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# Electronic Musician<sup>®</sup>

September 1995

## Windows Sequencers

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THEIR FEATURES**

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09



WRN



# IT'S UNLEASHED MORE CREATIVITY THAN

**T**he Mackie CR-1604 16x2 mic/line mixer is getting dangerously close to becoming a pro audio classic.

Not because it has the most mic inputs, knobs, buses or switches — others have long since topped us for sheer numbers of doo-dads and thingamabobs.

No, the CR-1604 has ended up in so many studios and on so many stages because it sounds good. And because it's downright easy to use.

More than any other component, your mixer is the focal point of all your creative efforts. If it's complicated to operate, you've just erected a frustrating barrier between you and your music. If it's noisy, everything that's recorded will be noisy, too.

When you're looking for an affordable, compact mixer that's good enough to regularly record complete albums and primetime TV soundtracks, call us toll-free (M-F 8:00 AM to 5 PM PT).

You'll talk to a real person who'll send you our 40-page color tabloid complete with a 16-page hook-up and applications guide.

Then start exercising your musical creativity with the mixer that's becoming a classic for all the right reasons.

## EXTREMELY RUDE, BLINKING SOLO LIGHT.

Sounds like a minor detail until some night at 2AM when you can't figure out why there's no sound coming out of your monitors.

## BEEFY HEADPHONE AMP WITH SEPARATE VOLUME FADER.

Instead of the usual wimpy amp, the CR-1604 has a separate, high-gain headphone amplifier section with enough gain to drive any brand of headphone to shock volume levels that will satisfy even a drummer.

Also has more than enough gain to drive any monitor amplifier.

## INSIDE: QUALITY COMPONENTS

like double-sided, through-hole plated fiberglass circuit boards with solid brass stand-offs, gold-plated interconnects and sealed rotary potentiometers that resist dust & liquid contamination.

## BEST RFI PROTECTION OF ANY COMPACT MIXER.

No matter how quiet a mixer's internal circuitry is, it can be sabotaged by external radio frequency interference. RFI is created by broadcast stations, cell phones, computers and even that expensive radio-controlled car your kid got for Christmas. RFI gets into a mixer via the input jacks where it uses the internal circuit traces as miniature antennas to produce noise ranging from a low-level hiss to actual, audible voices and music.

The CR-1604's 1/4" jacks use a shunting capacitor to stop RFI before the main circuit traces. Instead, RFI is re-routed back through the metal jack body and washer, then dissipated via the mixer's outer chassis.

XLR inputs are likewise protected from RFI via ferrite beads.

Next time you see a mixer with plastic 1/4" jacks, remember what you just learned.

## DUAL PURPOSE METERING SYSTEM.

Besides showing main L/R output level, the LED ladders are used to establish input levels. Set a channel fader at Unity, press the channel's SOLO button and set input trim level. This approach achieves very high headroom and low noise at the same time. Plus you have 20dB MORE GAIN above Unity.

## INSTANT HANDS-ON-ACCESS

to constant power pan controls, musical 3-band equalization, ALT 3/4 extra stereo bus, stereo in-place solo, seven high gain Aux sends per channel (via four controls) and four high gain stereo Aux returns (20dB more gain above Unity).

## MULTI-WAY CONVERTIBLE PHYSICAL DESIGN.

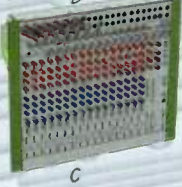
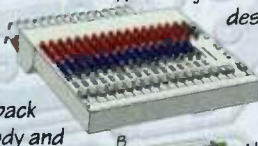
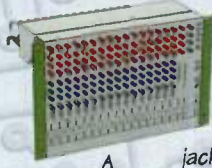
The CR-1604's rotatable input pod lets you conserve space in a road rack or spread out in a project studio.

Change from a 7-rack-space mixer with jacks to back (A) to a tabletop design with jacks to top (B) in minutes. Add our optional RotoPod bracket (C) and rotate inputs and outputs to the same plane as the mixer's controls (a favorite for small SR set-ups).

Any of these conversions takes just minutes with a Phillips-head screwdriver. And our XLR10 10-mic preamp expander can be added in any of the configurations.

## NOT VISIBLE BUT VERY IMPORTANT: THE MACKIE MIX

HEADROOM DIFFERENCE. Nobody uses just one channel of a mixer (although most headroom specs are stated that way). In any mixer, the mix amp stage combines signals from ALL inputs at once. If it overloads, you can't back off the master fader because it comes AFTER the the mix amp. So audible distortion results when the mix amp gets bogged down with multiple hot inputs. Mackie's unique mix amp architecture provides as much as twice the mix headroom of conventional designs. No wonder it's a favorite of top electronic percussionists.





# ANY OTHER COMPACT MIXER.

**ULTRA-LOW NOISE.** When you compare noise specs, look for the one that counts: all 16 channels up at Unity Gain — not one channel at Unity gain. No other compact mixer beats the CR-1604 when it comes to low noise floor.

**MULTI-FUNCTION AUX SEND SYSTEM WITH LOADS OF GAIN.** AUX 1 on each channel can be used either for effects (post-fader/pre-EQ) or switched to monitor sends for stage monitor or headphone cue signal (pre-fader/pre-EQ). AUXs 2 thru 6 are post-fader/post EQ. AUX 3 and 4 knobs can be shifted to AUX 5 and 6 at the touch of a button.

**MUSICAL 3-BAND EQUALIZATION.** The CR-1604 redefined equalization points for compact mixers: 12kHz Hi EQ (instead of 10kHz) for more sizzle and less aural fatigue, 2.5kHz Mid (vs. 1kHz) for better control of vocals and instrumental harmonics, and 80Hz Lo EQ (instead of 100Hz.) for more depth and less "bunk." Others have copied these EQ points, but none have successfully emulated our quality equalization circuitry.

It costs us more, but the result is zero

phase distortion and a sweeter, more musical sound. It's another reason that the CR-1604 is a favorite of TV and film soundtrack scorers.

## LEGENDARY MICROPHONE

**PREAMPS.** Instead of sixteen "acceptable" integrated circuit microphone preamps, the CR-1604 features six big-console-quality preamps...the same mic preamp design that's on our acclaimed 8•Bus consoles. You get tremendous headroom and bandwidth with less noise and distortion. If your particular application requires more mic inputs, simply add our XLR10 10-Mic-Preamp Expander. Both it and the CR-1604's internal mic preamps have real and verifiable specs of -129.5 dBm E.I.N., 300,000Hz bandwidth and 0.005% THD. No wonder several of the world's top microphone manufacturers use Mackie Designs CR-1604s to demo their finest condenser mics at trade shows.

**INPUTS AND OUTPUTS AT PROFESSIONAL — NOT HOBBYIST — SIGNAL LEVELS.** The CR-1604 operates internally at industry-standard +4dBu levels to help reduce noise. But it can also handle the weaker -10dBV levels found on some digital multitrack machines and other equipment.

**THE PERFECT MATCH FOR ADATS, DA-88s AND HARD DISK RECORDING SYSTEMS.** We'd dearly love for you to buy one of our 8•Bus in-line consoles, but the CR-1604 makes a very effective 8-track recording mixer. The CR-1604's first eight channels have post-fader channel inserts (channel access). This VERY important feature is found on few other compact mixers. It lets you create a "split console" so that you can simultaneously track on eight channels and monitor/mixdown on eight more.

**EXPANDABILITY.** If you add a second or third digital multitrack, you can use one or two additional CR-1604s with our MixerMixer active combiner. It lets you run 32 or 48 channels without having to "cascade" the mixers.

Split monitor configurable for easy 8-track digital tracking & mixdown

Used on more superstar world tours in the last three years than all other compact mixer brands combined<sup>1</sup>

Legendary studio-quality discrete microphone preamps

Used by members of the Tonight Show band, David Letterman band, Conan O'Brien band, Saturday Night Live Band<sup>2</sup>

Expandable with XLR10 Mic Preamp Expander & Mixer Mixer active combiner

Used by Fox Television Sports for Monday Night Football on-field sound<sup>2</sup>

Built-like-a-tank physical construction (it's too darned homely to be fragile)

Used for sound design and incidental musical scoring on the world's most popular TV show

Special mix amp architecture for twice the mixdown headroom of other designs

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# I N S I

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*By Clark Salisbury with Scott Wilkinson*

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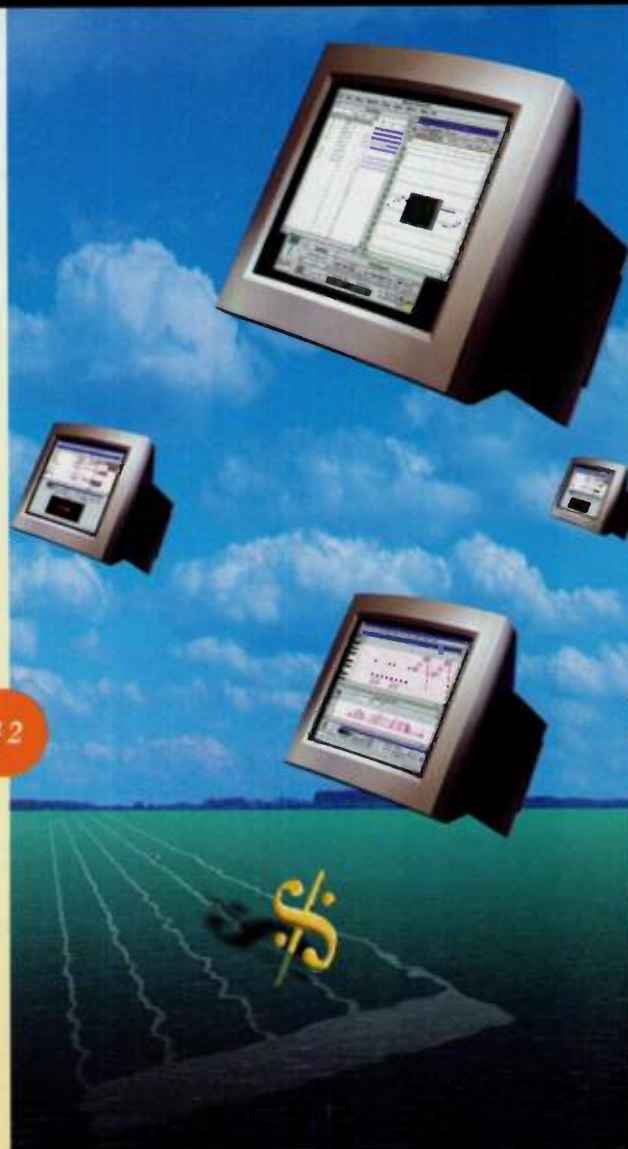
Enjoy the view as EM puts four Windows sequencers through a grueling comparison test. Watch closely as *Cakewalk Pro for Windows 3.01*, *Cubase 2.61*, *Master Tracks Pro 6.0*, and *SeqMax 3.0* put their best features forward.

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*By Daniel Levitin*



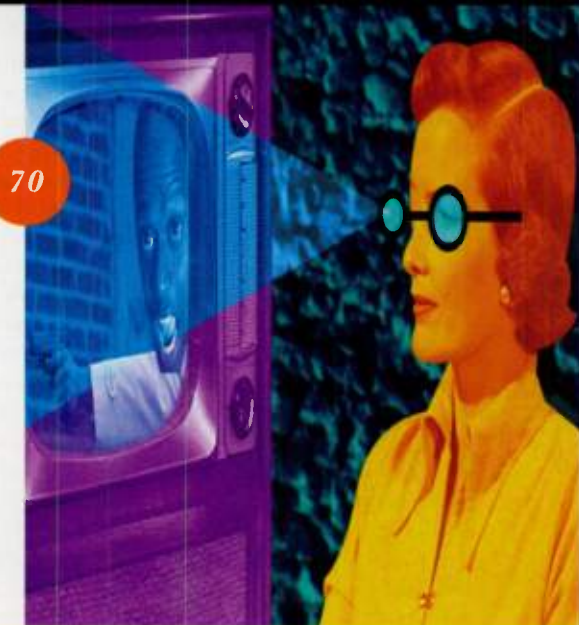
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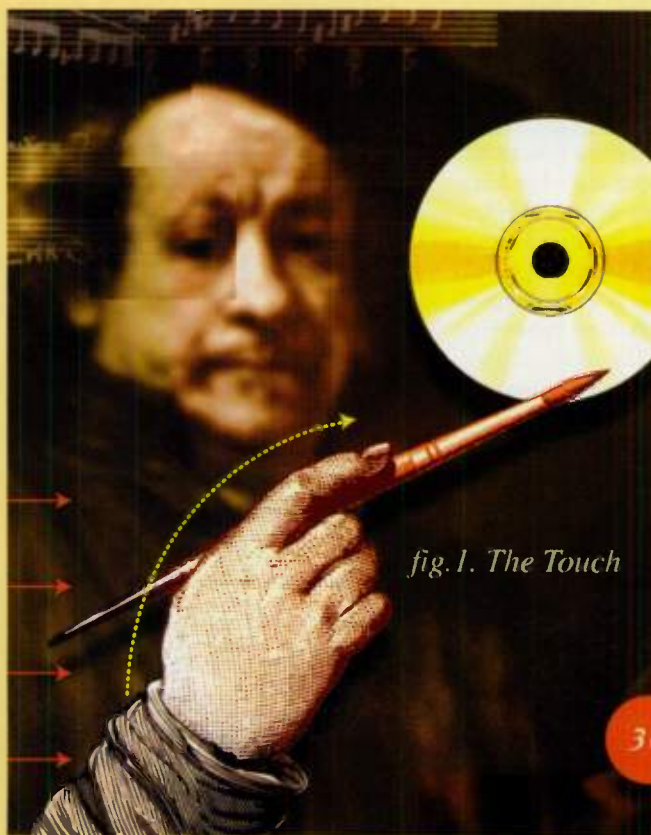


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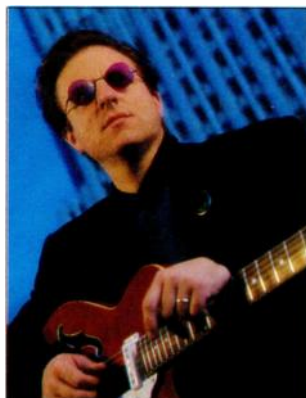
Cover: Photo/Digital Imaging by David Bishop.

Special thanks to Big Noise Software, Passport Designs, Steinberg North America, and Twelve Tone Systems.



## Little Engines That Could

Semipro gear is making big noises in audio production.



ROBERT PERRY

**A** celluloid crusade to the Middle Ages can be pretty darn cool if you happen to be Richard Gere. His Lancelot in the film *First Knight* gets to wear designer armor, strike heroic poses, and pine for the most beautiful maiden in Camelot. Of course, on the flesh-and-blood side of the silver screen, he might not have fared so well. In the real feudal system, a yawning social chasm divided the landed gentry from the peasants, and Gere, lacking royal blood, would probably have been tending sheep for some baron. The medieval nobility were not exactly champions of equal opportunity. (And remember, serfs never had a nice day!)

Well, it seems the same stifling, blue-blooded hierarchy exists in today's audio kingdom. The "peasantry" is semipro gear and the royals—I'm talking about the pro-audio market, not the baseball team—often behave as if you can't possibly make majestic sounds with the tools of the lower class. For example, at the recent summer NAMM show in Nashville, I constantly heard pro-audio types complain that "there's nothing worthwhile here."

What's up with that attitude? It's outright audio snobbery and it sucks. I thought there were several products at the show that will enhance professional music production. Yamaha's 02R digital mixer (previewed in last month's "What's New" column) may not be a Euphonix, but it's still a killer machine. And E-mu unveiled its Darwin, an 8-track hard-disk recorder for the MDM set. There were also exciting new synths from Korg and Roland and many other cool toys that we'll be reviewing and previewing in the coming months.

I must challenge this pro-audio hierarchy that looks down from towering parapets upon home recordists and project studios. I mean, is a film score any less "pro" because the composer used a DA-88 and a Mackie mixer instead of a Studer and an SSL? And what about established stars who use semipro gear? Should we strip Craig Chaquico of his professional status because he dared to record two top-selling Adult Contemporary albums on a Fostex B-16? Is sound-design kingpin Frank Serafine a fraud because he routes signals through a Mackie 32•8?

Now, I'm not saying that pro gear doesn't deliver tons more audio precision and sonic clarity than semipro equipment. It's no contest. Getting one's hands on great pro audio equipment is a truly rapturous experience. All I'm suggesting is that we reevaluate the concept of professional audio *production*. Producing quality music and sound requires more than the simple application of technology. Heck, if that were the case, anyone could buy a black box and instantly become a Bob Clearmountain, or a Flood, or an Eno.

It has been proven time and time again that an artist with great ears and brilliant ideas can make exquisite sounds with extremely limited tools. So, although most of the gear at the Summer NAMM show will not grace the racks of large commercial studios, you can be sure much of it *will* be used to produce unquestionably professional records, film soundtracks, and multimedia scores.

I'll close this little rant with another trip to the movies. Director Wayne Wang's latest film, *Smoke*, shows quite eloquently that a simple, forgotten loser can be a hero and a saint. Likewise, semipro gear can be used to produce regal audio. Never underestimate the underdog.

*Michael Molenda*

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### East Coast Advertising Office

tel. (203) 838-9100, fax (203) 838-2550

### Subscription Services Office

(Address changes and customer-service inquiries)  
PO Box 41525, Nashville, TN 37204  
tel. (800) 843-4086 or (615) 377-3322

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Electronic Musician (ISSN: 0884-4720) is published monthly by Cardinal Business Media, Inc., 6400 Hollis St., #12, Emeryville, CA 94608. ©1995. This is Volume 11, Number 9, September 1995. One year (12 issues) subscription is \$24; outside the U.S. is \$49.95. Second Class postage paid at Oakland, CA, and additional mailing offices. All rights reserved. This publication may not be reproduced or quoted in whole or in part by any means, printed or electronic, without the written permission of the publishers. POSTMASTER: Send address changes to Electronic Musician, PO Box 41525, Nashville, TN 37204. Editeur Responsable (Belgique): Christian Desmet, Vuurgatstraat 92, 3090 Overijse, Belgique. Canadian GST #129597951. Canada Post International Publications Mail Product (Canadian Distribution) Sales Agreement No.0478741.

Cardinal Business Media, Inc.  
Also publishers of *Mix*® magazine.  
Printed in the USA.





# PLAY HARD.

## WORK EASY.

Tired of music software that's hard to work with? Spending more time making tech support calls than you are making music?

Then bring in the Professional.

Cakewalk Professional remains the leading MIDI sequencer for Windows today. It's powerful, fast, stable, and yes — extremely usable.

And while other music software companies scramble to release something on the Windows platform, Twelve Tone Systems is now shipping the third major release of its award-winning sequencer.

Here are some of the new 3.0 features:

### GRAB A GROOVE

The new Groove Quantize option lets you "steal the feel" of one track, and use it to quantize another. Cakewalk's own groove format supports note start-times, durations and velocities. Also works with DNA Grooves.

### WHAT'S THE WORD

Add lyrics directly into the Staff view, and print in your notation. For on-stage performances, use the Lyrics view to see scrolling lyrics or stage cues in large fonts.

### MASTER MIXES

Mix volume, pan and other controllers using 96 assignable faders and 32 Note On buttons. Create fader groups for automated cross-fades and mix-downs. And the Faders view now fully supports the Mackie OTTO 1604 MIDI automation package.



### BANG ON THIS

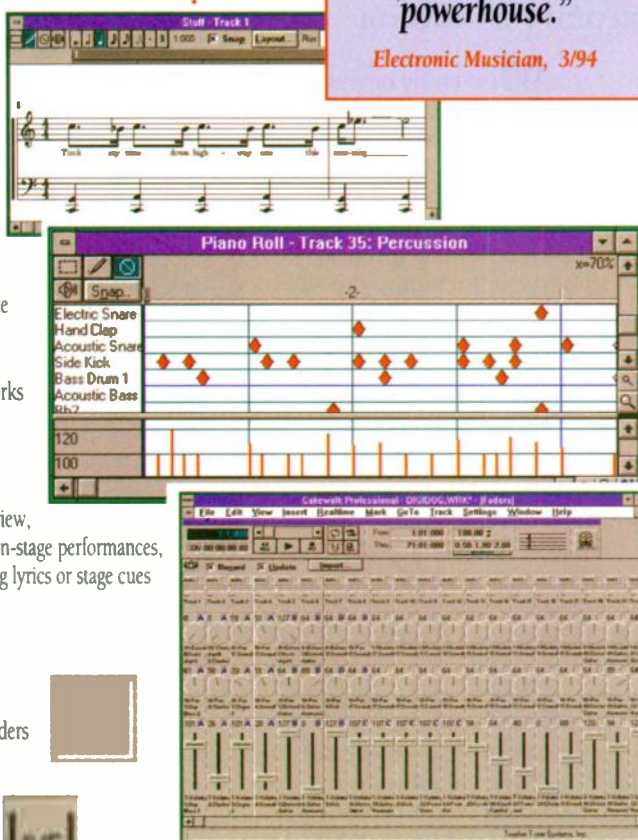
So what else is new in 3.0? Plenty.

- ⊗ Percussion Editing
- ⊗ MIDI Machine Control
- ⊗ Enhanced Swing Quantizing
- ⊗ Printing Up to 24 Staves per Page
- ⊗ Expanded Instrument Definitions
- ⊗ Bank Select
- ⊗ Way More



"Simply put, it's a professional powerhouse."

*Electronic Musician, 3/94*



VERSION

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for Windows



Twelve  
Tone  
SYSTEMS

### OTHER PROFESSIONAL FEATURES:

256 tracks; rock-solid SMPTE/MTC sync; custom programming language with macro recorder; MIDI remote control; system exclusive librarian and event filters, to name a few.

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## I DREAM OF GENIE

I enjoyed the "Online Juke Joints" article (July 1995). A few notes about GENie: the \$2/hr. Sprintnet charge mentioned in the article will be dropped as of August 1, 1995, and the baud rate will increase to 14.4 KB.

You might have gone more in depth about the subjects being discussed in the MIDI and Music Roundtables as you did in the section about The WELL. Topics covered include MIDI in the Home Studio, It's a Business: Going Pro, Songwriting, and hundreds of others. Oh yeah, GENie has *Electronic Musician* covered, too. Check it out in the MIDI Roundtable, Category 33, Topic 4.

**Michael Nickolas**  
m.nickolas@genie.geis.  
com

## 'NET KNOW-HOW

There is an oversight in "Online Juke Joints" concerning Internet access: although it's true that all ten of these online services "provide access to the Internet," some of them don't provide direct access from the Internet. For example, America Online users can browse the World Wide Web, but (as of this writing) they cannot make their own World Wide Web pages available to the rest of the Internet.

Full Internet access is an important issue to consider when choosing an Internet service provider. I am surprised that *EM* overlooked this point.

**Dan Barrett**  
barrett@cs.umass.edu

Dan—That was no oversight, it was an intentional omission. My primary purpose was to examine the musical resources available from each commercial online service; I never intended to provide a comprehensive report on their Internet capabilities. We decided to include some information about accessing the Internet from each service, but not about accessing them from elsewhere on the Internet. We felt that most people who read this article are relative newcomers to the Internet and not likely to be setting up their own Web sites. In addition, most people set up Web sites with direct Internet service providers, not national online services. In the future, we will continue to present information about all the aspects of cybermusic, including interesting Internet sites and setting up your own Web site.—Scott W.

## VELOCITY SANDWICH

Most of the time, I exclaim "Wow!" to each issue of *EM*. However, July 1995 was on the short list. Tainted ink in this issue was Russell Cardwell's article "Dream Sequences." First, is Cardwell working with outdated software? I own several sequencer titles, and all of them, including the \$29 version, allow me to set and tweak the starting controller (volume, pan) values on the fly. Why hard-code these events? It's like putting on handcuffs—talk about eating up valuable studio time.

Second, why compress Velocity? Velocity is not a volume controller. It is a controller of tonal characteristics impacting many parameters of the sound it controls. In the case of dual oscillators and combis, Velocity can determine how the combined signals are going to interact with each other. Compressing Velocity is like removing the bun from a sandwich then saying what's left is still a sandwich. Velocity should *never* be considered a volume control. Compression should *always* be done post.

In all fairness to Cardwell, his advice to be consistent and maintain standardized documentation, however, is right on the mark. So is the concept of splitting percussion into a template of individual tracks.

**rohhan@aol.com**

Author Russell Cardwell responds: During the sequencing process, many people use MIDI Volume to control the relative levels between instruments. If you have eight instruments coming from a keyboard with four outputs, this is an easy way to create a working mix. But in the studio, you will be tracking these instruments one at a time. For the best signal-to-noise ratio you'll need to record each of them at its optimum level. On most keyboards, this is full volume. At mixdown, you will use the faders on the console to set levels.

If you have used controllers as you played your parts into the sequencer, you may want to include messages in your template to reset all your controllers to default values. That way, if you stop the sequencer midsong, you won't have any surprises when you restart. You could do this manually for every controller on every track every time you start the sequencer. But why should you? Do all your editing at home, in your free time.

Compressing Velocity is simply a way to get a lot of tweaking done quickly. On the instruments whose Velocity you would most likely compress, such as kick drum, you usually don't want large changes in volume or timbre. You may still want to hand-tweak these values individually. This kind of global editing is merely a shortcut. Besides, you did save a copy before you did any global editing, right? Also, some instruments (such as the Alesis SR-16 drum machine) don't respond to MIDI Volume, so if you want to attenuate their output via MIDI, you must adjust the Velocity.

Remember that defaults are meant not to restrict you or to limit your choices but to free you from meaningless details, so you can focus on the details that count.

## CLAIR CONDITIONING

The June 1995 issue was the first I'd seen of your magazine. I can't believe how advanced home-recording gear has become since I bought my 1982 TASCAM 144. The equipment nowadays is so good that the weak link in the chain has become the home itself.

The article on Clair Marlo's fine home studio ("Creative Space: Bringing It All Back Home") mentions that background noise from jack hammers and

VALERIE SPAIN



# now you can have a DP, too

## DP/2 Features

**2 24-Bit ESP Chips**

**2 Inputs/2 Outputs**  
(balanced TRS)

**65 Algorithms**

**600 Presets**

## DP/4+ Features

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**4 Inputs/4 Outputs**  
(balanced TRS)

**Process up to 4 Signals**

**54 Algorithms**

**400 Presets**



## have a DP/2!

With the resounding success of the DP/4+, you're probably wondering, "why doesn't ENSONIQ make a smaller DP for the home studio user (*like me*) on a budget?"

Well, enough of you asked, and we're happy to oblige – with the DP/2. A two-processor version of the DP/4+, for about half the price. (*Now you're talking!*)

The DP/2 can process one true stereo or two discrete mono sources, through two of the same custom DSP chips we use in it's big brother. It offers the same unequalled range and quality of algorithms as the DP/4+, plus new combinations designed specifically for the home/project studio. And we've built them into a whopping 600 Presets, ready for any challenge.

Both DP's feature balanced I/O, total programmability, advanced MIDI control, and even a headphone jack.

ENSONIQ's digital effects deserve the reputation they've gained – from studios, musicians, and the music press. For those who need the ultimate parallel effects processor, the DP/4+ is your best choice. But if you want that power in a smaller package, there's now a DP for you, too. (*Thanks!*)

You can reach us at:  
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☐ Let me have more information on the DP/2!

Also send info on:

☐ DP/4+ parallel effects processor

☐ KT Series 64-voice weighted action synths

☐ TS Series synths

☐ ASR Series samplers

☐ SQ Series synths

☐ KS-32 weighted action synth

☐ I'd also like to have your *make music* think ENSONIQ demo CD (*here's \$5; ship it, handle it, whatever*).

Name

Address

City  State  Zip

Phone

Mail to: ENSONIQ Corp, Dept. E-57, 155 Great Valley Parkway  
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Yesterday, your guitar was really something. Today it's about to become something else entirely. The VG-8 V-Guitar System from Roland will turn your guitar into any guitar. Even ones that are

impossible to build. It is the next step in the evolution of the guitar.

The VG-8 combines the power of digital technology with the guitar's natural expressiveness to push your creativity further than ever. In simpler terms it means the subtle

nuances which make your guitar playing unique will never be lost.

By using a GK-2A divided pickup, the VG-8 gives your guitar a multitude of tuning options and polyphonic capabilities with the push of a button. Adjusting your guitar's pitch is just the beginning.

The VG-8 also employs an entirely new approach to the configuration and sound of your guitar. Roland's breakthrough technology, Composite Object Sound Modeling (COSM), consists of two modes. Together, they let you build your instrument and model the entire

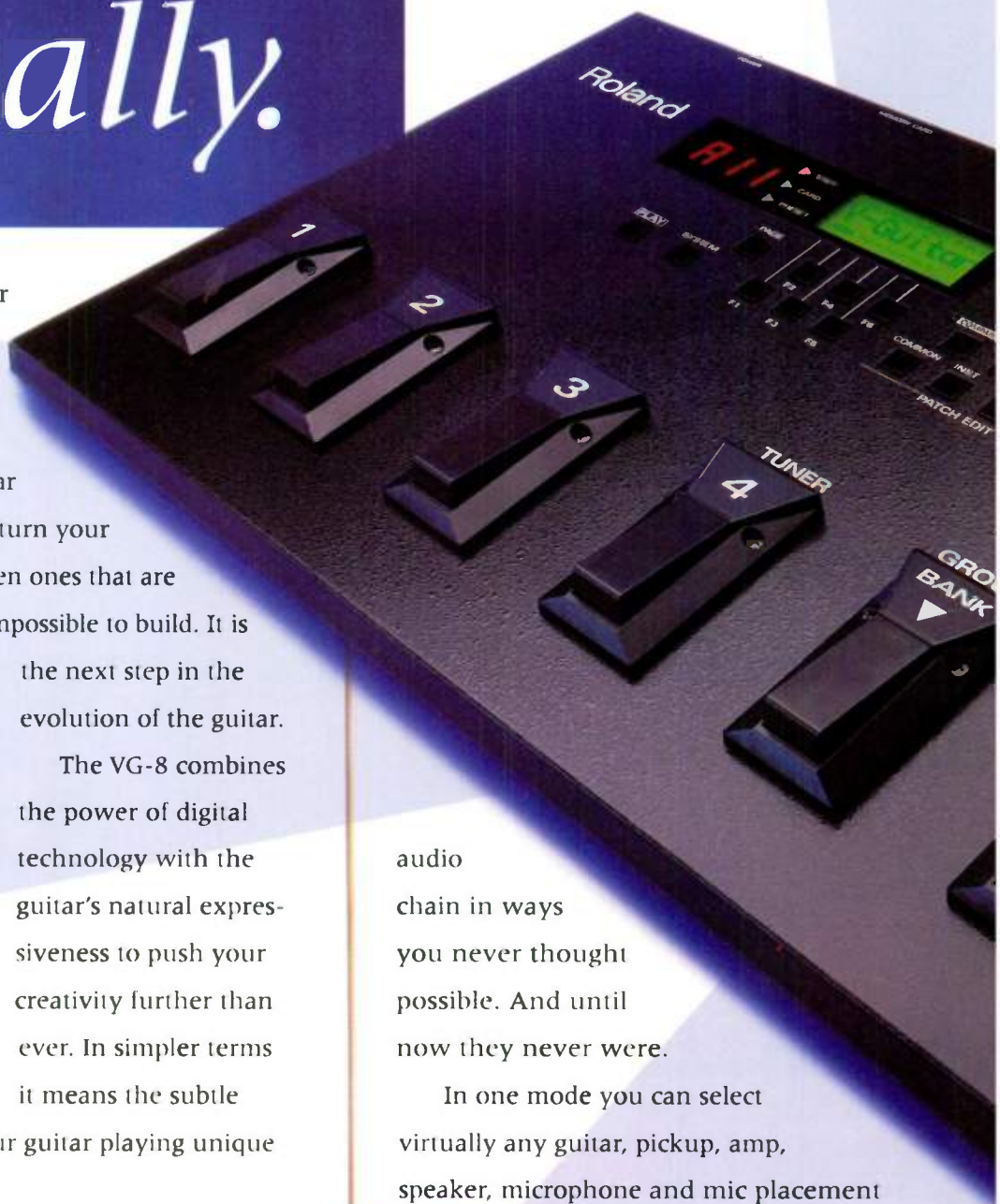
audio chain in ways you never thought possible. And until now they never were.

In one mode you can select virtually any guitar, pickup, amp, speaker, microphone and mic placement combination you ever imagined.

Even ones you couldn't. It doesn't

matter what guitar you're playing. With the VG-8 you can always transform it into something else.

Imagine being able to select a humbucker or



Roland's advanced Digital Signal Processing allows you to individually tune each string. Now you can get open tunings, authentic 12-string sounds or bass sounds without touching your tuning pegs.



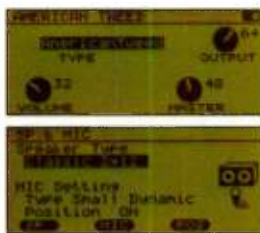
By combining magnetic and electronic modeling, Variable Guitar Modeling (VGM) enables the VG-8 to emulate the sounds of the most popular guitars in the world. No matter what guitar you own, turn it into a Strat®, a Les Paul®, a Tele® or any combination of your favorite guitars.



vintage single coil pickup, place it virtually anywhere on the guitar, select a vintage tube amp, your favorite microphone and its placement. And best of

all reproduce that sound using the guitar you have right now.

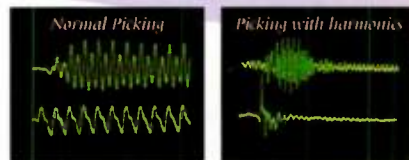
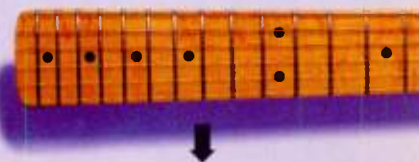
Imagine being able



VGM mode allows you to select your amp and mic configurations as well. From vintage two-12" reverbs to arena stacks to small tube combos, the VG-8 comes preset with all the classics. It'll even let you choose the microphone type and its positioning.

before. The VG-8 lets you modify the actual guitar waveform to create synth-type or entirely new sounds while preserving the feel of your individual playing style. So every subtlety from picking dynamics to fret harmonics to string bends will never be lost. An entirely new world of sound and expressiveness has arrived.

The VG-8 comes with 64 preset patches and 64 user patches for storing your own sounds using the Bank/Group pedals. Icons and a large backlit LCD panel make operating it intuitive and easy. So you can concentrate on



Top waveform: Guitar sound processed by VG-8  
Bottom waveform: Original guitar sound

With Harmonic Restructure Modeling (HRM) the VG-8 processes the actual waveform created by each string's vibration and restructures the harmonic content in real time without triggering or delay. No two players sound alike. This lets you create unbelievable new sounds without taking the creative expression of your playing style out of your hands.

the music and leave the rest to us. Once you've created a sound, the VG-8

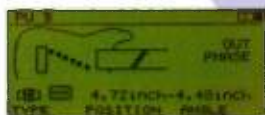
lets you add the final touch with on-board digital effects such as reverb, delay, chorus and EQ.

The guitar of the future has finally arrived. To hear the future of your guitar, call (800)386-7575

and ask for our \$5 VG-8 Audio Demo CD. Or visit your local dealer and see how you can get everything you ever wanted out of your guitar.

models of these instruments which completely emulate the sound. That's the beauty of the VG-8.

In VG-8's other mode you can create entirely new sounds that you've never heard or experienced



Because you build your guitars in the VG-8, you can place "virtual" pickups in positions which are impractical in the real world. Now you can put a humbucker at the nut and a piezo right on the bridge. Pickups can even be placed on the neck itself. You can even spread the pickup poles diagonally across the guitar.



## ● LETTERS

airplanes is a pitfall to recording at home. There's not much that can be done about environmental noise without shelling out major bucks, but some noise, like the noise from Marlo's air-conditioner, can be controlled. Assuming the air-conditioner is a central system—with the condenser unit located outside and the air handler either in the crawl space, in the attic, or somewhere in the house—I'd suggest that Marlo check out some of the newer high-efficiency units on the market when hers is up for replacement. A bonus to these modern energy misers is that most of them are *quiet*. (All of them come with sound ratings.) Also, a qualified contractor could possibly modify the duct work to minimize both mechanical and air-flow noise coming into the studio.

For the time being, a radiant-heat barrier (essentially a sheet of fiber-reinforced aluminum foil) installed in the attic just under the roof decking could help lower the temperature in the house. It works by reflecting most infrared heat back outside and may offer substantial relief from the hot Los Angeles climate.

As for the heat generated by lights, try replacing any standard incandescent light bulbs with modern compact fluorescent lamps. CFLs consume only about a quarter of the energy of standard incandescents, which dramatically reduces heat output. There's a snag, though. Some CFLs interfere with electronic gear—even simple stuff such as TVs and stereo receivers—so I'd suspect that during actual recording, the lights may still have to be shut down.

**Byron Papa**  
Chapel Hill, NC

### PLAIN BOOGIE TYPES

**G**erry Bassermann's article on how his group, Haunted By Waters, reproduces its multilayered, complex MIDI studio sound in live performance ("From Studio to Stage," June 1995) does a fine job explaining how he accomplished the transition. However, the focus seems narrow. The article deals with a musical form that depends on multilayered complexity as the basis of its sound. If I were a student of Haunted By Waters and were puzzled by how such a techno-rhythmically complex sound could be performed live, I would be grateful for the infor-

mation in the article; perhaps some of **EM**'s readers received practical benefit from reading it. Although I learned nothing of value for my personal use from this article, I think it's fine to keep publishing occasional pieces like it.

However, Bassermann made some pointed observations about the challenges we all face regarding the live performance of MIDI-engineered music. He noted correctly that playing along with programmed (or pre-recorded) tracks is "inflexible," that it detracts from the energy of a live performance, that it lacks "ebb and flow, a certain element of risk, or the fact that [the musicians aren't] actually producing the sound at that moment." I believe the challenge of playing with tracks is a critical one to all musicians seeking to share their MIDI-based (or only MIDI-supplemented) music with a live audience. I would like to see **EM** take up this challenge on a continuing basis. In addition to musicians like Bassermann, there are musicians who use MIDI to produce a total sound roughly equivalent to a blues quintet. Let's see some articles that help all of us (from the techno-complex to the just plain boogie types) meet the challenge that Bassermann so astutely described.

**Jim Mulrooney**  
Silver Spring, MD

### QUESTIONS, IDEAS

**I** would like to know your preferred compressor setting for leveling out an electric guitar that is played clean without any distortion. Clean electric-guitar sounds often produce sharp spikes that cry out for compression, but unfortunately I've been unable to compress the signal to a point where it sounds natural. I own a dbx 266 and would appreciate the threshold, ratio, attack, and release settings to achieve a natural sound that blends into the mix. I'm playing a Fender Strat into a Carvin Quad-X amp and out through a Fender cabinet with two 12-inch speakers. Do you recommend applying the compressor to the effects loop of the preamp or after miking the cabinet?

In addition to the above questions, I have an idea for you. How about a section illustrating new presets for effects processors? Similar to the way most guitar magazines print tablature for their readers, **EM** can print different

custom programs for popular effects processors.

Keep up the good work. I thoroughly enjoy **EM** and look forward to each issue.

