & The Detroit Wheels		
	DEVIL - BLUE DRESS / GOOD GOLLY MISS MOLLY	00180
Monkees	I'M NOT YOUR STEPPIN' STONE	00572
Van Morrison	MOONDANCE	00188
Mr. Mister	BROKEN WINGS	00067
	KYRIE	00090
n		
Edie Brickel & New Bohemians		
	WHAT I AM	00215
o		
Sinead O'connor	NOTHING COMPARES 2 U	01001
Billy Ocean	CARIBBEAN QUEEN	00487
	GET OUTTA MY DREAMS	00164
	WHEN THE GOING GETS TOUGH	00061
Roy Orbison	CRYING	00167
K.T. Oslin	DO YA	00072
	HOLD ME	00050
Donny Osmond	SOLDIER OF LOVE	00033
p		
Robert Palmer	ADDICTED TO LOVE	00185
	SIMPLY IRRESISTABLE	00105
Paul Revere & The Raiders		
	HUNGRY	00034
	INDIAN RESERVATION	00036
	KICKS	00035
Pebbles	MERCEDES BOY	00056
	TAKE YOUR TIME	00979
Wilson Pickett	IN THE MIDNIGHT HOUR	00850
	KNOCK ON WOOD	00040
Bobby (boris) Pickett & Krypt Kickers		
	MONSTER MASH	00168
Player	BABY COME BACK	00997
Pointer Sisters	NEUTRON DANCE	00156
Police	EVERY BREATH YOU TAKE	00076

MUSIC DATA

800-443-3210

MIDI Records are Easy to Use!



Play MIDI Records Right Out of the Box- You get a free Sequencer demo when you buy MIDI Records. You can interact with the music immediately with an MC-300, MC-500, IBM, Macintosh or Atari computer with MIDI.

Standard Arrangements- The songs are arranged for the Roland MT-32™ and also play out of the box on U-220, D-110, CM-32L and CM-64. MIDI Records can easily be adapted for Proteus™, Kawaii™ and other synthesizers.

Helpful Information- MIDI Records come with clear information for getting the most out of the sequences. Step by step instructions included for drum note and sound mapping. The free sequencing software makes it easy to get started.

Roland MC-500 Series Compatible!- The entire Music Data Company catalog is available for MC-300 and MC-500. Order disks in both the MRC and the Super MRC format. No computer required.

Hardware & Software- Complete hardware and software packages are available to help you with sequencing and using MIDI Records. Call for a complete list of products.

Get On The Record!- Our newsletter "On the Record", includes user tips, technical info, note maps, and the complete MIDI Record catalog. Stay in touch with new releases and take advantage of special offers.

ARTIST	TITLE	Part #
Elvis Presely	HEARTBREAK HOTEL	00942
	BLUE SUEDE SHOES	00197
	BURNING LOVE	00480
	DON'T BE CRUEL	00195
	LOVE ME TENDER	00943
	RETURN TO SENDER	00657
	TUTTI-FRUTTI	00160
Prince	BAT DANCE	00786
	POP LIFE	00134
R		
Ready For The World		
	OH SHEILA	00154
Regina	BABY LOVE	00465
Restless Heart	A TENDER LIE	00062
	BLUEST EYES IN TEXAS	00066
	CALM BEFORE THE STORM	00069
	YOU'VE LOST THAT LOVING FEELING	00119
Lionel Ritchie	DANCING ON THE CEILING	00499
	RUNNIN' WITH THE NIGHT	00012
	SAY YOU SAY ME	00747
Roachford	CUDDLY TOY (FEEL FOR YOU)	00276
Linda Ronstadt & Aaron Neville		
	DON'T KNOW MUCH	00916
S		
Sade	SWEETEST TABOO	00161
Sam & Dave	SOUL MAN	00039
Neil Sedaka	CALENDAR GIRL	00482
Bob Seger	SHAKEDOWN	00102
Sonny & Cher	BEAT GOES ON	00470
Ronnie Spector	BE MY BABY	00136
Spinners	COULD IT BE I'M FALLING IN LOVE	00492
	I'LL BE AROUND	00539
Bruce Springsteen	DANCING IN THE DARK	00141
Steely Dan	DO IT AGAIN	00509
	FM (NO STATIC AT ALL)	00834
	JOSIE	00852
	PEG	00641
	RIKKI DON'T LOSE THAT NUMBER	00753
Steppenwolf	BORN TO BE WILD	00477
Sting	SISTER MOON	00106
	WE'LL BE TOGETHER TONIGHT	00787
Barbara Streisand	EVERGREEN	00075
Donna Summer	BAD GIRLS	00467
	THIS TIME I KNOW IT'S FOR REAL	00272
Supremes	BABY LOVE	00164
Swing Out Sister	BREAKOUT	00201
T. Rex	BANG A GONG (GET IT ON)	00469
Temptations	THE WAY YOU DO THE THINGS YOU DO	00177
Three Dog Night	MAMMA TOLD ME NOT TO COME	01028

ARTIST	TITLE	Part #
T		
Tiffany	ALL THIS TIME	00279
	COULD'VE BEEN	00491
	I THINK WE'RE ALONE NOW	00346
Tone Loc	FUNKY COLD MEDINA	00273
Toto	PAMELA	00098
Turtles	HAPPY TOGETHER	00542
U		
Luther Vandross	ANY LOVE	00002
	GIVE ME THE REASON	00530
	SHE WON'T TALK TO ME	00001
W		
Wang Chung	EVERYBODY HAVE FUN TONIGHT	00077
Waterfront	CRY	00300
Wham	CARELESS WHISPER	00486
	WAKE ME UP BEFORE YOU GO-GO	00717
Whitesnake	HERE I GO AGAIN	00080
Wild Cherry	PLAY THAT FUNKY MUSIC	00645
Andy Williams	CAN'T GET USED TO LOSING	00484
Hank Williams Jr.	EARLY IN THE MORNING, LATE AT NIGHT	00073
Steve Winwood	HIGHER LOVE	00754
	WHILE YOU SEE A CHANCE	00887
Stevie Wonder	SIR DUKE	00679
	YOU ARE THE SUNSHINE OF MY LIFE	00179
Z		
ZZ Top	LEGS	00091

Get your free copy of "On the Record" our newsletter about MIDI Sequencing!

ARTIST	TITLE	Part #
	BIG BAND SELECTIONS	
Count Basie	APRIL IN PARIS	01253
Les Brown	HOW HIGH THE MOON	01019
	LEAP FROG	01016
Jimmy Dorsey	DON'T GET AROUND MUCH ANYMORE	00932
	SO RARE	00931
Les Elgart	BANDSTAND BOOGIE (AM B/S THEME)	00822
Duke Ellington	PERDIDO	00930
	TAKE THE "A" TRAIN	00782
Benny Goodman	DON'T BE THAT WAY	00972
	STOMPIN' AT THE SAVOY	00971
Woody Herman	FOUR BROTHERS	00955
Henry Mancini	PETER GUNN THEME	00868
Glenn Miller	GETTING SENTIMENTAL OVER YOU	00957
	IN THE MOOD	00755
	LITTLE BROWN JUG	00956
	TUXEDO JUNCTION	00912
	CLASSICAL SELECTIONS *	
Bach	BRANDENBURG CNCRTO #3 in G	00783
	BRANDENBURG CNCRTO #4 in G	00790
	BRANDENBURG CNCRTO #5 in D	00793
	BRANDENBURG CNCRTO #6 in Bb	00796
	JESU JOY OF MANS DESIRE	00244
	PRELUDE & FUGUE #01 - #06	00245
	PRELUDE & FUGUE #07 - #12	00251
	PRELUDE & FUGUE #13 - #18	00257
	PRELUDE & FUGUE #19 - #24	00263
	TWO PART INVENTION #1 - #15	00799
Beethoven	QUARTET #7 1st Mvt.	00947
Mozart	EINE KLEINE NACHTMUSIK 1st MVT	00784
Pachelbel	PACHELBEL'S KANON in D 1st Mvt	00785
Scarlatti	SCARLATTI- 8 PIANO SONATAS (EARLY PERIOD)	00975
	SCARLATTI- 8 PIANO SONATAS (LATER PERIOD)	00976
Igor Stravinsky	L' HISTOIRE DU SOLDAT(DANSE DU DIABLE)	01257
	L' HISTOIRE DU SOLDAT(MARCH DU SOLDAT)	01254
	L' HISTOIRE DU SOLDAT (MARCHE ROYALE)	01255
	L' HISTOIRE DU SOLDAT (PETIT CONCERT)	01256
Vivaldi	FOUR SEASONS-L'AUTUNNO	01267
	FOUR SEASONS-PRIMAVERA	01265
	FOUR SEASONS-L'ESTATE	01266
	FOUR SEASONS-L'INVERNO	01268

MIDI Records Specials

STEELY DAN 3 PAC

Rikki Don't Loose That Number / Josie / Peg

01261 Reg. $79.80 *Now Only $39.95*

BIG BAND 3 PAC #1

Tuxedo Junction (Glenn Miller) / In The Mood (Glenn Miller) / Don't Get Around Much Any More (Jimmy Dorsey)

01258 Reg. $59.85 *Now Only $39.95*

BIG BAND 3 PAC #2

Peter Gunn Theme (Henry Mancini) / Bandstand Boogie (Les Elgart) / Don't be That Way (Benny Goodman)

01260 Reg.$59.85 *Now Only $39.95*

Order the Easy Way & Save!

ABBEY ROAD SUPER SPECIAL

Hear Comes the Sun/ Because (The Sky is Blue) You Never Give Me Your Money / She Came In Through the Bathroom Window / Golden Slumbers Carry That Weight / The End

00978 Reg. $143.90 *Now Only $79.95*

BEATLES 3 PAC #1

Get Back / Got to Get You Into My Life / Good Day Sunshine

01259 Reg. $59.85 *Now Only $39.95*

If you perform, compose, arrange, teach, or just play around with music get MIDI Records Today!

"MIDI Records are both a ready source of instrumental backup for pros and a valuable learning resource for students...they fully realize MIDI's potential..."

—PC Magazine, November 1990

HOW TO ORDER

Music Data Company, 625 Miramontes St. , Half Moon Bay, CA 94019

FREE MUSIC SOFTWARE! If you purchase five or more songs you receive an additional MIDI Record of your choice absolutely free. First time buyers receive a free sequencer demo.

WHEN YOU CALL...Please have your order information ready including the song names and numbers, your VISA, Master Card or American Express number and the expiration date.

WHEN ORDERING BY MAIL... If you would like to order by mail, please pay by check or money order. Checks should be made payable to Music Data Co. (Mail orders may also be charged to your credit card).

CREDIT CARDS ... We will not bill your credit card until your order is shippable. We accept Visa, MasterCard and American Express.

SALES TAX ... California residents must add 7.25% sales tax to their orders. If you are ordering outside of California Do Not Add Sales Tax.

Format Information

Macintosh	800K Double Sided 3.5" Diskette
Atari ST	720K Double Sided 3.5" Diskette
IBM PC or 100% Compatible	720K Double Sided 3.5" Diskette
IBM PC or 100% Compatible	360K Double Sided 5 1/4" Diskette
Roland MC-300/500	MRC 3.5" Diskette
Roland MC-500 Mk II/MC-50	Super MRC 3.5" Diskette

Note:Some Older Atari ST's Have Single Sided Disk Drives

Call To Order!

MIDI RECORDS PRICING

				price per song	
1	SONG	$	19.95	$	19.95
5	SONG SET	$	89.95	$	17.99
10	SONG SET	$	149.95	$	14.99
25	SONG SET	$	295.00	$	11.80
36	SONG SET	$	395.00	$	10.97
50	SONG SET	$	495.00	$	9.90
3 PAK		$	39.95		
SPECIAL SETS		$	79.95		
SAMPLER DISK*		$	7.95		
SAMPLER TAPE*		$	5.95		

Shipping Prices	UPS Ground	2nd Day Air	Overnight
MIDI Records	$7.00*	$7.00	$20.00
Music Software	$8.00	$12.00	$25.00
MIDI Hardware	$10.00	$15.00	$30.00

*California orders shipped ground to arrive 2nd day. P.O. Box addresses are shipped 1st Class U.S. Mail. For specific shipping prices on combination orders please call.

*Classical Sequences are priced differently than other MIDI Records due to the length and complexity of these selections. Please call Music Data for pricing. Sampler disk and tape prices include shipping. Prices and specifications subject to change without notice. All sales are final. No C.O.D.

MUSIC DATA

800-443-3210

Opcode Studio Vision for the Macintosh

By Paul D.Lehrman

The makers of Vision *look to the future with the first program to integrate MIDI sequencing and digital audio.*

When MIDI sequencers first came on the scene, composers were delighted with the freedom they granted. The ability to correct mistakes quickly, to edit one musical phrase without affecting all the others, to quantize rhythms, to move whole sections in an instant, to preserve and choose from an infinite number of alternate takes; all the features we now take for granted were a godsend for musicians accustomed to working with multitrack tape.

The one thing missing from the MIDI studio, however, was "live" sound. Many sounds are beyond the capability of MIDI-equipped instruments to produce convincingly: human speech or singing, screaming sax solos, Kreislerian violin cadenzas, hard-strummed guitars, and the intricate performance techniques of many non-Western instruments. For composers to use those sounds meant putting them on tape, and although sync-to-tape has always been an essential feature of most MIDI sequencers, the fact that part of the piece was now committed to oxide immediately reimposed many of the limits sequencers had freed us from: Shifting things around in time on a tape is still no easier than it was; in fact, because you can't splice time-coded tape, it became even harder.

A partial solution has been to use samplers for "live" sounds and trigger them from a sequencer. This works fine for short sounds and phrases, but dealing with longer forms requires very expensive hardware, not to mention tons of patience, since samples normally are recorded, edited, transferred, and stored in separate, time-consuming operations.

In the last two years, we've seen the emergence of low-cost, personal computer-based hard disk recording systems, in which audio signals are digitized and stored in real time on a Winchester disk, under the control of an off-the-shelf computer like an Apple Macintosh, Atari, or IBM PC. Hard disk audio offers many significant advantages over tape, including linear frequency response, minimal distortion, freedom from wow and flutter, the ability to copy or bounce a nearly infinite number of generations without building up noise, random access, and the ability to mix and process entirely in the digital domain without the attendant problems of constant analog-to-digital-to-analog conversion.

The computer muscle required to handle MIDI is almost trivial compared with what's needed for hard disk audio, so a couple of hard disk recording systems have appeared that include MIDI capabilities. Digidesign, maker of the Audiomedia and Sound Tools systems for the Mac and Atari, has been at the forefront of this movement. Their *Deck* (reviewed in the November 1990 **EM**) and *Q-Sheet A/V* software allow both hard disk audio and Stand-

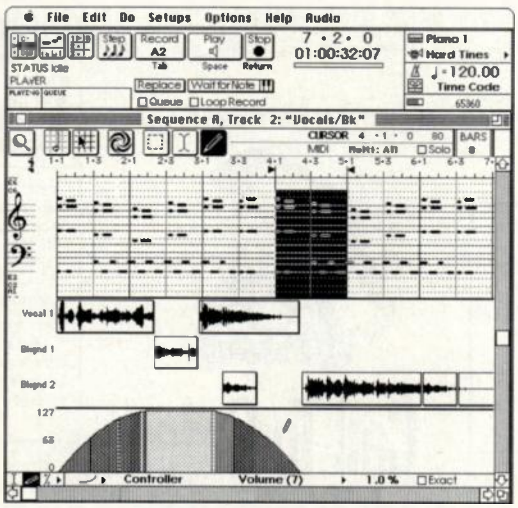


FIG. 1: Studio Vision's main graphic editing window, showing both MIDI and digital audio tracks. The Strip Chart at the bottom shows volume controller messages that will affect the level of the digital audio.

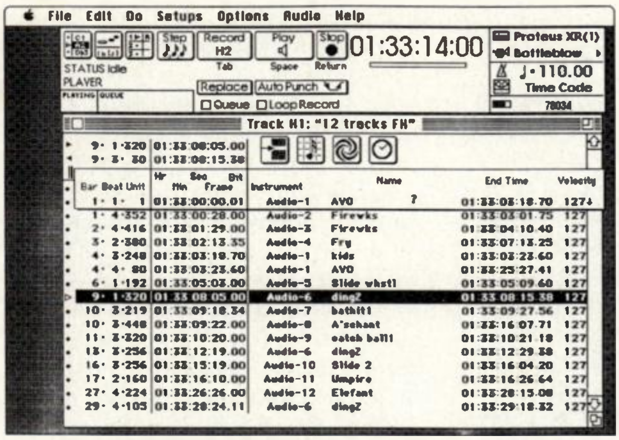


FIG. 2: The exact timing of all digital audio segments can be seen in the program's event list window.

ard MIDI File playback. In addition, *Deck* allows audio recording and a modicum of MIDI recording facilities.

But the first product to combine MIDI and hard disk audio in one comprehensive, creative tool is *Studio Vision*, from Opcode Systems. *Studio Vision* takes the opposite approach from *Deck:* It enables *Vision*, Opcode's top-drawer MIDI sequencer (reviewed in the August 1989 **EM**), to handle digital audio recording, editing, and playback.

Studio Vision looks just like *Vision* when you boot it up, except it has an extra menu, "Audio." It tries to make audio manipulation as easy as MIDI manipulation and brings many of the advantages of MIDI-based composition to audio editing. It's a simple, logical idea; but it's also revolutionary and, best of all, it works. As one dedicated MIDI maven has said, quite seriously, "It changed my life."

Studio Vision, which was created with licensed digital audio drivers from Digidesign (who are located literally next door to Opcode), is a very hardware-intensive application. It requires a Mac II, and either Sound Tools or Audiomedia. It will run, theoretically, with two megabytes of RAM in the computer, but if you want to use *MultiFinder*, you need four megabytes, and if you want to take advantage of certain audio editing features, make that five. It is *MIDI Manager*-compatible, but as I'll explain later, you'll need a very fast computer to run it under *MIDI Manager*. You also need a hard disk; as with all disk recording systems, the bigger the better.

