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# Electronic Musician®

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August 2003

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**25** Tasty Shareware  
and Freeware Treats

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*By Maureen Droney*

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Good music-production software doesn't have to be expensive, nor are the best-known programs always your best choices. Independent software developers have created some of the coolest music applications available today—and you can get them online for a song! We've selected and evaluated some of the hottest freeware and shareware for Mac and Windows.

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*By Mary Cutler*



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## Share and Share Alike

**A** guitarist I used to work with loved to chortle, "If it's for free, it's for me!" At the time, he was referring to such common musician's bonuses as fans buying drinks for the band. Today, though, music and software piracy are major issues, and it seems the saying has become, "If it's for me, it's for free"—a rather different proposition. It amazes me that some people actually feel entitled to take software without paying for it.

That makes it all the more remarkable and wonderful when developers—usually individuals—produce programs that legitimately are offered for free or are notably inexpensive and distributed on the honor system.

Freeware and shareware are time-honored traditions in software development. Usually, someone has developed it for personal use, and then decided to give it to the world. Shareware developers want to make (or at least recoup) a few dollars, but they don't expect to get rich and generally don't want to deal with the pressures of commercial development and distribution. They are generous people.

Nowadays, a lot of shareware programs are come-ons for more full-featured commercial versions. There sometimes is a gray area between demos of commercial products and true shareware. But as long as the product doesn't time out and is not crippled to the point that you can't do significant work with it (for instance, the Save feature is not disabled), we should consider it a wonderful gift from the developer, one for which we should be thankful.

We can express our thanks in several ways. When I was a child, my parents taught me that before I used a gift, I had to write a thank-you note. That principle applies here, too, except that we are allowed to use the gift first!

For starters, we can say thanks by paying shareware fees promptly for programs we use; I have found that that generates good karma. Shareware developers remember the people who have supported their work. Furthermore, I have sometimes received better tech support from shareware developers than from commercial software vendors. I don't know how they find time to do it, but I'm glad they do.

Shareware and freeware authors want their work distributed widely, so we can also thank them by giving away copies of shareware and freeware we find useful or fun. Just remind your friends to pay the shareware fees if they like the programs.

That brings us back to my parents' admonishments about thank-you notes. In an era when common courtesy is harder to come by than it used to be, a nice thank-you e-mail to the developer will be greatly appreciated. In fact, you can go a step further: a great way to thank a shareware or freeware author is to offer constructive feedback about the program, including what you like, changes you'd appreciate, a well-researched bug report, and a short and reasonable wish list for future development.

Finally, remember that these folks are giving you something cool for free or for cheap, and they are trusting you by letting you use it before registering it. So don't hammer them about bugs and missing features, just report the problems. You'll be pleased with the responses you get.



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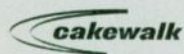
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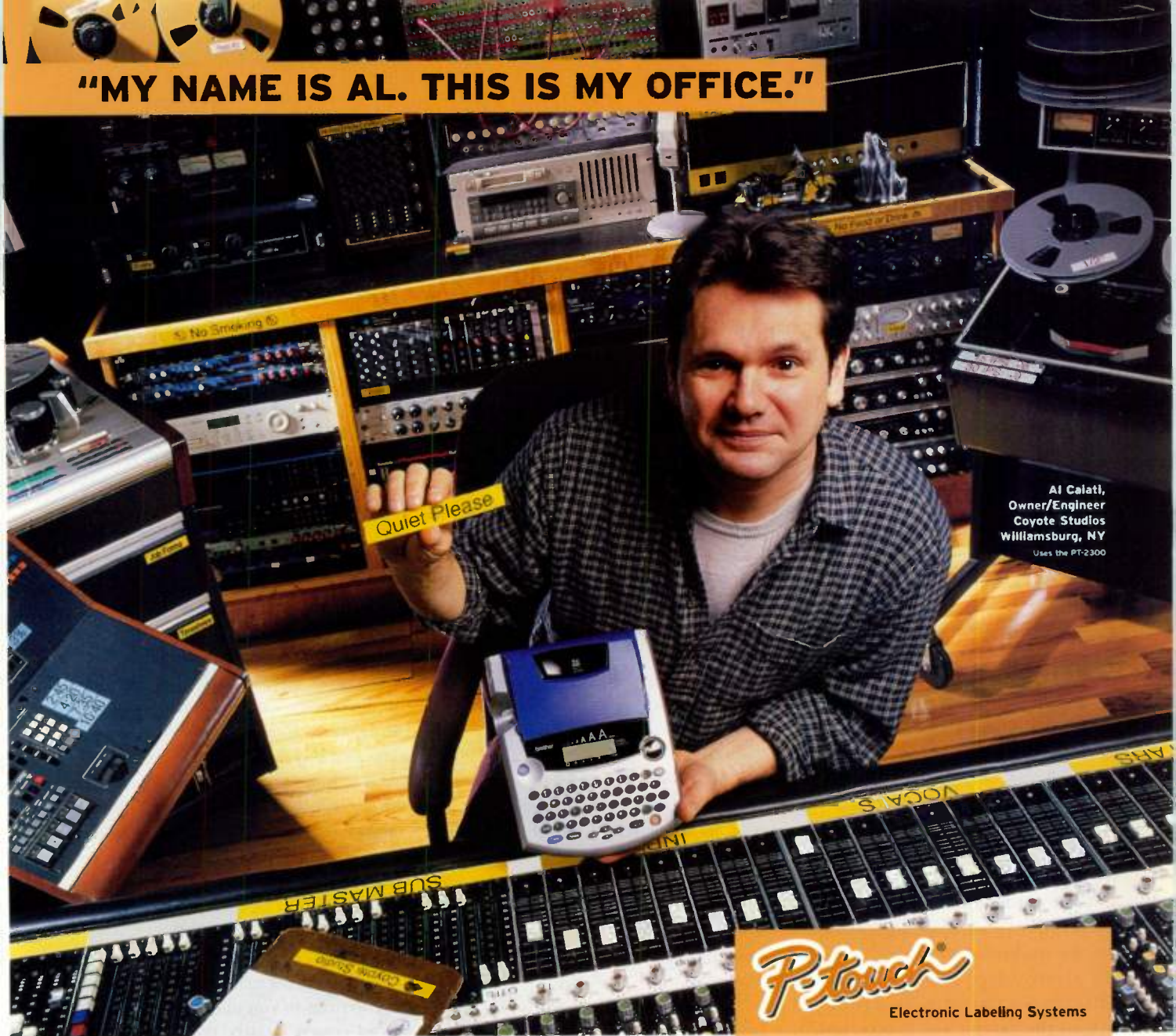