**Thomas Paciorkowski**  
Bayonne, NJ

*Thomas—Typically, to tame performance dynamics (or "spikes," as you call them), I compress the signal at a 2:1 ratio with a threshold setting of -10 dB. Attack and Release times are set midway between fast and slow; on the dbx 266, this would translate to the twelve o'clock position. Of course, this is just a basic setting. The combination of a player's technique and the sound quality of the guitar will determine how much additional dynamics processing is needed to capture the coolest tone.*

*When miking an amp, I compress the signal via an insert point on the console rather than patch a compressor into the amp's effects loop. By compressing the signal after the microphone, I can exercise some control over the room ambience leaking into the mic as well as the source sound from the amplifier. For a little sonic variety, you might also try recording your guitar direct to tape through a quality direct box. I just love the sound of a beautiful guitar untouched by amp, room, and mic coloration.*

*Regarding your idea of publishing custom presets for various effects processors—I like it! Offhand, I don't know how we'd incorporate such a feature into the magazine, but I'll put your proposal on the table for our 1996 planning meeting next month. Thanks.—Michael M.*

### ERROR LOG

**June 1995, "Multimedia Musician: Family Portrait,"** p. 77: Gordon Newell led the programming team for the *Material World: A Global Family Portrait* CD-ROM. Ted Evans was creative director and designer/illustrator.

**June 1995, "Audix OM-5,"** p. 100: Audix's correct address is PO Box 248, Lake Forest, CA 92630.

### WE WELCOME YOUR FEEDBACK.

Address correspondence to "Letters," Electronic Musician, 6400 Hollis St., Suite 12, Emeryville, CA 94608 or e-mail at [emeditorial@pan.com](mailto:emeditorial@pan.com). Published letters may be edited for space and clarity.



"The ProMix 01 gives me the flexibility to control all the elements of a show from my computer. Superb sonic quality and remarkable features, you just can't beat it."

- Stan Miller, Sound Designer, Neil Diamond Tour

"I bought four of them for the Steely Dan Tour, and I haven't shut up about the 01 yet."

- Roger Nichols, Engineer, Steely Dan

"Bottom line, the ProMix really does live up to all the hype. It's very quiet, it sounds great, it operates very cleanly." "One of the most amazing introductions in years."

- Recording Magazine, October 1994

"I did my latest project on the ProMix. And it's one of my best sounding yet. The ProMix 01 is really great!"

- Hans Zimmer, Composer, The Lion King

"ProMix 01 stands every chance of becoming a landmark product, changing the way a lot of people currently work."

- Studio Sound And Broadcast Engineering, July 1994

"We're not normally violent, but in this case, we're willing to make an exception. We're not letting this mixer go."

- Mix Magazine, November 1994

## WITH WORD-OF-MOUTH LIKE THIS, WHO NEEDS AN AD AGENCY?

"Premium...  
the trimmin's...  
through..."

- Songwriter/Musician

"As a sound designer, I create illusions. Yet, the power and flexibility of the ProMix is no illusion. It most certainly contributes to the prestige of Machine Head."

- Stephen Dewey, Sound Designer/Founder, Machine Head

"After working with ProMix 01, I am convinced its sound, quality and flexibility rivals that of mixing consoles costing many times more."

- Calvin L. Harris, Engineer/Producer - Lionel Richie, Diana Ross, Stevie Wonder

"My two ProMix 01s store all the parameters of my mix and play it back exactly as I heard it at the moment of creation. More importantly, they sound great!"

- David Schwartz, Composer for Northern Exposure

"Yamaha has done it again, just as it did in the early '80s with the DX-7 keyboard. It has created a cool piece of gear that does more, does it better, and costs less."

- EQ Magazine, December 1994

"It took Yamaha to create a brilliant sounding digital mixer with full MIDI control. I have no doubt that the ProMix 01 will quickly become an industry standard."

- Jeff Bova, Keyboardist/Arranger/Composer - Vanessa Williams, Robert Palmer

"Clean, quiet, powerful. The best words I can think of to describe the ProMix 01, the latest addition to my toolbox."

- Tom Jung, Producer/Engineer/President, DMP Records



If you think the ProMix 01 sounds good here, wait 'til you hear it in action. Call our 800 # and send for your free CD of The ProMix Sessions, produced and engineered by Tom Jung, President of DMP Records. Our ad agency thought we needed to say something clever here, but we told them we had enough opinions already. To order your CD, call 1-800-937-7171, Ext. 450.

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Smart Mixing.



# WHAT'S

# NEW

By Steve Oppenheimer



## ▲ FURMAN C-128

A compressor in need is a friend indeed, or something to that effect. If you need such a low-cost audio ally, check out Furman Sound's 1U rack-mount, single-channel C-128 compressor/limiter (\$269). The compression ratio is adjustable from 2:1 to 50:1, attack time ranges from 0.05 to 50 ms, and release time is adjustable from 50 ms to 1.1 seconds. The Limit Threshold ranges from -22 dB to no limiting. A 10-segment LED meter indicates gain reduction. The output level knob has up to 12 dB of available gain.

A switchable sidechain is provided for inserting an equalizer for frequency-dependent compression or ducking. When the De-Ess button is selected, only the frequencies above 4 kHz, which often are associated with excessive sibilance, will trigger gain reduction.

Two C-128s can be linked as a stereo pair using a regular patch cord with 1/4-inch connectors. Other features include a power-indicator LED, an input-overload LED, a ground-lift switch, and an on/off switch. Furman Sound; tel. (415) 927-1225; fax (415) 927-4548.

Circle #401 on Reader Service Card

## ▶ TRACER DART

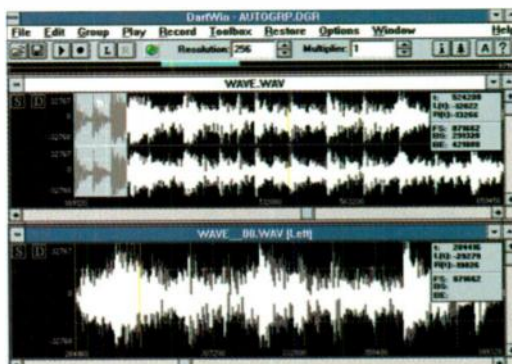
If you are archiving old recordings, restoring video or film soundtracks, remastering analog tracks, or even cleaning up new tracks, you're probably struggling to get rid of pops, clicks, and other types of noise. Tracer Technologies' *DART* (*Digital Audio Reconstruction Technology*; \$399) for Windows offers PC users a new way to take out the sonic garbage.

The program's TriCleanse process operates in three stages. First, the Smoothing Processor smooths and reconstructs the signal. Then, the Postfiltering Processor removes surface noise, hiss, and other anomalies that produce constant distortion. Finally, the Outlier Detector ferrets out pops and clicks and automatically removes them.

The process can be reapplied at different levels to remove noise totally with minimal degradation of the source sound. The deleted noise can even be

saved in a separate file and auditioned. The Soundtree feature lets you audition and compare numerous takes of the same sound file. Unlimited active windows are permitted.

Other tools include an 8-band graphic EQ; cut/copy/paste editing; sound left/right splitter; lowpass, highpass, band-



pass, and notch filtering; and a gain adjuster. A mixer application is also provided. Tracer Technologies; tel. (717) 747-0200; fax (717) 741-6790; e-mail 102037,2437@compuserve.com.

Circle #402 on Reader Service Card

## ▼ ENSONIQ ASR-88

Ensoniq's ASR-88 (\$4,495) couples ASR-10 sampling technology with the same 88-note weighted, Velocity- and Channel Pressure-sensitive keyboard as found in the KT-88. The sampling keyboard comes with 16 MB of RAM; a SCSI (SP-3) interface; an external, small-footprint, double-speed CD-ROM drive; Ensoniq's CDR-3 and CDR-4 CD-ROM sound discs; and the SW-6 damper-style footswitch. The unit also has a floppy-disk drive and Ensoniq's distinctive Patch Select buttons.

The ASR-88 includes all the sampling and editing features of the ASR-10, in-

cluding stereo sampling, sampling through the effects processor, 16-track sequencing, and two tracks of direct-to-disk audio recording. The effects processor uses the same technology as the company's powerful DP/4+ and offers 62 effects algorithms. Akai- and Roland-format samples can be imported via SCSI.

Options include S/PDIF digital sampling I/O, expansion to eight analog outputs, and the company's P-10 wooden keyboard stand and MS-1 music stand. Ensoniq Corp.; tel. (610) 647-3930; fax (610) 647-8908.

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**T**hat's right. For \$199, you can get state-of-the-art Digidesign recording, editing and mixing digital audio software—everything you need for high-quality digital audio production. What's more, with a Power Macintosh\* **you don't need any additional audio hardware to use it.**

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**QuickTime™**  
synchronization  
and audio posting  
features.

Imagine this—you've just finished laying down three takes of your lead guitar. Now you're ready to get started. With Session, you can cut and paste your takes together any way you like, as many times as you like, without altering your original tracks. That means you can create a composite performance of all your best takes, add different volume and pan

automations, experiment with crossfades and EQs, and more. In addition, Session is built on the Digidesign Audio Engine (DAE™), fast becoming the development standard for all digital audio workstations for the Macintosh.



This means you aren't investing in a dead-end system:

Session software grows as your needs do with products from Digidesign and our strategic Development Partners. In fact, no other manufacturer offers a more complete suite of products for all your digital audio production needs.

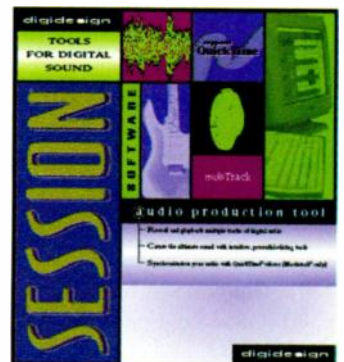
We're so convinced you'll be amazed with Session software that we're offering it for a limited time at a special introductory price of \$199. (That's a \$395 value). What's more, Session is yours **free** when you buy Digidesign's Audiomedia II system. These offers are good from June 1 through October 31, 1995.

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## ▼ CAD MEGAMIX

The MegaMix audio automation package has gone through many changes since its initial release over seven years ago. Now distributed by well-known microphone manufacturer CAD (a division of CTI Audio, Inc.), the MegaMix package (\$995) includes the

1U rack-mount M-1600 16-channel VCA module and *MegaMix* mixing software for the Macintosh.

The *MegaMix* software provides real-time display of levels, using moving faders; mutes (attenuation greater than -95 dB); groups; and time code. Any channel can be assigned to as many as eight subgroups at a time.

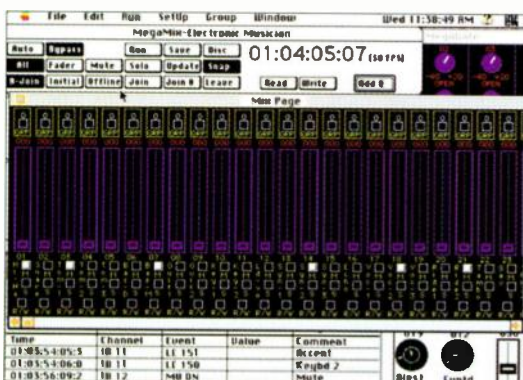
Existing moves can be altered in real time or offline. You can solo any channel or group, copy complete sections or individual channels to new locations in a mix, and delete fades on individual channels. When you edit multiple channels in real time, the software automatically toggles between Play and Record. A Snap feature automatically returns the

fader to the last position when you leave Write mode.

The software offers numerous special features. Channels can be set in inverse groups for automatic panning and cross-fading between stereo pairs. MIDI automation pages can be designed with faders, buttons, single knobs, and dual-concentric knobs. MIDI controllers can also be used to design a Recall page for checking EQ and aux settings.

The hardware's frequency response is rated at 20 Hz to 100 kHz ( $\pm 0.3$  dB), S/N ratio is 108 dB, and output noise is -88 dB. The Class A VCAs (model MTA1537) operate in 256 increments. The unit operates at +20 dB maximum input and output levels (referenced to 0.775V RMS). CAD; tel. (800) 762-9266 or (216) 593-1111; fax (216) 593-5395.

Circle #404 on Reader Service Card



## GET SMART

### ▶ TAP HARMONIC HEARING

Temporal Acuity Products, long among the leading developers of music-educational software, has released *Harmonic Hearing* (full course \$199), a Macintosh ear-training program that helps you learn to identify chord qualities. The company also announced that it has merged with Musicware.

The *Harmonic Hearing* course comes in two parts (\$129 each), which combine to cover several years of college chordal ear training, from very easy to quite advanced. In each section, you listen to a chord progression, identify the bass line and then the chord qualities. If you wish, the program can continue to repeat the progression so you can improvise over it. The program is General MIDI-compatible.

For PC computer users, TAP offers the *Music Lab Series*, a hardware/DOS software package that uses the computer to teach pitch and rhythm literacy. The program is available in special licensed versions for schools (Instructor Packet for first year \$195; AFI Pitch

Reader Card \$150; annual renewal \$95; Student Packet \$30). A Home Bundle version (\$275; \$199 special price for EM readers through December 1995) is available and includes the basic and advanced software and the AFI Pitch Reader Card.

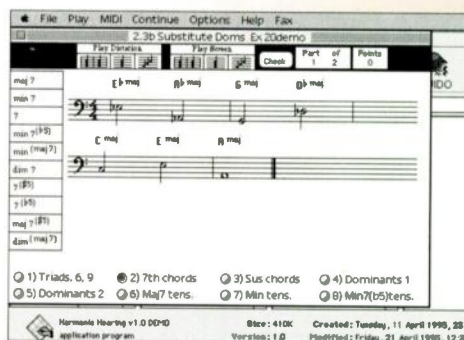
The card captures audio from a mic so that the software can analyze and visually display the pitches onscreen while you sing in real time. The ability to accurately analyze real-time vocal input distinguishes the *Music Lab Series* from other music educational programs.

The course is divided into eight inter-related segments. Three modules are pitch-related: SING teaches pitch accuracy in singing, using the AFI card and onscreen visual display; NOTES focuses on the staff and solfeggio; and NAMES teaches pitch recognition. There are three rhythm-teaching modules: ECHO teaches accuracy in rhythmic perception and response, PLAY teaches rhythm reading, and NOTATE teaches

you to write rhythms. The last two modules, READ and WRITE, combine the various skills in sight-singing and melodic-dictation exercises.

The *Music Lab Series* requires an 80286 or better PC with 640 KB of RAM, a VGA monitor, a hard disk, and either a synthesizer and MPU-401-compatible MIDI interface or a Sound Blaster-compatible sound card. (Many other popular sound cards are supported; check with the manufacturer.) Musicware/Temporal Acuity Products; tel. (800) 426-2673 or (206) 462-1007; fax (206) 462-1057.

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# THE BIG

# PICTURE

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The world's best studio monitors are like a picture window. If they perform with accuracy and transparency, you'll not only hear the mix, you'll see it. The new Alesis Monitor Two™ Studio Reference Monitors do just that.

Their sonic character was modeled after our TEC Award-winning Monitor One™, so you can mix on either speaker, in any size room, and get the same results. The difference? The Monitor Twos create a larger sound field, the sweet spot is bigger, bass response is deeper, and power handling is greater.

Our design team's 35 years of experience has produced a remarkable crossover design with super-low phase and amplitude distortion. This unique asymmetrical network combines 2nd and 3rd order filters with crossover points at 1.5kHz and 5kHz. And to top it off, a new silk-dome tweeter delivers sweet, natural sound without the harshness that produces ear fatigue. So you can do

marathon mixes and still make decisions that translate.

Monitor Twos are perfect for near to mid field monitoring in project studios, mixing suites, and even large control rooms. Or put them in your personal studio to make it sound virtually cinematic. Their combination of civilized size and serious muscle is due to our exclusive SuperPort™ bass venting technology that delivers accurate low end transients equal to much larger, more expensive systems. In fact, the Monitor

Twos cost less than some near field monitors. Which makes the case for owning them, sort of...full bandwidth.

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# GET SMART ▲ ▲ ▲ ▲ ▲

## ▼ MUSICWARE PIANO

**T**argeted at piano students from age seven to adult, Musicware's *Piano* series for Windows-based PCs requires a sound card and MIDI keyboard. *Piano: Course One* (\$149.95) includes a MIDI adapter cable and eight Training Units, each with over 200 lessons, providing a year's worth of training. Subjects include measure math, rhythm exercises, interval training, sight reading, music theory, flash cards, and much more. The complete 4-course series encompasses four years of piano lessons.

Although not a game, the program is interactive and provides aural and visual onscreen feedback. The exercises are self-paced and take only about ten minutes each, covering just one or two



compatible concepts. If you have to stop during a lesson, the program remembers where you were, and you can skip around to practice any exercise you wish. The user's guide is 25 pages long and designed for simplicity, and onscreen help is provided.

*Course Two* features 50 new songs that introduce triads; 2/4 time signatures; hands-together, parallel-motion melodies; additional scales; and more. *Course Three* recently shipped, and *Course Four* is under development. Musicware; tel. (800) 99-PIANO or (206) 881-9797; fax (206) 881-9664.

Circle #406 on Reader Service Card

## ► MASTERCLASS JAZZ TUTOR

**L**egendary jazz saxophonist Phil Woods is the star of Masterclass Productions' *Jazz Tutor Vol. 1*, an educational CD-ROM for Windows (\$149). The program features five original Phil Woods Quintet tunes created for Jazz Tutor, which include rhythm section-only tracks for you to play on. You also get fourteen additional tunes written by Woods, with piano scores and MIDI files.

All music on the CD is transcribed in standard notation for C, B $\flat$ , and E $\flat$  instruments. Complete MIDI transcriptions and exercises also are supplied, with over 2,000 variations.

The program teaches over 2,000 chords and scales in all keys. You even get a song list with composer, key, pickup, chords, and the first note and chord of the song. An interactive, jazz-theory textbook and tutorial are also featured on the CD-ROM, and a complete lesson plan and outline are included. Masterclass Productions; tel. (800) MCP-0833 or (201) 447-

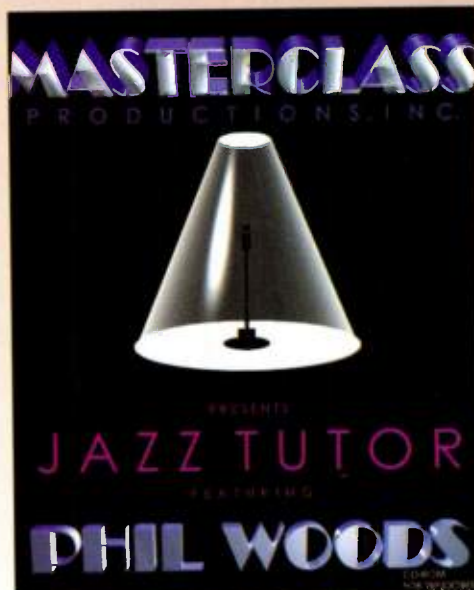
6108; fax (201) 652-6236.

Circle #407 on Reader Service Card

## ► ECS AUDIO MIRROR

**I**'ve lost count of the otherwise good singers I've heard who don't nail their notes right on pitch. They need real-time feedback so they know exactly when they're off pitch, in what direction, and by how much.

That's the idea behind Electronic Courseware Systems' *Audio Mirror* (\$79.95). The DOS program uses a Sound Blaster or compatible sound card to capture your



mic's output and indicate, in real time, which note you sang. A floating "pitch bubble" indicates whether you are sharp, flat, or in tune, and the program scores your pitch accuracy. The Range Finder helps you discover your vocal range.

The Note Singer is designed to aid vocal development. Your sung response is judged for accuracy, and the scores are recorded. The program keeps a history of average responses, so you can monitor your progress.

*Audio Mirror* can be adjusted to accept various mic levels and impedances. It requires an 80386 or better PC, 2 MB of RAM, a hard drive, Sound Blaster-compatible sound card, VGA or SVGA monitor, and microphone. ECS; tel. (800) 832-4965 or (217) 359-7099; fax (217) 359-6578.

Circle #408 on Reader Service Card





# Groovy Deal!

## 256 Hip Presets



## 24 spaced-out Oscillators

## Ride the Waves

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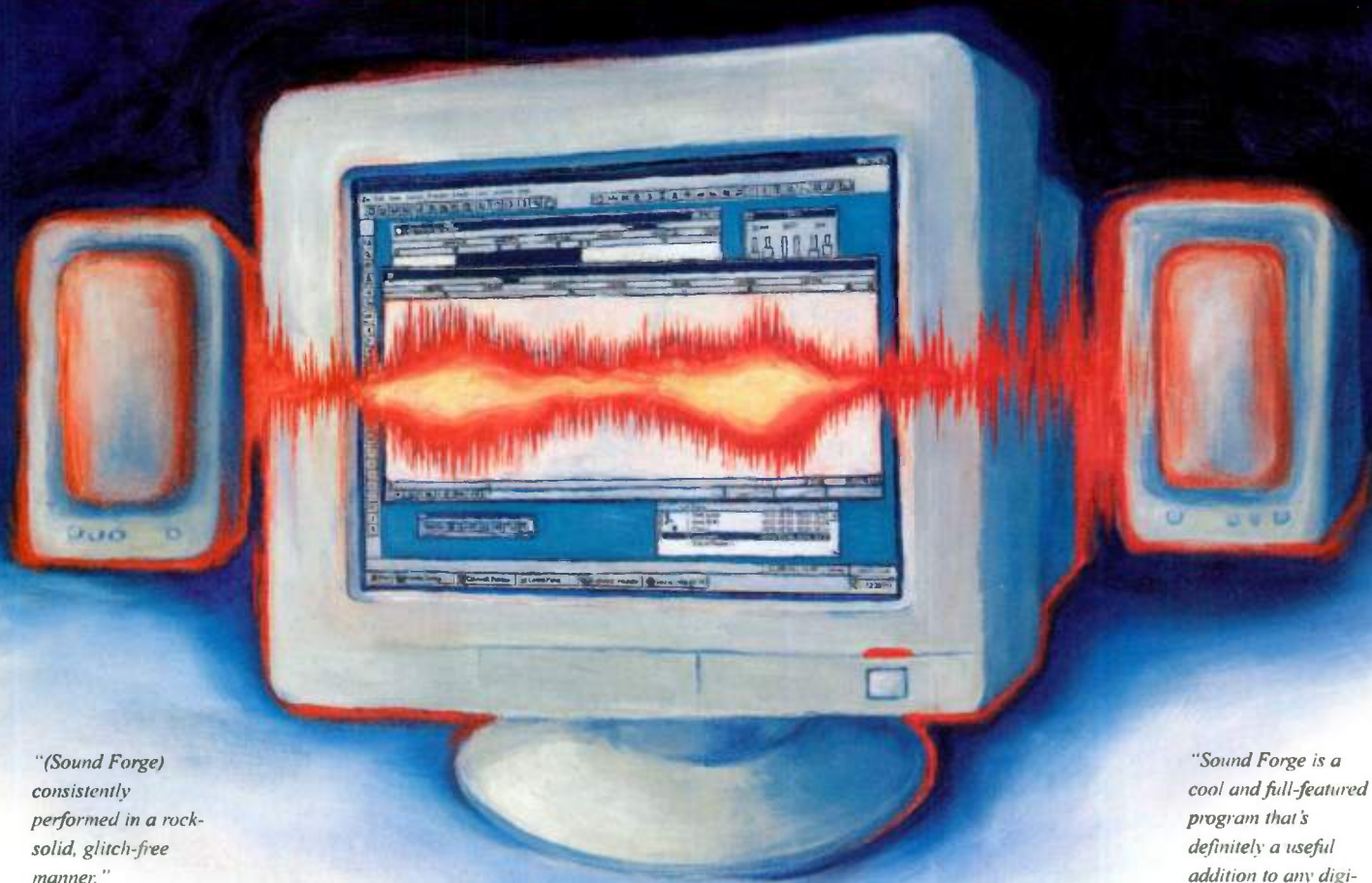
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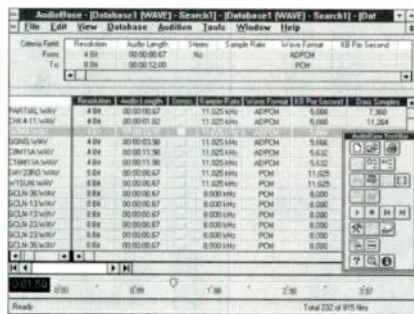
One of the more subtle perils of computer-based recording is getting buried in an avalanche of sound and MIDI files. Artic Software's *AudioBase* (\$69) is designed to help Windows users keep their files straight by automatically cataloging MIDI and WAV files that reside on hard drive, CD-ROM, or other removable media.

The program catalogs many kinds of information besides file names, including a stereo WAV file's length and sampling rate or a Standard MIDI File's key signature, tempo, time signature, and song length. The information is logged into an *AudioBase* database, which can be updated as desired.

With this information, you can do a variety of sorts and complex searches. You can print reports (with onscreen Print Preview) and export them in a variety of formats, including Microsoft *Word* and *Excel*, *Lotus 1-2-3*, *WordPerfect*, *Quattro Pro*, and *ASCII*.

*AudioBase* lets you audition any sound file or multiple selected sound files that have been cataloged in its database. With the click of a mouse, you can play, stop, rewind, fast forward, skip back, and skip forward. A real-time display shows your current position in the file. Finally, the program performs most functions of the Windows File Manager, including moving, copying, deleting, and renaming one or more sound files.

Also new from Artic Software is the *MIDI Music Utilities* package (\$69), a suite of nine programs for Windows. The *MIDI Technical Reference Guide* is a cross-referenced and hyperlinked Windows Help system that provides a description of all messages in the basic MIDI specification plus information on



General MIDI, MIDI Time Code, and many other extensions to the spec.

*MIDI File Informer* lets you convert Standard MIDI Files between types 0 and 1 and process your sequences to add or remove RIFF headers; merge, split, rechannelize, and duplicate tracks; edit Tempo, Volume, Program Change, and other data; change track names, comments, and copyright notices, and more. A Batch mode lets you process multiple files. Special features for multimedia include a Polyphony Counter that determines the maximum number of voices required to play an SMF.

*MusicCalc* performs such commonly required calculations as SMPTE offset, tempo-to-delay time conversion, and various types of time conversion. *MIDIHack* is a real-time MIDI-data display and analysis program that shows the messages (including SysEx) received at any MIDI port. *MIDI Tester* runs through a series of tests that checks every note on every selected MIDI channel to let you troubleshoot your gear. *SysEx Dumper* lets you initiate SysEx transfers from the computer and save the files in binary .syx format. You also can use it to enter and edit SysEx data and load it into your MIDI devices.

If you have multiple MIDI interfaces, a multiport interface, or even a sound card with MIDI In and Out ports, *MIDI*

*Thruway* lets you route any MIDI input to any MIDI output, in any combination, within your computer. This lets you control multiple instruments from the same external keyboard or control a single sound card from multiple controllers. Data from any input can be filtered before transmission, and you can store and recall setups. With this applet, you don't have to use the Thru feature in your various MIDI programs.

The *Chord Computer* is a reference guide for learning guitar and piano chords. It has eighteen built-in guitar tunings and one user-defined tuning. The program can locate guitar chords (in any tuning) from among 30 different chord types, in any key and on any guitar fret. It can play chord voicings as arpeggiated or strummed chords. The software can identify chord voicings for a specific fret position and lets you compare different chords visually and by ear.

Although all these utilities appear useful, *Tuning Wrench* could prove fun, as well. It lets you use microtuning to create alternative tunings, such as Just Intonation and Pythagorean, and ethnic scales, such as Arabic and Javanese. Supported instruments include the Roland Sound Canvas series; E-mu Proteus series, UltraProteus, and Morpheus; Turtle Beach MultiSound, Maui, and Tropez; Creative Labs WaveBlaster; Korg M1 and X3; Kurzweil K2000 and K2500; and Yamaha TX81Z, DX11, SY77/TG77, SY99, TG300, and VL1.

*MIDI Music Utilities* requires an 80386 or better PC with Windows 3.1 or later, 4 MB of RAM (8 MB recommended), 4 MB of hard-drive space, and a VGA monitor. Artic Software; tel. (414) 534-4309; fax (414) 534-7809.

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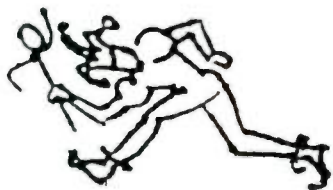
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FILE

## The Proof's in the Pudding

*Coyote Pudding stirs up a stylistic stew.*

By Michael Molenda

**J**ohn Land was not having any fun. The towering multi-instrumentalist was watching the Celtic rock band he performed in crash and burn, while his other musical pursuit, playing bass in a theater orchestra, was more frustrating than fulfilling. It was time to do something "his way." So Land formed Coyote Pudding and produced the band's CD *Joking, Drunk, or Bored as Hell* all by himself. Unfortunately, he still didn't have any fun.

"I went into the project with very high expectations," says Land. "It was my baby, but I was extremely unfamiliar and uncomfortable with studio technology, so I often couldn't express exactly what I wanted. As a result, the recording process would get stalled, or I'd get frustrated trying to achieve unrealistic goals. It's kind of funny, because I had recorded a CD a few years ago with another band and only partially understood what was going on. And yet, when I started working on the Coyote Pudding CD, I thought, 'What's to know?' Well, I found out pretty quickly that there's a lot to know about producing records!"

Despite Land's inexperience, or perhaps because of it, *Joking, Drunk, or Bored as Hell* is a wonderful melting pot of stylistic influences. Blistering guitars swoop in and out of gentle acoustic arrangements, and Celtic motifs co-exist with funk rhythms and heavy-metal bravado. The sonic circus even includes a story (originally recorded on a telephone answering machine) by Land's late father.

"The album goes all over the place," admits Land. "It's not for everyone. If I had a deal on a major label, they probably wouldn't have allowed the record to be so eclectic. But that's one of the great benefits of being independent—you can do whatever you want. That being said, I kept the songs short because I figured if you didn't like a tune, you wouldn't have to wait long until it was over."

However, Coyote Pudding's musical potpourri was not exactly an accident. One of Land's main stylistic influences is Ian Anderson, leader of Jethro Tull.

"The Tull records I loved had these wonderfully choreographed musical arrangements," he says. "The songs

were almost symphonic in the way that all the parts fit together."

Land ensured that the dense mixture of electric and acoustic instruments on *Joking, Drunk, or Bored as Hell* didn't degenerate into audio mush by keeping signal processing to a minimum. Just about every instrument was tracked with some degree of compression—typically a 2:1 ratio with a threshold of -5 dB—to capture warm, punchy timbres, but reverb and other effects were used so sparingly as to be almost inaudible.

"Everything is pretty natural," says Land. "There is one song outro where I snuck in some chorusing on the guitars, but even that was getting way out there for me."

*Joking, Drunk, or Bored as Hell* started out with one song, "The Resting Place," which was the only thing Land had written up to that point that he didn't hate. His desire to maximize studio time by doing more than one song led to a full CD project.

"I had all these fragments of songs that would never get completed unless I had a reason to finish them," says Land. "So it's quite a rush to finally have this CD that I can hand to someone and say, 'Have a listen; I hope you like it.'"

For more information, contact Fancy Jacket Music, 2595 Alma St., Palo Alto, CA 94301. ☎



Coyote Pudding (from left to right): Kelly Amthor, John Land, Shand Walton, and Mark Macario.





# Franken Synth

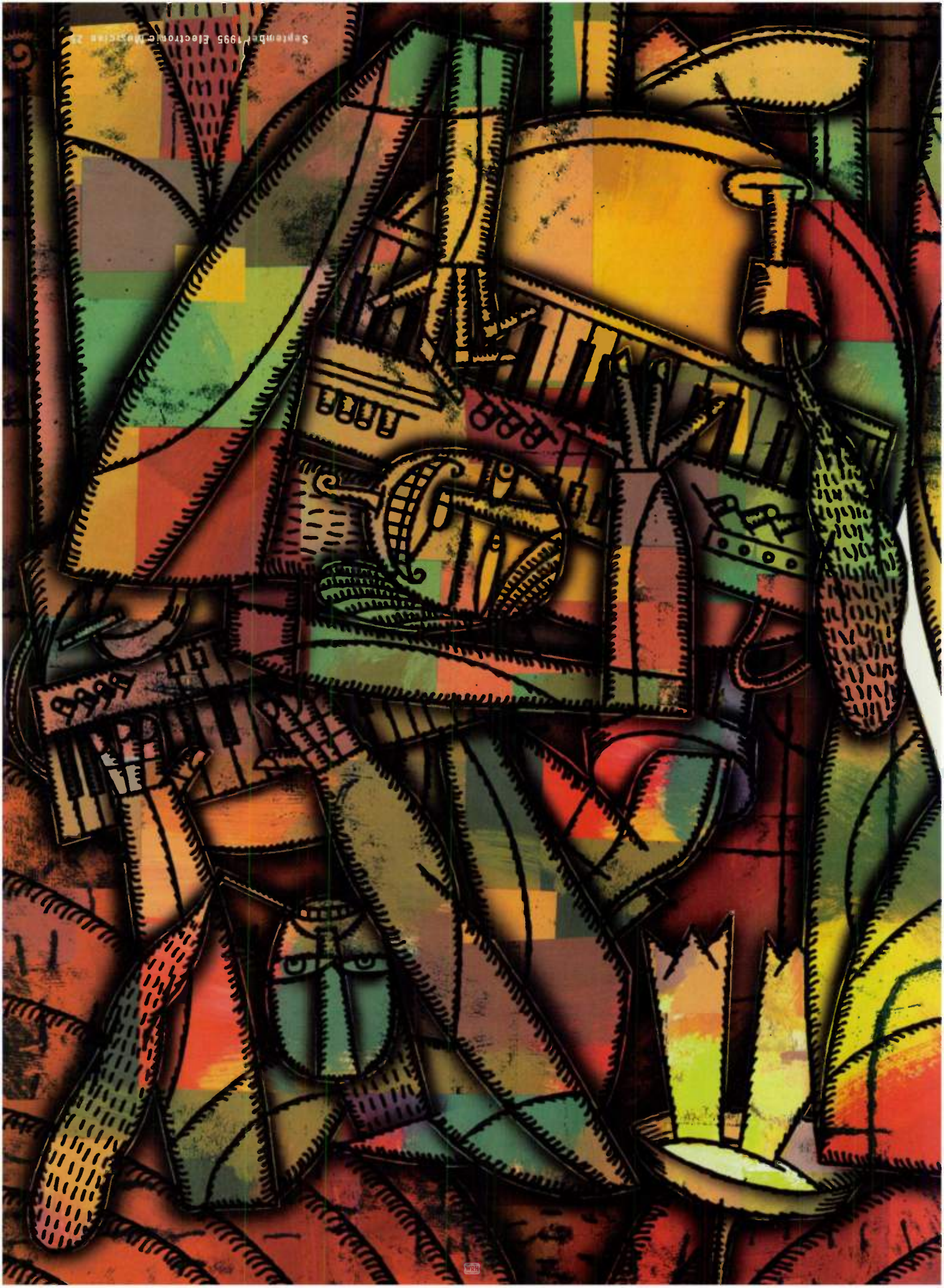
**I**T WAS A DARK AND STORMY NIGHT. A distant wolf howled at the full moon as several cars pulled up to the entrance of a brooding castle. Dark figures emerged from the cars and hurried through the castle's massive front doors as the wind whipped at their clothes and flashes of lightning cast flickering shadows on the stone escarpment.

By Clark Salisbury  
with Scott Wilkinson

Create monster sounds with these programming tips from experts.

Illustration by Richard Downs









Once inside, the new arrivals went directly to the laboratory, where a large table had been prepared for them. In the center of the table lay several synthesizers connected to a ghastly tangle of cables that almost seemed to writhe as they carried the electronic lifeblood on which the synths depended for their very existence.

As the people took their places around the table, it became clear that these were some of the most respected sonic scientists in the world. Each one had created many successful sounds for some of the most popular synths ever made. Tonight, however, they would pool their prodigious talents and share their programming secrets with the world.

## INTRODUCTIONS

To start things off on the right foot (Igor, I said get me a *right* foot!), each member of the panel introduced himself. Andrew Schlesinger has been involved with synths and electronic music since 1975. He's a self-taught keyboardist and composer who began his formal study of sound design at the Boston School of Electronic Music in 1979. Within the music industry, Schlesinger is well known for a wide range of sound-design projects. He's worked for Eventide, Lexicon, Kawai, Ensoniq, Korg, Kurzweil, Alesis, and Roland. He's the author of *The Insiders Guide to the Casio CZ Series* (Alfred), and his sounds are distributed through



Andrew Schlesinger

Sound Source Unlimited.

According to Schlesinger, "I'm not known for doing realistic, emulative things; I'm much more known for the exploratory, 'new timbral' sounds. I'm most interested in finding out where you can take a machine sonically to create a sound you haven't heard before. I usually do this in one of two ways. One way is to combine and manipulate dissimilar elements to create a unified whole. The other way is to layer the dissimilar elements together so that each one retains its own identity."

Manny Fernandez works about three and a half days a week as a dentist (which seems appropriately frightening for this ghoulish gathering). The rest of the time, he's a freelance consultant and sound designer, which he's been doing professionally since 1986. In that time, he's worked on instruments for Kawai, Korg, Kurzweil, Alesis, Yamaha, and Ensoniq. His sounds are also distributed through Sound Source Unlimited.

"In college," recalls Fernandez, "I was always interested in synthesis from the traditional 'squeaky-bonk' academic side. I took electronic-music courses for fun to balance out the hard-science background I have. These days, I'm probably known as an atmospheric, textural kind of guy. If you need a big D-50 or M1 pad that does a lot of stuff or a film-soundtrack type of sound, I'm your man. I'm also known as the emulation king. Need a particular synth to sound like another synth? That's my turf."

Lloyd Trammell has been involved in synthesis and electronic music since the early 1970s, when he acquired his first electronic instrument, a Theremin. He's been busy ever since developing sounds (including some used in the ROM of several instruments) and beta-testing for manufacturers such as Korg, Kawai, Peavey, Roland, E-mu, and Ensoniq. He's also created custom sounds for artists such as The Rippingtons, Rob Mullens, Petra, Yes, Matt Fink (keyboardist for the artist formerly known as Prince), and Dan Fogelberg. In addition, also he's won a Fami-



Scott Plunkett

award and an Ace award for sound design in cable television.

As the owner of Syntaur, Sam Mims is the only member of the panel involved in marketing sounds directly to the public. Syntaur sells samples and synth patches for every Ensoniq keyboard and also remarkets sounds originally produced by Ensoniq for its now-discontinued products. Recently, they've begun remarketing Casio sounds as well, in addition to developing a number of their own original Casio patches.

Scott Plunkett is a performing musician. He has been touring and recording with Don Henley for the last five years, and he has worked with Boz Scaggs and Michael McDonald as well. This is not to say that Plunkett has no programming chops. Like the rest of the panel, Plunkett began designing sounds in the early 1970s, working with Moogs, Arps, and the like. Eventually, he landed a gig as a product specialist with Yamaha. Since then, he has worked on most of their professional products since the DX7II, including the TG77, SY99, SY85, and W series. In addition, Plunkett is one of the handful of programmers (Fernandez is another) to develop sounds for Yamaha's physical-modeling synth, the VL1.

## A GOOD GROUNDING

Bringing new sounds to life requires a solid foundation of knowledge. Schlesinger feels that a basic understanding of analog-synthesizer architecture is essential for effective programming. "Once you understand the basics of signal flow and modulation, you'll find that virtually all instruments are the



same. The only things left to learn are how a new instrument is put together and what it allows you to do. For example, I look at the Kurzweil K2000 as an analog modular synth; although the signal paths are preset, you can still choose which DSP functions to use."

What's the best way to learn synth programming? "Go buy a monophonic analog synthesizer," Trammell insists. "Something like a Sequential Pro 1 or an ARP 2600. Even though you might get bored, stick with it, because there's a whole new world of stuff there that people haven't even touched."

Plunkett points out that you must have a sense of history and evolution before you can strike out in new directions. "It's like hearing some young guy playing free jazz. If he doesn't understand where the style came from, he's just playing nonsense. I feel the same way about programming synthesizers. I look at the newer digital instruments as essentially analog synths with samples in them. Those of us who grew up with analog have a better perspective. We can see where a particular feature came from, why it's there, and

what it does, all in relation to the analog instruments we started with."

Still, as a novice programmer, the wind's at your back in at least one sense. "Most of the current instruments come with good factory patches," says Plunkett. "I suggest that beginners find a sound they like and copy it. Look at the parameter values, then change them and see what happens. Mess around with each parameter, then return the value to where it was and move on to the next parameter. This can give you some really wonderful ideas you can use in your own sounds."