RECORDING AND IMPORTING

In addition to its own recording capabilities, audio files can be imported into *Studio Vision* from *Sound Designer*, Audiomedia, Dyaxis' *MacMix*, or any other AIFF (Audio Interchange File Format)-compatible application. When you import, you call up a file, assign it to a track, tell it where to start playing—either in musical (bars/beats/"units") or SMPTE time—and assign it a master volume, from 0 to 127. In keeping with the MIDI orientation of the program, this is called the file's "velocity."

When you record, you choose a track, open up the Record Monitor window containing two bar-graph level meters (you can record in mono or stereo), give the recording a name (stereo files get two names), tell the program what disk to put it on, and click on Record. While you are recording audio, you can play back any MIDI tracks already in the sequence, the program's metronome, and/or a previous audio track. You can record using the Mac's internal clock, or synched to MIDI time code.

When you're done, click Stop. The program takes a few seconds to draw a picture of the recorded audio waveform, and then displays it in an audio "track" at the bottom of the sequencer track's graphic window. If you want to do another take, click Record again. If you want to save disk space and throw out the first pass, select Undo Record and start again. If you want to save time, you can disable the waveform drawing, but you'll need it later for most editing features.

COMBINING AUDIO AND MIDI

Studio Vision's track structure is flexible enough so that not only multiple MIDI channels can be combined on one track, but also MIDI and audio—in fact, *multiple* audio tracks—can coexist on a single sequencer track and be viewed in one window. The program provides up to 16 "audio instruments," any of which can be assigned to as many sequencer tracks as you want, and a sound file, mono or stereo, which can be assigned to any instrument. If you have a color monitor, you can assign a

New Vision Features

Since *Vision* was reviewed in these pages (August 1989) there have been two upgrades, revisions 1.1 and 1.2. Most of the new features went into 1.1; 1.2 is primarily bug fixes. As of this writing, the shipping version is 1.21. *Studio Vision* is also shipping as revision 1.21, and except for the added audio functions, is identical to *Vision* 1.21.

The new features are as follows:

- *Vision* can now "subscribe" to a program list "published" by Opcode's universal patch librarian, *Galaxy*, so that instead of program numbers appearing in the program change windows, actual program names can be displayed. You can also enter the program names by hand and store them in a setup file.
- All 32 software faders can be displayed simultaneously, with their sources or destinations. Faders on the screen now follow playback.
- A Reassign command lets you map aftertouch, pitch bend, or controller messages to each other.
- As you move the cursor in a graphic window, the SMPTE time of the position is shown as well as musical time.
- You can hear notes sound when you click on them in a graphic or list window. Also, a scrubbing function lets you listen to a track's notes as you move the cursor.
- Tap Tempo creates a tempo map from taps on the Mac keyboard, a MIDI note, or a switch connected to a Studio 3 interface (but, as explained in the review, it doesn't work when playing digital audio).
- Several curves as well as freehand drawing are now available in the Strip Chart window, so controller movements are much more easily plotted.

Also, the notorious MIDI time code two-frame bug has been fixed. One of the peculiarities of MIDI time code is that by the time a receiving device figures out what the time code number is, it's actually two frames later. The original version of Opcode didn't take this into account, but the new version does. (Electric Kool-Aid Acid Test fans will recall Neil Cassady had the same problem with reality. His bug was a lot harder to fix.)

The *Studio Vision* manual comes with a *Vision 1.1* supplement, as well as a *Studio Vision* supplement, but the original *Vision* manual, which makes up the bulk of the book, has not been changed at all. The original review complained it could use some copy editing, and it still could. (According to Opcode, a new *Vision 1.2* manual will be available by the time you read this. *Vision* owners will be able to purchase it for $15, and it will be sent free to all *Studio Vision* owners.)

different color to each instrument: talk about an orchestral palette!

These audio instruments, unlike *Vision's* MIDI instruments, which are hardware and MIDI-channel specific, are primarily software constructs. Any instrument can play at any time, and can be panned anywhere in the stereo field. Once an audio track is in a sequencer track, it can be moved around in time, just like a MIDI event. If you start playing a track in the middle of an audio event, the audio will pick up right at the proper place because it's part of the MIDI sequence.

The sole limitation is that only two audio instruments (or one if it's stereo) can be sounding at a time. If that limit is exceeded, the last audio file to be triggered will take precedence. This is not as much of a problem as you might think, because the program includes extensive audio mixing functions that do not destroy the original tracks. Remixes can be done at any time, assuming you have enough hard disk space to keep all the various versions around. These functions are all done offline; that is, first you listen to what you want to mix, select the tracks and regions you want to combine, and then tell the computer to do its thing. The program creates a new digital audio file in a few moments.

You can impose "controllers" onto an audio track, much as you can on a MIDI track, by recording them from a MIDI source, or drawing them in on the track's "Strip Chart," or using the program's on-screen faders. You can enter any controllers you want, but the only ones that will have any effect are volume (controller 7) and pan (10). As with a MIDI track, you can hear the controllers' effect on the sound as you record them. Each audio instrument on a track can have its own set of controllers. When you mix down audio tracks, you can have these controllers affect the mix, so a mixed audio track can contain as many "moves" as you like.

EDITING

Editing audio tracks is absurdly simple and logical. Using various cursors, you can cut, copy, paste, and drag around sections of tracks with aplomb, and hear what you're doing immediately. You can change which files are assigned to which instruments, so that different combinations of files sound (two files sharing the same instrument cannot sound simultaneously), and you can move audio tracks to different sequencer tracks, or different sequences. You can clone a file and make it appear somewhere else (or even just echo itself) by option-clicking and dragging it. SMPTE numbers are always available on the screen for reference, and you can freely go back and forth between graphic and edit-list windows. All of this happens quickly because the program is not actually moving audio data, it is simply repositioning pointers. It's a wonderful way to edit audio in time, far faster and more intuitive than anything else I've seen.

For more serious editing and processing, the program provides a "hot link" to *Sound Designer II.* When you select an audio track or region and choose "Edit Soundfile" from the Audio menu, *Sound Designer II* automatically opens up (under MultiFinder) with that file showing in the window. You can then perform any operation you like on the file (other than destructive cutting), and when you switch back to *Studio Vision,* the changes are in place. There is no copying through the Clipboard, or saving to disk. Since the file is *already* on the disk, there's no need for that sort of thing: You just have two differ-

THIS IS GOING TO BE HEAVEN...

It is with great pride that we announce the grand opening of the Keyboard Institute of Technology (KIT) in March 1991. For the first time we will be able to offer the same world class vocational education to keyboard players that has made Musicians Institute famous.

KIT will offer an opportunity to surround yourself completely with music. To live, sleep, eat and breathe music. This is an opportunity to get to the heart of your creativity, to explore the music inside you in a totally professional learning environment at the center of the music business.

Our faculty and visiting artists include the biggest names in the business. All are working professionals ready to share their secrets with you, to help you become the best player you can possibly be.

We know you want to learn, and learn fast. No wasting time. During the year long program at KIT you'll study speed learning techniques to make the most effective use of your time. You'll study the theory to allow you to analyze the music you want to play, and you'll study the techniques to allow you to play it. This is going to be Heaven.

KEYBOARD HEAVEN

KIT
Keyboard Institute of Technology

MI
MUSICIANS INSTITUTE

SEND FOR FREE CATALOG • MUSICIANS INSTITUTE • 1655 McCADDEN PLACE • BOX 010 • HOLLYWOOD, CA. 90028 • (213) 462 • 1384

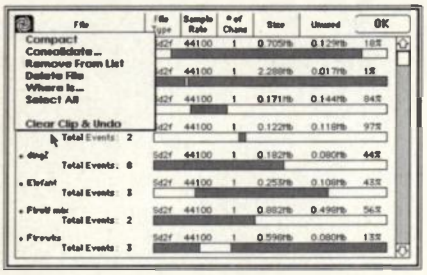


FIG. 3: Studio Vision's File Management window allows you to keep track of the various attributes of all digital audio segments.

ent programs working on the same file. (This, by the way, is going to be a feature of many programs running under Apple's long-awaited System 7 for the Macintosh.) A nice touch is that you can choose to have *Vision* hide all of its many windows when you are using a different application under *MultiFinder*, which can reduce screen clutter considerably.

Be warned, however, that you need the latest version (2.0) of *Sound Designer II* to do this trick. The *Audiomedia* software doesn't support this function, although Digidesign says that an update is imminent. You will also need at least 5 MB of RAM, but RAM is so cheap and plentiful these days that there's almost no excuse not to upgrade to 8 MB, in which case these programs run very happily together.

MANIPULATING TIME

A soundfile can be "separated" into multiple sections for individual manipulation, which can be useful in a number of ways. For one thing, you can use multiple audio instruments for different takes of a recording, separate each track into individual sections (phrases or notes, for example), and then assemble a single perfect track by choosing the best sections from each take. Before you commit yourself, you can audition your choices using the "Play Selected" option, and when you've made a final decision, merely copy the selected sections in one operation and paste them together into a single track. Again, because you're only manipulating pointers, the operation is quick and uses up no additional disk space.

A corollary to this is *Studio Vision's* most awe-inspiring feature: Strip Silence. This is a kind of digital "gate" in which you define what silence is—a certain level threshold and a certain amount of time, in milliseconds, that the signal must be below that threshold—and the program then deletes those sections from the sound file and separates all of the remaining parts of the track into discrete events. (It also pulls out all audio events shorter than 10 milliseconds, though the original manual doesn't say so, thereby helping to minimize clicks and pops.) Although the threshold setting uses arbitrary units, the screen provides clever visual feedback as you adjust it, which helps a lot. The Strip function is also undoable, which helps even more.

This means that it is very easy to edit the placement of individual words in a dialog track, make musical phrases happen earlier or later without messing with the whole track, pick out notes or small sections and repeat them either immediately or later in a song, or—and this is the best part—*quantize* discrete audio events. Sound effects can be lined up automatically with music, background vocals never will be late, that live bass track can groove perfectly with the sequenced rhythm track, and if you're working with the world's worst drummer, you can record him, separate the individual drum beats, and quantize the dickens out of him.

All of this audio editing is totally nondestructive, and everything can be undone, either right away or days later. If your silence threshold proves to be too high, for example, you can always go back to the original audio event and try again. Or you can take one of the separated events and change its end time—"stretch it"—so that it once again incorporates the rest of the file. (However, you can't do this in the graphic window. You have to use the list window, which works fine but isn't nearly as much fun).

On the other hand, all of this functionality can also let you save disk space (which you never have enough of, no matter how big a hard disk you are using). Once you've done all the editing and separating you want, and you really don't need your original files any more, you can eliminate the leftover audio from the original (that is, audio that no pointer is pointing to) with the Compact function. How much you will recover will depend entirely on the source material and how you use it, but I found I could often eliminate nearly 70% of the space used by the original.

Another highly useful function when you are using audio from many different original sources is Consolidate, which takes all of the portions of the various files you are using and splices them together in one file. This doesn't save you any space, but it makes storage and retrieval a whole lot easier and faster.

MOANS AND GROANS

As impressive as *Studio Vision* is, it's not without its teething pains. I got the program to lock up about a dozen times in the first couple of days. Granted, much of that time I was probably doing things you're not supposed to do (part of my job is to *try* to break things), but on two occasions I was just working normally, and after an hour or so, with no particular provocation, it would freeze. This is hardly unheard-of for a new program, but it means you have to be careful to save your work frequently. Fortunately, no files—especially hard disk audio files—were ever trashed in any of these crashes, so the damage was minimal.

More serious problems are found in the area of time code handling. Mixing audio and MIDI on the same platform brings up some interesting issues. If a MIDI sequencer is synched to tape (using SMPTE time code converted to MIDI time code) and the tape runs offspeed, the sequencer will slow down or speed up. If the speed variation isn't too gross, the results won't be audible; after all, the pitch won't change.

On the other hand, Digidesign's hard disk audio systems (except for the latest version of *Sound Designer II*) sync to SMPTE by starting to play when they receive a specific time code frame number, and then continue using the Mac's *internal* clock as a timing base. If such a file is playing at the same time as a MIDI sequence and the tape is offspeed, the MIDI and the audio will drift out of sync. I've found it's not hard to make this happen in *Deck*.

Studio Vision attacks this problem on

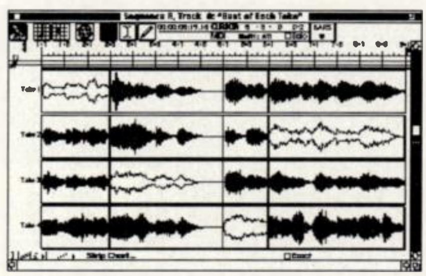


FIG. 4: Studio Vision allows you to combine different segments from multiple digital audio tracks (the highlighted white sections) and audition them as a single track.

Product Summary

PRODUCT:
Studio Vision

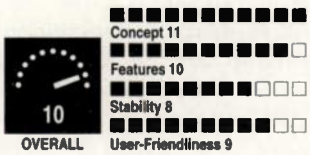
TYPE:
MIDI sequencer with stereo hard disk recording and editing capability

HARDWARE REQUIREMENTS:
Macintosh II with 2 MB RAM (4 MB or more recommended); Digidesign Sound Tools or Audiomedia system; hard disk with less than 28 ms. access time; MIDI interface; SMPTE-to-MIDI time code converter recommended.

MAIN FEATURES:
Hard disk recording in conjunction with MIDI sequencing; non-destructive editing of audio files; MIDI-controlled volume and pan for audio files; automatic digital gating.

PRICE:
$995

MANUFACTURER:
Opcode Systems
3641 Haven Drive, Suite A
Menlo Park, CA 94025
(415) 369-8131



two fronts. A Tape Calibration function makes sure that the program understands exactly what speed your tape recorder is playing at. You open up a window, start your tape, and tell the program to measure the speed of the deck. It compares the incoming MIDI time code messages with what its internal clock thinks *should* be the speed and displays how fast or slow the tape is running, to the nearest 1/1000th of a percent. It averages the speed variation over the period of time the window is open and then puts that number into the sequence. (Once it's in there, there is no apparent way to remove it, except by recalibrating. The manual is very vague on all of this.) Now when you record audio while the sequence is synced to tape, the timing of the audio events ("real" time) should match exactly the timings displayed by the program (SMPTE time).

The trouble is, the Tape Calibration function expects to receive SMPTE/MIDI time code at exactly 30 frames per second (fps), and in the world of video, that is extraordinarily rare: North American video runs at 29.97002617 fps. Granted, we're talking less than 0.1% discrepancy here, but since Opcode has taken such extreme pains to ensure proper timing, they could at least put in a provision for reading 29.97/non-drop SMPTE. As it stands, when you calibrate to a videotape, the program always thinks you are running about 0.1% slow. The program then applies the appropriate correction, and everything proceeds as planned. *(According to Opcode, the next release of the program will read 29.97 fps.—GH.)*

The other tape-speed-related function is Lock Audio to Tape. This is used when you are *playing back* audio and using a tape deck as the sync master. It measures the instantaneous speed of the incoming MIDI time code and changes the speed of the audio playback accordingly. Unfortunately, this function sometimes creates more problems than it solves.

Unlike MIDI sequences, minor periodic speed changes in audio playback sound terrible, because the ear is very sensitive to pitch changes. When I hooked up a free-running SMPTE generator (Mark of the Unicorn's Video Time Piece), which theoretically should put out perfectly steady time code, to Opcode's Studio 3 SMPTE-to-MIDI time code converter, I would occasionally hear a distinct "wow" imposed on the sound. It was especially noticeable on acoustic guitar and piano tracks. I also noticed it when I played back a VHS videotape, striped with SMPTE, through the Studio 3.

The problem proved inconsistent, so it was a little tough to pin down exactly what was going wrong, but my guess is that the algorithm used in the function is too sensitive. I was also told that *Sound Designer II 2.0* uses a similar locking scheme, so I tried it with the same file and hardware setup and noticed no speed variation.

(Opcode acknowledges that the Lock Audio function works less than perfectly at present, probably because of the serious load on the computer that this ambitious system presents, and they are working to improve its performance. For now, they suggest that Lock Audio be used only for material that would be less affected by changes in pitch.

● STUDIO VISION

For musical material, they recommend that it be disabled. In this mode, the beginning of playback is triggered by time code and continues thereafter at the rate determined by the internal crystal of the Macintosh. This will yield satisfactory results in many situations. —GH)

One more time code problem: If you set the SMPTE format to drop-frame time code and you then send it non-drop-frame (or vice versa), the program just ignores it altogether, which will send you running around your studio to find out what's wrong. Better it should *tell* you it doesn't like what it sees or, ideally, switch formats for you automatically.

Studio Vision is very demanding when it comes to hardware, and it experienced a certain amount of trouble with a SyQuest drive. The "Your hard disk is fragmented or too slow" message came up a lot, even if I had just optimized the disk and had 15 MB free. Often it would just stop recording or playing back in the middle of a file with no explanation—and the next time through it would be fine. Digidesign has been quietly telling people not to do heavy-duty audio editing on SyQuest drives, and they appear to be right. The best setup for *Studio Vision* would therefore seem to be a large, fixed hard drive for online work, and SyQuest cartridges (or, if you can afford them, read/write magneto-optical discs) for storage.

One other hardware issue: If you try to operate *Studio Vision* (or *Sound Designer II*) with a Sound Tools system with the AD IN box turned off (because you're not planning to record anything during that session), make *sure* you let the program know (using the Hardware Setup window). Otherwise, you'll get error messages, crashes, and all sorts of disasters. It would be nice if the program could detect the problem ahead of time and warn you that your current setup is not what it expects it to be.

The program is *MIDI Manager*-compatible, but performance under *MIDI Manager* with my Mac IIcx was unacceptably slow—screen redraws would take forever—and subject to crashes. Apparently you must have a IIci, or even better a IIfx, to use it.

One minor limitation I would love to see changed is that you cannot use the program's new tap tempo feature (you hit a Mac or MIDI key at any tempo you choose, and the program records into a tempo map) when audio is playing. Opcode says this is because the program is too busy to accept any external timing changes when it's spitting out audio, which seems reasonable, but wouldn't it be nice to record a vocal track in free time (without a metronome) and be able to construct a tempo map for the accompaniment afterwards? See what you can do, guys.

Finally, one suggestion: the Strip Silence function, good as it is, would be even more useful if instead of simply searching for times at which there is no signal, it included some slope detection. That would mean it could determine the difference between attacks and decays and be more forgiving when it comes to cutting off decays—in other words, it should act more like a real gate.