#### OLD DOGS, NEW SYNTHS

Once you have the basics down, you must still contend with a constant stream of new instruments from the manufacturers. How do you go about gleaning the essence of an unfamiliar instrument? According to Schlesinger, "Generally, the first thing I do is set up a single-oscillator, gated sound with the



Manny Fernandez

filter wide open and the effects turned off. Then, I go through the waveform ROM and listen to all the waves. Next, I check out the filters and listen to what the cutoff and resonance controls do. Then, if it has effects, I check out what's available there."

Fernandez's approach to a new machine is also fairly methodical. "I sit down and go through the parameter set very analytically. Of course, this

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includes finding out exactly what's available in the wave ROM. Then, I investigate the limits of the various parameter values. In particular, I want to know how far I can tune the samples up and down, the depth of modulation, what I can get out of the LFO at maximum settings, what I can get out of the envelopes, whether the filter has resonance, that kind of thing. I want to find out what kind of tools I have.

"After I've gone through all the wave ROM and parameter values, I say, 'Okay, now I know the designers' intentions. How can I approach programming in a way that the designers didn't plan on?' If they designed it to do certain things at the expense of other things, I want to know whether I can do those other things anyway."

Trammell suggests that the filter is perhaps the most important compo-

nent of a synthesizer. When he's working on a new instrument, he usually checks out the filter before anything else. "I start by turning the effects off to hear what the instrument really sounds like. Then I assign a sawtooth wave to the oscillator and proceed to the filter section. I check out the resonance, envelopes, and other filter parameters to see how good they are. If I like what I hear, then the ROM sounds don't have to be great. But if you have great ROM sounds and mediocre filters, then the instrument won't cut it."

#### FILTERED BLOOD

Trammell continues to stress the importance of resonant filters, especially for analog-style sounds. "To get that resonant pop on the attacks, set the filter cutoff at about 80%, crank the resonance up about three-quarters of the way, and set the filter envelope attack time very short. If the envelope's quick enough, you'll get almost a key-click kind of sound. If a filter can do that, it's probably pretty good."

Fernandez also recognizes the importance of filters, but he knows that



Lloyd Trammell and Cujo the MIDI dog (really!)

some synths fall somewhat short here. He constantly looks for ways to work around such limitations. "The best way to get dynamic range out of a sample-playback synth that doesn't have strong filtering is cross-switching Velocity or cross-fading between pitch-shifted versions of the samples.

"For example, the Alesis Quadra-Synth uses filters with a slope of 6 dB

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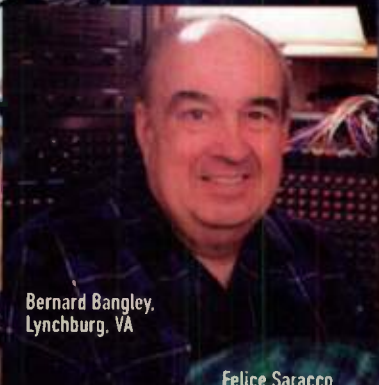
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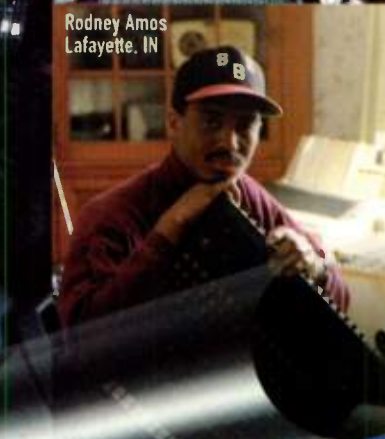
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per octave, which means you can't get really dramatic filtering. However, it offers four oscillators per voice, which lets you do this kind of cross-switching. But getting the oscillators to switch correctly can be a real pain, because the preset Velocity curves are a little too drastic. By routing the tracking generator to control the amplifier and filter, I can start bringing these components in where I want to."

Schlesinger takes a somewhat different view. "I would say the biggest thing in sound design is the combination of enveloping and pitch range, because if you take away the filters, you can still make great sounds with stock waveforms. You have to work harder, because changing the harmonic structure of the sound is accomplished by controlling the amplitude of the waves over time in relation to one another.

"Quite frankly, I have found that resonant filters are not necessarily so important with realistic PCM waveforms. For example, put a saxophone sample through a resonant filter; most of the time, it actually sounds worse. Resonant filters become much more important when you are doing synthetic sounds."

## PUSHING THE ENVELOPE

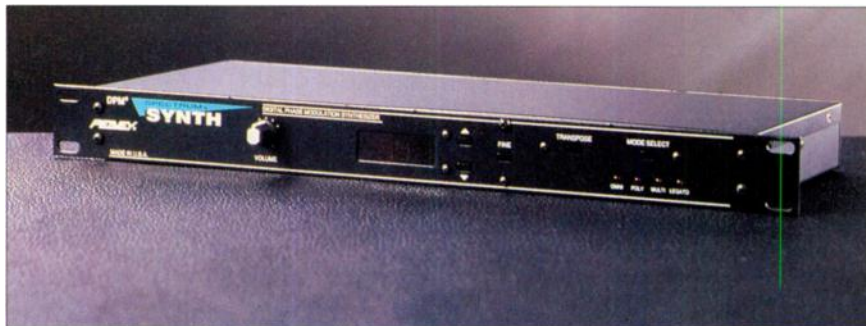
After the filters, Trammell believes that the envelope generators are the second most important component, particularly when it comes to emulating the sounds of other instruments, including other synthesizers. "The key to emulating other instruments is selecting timbres from the wave ROM that are pretty close and then spending the

time to get the envelopes very close. Once you get the envelopes set correctly, it's just a matter of hunting for the right waves."

Trammell points out the importance of pitch envelopes. "If you have a pitch envelope, use it. In most instruments, especially plucked instruments, each note gets more stable in pitch as it starts to decay. In a guitar sound, for example, you want each note to start off with some pretty deep chorusing, but you want it to disappear pretty quickly. So I use a pitch envelope to detune one of the waves in a pair at the beginning of the note, after which it comes back into pitch as the note decays. The same thing works for realistic piano sounds. If you listen to a piano note, it almost becomes a sine wave after about three or four seconds.

"One of the best ways to make brass sounds more realistic," he continues, "is applying the pitch envelope to one of the oscillators. You can use the envelope to make a quick, transient pitch-blip at the beginning of the note. If you can control the envelope with Velocity, that's even better; then you can almost perfectly emulate analog stuff. In the Prophet 5, for example, the oscillators are running all the time, and they're never in phase. If you can change the pitch with Velocity by very small amounts instead of simply detuning one oscillator, you can get something close to that Prophet 5 sound.

"This is what we tried to do on the Peavey Spectrum Synth," Trammell recalls. "In that instrument, you can modulate not only the pitch but the phase relationship between the two oscillators, as well. There are not many products that can do this. It took me a while to convince Peavey that controlling phase relationships would make a big difference, but once they heard it, they were into it."



Peavey Spectrum Synth



# Soundscape

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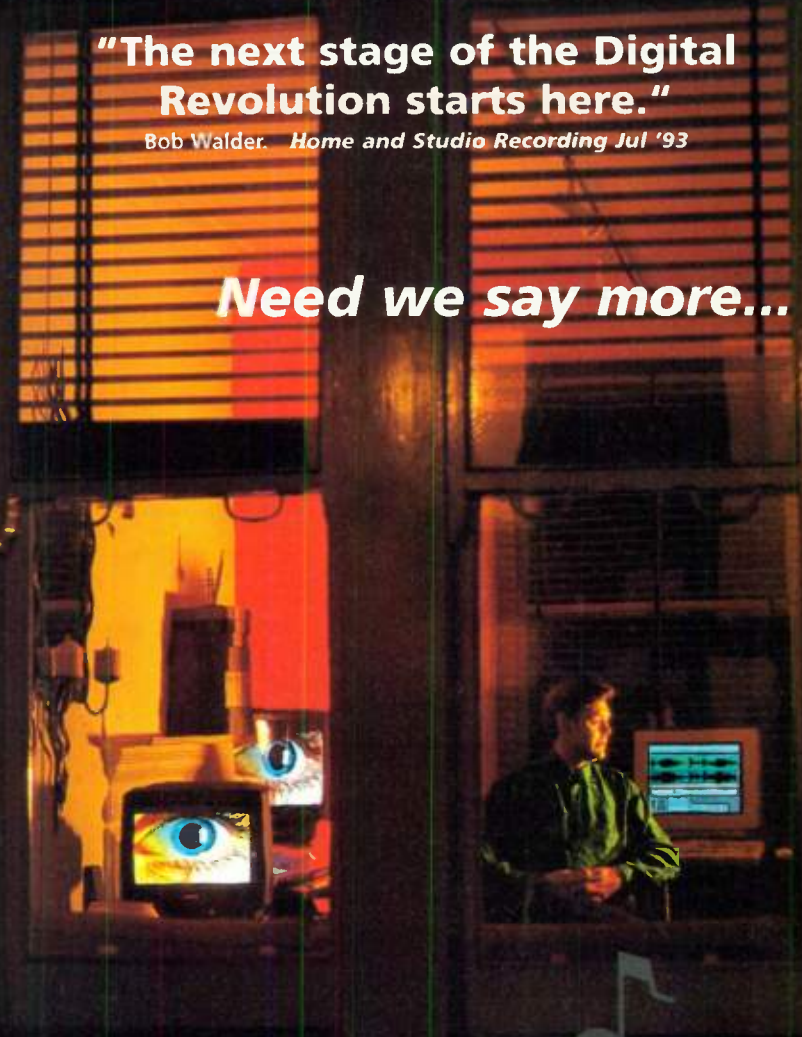
"I wanted to really check out the vari sync mode. I slowed the video down to a crawl, Cubase locked in and the sequenced music was playing slowly ... a bit faster ... and ... yes the Soundscape synced up and was recording. The SSHDR1 has lots of features, creative usage of available power, sounds great, syncs great, straightforward, easy to use and expandable."

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Mims agrees that pitch envelopes are particularly important for brass patches. "For example, to do a standard synth sawtooth brass patch, I wouldn't just detune two or three oscillators. I'd program the pitch envelopes so one oscillator jumps a little sharp when you first hit the key and another jumps a little flat. I also include some subtle pan motion, not necessarily so the whole sound moves, but so that one oscillator pans to the right while another pans to the left. The overall sound remains balanced, but it holds your attention a lot better."

Schlesinger also understands the importance of envelopes. "Among the parameters I find most critical to the musicality of a synth are the envelope attack and decay times at their lowest [i.e., fastest] values. The difference between values of 0 and 1 is a function of

how fast the processor can update the machine. This has a large effect on the transients you can do. The difference between 0 and 1 in some machines is very great, while it's very small in others. Having a lot of resolution at the fastest envelope times is more important to me than having a lot of resolution at the longer time values."

For nonrealistic sounds, Schlesinger likes to get a little crazy with the pitch and envelope settings. "One good exercise is to take a sound entirely out of its normal pitch range and totally alter its normal envelope. For example, one

of the sounds I did for Roland was a slow, highly chorused, multilayered pad made from a bunch of muted trumpet layers. The layers were detuned to such an extent that you wouldn't recognize them. I also transposed them into a lower pitch range and set the attack and decay very long. For another example, I might take a bass sample up two octaves, layer and detune several copies, and program a slow attack and release; this can create a really wonderful pad. Don't be afraid to take a sound and mutate it in completely uncharacteristic ways."



Alesis QuadraSynth

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Uncharacteristic or not, envelopes bring life and motion to virtually all sounds. Mims feels strongly about this point. "I'm very opposed to static sounds. If you press a key and the sound just goes 'eeee...' and keeps doing that, it doesn't do much for me. When I program a sound, I like to include some sort of animation, usually very subtle, but animation in timbre, tuning, panning position, that sort of thing."

### EFFECTIVE EFFECTS

Trammell expresses a common sentiment regarding on-board effects. "Don't rely on effects until the very end of the programming process. If you make a great patch without effects, it only gets better when you turn them on."

Asked for tips on setting up the effects, Trammell speaks from experience. "I typically use reverbs that last about two seconds; that's when the reverb usually starts to level out a little bit and the reflections can start to splatter around. Usually, the best thing to add to any patch is some type of chorus. That will fatten a patch every time. I usually set the chorus to a wet/dry mix of 50%."

Schlesinger feels the same way about effects. "I try to make sure the sound works without effects. Then, I add a bit of reverb or chorusing, because that's what most people use in a multitimbral setup. As long as the machine has a decent reverb and chorus, I can generally do what I need to do. Any other effects are ancillary to those two."

Fernandez takes a somewhat different view. "I don't like sounds that have too much chorus; they swim around too much. I'd rather create a more natural chorus by doubling, detuning, and panning the oscillators, maybe using an LFO on one oscillator to get that effect. I try to avoid that big, fat, chorus sound that tends to put a big bump in the low-mid range."

Taking yet another tack, Mims uses onboard effects as an integral part of the sound. "Effects can be a very important part of the sound, even more important in subtle ways than most people realize. As we programmed the Ensoniq TS series synthesizers, for instance, we used the parametric EQ a lot to get the



Sam Mims

piano sounds right, to get a Rhodes sound really tweaked in, that sort of thing."

### LOOSE ENDS

Programming new sounds is a little like assembling a body from disparate parts: you must make the most of what you have. For example, Fernandez likes to use overtones in his sounds; he includes a wave (often a metallic-sounding sample) tuned to an odd interval within the patch. "There are two ways to approach this: the added wave can be spice, or it can give you a chordal sense when you play a note."

One of the most well-known examples of this technique is the "Fantasia" sound Fernandez created for the Roland D-50, a sound he has since been asked to re-create in other instruments. Part of the unique character of this patch comes from one of the bell-like timbres within the patch that is tuned an octave and a tenth above the fundamental. "Tenths are good examples," according to Fernandez, "because you can actually voice some conventional chords that sound pretty neat, texturally speaking."

"Another example," he continues, "is a K2000 electric-piano patch called 'WireMeister' that I've released through Sound Source. It's actually two sine waves and a wave-shaped electric-piano sample that makes a little metal 'ping' in the high end. One sine wave is tuned to the fundamental, while the other is tuned to the second harmonic. The electric-piano sample is tuned two octaves and a half step above the fundamental."

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One tip that can help elevate your programming to an art form is knowing when to stop tweaking. As Plunkett points out, "I can't tell you how many times producers tell jokes about programmers that generally end with the producer saying, 'Leave the sound alone, go away, don't touch it!' It's easy to think, 'If I just speed up the LFO a little....' You can always think of other things to do with a sound, but the art of programming is to know when to say, 'That's great, stop!'"

Still, Plunkett was willing to provide a couple of tips for those times when you don't want to leave a sound alone. "Here's a wonderful old analog trick. Say you're doing a brass-section type of sound and you want to fatten it up. Certainly, you could assign the same sound to multiple oscillators. But if you're using a sampler or sample-playback machine, you can run into problems with flanging. If you have a sample start-time offset parameter, you can start one sample at a different point in its cycle than the other.

"Another thing you can do," Plunkett continues, "is to modulate the pitch of one oscillator with a slow LFO. This will detune it a bit, which creates a chorus effect that can sound more natural than running the sound through a chorus. It gives the sound some movement. If you can randomize the LFO, so much the better."

Trammell offers similar insights into the Peavey Spectrum Synth. "Wave 4 is a ramp and Wave 5 is a sawtooth. If you combine them in tune, you hear nothing because of cancellation. But if you detune one of them, you get a really fat string sound out of it! Then you can vary the start time of one of the waves, which sounds almost like varying the pulse width. Finally, you can modulate the detuning with an LFO, envelope, sample and hold, almost anything. It's pretty cool."

### TRUE LIES

When it comes to emulating familiar instruments, there is no substitute for direct knowledge of those instruments. According to Mims, "Emulative programming requires familiarity with the instrument you're trying to emulate and how it's played. I played trumpet all through college, and I was always in bands and orchestras. So I became pretty familiar with what a flute and a trombone sound like, even though I don't play those instruments.

"I also got familiar with how those instruments are played, which is very helpful for programming things like attack transients. The attack is probably the most important part of the sound; the first split second of a sound tells you what that sound is. If you can nail that, you're most of the way there. But if the attack of your trumpet sound is wrong, it's just not going to sound like a trumpet."

As with Mims, Plunkett's approach to synthesis is guided as much by his respect for the sound of acoustic instruments as it is by the desire to do something new. "My whole program-

ming philosophy comes from growing up with the desire for an orchestra in a box; as a keyboard player, that's my function in the band, and the Hammond doesn't really sound like a brass section. So imitative synthesis was a natural direction for me. It was interesting to me because I could apply it to my everyday working life as a player.

"Then it began to dawn on me that I really wanted to create synthetic sounds that had the complexity of natural instruments. But that complexity does not come from preset LFOs and such. It comes from a timbral complexity that constantly changes in response to what you input as a player. In our lifetime, I believe we will see an electronic instrument that takes as much time and study to master as a sophisticated acoustic instrument. That's very exciting to me, but it's also scary, because it's going to take a lifetime to realize the full benefits of such an instrument. But it's going to happen. It's right around the corner."

Mims tries to realize this goal with today's instruments. "I like a sound to be expressive, and not only in response to touch. I try to make sure the mod wheel, footpedal, and data slider all do something. I make it a point to build every possible nuance into a sound, so you can really *play* it."

In the end, the most successful sounds are those you *want* to play. As Plunkett puts it, "A sound is successful if I find myself playing it. I've gotten to a certain point, and I find myself getting into that dreamy state where I'm playing it, and it just feels good. That's what a good sound should do."

### HERE COMES THE SUN

As dawn began to break over the castle, the members of the panel hurried to their cars and sped away. (After all, synth programmers must avoid sunlight like the plague!) But the long night was fruitful, yielding many insights and specific techniques for creating monster sounds on just about any synth. Now you can try your hand (or any other part of your anatomy) at bringing your own sounds to life. All you need is a synthesizer and a full moon, and soon you'll be howling with the best of them.

*Clark Salisbury has created many monstrous sounds for a variety of synths. EM Technical Editor Scott Wilkinson avoids direct sunlight at all costs.*



Kurzweil K2000



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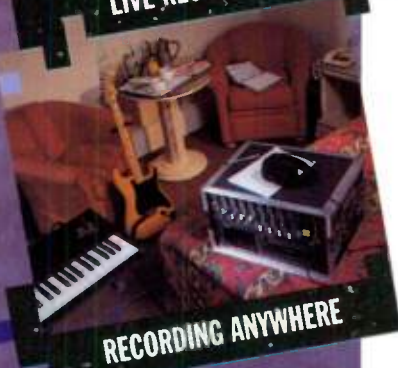
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Unfortunately, producing a home-grown CD that measures up to the sonic quality of big-budget releases is no small feat. A chart monster such as Michael Jackson can spend millions adorning his

comeback record with dazzling production values and pristine audio engineering. The typical home recordist, however, is often hard pressed to raise a budget numbering in the *hundreds* of dollars. And here's the kicker: when your self-produced record gets a break and is played over the radio (or is included in one of the listening stations at a major retailer), it must compete head-to-head with the big-money acts to seduce listeners. Hey, who said life was fair?

Luckily for you, a good engineer and a well-equipped mastering studio can level the playing field a bit. Mastering is the process of enhancing—and sometimes “fixing”—the sound quality of a recording project before it is sent to the pressing plant. It's the final step where the artist, producer, and engineer can exercise any control over the way the music sounds before it is immortalized forever on CD, vinyl record, or tape. A talented mastering engineer can transform a lackluster mix into a sonic masterpiece. Let's take a step-by-step look at how this magic is accomplished *and* how you can prepare your mixes to ensure a fruitful and cost-effective mastering session.

BY GARY WOODS  
WITH MICHAEL  
MOLEND  
ILLUSTRATION BY  
TERRY MIURA





*fig.1. The Touch*



1

2

3

4

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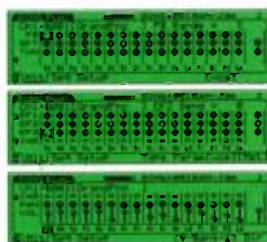
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# THE Master's TOUCH

## MASTERING HOMEWORK

Although you may be knocked out by how much a mastering engineer can enhance your music, the mastering process is not a miracle cure. Every sonic tweak and tonal correction takes time, and time isn't cheap inside a professional mastering studio. You can make the engineer's job a lot easier—and save yourself a ton of cash—by following a few simple mixing tips.

Michael Romanowski, a mastering engineer at Rocket Labs in San Francisco, says that the biggest mistake clients make is pumping too much bass into their mixes. Besides the obvious disadvantage of making a track sound muddy, overabundant lows can also overwhelm other frequencies until they sound weak by comparison.

"And something else people don't realize," says Romanowski, "is that they may be overdriving their mixer input channels by boosting the bass too much. The resulting distortion is often very slight, but it's there. Sometimes these tiny bits of distortion are why a home-studio project doesn't sound as clear and transparent as big-budget productions."

While we're on the subject of distortion, be sure you don't push your input levels too hard when mixing to DAT. Slamming input meters is an analog habit—the more signal on tape, the lower the signal-to-noise ratio—that doesn't translate to the digital domain. If you hit the red line on your DAT recorder, you're rewarded with digital distortion that is truly ugly and near impossible to fix.

Play it safe by putting a 1 kHz test tone through your mixer's stereo bus and adjusting its level until the VU meters read 0 dB. Make sure the VU levels on your DAT deck are aligned to read -12 or -14 dB. Now, if you keep your mix levels peaking at around 0 VU on the stereo-bus meter, the absolute peaks on the DAT should be a safe and conservative -3 dB.

If you plan to press CDs, another way to play it safe is to record all your DAT mixes at the professional standard sam-

ple rate of 44.1 kHz. (Duplication plants require a 44.1 kHz master for CD production, which is, of course, the sample rate of the CDs themselves.) Sure, the mastering engineer can use a sample-rate converter to change any 48 kHz mixes you have to 44.1 kHz, but why put your music through unnecessary signal processing? Not all sample-rate converters are transparent; conversion may compromise sound quality.

Romanowski also suggests that you do not activate the normalization function on your DAT recorder. "Normalization alters the dynamic range to fit the level of what's recorded onto DAT," he says. "It changes the spectrum of the music's soft to loud passages by dealing with signal peaks. As a consequence, the process limits my ability to EQ and boost overall gain to get your CDs sounding as hot and present as possible. On the other hand, if you're sending your DAT directly to a duplication plant and bypassing the mastering process entirely, normalization may be desirable to maintain consistent levels between songs."

Common sense should teach recordists that careful organization can save time and money in the studio *and* in the mastering suite. Unfortunately, many clients show up for their mastering sessions with a bunch of unlabeled DAT mixes and waste time searching for songs. You should always index each mix with an ID marker and identify the song by name and ID number on the DAT's packaging label. ID numbers speed up the mastering process by allowing the engineer to use the "Skip ID" function on his or her DAT machine to return to the beginning of a song quickly. It's also a good idea to document the take number and pertinent notes ("I'm a Boy," take 1, vocal too loud; "I'm a Boy," take 2, best mix; etc.) and the absolute time (12:10 to 15:00, 22:55 to 24:30, and so on) of each track.

"I have done sessions where the client shows up with a bag full of DAT tapes, and we spend hundreds of dollars just sorting through them looking for the right mixes," says Romanowski.

If you have an unsteady

hand on the master fader and find your songs plagued by jerky fade outs, you can leave that duty to the mastering engineer, too. Simply keep each song's outro running longer than you ultimately want it to, so the engineer has enough time to do an elegant fade.

Finally, plan on doing three different mixes of each song. The first mix should be exactly the way you want it to sound. The second mix should be identical, except for a louder vocal, and the third mix should have a softer vocal. These different versions provide the mastering engineer with some necessary slack when doing overall tonal tweaks.

"I'm very sensitive to vocal levels, because the average listener keys on the singer," explains Romanowski. "So if I'm re-EQing instruments and suddenly the vocal sounds softer, I can simply substitute the mix with the louder vocal track to compensate. Likewise, if some EQ adjustments cause the voice to sound louder than desired, I can grab the mix with the softer vocal level."

## IN THE LAB

Once you've organized your master tapes, the actual mastering process is relatively straightforward. Before an engineer listens to your mixes, he or she may ask whether you want to tackle any specific problems. You may believe, for example, that your vocal tracks are not as present as they should be or that the entire mix sounds too thin.

"I try to get a feeling whether the client has a particular sound in mind," says Romanowski. "Then I do my own listening. I listen critically to the recording quality and determine whether there is an absence or overabundance of certain frequencies. I also listen for



Home recordist Jay Rando puts the finishing touches on his mastering project at Quad Teck Digital Labs in Los Angeles.

GARY WOODS





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## THE Master's TOUCH

clarity. I want to know whether any instruments are overlapping. Is the snare drum interfering with the vocal? Is the guitar covering up a keyboard part? Depending on what's happening with the overall frequency spectrum, I'll choose a certain type of equalizer to process the sound. Or I may even use a couple of devices. All of this is done by feel. I try to select processing that will deliver the best sound for the purpose—a narrow- or wide-band equalizer, for example—and the style of music.”

Compression is another tool that mastering engineers use to bolster tonal quality and sonic impact. For example, the dynamic range of a track might be too extreme, with very loud volume levels fading to near whispers. If a peak (very loud signal) must be reduced in level to avoid going “in the red,” then the softer passages may end up being so quiet that the music, as a whole, sounds small and weak. Compressing and limiting can tame these vast level differences to give the track a more unified and punchier sound. Low-level signals no longer get lost in the mix, and the overall sound spectrum is fat and punchy.

A mastering engineer can even enhance a mix by adding elements that were never part of the original recording. For example, Fred Waring at Quad Teck Digital Labs in Los Angeles has accumulated a sample library of various acoustic ambiances. On a recent mastering session with local songwriter Jay Rando, Waring used a sampled grand-piano ambience to add depth to a track.

“When Fred added these ambiances during the mastering process, the piano on my track suddenly sounded richer and deeper,” says Rando. “It was almost as if the resonance of the piano were reaching out from the speakers and encircling the listener.”

Once all the tweaks have been made, the master is transferred to the Sony

U-1630 digital format—a parallel system that records both stereo channels simultaneously to ensure proper phase relationships—and sent off to the pressing plant. Then, the “1630” is used to make the glass master from which all the CDs are pressed.

“The mastering process is essential if you want to get the best sound from your mixes,” says Rando, who records his material on a TASCAM 688 8-track cassette ministudio. “I compare Waring to the director of photography on a film. He brings my music into focus and gives it a wider depth of field.”

### MASTER FADE

The typical cost for an album mastering session is between \$1,000 and \$1,500. The hourly rates for high-class mastering suites can run anywhere from \$120 to \$250, while enterprising Pro Tools owners often offer basic mastering services for as little as \$30 per hour.

If you're truly brave—or foolish—you can even master your project yourself. (See Recording Musician: DAT

*Consider quality-versus-expense options very carefully, because you'll probably get exactly what you pay for.*

Mastering at Home” in the October 1994 EM.)

Whichever route you choose, consider all the quality-versus-expense options carefully, because you'll probably get exactly what you pay for. Also, keep in mind that this is *your* music. When you work directly with a mastering engineer, you can be sure that the finished product will be as much your own as the original music was, instead of someone else's idea of what it should sound like.

“I'm noticing more artists attending mastering sessions with their producers than ever before,” says Romanowski. “And they usually have very specific ideas about things. I think this is great. An artist should care enough about his or her work to be involved in everything that can affect how the final product sounds.”

*Starting with The Mod Squad in the 1970s, Gary Woods has scored numerous films and television shows.*

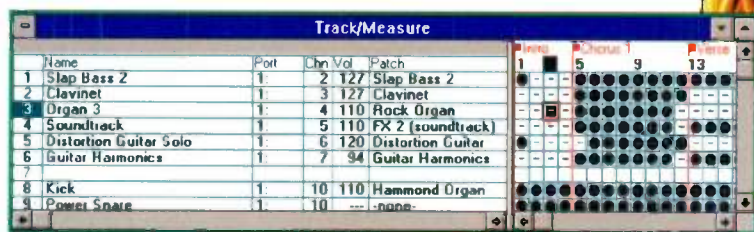


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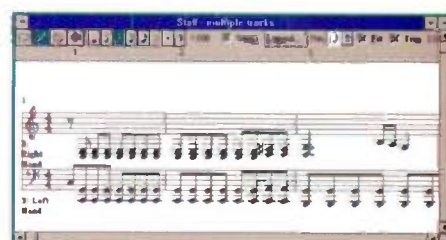
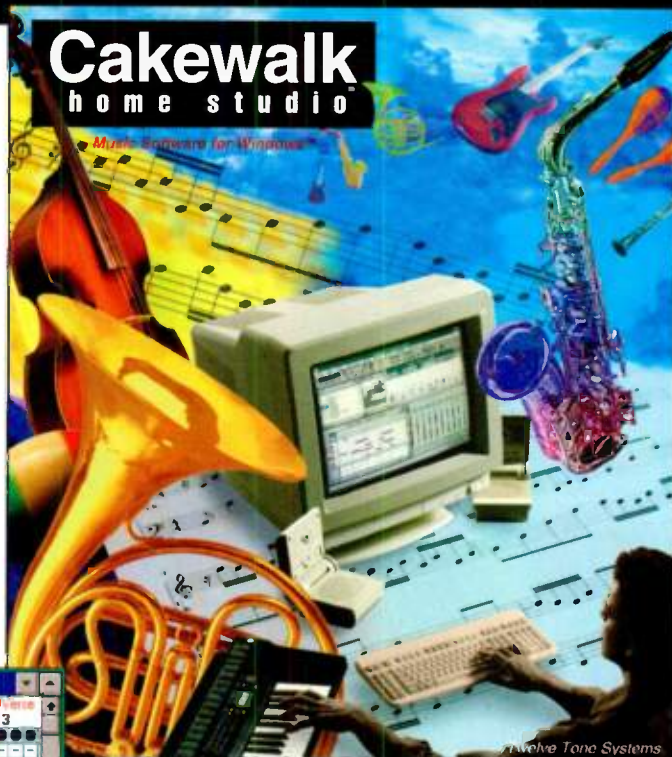
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# Musical



By Dennis Miller

Photo/Digital Imaging  
by David Bishop

WHEN WE LAST COMPARED a group of IBM PC sequencers, the first generation of Windows-based music programs was just appearing, and the IBM MIDI world lagged behind the Mac in nearly every respect. Two or three generations of software revisions have passed since then, and it's safe to say that IBM sequencers have fully matured and now provide all the high-end options of their Macintosh counterparts. Coupled with the dramati-

cally improved performance of PC hardware, it seems clear the PC can be taken seriously as a professional music platform.

We'll take a close look at four leading Windows sequencers: Twelve Tone Systems' *Cakewalk Professional for Windows 3.01*, Passport Designs' *Master Tracks Pro 6.0*, Steinberg's *Cubase 2.61*, and Big Noise Software's *SeqMax 3.0*. We'll also check out a beta version of *Vision/PC 2.0*, Opcode's important





# Windows

Which Windows  
sequencer is right  
for you?

We compare and  
contrast four leading  
programs.

new entry into the PC market, and we'll preview what some of these companies have in store for us in the near future (see sidebars "Op-code Does Windows" and "On the Horizon").

Unfortunately, space prevents us from including several other equally worthy products in the test group, including *WinJammer Pro* (reviewed in the August 1995 EM) and Musicator A/S's *Musicator Win*. (*Musicator* was last reviewed

in the July 1993 EM, and a review of the new audio version is planned.) We also will bypass EMAGIC's *Logic* sequencer, recently ported from the Mac, as it is essentially the same as the Mac version, which EM has already covered in depth (most recently in the May 1995 issue).

All of these programs are powerful, and they share many basic features. Each has a distinct personality with particular strengths

and weaknesses. Of course, I can't possibly cover every option of each program, so you should check out a demo version and, of course, peruse back issues of EM.

## OVERVIEW

Since the last time we looked at Windows sequencers (see "Windows Shootout" in the November 1992 EM), a number of major enhancements have appeared in all of the programs. Among the most





important are standard-notation editing, different types of "groove" processing, support for MIDI Machine Control, and automated faders. Though all of the programs use standard Windows features such as multiple open windows and graphic displays, the implementation of other options varies considerably.

For example, the ability to auto-arrange all open windows, a handy feature when multiple work areas are on the screen, is available in all of the programs except *Master Tracks*. The ability to send e-mail directly from within an application, as required by the new Windows 95 spec, is currently possible only in *Cakewalk*. However, any of the programs should work with just about any Windows-compatible MIDI hardware, including sound cards or stand-alone MIDI interfaces. (I tested both.) In addition, a basic 80386 PC with 4 MB of RAM provides acceptable performance, although a faster processor certainly makes the job more enjoyable.

## RECORD FEATURES

Sophisticated recording options abound in these programs. Each offers auto-punch in/out and record filters as standard options. Multichannel recording onto separate tracks is possible in *Master Tracks* and *Cubase*; *SeqMax* and *Cakewalk* allow you to record multiple channels onto a single track and split the data by channel after recording. *Master Tracks* has only one record mode, in which new material overwrites any existing data on a track. The other three programs allow you to choose between overwriting or merging new data onto a previously recorded track.

*Cakewalk*, *SeqMax*, and *Cubase* also provide variations on "looped recording" with which you can record multiple takes automatically. *Cubase* even allows you to switch tracks while recording. All four programs can manage SysEx data, although *SeqMax* and *Cubase* treat it just like any other data and record it in real time directly onto any track.

If your musical inclinations outweigh your performance chops, you can step-record data into any of the programs. *Cubase* and *Cakewalk* allow you to choose whether stepped notes will be merged with existing notes or inserted between them, while the other two can only merge. *Cubase* and *SeqMax* allow you to input repeated notes easily using the mouse: the former uses a Draw tool for this purpose; the latter lets you drag in the graphic piano roll. *Cubase* also has a Fill option that automatically fills a predetermined area with notes of a given value.

*Cakewalk* lets you build elaborate rhythmic patterns that determine the duration of successive notes; up to 64 notes can be used to create a pattern. The program also comes with a stand-alone Virtual Piano, which is an onscreen keyboard that you can use to enter notes. *Cubase* has an onscreen piano keyboard integrated into its Key Edit window, while *SeqMax* provides an onscreen piano from within its Step Record window. *SeqMax* also has the ability to step backward through a sequence.

## EDITING OPTIONS

All four programs offer endless options for tweaking your music, including familiar tools such as transpose, Velocity scale, fit time, and quantize. In *Cakewalk*, *Cubase*, and *SeqMax*, these and similar options can be previewed in real-time during playback before being applied to the data. *Cakewalk* and *Cubase* offer one-step, drag-and-drop editing, while *Master Tracks* and *SeqMax* are limited to the more traditional cut, copy, and paste. All except *Master Tracks* offer ready access to editing commands through the right mouse button, in addition to being able to access commands from menus and through keyboard shortcuts.

In *Master Tracks* and *Cubase*, you can edit any vertical range of notes just by highlighting them. For

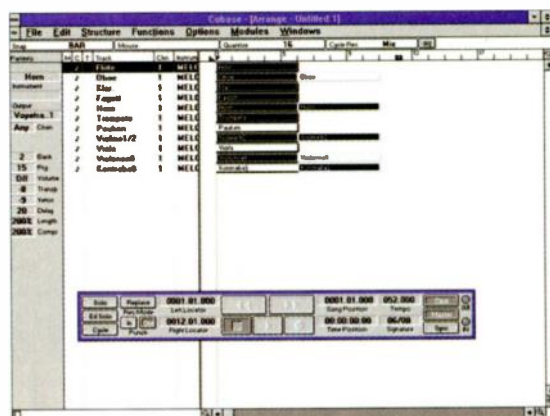


FIG. 1: *Cubase*'s Arrange window can be used to manipulate Parts, alter playback parameters, and set up MIDI routings on each track.

example, a range could consist of the octave C2 to C3 within a set measure. The other programs can accomplish this using edit filters, but the drag-select method is much easier. *Cubase* also provides a useful feature for editing existing note values from a MIDI keyboard: point to any note from within an Edit window, play a note on your keyboard, and the existing note will take on the pitch and Velocity of the note you played.

*Cakewalk* has the most elaborate Undo option: you can configure a History list of more than 100 different moments in your working session and return and undo any specific action by selecting it from the list. The others offer just a single level of Undo, although *Cubase* also allows you to undo all changes made to an open window. All of the programs except *Master Tracks* also offer a configurable Auto-Save option.

Groove processing has become one

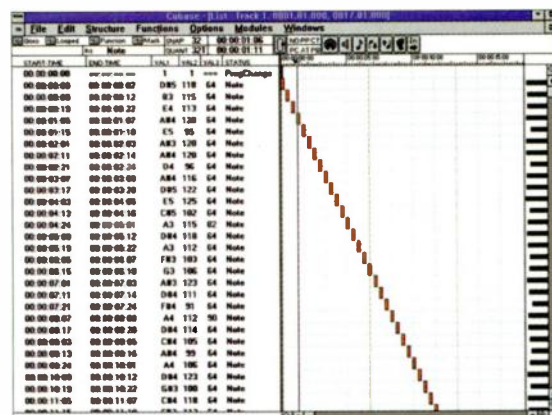


FIG. 2: The List Editor in *Cubase* combines a graphic view with a text-based display of all data in a track.





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of the most popular options around. *Cubase*, *Cakewalk*, and *SeqMax* allow you to define a phrase that can be used as the rhythmic grid on which other data can be mapped. If you've improvised a line with a particular rhythmic feel to it and want that feel applied to some other data, groove processing is the way to go. You can also apply predefined grooves, included with each of the three programs, to achieve similar effects. *Master Tracks* has a more limited approach: its Swing option can alter the rhythmic feel of notes within a selected range.

All four programs provide edit or "change" filters for determining what type or range of notes is altered during edit operations. *Cubase*'s Logical Edit screen is somewhat different from the others, however, in that you actually perform the edits there. The range of options it provides is massive and includes various types of mathematical processing, such as inverting all values or "flipping" them around a central axis. Once you come up with something you like you can save it as a template for later reuse.

One final option that has been upgraded significantly in this round of programs is drum editing. All of the programs except *Master Tracks* have dedicated windows or specific edit features for handling drum parts. Both *SeqMax*, through its bundled drum pat-

terns, and *Cakewalk*, with its sample drum files, include actual data to get you running even quicker.

## PLAYBACK OPTIONS

Each of the programs uses the familiar tape-transport approach for playback, though here, as elsewhere, the specific features vary considerably. All four can loop individual tracks while other nonlooped tracks play back, and *Cakewalk* and *Cubase* allow you to set the number of times a track will repeat. *Cubase* has the ability to define a segment of any arbitrary length for looping, and if you convert that segment to a Part, you can set a specific number of repetitions.

*Cakewalk*'s AutoShuttle option allows you to play the entire sequence repeatedly between any two points. Again, *Cubase* goes one better by offering "nested" repetitions in which segments of individual tracks play through while other areas of the sequence loop. For example, you could have beats 1 through 3 of measure 2 in track 4 repeating continuously while measures 1 through 6 of tracks 1, 2, and 5 loop. If you have more than one part on a single track, you can even loop each part individually!

All of the programs except *Cakewalk* provide fast-forward buttons for accelerating playback. (In *Cubase*, you can drag the mouse to slow down or speed up while fast forwarding.) *Cakewalk* has two programmable transport-control buttons that can be used to switch instantly to two alternate tempi. A similar result can be accomplished in *Cubase* by entering an alternate tempo in the Mastertrack and then toggling the Mastertrack on and off.

Another useful option is *Cubase*'s and *Cakewalk*'s Scrub feature, which allows you to scroll playback forward or backward through a single track. *SeqMax* allows forward scrubbing only, but you can adjust tempo in real time using external MIDI controllers such as a wheel or dataslider (something I've never seen before on a PC sequencer).

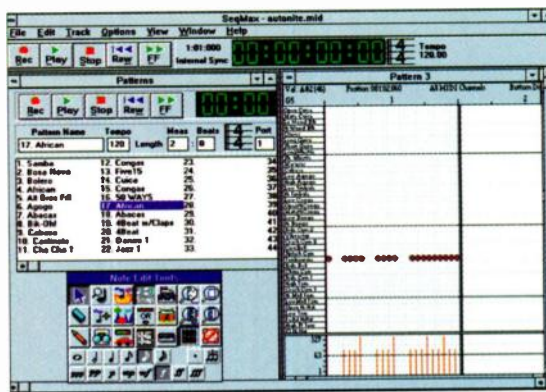


FIG. 4: The Pattern List in *SeqMax* holds up to 255 patterns that can be arranged in any order.

*Master Tracks* is the only program that has specific buttons on the transport bar to move instantly to the beginning or end of a sequence. Both it and *Cakewalk* have the ability to display time in an oversized window, which is very useful if your PC isn't close to your keyboard. *SeqMax* has an option for playing back setup information, such as SysEx data, before any notes are sent, while *Cakewalk*'s Auto Bank feature allows you to automatically send SysEx data when a file is first loaded.

One of the major enhancements in this group of sequencers is the appearance of recordable faders. These can be used to automate mixdowns or control synth parameters in real time. *Master Tracks* has a fairly straightforward approach: the individual faders appear on the main screen alongside other track settings. *Master Tracks* has a recordable Master Fader that can float anywhere on the screen, while a similar fader in *Cubase* is accessible from a Mixer window. To achieve the same effect in *Cakewalk* or *SeqMax*, you could group multiple faders, but that's not nearly as easy. However, *SeqMax* has a nonrecordable master slider in its Track Mixer window.

The MIDI Automation module that ships with *SeqMax* provides an entire screenful of programmable buttons and sliders and includes templates for several specific devices, such as the Mackie OTTO and Lexicon LXP-5. There's also an option to redesign the Mixer window completely and add or remove any buttons or sliders you choose. *Cakewalk*'s Fader window is equally useful and includes several preset ganging options that allow you, for example, to crossfade smoothly between tracks. *Cubase* also provides a

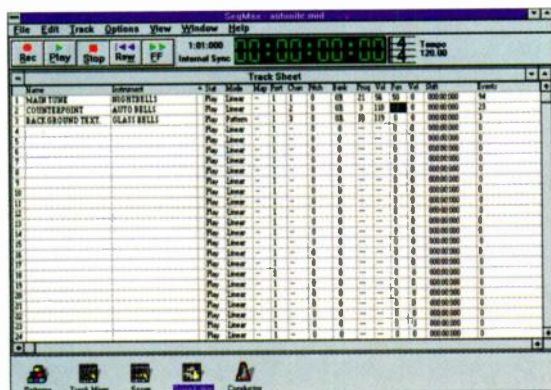


FIG. 3: *SeqMax*'s Track Sheet can be used to change track parameters and perform large-scale edits.





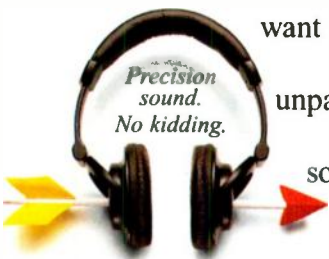
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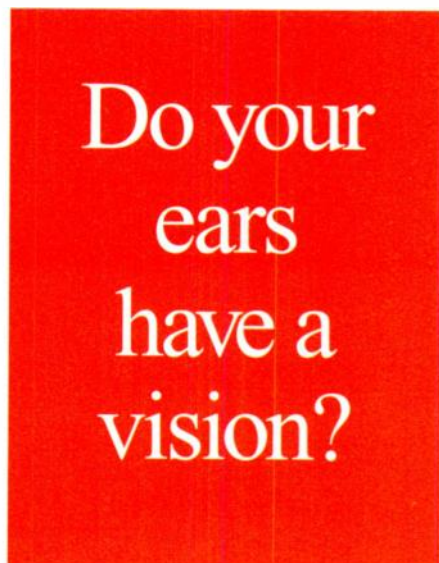
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All of the programs support playback of WAV audio files along with MIDI data. *Cakewalk* wins the prize for the easiest implementation: just select "Wave file" from the Insert menu and add the file wherever you want. *Master Tracks* uses an elaborate MCI window, which provides access to all the different types of MCI options Windows provides, while *SeqMax* simply requires you

to type the MCI command "Play" into the Event List, followed by a file name. (At the time of this review, *Cubase* required another add-on called WavePlayer, which I was unable to test. It is now included free of charge with the program.) For live sets, you'll also find capable Song List options in *Master Tracks*, *SeqMax*, and *Cakewalk*, while *Cubase* allows long strings of sequences to be chained together via its Song Mode.

## NOTATION AND PRINTING

Though all of the programs provide functional standard-notation views and printing, none has the capabilities of even an entry-level notation program. Still, many musicians will appreciate the ability to see their music as notation. All of the programs except *Master Tracks* allow you to view multiple tracks as standard notation: up to 64 tracks in *SeqMax* and 24 in *Cakewalk*. Avail-

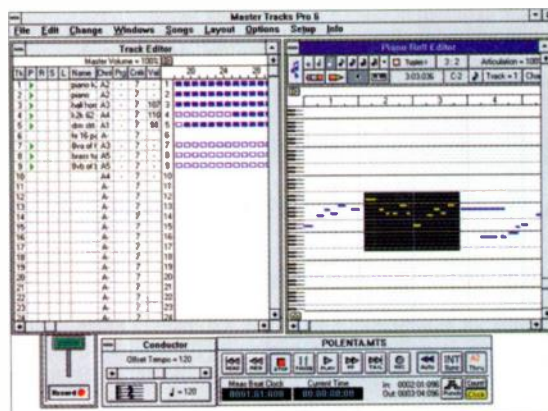
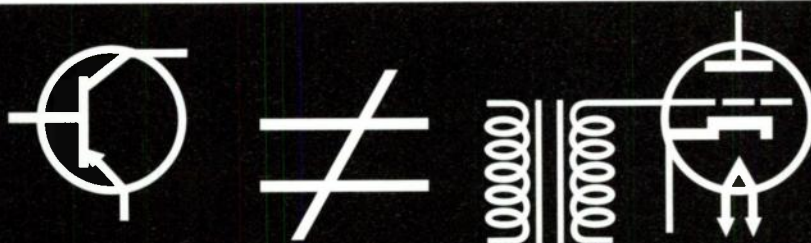


FIG. 5: Any range of notes can be selected for editing in *Master Tracks Pro* by clicking and dragging with the mouse.

able system memory seems to set the limit in *Cubase*, where I was able to display fourteen tracks on a system with 16 MB of RAM and a 20 MB swap file. (Your screen resolution will determine how many staves can appear at once.)

*SeqMax* has the best selection of symbols, including numerous articulation and dynamic markings, but these are for appearance only and do not change



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the underlying MIDI data during playback. None of the other programs displays any marks other than pitch and rhythm, though lyrics can be added in all except *Master Tracks*. *Cakewalk* has a dedicated screen for entering lyrics that is about as easy to use as any I have seen, while *SeqMax* allows you to import entire text files and turn them into lyrics, with good results. In *Cubase*, lyrics are a bit trickier, as you have to create text blocks underneath every staff and enter the text manually.

All of the programs let you set a display quantization, staff-split point, and "octave display" (for changing the register of the notes onscreen), and in *SeqMax* and *Cubase* these can be applied on a track-by-track basis. Overall, *Cakewalk* and *Cubase* have the most display-configuration options, including the ability to shorten note durations so they don't overlap. *Cubase* also offers other, more advanced options, such as its Explode feature, for splitting the notes in a chord out to individual tracks.

## DOCUMENTATION

*Cakewalk* easily takes first place for best documentation. With a thorough and

well-organized manual, complete with numerous tutorials, you can't ask for more. *Cakewalk*'s online help is also extensive, as is *SeqMax*'s; the latter has context-sensitive help for nearly every screen. Neither *Master Tracks* nor *Cubase* offers any help from within the program, and the manual I received for *Master Tracks* had no index. All of the programs are supported online via CompuServe, and Steinberg's tech staff are often found lurking on the Internet in various music groups.

A true sign of the sequencer industry's maturity is the availability of third-party instructional videos for three of these programs. Blackwell and Martinez have produced an excellent two-part series for *Cubase* that moves at just the right pace. EVS has produced a tape on *Master Tracks Pro*, as well as a five-part series on *Cakewalk*.

In the section that follows, I'll cover each program in greater depth. Before reading further, however, you might want to look over **Table 1** ("Windows Sequencer Features") to get a quick overview of each program.

## CUBASE

Of all the programs I looked at, I developed the most complex relationship with *Cubase*. Although it is a massively powerful program with a seemingly end-

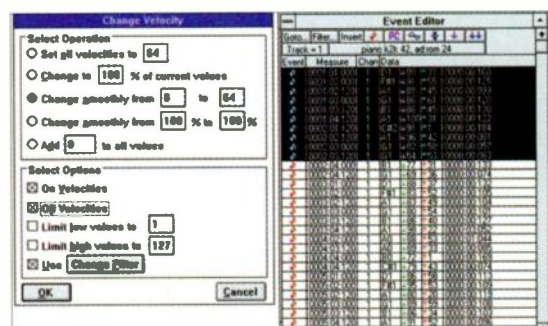


FIG. 6: Data can be altered using the different scaling options found in *Master Tracks*' Change menu.

less number of useful features, it was the only program to crash during the review period, and it did so on several occasions. Following the recommendations of the manufacturer, I updated both my MIDI and printer drivers and switched to standard Windows SuperVGA display drivers. Although that helped, I still had unexplained crashes.

Just to be sure the problems weren't unique to my particular computer, I tested the program on a second PC. Once again, I ran into trouble, this time with the dreaded dongle, a hardware key that is needed to run the program. The key attaches to the computer's parallel port, but on this machine, the program wouldn't run unless the printer (a Hewlett Packard LaserJet II) was connected and turned on, a pointless waste of energy and time. (The manufacturer recommends a fix that I was unable to employ.)

Because it has far more real-time capabilities than most other software, *Cubase* places special demands on the host system. As a result, the program seems less tolerant than most, which could mean you'll have to tweak your system to get it to work.

Still, once it's working, *Cubase* is powerful indeed, and it towers over the others in its range of options. Most notably, *Cubase* provides two additional structural layers. One of these allows you to work on chunks of data called Parts, which are smaller than individual tracks, and the other combines entire multitrack sequences (or Arrangements) into larger forms called Songs.

*Cubase* also has the most advanced grouping capabilities, with which you can combine arbitrary Parts and perform numerous global operations. The program offers a number of useful shortcuts for configuring your system, and its powerful Interactive Phrase

## WINDOWS SEQUENCER FEATURES

	<i>Cakewalk Pro</i>	<i>Cubase</i>	<i>Master Tracks Pro</i>	<i>SeqMax</i>
Simultaneous Tracks	256	1,024*	64	64**
Dedicated Pattern Editor	no	no	no	yes
Max Clock Res. (ppqn)	480	384	240	480
Max Channels	256	512	256	256
Groove Quantize	yes	yes	limited	yes
WAV File Playback	yes	yes	yes	yes
Song List	yes	yes	yes	yes
Master Fader	no	yes	yes	yes (play only)
MIDI Mixer Screen	yes	yes	yes	yes
Real-time Editing	limited	yes	yes	yes
Copy Protected	no	yes (dongle)	no	no
SysEx Editing	yes	yes	no	yes
Price	\$349	\$349	\$149	\$299

\* Sixteen Arrange screens with 64 tracks each

\*\* Up to 512 tracks w/multiple instances



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Synthesizer offers live-performance capabilities that none of the other programs even approaches.

Though many of its basic features are intuitive, less-traditional functions impose a steep learning curve. The program would be well served by a thorough editing of the manual and the addition of tutorials.

*Cubase* works its magic in several main work areas. The Arrange window (see Fig. 1) is a configurable screen for setting up track routings, viewing and editing Part data, and altering parameters in real time. These parameters include some not found in any other program, such as Length for changing the duration of notes from 25 to 200% of their value and Compression for scaling Velocity, also using percentages. Like other settings, the parameter values can be easily changed using mouse buttons or key combinations, and if you decide you want them applied to the data permanently, just select Freeze Play from the Edit menu.

Unlike the other programs, *Cubase* allows you to designate several different types of tracks, such as MIDI, Drum, Mixer, and Tape. This provides you with a highly integrated work environment, as you can manipulate different types of data from the same central screen. For example, if you record a bunch of fader moves in the Mixer,

that data appears as a Part on the Arrange screen. You can then copy, paste, cut, or move the Part like any other, allowing you to easily duplicate the exact fader movements anywhere else in the sequence.

The second major work area is a series of windows called the Editors. Here you'll find the familiar piano-roll view. In most cases, there is an Editor dedicated to each track type, although you'll also find a List Editor that integrates an event list with a graphic display (see Fig. 2), a Score Editor, and a GM/GS Editor for General MIDI devices.

Most of the Editors share certain basic functions, such as the ability to make selections based on different criteria and to view or edit controller data. Each also has features optimized for one type of data. The Drum Editor, for example, has a large number of settings that allow you to individually control quantization levels for every note number, map any note coming into the program to an outgoing note, and customize Velocity levels. In conjunction with *Cubase's* versatile note-entry and editing tools, which appear in a menu when you click the right mouse button, you can build elaborate drum patterns in very little time.

Of all the programs, *Cubase* offers the most advanced MIDI processing options, available through both its extensive Quantize functions and its versatile Interactive Phrase Synthesizer (IPS). After several hours of experimentation, I managed to get a good grasp on the IPS and was able to generate endless variations on a short melody I composed. These variations were created in real time but were recorded back into the program and saved along with

other data. After some editing in *Cubase's* Score Editor, I printed them out, and I now have over ten pages of melodic sketches to use in a piece I'm writing.

## SEQMAX

Although it doesn't have the name recognition of the other programs, *SeqMax* is a solid competitor, and the well-integrated suite of MIDI applications it ships with is an exceptional value. Running under a central shell called the MaxPak Control Center,

you'll find the sequencer, a highly customizable MIDI mixer called MIDI Automation, a song-list program, a dedicated synth librarian, and a program for controlling audio or video tape decks that respond to MIDI Machine Control (MMC). An included bonus disk contains additional smaller utilities, such as a MIDI-data viewer and SMPTE calculator, making for a thorough set of programs.

All of the time-based applications can be locked to a central timer, so you can run them simultaneously. You can also run multiple instances of *SeqMax* (up to eight), giving you hundreds of tracks to work with.

*SeqMax's* main screen, the Track Sheet (see Fig. 3), is clean and uncluttered and displays numerous adjustable track settings. At the bottom of the window are icons that take you to other areas of the program. It's easy to arrange the whole window to your liking and save that layout to disk.

*SeqMax* is unique in supporting both linear and pattern-based sequencing, and it integrates the two very well. You load 1 to 255 patterns in the Pattern Editor (or record new ones) and then add them in any order and as many times as you like into any track's Pattern List (see Fig. 4). The track you've specified plays through the patterns, while other tracks play linearly, and you can apply any of the same real-time changes to the pattern track that you might use on the linear ones. A separate Links Editor allows you to build similar playlists from entire tracks.

Editing options are numerous and include all the familiar tools, plus a few custom ones, such as Harmonize, which allows you to create a new line of notes or Pressure events from a single line. The Humanize feature also adds a unique touch, allowing you to randomize controller events, as well as note start times, durations, and Velocity. Another group of useful Controller Transforms functions allows you to limit, scale, shift, thin, smooth, and invert data in numerous ways.

I particularly like the consistency of the various Edit windows; you'll have no trouble figuring out how they work, even without the manual. The ability to save Edit Filter setups, which only *SeqMax* allows, is an especially useful option. *SeqMax's* "floating toolkit," which appears when you click the right mouse button, also provides access to

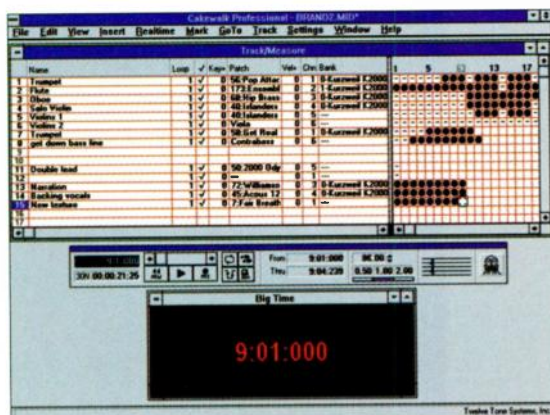


FIG. 7: *Cakewalk's* main screen provides an overview of all track data and playback parameters.



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far more functions than the other programs. I found this saved lots of time.

*SeqMax* handles SysEx data particularly well. Not only can you record it in real time directly into a track but, using the Event List, you can edit it, too. Open the View icon from the Event List's Toolbox, and you'll find numerous types of data listed, which you can view or hide in the Editor. Select SysEx, and the data appears in the list along with your other choices.

The Score Editor is another flexible work area. It's easy to customize the display using different fonts for notes, lyrics, and markings, and you can easily change score width and measures per staff on a track-by-track basis. Of the four programs, *SeqMax* has by far the longest list of music symbols; all are accessible from a Toolkit called up by the right mouse button.

## MASTER TRACKS PRO

Keeping up with the Joneses is often the name of the game in the software world, and *Master Tracks Pro* is finding that hard to do. After a fairly long stretch since the previous release, version 6.0 has managed to add a number of important new features, but it still falls short in certain key areas.

*Master Tracks* has neither the pattern features of *SeqMax* nor the real-time processing capabilities of *Cubase*. Still, it remains a solid performer and provides a highly functional feature set under a well-designed interface. At a list price of just \$149, it's the least expensive of the four and clearly an excellent bargain if you don't need the more advanced options it lacks.

Among the new features in 6.0 are a recordable master-volume control, optional Velocity display (called Velocity Tails), a snap-to-grid feature in the piano-roll editor, and improved notation editing. *Master Tracks* shares with *Cubase* the ability to highlight any range of notes, even just a few events within a measure, and alter them using any of its editing functions (see Fig. 5). Combined with

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numerous other time-saving selection options, such as the ability to select an entire measure with one click, editing is quick and easy. Access to more edit functions using keyboard shortcuts or perhaps right mouse-button options would be handy, though.

*Master Tracks* is the only program that allows you to open multiple files directly into multiple windows simultaneously. I found this especially useful when I was building some complex drum tracks and wanted to combine patterns from several different files. Its Marker options also provide excellent tools for navigating through sequences.

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*Master Tracks'* editing functions, accessed from the Change menu, are quite robust and include a number of time-based operations. I especially like the fact that Fit and Scale Time appear as separate options, and the program has no problem with complex ratios, such as changing a range of measures to  $\frac{1}{2}$  of its existing length.

Although several of the other programs allow you to alter parameter values using percentages only, *Master Tracks* often provides several options. For example, in the Change/Velocity menu, you can choose to set all Velocities to a single value, change values by a fixed percentage, scale between a start percentage and an end percentage, or add a set value to the entire range (see Fig. 6). You can also use *Master Tracks'* Change filter on any operation to limit the notes that get altered by defining pitch, duration, or Velocity ranges, or set the criteria based on a note's start time. Virtually all edits can be performed while a sequence is playing.

*Master Tracks'* notation editing is basic, which is ironic because the company also makes the highly regarded *Encore* notation software. There are only a few score-setup options, and you can only see one track at a time, but the printout is usable for quickie output.

A Remote Control feature has some handy options. You can perform most transport functions using user-defined MIDI note triggers, or change numerous step-record options remotely. While the other programs have extensive synth-librarian support, *Master Tracks* hasn't updated its list of supported devices in some time, and you won't find much help if you own, for example, a Kurzweil K2000 (which has been around for years) or even a recent Korg model. Though you can use the Generic device as a blank template and build your own patch list, I'd prefer to see more synths included.

## CAKEWALK PROFESSIONAL

*Cakewalk Professional* has long been a best seller among PC sequencers, and version 3.01 should help it keep that leadership position. Its well-designed interface provides ready access to many of the most

common features musicians need, and with its thorough Windows implementation, users of other Windows programs will feel right at home.

*Cakewalk's* flexible Key Bindings feature allows you to customize the program by specifying what keystrokes you would like to use for nearly any command. Combined with CAL macros, with which you can record and play back long strings of keystrokes and create new editing features, you have almost total control over how the program responds to your input.

Like the other programs, *Cakewalk Pro's* main screen consists of a track layout area and a measure-by-measure view of your data (see Fig. 7). You can change the arrangement of any of the track headings so only the ones you choose are displayed, and this arrangement, plus any default parameters you wish to set for one or more tracks, can be saved as templates. (Templates for numerous ensemble combinations are also included with the program.) You can also sort the tracks using different criteria, including name, channel, and port.

Clicking the right mouse button in the main screen brings up a small dialog window from which you can move to any of the program's other five major work areas. Once you're in a work area, you'll find tools dedicated to that window's task that supplement the commands available from the main menu line.

The Piano Roll window, for example, provides a keyboard template along the left edge of the screen for previewing individual notes (see Fig. 8). Click once on a key, and you'll trigger a note on your synth; double-click, and you can

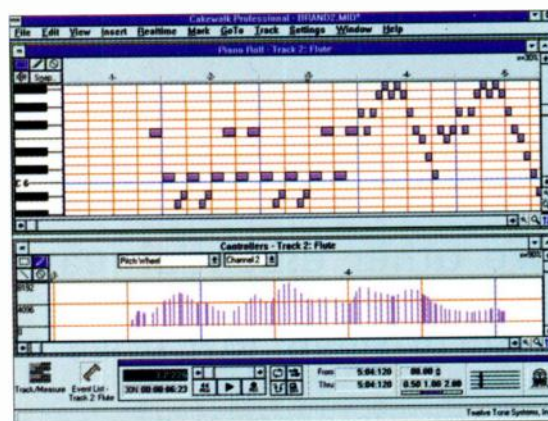


FIG. 8: The Piano Roll window in *Cakewalk* provides ready access to individual note parameters.



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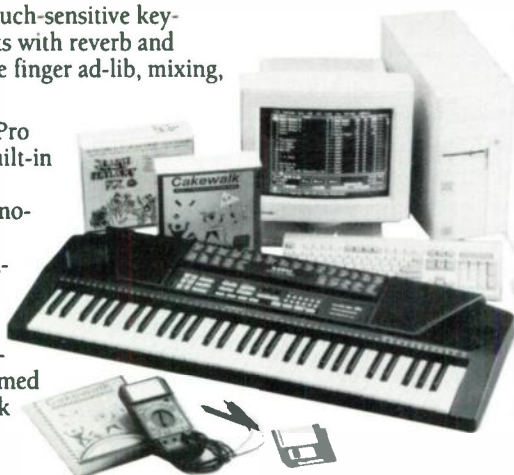
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drag all the instances of that pitch in the selected track up or down. This drag option is a great tool for selecting or remapping drum notes; you can hear each note as you move across it. (You can also choose to display drum names instead of the piano keyboard.) If you click on the keyboard with the right mouse button, you move to an instru-

ment-definition dialog. Here, you can select a new instrument to override the setting on the main track screen or set up an entirely new bank of patch names. This type of ready access to related work areas is typical of *Cakewalk* and demonstrates the program's logical and thoughtful layout.

*Cakewalk's* graphic editing tools are

## ON THE HORIZON

PC-based musicians have long felt somewhat underpowered compared to their compatriots on the Mac. Until now, integrated MIDI and digital-audio editing was a key application PC users could not enjoy. That's about to change. All four companies discussed in the main article have exciting plans for such products on the PC, as do Opcode (*Studio Vision Pro*), Musicator A/S (*Musicator*), and EMAGIC (*Logic Audio PC*). This development will finally validate the PC as a platform for the serious audio professional.

Passport has announced plans for *Signature*, a product aimed at a broad range of users. While certain aspects of the program will retain the general flavor of *Master Tracks*, the program appears to more closely resemble Passport's now-defunct *Producer*. On a single overview screen, you'll be able to manipulate MIDI, digital audio, and video elements (through AVI files), while more detailed destructive editing will occur in dedicated editor windows for MIDI and audio. An

integrated mixing console will let you adjust track faders, pan, reverb, and other parameters.

Twelve Tone Systems plans to seamlessly integrate digital audio into the next version of *Cakewalk*, providing a smooth transition for current users (see Fig. A). Audio data will be represented like any other data on the main track screen, and the program will have a more flexible structure, allowing you to work with segments of data not bounded by measure borders. A dedicated window for viewing and editing audio will provide instant access to recording options. Loading preexisting WAV files will be as simple as dragging a file from the File Manager and dropping it onto the screen.

*Cakewalk* will not offer all the features of a dedicated WAV editor. However, it will provide such processing tools as normalize, EQ, and crossfade, plus a scrub feature and an envelope option that will let you draw curves right on the waveform display, in real time. You'll also be able to split a long wave-

form into chunks, which should make synchronizing audio with MIDI much simpler. *Cakewalk 4.0* will be available for generic Windows sound cards and for hardware such as Digi-design's Session 8 and Spectral's Audio-Prisma. The number of audio tracks will depend on drive speed, but the demo I saw managed to record eight mono tracks on a '486/66, using a hard drive of modest speed.

Steinberg has announced several PC audio and MIDI programs. One of them, *Cubase Audio* for the Yamaha CBX D5, has already been released. The program is modeled after the current *Cubase*, but it adds capabilities for managing audio tracks right alongside MIDI data. Not only can audio and MIDI be played and edited, but you can record the two simultaneously!

Like many hard-disk recording systems, *Cubase* allows you to create segments from complete audio files on disk. Segments appear onscreen within Events, where certain playback parameters are defined. Because they merely represent pointers into the audio file, numerous segments can be created from the same source.

A handy feature called the Audio Pool helps manage your data by displaying all the segments currently in use in a project, as well as their source files. You can import previously recorded files directly into the Pool and audition them before laying them into tracks. Some DSP processes will also be included, such as time correction, pitch shifting, and normalization.

Big Noise Software will be releasing a cassette multitrack recorder-style program that will include a screenful of faders, buttons, pots, and meters. Basic editing functions, such as compression and volume changes, will be handled by the program, and you will be able to export files to other WAV editors if you need more elaborate processing. As with the other programs, you will get between two and eight tracks of audio depending on the hardware in your system, and the program will support multiple sound cards.

It's going to be an exciting year for the PC, so keep your eyes and ears open.

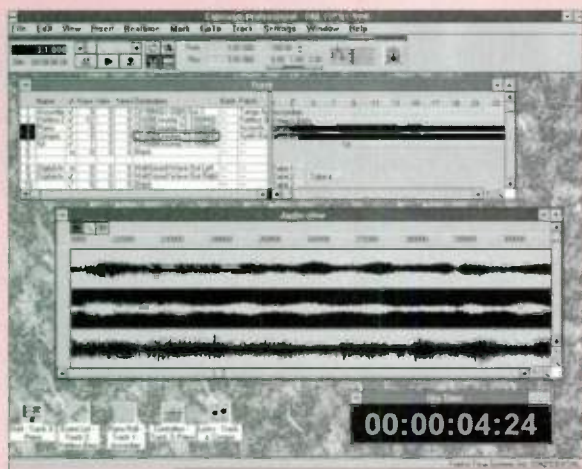


FIG. A: *Cakewalk 4.0* will seamlessly integrate digital audio data with MIDI.



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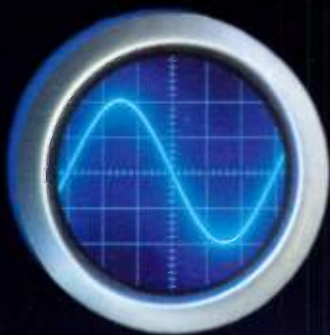
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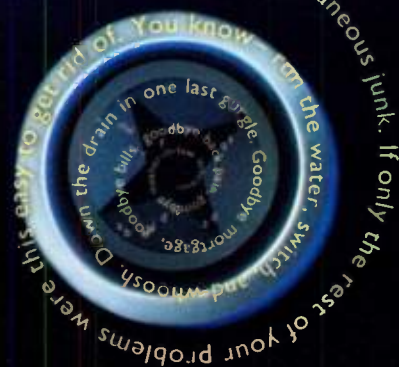
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very flexible and allow you to enter data in broad strokes or minute detail. The straight-line drawing tool is especially handy for drawing linear ramps, and you can also use the mouse to create any shape by hand. Once you've created a graph, you'll find numerous ways to edit it or any other data in the CAL macro menu. These macros are easy to

load and run: just highlight the range you want to operate on and pick the macro from a pull-down menu. I found dozens of cool macros on Compu-Serve and loaded them into the program with no problem.

*Cakewalk's* Staff window is very attractive and allows you to work on individual or groups of tracks: simply

## OPCODE DOES WINDOWS

Opcode Systems is poised to enter the PC music market in a big way. Devoted exclusively to Macintosh products since its inception, Opcode is now in an enviable position to assert its influence on the PC. First, the company has struck a licensing deal with software giant Microsoft to have its Open Music System (OMS) software included as part of the Windows 95 operating system. Although OMS will not be included in the first rollout of Windows 95, it will be available as an extension shortly thereafter. Subsequent versions of Windows will then incorporate OMS as an integral part of the operating system. (For a look at Microsoft's new operating system, see "Windows 95 Preview" in the August 1995 EM.)

OMS provides PC users with MIDI capabilities that only Mac owners have enjoyed until now. In short, OMS familiarizes itself with all the equipment in your studio and shares that information with any music program that might be interested. OMS also provides interapplication communication services. These routines allow you to pass MIDI data directly from one program to another over a "virtual" data bus.

For example, if your WAV editor allows you to trigger playback of audio files using MIDI notes, you could run the editor and a sequencer simultaneously and schedule all the note events in your sequencer. Alternatively, you could send the output of your sequencer directly to your notation program and transcribe any real-time parameter changes you might make as the sequencer plays.

The second main aspect to Opcode's plan is that it will roll out an integrated suite of Windows software and hardware. In addition to OMS, the

release will include the company's top-rated *Vision* sequencer, *Galaxy* universal librarian, and Studio 4 multiport MIDI interface. This integrated offering will provide a highly automated and intelligent environment for music production that should appeal to both new PC users and seasoned pros who want to update their computers' music systems.

At the center of the Opcode package is *Vision/PC* 2.0, a professional sequencer that enjoys a reputation as one of the most bullet-proof programs around. I spent some time with a late beta version of *Vision/PC* and was very impressed. The program

MIDI and digital audio program for the Mac, *Studio Vision Pro*, will solve that complaint.) With the exception of those two features, there's little missing from *Vision/PC*.

*Vision/PC* has a versatile architecture that allows you to work with your music in many different ways. Like other programs, its main screen is oriented around a multitrack, multi-channel display, but that's just the start.

On any track, you can create a Subsequence, which is similar to a Part in *Cubase*, but in this case can actually be an entire multitrack, multichannel sequence! This type of "nesting" al-

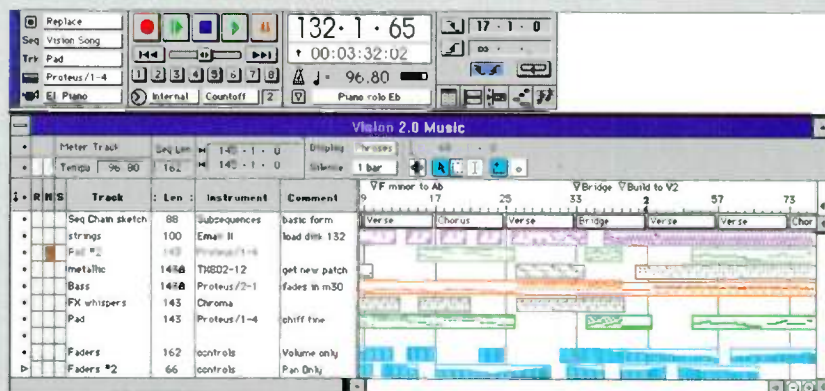


FIG. B: Each of the phrases in the *Vision/PC* track overview contains a tiny piano-roll display.

provides many of the real-time features *Cubase* offers, but *Vision/PC*'s features are accessed from within a more integrated and intuitive interface. And while the program doesn't have the dedicated Pattern editor of *SeqMax*, it offers much of the same functionality in slightly different form.

On the down side, *Vision*'s notation capabilities are just average, and it does not support playback of WAV audio files. (A future port of Opcode's highly acclaimed integrated

allows you to work with large blocks of multitrack data and move, copy, or delete them as easily as a single note. Subsequences can also be expanded into their "host" sequence with the data from the two being merged track by track, and they are very useful for setting up loops of any length at any arbitrary point in a file.

*Vision/PC*'s Strip Chart, a sizable area that appears at the bottom of the Graphic and Notation Editor windows, lets you work with the controller



highlight the tracks you want to work with in the main screen, and they appear on the staff page. It's easy to transpose instruments: just enter the note data in concert pitch, then use the Key+ parameter on the Track screen to transpose it automatically. You can't zoom in or out from this screen, but if you want to see how an entire staff page will

look, choose the Print Preview option, and you can see your entire score before you print. *Cakewalk* supports nine different "raster measurements" (standard staff sizes) and has especially nice-looking printed output.

#### SUMMARY

Because different sequencing jobs and

information, note parameters, and other types of data. Although this type of feature is fairly standard in the programs we've looked at, the editing options it contains are not. First, the Strip Chart lets you define with great precision which data will be altered. Not only can you define a range of notes or tracks, you can limit the edits to certain parameter values without using a separate edit filter. And you can make adjustments to the data of the selected type in numerous tracks simultaneously.

One of my favorite features is the Pencil Tool, with which you can apply various preset shapes or work entirely freehand. In addition to a simple line tool, the Pencil can be configured as a parabola, with inward or outward curves; a flat line for quickly drawing horizontal lines; or a random-value generator. If your drum part needs just a bit of "humanizing," you can use the random tool to alter a range of Velocity values by just a slight amount.

One thing that continually struck me while looking at *Vision/PC* was the program's musicality. It seems the developers went out of their way to ensure that the program worked the way most people actually write music. This is demonstrated in many ways.

For example, most sequencers provide you with a track overview that represents measures as short, small bars. Although this is useful for large-scale editing, it doesn't give you much information about how the music in those measures is structured. *Vision/PC*'s Track Overview not only allows you to view track data as "phrases," but each contains a miniature piano-roll display of the actual note events in the phrase (see Fig. B).

Suppose you record a track that consists of several phrases of differing lengths. In most programs, you could go into the piano-roll view, zoom way out, and try to find the various phrase start and end points. *Vision/PC* automates the whole process. Using a Silence Threshold, it automatically detects where the breaks are in the music and groups the data accordingly, so what you see on the screen is a clear musical representation of your track.

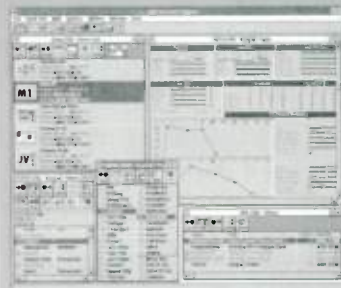
Of course, if you prefer the traditional measure-by-measure view, it's there. But you can also configure the display to show segments of any duration between an eighth note and full 16-measure blocks! This gives you great editing flexibility if, for example, you want to alter the Velocity of just the second phrase of the bass line or cut out the middle four eighth notes of a drum part.

Many areas of the program are optimized for real-time functions or live playback, including an elaborate, playlist-style feature called Players. Players allow you to trigger entire sequences or even multiple sequences simultaneously using key strokes you've previously defined. You can set up a huge string of sequences, up to sixteen in each of nine different Players, to play sequentially. You can also perform most edits in real time and move instantly to any of nine user-defined cue points.

Combining this type of versatility with flexible architecture and well-managed MIDI device support, Opcode's *Vision/PC* is a powerful windows program that will represent a formidable challenge to existing PC software. Upon its arrival, things should really heat up in the PC sequencer wars.

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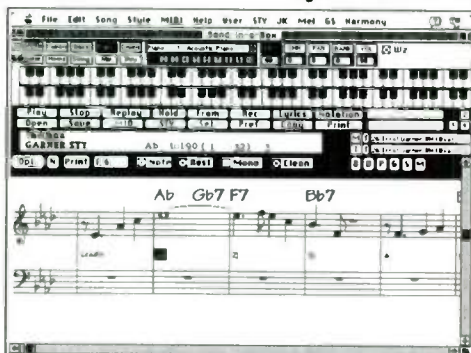
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different working styles demand different tools, singling one of the programs out as the winner is not practical or desirable. That's not to say that each doesn't have strengths that make it particularly well suited for certain uses and users. Here are some suggestions to help you decide which one is best for you.

With its superb implementation of the Windows interface, *Cakewalk* is the easiest program for users of other Windows programs to become acquainted with. It also has a thorough feature set, including the best handling of lyrics and sophisticated librarian functions. *Cakewalk's* well-integrated interface makes it especially easy to use, and it offers options that musicians at all levels will appreciate.

For anyone who likes software "suites," *SeqMax* is a good choice. It makes especially good sense for musicians who work with patterns, and if you need an enormous amount of tracks to work with, it's definitely the way to go.

Once past its initial setup problems, *Cubase* packs an extremely potent punch and has real-time capabilities you won't find elsewhere. Even if real-time MIDI processing isn't your game, the program's range of features is so vast you'll probably find what you need. For simpler MIDI projects, however, it could easily be overkill.

Finally, there's *Master Tracks Pro*. I've known and worked with the program for years, and it always did everything I needed and then some. It's inexpensive, easy to use, and provides all the basic features you'll need for most sequencer projects. However, it clearly has fallen behind the pack, particularly in the areas of notation and groove processing. I hope Passport will catch up and add other features soon, but for now, it comes up short by comparison. If price is an issue, however, it is a good choice.