AND THE HOME STRETCH

The time code issues are probably not going to affect many users, and I imagine they're easy enough to fix. The other gripes I'm sure will be dealt with in an upgrade or two. So when I'm done complaining, what do I think of *Studio Vision*? In a word, it's brilliant. A stellar concept, executed extremely well. If any one product manages to kick MIDI-produced music out of the repetitive rut it often falls into and gets project studios working with live musicians again, this will be it. Even without its MIDI sequencing capabilities, it brings some revolutionary and welcome ideas to audio editing. Besides its obvious musical applications, and although Opcode does not seem to be pushing it in this realm, I see it as a marvelous tool for sound effects, dialog editing, and other non-musical and visuals-oriented tasks.

It is easy to use, especially if you already know *Vision*. If you don't, it's not the fastest sequencer around to learn, but it's worth the effort. In all, a visionary product (ahem!) that provides a clear vision (stop that!) into the future of computer-based music making. It may change your life, too.

(Thanks to Dave Mash for his assistance in preparing this review.)

Paul D. Lehrman *has recently upgraded his memory capacity and reports that all his slots are now full. He intends to do the same with his computer shortly.*

Steinberg/Jones Cubase 2.0 and C-Lab Notator 3.0 for the Atari

By Jim Pierson-Perry

Two of the leading Atari-based sequencing programs receive major updates, adding to their already-impressive power and flexibility.

The 1990 German import models are here at last. Bag the Porsches and BMWs, we're talking about the new versions of *Cubase* and *Notator*, two top-of-the-line sequencers for the Atari computer. Both programs go far beyond basic sequencing operations and aim at being all-purpose production stations, able to handle recording, editing, arranging, and scoring. Each approaches its functions from a different angle, and each succeeds to different degrees.

C-Lab's *Notator* is a superset of the separately available sequencer/editor, *Creator*, to which it adds the ability to score sequences. The new *Notator* offers improved notation and printing, graphical event-editing, adaptive groove quantization, expanded MIDI generator functions, and a major manual overhaul. All comments here about *Notator* (except those about scoring) apply equally to *Creator.*

Cubase 2.0 also has added improved MIDI generator functions, score printing, and "interactive phrase synthesis," a real-time algorithmic composer. Version 1.0 of *Cubase* recently was ported to the Macintosh, but for now, the version 2.0 features are only available for the Atari. Any comments I make here reflect those inter-platform differences.

Either program can handle virtually any sequencing application and handle it well. Since **EM** reviewed earlier versions of *Notator* (January 1989) and *Cubase* (January 1990), I'll restrict the discussion to the programs' new features.

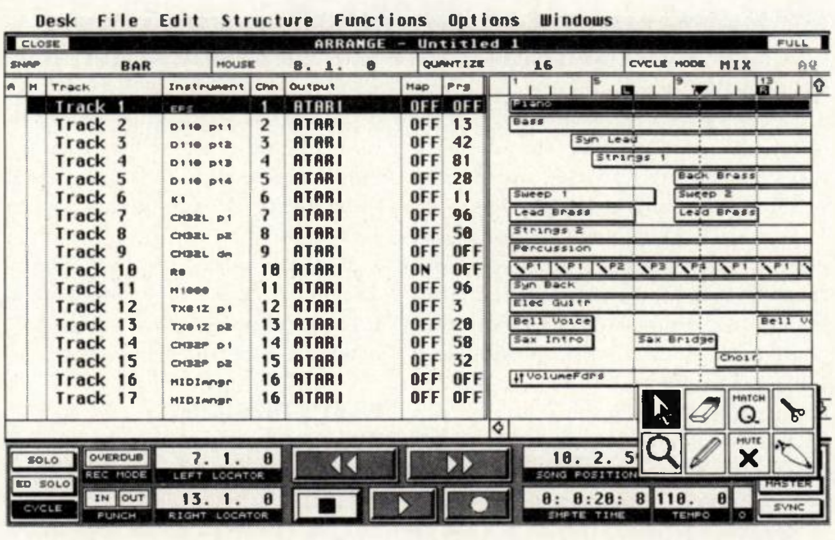


FIG. 1: Main arrangement window from *Cubase 2.0.* Parts are individually named and displayed across the tracks, with respect to the time grid. The toolbox at the bottom holds icons for various part-editing options.

CUBASE 2.0

Cubase defines the state-of-the-art for graphically oriented sequencing software. Through the program's graphics, you can display, modify, and control every aspect of your music, from a single MIDI event up through an entire 64-track song arrangement. The attention to consistent, intuitive operations makes for one of the best user interfaces I have ever seen in any piece of software.

In the arrangement screen (**Fig. 1**), you assign a series of parts to a set of tracks. Modifying the song structure is as easy as selecting a part with the mouse and dragging it to a new location, just as you would in a drawing program. Additional graphical tools from the mouse toolbox provide immediate delete, cut, paste, audition, mute, and quantize functions without having to go into the menus.

Cubase offers several editing modes: event-list, piano-roll, drum patterns, standard notation, and logical transformations (similar to Dr. T's *PVG* module), and each has its own dedicated window. The Drum Pattern edit window in **Fig. 2** gives you an idea of the variety of features in these windows. Notice how drum hits for each sound (named from a drum map) are shown against the time grid. You can operate at any level, from mass actions on all notes, to individual tweaks. The optional graphical strip along the bottom lets you show, create, and edit virtually any type of MIDI event. For instance, I used this window to create a volume ramp using the mouse compass tool. The contents of the toolbox change, depending on which edit window is open, to provide appropriate functions.

MANAGING YOUR MIDI

Cubase 1.5 saw the addition of the MIDI Manager edit module (not to be confused with Apple's *MIDI Manager*), which provides a way to create mouse-movable faders on the screen for creating and modifying MIDI events in real time. These capabilities were dramatically souped up for version 2, makng it amazingly easy to build control panels in *Cubase* for just about any MIDI need. A single mouse click calls a dialog box where you select a graphic object for a panel, assign its function through pull-down menus, and define its operating range. The graphic objects that you can build into the control panels now include horizontal and vertical faders, knobs, push buttons, numeric displays, and simple, descriptive text. You can assign the objects to do nearly anything: play notes, manipulate controllers, send program changes, or even issue sysex commands. With its learn function, *Cubase* automatically identifies incoming MIDI events and sets up object definitions. This is great for those of us who don't want to memorize the MIDI lexicon.

You can build MIDI Manager control panels with a multitude of functions, such as patch editors, real-time control of effects devices, mixing boards, or sending MIDI program changes over any MIDI channel. **Fig. 3** shows a control panel I built in under ten minutes to handle simple part setups for a Roland D-110 synth. A variety of other setups—for the Lexicon LXP-5; Roland U-110, MT-32, and D-50; Oberheim Matrix-1000; Fostex R8; and other popular MIDI devices—are included on the program disk.

One of the most powerful features of the control panel is that you can define up to 127 different groups, containing any number of faders or other objects, to act as slaves to a master device. Slaves either follow their master absolutely (all at the same value), or change relative to their original values. One great feature is that the direction of the slaves' response is programmable, so you can set up crossfades where moving just one master fader decreases a value on one set of channels and increases it on another. You can also take "snapshots" of a control setting and save them to be recalled for later use.

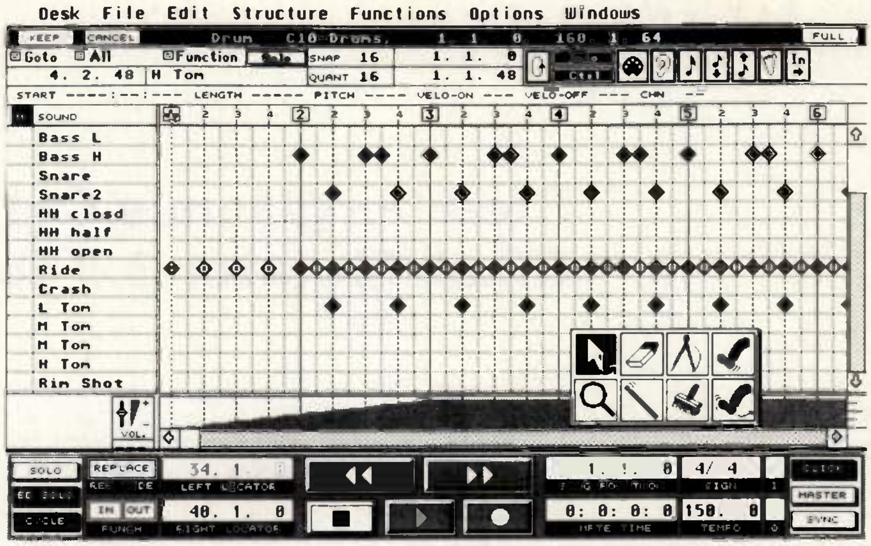


FIG. 2: The Cubase drum-editing window. Up to 64 drum sounds appear along the left axis. Hits are displayed with different symbols for different default velocities. The bottom strip is for graphical event-editing. Note different toolbox contents from arrangement window in Fig. 1.

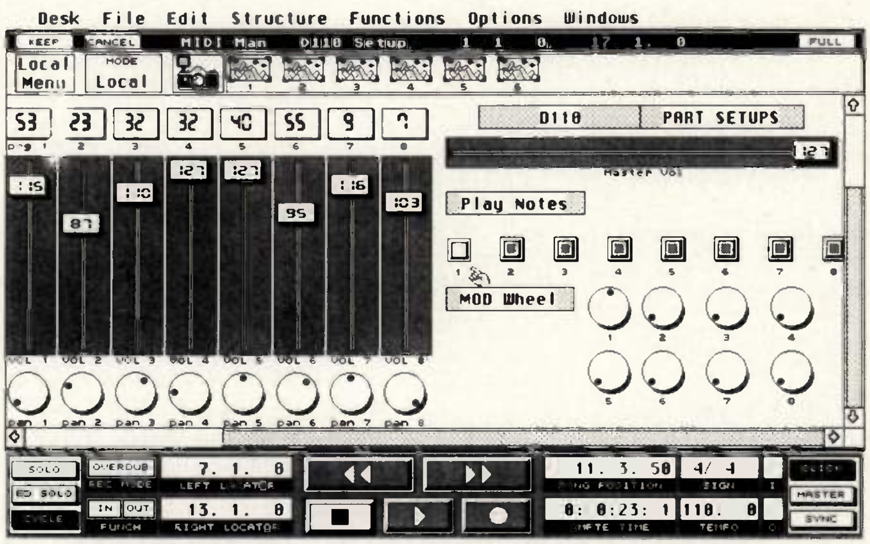


FIG. 3: Control panel built from the Cubase 2.0 MIDI Manager, controlling various part-setup parameters for a Roland D-110.

The MIDI Manager is useful at any point in the recording process: before recording, to prepare your system; during editing sessions, for mixing or other changes; and even while playing live, for special effects. When you build a control panel, its graphic objects can be independently assigned to respond to specific external MIDI controllers. For example, I defined a set of knobs to control the pan position for D-110 parts and others to control patch parameters for a Matrix-1000. I grouped them under a single master knob, which itself was set to respond to mod wheel input. While I played live, rotating the mod wheel moved the D-110 parts about the stereo field while altering the Matrix-1000 timbre.

The examples I've mentioned only scratch the surface of the MIDI Manager. It has great potential for all sorts of uses in all phases of your sequencing.

WHAT'S THE SCORE?

The new *Cubase* score-printing feature does not come off as well. *Cubase 2.0* uses standard GDOS text fonts (without the GDOS program itself) and has its own symbol font for producing hardcopy of the score edit window. Numerous, but non user-adjustable, printer drivers are supplied for popular 9- and 24-pin dot matrix printers, HP's DeskJet and LaserJet, and Atari's SLM804 laser printer. You can print anything in the score edit window, from a full score to a single part.

The printout routine is cumbersome, particularly compared to competitive programs. Text output is built one character at a time from disk font files. Preparing a single page for laser output took more than ten minutes of almost solid disk access with a floppy drive. Going to an Epson FX-80 was much faster, since the font files are smaller, but still beat mercilessly on the disk drive. It would be much faster if the program simply read the needed font files first, then built the output page in memory.

The Epson FX-80 printout was acceptable but no threat to dedicated notation software. Some of this reflects limitations of the Score Edit module itself, which, among other functions, lacks slanted beaming, grace notes, chord symbols, and guitar tablatures. Drum parts cannot be transposed to notate their proper pitches without altering the underlying notes, taken from your actual drum mappings. Text sizes are determined by the GDOS font you select and do not have display

Product Summary:

PRODUCT:
Cubase 2.0 (Atari)
Cubase 1.0 (Macintosh)
TYPE:
Sequencing and notation software
HARDWARE REQUIREMENTS:
Any Atari computer (including STacy and STe); minimum 1 megabyte RAM; monochrome monitor (including large-screen monitors)
PRICE:
Atari version: $579
Macintosh version: $495
MANUFACTURER:
Steinberg/Jones
17700 Raymer St., Suite 1001
Northridge, CA 91325
tel. (818) 993-4091

Features 9
User Interface 10
Documentation 9
Notation 7
9
OVERALL

attributes such as bold, italics, outline, and so on. Neither is there a provision for user-defined notational symbols.

The SLM804 laser printer driver does not work. It builds the page image on screen, but the printer only ejects a blank page. Steinberg is actively pursuing the bug. They claim it works fine in Germany, and they expect to have it solved by the time you read this. Another glitch is that you cannot edit the SLM804 driver to change the DMA device number. It expects the printer to be device 7, although for the past year Atari has been selling the printers set to be device 5. If you want to use an SLM804, you can change the internal setting on the SLM804 controller to device 7.

ALGORITHMIC COMPOSITION

Interactive phrase synthesis (IPS) is the term coined by Steinberg for its approach to real-time, interactive, algorithmic composing. The overall scheme (see **Fig. 4**) combines a prerecorded musical phrase with real-time MIDI input, according to the rules of an interpreter module. The notes that result are split into their pitch, dynamics, and rhythm components, which then can be independently massaged by additional algorithms. The processed components are reunited and fed back into the MIDI datastream.

Cubase uses a synthesizer metaphor to describe the various elements by which IPS processes notes. The interpreter output acts as the basic waveform, while the operational algorithms are represented as synthesis elements. You can change input, processing, and environment parameters in real time, or through software modulators, just as you'd tweak the knobs on a real synth. Virtually every parameter is under user control except for scale selection in the pitch processor, where you're limited to twenty predefined scales that repeat their notes every octave. This limitation is unfortunate, and I would like to see a provision for user-defined scales not limited to identical octaves. A setup can be saved as the equivalent of a patch program, and you can change patch programs any time. The program provides two independent IPS "synthesizers" that you can invoke alternately or run in tandem.

I approached IPS with some trepidation but quickly started to get fairly sophisticated and interesting results, even without fully understanding what I was doing. Fortunately, Steinberg recognized the complexity of this beastie and provided example setups and several tutorials in the manual to get you started. Although a lot of *Cubase* users may never venture into the IPS, if you're looking for something new, it will offer you rich grounds for experimentation.

Version 2.0 offers a well-written manual and several example songs to get you up and running quickly. There are drum maps for Roland's D-10 series and the MT-32, and two for the Korg M1. As a bonus, the program disk includes *Satellite*, a patch librarian desk accessory. *Cubase* had no compatibility problems with any desk accessories and autorun programs I tested, including GDOS and PINHED, which caused problems in earlier versions. The only oddity I found was in using LGFSEL, an alternate file-selector program. I had to position the mouse cursor to lie within the file directory list when the dialog box opens; otherwise, moving the mouse acted like a cancel command. It's silly, but easily remedied. *Cubase* runs on all Atari computers with at least one megabyte of memory and a monochrome monitor, including the new STacy, STe models, and large-screen monitors.

NOTATOR

Notator, which is tied with Coda's *Finale* for the most expensive sequencing soft-

Product Summary

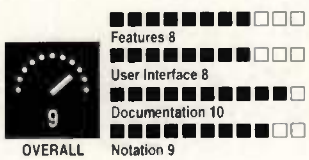
PRODUCT:
Notator 3.0
Creator 3.0

TYPE:
Sequencing and notation software

HARDWARE REQUIREMENTS:
Any Atari computer; minimum 1 megabyte RAM; color monitors usable, but cut resolution in half

PRICE:
Notator: $729
Creator: $445

DISTRIBUTOR:
C-Lab/Alexander Publishing
3537 Old Conejo Rd.,
Suite 101
Newbury Park, CA 91300
tel. (805) 499-6200



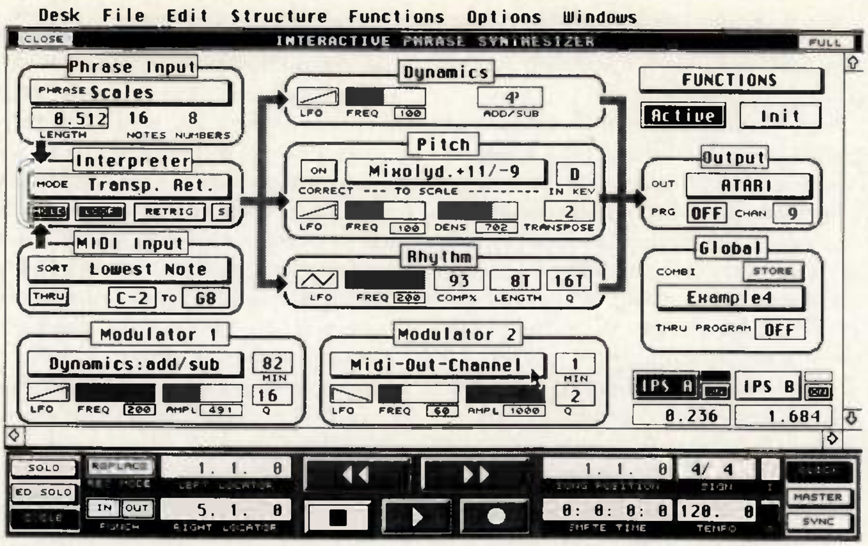


FIG. 4: Patch program for Cubase 2 0 IPS Screen shows musical routing through synthesizer with visual feedback. All settings are in the popup menu for each element.