**Dennis Miller** will be returning to his teaching job at Northeastern University after a one-year leave.

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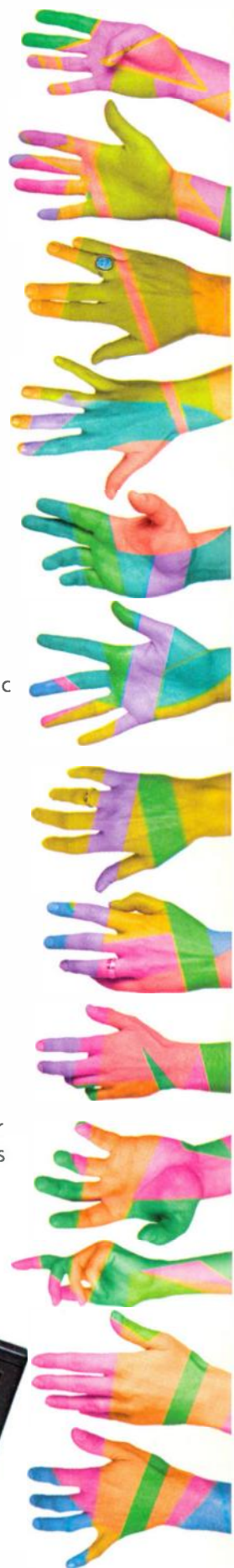
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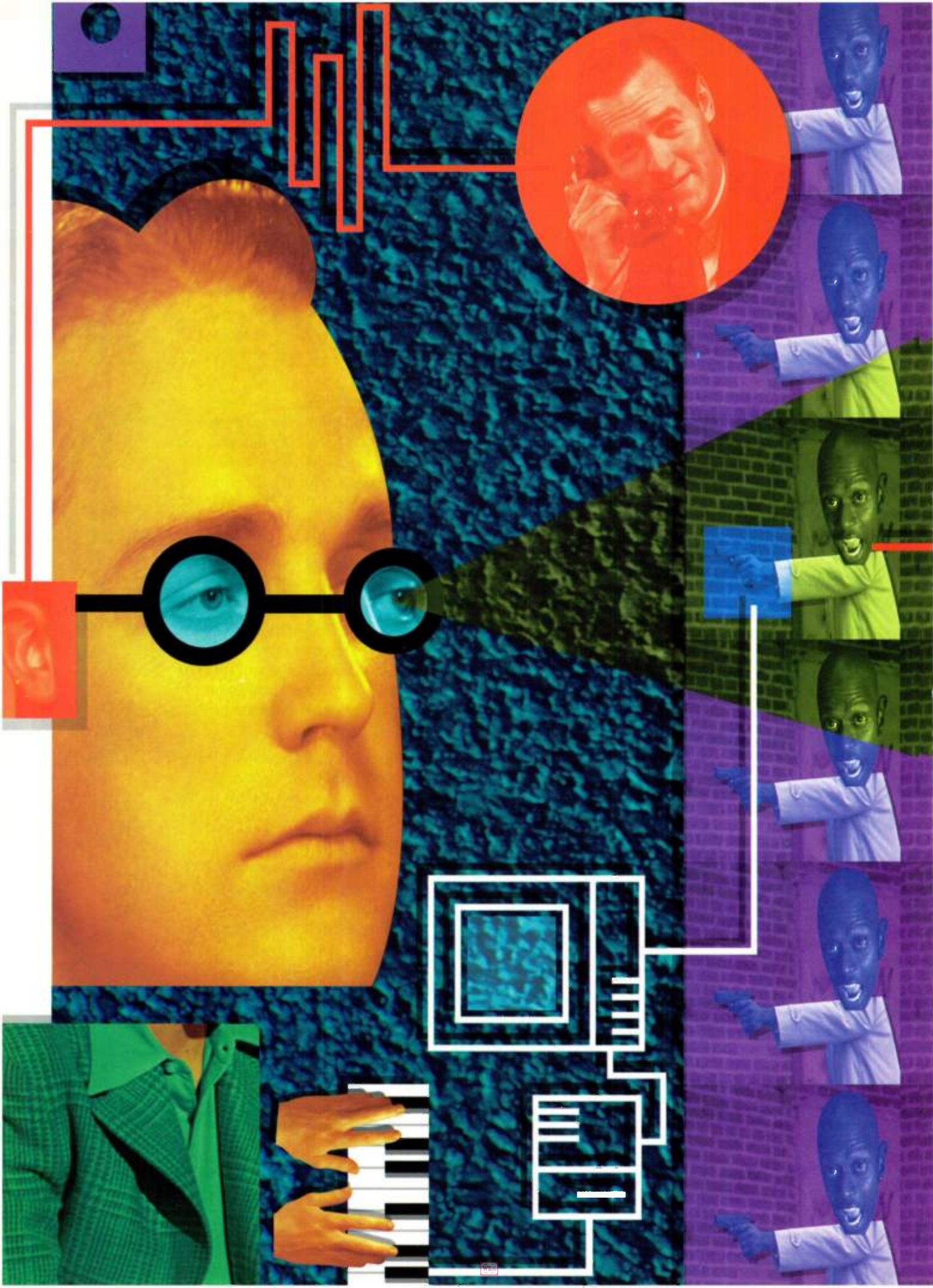


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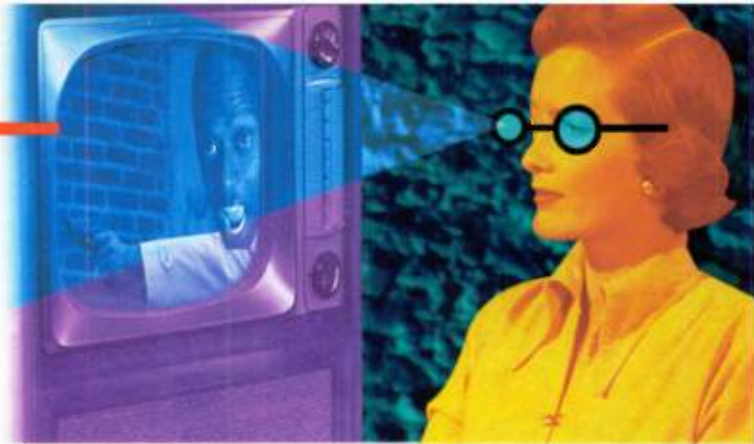








By Daniel Levitin



# Homicidal MANiAC

**D**ATELINE: MANHATTAN. Working feverishly inside his personal studio, composer Douglas J. Cuomo is writing and producing the underscores for NBC's weekly cop drama *Homicide*. It's a grueling job. An underscore is any original music that appears in the program, such as the ominous percussion that drives a chase scene or the sax solo that adds spice to a love scene, and a typical *Homicide* script requires Cuomo to produce an average of twelve minutes of new music each and every week.

Now, before you say that twelve minutes is no big deal, put yourself in these shoes: Cuomo has just six days to conceptualize, score, record, and mix all of the underscores. He must write different and evocative scores for an average of fifteen cues (the actual

**a day  
in  
the  
LIFE**

**Douglas J. Cuomo  
tracks killer scores for  
TV's *Homicide*.**

places in the script where music is needed) per episode. In addition, generating material is only part of the game. Every cue Cuomo writes must satisfy the expectations and desires of the program's director and producers. If an underscore doesn't pass, he must go back to the drawing board. Of course, the deadline remains the same.



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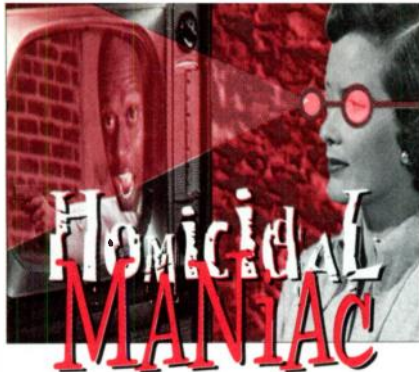
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"It's a pretty intense time schedule," explains Cuomo. "I have to wait until I get a working copy of the show before I can really start composing specific cues, and by then they have already shot and edited the whole episode. It usually takes a bit longer before I get a VHS copy with a 'locked picture,' which is a version with no remaining editing changes. As soon as I receive my copy of the tape, I call one of the producers, Henry Bromell, in Baltimore. The two of us watch the show together and discuss where we think music should be placed. All of this is done over the phone."

#### WORKING TOGETHER

The feedback from the producers is invaluable to Cuomo, as *Homicide* is not your typical scene-by-scene melodrama. The creative concept, developed by Executive Producer Barry Levinson (best known for directing movies such as *Rain Man* and *Disclosure*), subverts and re-energizes conventional TV production. Rapid "jump cuts" from one perspective to another, the use of grainy 8 mm film, and other decidedly cinematic devices are used to confound viewer expectations and heighten the drama. However, a butchered narrative structure can sometimes make it difficult for a composer to capture the right mood for a scene.

"I always send the producers work-in-progress to ensure that I'm doing what they want," says Cuomo. "My rough instrumental tracks are recorded onto a VHS tape that includes only those parts of the show where music is needed. I usually do this halfway to the deadline and keep three key people in the loop: Levinson, Bromell, and Music Supervisor Chris Tergesen. They either make comments or they don't say a thing."

"However, if I'm stuck for a musical direction because of writer's block or some other complication, I'll intentionally send them music that I know isn't quite right. I'll ask them what *they* think I should do, and they're usually very helpful."

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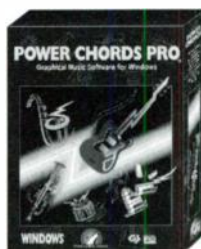
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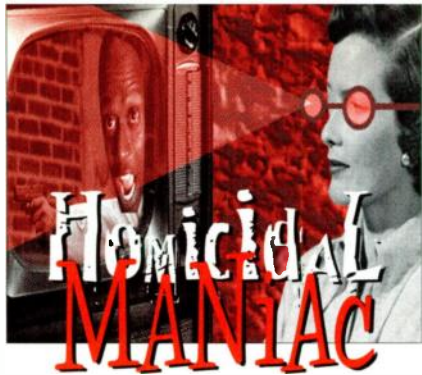
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## STAKING OUT THE SCORE

The ultimate road map for *Homicide*'s music and sound design is the VHS dub of each episode. Cuomo, the sound-effects editors, and Foley artists all receive copies of these tapes (and must toil under the same six-day deadline). To facilitate easy referencing, a "window dub" that displays SMPTE running time is burned into the video picture. For example, during the telephone "spotting" session with Bromell, Cuomo uses the window dub to accurately mark the places they've decided to place music. Also, if a producer asks for a different feel to the string pad occurring at 15:32:00, Cuomo can roll the videotape to the exact point in question. For further reference, each VHS dub has all the dialog and production sound recorded onto one of its stereo audio tracks and SMPTE time code recorded on the other.

When Cuomo starts to compose, he locks his MIDI sequencer to the time code on the VHS dub to ensure that every musical cue is matched precisely to the picture (or scene). On those occasions when acoustic instruments are

warranted, he records them onto his TASCAM DA-88, which is also locked to picture. Most of the instruments used for the *Homicide* underscores, however, are sound modules and samplers.

"I use the sampling capabilities of my Kurzweil K2000RS a lot," says Cuomo. "I have compiled a pretty decent sample library from various sources over the years, including samples I've made myself. The library is especially helpful for producing percussion tracks. I've used a few percussion loops in the show, but the preset grooves are often too limiting. Most of the time, I program my own drum tracks to match the scene and then choose sounds that enhance the action."

An important musical requirement for an underscore is that it be stylistically recognizable but not *too* familiar. Cuomo tries to develop common, yet distinctive themes for many of the cues.

"It's a tough balancing act," he says. "I want people to walk by their television sets, hear the score, and say, 'Oh, that's *Homicide* music.' But I don't want things sounding so familiar that viewers might wonder whether they're hearing last week's score."

But how does Cuomo achieve a balance between giving his underscores an identifiable sound and not repeating himself? "I address this two ways," he explains. "The first is through my choice of instrumental sounds. Because many of the cues are fairly short, the



The cast from the NBC series *Homicide*.

timbral consistency of the music can be just as important as the compositional elements. Therefore, I use and reuse certain sounds as recognizable sonic personalities. Now, although the sound palette is somewhat limited, I can get variation by employing performance dynamics, phrasing, and melodic changes. Also, I've been playing a fair amount of electric guitar lately and that adds another color.

"The second method is using reoccurring melodic and rhythmic motifs that add continuity to the score. Originally, we thought about composing a motif for each character. However, that didn't seem right even though the show is more psychologically oriented than action oriented. Yes, the show is about homicide detectives, but it deals more with what's going on between them and in their heads, rather than watching them make arrests."

## MIXING IT UP

Cuomo does not mix his underscores to DAT, he mixes the music directly to his DA-88 and monitors on Aurotones. His final stereo mix is recorded onto two tracks, while the main musical elements of the composition are split up on the DA-88's remaining six tracks. This "dual mix" allows the producers to do a different or alternate mix in the post-production suite (where all the music, dialog, Foley,

## Cuomo's Manhattan Music Station

Console	Mackie 32•8
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Keyboards/Sound Modules	Ensoniq ESQ-M; Korg Wavestation EX; Kurzweil K2000RS with orchestral soundblock; Roland JD-880, JV-1080, and S-760
Signal Processors	Alesis QuadraVerb GT; Aphex Model 106; DigiTech RDS-1900; Orban 764A; Sony R-7; SPL Vitalizer; Yamaha REV7, REX50, and SPX1000
Computers/Software	'486 PC; Apple CD600e CD-ROM drive; Dynatek 88 MB removable drive; Music Quest MIDI interface; Peavey PC1600; Coda <i>Finale</i> ; Twelve Tone Systems <i>Cakewalk Pro</i>
Power Amp	Electro-Voice 7100
Guitars	1961 Fender Stratocaster; 1968 Gibson ES-335



and sound effects are combined to produce the final broadcast audio) quickly and easily.

"Although I mix everything at home, it's difficult to know how loud a certain element should be once everything is put together for the final audio mix," explains Cuomo. "When I'm mixing, I don't really know how loud they're going to want the music cue relative to other things happening in the final mix. For example, if the cue ends up being placed at a higher volume than I expected, a triangle part might then pull the viewer's attention away from the dialog or mask the drama of a door creaking open. Putting critical elements on separate tracks of the DA-88 gives everyone involved the most flexibility. Usually, we end up remixing two or three cues each show."

In addition, signal processing plays a large role in Cuomo's craft. "A lot of the cues I write are fairly spare," he says, "so the types of effects I put on things are often a big part of the sound. I use the Sony R-7 stereo reverb a lot, because it's especially good for those times when you need long decays. For



Douglas J. Cuomo, "locked up" in his personal audio post-production studio.

example, I might decide that a scene calls for a deep drum washed in reverb, and that's it. The reverb helps the drum fill space and create a mood. A dry drum just wouldn't produce the

same effect, no matter how 'big' of a source sound was used."

As a final touch, Cuomo runs his mixes through an Aphex Model 106 compressor and an SPL Vitalizer.

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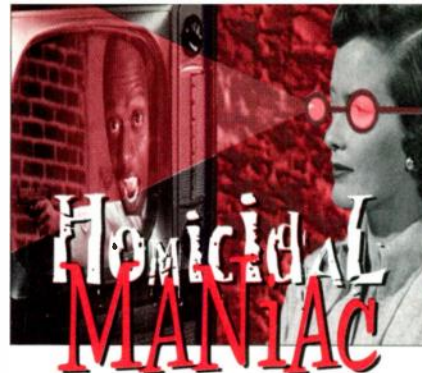
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"Everything on television gets super-compressed by the network to maximize broadcast bandwidth," he says. "By compressing the mix myself, I can at least maintain some control over how the tracks will sound."

Cuomo then runs the signal through the Vitalizer to replace some of the high-frequency shimmer that is often lost when signals are compressed. The Vitalizer also clarifies the stereo imaging of the mix. The final post-production mix is done at Sync Sound in New York City, and after that Cuomo is free to start worrying about the deadlines for the *next* episode.

## BOOK 'EM

Cuomo receives a flat fee per episode and is responsible for all recording and production expenses, including any outside players and commercial-studio time. "The important thing is making sure the music sounds great," Cuomo stresses. "I don't really think twice about hiring studio musicians if they improve the score. Recently, I brought in an acoustic-guitar player to do a bluesy John Lee Hooker kind of thing. I could have played the part myself, but he could play with a more authentic feel because he was a *real* blues player."

For inspiration, Cuomo turns to film composers rather than checking out popular television underscores. Some of his favorite composers for the big screen are Carter Burwell (*The Hudson Sucker Proxy*, *Raising Arizona*), Mark Isham (*The Public Eye*, *The Moderns*), and Elliot Goldenthal (*Interview with a Vampire*, *Drugstore Cowboy*).

One huge advantage of scoring a television series is the fact that only about 20 to 26 episodes are shot per season. During the show's summer hiatus, Cuomo is able to accept other interesting composing jobs. This summer, however, he plans to do something for himself—write and record a one-act opera.

Daniel Levitin watches eight hours of TV a day and keeps it tuned to the telephone-book channel.

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# Hand Over Hand

***Healthy hands are vital to a musician, so keep them happy.***

By Diane Lowery

**F**or most people, Carpal Tunnel Syndrome (CTS) is something that happens in the workplace. This so-called industrial injury is common among those who work at computers or on assembly lines. In fact, CTS accounts for sixty percent of all workplace injuries.

But musicians are just as likely to suffer similar injuries, because they also perform repetitive movements with their wrists and hands. Bowing a violin, fingering a guitar chord, and comping on a keyboard all require small, tense hand movements that can lead to injury. Musicians who work at com-

puter terminals during the day and then come home and play music are at even greater risk.

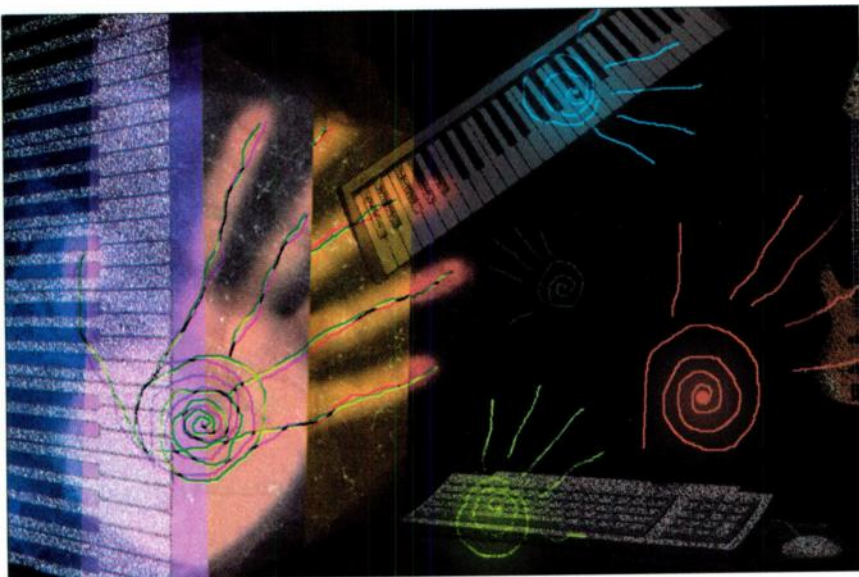
Not everyone is prone to repetitive hand-motion injuries; some people never get them, even though they engage in high-risk activities. Nevertheless, all musicians should be aware of these injuries and their symptoms as well as the available treatments. (For an explanation of alternative treatments for CTS, see "Working Musician: Carpal Tunnel Syndrome" in the September 1993 **EM**.)

## WHAT IS CTS?

James Stewart, a keyboard player, was starting to work on his first album, *Season of the Butterfly*, in 1989. He wanted to build his confidence and improve his performance by studying with a tutor, John Novello. "We were trying to push the envelope of my playing far beyond what I was capable of at the time," says Stewart. "I was actually playing six to eight hours a day, six days a week."

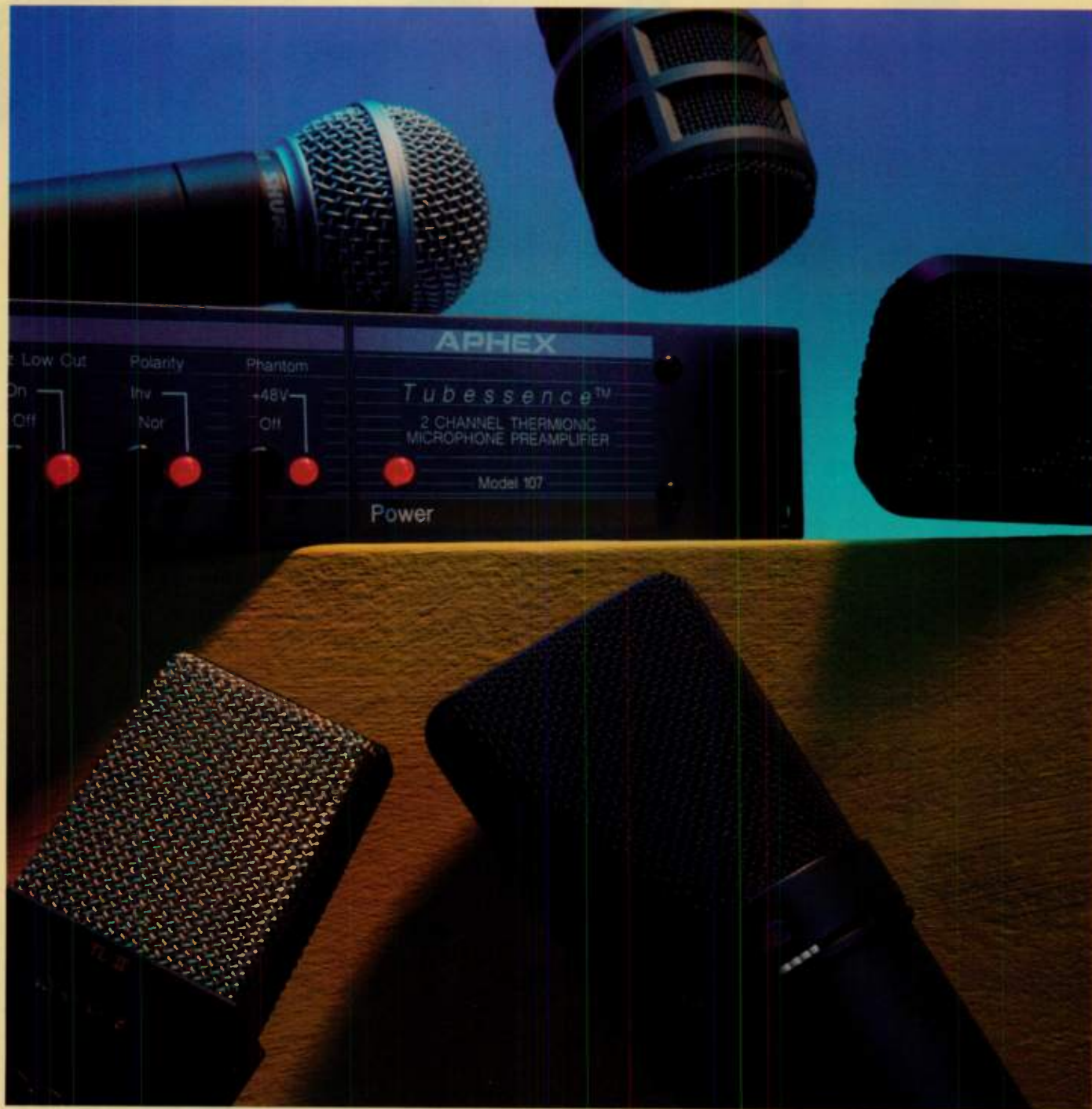
Most keyboardists practice on a piano. "Playing on a piano is the best way to get your technique together," opines Stewart. "It's a weighted-keyboard unit, which means there's more resistance when you're playing. Therefore, it takes more energy to play." Playing the piano for long periods of time can cause stress and strain in the wrist, leading to minor aches and pains that can develop into major injuries.

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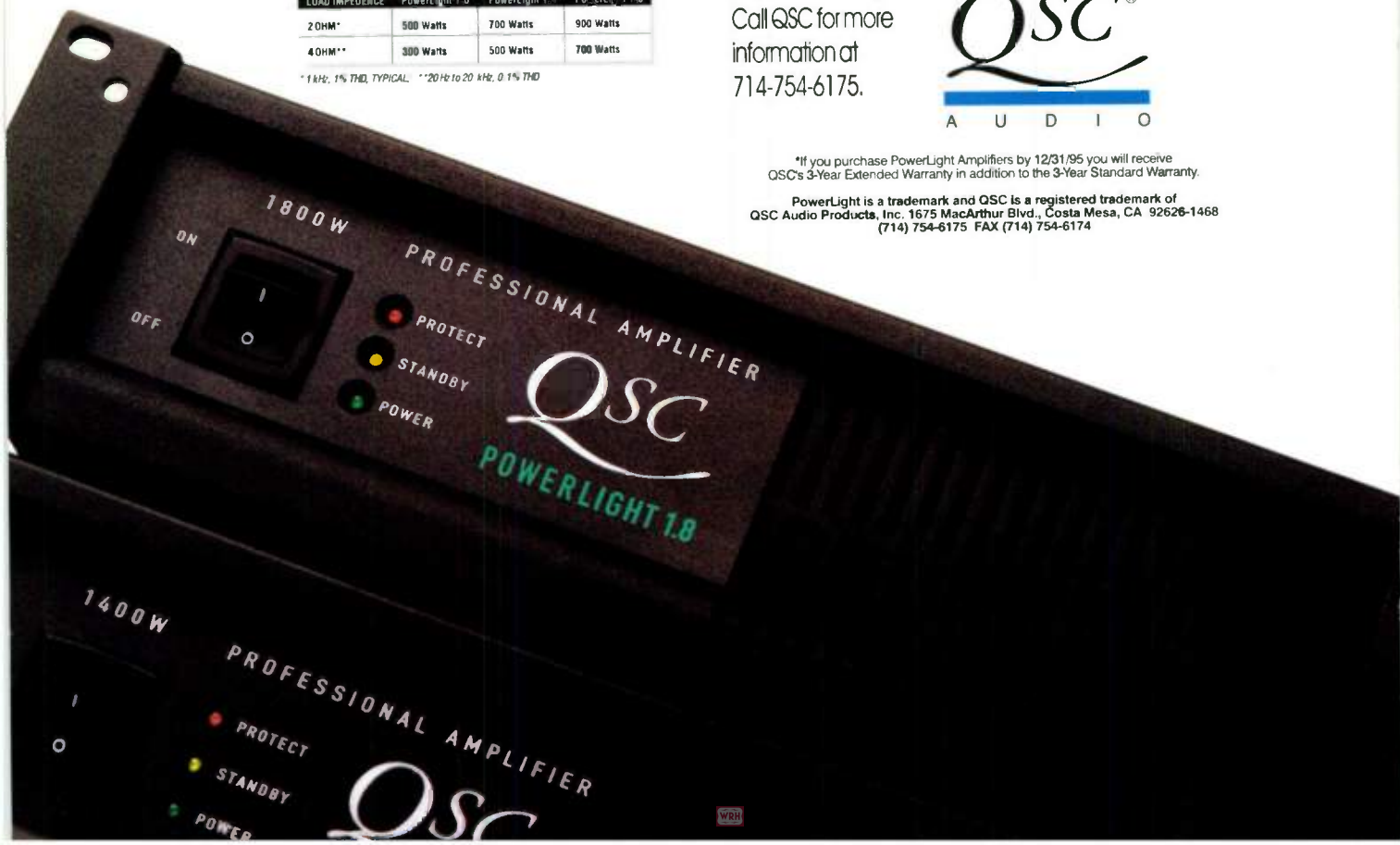
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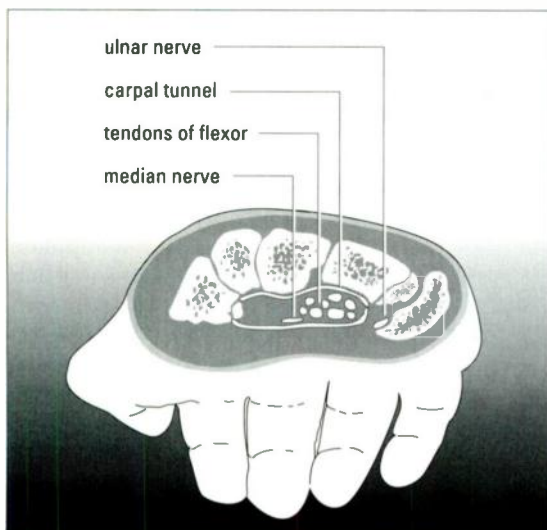
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**FIG. 1:** The carpal tunnel runs through the wrist, surrounding the nerve and tendons that control the hand and fingers. The tendons can become irritated and swollen from overuse, putting painful pressure on the nerve.

Dr. Michael Lodes, a chiropractor in Wilmington, Delaware, knows this all too well. "Carpal Tunnel Syndrome," he explains, "occurs when there is pressure on the median nerve, which passes through the carpal tunnel in the wrist." The tendons that pass through the tunnel become irritated and inflamed, causing fluid to build up and pinch the nerve (see Fig. 1). This pressure causes great pain, and even simple movement of the wrist or hand can be excruciatingly difficult. Any repetitive hand motion can cause microtraumas to this area of the wrist. These microtraumas are cumulative, eventually leading to CTS.

#### WARNING SIGNS

Our bodies are designed to issue warning signals when they are under duress. If you have the flu, your body raises its temperature to fight off the virus by "cooking" it. If you bump yourself, your body creates a bruise that is livid and tender to the touch. With repetitive hand-motion injuries, there are some basic indications that the median nerve is under pressure. "There is usually numbness and pain in the fingers," explains Lodes. "There are tingling sensations in the hand. Often, the pain gets worse at night because most people curl their fists when they sleep, which puts pressure on the nerve."

However, sometimes there are no early warning signs of CTS. "To me, it seemed to happen overnight," says

Stewart. "I woke up, went into the studio, and started playing. After a few minutes, there was so much pain, I could barely move the fingers of my right hand." Stewart immediately thought about his livelihood. How could he continue if he couldn't use his right hand?

When Stewart was a student at the Berklee College of Music in Boston, he had heard about other students being unable to use their hands. But because CTS was not widely familiar at the time, people assumed it was a psychological problem. "Everyone had auditions and try outs, big pressure situations," remembers Stewart. "Suddenly these people

were in pain, unable to play. Everyone assumed they had psyched themselves out." When it finally happened to Stewart, he knew he wasn't playing head games. He was newly graduated, studying with a tutor, and feeling pretty confident. He had to reevaluate what was going on.

#### THERAPEUTIC MEASURES

When something doesn't feel right physically, the majority of people go to their regular doctor for treatment. Lodes recommends putting your general practitioner farther down the list of options for hand injuries. "Most physicians will prescribe painkillers, which mask the problem and don't solve it," he says. "I recommend that you start by checking your diet. Cut out dairy products, and eat more vegetables and fruits." He also suggests taking vitamin B<sub>6</sub> supplements to help decrease swelling and fluid retention in the wrists. You may also want to use a "cock-up splint" on your wrists at night to keep them in a neutral position.

If these measures don't work, the next step may be to see a physical therapist or chiropractor. A physical therapist will use modalities such as ultrasound, electrical stimulation, ice packs, and wrist/hand exercises to alleviate the pain and strengthen the muscles and tendons.

A chiropractor will use manipulation and mobilization techniques, which are designed to improve biomechanical

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function, decrease pain, and decompress the carpal tunnel. As Lodes explains, "We use long-axis traction, where the bones and tissues of the hand and wrist are stretched out to open up the entire region. We also use trigger-point therapy in the forearm muscles, in which we look for tender spots in the forearm and manipulate those muscles." Lodes points out that there is often a Double Crush Syndrome associated with CTS. This involves a compression of a cervical nerve root in the neck. Most people who have CTS also have a compressed nerve, so pressure must be relieved in both areas for the wrist to get significantly better.

Stewart opted to see a chiropractor about his hand. "I have a friend who was a drummer with a similar hand problem. He went to his regular doctor, who gave him painkillers. He spent a month lying around, zoned out on the drugs, and it didn't solve his problem. He still couldn't play. I didn't want that." Stewart's chiropractor quickly isolated the problem: it was a combination of overworked hand muscles and a misaligned back. Over the course

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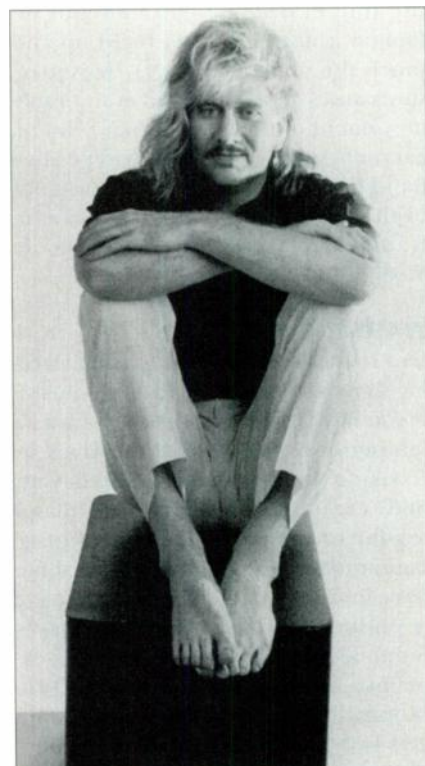
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of a few weeks, Stewart had several treatments, which quickly cleared up his condition.

Only as a last resort should a CTS sufferer consult an orthopedic surgeon. Surgery on the wrist requires cutting the ligaments, which attach bones to each other. This lets everything—tendons, muscles, bones, nerves—spread out, relieving the pressure and pain. However, this also causes the bones in the hand to become loose, and they don't work as well. You lose strength and mobility, and some movements can never be regained.

### MIND OVER MATTER

Stewart spent a lot of time reading up on CTS and tendonitis. In order to keep his injury from reoccurring, he practiced some basic meditation techniques. "I know it sounds like New Age hype," Stewart laughs, "but the technique really seems to work. You become more aware of your body, so when you feel pressure or strain coming on, you know how deal with it, and you can continue to play without causing any damage."

Stewart meditates before he begins to play. He takes a few deep breaths to relax himself, relaxing his arms in a neutral position. "You must clear your mind," he says. "You have to get all the normal everyday chatter out of your head. I try to envision total blackness. Once I'm in that state, there's nothing to distract my attention, and I'm more in tune with my body. My muscles are relaxed, and it's much easier to play."

This is not as far-fetched as you might think. Yanni, Keith Emerson, and George Duke have all discussed entering a relaxed mental state in various interviews. "Yanni spends twenty minutes getting into a relaxed state of mind before a show," Stewart recalls reading. "Michael McDonald [of the Doobie Brothers] would have massages before going onstage." Unfortunately, twenty minutes of meditation and massage is a luxury most musicians can't afford in the midst of sound checks, shared dressing rooms, and roadies dropping equipment cases onstage.

In addition, it can be difficult to learn to focus in this way. "It does take some practice," Stewart encourages.

"You need to practice over and over again so that you can do it for a minute or two before you perform. If you can get yourself into that relaxed state in which you're focused but not concentrating heavily, it becomes universally applicable. It works for drummers, guitarists, data-entry people, anyone."

The key is an enhanced awareness of your mind and body. If numbness occurs in your hands and you can't play, don't panic. Research the problem and symptoms. You may catch a minor hand injury before it develops into something more serious. You can then properly assess what is going on in your body and make a wise choice about what to do. Don't let a hand injury keep you from enjoying what you do. As Stewart says, "Figure out what works for you. Be aware of what's going on. I'm a better player now, and the entire process has helped me develop my music and feel good about myself."

*Diane Lowery is the copy editor for EM. Although the staff thinks otherwise, when she has her eyes closed and she's snoring, she's really meditating.*

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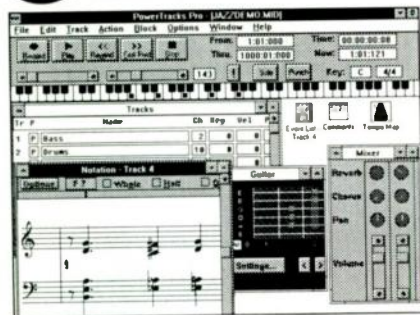
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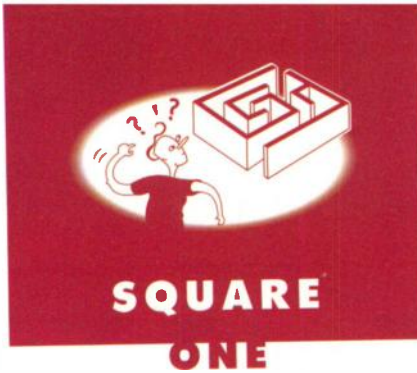
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# Patch Me Through!

*Audio patch bays help keep your signals straight and true.*

By Scott Wilkinson

Anyone who operates even a moderately sophisticated recording studio knows the joys of crawling around behind the gear to rewire the connections. Unless you have designed your studio so you can reach the rear connectors easily, this process quickly becomes a big hassle.

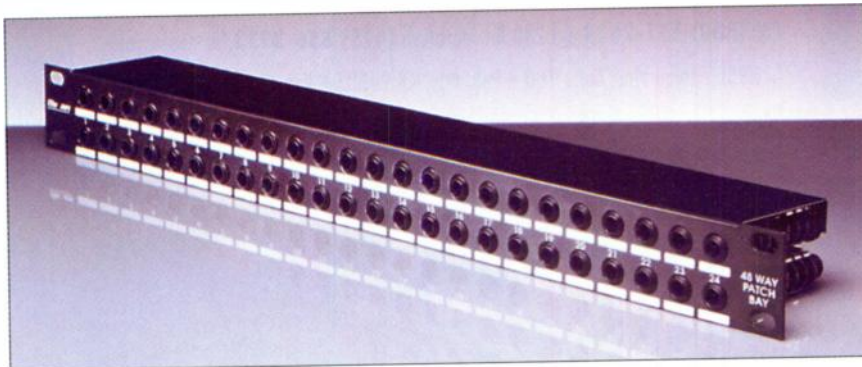
Fortunately, there is a simple solution: audio patch bays. These devices let you easily change connections from their front panels, instead of slithering around behind your racks. Of course, it takes some planning to make the most of a patch bay, and you must establish the rear-panel connections when you first install it. But once that is done, you rarely need to get your clothes dirty clambering around behind the gear.

## BASIC DESCRIPTION

Most patch bays are 1U rack-mount boxes with two horizontal rows of connector jacks on the front and back; each rear jack is connected directly to the corresponding front jack. Typically, there are 16 to 24 jacks in each row. The front and back panels are known as *jackfields*, and each jack is called a *patch point*. A few patch bays have jacks only on the front panel; they usually have *punch blocks* (which make a connection with bare wires) for the rear-panel cables, but in some cases you must solder the connections on the back. These types are more common in commercial studios.

The type of jacks on the front and back panels of a patch bay varies according to the equipment found in the studio. RCA jacks are most often used for consumer and semipro equipment, while 1/4-inch, 2-conductor jacks are used for devices such as synthesizers. However, it is better to use 1/4-inch, 3-conductor (tip-ring-sleeve, or TRS) jacks so you can connect either 2- or 3-conductor cables without problems. Most commercial studios use patch bays with *TT* (Tiny Telephone, also called *bantam*) jacks, which are smaller than other types of jacks, allowing up to 48 jacks in each horizontal row.

To use a patch bay, you connect the inputs and outputs of your equipment to the rear-panel jacks. Thereafter, to route the output from one device to

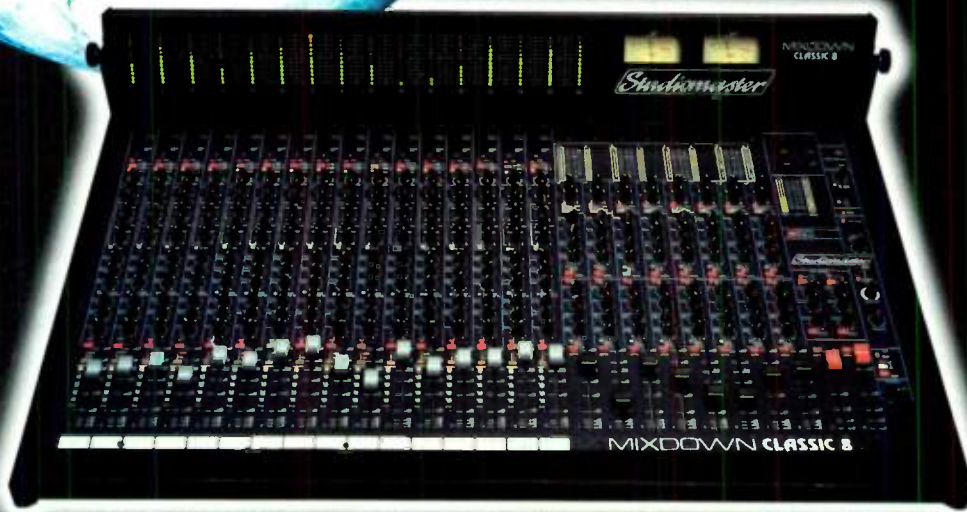


This 48-point patch bay by Rean uses 1/4-inch TRS jacks. Each set of front and rear patch points is on a reversible card. To change from half-normaled to denormaled, you simply remove, reverse, and replace the card.



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● SQUARE ONE

the input of another, you simply connect a short patch cord to the appropriate jacks on the front panel.

INTERNAL CONNECTIONS

In many cases, the jacks in each vertical pair on the rear panel are internally connected; this is called a *normaled* connection (see Fig. 1a). Any signal appearing at one jack passes directly to the other one. This configuration lets you connect your equipment to the rear jacks in such a way that the normal (hence the term "normaled") connections between devices are maintained without using front-panel patch cords.