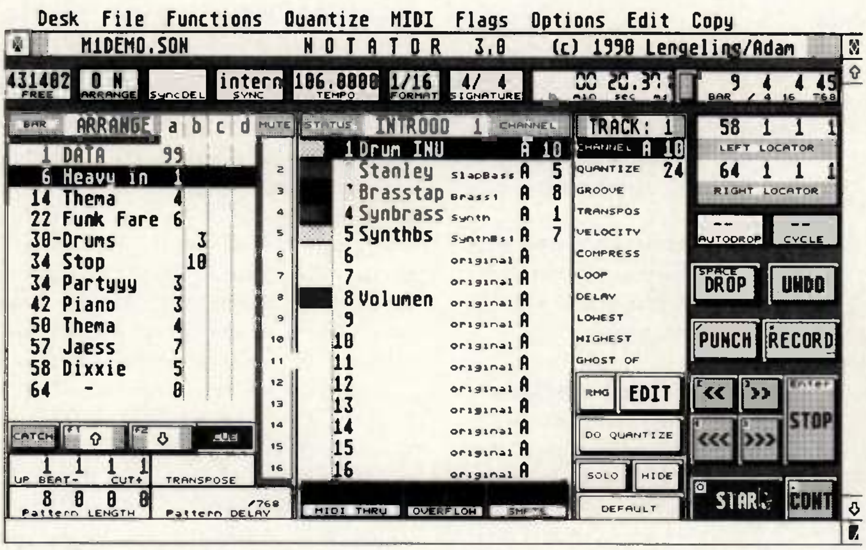


FIG. 5: Notator 3.0 main arrangement window. Arrangements are in list chains to the left, the active pattern is shown in center, transport controls are to the right.

ware for any personal computer, is the only program on the Atari that captures and immediately displays a score as you play.

Notator's user interface is mostly text driven and easy to follow, but has some inconsistencies. For example, you can directly type in values for some, but not all, parameters with no apparent rationale for the differences.

Version 3.0 runs on all Atari computer models with one megabyte or more of memory. You can use it with color monitors, but I don't recommend this, as it cuts display resolution in half. The program showed only one intermittent compatibility problem—locating fonts when GDOS was installed—that caused system lockup. The easy solution is to avoid GDOS, since *Notator* doesn't use it. The manual was completely rewritten for this release and is a major improvement in design and readability over the previous one. Its only fault is the omission of clear instructions for setting up the program disks, particularly regarding font files and printer drivers. Regular Atari users will be able to puzzle it out, but musicians new to the Atari will need help.

THE INTERFACE

Notator uses two mutually exclusive working screens: arranging and editing. The arranging screen (see **Fig. 5**) shows the current pattern in the screen center, with its sixteen tracks and playback parameters, and a set of transport controls to the right. On the left of the screen is the arrangement box in which you build song arrangements by chaining patterns. Four independent pattern chains can play at the same time, giving you a total of 64 active, multichannel tracks. Along with these features, *Notator* has both a MIDI thru feature and a wealth of real-time processing for altering playback, making it as powerful for live playing as for the studio recording environment.

The program offers four editing modes: event-list, scoring, matrix (piano-roll), and the new Hyperedit. Scoring and Hyperedit can be used together but are not active with the matrix editor, and the event list is always displayed. With the exception of Full Score mode in the scoring editor, which can show all tracks of the active pattern, you select one track at a time for editing from the arrangement screen.

Hyperedit brings the long-awaited graphic event editing and simplified drum-pattern programming to *Notator*. Hyperedit works through the concept of *instruments*, user-defined event types that are singled out from all other track data for display and editing. You define instruments for a single MIDI channel by event type, including note on/off (all or single note), pitch bend, controller (all or single type), program change, aftertouch (channel or poly), sysex, and pseudo-events such as tempo or mute.

Up to 128 instruments can be defined and grouped into eight sets of sixteen each. How you assign event types and MIDI channels is up to you. For example, assigning each instrument to show MIDI volume on separate channels gives you a graphic mixer. On the other hand, assigning each instrument to different event types within a channel lets you view events such as tempo changes, mutes, and program changes. You can move freely between sets while editing. You also can toggle a set to ignore MIDI channels so, for example, an instrument defined to show program changes would display all such events within the track, regardless of channel number.

You can expand or shrink the Hyperedit display size along either, or both, axes. This lets you work with many instruments or several bars at once, or zoom in for minute changes. On the other hand, all *Notator's* instrument display fields are of equal size. This seems clumsy to me; I'd rather be able to expand the more sensitive fields such as pitch bend, modulation, or volume and use smaller fields for simple program changes or sysex sends. All events in the track that match an instrument definition are shown in the display field as adjustable bar graphs. While multiple, selected event values can be increased or decreased simultaneously, *Notator* lacks more sophisticated graphic tools for constructing smooth ramps or curves.

Hyperedit has several global edit operations. Delay moves displayed instrument events ahead or back in time, without affecting anything else in the track. Selecting "do groove" applies any quantization to instrument events, letting you create different grooves for different instrumental parts. The Hi-Hat function marks instruments within a set (open and closed hi-hats, for example) that you want kept mutually exclusive so only one can play at a time. Convert Events redefines an instrument's events to another type, turning mod wheel to aftertouch, or changing notes from one channel to another. Convert Set goes a step further and changes all events, across all instruments in a set, to match the instrument definitions of another set. This is useful for quick note-remapping between drum machines.

The score notation display shows and synchronizes instruments. This works particularly well for programming drum patterns (see **Fig. 6**). You can define each of your drum sounds as a separate instrument and see them displayed simultaneously in the event list and score. *Notator*

Hardware and Appliances

Both Steinberg and C-Lab offer a wide assortment of integrated hardware to go along with their sequencer software. All of it is modular, so you can add what you need a piece at a time. Listed below are current offerings and how they connect to the Atari. Plan enough space, though; a fully loaded C-Lab system looks like the mouth appendage from "Alien" growing out of your Atari.

STEINBERG:

Key Expander: Extension bus for the Atari cartridge port. Holds three hardware keys. ($375; cartridge port)

MIDEX: The new, extended MIDI interface port. Offers four MIDI outs, two ins, and two additional key slots for hardware cartridges. ($599; rack-mount; parallel port)

MIDEX+: Adds SPMTE (all flavors) to the MIDEX interface. ($699; rack-mount; parallel port)

Time-Lock: SMPTE interface. ($399; parallel port)

SMP 24: Programmable SMPTE interface, 1,024-bar tempo table, two MIDI ins, four MIDI outs. ($1,295; rack-mount; parallel port).

C-LAB:

Combiner: Extension bus for Atari cartridge port. Holds four hardware keys. ($399; cartridge port)

Export: Provides three additional MIDI outs. Recognized by other developers as expansion Atari MIDI out. ($195; serial port)

Unitor: SMPTE interface, two MIDI ins, two MIDI outs. Comes in two flavors: Unitor-C (for Creator) and Unitor-N (for Notator) containing the copy protection dongle. Only available from C-Lab/Alexander Publishing. ($575; cartridge port)

Unitor II: Unitor with cartridge slot for optional copy protection dongle. Includes additional hooks for Notator HD (see main text). Sold through regular dealers. Contact C-Lab/Alexander Publishing for upgrade and availability. ($575; cartridge port)

Human Touch: Allows external signals to control tempo. Three audio inputs, built-in microphone, three audio outputs for click signals. ($299; cartridge port)

Steady Eye: VITC interface. Contact C-Lab/Alexander Publishing for availability. (cartridge port)

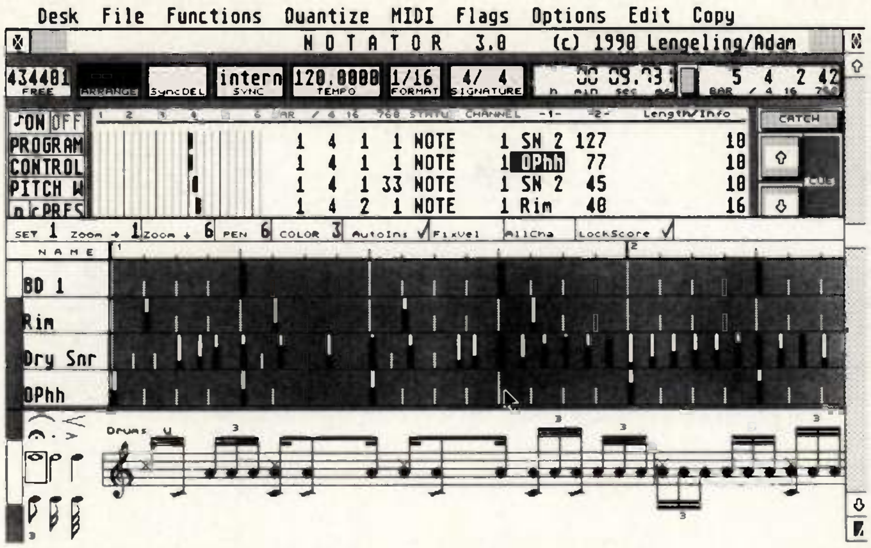


FIG. 6: Notator basic drum-pattern edit window. The event list is at top, Hyperedit display in the middle, and standard notation with transposed pitches and note graphics at the bottom. The Hyperedit display is synched to notation for easy editing.

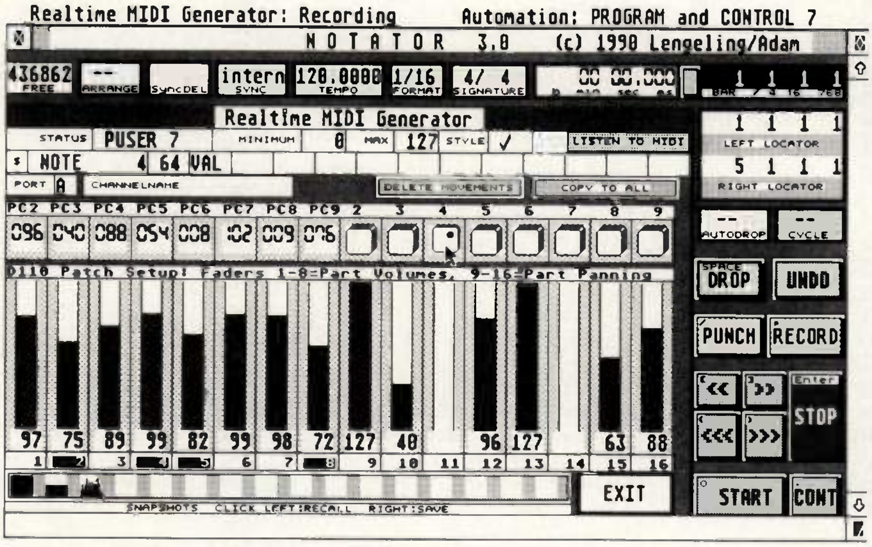


FIG. 7: Notator RMG version of a D-110 part-setup control panel. Numeric displays control program number and buttons turn notes on/off for auditioning. Faders 1 to 8 control part volumes, faders 9 to 16, pan positions.

uses intelligent maps, a definable notehead graphic, and—to show drum parts in standard drum notation without affecting the actual note played—a Display Pitch function for each sound.

The Real-time MIDI Generator (RMG) has added two new control panel building blocks to the screen faders: numeric displays and buttons. This module operates like the MIDI Manager in *Cubase* but lacks support for external, real-time control. The panel layout and individual graphic object formats are not editable.

There are two ways to configure the RMG: faders only and pseudo-event definitions. The faders only mode was the original RMG implementation, where each fader represents a single MIDI channel. A status box defines the global MIDI message, such as volume and pan, sent by all faders, and you can select and control individual faders as a single group. Movements of the RMG faders directly enter the appropriate MIDI data into the event list.

Version 3.0 includes a pseudo-event mode that provides a graphic-object switch—shown as a numeric display or button, but not both—with each fader, for a total of 32 separate controls. These are not locked into preset MIDI channels but can be assigned as you like. Each object is separately defined by message type, channel, and allowable range, such

Advertiser Index

VOTE FOR YOUR FAVORITE ARTICLE!

We want to give you more of the topics and types of articles you find most useful and enjoyable. Now you can use EM's reader service cards to indicate which ONE article in this issue was your favorite. Please check the ONE box under question #5 on the attached reader service card that corresponds with the title of the article you like the most:

a. "The Computer Musician: Multi-Port MIDI for Your Computer," p. 21
b. "Service Clinic," p. 26
c. "Beyond Sequencing: Interactive Electronic Music," p. 30
d. "Monster Synth Stacks," p. 43
e. "MIDI Systems Both Great and Small," p. 54
f. "EM Guide to Expander Modules," p. 70
g. DIY: "Creative Control with the EM MIDI Fader," p. 90
h. From The Top: "The Truth About Synthesizers," p. 102

SEE QUESTION #5 ON THE READER SERVICE CARD!

Start my subscription to Electronic Musician for:

❒ Two years (24 issues) for $29.95. SAVE OVER $54!
❒ One year (12 issues) for $17.95. SAVE OVER $24!

Savings based on annual/single copy price of $42.

MR.
MS.
MRS. ______________________________
Please print full name

ADDRESS ______________________________

CITY ____________________ STATE ________

ZIP ____________ PHONE ______________

❒ Payment enclosed ❒ Bill me B10206

Add $20 per year for Canada & foreign. Annual basic subscription rate–$24. Please allow 4-6 weeks delivery of first issue.

SUBSCRIBE

TO ELECTRONIC MUSICIAN

TODAY

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO 7231 NASHVILLE, TN

POSTAGE WILL BE PAID BY ADDRESSEE

Electronic Musician
P.O. BOX 41094
NASHVILLE, TN 37204-9830

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO 7231 NASHVILLE, TN

POSTAGE WILL BE PAID BY ADDRESSEE

Electronic Musician
P.O. BOX 41094
NASHVILLE, TN 37204-9830

as 1 to 127 for velocity. The RMG only supports positive ranges, so crossfade setups are not possible.

The entire control-panel setup is stored as a pseudo-event, and up to four such panels of separate pseudo-event types can be created in a song. In this mode, movements of RMG faders are entered as pseudo-events in the event list and must be played through the corresponding control panel to generate the expected MIDI data.

Fig. 7 shows a *Notator* RMG implementation of a D-110 part-setup control panel. Compare this with the *Cubase* version in Fig. 2. You can define and send virtually any MIDI message, from note on to sysex, through the RMG. As in *Cubase*, a Listen function lets you capture incoming MIDI data to build an object definition, which beats figuring it out and hand-entering it yourself. This feature is a big help in capturing sysex data such as instrument patch information. *Notator* includes example setups for the LXP-1 and M1.

As if you didn't have enough quantization options before, *Notator 3.0* offers an Adaptive Groove function that automatically and simultaneously applies a set of multiple preset and/or user-defined quantization styles within a track. Up to eight styles can be gathered together and saved into a set, although I've never needed more than two or three. Customizing touches let you weight the styles (so some are more likely to be selected); set a minimum number of notes before *Notator* makes a style decision for a phrase; and set how long the selected style will apply. Still not enough? A secondary groove correction can be defined to kick in after the initial quantization. You can use this to correct a part in your bass groove, then adjust it further for some swing.

Several new features and enhancements have greatly improved *Notator's* scoring and printing capabilities. A new page preview function lets you check the score layout before committing to print. It would be nice to see this extended to allow some editing capability in Preview mode, such as changing stave and text position and styles. Editable drivers are provided for most common printers, including the SLM804 (yes, the DMA device number can be changed) and DeskJet. Unfortunately, the drivers are poorly described in the manual, and you have to hunt for the appropriate one.

A convenient new system is used for text font management. The font-management table lets you load and choose from up to thirteen standard GDOS fonts, although the program does not use GDOS. Once you set up a table, you can save it as part of a system default file and load all the fonts a score requires prior to printout. To trade some print quality in return for saving some RAM, you can scale fonts; you can load a 10-point font, for example, and print it at 20 points. This is particularly valuable when you use memory-consuming laser fonts. Style attributes to dress up your text include bold, italics, underline, boxed, and others, and you can assign separate fonts to lyrics, each text symbol, tuplet numbers, and bar numbers. New notational symbols include grace notes and up to fifteen n-tuplets. A new note-attributes window lets you click on a note and directly tweak parameters such as the distance between accidentals and a note head, beaming and stem direction.

The program's excellent notation-to-MIDI feature also has been improved. Earlier versions already allowed sustain pedal marks to be interpreted as note-on velocity adjustments, and version 3.0 gives accent marks the same capability.

Printout quality is good, particularly on the SLM804, but even with an Epson 9-pin printer, you can produce acceptable lead sheets and scores.

Need Help With Notator?

Even though C-Lab just did a massive rewrite of the *Notator/Creator* manual, it's still pretty deep, especially for beginners. Help is on the way however, from a new three-volume set of instructional books by teacher, musician, and *Notator* beta-tester Phil Shackleton and composer/publisher, and now U.S. distributer of C-Lab software, Peter Alexander.

C-Lab Notator: Vol. 1 (278 pp.; $29.95) takes readers from turning on an Atari computer through basic sequencing and editing. Although based on *Notator* version 2.2, it covers most of the bases up to the current version 3.0, upon which future volumes will be based. Release of Volume 2 is planned for the second quarter of 1991 and will cover arrange mode, advanced sequencing, the RMG, and sysex. The final volume in the set is due in late 1991.

The topics in Volume 1 are well-organized, in progressive learning sessions, with numerous illustrations, examples, and reader exercises. The writing style is informative without being pedantic; important points are called out in boxed notes for fast reference. My only complaint is the lack of an index, but the table of contents is fairly detailed. The three volumes will form the basis for an educational course built around *Notator.* Based on this initial installment, it should be required reading for all *Notator* users and well worth the price.

Peter L. Alexander Publishing, Inc.
3537 Old Conejo Rd., Suite 101
Newbury Park, CA 91320
tel. (805) 499-6200
(Also available from the Mix Bookshelf; tel. [800] 233-9604 or [415] 653-3307.)

MULTITASKING

Beyond similar software features, *Cubase* and *Notator* get timing accuracy and limited multitasking capabilities from proprietary enhancements to the Atari's native GEM operating system. The C-Lab system is called *Soft Link* while Steinberg uses *M-ROS*, which it also uses with its Macintosh version. Both are basically switcher environments, partitioning computer memory into isolated, independent blocks in which separate programs can run independently, with some degree of interprogram communication.