For example, you might connect the outputs from a multitrack tape deck to one rear-panel row of jacks and the tape-return inputs on the mixer to the corresponding jacks in the other row. The tape tracks are then connected to the mixer's tape returns without requiring front-panel patch cords. Be careful not to connect two inputs or outputs to the same vertical pair of normaled jacks, though, as you would be routing an output to an output or an input to an input. Many engineers use

a simple convention to avoid this problem: the upper jacks are connected to outputs, and the lower jacks are connected to inputs, or vice versa. This is not always convenient (or even possible), but it helps organize the system and prevent connection mistakes.

In older, fully normaled patch bays, the default connection between the upper and lower jacks is broken if you plug a cable into either front-panel jack of the vertical pair. For example, if you want to send different signals (say, from some extra synthesizers) to the mixer's tape returns, you can connect the desired outputs to the tape-return jacks on the front panel of the patch bay. This breaks the normaled connection (i.e., disconnects the multitrack tape outputs from the tape returns) and sends the new signals to the tape returns.

These days, however, most patch bays are *half-normaled*. In this configuration, the rear-panel input is routed (normaled) directly to the corresponding rear-panel output, just like in a fully normaled patch bay. Plugging into the lower front jack breaks the normal (see

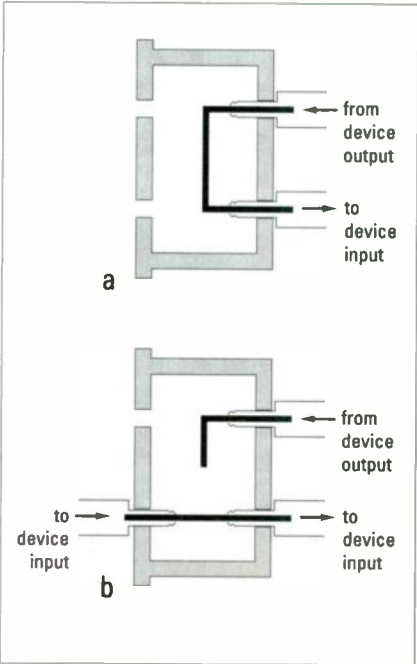


FIG. 1: In a normaled configuration, if the front-panel jacks are unused, the rear-panel jacks are internally connected (a). If the lower front-panel jack is connected to anything, the normal connection is broken (b).

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## ● SQUARE ONE

Fig. 1b). However, if you connect something to the upper front-panel jack only, the signal is sent to both destinations (see Fig. 2a). This provides a *mult*, or signal splitter, which can be useful in a number of situations. For example, you could use a mult to send the same signal to two outboard processors or two mixer channels for separate equalization. Another possibility is to split a mixer subgroup output and simultaneously route it to a tape deck and a sampler, so you don't have to repatch for different applications.

Sometimes, you don't want the upper and lower jacks to be internally connected at all. This configuration is called *non-normalized* or *denormalized* (see Fig. 2b). This lets you use both upper and lower jacks as inputs or outputs, but it also requires that you make all desired connections with patch cords on the front panel.

Many patch bays let you configure the internal normalizing for each vertical pair of jacks. In some cases (e.g., patch bays made by Rean for dbx, Conquest, and others), you simply reverse a circuit card in the patch bay to normal or denormal a particular vertical pair. In other products, you must make or break solder connections to establish normal, half-normal, or non-normal connections, which is inconvenient.

## APPLICATIONS

When you decide to install a patch bay, there are a few things you should consider. First, how many patch points do you need? These include all inputs and outputs to and from the mixer, multi-track tape deck, mixdown tape deck, signal processors, samplers, and/or hard-disk recording system, as well as all synth outputs. Typically, you need several patch bays to accommodate all these inputs and outputs.

What type of connectors are most appropriate for your system? I recommend 1/4-inch, TRS jacks for maximum flexibility. In this case, however, you will need adapters for RCA-equipped gear. In addition, if you connect a 2-conductor cable to any TRS patch point, the ring is shorted to ground, and that particular signal path is 2-conductor thereafter. This won't typically cause a problem, but you should be aware of it.

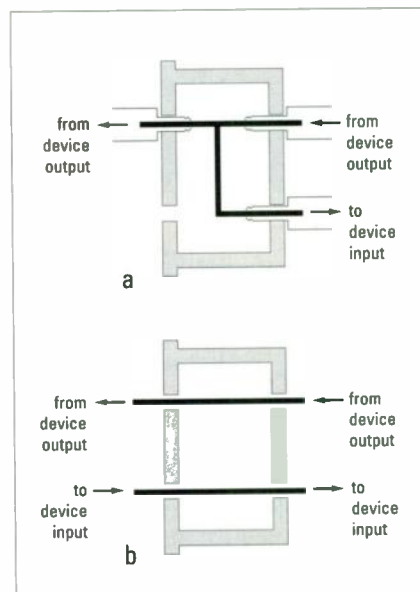
Make a chart of all patch-bay connections. This can take the form of a graphic diagram (see Fig. 3) or a table

that lists all patch points along with their normalizing status and rear-panel connections. You might also keep a blank table handy to document front-panel patches. In addition, it is critical to label all front and rear patch points and rear-panel cables. This makes it easy to establish new front-panel connections at a glance and reconfigure the rear-panel connections, if necessary.

Many people have more outboard gear than their mixers can accommodate. A patch bay is essential in this situation because it moves the inputs and outputs from the back of the rack to a convenient location near the mixer, making them easy to access as needed. The "extra" inputs and outputs can be connected to denormalized patch points for added flexibility.

Many engineers normal their effects inputs and outputs to the mixer's aux sends and returns, respectively. However, some people prefer to denormal the effects inputs and outputs on the front of the patch bay. This lets you configure the effects in any way (e.g., in a chain) and assign them to any aux send and return, which is especially useful when you have more outboard processors than you have aux buses.

If your mixer's input channels don't include direct outs (e.g., the Mackie CR-1604), a patch bay can adapt the



**FIG. 2: A half-normalized configuration splits the incoming rear-panel signal to both the rear- and front-panel outputs (a). In a denormalized configuration, the upper and lower jacks are not internally connected (b).**



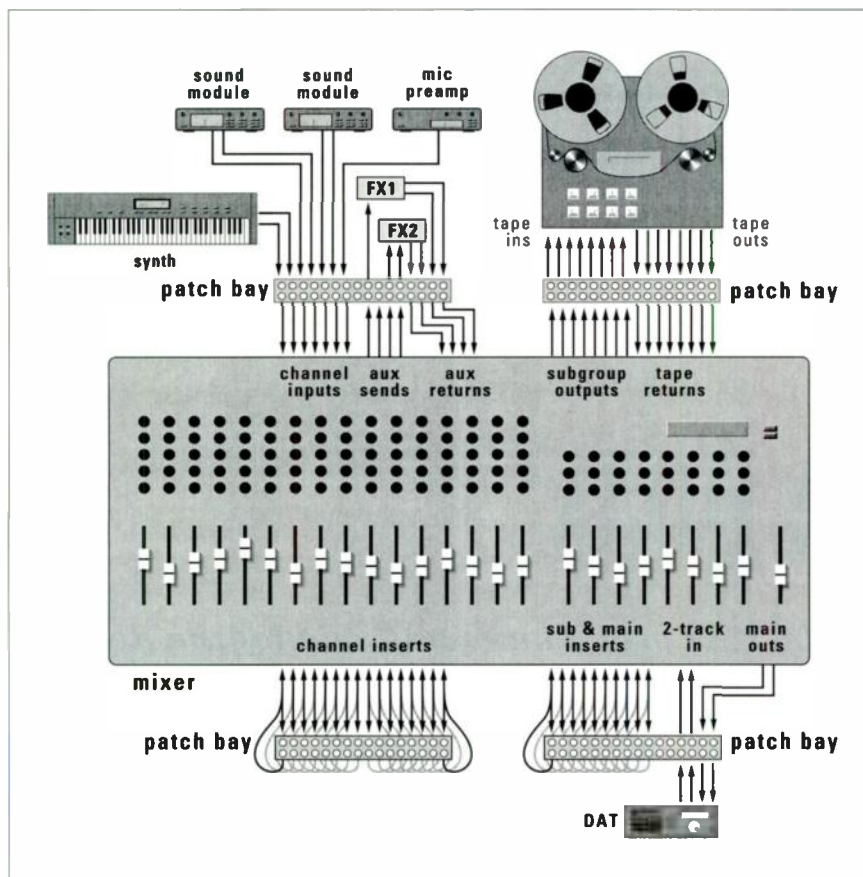


FIG. 3: In this hypothetical studio setup, all inputs and outputs are connected to normaled patch bays.

channel insert points for this purpose. When wiring the inserts to the patch bay, you simply normal the sends to the returns. (If your mixer's insert points use a TRS jack for each send/return pair, you'll need a Y cable to separate the send and return.) If you don't plug anything into the front-panel jacks, each channel's signal passes from the send to the return, just as if nothing had been plugged into the channel insert. You can still use the individual send and return jacks as you normally would, but the insert send can also be used as a direct out. Generally, the insert send/return pairs on the patch bay are half-normaled, so you can mult the sends to other inputs (e.g., a multitrack tape deck or sampler) without disrupting the signal flow through the mixer. Some engineers make such connections on the front of the patch bay and leave them semipermanently patched.

If you perform live or travel to other recording studios, you might have a portable rack with the gear you need for these applications. If so, consider installing a patch bay in the rack. This allows you to easily access the inputs

and outputs of the rack gear in any situation. To create a totally integrated live-performance system, you can rack-mount a line mixer and normal everything in the rack to it. When you bring the rack to a studio, just plug in the studio snakes to break the normals and send the signals directly to the mixing station.

To maintain clean rear-panel connections, you should usually install the patch bay in the back of the rack. The most common exception is when the rack will be located at the sound-reinforcement mixing station, and you anticipate that the engineer may need to repatch on the fly. In this case, the patch bay is front-mounted for convenient access.

Patch bays can make your life in the studio much easier. Once you make the initial connections on the rear panel, reconfiguring those connections on the front panel is a snap. In addition, you can add new gear to your rig with a minimum of fuss and muss. Patch bays are the unsung heroes of the studio, so get out from behind your gear and give them a try. ☉

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# Dealing with DOAs

*The doctor lectures on initial test procedures and raising the dead.*

By Alan Gary Campbell

**I**n recent columns, we have explored tools, basic do-it-yourself service, soldering and desoldering, and some "tricks of the trade." Next month we will make the jump to some rather substantial service topics, but first I want to suggest a basic approach to service, cover some "dead-unit" procedures, and add a coda on soldering and desoldering.

## A BASIC SERVICE APPROACH

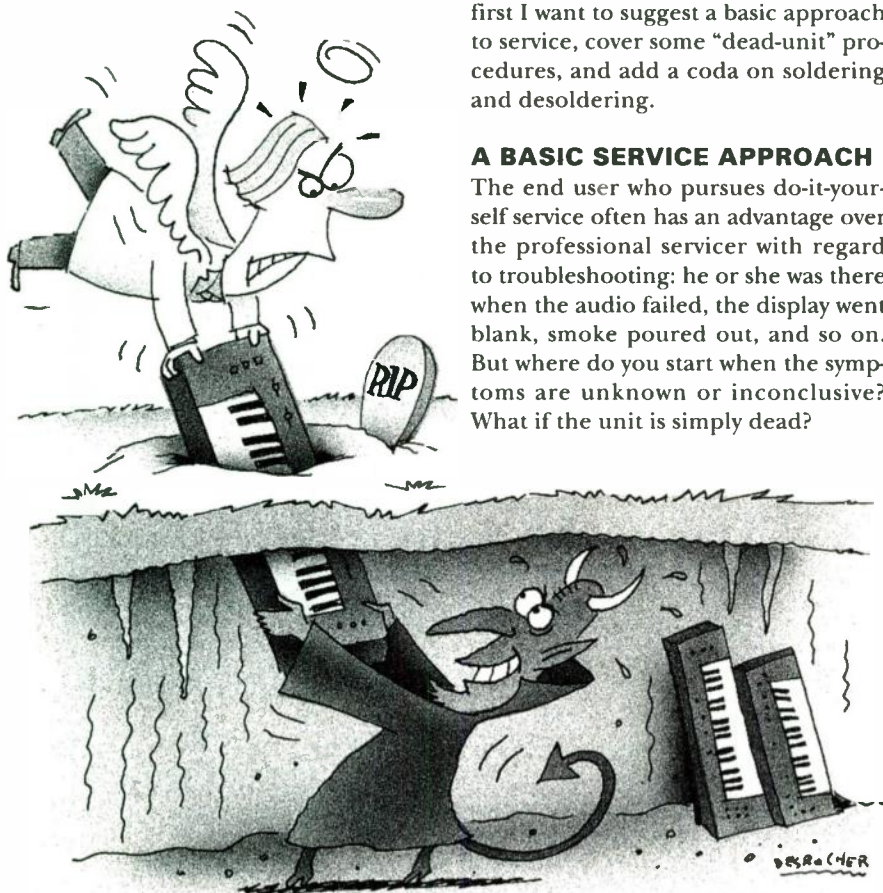
The end user who pursues do-it-yourself service often has an advantage over the professional servicer with regard to troubleshooting: he or she was there when the audio failed, the display went blank, smoke poured out, and so on. But where do you start when the symptoms are unknown or inconclusive? What if the unit is simply dead?

Before a malfunctioning unit is powered up, it should be checked carefully for any signs of physical damage or catastrophic failure. Dented case components, telltale signs of liquid spills, subtle discoloration or residue that may have been caused by overheating, debris that rattles around inside the unit—all of these are "red flags." When I receive a dead unit with unknown problems, I thoroughly view it, sniff it, prod it, and (if possible) pick it up and shake it.

A common example shows the importance of this approach. Something as seemingly innocuous as a paper clip can find its way inside an instrument, usually via the spaces between keys. A paper clip is conductive, and if the unit is powered up with one resting on a circuit board, fireworks—or at least, scrambled memory—can result.

In almost every case, a thorough "shake test" discloses the presence of a foreign object. *Disassemble the keyboard and remove the foreign object before powering up.* If you've found a conductive object in a dead unit, assume it has shorted out one or more components. Inspect all the circuit boards closely, especially the power-supply board, looking for signs of arcing or other over-current damage.

Stick your nose in it! If it smells like it has overheated, be suspicious. A step-by-step inspection procedure can help you prevent further damage and avoid





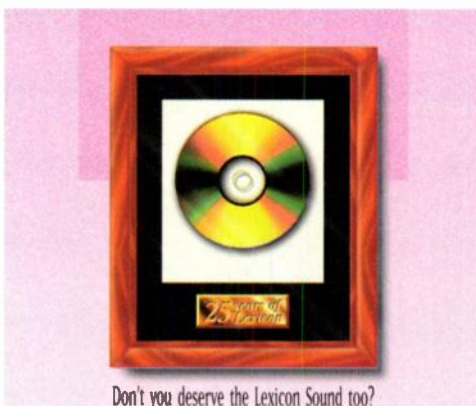
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aggravating existing problems. For the serious tech, this cautionary approach should become standard operating procedure.

### COMMON DOA PROBLEMS

There are hundreds of possible causes for a dead unit, but the simplest are the most frequent. Scrambled memory is the number-one cause of death for microprocessor-based instruments and effects. Memory glitches can occur from something as simple as a line transient. Other sources include excessive ambient operating temperature, loose

Also, it's useful to substitute a replacement AC-to-DC adapter for a suspect unit, but be wary of adapters that aren't within the factory-specified values. It's all too easy to get the tip polarity reversed, and many generic adapters do not provide proper voltage regulation. These deficiencies can cause equipment damage. You can measure adapter output with a digital multimeter (DMM), but under no-load conditions, the measurement may be misleading, and a slip of the probes can short and damage the adapter.

Suspect fuses should be removed and checked with the ohms function of a DMM. Open fuses may look intact (not "blown") yet have a detached lead under the cap. Replace an open fuse or fuses with the exact type and rating specified. Never substitute a higher amperage rating or replace a standard fuse with a slow-blow type. Never replace an open fuse with a fuse case wrapped in aluminum foil. This can cause a severe fire and shock hazard.

An open fuse is another red flag. Occasionally, a fuse will open due to simple mechanical fatigue that is not related

to instrument failure. But an instrument that exhibits open fuses may have power-supply or major subsystem damage and should be observed closely for subsequent symptoms.

### SOLDERING REVISITED

Some retrofits and modifications require leads to be tack-soldered in place. Generally this is done by applying small amounts of solder to the wire ("tinning" the wire) and the receiving location, and then holding the wire in position, and reheating both without adding more solder. Although tack-soldering is usually reliable, most of the flux is dissipated before the joint is made, and there is a danger of a cold joint. Whenever possible, skip the "tinning" process, position the wire to be tack-soldered with a jig, and solder normally to improve reliability.

Occasionally, a joint will not form well no matter how many times you

resolder or reheat it. This occurs most often with older, inexpensive, electromechanical components, such as pots and switches. It is usually caused by excessive contact oxidation, which does not respond well to cleaning, or by poor plating quality. It is better to live with the poor joint than to reheat it repeatedly. Better yet, replace the offending part. Clean the soldering tip thoroughly after working on a problem joint, as freed plating compounds can invade the tip.

For large work at the limit of a station's heat capacity, use the maximum setting and *slow down*. Between joints, allow extra time for the tip to recover and the previous joint to set. Moving or jarring a large joint before it cools can greatly diminish its reliability.

Inaccessible joints are frustrating. Sometimes, simply swapping hands helps. If you're right handed, you normally hold the soldering device with your right hand and feed solder with your left, but inverting this hand assignment can make some cramped work easier.

### DESOLDERING TRICKS

Joints heavily encrusted with flux residue are hard to desolder. Scrub the joint using denatured alcohol and a toothbrush. *Caution: Alcohol is flammable. Keep it away from soldering or desoldering equipment, space heaters, and any other source of heat or flame.*

Sometimes multilayer boards are difficult to desolder, even with a new desoldering station. You should remove the board from the gear chassis, add a small amount of fresh solder to the affected joint, then invert the board (at the edge of the workbench), and desolder *from below*. The added solder and inverted position improve heat conduction.

The heat required to desolder large components, such as jacks, can exceed the capacity of a desoldering station. In this case, use the soldering station to boost the capacity. Immediately after the desoldering tip is in position, touch the soldering tip to the joint, then desolder normally, and remove both tips as quickly as possible. Generally, this technique is so fast that, despite the approximately doubled heat capacity, it is safer for the work if done quickly.

**EM** Contributing Editor Alan Gary Campbell is owner of Musitech.



A digital multimeter (DMM), such as this Micronta unit from Radio Shack, can be used to check suspect fuses and to measure AC adapter output. However, keep in mind that under no-load conditions the AC adapter measurement may be misleading.

memory-expansion boards or cartridges, and the presence of conductive foreign objects, as described earlier.

Usually, the fix is as simple as resetting the unit. Sometimes the memory is so scrambled that it is necessary—with the power off, of course—to briefly short the RAM power-supply line. Keep in mind such a drastic procedure, like many front-panel hard-reset routines, will erase user programs—a reminder that frequent program backup is indispensable.

Other common dead-unit problems are ill-fitting AC line cords (cords and sockets do not always mate snugly), defective external power supplies, and blown fuses. For a unit that uses a standard IEC, 3-wire, detachable AC line cord, it's simple enough to substitute a replacement cord. (These are available from Radio Shack and most electronics and computer stores.)



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## Roland XP-50

By Julian Colbeck

**This keyboard  
workstation delivers more  
than meets the eye.**

**T**he Roland XP-50 is the David (as against Goliath) of workstations: a small, unremarkable-looking instrument with fearsome hidden firepower. Like the biblical hero, this musical warrior has some external characteristics that might cause you to underestimate its potential. The keyboard action is uninspiring, the control panel is confusing, and the owner's manual is, well, let's just say they would love it at the Tower of Babel. Look past these things, however, and

wheel, and a hard-wired power cord, which is a drag. (So much for all those Euro cords you've been acquiring.)

Inside this unassuming exterior are a full panoply of sounds. There are GM sets, Rhythm sets, Presets, user programs, multitimbral Performances, effects, expansion-board Patches and Rhythm sets, musical Phrases...after a while, your ears and eyes go fuzzy. But you prod this and stab that, and a succession of hard-edged, techno-friendly noises burble out. Yes, there are also electric pianos and Hammond sound-alikes to die for and drum kits everywhere. You are impressed. You want to know more. Time out for a bit of history, then.

### FAMILY TIES

The XP-50's ancestry can be traced back not just to the JV-1080 module, which uses the same sound engine, but to the JV-1000, the JV-80, the JD-800, and all the way back to the D-50. All share a similar style of Tone-based, subtractive synthesis. Like the JV-1080, the XP-50 incorporates Roland's new 32-bit RISC chip, which can process large amounts of data *fast*. This manifests itself in things such as real-time control over effects and being able to move around large amounts of sequence data. The envelope generators are particularly smooth and fast.

The sound engine processes PCM-sampled sounds with subtractive synthesis. The voice architecture is built upon Tones, each of which has its own waveform, amplifier, filter, and accompanying envelope generators, plus a pair of LFOs (see Fig. 1). What you actually play, though, are Patches, which are made by combining up to four Tones in a number of ways called Structures. For multitimbral use, the XP-50 employs things called Performances, in which Patches or drum kits are then slotted into Parts.

In print this might seem about as easy to understand as your phone bill, but in practice, it's a good system. Be aware, however, that the 64-voice



Don't let its unassuming façade fool you; with hundreds of sounds and a powerful sequencer, the Roland XP-50 workstation packs a musical wallop.

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Weighing in at a mere twenty pounds, the XP-50 is considerably easier to extract from its polystyrene tomb than most. Once out of the box, a quick glance reveals more buttons than you would expect, a small strip of orange LCD, a 3.5-inch disk drive, Roland's traditional pitch bend/modulation lever, two assignable sliders, an alpha



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polyphony claimed is more accurately described as 64-Tone polyphony. Some Patches use up to four Tones, reducing your actual polyphony to sixteen voices, and that doesn't even account for multitimbral operation.

## SOUNDING BOARD

Simply enumerating the XP-50's Patches would take up most of this review so I'm going to be thematic. Fortunately, there is a thread that runs through the programming if not the waveform ROM, which tends toward edgy, ambient, techno sounds that beg for space on your next megamix.

This is smart thinking on Roland's part, because in addition to this wealth of freely programmed sounds, the XP-50 holds a full complement of General MIDI Patches, where all pianos, gunshots, applause, and fretless basses are created relatively equal. The blend of GM and wild and wacky is a star feature, balancing out the instrument to perfection.

With more than 600 presets that represent a sort of "greatest hits" collection from the past two years of Roland synthesizers, simply flipping through the Patches can be an overwhelming experience. The 32-bit engine under the hood is clearly evident from the stream of sweeping resonant-filter patches, psychedelic flanging and phasing, and so on. This is a multicolored, fun-lover's instrument.

Armed with this wealth of Presets, you would be forgiven if you avoided the button marked Edit and the 128-location User bank altogether, but don't. The XP-50 can be downright unfriendly at first: many of the front-panel controls are dual function, some require the addition of the Shift key, others require a second Bank key, and some work only when others are on or off. But when it comes to sound editing, the instrument becomes a pussycat.

## PROGRAMMED TO SUCCEED

An easy method of producing new sounds is simply to remove or add Tones to a Patch, selecting or deselecting any of four named Tone buttons. Almost as painlessly, you can slip into Edit mode and substitute the waveform assigned to any or all of the Tones, something you can do with a degree of accuracy and intent because the dedicated Tone buttons effectively allow you to solo the constituent parts of a sound.

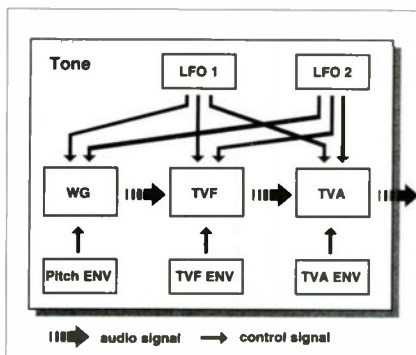
Real programming, if this is not too grand a concept, is great fun. The first port of call is selecting a Structure, which determines how your chosen Tones fit together. There are ten Structures to choose from, ranging from the straightforward Structure Type 1, where two Tones run in parallel in a waveform-to-filter-to-amplifier chain, to highly involved Structures such as Type 8. Here, the Tone 1 (plus Tone 3, if used) waveform-to-filter-to-amplifier chain is ring-modulated by the Tone 2 (plus Tone 4, if used) waveform. The result is then processed through Tone 2's filter and amplifier. Such interaction between Tones produces appropriately complex-sounding results. Not

ing options, and if you choose a Structure with the Booster parameter, you'll be able to overdrive the filter. This accounts for the XP-50's particularly strong set of rich, analog-type synth sounds.

Roland's time-honored Time Variant (TV) system gives you separate 4-stage, time and level envelope generators to manipulate the filter (TVF) and amplifier (TVA). A similar envelope generator is reserved for pitch and can also be Velocity controlled. Velocity control over pitch is great not just for spectacularly crazy sounds but also for creating wonderful percussion instruments. Physical modeling? Pah! Who needs it?!

The programming architecture may be familiar, but it's not dull. Many interesting new twists and turns are offered, including an invaluable parameter called Wave Gain. This boosts the fundamental output of a waveform, which enables you to raise the perceived level of a component part of a sound as opposed to having to reprogram it or destroy the overall balance.

Other useful goodies include Frequency Cross Modulation, numerous variations on the Tone-delay theme, including Playmate (helps tie the delay time to your current style of playing), Clock Sync (lets you delay tones in time with a sequence), and even MIDI-synchronizable LFOs. Yes, very tasty, these.



**FIG. 1: The XP-50's voice architecture is based upon Tones, each of which has a waveform generator, Time Variant Filter (TVF), Time Variant Amplifier (TVA), three dedicated envelope generators, and two LFOs. Up to four Tones can be combined to create a Patch. (Courtesy Roland Corporation US.)**

all Structures use ring modulation as a link. Some use what Roland calls a Booster, which overdrives the incoming signal, producing amp distortion-type effects.

The next critical decision comes when choosing waveforms. On a standard XP-50, these waveforms range from acoustic-piano samples—full samples to thumps—to electric pianos, D-50 waves, organs, component parts of electric-guitar sounds, basses, blown noises, string scrapes, hits, plucks, tinkles, crashes, and so on. There's also a vast army of unadulterated percussion samples. Within the Internal A and B banks, there are some 450 sound nuggets to choose from.

From here on, the signal path will be familiar to anyone acquainted with analog synthesis. The resonant filters offer highpass, lowpass, bandpass, and peak-

## EFFECTS PROGRAMMING

There are three independent effects processors. One is dedicated to reverbs, of which there are eight types; one is dedicated to chorusing; and one contains some 40 fully editable effects algorithms. Though the effects are extremely well presented, the thing that impressed me most is being able to switch effects on and off separately from the control panel.

The programmable effects bank runs the gamut, including an EQ, delays, flangers, a splendid auto wah, a minutely detailed rotary-speaker program with specific upper/lower speaker acceleration/deceleration parameters, a Dimension D sound-alike, a 6-phase chorus, and an overdrive. As a nice added touch, certain effects parameters—depths, speeds, and the like—can be controlled in real time from the mod-lever control.

Many of the 40 effects are multi-effects in themselves, such as an enhancer



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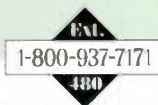
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and flanger running in series or a chorus and delay running in parallel. Effects are applied per patch until you go multitimbral, at which point a Performance's setup takes over. This can be most frustrating when a Patch's effects are crucial to the sound, but in this respect the XP-50 is no better and no worse than any other multitimbral synthesizer currently on the market.

## LAUNCH SEQUENCE

As the only major company still producing dedicated hardware sequencers, Roland is at a distinct advantage when it comes to building keyboard workstations. The sequencer on the XP-50 is based on the company's MRC sequencing system, which has animated legions of dedicated sequencers from the trusty MC-500 to the MC-50 MkII. Fast and direct, MRC's only real limitation is screen size: it's a bit like viewing a room through a keyhole. But in terms of power and control, it has almost everything you need.

The XP-50's sequencer uses MRC Pro, a souped-up version of Roland's Super MRC. The instrument happily converts

and loads Super MRC files; Standard MIDI Files on 3.5-inch, DOS-format disks can be loaded in directly. Although there is not a seamless transition from MC-500 sequencing to MRC Pro, there are enough familiarities and crossovers to make the journey quick and comfortable.

When you're working on a sequence, you slide the XP-50 into Performance mode. Performances house batches of Patches (slotted into Parts) that can be arranged multitimbrally. Roland provides a number of Performances that have been named and styled for certain types of recording: for example, "Big Band Set," "LA Ballad," and "Ambient Set." There are 64 preset Performances in all and just 32 locations in which you can write and store your own. Having married tracks and parts so that the sound you play will be the sound you record, you can begin basic recording in either real time or step time.

## SHUFFLE (with settings of Resolution= and Rate=75)

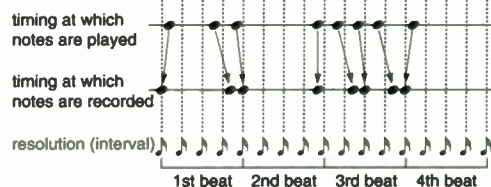


FIG. 2: Shuffle Quantize alters the note timing to provide a swing feel. The quantization factor can be altered by percentage, in real time. (Courtesy Roland Corporation US.)


The sequencer's capabilities are one thing; figuring out which buttons to push on the XP-50 is another. The reason is one of ergonomics, plus one or two, shall we say, "curious" habits. In the latter camp, the metronome works independently of the sequence. In other words, when you switch it on, it starts tapping away and keeps going until you switch it back off again; pressing Stop at the end of a take doesn't silence it. Dealing with this gets mighty tiresome.

Button pushing is the order of the day. When you stop recording, for instance, pressing Stop halts the proceedings, as expected. However, if you want to go back to the top, you have to press Shift plus the BWD (Backward) button. Pressing the Backward button alone merely nudges you back a few ticks (or bars, if, like me, you continue to drill at the wretched button like a demented woodpecker because you can see no other obvious method of returning to the beginning of your sequence).

Many of the physical controls have dual functions, which makes operating the sequencer a hazardous and button-hungry affair. As a seasoned MC-500 MkII user, I realize that you can become quick on these machines, but you couldn't accuse them of being friendly or obvious. A clearer panel layout with more dedicated buttons would help. A decent manual would also go a long way toward taming the instrument's complexities. Lacking that, you may want to acquire a copy of Roland's 2-hour instructional video (\$39.95), which covers every aspect of the instrument.

## IN THE DEEP END

Such a situation would be catastrophic if the sequencer itself weren't worth the investment in time. Luckily, it is.



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There's plenty of depth here. You can record in an endless array of time signatures, and you can overdub, punch in and out, set loops, vary count-ins, and erase on the fly.

You can also record Phrases, which, as their name suggests, are musical snippets you can subsequently initiate directly from a preassigned key on the keyboard. The idea, borrowed from home-keyboard technology, allows you to add parts to songs in real time: a ripping brass line, a drum fill, etc. The XP-50 is not, I hasten to add, a home keyboard. There are no Styles. The Phrase-track concept is simply a way of spicing up your performance with or without the internal sequencer.

Another spicer-upper, and one of my favorite aspects of the XP-50, is its range of quantization features. Although Grid Quantize drags notes back in time, it can do so in percentage terms, so notes are progressively dragged nearer to your set quantize value. Shuffle Quantize effectively swings the whole framework of timing (see Fig. 2), with the quantize factor similarly alterable in percentage terms. Even better, you can perform these maneuvers in real time as a sequence is moving along. Being able to audition the effect of different quantization styles and percentages before you actually apply them to the data is both fascinating and extremely useful.

Editing is as in depth as most of us will ever need. You can record tempo changes, filter out specific data, cut/copy/paste, and edit individual events in "microscope" mode. You can also merge tracks and can even merge all sixteen MIDI channels onto a single track. One other useful sequencer feature worth mentioning is Time Fit, which fits a sequence into a specified length of time by altering its tempo. Resolution is 96 ppqn, by the way.

The XP-50's sequencer does, of course, have some limitations; what doesn't? The most noticeable is only being able to load one song at a time. True, you can access songs directly off disk for playback, saving the instrument's gigging potential in this respect, but free cutting and pasting between songs in a recording environment would have been nice.

Most people's sequencing kicks off with a drum track, and with no less than ten drum kits, plus room to store a further two kits of your own making,

the XP-50 has a drum kit to accommodate almost any musical style. Interestingly, the instrument does not limit you to what it thinks of as drum sounds; you can build up a kit by trawling the regular waveform bank for likely suspects, which is another nice touch.

Speaking of touch, I have two tactile observations, one good and one not so good. The not-so-good concerns the keyboard. True, it responds to both Velocity and Release Velocity, as well as Channel Pressure, but the weight and travel are just not up to normal Roland

standards. The upshot is that the keyboard is unsatisfying to play if you are used to playing keyboards. This is not quite as absurd an observation as it seems because the XP-50's sounds and features make it a perfect choice for the dance-music programmer or remix specialist, people who are generally not looking for a keyboard, say, to play piano on. I worry about things like keyboard action, so I hooked up the XP-50 to a "better" keyboard. Let's hope that Roland will bring out a semiweighted, 76-key version of the XP-50 soon.

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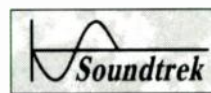
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## ● XP-50

On the positive side is a minor, but noticeable adjustment to the Pitch/Mod lever. This has been given a deeper travel than on recent Roland synths, which not only provides a greater range of expression for adding vibratos and the like but gives you an excellent feeling of control when it comes to real-time manipulation of effects parameters.

## EXPANDING UNIVERSE

Today, expandability is the name of the game. Although the XP-50 does not have a card slot—possibly its only loss from the JV-1080—you can insert SR-JV80 wave-expansion boards, which hold both waveform and program data.

Six expansion boards are currently available: Pop, Orchestra, Piano, Vintage Synth, World, and Dance. They don't come cheap (\$475 each), and there are so many sounds already on board—a fully loaded XP-50 holds almost 2,000 sounds, based on some 40 MB of waveform ROM—that even the thought of more is positively alarming. Nevertheless, players who specialize in a specific musical style can always use more sounds targeted specifically at their needs. For example, people involved in the sound-dominated dance scene won't balk at the challenge of auditioning 75 different synth basses and should check out the Dance board.

Finally, there are GM features. It is interesting to note that Roland has forsaken the higher-level GS features on the XP-50, though it is fully up to the GM mark in terms of sounds, polyphony, sequence tracks, and file formats. (SMF Types 0 and 1 can be loaded.) If you are still unconvinced by General

## Product Summary

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XP-50 Music Workstation

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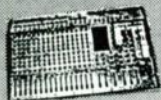
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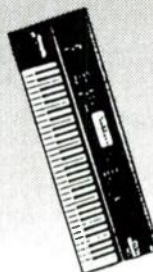
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QUALITY OF SOUNDS	●	●	●	●
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MIDI, then the XP-50, like the JV-1080 before it, is living, breathing proof that you can standardize without having to sterilize. Slot a couple of GM Standard MIDI Files into the disk drive and be amazed.

In terms of yodels for the yen or bang for the buck, the XP-50 comes bursting with goodies. The techno- and ambient-inclined, in particular, will love the samples; appreciate the wild, yet controllable effects; and be quite happy with the street-level grooviness of MRC-style sequencing.

You would be wise to fully understand what Roland means by polyphony. As with any synth, you should audition the sounds to make sure they suit your style. Make sure that you can come to grips with the control panel and that the keyboard suits your application and skills before you buy. But if the instrument comes through these tests intact, you can be sure you won't regret buying an XP-50.

*Julian Colbeck plies his trade variously as professional pundit and player and Obenfuhrer of Keyfax Software.*

## Alesis Midiverb 4

By Rob Shrock

**Alesis once again draws  
a line in the  
price/performance sand.**

**T**ake a look around the average project studio, and chances are you will see more than a few audio weapons from Alesis. It appears the company would like to do battle on every front from digital recorders, mixers, tone modules, keyboards, and drum machines to compressors and power amps.

Alesis began the battle a decade ago in the arena of affordable digital effects processors, especially reverbs, and their products' quality and features have steadily improved. The Midiverb line has gone through radically different designs with each incarnation, and the Midiverb 4 is no exception.

## FORWARD MARCH

The trend in digital audio recording and processing is toward greater bit resolution and higher sample rates. Even if the final product is a CD, which is limited to 16-bit, 44.1 kHz stereo, the benefits of manipulating digital audio at higher resolutions during all the prior stages of recording and mixing have a profound and audible effect.

Of course, higher fidelity almost always means higher prices. The Midiverb 4, however, refuses to accept this tradeoff. Despite a list price of only \$399, the multi-effects processor has 18-bit Sigma-Delta A/D converters and a 48 kHz sample rate. Frequency response is listed at 20 Hz to 20 kHz ( $\pm 1$  dB) and dynamic range is in excess of 90 dB. Distortion is listed as  $<0.009\%$  at nominal and  $>0.005\%$  at peak level. It sure looks good on paper!

The single-rackspace unit is a stereo-in/stereo-out processor. As a result, a stereo input signal not only maintains its imaging on the output of the dry signal portion, but each side can be processed separately. This can lead to more interesting and complex effects,

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(keyboards, Musical Director - Michael Bolton)



as the processing reflects the complexity of the original stereo image rather than a collapsed mono image. This is another step in the right direction for Alesis. Other manufacturers should take note that real stereo operation is now expected from even the most inexpensive processors.

The rear-panel audio connections are made via unbalanced, 1/4-inch jacks (-10 dBV). The back panel also holds a MIDI In jack and a switchable MIDI Out/Thru. A 1/4-inch connector is also provided for a footswitch, which can be used for effects bypass, program advance, or tap-tempo for delay effects. Power is supplied by a wall-wart.

### TACTICAL CONFIGURATIONS

The Midiverb 4 reminds me a little of the original QuadraVerb, as its programming uses preset algorithms to determine the multi-effects chains. There are 128 ROM presets and 128 user program locations. The arrangement of effects in an algorithm is called a Configuration. Each program uses one of

ample, "Realroom+Chorus"). Each input feeds a separate processor, and both effects are summed together at the main outputs. Actually, with the exception of the reverbs and Leslie simulator, all the effects collapse to mono when combined with another effect.

Dual Mono Configurations consist of two mono-in/mono-out effects and are designated with a colon in their name (e.g., "Chorus:Delay"). The effects chains are routed independently; each input channel feeds its own output channel directly. Effects can also be chained in Cascade mode, in which the output of channel 1/left feeds the input of channel 2/right. When set up this way, the channel 2 input jack is disabled, the channel 1 output only consists of effect 1, and the channel 2 output carries both effects combined.

Multi Chain Configurations provide two or three stereo (reverb only) or mono (all other) effects connected in series and are identified by an arrow sign in their name (e.g., "Flange->Delay->Room"). As the internal engine

If audio is running through the unit while programs are changed or (especially) when the chorus is being modulated, nasty glitches or artifacts are produced. However, other parameters, such as Reverb Wet/Dry Mix, are smooth and transparent when modulated. Real-time MIDI control of delay time in some of the Configurations would have been useful to simulate oscillator modulation, but I guess you can't have everything.

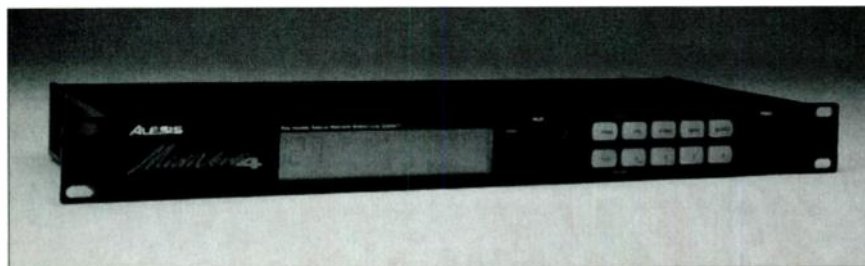
### THE ARSENAL

Within the 32 Configurations are a variety of different effects types and versions (see Table 1, "Effects Types"). As previously mentioned, multi-effect Configurations divide processor power between each effect. This is usually reflected in fewer available parameters for editing, and most of the effects are reduced to mono.