Getting *M-ROS* to run multiple programs was not trivial. Although *M-ROS* itself never reported a setup error, I experienced many odd problems, including files not loading, computer lockup, and a host of others that only stopped when I lucked into acceptable partition settings by trial and error. I eventually got *Cubase* running simultaneously with other programs, both MIDI and non-MIDI, although none of them were able to share data directly. *Soft Link* was considerably better-behaved. If it didn't like a memory allocation, it said so and bounced me back to the setup page to try again. After a few tries, I was running without problems and jumping between partitions at will.

A more insidious problem with both systems is that Steinberg and C-Lab use hardware dongles that plug into the Atari cartridge port for software copy protection. You *must* buy a hardware key expansion bus if you want to run more than one of their programs at a time, and these are neither cheap, nor compatible with all cartridges, such as sound digitizers. While it is a developer's right to use copy protection, it is a major hassle for users. The current trend, led by such companies as Passport Designs and Dr. T's, is to drop protection. Indeed, there is little that anyone would get out of these programs without the manuals, particularly since neither has any on-line help. This in itself should mitigate seriously enough against piracy to induce the manufacturers to remove copy protection.

Neither *M-ROS* or *Soft Link* were able to exchange music data directly between MIDI programs, largely because these systems are just now starting to be used by other developers. About the best that can be done presently is to run a patch editor in one partition and capture sysex data into the parent sequencer (still quite useful in its own right). Developers need to start making use of operating system hooks to allow real communications between programs. Multitasking MIDI software on the Atari is still in its infancy. Hopefully, the forthcoming *MIDI Tasking* system software from Atari will standardize and promote multi-program communication

CONCLUSIONS

Differences between *Cubase* and *Notator* arise from their underlying focus and how they let you interact with your music. *Cubase* is heavily weighted towards graphic expression and control of song elements. *Notator* is more text-oriented but firmly weds MIDI data with musical notation.

Both programs offer comparably excellent recording and playback features, though I feel *Cubase's* visual display offers a better approach for song arranging than the simple pattern chain lists of *Notator*. Having the additional part and group structure elements, in addition to usual tracks and patterns, gives more flexibility. I also give *Cubase* the edge for overall interface design. *Notator* has a few rough spots left to improve, particularly direct parameter entry. With its emphasis on traditional music representation, however, *Notator* scores well with educators.

Editing is a toss-up, depending on one's background and needs. Users with previous computer music backgrounds will appreciate the variety of ways that *Cubase* can present and tweak song elements. Others, particularly newcomers to MIDI, will prefer *Notator's* far superior notation and printing. *Notator* also allows individual parts, including drums, to be transposed for display and printing without affecting the underlying MIDI data: very handy for making lead sheets.

Beyond basic sequencing needs, *Cubase* shines with its updated MIDI Manager and new phrase synthesis module. Against that is *Notator's* more powerful real-time MIDI-processing capability.

Of course, all of the above will change with the next iterations. Both developers have excellent reputations and are continually chasing each other, improving their strong points and adding the good points of the competition. In addition, the U.S. distributors for both products supply excellent technical support services.

The next escalation will be *Notator HD*, due out by the end of the year. This collaborative effort between C-Lab and Digidesign mates *Notator* with Sound Tools (*à la Studio Vision* for the Macintosh) to integrate two digital audio tracks with MIDI sequences. It will be available only for the Atari Mega 2/4 computers. *Cubase 1.5* for the Mac, due soon, supports the Apple *MIDI Manager* and IPS, but not score printing. A version of *Cubase* that supports Sound Tools is in development.

Both programs can be strongly recommended for all users, novice to pro. Beginners do not have to learn all the features at once to start making music. Just bite off a piece at a time as you need it and grow into the software. With their current degree of sophistication and ongoing stream of new features, however, expect to be chewing for quite some time.

Having finished with the Twin Peaks of Atari sequencing, all **Jim Pierson-Perry** *wants is a jelly donut and a damn good cup of coffee.*

DigiTech IPS-33B Super Harmony Machine

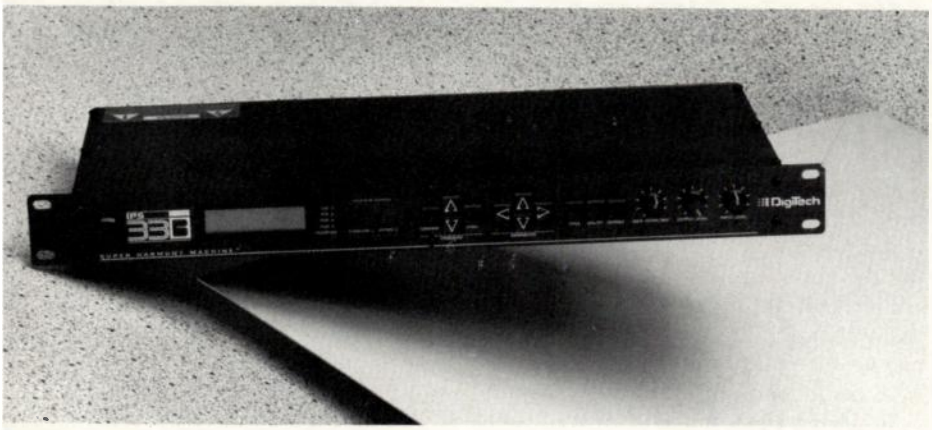
By Larry "the O" Oppenheimer

Good-sounding pitch shifters have dropped dramatically in price, but DigiTech's latest machine doesn't skimp on useful features.

"They go up-diddy-up-up-up, They go down-diddy-down-down-down. Those Magnificent Men in Their Flying Machines..."
— from the movie of the same name

Although pitch shifting is one of the earliest applications of digital audio technology, it remains one of the most elusive in terms of performance and price. Traditionally plagued by tracking and fidelity problems, pitch shifters have fallen into one of two categories: expensive and acceptable, or cheap and very dirty. Lack of contextual awareness (tonality) has limited the usefulness of even the best pitch shifters. However, in the last few years, pitch-shift boxes that offer reasonable audio quality and features have started to appear at a price small studios (and some musicians) can afford. Even the price of high-end devices has come down to that of mid-level reverb and effects processors. The IPS-33B, DigiTech's latest hat in the ring, is representative of the current state of affairs.

The IPS-33B provides two independent pitch shifts from a single-channel input source, along with numerous harmony and scale options for constraining the pitches to the desired tonality. Enhancements include delay, pitch and volume modulation, remote selection of key and preset, and of course, MIDI control. I put the IPS through its paces, trying it on a wide range of sources and comparing it to units on either side of its price. At $799, I found the IPS has a lot to offer within its limitations.



UP, DOWN, FLYING AROUND

The 1U rack-mount package, weighing in at only 6.5 pounds, sports a straightforward front panel with (from left to right): the power switch; a 2-line by 16-character, back-lit LCD; a 4-LED input-level display; 3-character LED program number display; two 4-button arrays for program and parameter selection and editing; three buttons for utility functions; and three pots. Input and output levels are set with the rightmost two pots and are stored with each preset. The third pot is an infinite-turn, stepped pot that controls wet/dry mix or adjusts a selected parameter during editing. The program-button array includes forward/backward step arrows and buttons for comparing and storing presets to any of the 128 user memories. (There also are 128 factory presets.) The parameter array uses the L/R arrows to select parameters, and the up/down arrows (in addition to the Data Entry/Mix pot) to edit the values. The utility buttons allow titling of presets, front panel bypass, and access to MIDI and system parameters (more on these later).

The rear panel is equally simple: input jack, dry output, left and right mix outputs (all ¼-inch unbalanced), -20 dB/+4 dB level switch, two footpedal jacks, footswitch jack, MIDI in/out/thru, 5-pin jack for the remote hand controller, and a standard IEC line receptacle.

So much for the hardware laundry list;

what does the thing do? From a single input, IPS-33B can perform two independent pitch shifts in either direction, from a minimum of one cent ($\frac{1}{100}$ of a semitone) to a maximum of two octaves. Leaving the micro pitch shifting and detuning aside for a moment, the first steps in defining a pitch shift are to pick a key, interval, and harmony type (the most crucial parameter of the three). There are five different harmony types: chromatic (standard, parallel pitch shifting, with no key awareness), scalic (where pitch shifting is constrained to notes within the specified scale system), chordal (which tries to choose pitch shift intervals such that any note played will be harmonized to sound good over the specified chord), arpeggiate (which creates an arpeggiation from a single note), and custom.

For scalic harmonization, all the standard major, minor, and church mode scales are available, including other deviations such as Lydian augmented, whole-tone, diminished, pentatonic, and blues. These types indicate how scale tones will be harmonized, but there is also a choice between five variants of each scale type (diatonic, parallel, diminished, modal, and altered) that determines how non-scale tones are handled. Two types of chordal harmony, simple and complex, are available. Simple harmony uses chord tones as often as possible to harmonize notes, while complex harmony uses more voice-leading and contrary motion. The arpeggiator offers 64 factory presets and 32 user-programmable patterns, as well as detailed control over the rate and repetitions.

The custom harmonies are where more exotic scales can be explored. There are 32 factory-custom harmonies and 64 user presets. Two separate harmonies can be programmed for each note in the octave, but all octaves use the same map.

In addition, each side can be detuned up to ±100 cents in one-cent increments and delayed up to 1.5 seconds. When using the chromatic scale, there is regeneration available on the delays. The pitch- and volume-modulation sections provide an LFO for each side, with programmable rate, depth, and—for pitch modulation only—shape (sine, triangle, square, and random). The LFOs for each side can run independently, or be linked in or out of phase. A side's volume LFO even can be linked to its pitch LFO. Finally, there are a few global parameters, notably pitch correction and response to pitch bends (stepped or continuous).

LOOPING THE LOOP (CONTROL)

While a lot of choice and flexibility exists, the real issue is how well all these factors can be controlled. With four ways to control many of the major parameters, this is an area where the IPS-33B really shines.

First, of course, is the front panel. Also included with the IPS is a wired, hand-held, remote controller (of somewhat cheezy construction) that duplicates the front-panel buttons for controlling the IPS from a distance. An optional footswitch allows remote selection of presets and key changes, either by stepping with successive taps on the pedal, or by holding the pedal down and playing a note on your instrument (quite a useful feature in live performance). A bypass switch is included on the footpedal. Finally, there is MIDI.

Program change messages can select presets in a direct, one-to-one fashion (program change 1 calls up preset 1), or they can be remapped to any selected preset number so that, for example, program change 1 can call up preset 17. The IPS even can send the remapped program change to the MIDI out. Thus, a

Product Summary

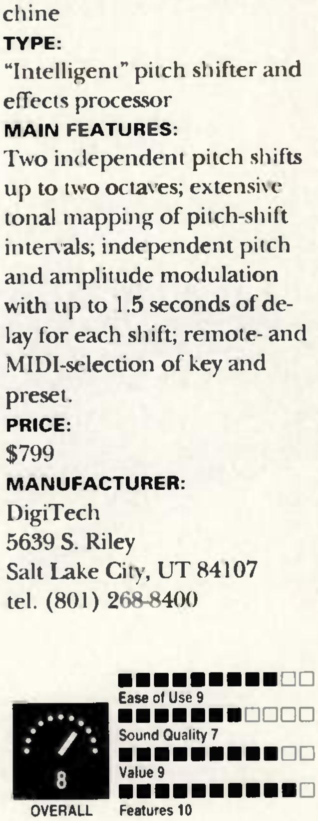
PRODUCT:
IPS-33B Super Harmony Machine

TYPE:
"Intelligent" pitch shifter and effects processor

MAIN FEATURES:
Two independent pitch shifts up to two octaves; extensive tonal mapping of pitch-shift intervals; independent pitch and amplitude modulation with up to 1.5 seconds of delay for each shift; remote- and MIDI-selection of key and preset.

PRICE:
$799

MANUFACTURER:
DigiTech
5639 S. Riley
Salt Lake City, UT 84107
tel. (801) 268-8400



preset can be selected from your instrument and a program change sent out to the rest of your MIDI system. Incoming MIDI program changes not only can be used to select presets, but key changes, too. The IPS can designate a MIDI channel—independent of the basic MIDI channel over which it receives program change, controller, and sysex information—for receiving information that is applied to key changes. On this channel, program changes or MIDI notes can be used to select the key; a split-point parameter allows notes above a specified cutoff to be ignored. Lastly, up to five MIDI controllers can be applied (in addition to the two controller jacks on the back) to control level, mix, pitch bend, and modulation parameters. The only one of these for which any scaling is available is pitch bend.

One of the biggest bugaboos in a pitch shifter is how well it tracks the input. The pitch-follower section of the IPS, designed by pitch-tracking pioneers IVL Technologies, offers six different tracking options: Normal, Distorted Guitar, Bass Guitar, Chord, Chord Min Delay, and Fuzz Guitar. Unfortunately, the manual does not clearly list the options, nor does it indicate what options are exclusively available in which modes.

DEFYING THE GROUND (EVALUATION)

I used the IPS-33B both in my home studio and during the mixing of my Celtic rock band Phoenyx's debut album. To gain perspective on its use in live performance and its accessibility to a musician relatively inexperienced with music technology, I let our electric violinist use it live for a while. How did we like it? It does some things just ducky and others, well...let's get a little more specific.

As mentioned, tracking and fidelity (lack of artifacts) are usually the tests of a pitch shifter. In this case, features were another significant consideration. We found the tracking to be adequate and up to the standard of most pitch-following devices. Well-defined, single-note lines were handled with ease, pitch bends tracked well in the continuous mode, and guitar hammer-ons and even slides were no problem. Finger vibrato (on guitar or violin), on the other hand, tended to disturb the IPS. Like most pitch shifters, the IPS is stumped by a polyphonic source. This not only means a piano, but a guitar with ringing strings. We can hope for breakthroughs in the future, but for now, it seems that one still has to adjust one's technique to accommodate the pitch tracker.

Fidelity varied widely with the quality of the source and the distance of the pitch shift. With guitar, I could get up to a fourth or so of pitch shift before the grungy distortion became offensive. Octaves, ninths, and so on got pretty gnarly. As a rule of thumb, the more complex the source, the greater the distortion. Vocals tended to suffer when they changed timbre in the course of a note or phrase. In live performance, though, much of this was lost in the general melee of the band.

Small pitch shifts sounded fine; in fact, my most successful use of the IPS was on bass, where I detuned each side by a few cents and spread it into stereo to give a full, chorused sound. The ability not only to detune each side independently, but to pitch-modulate them separately worked beautifully in this application. The IPS's chorusing and Leslie simulators also were nice. It's good that it can do these less-dramatic functions well, as they are called for more often than the harmonized pitch shifting (unless you are building part of your sound around the harmonies). The flexibility of the IPS in defining tonality is impressive and certainly maximizes the usefulness of the harmonies.

I appreciated the ability to change presets and keys from the neck of the guitar and was pleased to see that the feature worked well. My only complaint is that it is too easy to accidentally hit the bypass button on the footswitch when changing keys on the fly. The flip side of the coin is that not only can the IPS be bypassed at the front panel and the footswitch, but there is a preset so it can be bypassed with a MIDI program change. Finally, the footswitch bypass can be programmed to be latching or momentary, another attractive touch.

Given the variety of methods for controlling the IPS, it is most unfortunate that there is no scaling available for controllers varying parameters (with the exception of pitch bend). As an example, our electric violinist did not want to be limited to adjusting the mix from 0 to 100% exclusively, but would rather have a flexibility of range from, in one case, 30% to 85%. I ran into similar problems in the studio, where I used MIDI controllers to control modulation depth and speed.

It is unfortunate, with such gracious plenty of desirable features and a reasonable user interface, that the manual is incomplete, inaccurate, and unclear. There are bad page cross-references and a lack of information such as a listing of the factory-custom harmonies. (*The manufacturer plans to release a new manual by the time you read this.—SO*) There is a Quick Reference card supplied that lists all the factory presets, though, and I like Quick Reference cards.

I experienced a problem finding an optimal input-level setting for the IPS. It seems that a good, average level that lights the bottom couple of LEDS on the meter drives the IPS into clipping on peaks. The IPS (like most digital audio devices) does not clip gracefully. Wouldn't it be lovely if digital studio gear had simple, switchable, analog limiters on the inputs? If forced to choose, I would rather hear bad limiting than digital clipping.

THOSE MAGNIFICENT MEN

DigiTech has assembled a fun and feature-packed system in the IPS-33B, and it's a good value. It provides adequate (if not stunning) tracking and fidelity and a great deal of flexibility in control. The tonal harmony features are extensive, but the fidelity may dictate judicious use in exposed situations. The micro pitch shifting and chorusing types of applications sound fine on many sources and are suitable for a great deal of studio work.

Musician, engineer, producer, and lazy bum **Larry the O** *was heard to exclaim, "Nothing exceeds like excess," as he patched the sixteenth digital effects box into the mix.*

Wild Rose Technology !nspire 1

By Connor Freff Cochran

This sequencing software for the IBM and compatibles offers an inspiring price and a solid set of features, but ease-of-use is a problem.

Time and technology march on, and with them march the standards for music software. The first MIDI sequencing program I ever worked with, for example, had four tracks and no editing capability at all beyond the rather brutal act of chopping off an entire track. At the time (circa 1983), I was enthralled. Today, of course, that program is deservedly ancient history, as the sequencers of choice have sprouted more editing features and MIDI power tools than a redwood tree has growth rings.

This constant improvement may be good for musicians, but it presents a special problem for software designers: namely, staying current.

Which brings us to Wild Rose Technology's *!nspire 1*, a sequencer program for IBM PCs and PC-compatibles that originally saw release five years ago, from Passport, under the name *Master Tracks PC*. Back then, it was an innovative industry leader, a power program costing $500. Today, the program remains quite powerful and is, in some ways, still innovative, but it's marketed by Wild Rose as a beginner package that sells for $79.95. That makes it one of the least expensive sequencers on the market, which goes a long way toward making up for any of the areas in which it has slipped behind its newer competition.

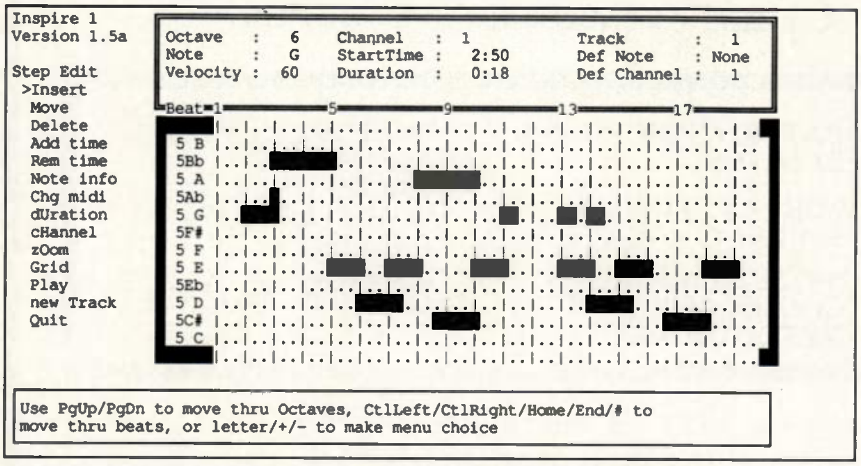


FIG. 1: Inspire's Step Edit screen lets you adjust channel data for individual notes in a track.

THE INSPIRING FEATURES

!nspire 1 builds sequences modularly. You start by creating a pattern of anywhere from 1 to 64 tracks, link patterns together to create songs, then link songs together to create song lists (a useful feature if you need to automate an entire set or show). Furthermore, songs can be "linearized" into a single pattern that can be expanded on with other patterns, and sections of tracks (or sections of selected groups of tracks) can be saved at any time to become usable patterns in their own right. This structure allows a high degree of individual choice, successfully accommodating both users who like to work in tight, repeating musical structures (drum machine programmers) and those who like to work in longer, linear, multitrack sweeps. The fact that you can easily shift between these conceptual modes while recording and editing is a big plus.

Program control resides in the function keys and various other keys on the computer keyboard, plus a series of command windows. *!nspire 1*'s manual variously refers to these as menus and screens, though sometimes their distinguishing characteristics are blurry.

At the top of the program is the Pattern screen (see **Fig. 2**), which lets you view, and edit, such per-track basics as track name, input and output MIDI channels, and the start-up program number. This is the basic screen for recording and playback, allowing you to solo tracks, monitor selected groups of tracks, change tempo, do punch-ins, select metronome modes, set a count-in, loop the pattern,

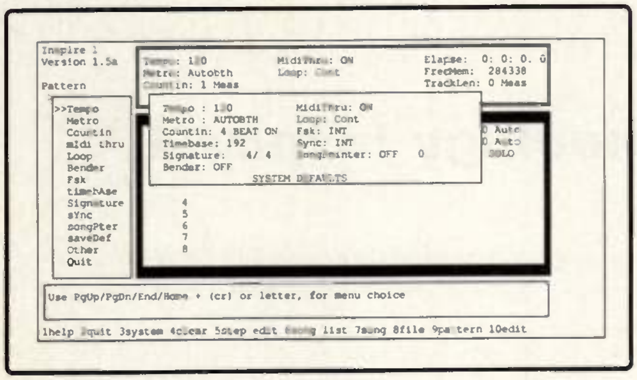


FIG. 2: !nspire's Pattern Screen.

and designate beginning- and end-points other than those for the entire pattern.

Most of these features are standard now, but I applaud the way *!nspire 1* separates MIDI input and output channels, keeping both settings available. This is great for transferring sequences from one machine to another, MIDI recording with groups of players, and other small conveniences in daily operation. If you select zero for input, all MIDI channels are recorded; select an individual channel, and only that one is stored, filtering out all others. Selecting zero for output plays back MIDI data on that data's original channel, while picking 1 to 16 will rechannelize it. Keeping both settings available at all times is nifty and convenient. The track-length command should also be noted: *!nspire 1* lets you record on and on, or it will let you set track length in advance of recording. Every track in a pattern can be a different length.

The Track Edit menu (**Fig. 3**) combines the old Pattern screen with a new set of commands: erase, copy, merge, quantize, transpose, velocity, and repeat. These are all fairly standard, too, though some limitations should be noted: Tracks only can be repeated up to 255 times, and quantizing can't be undone, so you'll need to save a safety copy of a track before you fool around with quantizing it. You can quantize portions of a track, as well as the entire thing, but you have to set the start- and end-points (using the commands in the Pattern screen) before starting to quantize.

The Files menu is used to show, save, load, rename, and erase your patterns, songs, and songlists. Which file types you see depends on which program screen you were in when you pressed the function key for the Files menu. *!nspire 1* automatically keeps track of them by giving each a different file extension.

The Step Edit screen takes you down into a track for serious data surgery. In the main window, there is a piano-roll-type graphic display of the MIDI note action. Above that is a window showing individual note information such as octave, note, velocity, channel, start time, duration, and so on. The main window can be zoomed in and out to show a range of from three to 48 divisions per beat. In addition, a highlighted border in the main window shows the location of other MIDI events, such as program changes and aftertouch, using abbreviations. These events can also be looked at and edited in detail. One thing I liked very much about *!nspire 1*'s approach to this editing mode is that it lets me fiddle with the channel data for individual notes in a single track. I also liked the fact that the program lets me insert and delete time from within a track, although I question whether this editing level is the only place that this function belongs.

The three remaining screens are the Song screen, the Songlist screen, and the System screen. The Song screen is much like the Pattern screen in appearance, except that you use it to place patterns in order, set their relative tempi, determine which tracks in the pattern will be muted (extremely useful for coming up with quick variations), and so on. The Songlist screen is even simpler. Its key features are the ability to set how many times a song will repeat before moving on and whether moving on is automatic or under manual control. The System screen can be called up at any time by pressing F3. With it, you can temporarily, or permanently, change all system parameters, including the time base (normally 120 ppqn, but values between 48 and 192 are available), MIDI thru, time signature, count in, looping on/off, sync choice, and so on. With the System screen it is possible to save versions of *!nspire 1* for different applications, so that you can "automate" what screen the program starts up in: the Songlist screen for live performance and the Track Edit screen for work sessions with existing material, for example.

Purely in terms of features, *!nspire 1* deserves applause. Once you learn your way around the program, there's a lot that you can do, including some things the program does better than any of its competition, such as creating new songs by easily combining multichannel track ranges from separate song files.

Product Summary

PRODUCT:
!nspire 1
TYPE:
Sequencing software for IBM PC-compatibles
HARDWARE REQUIREMENTS:
IBM PC XT/AT or compatible; DOS 2.0 or later; 640K RAM; any graphics card; hard drive recommended but not required; MPU-401-compatible MIDI interface
MAIN FEATURES:
Piano-roll-type step-editing; 64 tracks per pattern; ability to structure patterns as songs and songs as playlists; ability to specify MIDI in and out channels on a per-track basis
PRICE:
$79.95
MANUFACTURER:
Wild Rose Technology
PO Box 27
Volcano, CA 95689-0027
tel. (800) 782-0748
or (209) 296-4813

Ease of Use 5
Features 8
Documentation 3
Value 7
7
OVERALL

THE UNINSPIRING INTERFACE

However, there is more to a program than what features it has (or doesn't have) and whether it crashes constantly or runs forever without breaking down. There is more to a program than whether it is inexpensive. There is also the dreaded question of interface. It is in this area where *!nspire 1*'s age is showing.

First, the arrangement of screen elements is weak, even by comparison to other text-based programs such as Voyetra's *Sequencer Plus Jr.* When compared to the new, Mac-like graphic standards established by such programs as Passport's *Trax* (reviewed in the December 1990 **EM**), it becomes almost painful. Second, the actual location of commands is not as functional as it could be. All the Track Edit commands could have been more useful if located on the Pattern screen, instead of being sequestered separately. Similarly, placing the only save command on the Files screen is inconvenient for regularly backing up your work. Third, abbreviations and terminology throughout the program are inconsistent and sometimes unclear.

Finally, and probably most important, the basic computer keyboard commands for moving around inside the screen and windows, activating functions, and toggling between choices are confusingly arbitrary. Even as simple a matter as toggling values must be done (depending on where you are in the program) using either the spacebar or the left/right cur-

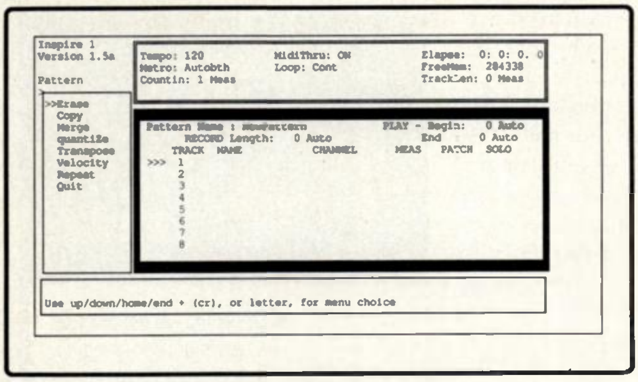


FIG. 3: The Track Edit menu combines the Pattern screen with a new set of commands (displayed on the left side).

sors or the up/down cursors or the plus/minus keys, and always only one of them. Should you forget and use the spacebar when, for instance, plus/minus keys are called for, tough. A few years ago I wouldn't have complained as much about this because all the available sequencing programs had their own version of this fault. Today, that is no longer the case. Furthermore, since *!nspire 1* is now being marketed for inexperienced users, such inconsistency is particularly annoying. It goes wiying that eginners are precisely the people who need consistency the most.

As for relying on the documentation to help you figure out what's up, don't bother. The manual is extremely skimpy. The basics are there—but nothing more than the basics—and there are some features that are mentioned but left completely unexplained. (The online help within the program is better, but still could be improved.)

The bottom line is that *!nspire 1* has plenty of power and flexibility—a remarkable amount of power for the price—but its interface design has not aged well. I am told that Wild Rose plans a complete revamp that will bring the interface into the 1990s. I hope so. Meanwhile, beginners should be aware that what they save on *!nspire 1*'s price tag, they will have to make up in climbing a slightly steeper learning curve.

Connor Freff Cochran *has been known for the last twenty years as just plain Freff. These days he lives in California, Colorado, Wisconsin, Illinois, and New York. His cat lives in California. Everything else is subject to change.*

FOR YOUR INFORMATION

ABOUT EM (*Electronic Musician*):

Since its inception in 1975 under the name *Polyphony*, **EM** has been a communications medium for sharing ideas, circuits, tips, and other information and is dedicated to improving the state of the musical art.

SUBSCRIPTION SERVICES:

All subscriber services are handled by a different office from the main **EM** business offices. For subscription inquiries, address changes, renewals, and new subscriptions contact: **Electronic Musician**, PO Box 41094, Nashville, TN 37204; tel. (800) 888-5139 or (615) 377-3322 outside the U.S. Do not send any other requests or items to this address. One year (12 issues) is $24; outside the U.S., $39—all amounts in U.S. dollars. Visa and MasterCard accepted (only Visa, MasterCard, or international money orders on foreign payments). Allow 6 to 8 weeks for new subscriptions to begin or to renew current subscriptions. Postmaster: Send address changes to **Electronic Musician**, PO Box 41094, Nashville, TN 37204-9830.

NATIONAL BUSINESS OFFICES:

Direct all editorial, advertising, and other inquiries (except subscriptions—see above) to the main **EM** business offices: **Electronic Musician**, 6400 Hollis St. #12, Emeryville, CA 94608; tel. (415) 653-3307.

BACK ISSUES:

Single/back issue price is $5. For a listing of published articles, send a SASE (self-addressed, stamped envelope) to our Emeryville, CA, address and request a "Back Issue Listing."

ERROR LOG:

Occasional errors are unavoidable. We list known errors in "Letters." We compile published corrections annually for those who order back issues; to receive a copy, send a SASE to "Error Log Listing" at our Emeryville, CA, address.

MIX BOOKSHELF:

This mail-order service offers products (books, instructional tapes, software, etc.) oriented toward our readership. For a free catalog, contact: Mix Bookshelf, 6400 Hollis St. #12, Emeryville, CA 94608; tel. (415) 653-3307 or (800) 233-9604.

EM REVIEW POLICY:

Manufacturers constantly update products, and prices and specifications stated in **EM** are subject to change. **EM** does not make product recommendations. Reviews represent only the opinion of the author.

LETTERS:

We welcome opposing viewpoints, compliments, and constructive criticism and will consider these for publication unless requested otherwise (we reserve the right to edit them for space or clarity). All letters become the property of **EM**. Neither the staff nor authors have the time to respond to *all* letters, but all are read. If you are having problems with your gear, please call the manufacturer, *not us*.

PROBLEMS WITH ADVERTISED PRODUCTS:

Information in ads is the responsibility of the advertiser; **EM** cannot check the integrity of every advertiser. If you encounter problems with an advertiser, write to our Emeryville address. Tell us the problem and what steps you have taken to resolve it.

MAIL ORDER:

Mail-order operations operate under very strict federal guidelines; if you have any problems, contact the U.S. Postal Service. Order COD or with a credit card if possible. Always allow 6-8 weeks for delivery; if there seems to be a problem, contact the company you ordered from, not **EM**.

WRITING FOR EM:

Send a SASE (25¢ postage) for our author's guidelines. We welcome unsolicited manuscripts but cannot be responsible for their return.

DO-IT-YOURSELF (DIY) PROJECTS:

Beginners should get a good book on the subject from your local electronics supply store (or try *Electronic Projects for Musicians*, available from Mix Bookshelf).

If you detect an error in a schematic or listing, *let us know*. If a project doesn't work for you, contact us to see if anyone has reported any errors (wait at least a month for **EM** to be in circulation).

Electronic Musician makes no warranties and assumes no responsibility or liability for errors in these projects, for the consequences of such errors, or for the safe and proper function of reader-assembled projects based on plans, descriptions, or information published in **EM**.

HELP US HELP YOU:

Please reference **EM** when asking manufacturers for product information, returning warranty cards, etc. Advertising provides our financial base, and ad purchases are based on your feedback to manufacturers about which magazines you like.

To the best of our knowledge, the information contained herein is correct. However, **Electronic Musician**, *its owners, editors, and authors cannot be held responsible for the use of the information in this magazine or any damages that may result.*

CLASSIFIEDS

***ELECTRONIC MUSICIAN** Classified Ads are the easiest and most economical means to reach a buyer for your product or service. See page 153 for complete information on prices and deadlines.*

EMPLOYMENT OFFERED

Musicians National Referral. Professional musicians & bands, seeking each other. Money-back guarantee. **(800) 366-4447**.

Earn cash writing interactive music or adapting your original instrumental music to an interactive format. Request exciting details today: Larry J. Holze, 1510 Easy St., Elgin, IL 60123.

Wanted—Unsigned artists & songwriters! Looking for a record deal? Amazing systematic techniques revealed. Free bonus directory. **(900) 420-TALENT**. Book sent upon request, $10 fee.

Let the government finance your new or existing small business. Grants/loans to $500,000. Free recorded message: (707) 448-0270. (NS9).

Make money with MIDI! Write music at home for special interest groups. Send $7 to: D'lant Studios, Dept. E912, PO Box 151022, Cape Coral, FL 33915.

EQUIPMENT FOR SALE

Largest selection of multitrack recorders and consoles. Trident, Amek-TAC Magnum and Scorpion II Apple computers, Soundtracs, Akai A-DAM, Tascam M3500, Digidesign Sound Tools, Panasonic SV-3700, Opcode, Tascam DA-30, Studer-Dyaxis, Eventide H300 0SE, Adams Smith Zeta-3, Roland/Akai samplers. Studio package specialists. Experienced staff/unequaled service. **EAR Professional Audio/Video**, (602) 267-0600.

Looking for used or new MIDI equipment? We've got tons of super clean Yamaha, Roland, Korg, Ensoniq, Kawai, and E-mu products in stock. **Come in or do it all through the mail.** Call, write or fax for prices & details. **Caruso Music**, 20 Bank St., New London, CT 06320, USA; **(203) 442-9600**. FAX (203) 442-0463.

Sounds Incredible, Inc. PO Box 796054, Dallas, TX 75379-6054. Sound & recording gear delivered to your doorstep. From cables to mics & power amps to tape decks: all major brands. Write for free catalog. **(214) 238-9393.**

Before you buy...**Akai, Ross, Studiomaster, all software,** call **MIDI Music**, the NW's largest **Akai** dealer, **(503) 236-2270**. For orders only, **(800) 729-6167**.

Mail order prices with knowledgeable, helpful people...major brands of MIDI-based music and recording equipment...E-mu Systems, Kurzweil, Akai, Toa, JBL, Lexicon, QSC, AKG, Carver, Ramsa, Panasonic, Fostex, Amek/TAC, J.L.Cooper, Digidesign, all Macintosh, IBM, Atari software and interfaces. **Sweetwater Sound, Inc.**, 4821 Bass Rd., Ft. Wayne, IN 46808; (219) 432-8176.

Road cases, unbelievable introductory prices. Keyboard $72, racks $65, DJ coffin $129, many more. Write for brochure and nearest dealer. Island Cases, 1121-I Lincoln Ave., Holbrook, NY 11741; (516) 563-0633, (800) 343-1433.

TEKCOM
DIGITAL AUDIO SPECIALISTS
COMPETITIVE PRICES
EXPERT ADVISE & SUPPORT
SYNTHESIZERS & SAMPLERS
MIDI INTERFACES
MUSIC SOFTWARE
& COMPUTERS

DIGITAL AUDIO PRODUCTS
FOR EVERY BUDGET

(215) 426-6700
1020 N.Delaware Ave.
Philadelphia PA

We want your used MIDI equipment and well-maintained recording gear. We'll give you **cash** or take it in on trade. Come in or do it all through the mail. Call, write or fax for prices and details. **Caruso Music**, 20 Bank St., New London, CT 06320; **(203) 442-9600**. FAX (203) 442-0463.

American Pro Audio

• Sony/MCI • Trident •
• Tannoy • Eventide •
• Yamaha • Tubetech •
• Fostex • Soundtracs •
• Beyer • Roland • Akai •
• Ramsa • Panasonic •

Mini Lease Program
New or used, trade-ins 24-60 months with buyout option $5K-25K **no** financials required min. 2 yrs in business.