The unit's operating system makes parameter editing relatively easy. When the Edit button is pushed, the lower left of the LCD shows up to four page numbers with a paper icon surrounding the currently displayed page. Each page has up to four parameters on the screen at a time; continually pushing the Edit button steps through the pages. Each page displays an abbreviated name for the parameter with the corresponding value below.

Under the values are the letters A, B, C, or D, which correspond to the similarly labeled front-panel buttons. Pushing one of these buttons highlights the parameter you wish to edit; values are then changed with a notched wheel. The word "edited" appears under the value as an additional indicator, and the name of any program that has been edited changes from all uppercase letters to lowercase letters. The LCD itself is bright and easy to read, but there is no contrast or angle control.

There are several unique and helpful design features for which Alesis should be commended. There is a type of on-line help when editing parameters: if you can't remember what "PMix" stands for, push and hold the corresponding letter button (in this case, button D), and the Midiverb 4 will give you the entire name (Pre-Delay Mix) on the top line of the display. To the right of each value is a small, but useful, vertical bar-graph representation of the value.



The Alesis Midiverb 4 produces good reverbs and delays and surprisingly realistic Leslie simulations. Oddly enough, the chorus is its weakest effect.

32 available Configurations; the current choice is displayed to the right of the program name in the LCD.

Configurations fall into four category types: Single, Double, Dual Mono, and Multi Chain. Single Configurations dedicate the unit's entire 3 MHz processor chip to one effect type, which provides the highest quality processing. In general, effects using this Configuration sound quite good, and the extended response of the 18-bit, 48 kHz digital processing is apparent in their smoothness and low noise floor. Single Configurations can be specified as mono-in/mono-out, mono-in/stereo-out, or stereo-in/stereo-out.

Double Configurations consist of two side-by-side, mono-in/stereo-out effects (so the manual says) and are indicated by a plus sign in their name (for ex-

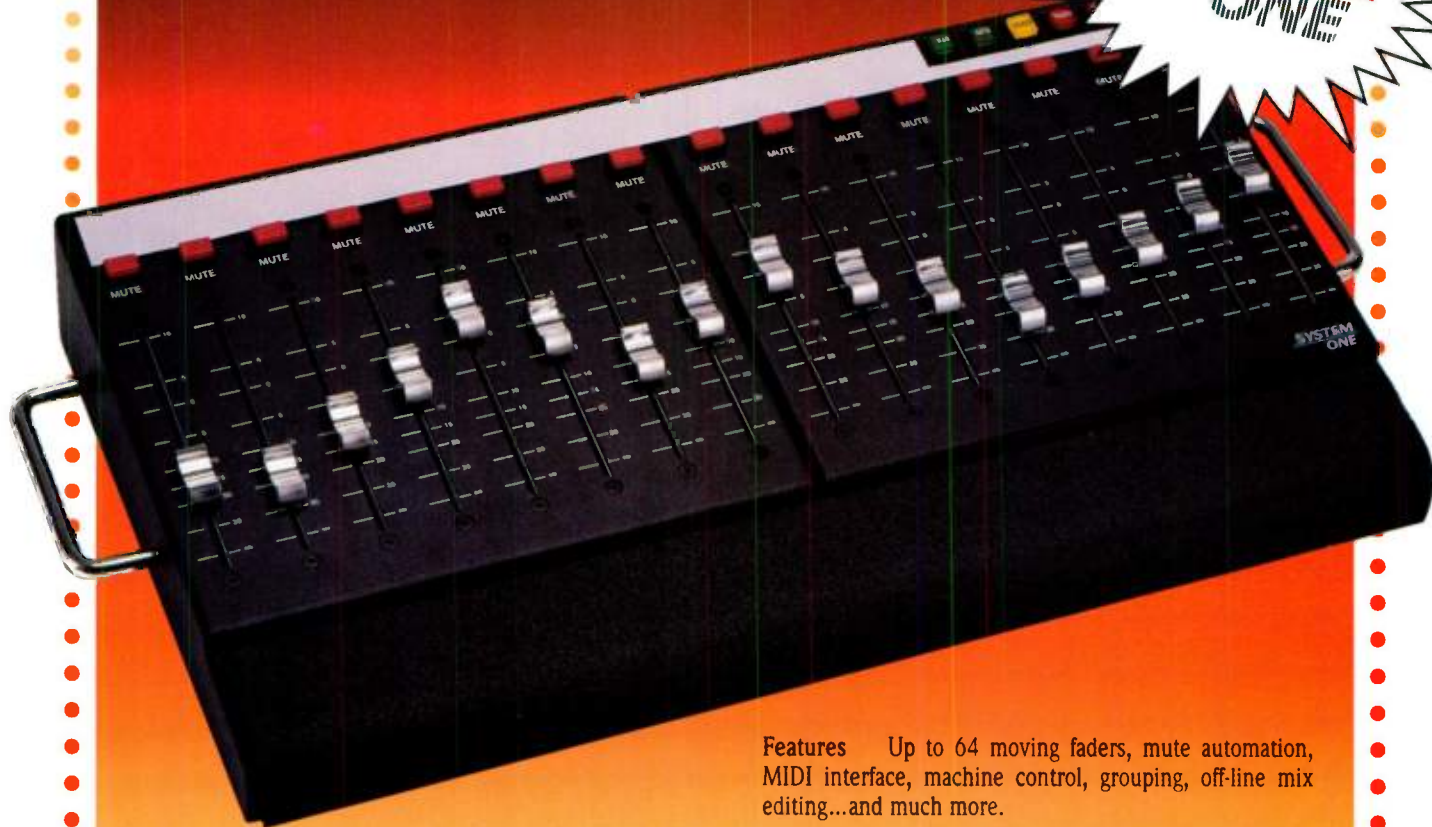
ample, "Stereo Chorus" than in "Chorus->Delay->Room.") Each effect has its own mix amount, but I would have liked a bypass on each individual effect to aid in programming.

Most Configurations have two parameters available for MIDI modulation. In page 4 of the Utility section, you are given a choice of two modulators (Mod X and Mod Y) as well as amplitude amounts for each, with a range of -99 to 99. Modulation sources can be Pitch Bend, Aftertouch, note number, Velocity, or Control Changes 00 to 119. Destinations are preset for each Configuration.



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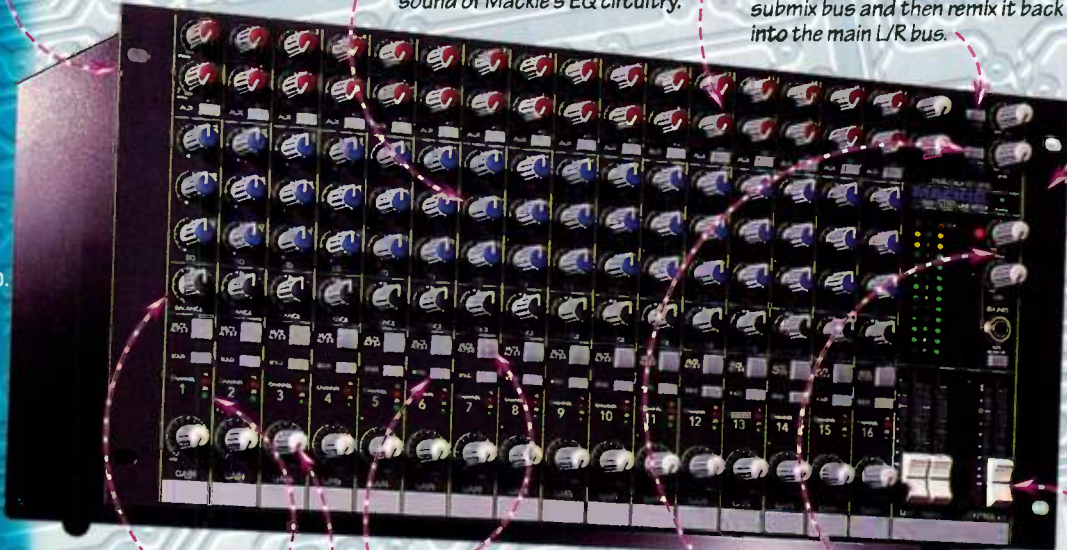
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On the bottom line of the display are two larger horizontal bar-graph representations of the input level, which is very cool. This is much better than having just a small light that tells you clipping has already occurred. However, the coolest feature is an Auto Level Sensing function accessed by pushing the Input and Output buttons simultaneously. This will "listen" to approximately five seconds of the incoming signal and set the input levels accordingly. This function works extremely well and makes it easy to get up and running on the fly. I hope to see these creative design ideas on more processors in the future.

### IN THE LINE OF FIRE

I have to admit that my first experience with the Midiverb 4 was not a positive one. In my road rack, I have an original QuadraVerb that is solely dedicated to processing a DX7IIFD. This poor thing has been knocked around the world for the last six or seven years, often held together with duct tape for weeks at a stretch. Yet it keeps on going like the Energizer Bunny.

I use the QuadraVerb mainly for chorus and reverb on electric-piano patches and for Leslie simulation on organ patches, as well as for the occasional chorus/delay/reverb thing. I took the

Midiverb on the road to see whether, in an afternoon, I could whip together some patches to match, if not better, the ones in my QuadraVerb without four other discerning pairs of ears (my employers) noticing something disagreeable going on in the keyboard section.

What I thought would be the simplest effect type to program ended up putting an end to the afternoon adventure altogether. No matter how much editing I did, I could not get the Midiverb 4 to give me a pleasant stereo chorus sound for my electric pianos. Admittedly, there is a subjective nature to chorus sounds that defies description, but a little thick cloudiness and blur is the whole point of a chorus sound to a lot of people. The QuadraVerb stereo chorus, even in a multi-effects algorithm, is much more smooth and silky than the Midiverb 4, which sounded warbly and edgy.

There also doesn't seem to be a wide usable range on many of the effect parameters. For example, the chorus rate ranges from 0.1 to 25.5 Hz, in 0.1 Hz increments, and chorus depth ranges in units from 0 to 255. Yet the chorus sound becomes overbearing after only a rate setting of 1.5 Hz and depth setting of 30. What is the rest of the range for?

The most common delay-level range was only five to ten percent; the other ninety percent was too much for typical applications. This made it difficult to tweak delay amounts to fit into programs when the unit is used as an inline processor. Although I appreciate the usefulness of extreme ranges, I would much prefer to have the resolution more finely limited to a useful area. It is easy to overdo it, particularly when trying to find that sweet spot between too much and not enough delay in the chorus.

I also noticed that the reverb time on most programs has to be set much higher than usual: typically, a setting in the 4- to 5-second range produces a sound I normally expect with a reverb time under two seconds. Also, when you bring the Chorus amount down to zero, there is still a little bit present in the outputs. And while we're on negatives, don't power this puppy up or down with your speakers or headphones on: it makes one of the loudest, nastiest spikes you'll ever hear.

I was interested to see how the Midiverb 4 would fare on Leslie simulations.

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## • MIDIVERB 4

What a complete turnaround! I was blown away by how realistic it sounded. You only get four parameters on the "Leslie" page: Motor (On/Off), Speed (Fast/Slow), High Rotor Level, and Wet/Dry Mix, but that's okay. It sounds great.

When you turn the Motor off, not only can you hear the rotating horn slow down and stop, you can hear exactly in what position the horn stops in a 360 degree circle. Start it up and stop it again, and it ends up in a different position. It makes the Leslie simulator in the old QuadraVerb sound like a bad, warbly chorus effect. As you increase and decrease the High Rotor Level, it sounds as if you are moving a stereo pair of microphones up and down the Leslie cabinet. It's almost worth \$399 for this effect alone.

When I got back home, I decided to see how the Midiverb 4 sounded in a recording environment at my home studio. The Single Configuration reverb programs are excellent. The reverbs have a nice density with smooth decay tails, although I still was confused by the Reverb Times displayed. I just used my ears and ignored the values. An added feature worth mentioning is the Pre-Delay Mix Amount, which is not found in a lot of inexpensive processors.

The 18-bit, 48 kHz conversion is especially apparent in the delays, which are excellent even though the smallest delay resolution is a millisecond. The pitch-change programs are also good, and the fine-tune parameter helps lock in the pitch. In fact, I like most of the Single Configuration programs. Even



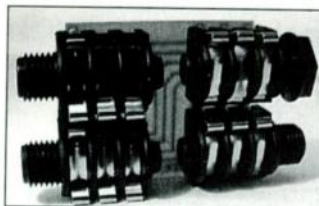
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## Product Summary

### PRODUCT:

Midiverb 4

### PRICE:

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### MANUFACTURER:

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the Stereo Chorus sounded a little better in a controlled environment, but it would still not be one of my first choices for this effect.

## WHEN THE SMOKE CLEARS

As a single-effect processor, the Midiverb 4 shines in a lot of areas. The reverbs and delays are especially good, and there are some unique features such as the Auto Level Sensing and LCD bar graphs. Real stereo operation and effective, although limited, real-time MIDI modulation are additional pluses.

As a multi-effects unit, however, it falls short, mainly because most effects become mono and the available parameters are more limited. The value ranges are not subtle for a lot of parameters, and the chorus is particularly unpleasant. The Leslie simulator is this unit's secret weapon and, to some, this alone may be worth the price of admission.

*Composer/producer Rob Shrock is also the keyboardist/arranger for Dionne Warwick and Burt Bacharach.*

## Fatar Studio 1100 Master Keyboard

By Steve Oppenheimer

**Goldilocks and Popeye go in search of a cool MIDI master controller.**

**E**nough is enough, and enough is too much," famed maritime philosopher Popeye the Sailor often opined. But if we attempt to apply the great nautical sage's wisdom to MIDI master keyboards, we're left with two obvious followup questions: "How much MIDI control is enough?" and "What constitutes too much control?"

The answers to these deep, philosophical questions depend on your applications and the capabilities of your other equipment. Lots of MIDI-control features translates into flexibility and increased expressive capability. But more features equals a higher price and sometimes can result in a steeper

learning curve. In other words, enough could be too much.

On the other hand, if you have a powerful sequencer and a MIDI patch bay/processor, you might not need to duplicate all that power in your keyboard. If your live rig is small, or your sequencing needs are few, why spend extra money for features you won't use? Sometimes, all you really need is a weighted action with Velocity and Pressure, two or more programmable zones (especially for live work), a few control wheels and pedals, a sustain pedal, SysEx support, and perhaps a bell or whistle for good measure. In such cases, enough is enough.

Fatar's extensive line of 88-key weighted keyboards lets you choose a unit with just the features you need, including an optional, integrated road case. (The company also offers unweighted keyboards, but that's another story.) Those who need extensive parameter control with all the trimmings may find bliss with the Studio 2001/C (\$2,295; reviewed in the July 1993 *EM*). If you just need a basic, weighted keyboard with Velocity, Pressure, control wheels,

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and not much else, check out the Studio 900/C (\$1,295). The most basic of all is the Studio 90/C (\$1,050), which has just one split point, transposition, and a sustain jack, but no control wheels.

On the other hand, Goldilocks might exclaim that an in-between solution would be "just right." If you agree with her, you may prefer the Studio 1100. (A "just right" solution for those who don't need 88 keys might be the new 76-key weighted version, the Studio 1176 [\$1,395], which should be shipping by the time you read this.)

## THE WEIGHT

A weighted action is essential to the keyboard player whose primary instrument is piano, but it is advantageous for more than just piano parts. Compared to an unweighted or semi-weighted action, a fully weighted action is deeper, smoother, and more precisely responsive to the player's touch. That makes it superior for many types of lead and background lines, such as strings and horns, where a better touch lets you deliver a cleaner and more expressive performance.

As important as the action is, it's also the hardest part of a master keyboard to describe and review. I've played (and lived with) the Fatar-built, 88-key weighted actions in the Ensoniq KS-32 and TS-12, Peavey C8, Cheetah MS-770, and the Fatar Studio 88 and Studio 2001. Each one is a little different, but they're all quite good. The Studio 1100's action is very similar to the TS-12: it's smooth and moderately fast. Like virtually all weighted actions, there is a noticeable key click. The Peavey C8 action is the most distinctive of the bunch, and I prefer it to the Studio 1100 action, but not by much. (I like a slightly deeper, heavier action.)

Is the Studio 1100 action as good as a real piano? Of course not; no MIDI keyboard I've played is as good as the real thing in this respect.

## IN THE MODE

As with most aspects of the Studio 1100, the I/O ports are simple and adequate. The rear panel sports a MIDI In port, two MIDI Outs (which are parallel, i.e., they carry the same data), a CV-pedal jack, a normally-open sustain-pedal jack, and a barrel connector for the external power supply. The MIDI In port can be used to load Presets via System Exclusive, but it can also be used to merge an incoming datastream with the Studio 1100's MIDI output. The rear-panel jacks are labeled with raised letters (black-on-black) and are not marked on the keyboard's top surface. I needed a flashlight to read the labels.

If a master keyboard doesn't have an extensive parameter set, it doesn't need a sophisticated, expensive user interface with a graphic LCD and tons of menus or buttons. Following this logic, the Studio 1100's interface is simple and easy to use. For example, you don't even have to save your changes to the unit's Presets, because all parameter changes are automatically saved in real time to the current Preset.

The Studio 1100 offers two modes of operation. You normally play in Perform mode, in which you can call up the onboard Presets. The programming features are accessed in Edit mode. The keyboard and all controllers are active in both modes, so you can audition your edits in real time.

You get six performance controllers in addition to the Velocity and Channel Pressure (Aftertouch) messages generated by the keyboard. The obligatory

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mod wheel and spring-loaded pitch-bend wheel are conveniently located above the bottom half-octave of the keyboard. There also are two sliders; one is dedicated to Master Volume, and the other is a programmable controller that can send Control Changes 0 to 120. This programmable controller becomes a data-entry slider in Edit mode. The CV pedal can also be programmed to send CC 0 to 120, and don't forget the sustain pedal (CC 64).

These should satisfy most players. However, if you want to add a second

MIDI controller to your rig, you can do so via the unit's merging MIDI In port.

There are 32 user Preset memories, arranged as eight banks of four. Demo Presets are provided in locations 11 through 14; these can be replaced with user programs and restored by reinitializing the unit. In Perform mode, the two Preset/Zone buttons step incrementally through the eight banks, while four Preset/Function buttons select Presets within the selected bank. (The data slider is not available for calling up Presets because it is a programmable MIDI

controller in Perform mode.) Preset numbers and parameter values are shown on a 3-character by 7-segment, numeric LED display.

In Perform mode, you can quickly and easily send Bank Select and Program Change commands directly from the keyboard. Eleven black buttons in the middle of the keyboard are labeled with ten numbers (1 to 9 and 0) and the word "Bank." When you hold any Zone button and press these numbered keys (or the Bank key and then the numbered keys), the Studio 1100 sends a Program Change or Bank Select command on that Zone. This nifty short-cut not only lets you change sounds quickly, it makes the unit's otherwise paltry 32 Presets go a lot further, because you don't have to create multiple Presets in which the only difference is a Program Change or two.

#### GETTING ZONED

The Studio 1100 keyboard is divisible into four independent, programmable Zones. These Zones can be enabled and disabled in Perform or Edit mode, using dedicated Zone buttons with status LEDs.

To enter Edit mode, you simply hold the desired Zone button and press one of the four Preset/Function buttons. There are eleven user-programmable parameters, which can be set independently for each Zone. Each Function key accesses three of these parameters, which you step through by repeatedly pressing the key. (Although it is global, the MIDI Receive channel is programmed as if it were a twelfth Zone parameter.) The Zone's LED flashes until you hit the Zone button again to exit Edit mode.

Values are set with the data slider. Although the Studio 1100's method of scrolling through values isn't the fastest or easiest I've seen, it's good enough. Moving the slider from one end position to the other alters the selected value by sixteen. If you keep moving the slider up and down to its extreme positions, the numbers continue to progress in one direction until you reach the maximum or minimum value. If you stop part way through the slider's travel and reverse directions, the values reverse, too. If you set the value to a dash, the parameter is disabled (including Program Changes).

The Preset/Zone increment/decrement buttons step between Zones while

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Fatar's Studio 1100 MIDI master keyboard is moderately priced, includes a modest but solid feature set, and fills the middle niche in Fatar's wide-ranging line of 88-key weighted controllers.

you are editing a parameter, which is great for making quick A/B comparisons. Similarly, when editing in a given Zone, you can use the Preset/Function buttons to navigate between the parameters.

Each Zone can be assigned to send on any MIDI channel and any note range from 0 to 127, so the unit can be used for layers as well as splits. You can set the Zone range with the data slider, but it's much easier to use a handy shortcut: simply press and release the Zone and Function buttons, and then press the desired bottom and top keys. Using the data slider to set the note range is a pain because Fatar does not help you interpret the MIDI note numbers as black and white keys. Some keyboards have a test mode that displays the note number for any key you hit; others have note numbers silkscreened above the keyboard. I would have settled for a chart in the manual.

The other Zone parameters cover the basics. Separate Program Changes can be sent for each Zone, and you can transpose the Zone data by  $\pm 24$  semitones. Relative levels can be balanced by setting an initial Volume value for each Zone that takes effect whenever the Preset is recalled; thereafter, the Master Volume slider maintains the level relationship between Zones.

As mentioned earlier, the Studio 1100 gives you Channel Pressure, Velocity, and six other performance controllers (two wheels, two sliders, a CV-footpedal jack, and a sustain-pedal jack). The only Velocity curve is linear, but it is available with five positive and five negative slopes. (A slope of 0 gives you a flat Velocity of 64, regardless of playing force, while a slope of +3 provides normal, positive Velocity.) Most people never use the alternative Velocity curves provided in high-end keyboards,

so this feature helps separate the player with average MIDI control needs from the power user who is better off with a higher-end master controller.

Pressure sensitivity can be defeated for each Zone independently. The Master Volume slider is global and can't be defeated, which makes sense. Besides, you can use a CV pedal for individual Zone volumes. In addition, the global MIDI receive channel (the channel on which the unit responds to Program Changes) can be disabled.

However, a few of the controller implementations are a bit disappointing, even for a midlevel master controller. The pitch-bend wheel and mod wheel are enabled/disabled together, rather than separately, which was an unpleasant surprise. In addition, the sustain pedal is global and cannot be defeated. As a result, you may have to create multiple versions of certain synth sounds to sustain them in some applications (e.g.,

### Product Summary

#### PRODUCT:

Fatar Studio 1100 master keyboard

#### PRICE:

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## ● STUDIO 1100

as part of a layered pad) and not others (such as a lead or bass line).

Using SysEx is straightforward enough: hold any Zone button and press Save, and the Studio 1100 sends SysEx; press Load, and the unit waits to receive SysEx. If the incoming SysEx matches the Studio 1100's SysEx ID, the keyboard loads its Presets. If the SysEx data is "foreign," it is automatically passed to the MIDI Out port, where it is merged with the Studio 1100's data and sent to all connected MIDI devices. It's a slick way to handle SysEx and data merging.

### ENOUGH IS ENOUGH

A wish list of cool features the Studio 1100 lacks would be long. If you feel enough should be too much, you need a Studio 2001-class keyboard. Still, there are two missing items of consequence that I haven't previously noted. First, you cannot send Start/Stop/Continue messages for a sequencer or drum machine, which would be handy for live performance. More important, there is no Panic button to deal with hung notes and stuck controllers. (When fully implemented, this feature should send MIDI All Notes Off, Note Off 0 to 127, Reset All Controllers, and nominal values for all Control Changes and Pitch Bend on all channels.)

I like the Studio 1100. The action feels good, and the unit's layout is ergonomically excellent. I rarely needed the documentation, but when I did, I had no problem finding answers. (The MIDI Control Change chart is out of date, though.) I already have lots of MIDI processing and mapping power, thanks to a pro-quality sequencer and high-end MIDI patch bay/processor, so the Studio 1100's control features were enough for me. And anyone who can't find their way around the features on this unit needs a wake-up call and a quadruple espresso (or a can of spinach for one-eyed sailors).

If a weighted action is at the top of your wish list, Fatar MIDI master keyboards could be just right. And if you think enough is enough for your applications, the Studio 1100 won't be too much. Goldilocks and Popeye finding common philosophical ground—it could only happen in the pages of **EM**.

**EM Senior Editor Steve O. insists that even if you get what you pay for, it isn't a bargain if you can't afford it.**

## Free Play World Music Menu 2.03

By Scott Wilkinson

**This Mac and Windows program makes it easy to explore the world.**

**A**mong the hallmarks of non-Western traditional music are the scales used in its performance. These scales differ from those in the Western tradition in that they do not usually divide the octave into equal intervals. Although it is possible to retune many modern synthesizers to these scales, you must first study the scales and learn their intervals and then navigate the tuning editor of the synth, which can be daunting. Alternatively, you can take the easy route and buy Free Play Productions' *World Music Menu* (WMM) for Macintosh or Windows. (I reviewed Mac version 2.03.)

Free Play's program instantly retunes any supported synth to any of over 100 scales from around the world. The supported synths include the E-mu Proteus (any model); the Kurzweil K150, K2000, and K2500; and the Yamaha DX7II, TX81Z, TX802, SY/TG77, SY99, and VL1. The Windows version also supports Turtle Beach MultiSound sound cards, which are the only current MIDI products that support the MIDI Tuning Standard. (Other manufacturers, take note!) Unfortunately, most other synths and sound cards have insufficient, if any, microtonal capabilities.

### WHY RETUNE?

Most modern Western music and the instruments used to perform it are based on the 12-tone, equal-tempered scale. Unfortunately, it is generally quite difficult to retune most Western acoustic instruments to non-Western scales. The only such instruments on which this can be easily accomplished are fretless strings (violins, cellos, etc.), trombones, and the human voice. However, performing non-Western scales on these instruments requires performers with significant dedication and skill.

On the other hand, it would seem a simple matter to retune a synthesizer; all you have to do is change some numbers in the instrument's software. A few

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years ago, several manufacturers (especially Yamaha) realized this and started to offer synths with microtonal capabilities. (It's important to understand that "microtonal" doesn't necessarily mean tiny intervals; it means the intervals are "detuned" from 12-tone equal temperament by tiny amounts.) As mentioned earlier, though, programming alternate tunings into a synth can be more trouble than it's worth.



**The program includes  
over 100 scales  
organized primarily by  
geographic region.**

*World Music Menu* makes this process simple by sending preprogrammed strings of SysEx to the synth. All you do is select a scale from a menu and play. This lets you explore the amazing world of scales with unparalleled ease. (During your initial forays, I suggest using a harpsichord sound, which reveals the nature of each scale quite well.)

#### PLANNING YOUR TOUR

Installing *World Music Menu* is a snap. (The program is not copy protected.) The first time you run it, a dialog box appears reminding you to select the serial port and identify your synths.

Once the program is running, a nice graphic of Pythagoras' monochord appears, and you can select OMS or the serial port to which your MIDI interface is connected. The next step is telling the program what synths you are using. Each time you add or change a synth in your setup, you select from a list of supported synths and specify the MIDI channel, SysEx or Device ID, and tuning memory location to receive the scale data. If you are using OMS, you select the OMS name for the synth from a pop-up list. You can also easily delete synths from the setup.

Finally, you designate one or more synths to receive the scale data. Whenever you add or change the configuration of a synth, it is automatically designated. I suggested this particular refinement to the programmer of *World Music Menu*, Stephen Nachmanovitch, and he implemented it on the spot. Talk about responsive!

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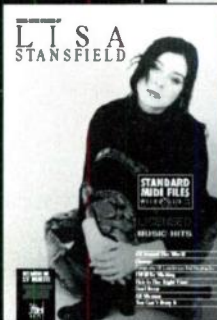
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## ● WORLD MUSIC MENU

### EXPLORING THE WORLD

Once the setup is complete, you simply select a scale from the Scales menu, and the data is immediately sent to the selected synths via SysEx. The program includes a total of 121 scales organized mostly by geographic area (see Fig. 1). The types of scales include Greek, Indian, Mesopotamian, Asian, Balinese, Middle Eastern, African, Blue, and Mathematical, which includes various forms of Just Intonation and several baroque temperaments such as Bach might have used. A dedicated Equal Temperament menu item with a Command-key equivalent lets you quickly reset the synths to 12-tone equal temperament, and the last selected scale is underlined in the menu.

Most of the scales include five or seven tones per octave, which map to the black or white keys, respectively. Seven-tone scales start on C, while 5-tone scales start on C#. There are a few 12-tone scales, such as the baroque temperaments, but no scales with many notes per octave (e.g., 19-tone, 53-tone, and so on), which are difficult to map onto a standard keyboard. When you select a scale, a bar graph appears that indicates the width of each interval (see

### Product Summary

#### PRODUCT:

World Music Menu 2.03 (Mac)

#### PRICE:

\$99

#### SYSTEM REQUIREMENTS:

Macintosh: Mac Plus or better, hard drive, System 6.0.7 or later (System 7 recommended), MIDI interface, one or more supported synths  
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Fig. 2). If you select a 5-tone scale, the white keys all play the tonic note of the scale; if you select a 7-tone scale, the black keys all play the tonic. Pressing the space bar toggles between the last two selected scales.

World Music Menu provides several ways to transpose and modulate the current scale. For example, a Change the Tonic feature lets you shift the entire scale up or down in semitone and 1-cent increments. The scale always starts on the C or C# key, but the actual pitches you hear change according to your setting. For example, if you set the scale to start on F and you play a C key, the actual pitch will be F.

You can also instantly transpose or modulate the scale upward by pressing one of the number keys at the top of the computer keyboard; e.g., the "2" key shifts the scale up to start on the second degree, while the "4" key shifts the scale up to start on the fourth degree. When you press a number key, the number appears in the interval bar graph, reminding you of your action. Pressing "1" returns you to the original scale.

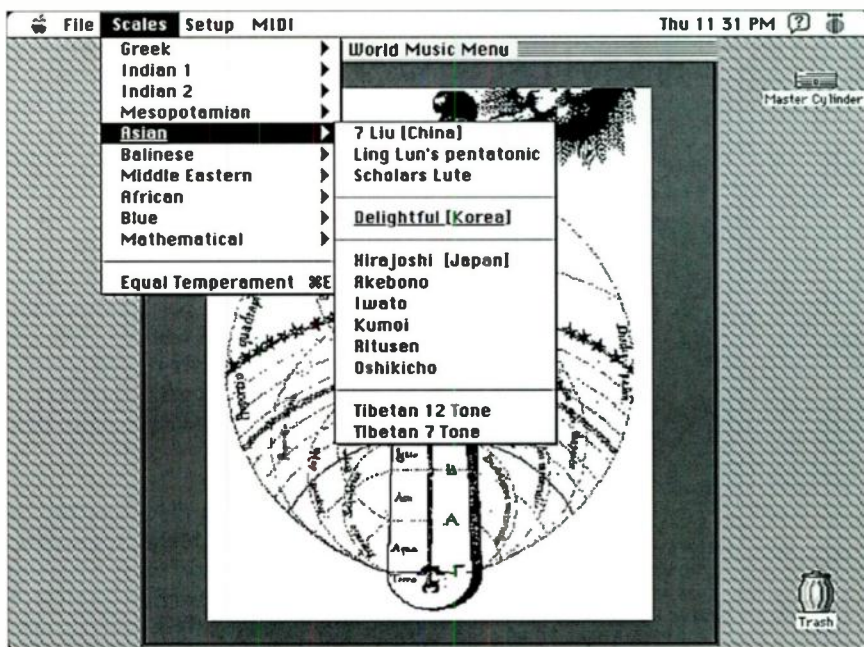
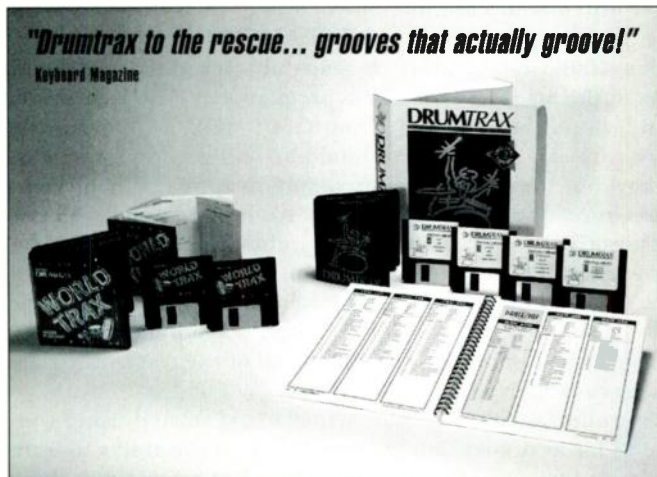


FIG. 1: World Music Menu's scales are organized by type and appear in submenus. The last selected scale is underlined.

The number keys operate in one of two modes: Transpose and Modulation. Transpose mode works just like

Change the Tonic, except that the tones shift according to the intervals of the scale, rather than semitones and

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## ● WORLD MUSIC MENU

cents. Modulation mode shifts the scale to start on a different key on the keyboard. For example, if you press the "2" key on the computer keyboard, the scale starts on the D or D<sup>♯</sup> key, instead of the C or C<sup>♯</sup> key, and the scale's intervals are maintained from the new starting note.

This is handy for playing Just Intonation and baroque tunings in different keys. In addition, Nachmanovitch's future plans include adding a feature that will let you specify these transpositions and modulations from the bottom octave of your keyboard controller.

### SIDE TRIPS

Stacking is one of *World Music Menu*'s coolest features. In addition to toggling the last two selected scales with the space bar, you can assemble up to 24 scales (including different transpositions and modulations of the same scale) into a Stack. Once you do, you can step through these scales by pressing the Page Up and Page Down keys on the computer keyboard. In addition, the Home key jumps to the first scale in the Stack and the End key jumps to the last scale. You can also assign any MIDI Control Change or note message to step upward through the Stack. This is also helpful for playing Just

Intonation and baroque temperaments in different keys or changing from one scale to another in a performance set.

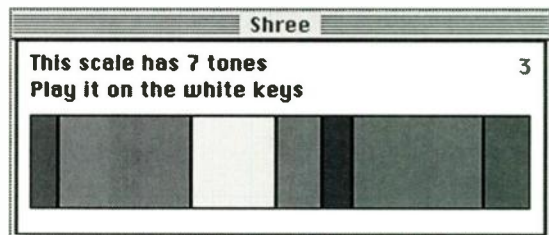
I would like to see a couple of refinements to this feature. For example, it's easy to forget which scales are in the Stack. When a Stack is assembled and used, a window should appear with a list of the scales in the Stack and the current scale underlined. Also, after you build a Stack, you can clear it by pressing the C key, but the resulting dialog box has no Cancel option. If you hit the C key by mistake, your Stack is cleared whether you like it or not. You should be able to abort this and retain the Stack.

Other features include Reset and Silence MIDI, which sends All Notes Off and Reset All Controllers on all channels. This is fine as far as it goes, but there are many synths that do not recognize one or both of these messages. For example, the VL1 recognizes Reset

All Controllers but not All Notes Off. This function should also send Note Off 0 through 127 and nominal-value Control Change and Pitch Bend messages on all channels.

In most cases, *WMM* happily coexists with other MIDI software, which is great for using different tunings with a sequencer. However, there are a few exceptions, so the program lets you open and close its connection to the computer's MIDI driver. It also offers a handy Test Play feature, which plays a 1-octave scale up and down on the specified channel.

If you have at least two supported synthesizers and a master keyboard controller, try this neat trick I learned from Nachmanovitch. Set the synths to the same channel, and send a 7-tone scale to one of them and a complementary 5-tone scale to the other (for example, Balinese Pelog 1 and Sorog).



**FIG. 2:** When you select a scale, a bar graph appears to indicate the width of each interval. The number in the upper right corner reveals that the scale has been transposed or modulated to the third degree of the scale.

Now, as you play the white keys, you hear the 7-tone scale along with the tonic drone from the 5-tone scale and vice versa. This produces a wonderful, gamelan-like effect.

### CONCLUSION

I've already picked most of the nits in this program, but I still have one minor complaint: MIDI is an acronym and should be spelled with upper case letters, but it appears in mixed case ("Midi") almost everywhere in the program and documentation. (After he read this review, Nachmanovitch immediately made some of the changes I've suggested, and he will implement virtually all of the rest by the time you read this.)

When I first started using the program, I wanted the ability to input my own scales. It turns out that this capability will be offered in a different program for "power users." *WMM* is



intended for those who want to explore the wonderful world of alternate tunings with a minimum of previous experience, an intent I heartily applaud. Nachmanovitch will even add specific scales on request, which is the epitome of customer service.

*World Music Menu* comes with two excellent manuals. Both are well written and attractively designed. The *User's Guide* includes a few small errors, such as incorrect and missing page numbers when referring to other sections. *Tuning* is an excellent introduction to the entire subject, and it offers an excellent bibliography, which includes my book *Tuning In: Microtonality in Electronic Music*, (available from Mix Bookshelf; tel. [800] 233-9604).

Despite a few minor quibbles, this is an exceptional program that offers a excellent way to learn about scales of the world. *World Music Menu* makes it easy to explore these scales and use them in your own music. I had great fun playing with it, and I suspect you will, too. ☺

## Voce Electric Piano

By Alan Gary Campbell

**Classic keyboard  
sounds in a  
half-rack module.**

**A**lmost every synthesizer features some sort of electric- or electronic-piano sound. In fact, many electronic musicians consider a synth incomplete without at least a Fender Rhodes patch. So why would you want a sound module dedicated to electric pianos? Because no stock synth convincingly covers all the major classic electrics.

Voce's Electric Piano is an additive synthesis-based box designed to fill this niche in the sound-module market. Like many specialized devices, it has cool features and quirks, but no preset box lets you try out your piano parts with more classic electric instruments. To match Voce's offering, you probably would need a sampler with lots of RAM and a solid sample library or an expandable synth with supplemental cards. Of course, the number of classic

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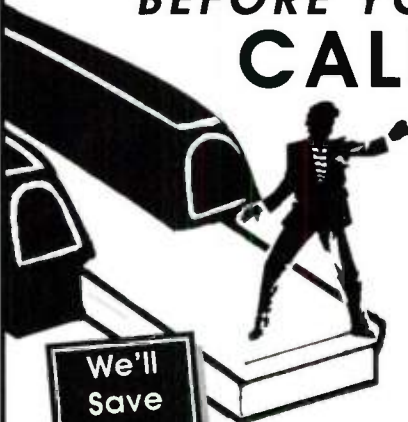
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## ● ELECTRIC PIANO

patches isn't the only measure of success, so let's explore the Electric Piano's features and discover how well it does its job.

### BASIC FEATURES

By design, the Electric Piano is easy to use; you don't need the manual for basics. On the front panel, a rotary switch selects the first 22 presets, which are identified by tiny numbers on the knob. Ten additional presets are available via MIDI Program Change commands. The module has no display, so when you change presets via MIDI, you can't visually confirm which preset is active.

This is a preset-only box in the literal sense: you can adjust the global effects, transposition, and MIDI-channel parameters, but you can't adjust the tone-generation parameters or Control Change maps. Front-panel knobs adjust volume, overdrive (a transistor-type distortion most useful with Wurlitzer sounds), and rate and depth for the chorus and tremolo effects. Momentary switches select chorus, tremolo, and a funky auto-wah effect, with associated



Voce's half-rackspace Electric Piano module provides impressive Wurlitzer, Pianet, and RMI emulations. The Clavinets are good, too, but the Rhodes sounds are disappointing.

LEDs to indicate status. All three effects are available simultaneously.

A rotary switch selects various transposition intervals. You can transpose chromatically, or up or down by octaves, but not both. The straightforward transposition control is welcome, but the tiny panel legend makes it difficult to set in dim lighting. (The same thing is true of the preset-select switch.) A MIDI Transpose function would have been a plus.