1-800-333-2172

Prophet VS Sequential Circuits Vector synthesizer w/ ATA approved flight case. $1,650. (817) 274-5857.

Compressor/limiter. Pro studio quality — factory-direct low price, $169. **Stereo** in/out; auto attack/decay; variable ratio/threshold/output; 1/4-rack size. **Rocksonics**, PO Box 442, Los Alamitos, CA 90720. (213) 596-8308.

Computer/sequencer — Complete package includes 1 meg Amiga 500, color monitor, color printer, Dr. T's KCS V3.0 and MIDI/SMPTE interface. Much more. Call (201) 694-8102, ask for Dave or leave message.

INFRARED REMOTE CONTROL

Control any software up to 25 feet away. Great for sequencers! Also, control VCRs, CDs, TAPEs and other equipment from your computer. For IBM or MAC. Plugs into serial port. No external power required. Hardware and software only $99.95. Use your remote controller or buy ours for $49.95 extra. COD or CHECK.

TECHNOBOX, 12-B The Ellipse - Suite #300, Mt. Laurel, New Jersey, 08054-2231.

1-800-622-9990, Dial Ext. 550

E-mu systems & Kurzweil...we specialize in new sales, upgrade advice, service...all models in stock at ridiculous prices. Free newsletters. Sweetwater Sound, Inc., 4821 Bass Rd., Ft. Wayne, IN 46808; (219) 432-8176.

DON'T GET BEAT–
CALL 8TH STREET MUSIC
(800) 878-8882
Philadelphia's LARGEST Music Dealer!
8th Street Music 1023 Arch Street
Philadelphia, PA 19107

Korg WaveStations are here! Also the incredible M1s, T1, T2, T3s. Instruction manuals for the beginner and professional, also "Cookbooks" in stock now! Call or write: Mountain Song Music, PO Box 4502, Dept. "E", Estes Park, CO 80517. Ph. (303) 586-5542. Visa/MC accepted.

Lync, lync, lync strap-on **MIDI controllers**, (**vintage hotline**, 9 pm-8 am EST), **new gear — all brands**. Charlie Solak, Keys/Tour/Studio, 133 Myrtle Avenue, Johnson City, NY 13790. **Worldwide, (607) 770-9542**.

APO or **FPO** as a mailing address? Then call, write or FAX our special department for **absolutely** all of your new or used musical equipment needs. Worldwide delivery! **Caruso Music**, Dept. OS, 20 Bank St., New London, CT 06320, USA. Phone: **(203) 442-9600**; FAX: (203) 442-0463.

MUSIC SOFTWARE SUPER-SALE
SHIPPED FREE
LOWEST PRICE ON HUGE INVENTORY
HARDWARE TOO
DON'T MISS
313-973-6262
PATH MUSIC
VISA/MC

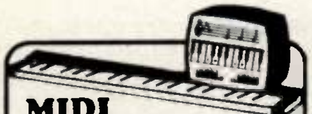
Arp 2600, Ober. 4-voice, MPU-101, Emax SE, TX802, MKS-20, -70, -80, DSS-1, Crown PB1, JBL 4435 spkrs. (704) 875-0717.

INSTRUCTION

Be a recording engineer. Train at home for high-paying, exciting careers. **Free** information. **Audio Institute**, 2174 Union St., Suite 22F, San Francisco, CA 94123.

Dr. Maury Deutsch: composition, arranging, Schillinger, multi-media, computer-electronics, applicable to films, TV, theater. Send for catalog. 150 W. 87th St., NYC, 10024; (212) 724-4722.

CLASSIFIEDS



MIDI KEYBOARD LESSONS For IBM PC
- Highly interactive music education.
- Check, Money Order, AMEX, and UPS COD.

From $39.95

Call 1-800-327-0209

FAST FINGERS MUSIC SOFTWARE
Box 741 Rockville Centre NY 11571

Bachelor of Science, Music Engineering Technology. Fully equipped individual MIDI work stations, accredited curriculum, career preparation for music, electronics, or computer industries. **Cogswell Polytechnical College**, 10420 Bubb Rd., Cupertino, CA 95014; **(408) 252-5550**.

Learn to play any keyboard & read music overnite with this new 84 min. video production, **"Beginning Keyboard"**. Great for students at all levels. Study booklet included $29.95 + $3.50 s/h. ATP, 611 Lacey Way, No. Salt Lake, UT 84054. MC/Visa. (801) 292-6331.

Learn at home–**MIDI course** for the aspiring MIDI musician. For complete course package send $49.95 + $3 p/h, check/MO: Musical Technologies, Inc., PO Box 839, Lindenhurst, NY 11757-0839.

Video Guide to MIDI. Setting up your personal MIDI studio. Keyboards, drum machines, sound modules, effects, computer, mixer and monitors. $39.95. MC/Visa/COD. (616) 374-0061. Two Legs Productions, 1003 Fifth Ave., Lake Odessa, MI 48849.

PARTS & ACCESSORIES

DUST

Custom Covers for "Your Equipment" by **Le Cover**™

For Brochure Call
1-800-228-DUST
prices from **$14.95..**
M/C Visa

The **Pedal Organizer**
Only **$19.95**
(4" x 15")

SOUND LOGIC
1125 Eleventh St.
Ramona, CA 92065
619-789-6558 / 800-753-6558

Build your own P.A., guitar, bass systems. Product designer for major electronic companies. **Consumer direct! P.A.s**: 8-24 channels, 4-16 outputs, 32 channels, 16-24 outputs. Stereo rack-mount amps 300W-600W. Parts, additional kits or assembled. **Strada**, PO Box 612-E, Alpha, IL 61413; (309) 667-2553. Catalog $2 s/h.

MT-32 OWNERS
AND D-110, D-10, D-20 OWNERS
MODIFICATIONS FROM REAL WORLD INTERFACES

MT-32: Battery Back-Up
Less Noise & Distortion
50 Reverb Settings
Front Panel Memory Access
D110 Reverb Sounds
Individual Outputs

D-110: 5.4 db More Gain
2.2 db Less Background Noise
New Reverb Outputs

D-10 & D-20: 5.4 db More Gain
4 New Outputs
Smoother Reverb

Call for Free Brochure
L.A. Custom Instruments
(818) 797-8529
Technical Magic - Ottawa (613) 596-9114
Robin Whittle - Austrailia 011-613-459-2889

REMOVE LEAD VOCALS From Records & CD's

Build this kit for under $50 which removes lead vocals from standard stereo records, CD's, Tapes or FM broadcasts. Easily connects to any home component stereo. Perform live with the backgrounds. You can be the lead singer of your favorite band. Detailed Plans $4.95.

Weeder Technologies
14773 Lindsey Rd.
Mt. Orab, Ohio 45154

Factory-direct flight cases for keyboards, guitars, lights, amp racks, utility trunks, etc. Best quality; low, factory-direct prices. Custom orders shipped in 5 days or less. Sound Engineering, **(800) 837-CASE**.

INSTANTMOD™! Unique ribbon pot modulation source for **CZ-101/CZ-1000** synths. Reviewed in EM; free info. Assembled & tested; easy Installation. $39 ppd; CA res. add 6.25% tax. Blacet Research, 15210 Orchard Rd., Guerneville, CA 95446.

Wine Country Productions provides operational and technical support for **Sequential Circuits synthesizers, samplers, & drum machines**. Sales, service, parts, and accessories for Sequential instruments from the Prophet 5 to the Prophet 3000. Operational & technical manuals, sound disks, cartridges, & data cassettes, latest software, memory expansions, custom ICs & spare parts. **New MIDI kits** featuring velocity, aftertouch, pitch & mod wheels for the Rev 2 and Revision 3 Prophet-5. More new MIDI kits for **vintage synthesizers** by Arp, Moog, Oberheim, Sequential, Linn, PPG, Roland, Korg, Yamaha, & Rhodes Chroma. Wine Country pays cash for Prophets...dead or alive! **Free catalog. Visa, MasterCard, American Express & CODs welcome**. 24-hour **FAX line: (408) 266-6591**. Open Monday through Friday from 9:30 am to 5:30 pm Pacific time. **Call (408) 265-2008**, or write to: **Wine Country Productions Inc.**, 1572 Park Crest Ct., Suite 505, San Jose, CA 95118.

Keyboard dust covers: S (6x18-10x25); $9, M (8x25-12x35); $10, L (12x35-16x45); $12, XL (16x45-20x55); $14. Send check & size to: **Duracover**, 39950 Garfield, Mt. Clemens, MI 48044.

PUBLICATIONS & BOOKS

Money saving **DIY projects**. Amps, eq, crossover, mixer etc. Plans for 10 projects. $10 check or money order to: Westwind Publications, PO Box 13700, El Paso, TX 79913.

Guitarists: Discover the secret to creating effective distortion without tubes! Build your own distortion unit! Incredibly powerful, unique distortion. Not a cheesy fuzzbox. Be different, save big money. Simple, detailed plans $6. Jonathan Bird Publishing (E), PO Box 792, Hudson, MA 07149.

Raga Encyclopedia—Exotic music scales of India. For Western musicians and composers. Written in staff notation. Batish's, 1310 Mission St., Santa Cruz, CA 95060. (408) 423-1699.

Cubase Users
Announcing the Official Bi-monthly Newsletter for Cubase & Cubeat

Cubasics

Edited by computer-MIDI "guru" **Geoffrey Ryle**; helpful hints, tips and techniques; plus interviews and reviews.
1-yr (6 issue) subscription is only $18 before 3/1/91

Also available...
The Official Cubase Handbook
Just $29.95 incl. FREE sub.

Creative Input
4029 S. Pacific Ave., #5
San Pedro, CA 90731
(213)548-0218

Sequences—217 modern patterns in all keys; $20, $3 p/h. **Improv**–3 bks, covers all styles up to fusion & free; $10 ea bk, $1 p/h. Rich Corpolongo, 3135 N. 76th Ct., Elmwood Pk, IL 60635. (708) 456-1382.

BOOKS, TAPES, VIDEOS

Get the world's most complete collection of resources for the audio and music professional. Write or call now for your free catalog.

MIX BOOKSHELF
6400 Hollis St. #12, Emeryville, CA 94608
(800) 233-9604 • (415) 653-3307

RECORDING SERVICES

"A great deal" "Real time cassettes–Nakamichi decks, chrome tapes—the best! Album length $1.50/100. On cass. printing/inserts avail. Grenadier, 10 Parkwood Ave., Rochester, NY 14620; (716) 442-6209 eves.

EUROPADISK, LTD.
MASTERING / MANUFACTURING
- Compact Disc
- Cassettes
- Vinyl Records
- Printed Graphics
- Neve Sony Digital CD Premastering

The U.S. most complete facility and a 20-year reputation for the finest quality. Call for our information-packed brochure.

EUROPADISK, LTD.
75 Varick Street, New York, NY 10013
☎ (212) 226-4401 FAX (212) 966-0456

CLASSIFIEDS

RECORDING SERVICES

Cassettes duplicated **highest quality cassette duplication. Custom-loaded blank cassettes. Lowest prices. Visa/MC accepted. Call or write: Cup of Water Productions, 13780 12th Road, Plymouth, IN 46563; (219) 936-2015.

Cassette label-maker program and pin-feed labels. Atari St software (soon for IBM and Mac) with fifty blank labels, $24.95. Check or money order to: Midnight Studio Software, 66255 Red Band Rd., Bend, OR 97701.

SOFTWARE & PATCHES

GFmusic $49
IBM/MPU401/KEE Sequencing
Ultimate power/flexibility.
Convince yourself with a free TRYB4BUY disk *& manual.*
Not just a Midi Tape Recorder!
(813) 961-9207 Box 272136
Tampa, FL 33688-2136

TRYCHO TUNES
PERFORMANCE SEQUENCES
Over 800 current Top 40, oldies, standard, and c&w songs for most brands of sequencing equipment.
We're the oldest and still the best!
Trycho Tunes are available at many fine pro audio/computer stores, or order direct at:
(714) 826-2271
TRYCHO MUSIC INTERNATIONAL
2166 W. Broadway St., Suite 330,
Anaheim, CA 92804
Fax: (714) 995-8079

'REALSTUFF' MIDI professional, top 40 sequences. **Hot dance** tunes and standards, used by the people that program them! **Complete** arrangements available for Atari or Mac. (401) 884-5961. 'REALSTUFF' MIDI, Suite 103, 5600 Post Road, East Greenwich, RI 02818.

Public domain MIDI software for Atari ST, Commodore 64/128, IBM, from $4/disk. Utility, patches, editors, thousands of programs! Write today. **Free catalog disk!** Specify computer. MIDI Software, PO Box 533334, Orlando, FL 32853-3334. Or call (407) 856-1244.

S900/S1000/EPS/MPC-60/EMAX
EMAX II/DSS-1/ADS/P-3000 disks.
Strings, brass, pianos, drums, percussion, FX. Fairlights, and other classic keyboards.
Call for FREE CATALOG.
Demo disks Available.
Call for Holiday Special – FREE Overnight Delivery with min. purchase
greytsounds
SOUND DEVELOPMENT
9823 Mason Ave., Suite 23
Chatsworth, CA 91311
818-773-7327 • FAX: 818-773-9203

The best sequences available. Tran Tracks has been providing professionals with the highest quality sequences for years! Our clients continue to say **Tran Tracks** are the best. Incredibly accurate programming. Large library of hit songs. Unparalleled technical support. Complete documentation. Immediate delivery. Formats: IBM, Macintosh, Atari, Amiga, Roland, Yamaha, Kawai, Alesis. Licensed by major publishers. 5 songs or more–$10 each. MC/Visa/AmEx. Free demo and catalog. **Tran Tracks**, 133 West 72nd Street #601, New York, NY 10023. (212) 595-5956. FAX (212) 595-8079.

MIDI JUKEBOX™
MIDI SEQUENCES
WITH FRESH NEW SOUNDS FOR YOUR MODULE
- PROTEUS
- U-220
- D-110
- MT-32/CM SERIES

DemoDisk - Atari, IBM, Mac, MC-500 $9.95. Specify computer/synth.
MIDI JUKEBOX
12335 Santa Monica Blvd. Suite #124
Los Angeles, CA 90025
1-800-777-8010

Supersequencer 64
for the Commodore 64
Also available for the Commodore 128 & Apple IIe/GS
Other programs available for Atari ST. MIDI interfaces too. Free catalog
call 1-714-242-0454. Low $
Excellent Products
SOFTpacific
12240 Perris Blvd. Ste 157
Moreno Valley, CA 92387

WHY PROGRAM??
when you could be playing!
Livewire has great sounds for Yamaha, Korg, Kawai, and for many other synths. We received rave reviews in "Keyboard". Thousands of customers agree - we are the **best!**

Korg **M1/M3R** - "M1 Dreams" 200 hot sounds: $29.95. ***M1 Disk Library*** - 1000 sounds: $99 **(T1** disks: $139), **M3R** - 600-sound disk: $69! **T1** - program and PCM disks: call! **Wavestation** - Synth or Acoustic. 117 sounds: $29.95 ea. 192 sounds for **DW-8000:** $29.95. 64 sounds for **Poly-800:** $24.95. 400 **DS-8/707** sounds: $39.95. *KAWAI* **K1** - 96 sounds: $29.95. **K4** - 2 128-patch sets: $29.95 ea., **XD-5:** 16 hot new kits: $29.95. *YAMAHA:* 4000-patch **DX7** disk library: $75! **SY55, SY22, TG33** - 64 patches: $29.95. **TX81Z, FB01, DX11, V50** - 96 patches: $24.95. *ROLAND*- **JX:** 32 "tones": $24.95. **Juno 1/2** - 128 patches: $39.95. **Juno106/60** - 64 patches: $29.95. **MT32/D110**- 128 patches: $29.95. **Jupiter & D-50** owners - call!! *EMU* **Proteus** - 64 sounds: $29.95. *CASIO* - **CZ & VZ** sounds - call! *Sample Disks* - For Ensoniq **EPS, EPS-16, Mirage,** and Casio **FZ:** call! We accept chargecards (5% extra). Order on tape or Atari, C64, Amiga, IBM, Mac, Brother, Alesis, or DX7 disks. *For fast, free info, send a stamped self-addressed envelope.* ***TRY US!***

Official Korg/Yamaha developers
Livewire Audio
PO Box 561-E
Oceanport, NJ 07757
(201) 389-2197
Preferred by musicians---
Because we ARE musicians!

Elite K5/K5M owners! Sample converted patches!! Disks on Atari, Mac, C-64/128, IBM, Q-80 or send insured RAM card. $34.95: check/MO. Turnkey Group, 3560 Old Mill Rd., Highland Park, IL 60035; (708) 433-5760. Fax (708) 433-2795.

The Definitive MT-32 library: 1,001 new voices, $100. **1,199 D-10/110/20** voices, $100. **2,306 M1 voices, 2,113 K1, 2,194 D-50**, each in two 1000+-voice groups — rhythm, orchestra — $100 each. **2,250 TX81Z/DX11/V50**, $100 (tape, diskettes). **4,009 DX7/TX802**, $100. **2,095 ESQ-1**, $100. **Proteus, VFX, K4, M3R, T1**: free info! All libraries: highly organized by categories, alphabetized. **No duplicates**. Available on diskettes **for all computers, MC-500, DX7II-FD! Money-back guarantee.** Visa/MC/COD. Many—MIDI Products, PO Box 2519-EM2, Beverly Hills, CA 90213; (213) 650-6602.

FREE SOUNDS !
M1, D50, D110, ESQ/SQ80, TX817, M1000, Poly 800, FZ owners! Write us for a **free** ***SPECTRUM*** *Studio Sounds* patch plus reviews, testimonials, voice lists of our legendary, world-famous satisfaction guaranteed sounds (specify synth)! **(Atari ST** Special:Disk $1) **PATCH/WORKS**, PO Box 450-EM, New York, NY 10024

Best performance samples for Emax, Emax II. Advanced synthesis design uses lowest possible RAM memory. Choose from **Top 40, rap-funk, new age, sound effects & lots more**. 4-disk set $29.95; any 16 disks $99.95. $4 shipping. CODs accepted. PA residents 6% tax. 1,000 sounds, 16-bit **multisampled cassette:** $19.95. Dolby or dbx. Stoklosa Productions, PO Box 13086, Pittsburgh, PA 15243; (412) 279-8197.

SEQUENCES by MUS-ART
Past / Present
Large library
All formats
Licenced
FREE CATALOG
Box 680664
Orlando FL 32868-0664
TEL: 407-290-MIDI
FAX: 407-291-2266
BBS: 407-292-0444

MIDI SEQUENCES
All types of music available on most formats. Call or write for **FREE** catalog and demo tape. Specify sequencing software and hardware.
THE MIDI INN
P.O. Box 2362, Dept. EM
Westmont, IL 60559
(708) 789-2001

CLASSIFIEDS

Standard MIDI File ToolKit for reading & writing Standard MIDI files for IBM. Includes 62 pg. programmer's reference & software tools on disk for Turbo Pascal, Turbo C, Turbo C++, Microsoft C, Quick C, QuickBASIC. **$39.95 + $3 s/h. Visa/MC. Music Quest, Inc.**, Box 260963, Plano, TX, 75026. **(800) 876-1376**.

New life for your K5, volumes 1 & 2 — $30 each. **TX81Z**, 96 great sounds, $25. You pick **DX7** patches, $25 per bank. Atari/IBM/Mac/RAM card/cartridge. Triple Gem Music, PO Box 838, Trumansburg, NY 14886. (607) 387-9270.

Top 40 sequences! Available for Amiga, Atari, IBM, Mac, Roland, Yamaha, and other systems. Current dance songs for soloists, duos, trios, etc. All **tested** with audiences. Over 1,100 songs—we're the oldest and still the best! **Retail inquiries welcome. Trycho Tunes**, 2166 W. Broadway #330, Anaheim, CA, 92804. Call toll-free (800) 543-8988. See us at NAMM booth #4762.

MIDI Programmer's ToolKit for MPU-401 compatible IBM interfaces. Includes 76-pg. tech. manual & software tools on disk for Turbo Pascal, Turbo C, Turbo C++, Microsoft C, Quick C, QuickBASIC. **$39.95 + $3 s/h. Visa/MC. Music Quest Inc.**, Box 260963, Plano, TX 75026. **(800) 876-1376.**

DISCOUNT MIDI SOFTWARE
FOR ANY COMPUTER MUSICIAN
MAC IBM APPLE ATARI C64/128 AMIGA
1991 MIDI Buying Guide Catalog
Leading MIDI Software Interfaces SMPTE
Incredible Savings • All Major Sequencers
Ed/Librarians • Keyboards • Modules + More
SOUND MANAGEMENT 800-548-4907
P.O. Box 3053 • Peabody, MA 01961

CANADIAN Proteus/D-110
U-220/MT-32/MC-500
Users Groups
Module Specific Sequences & Midi Files
Marty - 2426 W. 6th Ave.
Vancouver, B.C. V6K 1W2
(604) 738 - 4012 MarTunes

Gig-proven MIDI sequences. Top 40, 50's and 60's, country, standards. Macintosh, IBM, Atari, Akai, Roland, Kawai, Yamaha and Alesis formats. Call or write for free song catalog and demo. **The Works Music Productions Inc.**, PO Box 22681, Milwaukie, OR 97222. (503) 659-3964 or (206) 254-3187.

IBM PC Music Feature! Option card with 8-voice, multitimbral, MIDI synthesizer onboard. Includes 240 preprogrammed Yamaha sounds, 96 programmable patches, and a MIDI in/out/thru interface. Use two cards to double capacities. An all-in-one MIDI studio for IBM and compatibles for only $495. Software available for recording, arranging, and educational needs. Packages recommended. Dealers, catalogers, & VARs call for discount schedule. **Distributed by Mix Bookshelf**, 6400 Hollis St. #12, Emeryville, CA 94608; (415) 653-3307, (800) 233-9604.

PROTEUS PROTEUS PROTEUS
THE ORIGINAL USERS GROUP
• OVER 500 PRESETS
• 25 PAGE MANUAL
• FREE CONSULTATION
• BBS • SEND $1 FOR INFO
• CALL US 1-800-777-8010
THE FARKER ADAMS GROUP
2336 SANTA MONICA BLVD. SUITE #124
LOS ANGELES, CA 90025
PROTEUS PROTEUS PROTEUS

U-220 PROTEUS MC-50
THE ORIGINAL USERS GROUPS!
CALL TODAY!! 1-800-777-8010
D 110 MC-500 MT-32

Free sequences: 600 songs to trade. MC-500, Mac, IBM. Tal, 3047 Riverbrook Dr., Orlando, FL 32792. (407) 671-0352 anytime.

The
VOICE DEVELOPMENT SYSTEM
EDITOR LIBRARIAN
SEQUENCER &
PATCH CREATOR
for the Atari ST &
Kawai K1/K1r/K1-II K4/K4r
Yamaha V50 TX81Z/DX11
DX21/DX27/DX100 WT11/
YS100/YS200/DS55/B200/TQ5
Order today
MUSICODE (800) 448-3601
5575 Baltimore Dr., Suite 105-127
La Mesa, CA 92042 (619) 469-7194

Leigh's Computers has the best selection of MIDI software. We have all the programs for your computer, synth, and samplers! We ship worldwide! Call (800) 321-6434 now! Leigh's Computers, 1475 3rd Ave., New York, NY 10028; FAX: (212) 772-1689.

Amiga Editor/Librarian EL1.1D for all synthesizers, with powerful features for professionals. Limited time price, $95. Version upgrades $10. Send your order to: RHMS-SOFT, PO Box 317, HomeCrest Station, Brooklyn, NY 11229.

CZ users: call the demo line at (201) 334-3546 & receive **free** CZ patch samples & info. Or send $5 to get a returnable, 1-hr demo tape of 192 imitative patches plus Tchaikovsky's *Capriccio Italien*. Check/MO to: Charles Lauria II, Dept. E2, 17 Forest Place, Towaco, NJ 07082.

AMIGA MIDI PROGRAMS
* SoundScape <-> MIDI file Converter now $12.95
* MIDI MATH V1.1 *Algorithmic Composer* now just $49.95
* MT-32 Mixer/Utilites Package only $39.95
* Patch Editor/Librarians $49.95 ea.
Yamaha G-10 (guitar), Lexicon LXP-1 or LXP-5 (effects)
Order these fine Amiga products From
Borotec, Inc.
P.O. Box 17149
Euclid, Ohio 44117-0149
(216)-481-3642
We do NOT copy protect
Free Shipping
(COD add $4.00)
Dealer Inquiries Invited
Custom and Contract
Programming Available

Macintosh users! Powerful new rhyming software allows you to write and auto-rhyme lyrics in one program! Over 50,000 possible rhymes. Recognizes over a million words! Rhyme Design™, $129.95. MC/Visa. Call **R.S.I.**, (219) 262-1324. 300 Oakwood Ave., Elkhart, IN 46514.

DIGITIAL DOMINATION FOR YOUR EPS
Get the best sounds for your EPS from a library of contemporary electronic instruments, including the M-1, D-50, U-20, D-70, Proteus, VFX-SD, Alesis HR-16B and MORE! Membership discounts available. Call or write for free info:
maestro sounds
113-30 199 St., Jamaica, NY 11412
(718) 465-4058

Would you pay $19.95 for an E-mu Proteus/1 and an E-mu Proteus/2 editor/librarian? If you have an IBM and a Proteus, **check Volkan out**! For info send $2 to MMI Computers, PO Box 14807, San Luis Obispo, CA 93406, or call (805) 541-8457.

SPX Edit 90 ed/lib for the SPX-90/90II, $69.95. **OB-8** librarian, $24.95. Atari ST format. Send chk/MO or write for more info. **RoGloCo**, 11684 Ventura Blvd., Suite 838, Studio City, CA 91604.

PATCHES
SEQUENCES
MIDI PROGRAMS
MIDI DEMOS
SOUND MANAGEMENT BBS
DIV. OF Lakeside Recording Studios Inc.
708-949-MIDI
708-949-KEYS
708-949-4BBS
ALSO ! EPS Samples on disk from $2.50 a disk!
For EPS DISK LIST
Send $1 ATTN EPS DISK DEPT
WHAT! FILES BY MAIL!!! ON 3.5 DISK
NO MODEM! Send $1 ATTN BBS FILES
Box 396, Mundelein, IL 60060

MISCELLANEOUS

"Music Makes the Heart Grow Stronger", "I Lip Sync." & other great 100% cotton t-shirts. Specify size, color (red/black/white) & slogan: $15. Dan Allen, Box 839, Fairfax, CA 94978.

JOIN COMPUTER MUSICIAN COALITION JOIN
the Nation's Computer/Music Enthusiast's Users Group
1024 W. Willcox Av.
Peoria, IL 61604

AFI Pitch-Reader card plugs into IBM PC/XT/AT or clone. Gentle electric technology. Mic/line input. Accurately displays notes and tuning onscreen or records melodies and writes them as standard MIDI files to your sequencer/notator/editor. $295 + s/h + tax. Developer's kit available. Music educator's package available. Call AFI at (512) 250-1060. 15805 Booth Circle, Volente, Texas 78641. MC/VISA.

Your song or instrumental theme! Notated, lead sheet, full score. Professionally arranged and performed by full orchestra. MIDI programmed, recorded and mastered on DAT, reel-to-reel, cassette or all of them! For more info write to: **R & K Music**, 32545-A Golden Lantern, Suite 456, Dana Point, CA 92629, (714) 489-1982, or send $5 for introductory demo cassette and info.

PUT EM CLASSIFIEDS TO WORK FOR YOU!

SEND THIS COUPON TODAY FOR YOUR EM CLASSIFIED AD!

Pricing: $7.50 per line (approximately 25-32 character spaces per line); six-line minimum. Add $0.50 per bold word. Each space and punctuation mark counts as a character. $45 MINIMUM CHARGE for each ad placed.

Display rate: $80 per inch (1" minimum). Logos or display advertising must be camera-ready (width is 1 5/8"). Frequency discount rates available; call for information.

Special Saver rate: $25 for up to four lines, including first word in bold. **Only available to individuals not engaged in commercial enterprises.** No additional copy allowable for this rate.

Payment must be included with copy: check, Visa, MasterCard or American Express accepted. Sorry, no billing or credit available.

Closing: First of the month, two months preceding the cover date (for example, the April issue closing is February 1). Ads received after closing will be held for the next month unless otherwise stated. **Cancellations will not be accepted after the closing date.** Copy changes and cancellations must be submitted in writing.

Other requirements: Full street address (PO boxes aren't sufficient) and phone number must accompany all requests, whether included in ad or not. All words to be **bold** should be underlined. Copy must be typed or printed legibly in standard upper/lower case. Copy in all capitals is not permitted. Publishers are not responsible for errors due to poor copy. Arrangement of characters may be altered in typesetting process due to space. The publishers are not liable for the contents of advertisements.

The small print: Only ads dealing with music, computers, or electronics will be accepted. No stated or implied discounts allowed on new equipment sales. Publishers reserve the right to refuse or discontinue any ad deemed inappropriate.

Electronic Musician Classifieds: Attn: Robin Boyce, 6400 Hollis St. #12, Emeryville, CA 94608, (800) 747-3703 or (415) 653-3307, Fax (415) 653-5142.

INSERT THIS AD IN THE ________ ISSUE OF EM.

Categories available (Check one):

- ○ EMPLOYMENT
- ○ EQUIPMENT FOR SALE
- ○ INSTRUCTION & SCHOOL
- ○ PARTS & ACCESSORIES
- ○ PUBLICATIONS & BOOKS
- ○ RECORDING SERVICES
- ○ RECORDS, TAPES & CDS
- ○ WANTED TO BUY
- ○ SOFTWARE & PATCHES
- ○ MISCELLANEOUS

ATTACH YOUR CLASSIFIED AD COPY ON A SEPARATE SHEET, TYPED DOUBLE-SPACED OR PRINTED CLEARLY IN CAPITAL AND LOWER-CASE LETTERS.

Cost: ____________ Lines @ $7.50 = ____________

____________ Bold @ $0.50 additional ____________

____________ Special Saver rate = $25

Total payment included ____________

○ Visa ○ MC ○ AmEx ○ Check/Money Order # ________

Card# ____________________ Exp. ______

Company Name ____________________

Name ____________________

Address (No PO Boxes) ____________________

City ____________ State ______ Zip ________

Phone ( ) ____________________

Signature ____________________

MAIL-ORDER CONSUMERS DO HAVE RIGHTS.

As a mail-order consumer, you should know your rights.

Mail-order sales must comply with the rules of the Federal Trade Commission (FTC) and various state laws. Here are some guidelines to alert you to your rights and help you shop by mail more effectively.

THE FTC MAIL-ORDER RULES STATE:

1. The Seller must ship your order within 30 days of receiving it, unless clearly stated otherwise in the advertisement.

2. If the Seller cannot ship your order when promised, you must be notified in writing prior to the promised date. The notice must specify a new date if available, and must give you the opportunity to (a) cancel with a refund; (b) agree to a specified delayed shipping date; or (c) agree to an indefinite delay.

3. The Seller's notice must include a postage-paid reply envelope or card so that you may indicate your preference. If you do not respond, the Seller may assume you agree to the delay.

4. Even if you agree to an indefinite delay, you retain the right to cancel at any time before the merchandise has been shipped.

5. If you cancel an order that has been paid by check or money order, the Seller is obligated to mail your refund within seven business days. If you paid by credit card, the Seller must credit your account within one billing cycle following receipt of your cancellation. Store credits or vouchers are not acceptable in place of a refund.

6. If the item you order is unavailable, the Seller may not send you substitute merchandise without your consent.

BE AWARE

- If you do not receive your order as promised or if the merchandise is defective, write to the Seller immediately. Include a description of your order, the price, date and account number or order number if available. Keep a copy of your letter.
- If you register your complaint by phone, send a follow-up letter to confirm and keep a copy of it.
- If you think the merchandise is defective, review your product instructions and warranty carefully. Make sure you expect only those features and abilities that the product is supposed to have. Then contact the Seller for procedures. Do not return the merchandise until you have been instructed to do so.
- If you return the merchandise, keep the shipper's receipt or packing slip. Your right to reimbursement of postal costs is determined by store policy.
- If you have discussed your problem thoroughly with the Seller and remain dissatisfied, write to the Better Business Bureau, Chamber of Commerce or the consumer complaint agency in the Seller's state. If you paid for the merchandise by credit card, you may have the right to withhold payment under the Federal Trade Commission's Fair Credit Billing Act.
- If you suspect mail order fraud or false representations, notify your local postmaster or the nearest postal inspector.

* Special thanks to MACWORLD for permission to print their research on this topic.

Music For Mind and Body

Computer musicians who don't want to be confused for office workers should remember to get up, shake it one time, and do some hard playing.

By David Zicarelli

Do you make music with your body or your mind? As far as I'm concerned, there's no question that the body is more important. If John Coltrane had merely notated his tenor solos into *Finale*, would we have any reason to care about his music? Is it possible to create music that will make people want to "get up and dance" while you're sitting at a desk?

Music, throughout history, has been played or sung by means of physical movement of the body. The physical gestures we make organized the shape of our instruments as well as the shape of our melodies and rhythms. While music may occasionally appeal to the intellect, for much of the world, it is primarily a participatory activity, whether in performance, dance, or singing. Music ceases to be a purely intellectual exercise once it hits your body, and even if all you do is type a few numbers into a computer, you can't make any music without using your body in some way.

If we look at computer-based music studios today, we see people at desks, staring at hazardous video display screens, occasionally moving a small, rather unresponsive box (a mouse), or typing on a keyboard. We want to think of musical performance as somehow "above" day-to-day office work, but an outside observer would be hard-pressed to see any difference between office work and the actions of the vast majority of people who use computers and software to produce music. This is not to say that there aren't people who have learned to use computer interfaces in much the same way as they play musical instruments. But the people I've met with this ability have all been performing musicians who share an acute awareness of how bad screens, mice, and keyboards are in comparison with their "native" axe.

Have computers turned music into office work? I think they have. Everyone I know expresses uneasiness with music technology for one reason or another, but few people are willing to look at the root cause: Today's "personal" computers and software have been designed for offices, and all the values inherent in them spring from office organization: productivity, consistency, and, for lack of a better word, *rationalization*. When a bunch of computer programmers design software for an office, they analyze what an individual worker does and attempt to implement those tasks as menu items. Enter customer order, sort database, etc. Looking at a typical music software program, we see the same kinds of thought processes: Musical activities become menu items, and most of these items are basic data-processing activities on "musical information" such as sample data, sequence data, patch data. I find the notion that music now consists of *data* wholly offensive, because data makes no distinction between Beethoven and James Brown, a distinction any conscious member of our society could make instantaneously upon hearing their music.

What's missing in the rush to rationalize music is any notion of the effort it takes for our bodies to play a musical instrument. Musical instruments reward effort with eloquence. Today's computer interfaces would break immediately if exposed to the same amount of effort we put into our instruments. But the solution is not to use stronger plastic, it is deciding that music does not need to be made any easier. More notes, played more perfectly on the beat, with less total harmonic distortion, is not better music.

Making music technology that rewards the knowledge in your body is hard. The computers we have to work with keep seducing us to think about the office when we should be thinking about the concert stage. Here are two thoughts about the direction we can take:

- The computer screen cannot be part of a musical instrument. You must move physical, not "virtual," objects to perform.
- Your computer/software system has to have *the ability to change* as its essential feature. Your body is always changing as you learn to play an instrument, and what your body was doing with the saxophone or computer last week may bore you to tears this week. Music *environments* such as *HMSL* and *MAX*, coupled with flexible controllers, allow performance systems to drift and evolve as the performer's interests and skills change.

In general, we have to stop thinking about making musical instruments "obsolete" through sampling and start appreciating the way they have evolved to function with our bodies. And the first thing to realize is that Coltrane did not play the tenor sitting at a desk.

David Zicarelli *lives in San Francisco, where he is completing a Ph.D. in psychoacoustics at Stanford University. He is employed full time in Opcode Systems' R&D department and is the author of* Ovaltune, M, Jam Factory, *Opcode's* DX7 Ed/Lib, *and* MAX *(with Miller Puckette).*