On the back panel, the Electric Piano has the expected adapter input; power switch; MIDI In and Thru (but not Out) jacks; and 1/4-inch, unbalanced line outputs. The second line output can drive high-impedance (600Ω) headphones directly. That type of headphone is pretty rare, though; I wish Voce had supplied a separate, standard headphone jack. An unexpected plus is a pedal input for controlling the wah effect, which works with a standard volume pedal.

The MIDI channel is selected with a miniature, set-and-forget rotary switch. This is adequate for most setups, but if you mount the half-rackspace Electric Piano on a rack shelf (mounting hardware is included, by the way), you may have trouble getting to the switch later. Potentially even more troublesome is the back-panel tuning control. It's optimistic to assume you won't need access to it! Granted, the front panel is packed, but surely some way could have been found to accommodate the tuning control, such as a dual pot for volume and overdrive. Fortunately, the tuning control has a center detent that keeps the pitch stable at A-440.

### CLASSIC SOUNDS

Inside the Electric Piano is a clean, G-type epoxy circuit board with what appears to be an adequate ground plane. There was no appreciable hum or RFI coming from the unit, but the sound quality is far from pristine. The basic tone-production circuitry uses digital

additive synthesis with carefully tweaked envelope generators. However, the tremolo and wah circuits are analog, which lends realism to the effects but probably also accounts for the low-level hiss in the outputs. The filters are based on CEM 3379s, and the op amps on board are TLO84s; neither is a particularly low-noise chip.


Also of concern is the perceptible aliasing that occurs with the upper notes of some presets, even with octave transposition off. These problems are unlikely to affect live-performance applications but will undoubtedly show up in digital recording environments.

Voce has supplied seventeen basic electric-piano sounds, including two Wurlitzers; five Clavinets; Rhodes Stage, Suitcase, and "Nail Polish"; two harpsichords (8' and coupled 8' and 4'); two Hohner Pianets; Yamaha DX7 Electric Piano 1 and Electric Piano 2; and RMI Electric Piano. The remaining presets simply add effects, such as chorus and tremolo.

The Wurlitzer presets are very good and sound especially convincing with overdrive and tremolo. The Pianet and RMI presets, too, are right on. The DX7 presets hold up well in context, though they are not as mellifluous as the originals. The Clavinet presets are convincing, and Clavinet connoisseurs will appreciate the attention to detail. However, the presets have similar, basic timbres. What a shame that not one of the Clavs has the mute on!

The Rhodes presets, on the other hand, have a lack of timbral range that diminishes their effectiveness. At least one of the Rhodes sounds should "bark" at you when you lay into the keys, but all three are rather nondescript and fail to produce a distinct bell-like character, even at lower Velocities. Many Rhodes simulations are more convincing and fun to play than these, not least of which are the versions in the Kurzweil MicroPiano and Roland P-55 piano modules.

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The harpsichords are pitiful, without so much as a hint of "pluck" in the attack. However, enabling the auto-wah with the coupled sound, transposed down an octave, makes a killer, Godzilla-size Clav substitute. Overall, it's the best sound on the machine.

The decay curves on all the sounds seem a little unnatural. They're too linear and too long. This is most noticeable in the upper range, especially with the Clav sounds. To be fair, this is a minor inaccuracy that will probably not bother most users.

#### PRESET EFFECTS

The presets with effects are generally well designed. The best effect of the bunch is the wah circuit, which sounds great. The tone generator, chorus, and wah are mono, but the tremolo is stereo, which greatly enhances the Wurlitzer and Rhodes simulations. For mono operation, it's important to use



**The best effect of  
the bunch  
is the wah  
circuit, which  
sounds great.**

only one of the line outputs, or phase cancellation will cause the tremolo to disappear.

Presets with preprogrammed effects are stored together in ROM, including effects rate and depth values. There is no user memory, and any effects changes are lost when you power down or change presets. When you power up the unit or change programs, the front-panel controls are ignored, and the parameter values are those in the current preset. If you turn an effect off and back on with the momentary switches, the unit implements the front-panel values.

The Electric Piano has 32-voice polyphony, but the chorus uses two voices per note, which effectively cuts this to a dangerously low sixteen voices. The voice-assignment algorithm doesn't help, as it assigns voices (or with the chorus on, pairs of voices)

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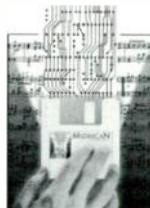
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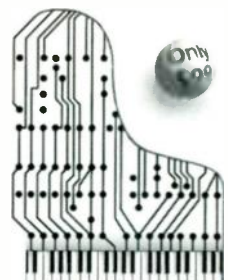
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SEPTEMBER 1995

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e. "Working Musician: Hand Over Hand," p. 78	717	718	719	720
f. "Square One: Patch Me Through" p. 86	721	722	723	724

## ● ELECTRIC PIANO

using simple, last-note priority. Therefore, if you hold a left-hand chord while performing right-hand arpeggios with the sustain pedal down, the left-hand notes are all too quickly robbed and unceremoniously cut off. I wish Voce had written the assignment algorithm to hold notes for which no Note-Off command has been received. With or without chorus, a minute "thump" is audible when voices are robbed, though in this respect the Electric Piano is no worse than many other modules.

If the limitations of the onboard effects get in your way, the best solution is to simply turn them off and use an external effects processor. This would also provide superior programmable control while preserving the sound module's full polyphony.

### MIDI IMPLEMENTATION

The Electric Piano's MIDI functions are adequate. The unit receives in Omni mode ("channel 0") or selectively on channels 1 to 15. (I guess they couldn't find a 17-position rotary switch.) Setting the front-panel Preset switch to the "M" position enables a limited multitimbral mode in which the Electric Piano receives data on three consecutive channels, starting with the base channel. If a high-number base channel is selected, the multitimbral channel assignment "wraps around"; e.g., if the base channel is set to 15, the unit also receives on channels 16 and 1. This mode facilitates the creation of composite timbres, such as a Clavinet/Pianet Duo simulation.

### Product Summary

#### PRODUCT:

Electric Piano sound module

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However, this reduces the polyphony, which is especially critical with the chorus enabled.

The chorus, tremolo, wah, and auto-wah effects can be enabled and disabled using MIDI Control Changes 80 to 83. Control Change 1 (Modulation Wheel) modulates the wah center frequency. The chorus and tremolo share common rate and depth values, which can be altered via Control Changes 91 and 94. These two assignments are a bit unusual; CC 91 is generally used for reverb depth, CC 94 for delay depth, CC 92 for tremolo depth, and CC 93 for chorus depth.

The Electric Piano responds well to keyboard controllers with linear Velocity curves, but it is unforgiving of instruments with oddball curves, such as the Yamaha pf85 digital grand. Pitch Bend, which I found especially useful with the Clav presets, is fixed at a whole step. MIDI Volume is supported, but Pressure is not.

### THE VERDICT

To my ears, the Electric Piano module's greatest strengths are the Wuritzer, Pianet, and RMI sounds. These are good enough that, aside from the effects, you probably won't care that you can't tweak them. The idea is to reproduce classic sounds, not to create original sounds; if you absolutely have to customize your patches, this isn't the module for you.

The unit would make a stronger impression if it had a better Rhodes sound. If you have enough Rhodes patches elsewhere, you can live with that, but it's still disappointing. To add flexibility, you probably will want to process the output through an external effects device. Quieter outputs are also near the top of my wish list.

Considering its drawbacks—lack of a real effects processor, mediocre audio quality, lack of a display, and very limited feature set—I think the Electric Piano is overpriced. Still, some allowance must be made for a specialized device with a limited market. Also, keep in mind that unlike most of its competitors, this is not a sample player but a carefully programmed additive synth. Voce got the basic idea right on the Electric Piano, and it's a solid unit. If Wuritzer, Hohner, and RMI instruments are near and dear to your heart, you might want to make room in your crowded rack for one more module. ☺

## KAT trapKAT

By Brad Schlueter

### Welcome relief for overworked electronic drummers.

If you play many gigs, you've probably heard a drummer remark, "I play for free; they pay me to set up." Who can blame drummers for enjoying a little self-pity about the quantity of gear they must carry? Electronic drummers may have it even worse than their acoustic counterparts; they have to transport drum pads, cymbal pads, amps, monitors, and sound modules, assemble a jungle gym of hardware, and cable the lot together. Then they have to pray that everything works.

KAT's new trapKAT MIDI percussion controller rescues electronic drummers from this nightmare. It not only simplifies the physical setup process but works right out of the box with most popular drum sound modules. It also instantly supports General MIDI boxes and even includes ROM-based melodic and percussive grooves for practicing or performing. Best of all, its easy setup is complemented by larger and more playable pads than those offered on KAT's dk10 and drumKAT, Roland's Octapads, and Simmons' Portakit.

### IT'S A TRAP!

The trapKAT is shaped like the top half of a stop sign, and it's big, big, *big!* It has a total of 24 trigger areas, divided into ten large pads and fourteen smaller raised-rim triggers, plus bass-pedal and hi-hat inputs. The trapKAT has no internal sounds, so you may need to factor in the cost of a sound module.

The pads' semicircular arrangement is an approximation of the way most drummers set up their kits. Everything is in about the same plane, though the fourteen rim triggers sit about a half-inch higher than the ten larger pads they surround. Playing the kit can be likened to playing on a drafting table covered with rubber. The flat design minimizes the up-and-down movements drummers naturally make when playing on a conventional kit, which may take a little getting used to.

EM METERS	RATING PRODUCTS FROM 1 TO 5			
FEATURES	●	●	●	●
EASE OF USE	●	●	●	●
AUDIO QUALITY	●	●	●	●
VALUE	●	●	●	●



## ● TRAPKAT

Fortunately, the days of hard plastic pads are behind us. The trapKAT's gum-rubber playing surface feels great. The pads are even thicker than those on the drumKAT and feel soft and lively. I wish all electronic pads felt this good. They also produce less stick noise than other pads I've played, which minimizes leakage into overhead mikes for drummers who record with real cymbals.

The pads and rims trigger very accurately and are excellent at rejecting hits on adjacent pads. They never mistriggered during my tests. The pads use force-sensing resistor (FSR) technology,

touch, KAT made the viewing angle of the display adjustable to accommodate players who sit down while playing (edge view) and those who stand (above view).

The base of the unit is made of steel, not plastic. Overall, the trapKAT is very rugged and well made and, with a modicum of care, should last a lifetime. The side effect of this sturdiness is weight: 34 pounds, to be exact. The optional trapKAT stand is also built like a Mack truck, sets up in seconds, and looks like an artist's easel. It weighs in at 28 pounds.

The connections on the trapKAT include a hi-hat pedal input, a bass-drum pedal input, one MIDI In and two MIDI Outs, a locking AC-adaptor input, four footswitch inputs to access different editing functions, a breath-controller input for use with a Yamaha BC10 Breath Controller (not included), and an on/off switch.

Packed with the unit is a Kf1 footswitch, an AC adapter, a MIDI cable, and a  $\frac{1}{4}$ -inch Allen wrench. The wrench is used to tighten or loosen Allen screws that are located between the pads on the playing surface, which fine-tune the sensitivity of the rubber playing surface.

Because the trapKAT requires so little cabling, getting it up and running is easy. Once you've plugged in the bass-drum and hi-hat pedals, screwed in the locking

AC adapter, and attached a MIDI cable to your sound module, you're ready to play. The manual is clear, helpful, and explains things in a way even a MIDI novice will find informative. KAT has included a separate, one-page "quick start" manual for the impatient user.

### EDITING

The trapKAT has no data wheel, cursor buttons, or knobs of any sort. All editing is done by the combination of hitting pads and pressing footswitches. The LCD helpfully prompts as you go through the editing process, and the unit beeps in different ways to indicate different operations. The beep may also

be turned off if you find it distracting or irritating.

If you are not pressing any of the footswitches, playing the trapKAT sends MIDI commands to your sound module. When you hold down any of the footswitches, however, hitting the pads accesses and changes the unit's settings.

All editing on KAT drum controllers is done in the same way. First, press a footswitch. Each footswitch input accesses different editing parameters. The four inputs on the trapKAT are Kit Select, Note Edit, Kit/Pad Edit, and Global Edit. Next, strike a pad to let the trapKAT know what you want to change. Then continue striking the pad until your selection is found in the display. Finally, release the footswitch to get back to playing. Values can be decremented with a Quick-Click: release the footswitch and quickly depress it again. The trapKAT's beeping will change to indicate that you are now decrementing. Another Quick-Click returns you to incrementing.

At first, I didn't find editing the trapKAT to be intuitive. The main reason is that you have to remember which edit function is controlled by which pad, and each pad has different functions depending on which footswitch is pressed. To be fair, every editing system requires you to remember where its functions are located. After awhile, I got used to it and found that making edits was often quicker than scrolling through layers of menus and pushing buttons. Once I found the parameter I was looking for, the display prompts led me quickly through my edits. The manual includes charts detailing each parameter's location.

If you only have the Kf1 included with the trapKAT, you must move it between the four footswitch inputs to access all the different edit options. To avoid this, I highly recommend KAT's optional Kf3 triple footswitch (\$59.95). Used with the Kf1, the Kf3 allows you to access every editing option without having to plug and unplug anything. KAT could also make single-footswitch owners' lives a little easier by labeling the top metal surface of the trapKAT above the footswitch inputs, as you can't see which input is which when you are in front of the unit.

The manual states that the Kf1 and Kf3 can be plugged and unplugged with the unit turned on, but if you use another brand of footswitch, you



KAT's trapKAT MIDI drum controller combines easy setup with a large, great-feeling playing surface.

which is generally considered superior to piezo transducer triggers. They are uniformly sensitive across their surface and trigger evenly to within about a quarter-inch of their edge.

The gray, white, and black marbled playing surface not only looks great but hides stick marks as well. In fact, after over a month of regular use, I can't see a single mark. The trapKAT has a hip look and layout. A client who saw the unit in my studio remarked, "This is cool. What is it?"

There is a backlit LCD display of two lines by sixteen characters to indicate what mode you are in and prompt you through your edits. In a thoughtful

should plug it in before turning the trapKAT on. The trapKAT should automatically read and adjust to your type of footswitch. However, the Kawai and Roland footswitches I tested didn't work with the unit. A call to KAT revealed that the firmware version I reviewed (1.02) doesn't implement this feature but that the current version (1.05) does. (ROM upgrades are available for \$15.)

## KIT KAT

The trapKAT has 24 FactoryKits and 24 UserKits. The principal difference between the two is that you can't save changes to FactoryKits; they can be edited, but they revert back to their original settings when you change kits or turn the trapKAT off. FactoryKits are the best place to experiment with your trapKAT when you first get it, as any destructive changes you accidentally make will not be saved.

To move around the different FactoryKits, simply plug your KF1 into the Kit Select footswitch input and press the footswitch. This will allow you to incrementally move between the FactoryKits.

Each of the trapKAT's 24 pads is assigned a number. You can access a kit even more quickly by depressing the Kit Select footswitch and striking the pad that corresponds to the kit you are seeking. For example, if you want to go to Kit 03, simply depress the Kit Select footswitch and strike pad 3. It's simple and fast.

Because they can't be permanently changed, you are assured that FactoryKits will always work with GM modules. Some of the FactoryKits have different sounds assigned to the 24 pads; others use the same sounds but assign them to different pads. For example, Kit 01 is a basic right-handed drum-set layout, Kit 11 is a left-handed setup, Kit 23 is specifically designed to accommodate the E-mu ProCussion sound module, and Kit 24 is designed for the Yamaha RY30 drum machine. The trapKAT can display GM note names, along with the note number. I found this feature useful at a gig, where it allowed me to change a sound with the output of my Roland TD-7 percussion sound module turned down so as not to disturb anyone.

If you want to customize kits with your own layouts, Program Changes, and Velocity settings, you'll need to access the UserKits. The 24 UserKits are duplicates of the 24 FactoryKits when the unit is shipped from the factory. This gets you up and editing quickly, especially if there is a FactoryKit that can be slightly tweaked to meet your needs. Conveniently, changes made to UserKits are automatically saved, unless you have the memory-protection feature turned on.

## TWEAKING THE KAT

The trapKAT's MIDI implementation is adequate for a drum controller. Each pad in each Kit can have individual settings for note number and MIDI channel, as well as minimum and maximum Velocity values, a Velocity curve (there are six to choose from), and gate time (ranging from as little as 5 ms to as much as 6.4 seconds). For simpler setups, all of these parameters except note number can also be set independently for each Kit. This allows you to shift an entire Kit from, say, MIDI channel 10 to some other channel without having

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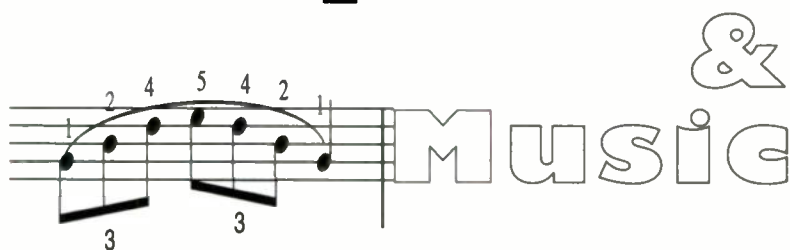
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to change each pad. Other parameters that can be set per Kit include an outgoing Program Change and Kit Volume, which adjusts the sound source's overall MIDI Volume.

In addition to the aforementioned settings that are programmable per UserKit, the trapKAT also has a number of settings that apply globally to all Kits. For example, each pad can have its own minimum and maximum Dynamics settings, which can be set manually or via a process called Autotraining. When Autotraining, the display prompts you to hit the pad first softly and then with full force. It's that easy to customize each pad to your playing style. The global Dynamics settings interact with the pad/Kit Velocity settings and Velocity curve so that your soft and hard strokes are correctly interpreted as MIDI Velocity values.

Each pad also has a trigger Threshold setting that determines its strike sensitivity. If you use real cymbals over your trapKAT, you may find, as I did, that you have to raise the Threshold of the pads directly under your cymbals to prevent them from accidentally triggering. And just in case, depressing the Kit Select footswitch while holding any pad with your hand sends a series of All Notes Off commands to quiet a stuck note.

The trapKAT supports System Exclusive data dumps. You can dump all memory, one Kit, or just the global memory (pad thresholds, dynamics, etc.). The trapKAT also automatically receives data dumps you've previously stored, and it only takes a few seconds to reinitialize the unit.

On the negative side, I was puzzled by the absence of certain features, most notably the ability to layer MIDI note numbers and then mix, switch, and crossfade between them using Velocity. Even the Roland Octapad II supports this useful feature with up to three different note numbers. For example, by assigning a muted, open, and slap conga sample to a single pad, you can get some pretty realistic results with the natural dynamic variations of your performance.

A KAT representative said these features are not currently implemented because many drum modules allow you to assign multiple sounds to a single note number and mix, switch, and crossfade within the module itself and because the main goal of the trapKAT

is to provide a very easy-to-set-up electronic drumset. The trapKAT Pro will address the advanced software issues.

## STEP ON IT

Like the pads, both pedal inputs can be Autotrained for threshold and dynamic range. The Bass Pedal input also has a globally selectable input gain designed to adapt to any bass drum trigger made.

If you have a hatKAT hi-hat pedal (\$279) or Roland FD-7 hi-hat controller, you can continuously vary the open-to-closed hi-hat sound as you play, or you can assign chick or splash sounds. The Channel, Velocity, and Gate time of the chick, splash, open, and closed sounds can be edited individually. I was glad to see KAT implement this feature, as it adds immeasurably to the realism of electronic-drum performances. Of course, this only works with sound modules capable of responding to Continuous Controller messages; Roland's TD-7 and TD-5 and E-mu's ProCussion are among those that do.

The hatKAT pedal worked well, but I found that the pedal's design makes it more difficult to perform toe-heel splash ostinatos than with Roland's FD-7. However, the hatKAT is considerably quieter than the Roland pedal and can also be used as a kick pedal in a pinch.

Another feature that adds a realistic touch is the ability to choke cymbal sounds by grabbing a rim or pad immediately after striking it. This feature is supported by Roland's TD-7 and TD-5, and on KAT's malletKAT Pro with the Sounds option. Unfortunately, I was unable to test one final expressive feature: the breath controller can be assigned to control Pitch Bend up or down, Expression, or Sustain.

## GROOVING

As mentioned earlier, the trapKAT comes with a selection of ROM grooves that can be used with any GM drum module for practice or performance. (The manual mentions that the BOSS DS-330, Kawai GMega, Korg 05R/W, and Roland Sound Canvas work immediately with the trapKAT.) The grooves are divided into two categories: Percussive and Melodic.

The 22 Percussive grooves can be used to create interesting rhythmic beds to practice over. There are a few click tracks included among these, as

well. The eleven Melodic grooves create even more involved musical phrases. They cover a variety of basic styles and are fun to play over.

The grooves may be accessed from FactoryKits or UserKits. RimPads 15, 16, 23, and 24 are used to select a particular Percussive or Melodic groove, adjust the tempo of its playback, and start or stop them. For example, to practice over the Funky Flute Melodic groove, hit rimPad 15 until it appears in the display, strike rimPad 24 to start or stop its playback, and hit rimPad 23 (Groove Tap Tempo) to adjust its tempo. This means that four of the FactoryKit rimPads are dedicated to controlling these grooves and cannot be assigned sounds. Drummers who need all 24 pads for sounds should use the UserKits. You can also adjust the volume of the Grooves over a range of values from 0 to 10.

## THE KAT'S MEOW

The trapKAT is not an enlarged version of KAT's top-of-the-line drumKAT. It's more of an enlarged dk10, the entry-level, beginner-friendly controller. In the future, KAT plans to expand the trapKAT with some of the features that make the drumKAT such a powerful drum controller.

If you currently own a drumKAT, you can "KATalyze" the trapKAT. If you plug the MIDI Out of the trapKAT into the MIDI In of your drumKAT, the drumKAT will apply its edit parameters to the incoming MIDI note numbers, giving you much more power.

I question the decision to introduce

## Product Summary

### PRODUCT:

trapKAT

### PRICE:

\$1,199

### MANUFACTURER:

KAT, Inc.

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DOCUMENTATION	●	●	●	●
VALUE	●	●	●	●

any drum controller in today's market without internal sounds. I work in a good drum store and have noticed that the vast majority of people in the market for electronic-drum equipment will not even consider a unit without internal sounds. Also, the design of the trapKAT as a portable, easy to set-up unit begs for the inclusion of internal sounds.

I also think adding external trigger inputs would be of help to drummers who can't easily adapt to having their cymbal pads in the same plane as their drum pads. This would allow them to mount cymbal pads above the trapKAT in a more conventional position.

KAT President Bill Katoski notes that these features will be included in a future upgrade, the trapKAT Pro. As evidence of this, the trapKAT housing already has 1/4-inch holes for external inputs and audio outputs. Hopefully, a headphone jack will also be included;



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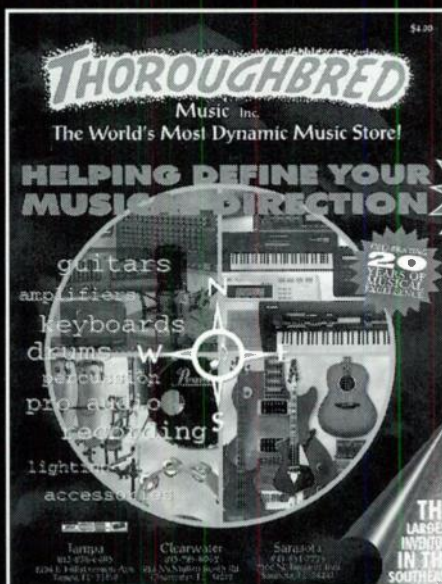
**sensibilities.**

if so, I'd like to be able to route a click to the headphones that is not sent out the audio outputs. The trapKAT Pro upgrade will be available to all existing trapKAT owners.

Certain design features, such as the locking AC adapter, breath-controller input, solid-steel case, and wonderful playing surface, prove KAT is committed to giving drummers a comfortable, high-quality controller. The trapKAT's two MIDI Outs send identical data, reducing MIDI and sound-source delay while providing cabling and configuration options. Four-note polyphony per pad allows the unit to sound even more realistic with modules that support polyphony. The instant compatibility with the most popular drum modules available and the excellent manual make it simple for novice electronic drummers to use right out of the box.

I also appreciated the inclusion of Groove Tap Tempo, a feature often

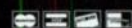
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overlooked but one exceedingly useful to the jobbing drummer. It allows you maintain a steady tempo by playing to a click track or groove at the exact tempo counted off. Other niceties include the ability to accept almost any positive-tip (2.1 mm) AC adapter, between nine and twelve volts, which can be a lifesaver in an emergency.

Do I recommend it? Absolutely. As it is, the trapKAT has enough features and is powerful enough for most drummers. After KAT adds the planned upgrades and some of the drumKAT's high-end features, they will have made the trapKAT the Amazing Colossal Drum Controller it's destined to become.

**Brad Schlueter** is a Chicago-based drummer, teacher, and project-studio owner.

## Miroslav Vitous Orchestra Samples

By Gerry Bassermann

**A virtual  
orchestra arrives  
on CD-ROM.**

**R**ecently, I had a curious experience. It's not exactly clear what happened; I rolled out of bed, made some tea, and turned on my gear. Then I slipped the *Miroslav Vitous Symphonic Orchestra Samples* CD-ROM into the drive and loaded the first bank into my E-mu Emulator IIIx. My hands came to rest on the keyboard, and I began to hear a simple minor chord. The result was an achingly beautiful violin section, bows rising and swelling, bowing life into the notes that spelled G minor.

And then I understood: this review could take some time. It has been a roller-coaster ride where half my time is spent in rapturous throes of sound, and the other half is spent examining, documenting, and sometimes complaining about this mammoth sound resource.

Distributed by InVision Interactive, *Miroslav Vitous Symphonic Orchestra Samples* is a collection of high-quality, stereo recordings of solo instruments and sections available on CD-ROM in two configurations. The first is the "mother" library, a 4-CD set available in Akai,

E-mu, Roland, and Digidesign SampleCell formats. The discs, which are also available separately, include *String Ensembles* (\$1,795), *Solo Instruments 1* (\$795), *Solo Instruments 2* (\$795), and *Woodwind and Brass Ensembles* (\$795). A complete selection of sounds from the orchestra is offered, with the exception of harp and percussion. (An orchestral percussion title is planned for the spring of 1996.) A smaller version, the *Miroslav Vitous MINI Library* (discussed shortly), also is available.

### GET REAL

Sample fidelity and sampler programming features have evolved tremendously during the last decade. And yet samples of orchestral instruments often lack the natural qualities associated with symphonic tones. However, this sound set succeeds because it was produced by a musician with deep orchestral sensibilities. Miroslav Vitous was rigorously trained in classical music from an early age, and his subsequent experience has been far ranging, covering everything from classical work to performing with Miles Davis and Weather Report. After listening to the overall quality of his sounds, I didn't hear a loser in the bunch. Every tone is consistently well recorded and musical.

Miroslav Vitous' vision for this product is to ensure that the sounds are completely authentic. They have been stereophonically recorded with the proper image and miked at a distance to bring out the natural sound of the whole instrument. The booklet that comes with each CD extols one to "do nothing" in the way of reshaping the raw sounds with envelope generators or the like, simply because the attacks and release characteristics are already "natural."

In the interest of authenticity, Vitous also refrained from manipulating the sounds in the digital domain after the recordings were made. For example, the levels are all different, instead of being uniformly normalized. Little or no DSP (such as EQ) was used, even to "clean up" the samples; everything sounds exactly as it was when recorded. The sound designers were also careful not to trim any signal,

however slight, off the beginning of the sample.

This means that while there may be slight delays before the notes sound (which can be offset in the sequencer, if necessary), a natural attack is preserved. After all, acoustic instruments build up energy toward the attack transient, and these characteristics are picked up by the ear. The reason a lot of sampled sounds are fatiguing and sound like samples is because the front of the sound has been trimmed too close.

Choosing a great ensemble to record is a crucial step in securing superior sound, and some of the Prague musicians whose playing was captured on this project have played together for 30 years. This is especially evident on the *Woodwind and Brass Ensembles* disk, where the 3-player blend is important. An extremely careful recording process also sets these sounds apart from other orchestral attempts. The ensembles are all real (that is, not built up or inflated by overdubbing or recombining material), and the miking techniques captured the instruments in a realistic concert setting. In contrast, close-miked studio recordings can yield a hearty signal but an unnatural presence.

### WHAT'S IN THERE?

All instruments in the library are represented with a variety of attacks, dynamics, and playing styles. For example, the violin sections (eleven players) include long, soft and loud, pizzicato, staccato, tremolo, and detache notes.

MIROSLAV VITOUS

*Symphonic Orchestra  
samples*

### STRING ENSEMBLES

A primary production goal for *Miroslav Vitous Symphonic Orchestra Samples* was strict authenticity with no digital processing and no loops. Some of the sounds in the 4-disc set are also available in both looped and unlooped versions in the single-disc *Miroslav Vitous MINI Library*.

The banks vary in size, maxing out at about 8 MB. If your sampler memory has less than 8 MB of RAM, you'll need to load just a few keyboard zones to access the larger ensembles. If you have a lot of sampler memory, you can load and combine presets from various banks. There are also mono versions of most instruments, so more sounds can fit into a sampler bank.

However, none of the samples are looped. Imagine yourself playing the ultimate high-fidelity Mellotron; you hit a chord, and for three to six seconds you hear some of the sweetest sounds you've ever heard; then it's over. InVision claims that many users have written stunning orchestral pieces that require no long-sounding (looped) notes, but I couldn't get used to it and spent a fair amount of time looping samples.

Apparently, I was not alone in wanting loops, because InVision has since introduced the *Miroslav Vitous MINI Library*, a subset of the mother library that combines a selection of solo and ensemble strings, winds, brass, and timpani on one CD. (The *MINI Library* is also available in Kurzweil K2000 format.) All samples are mono, and all are looped. This disk is quite useful to composers who want to build custom multi-instrument sampler banks quickly and without constantly changing CDs. Apart from the lack of a stereo spatial effect, all samples are of equal quality to the mother set.

Offered at a fraction of the cost of the mother set, this CD also contains much less sample data (66 MB, compared to well over 1 GB on the 4-CD set). A 50% reduction results from the stereo-to-mono conversion, but there are also fewer instruments. Don't look for piccolo, English horn, tuba, solo viola, string effects such as *detache* or *tremolo*, bass clarinet, contrabassoon, bass trombone, or brass mutes in the *MINI Library*.

There also aren't a variety of articulations in the *MINI Library*. For example, the violin ensemble includes only three playing styles (long, staccato, and pizzicato notes), the cellos only two (long and staccato notes), and the violas one (long notes).

Both the full collection and the *MINI Library* contain samples recorded with vibrato. I believe this is one reason all the tones produced are rich and full and sound so real. One of the immedi-

ate benefits of sampled vibrato is the ease of looping, because the periodicity of the natural modulation provides a convenient and natural loop rhythm. However, some composers might bristle because the rate and depth of this modulation are fixed, and the modulation can't be eliminated.

The best of both worlds is the imminent release of version 2 of the mother library, which will provide looped and unlooped versions of the sound files, alternate versions without vibrato, and a lot more string-ensemble data (e.g., a 23-player violin section and new string-playing effects, such as *sul ponticello*).

## BUILDING A SUPERSECTION

At first, I was bewildered by the string-ensemble material on the mother library. There were long notes with somewhat slow attacks and swelling sustain; staccatos with sharp attacks but no sustain; and quick *detache* attacks, light and "off the string," with sustain. But where were the hearty, *marcato* downbow attacks that would then sustain? After all, these have been the staple of sampled string sections for years, and you can easily transform them into lyrical, slow attack shapes with the use of an envelope generator.

Vitous describes the raw keyboard layouts found on the disks as elements that can be combined in many ways to yield various new effects. For example, you might build the *marcato* style by linking or stacking the long-note sound with the staccato, or you could create a huge violin section of 33 players by combining the Violins Large 1, Violins Large 2, and Violins Soft, each of which has completely different samples, which allows them to be sounded together without any phasing problems. In fact, the *MINI Library* sports a number of such combinations, using, in the case of the E-IIIx, the Link Preset feature.

## VOICING AND DOCUMENTATION

The same *laissez-faire* approach that enhances authenticity also leads to a shocking lack of programming at the preset level. Each keyboard setup is represented by exactly one preset; there are no variations with different envelopes, filters, sensitivities, or modulations. On the mother library, exactly one modulation path is set up: Velocity is mapped to level (with roughly 40% sensitivity). This means that if

you're sequencing, you get roughly 60 increments of MIDI Volume change instead of 127, so Velocity fade-outs will have a coarser resolution.

Because modern samplers have a lot of program locations within each bank of user memory, it would have been nice to see some presets set up for playing and others for sequencing (with full sensitivity control). Nothing interesting is programmed on the mod wheel except whatever zany default is in the sampler (usually an overzealous vibrato), and the pitch wheel is, for some unknown reason, completely disabled! Therefore, the mother library is an archive. You will need to spend time programming combinations and expressive modulations, to loop sounds when needed, and to save your work to a hard drive. If you use virtual tracks and have to rebuild the mix, you'll probably need those custom programs.

The *MINI Library*, while featuring loops and some combinations, doesn't have much in the way of preset programming, either, although the Velocity sensitivity has been increased. Once again, more voicing would be a welcome addition to each bank. Instead, some instruments are stacked together, creating splits or layers. This single-disc collection also underutilizes the capacity of the CD-ROM medium, featuring only 66 MB of data, all of which show up in the first ten banks.

The following banks contain combinations drawn from the first ten. These combinations are sometimes generically

(continued on p. 137)

## Product Summary

### PRODUCT:

*Miroslav Vitous Symphonic Orchestra Samples*

### PRICE:

4-disc set: \$3,495

*MINI Library*: \$695

### DISTRIBUTOR:

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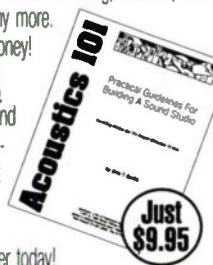
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(continued from p. 129)

useful, such as the String Orchestra banks, which combine five string-ensemble sounds. Some are not as generically useful, such as the Violins Pizzicato and Bassoon bank. Others are simply not well programmed, such as the Violas/Basses bank, which also has abrupt and unmusical split points across the keyboard. Any of these 48 combo banks are only a handful of button-pushes away.

In addition to more varied and expressive voicings in each bank, I wish there were more data on this *MINI Library*—after all, 66 MB is only 6% of the 1.2 gigabyte mother set—and fewer banks that simply combine the basic elements. This is especially true in the elemental way the sounds are designed to go together. As stated earlier, one needs staccato samples and long-note samples in order to create sustained instruments with fast attack. With so little sample data on the disk, there are no staccato samples of section violas, the woodwind ensembles, solo winds, or brass, and therefore no fast attacks

for any of them. All of this is fine if the music you write is endlessly legato.

The booklets that accompany the CDs are somewhat useful, making musical recommendations about phrasing, idiomatic playing, and so on. The suggestions for building up textures and ensemble effects are quite good. The only additional documentation I would like to see would cover the presets and keyboard zones and provide a chart of instrument ranges.

## AT THE DOUBLE BAR

Most composers will find this CD greatly improves their virtual-orchestra sound. The collection is quite expensive, but the gorgeous swell of the ensemble violins and natural quality of the strings could make the library worth the price of admission. All the instruments were recorded with the utmost care. I can't wait to use these sounds on a new recording. I can, however, get involved with playing any or all of them for long periods of time, to the detriment of all else.

I like to program keyboard sounds

anyway, so the lack of voicing isn't as important to me as it would be to most people. It's fun to play through a couple hundred sounds and find some that you simply love, but a little voicing would really make the orchestra on these discs sing.

The arrival of *Miroslav Vitous Orchestral Samples* version 2 heralds a milestone in the evolution of the virtual orchestra. Look for version 2 to be available in all platforms by midsummer. In addition, the *Miroslav Vitous Choirs* and *Miroslav Vitous Orchestral Textures* collections are due out in the spring of 1996.

Be good to your sampler; after all, being a sampler in a sound-module world is a tough role these days. Treat both of you to some of these sounds, and you'll feel better about your musical life.

*Gerry Bassermann was trained in composition and conducting at the Eastman School of Music and now operates Opus Nine, a studio specializing in virtual acoustic simulations.*



# TECH PAGE

## HDCD Hoopla

*Improving the sonic accuracy of CDs.*

*By Scott Wilkinson*

In 1982, Sony promised that the compact disc (CD) would provide "perfect sound forever." But many believe that the sound of CDs is far from perfect. They argue that CDs sound harsh, cold, and devoid of the subtleties that help make great music sound great.

Many claim that the basic specs of CD audio—16-bit resolution at 44.1 kHz—are insufficient to reproduce these subtleties. However, the format is so entrenched that abandoning it would be economically disastrous. As a result, a number of ideas have been proposed to increase the aural accuracy of CD audio without rendering it incompatible with the current standard. (See "Tech Page: Sony Super Bit Mapping" in the February 1993 *EM* and "Tech Page: Sixteen Will Get You Twenty" in the October 1994 issue.)

One of the most interesting ideas comes from a small California company, Pacific Microsonics (tel. [510] 644-2442; fax [510] 644-3559). Their High Definition Compatible Digital (HDCD) process is creating quite a stir in pro-audio and consumer-electronics circles. HDCD improves the audio performance of CDs by preserving more information in the frequency and amplitude domains while reducing such artifacts as intermodulation distortion in the A-to-D stage and low-level linearity problems in the D-to-A stage.

Unlike other approaches, HDCD

does not use masking or noise shaping. It's a double-ended process, requiring an encode/decode cycle for optimum results. However, HDCD-encoded discs can be played on standard CD players without difficulty (more on this in a moment).

The encoder accepts analog or digital input signals. An analog signal is sampled at well over 100 kHz with greater than 16-bit resolution. (The company will not disclose exact numbers because they believe sound quality is the defining goal, not spec hype.) In addition, 20-bit masters can be transferred to CDs with their extended dynamic range intact.

The encoder analyzes the input signal using eleven Motorola 56000-series DSPs to identify sonic elements that are perceptually important but beyond the range of conventional CDs. This analysis is based on years of research into psychoacoustics and the mechanism of auditory perception.

HDCD uses two methods to fit the extra data into a 16-bit, 44.1 kHz data-stream. Part of the additional information is included in the actual PCM data by optimizing the utilization of the linear bits. This technique works only to a

certain point without introducing audible artifacts of its own. However, the data is available from any CD player, which improves the sound of HDCD-encoded discs in non-HDCD machines.

The remaining extra data is encoded in the least significant bit (LSB) of each binary word, using only 1 to 5% of the LSB over time. The encoder makes instantaneous, real-time decisions about which encoding method to use for optimum performance.

Most of the "intelligence" of the HDCD process resides in the encoder, which means the decoder can be a small, inexpensive chip (see Fig. 1). The decoder replaces the monolithic filter located before the DAC in any CD player. As you would expect, the decoder reconstructs the data on an HDCD disc and sends it to the DAC at the appropriate resolution and rate. In addition, the decoder chip also includes its own filter, which improves the sound of non-HDCD discs. All in all, HDCD provides complete cross-compatibility with conventional CDs and players.

Among the first artists to use HDCD are Neil Young and Pearl Jam on their recent collaboration; this is particularly significant in light of Young's well-known criticism of digital audio. Among the mastering engineers who have ordered an encoder are Denny Purcell, Bob Ludwig, and Joe Gastwirt, who master for most of the major labels. On the end-user side, over 40 (mostly high-end) manufacturers have licensed the decoding technology, including Adcom, Madrigal, Theta, and Krell. However, HDCD decoders could soon filter down to mass-market products, which should be music to your ears. ☼



**FIG. 1:** The HDCD decoder can be implemented in a small, inexpensive chip for mass production.



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