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DIMITRY PANICH

## IN YOUR FACE!

**T**his letter is in response to a statement that was made in **EM**'s article on vocoding in the June 2003 issue ("Square One: Look Who's Talking"). Brian Smithers makes a bold statement in claiming that "the timbre is all in your face." That statement is far from being a "straightforward truth."

While it is true that tongue, jaw, and lip positions can have a great effect on the timbre of the voice, none of the elements are as profound as the differences that can be produced within the larynx (or "voice box"), which houses the vocal cords. Smithers failed to account for the position of the larynx—which has the greatest effect—and the three types of voices that are created by the vocal cords themselves: chest voice, falsetto, and a mix of the two.

I can understand why he would focus on the mouth for the purposes of his article. However, making a statement such as "The timbre is all in your face," and calling it a "straightforward truth" are hugely misleading. One can easily manipulate tone without moving one's face at all. Try it!

**Ed Cohn**  
Voice Teacher  
Corte Madera, California

Author Brian Smithers replies: Ed—You are correct in asserting that "all in your face" is a simplified view of vocal timbre, which is why that same paragraph begins with a more complete statement crediting the "human mouth, throat, and nasal cavity" with shaping the timbre produced by the vocal folds. Because the larynx is part of the throat, its effect on timbre is included in that statement. I must confess, however, that I gave inadequate credit to the contribution of the vocal folds to timbral variation, and I regret if that misled anyone. In the interest of attaining a more complete understanding of vocal timbre, we turned to speech pathologist and vocal therapist Joanna Cazden, a longtime **EM** contributor:

*Cazden comments: "The resonant acoustics of the vocal tract as a whole are extraordinarily complex. At the level of the vocal folds (which are commonly called "cords"), voice quality is influenced by levels of muscular force, air pressure, and muscular resistance. Examples include very breathy phonation and tense/belted/pressed phonation.*

*"There is a significant resonating space just above the cords, in the upper area of the larynx. The height, shape, and tension of that area can be manipulated for timbral effect. Some researchers and training techniques emphasize it, while others do not.*

*"There are also major resonance changes created above the larynx by the throat, tongue, soft palate, cheeks, and lips. Vowels, for instance, are differentiated by mouth shapes that emphasize or damp certain spectral elements.*

*"Mask" resonance is a widely used, legitimate concept, and one that is not yet fully understood in voice science. It is probable that subjective sensation and objective physiology do not match, but sensation may still be valid as a teaching tool. For instance, there is evidence that some of the buzz expe-*

*rienced in the face is actually a formant (area of the spectrum) shaped in the upper larynx. Different schools of voice training approach it differently.*

*"So yes, there is timbre in the face, and many singers find that focusing there helps other aspects of vocal technique fall into place. But the mouth, throat, and vocal folds themselves also contribute to quality, or timbre, in important ways. Chest resonance, top-of-the-head resonance, and even vertebral resonance are experienced by some singers.*

*"Singing teachers have argued for centuries about what is actually going on, and voice science does not yet have all of the answers. How the vocal instrument works and how it feels are fascinating and relevant subjects to singers and coaches. Neither is fully understood. Until all the evidence is in, the field of voice will best advance if open mouths are matched by open minds."*

## WHERE CREDIT IS DUE


**A**s 50 million readers must have written to you about this by now, you of course realize that "producer David Seville," who is mentioned in the sidebar "Avoiding Rodents" in **EM**'s review of TC-Helicon's VoiceOne (June 2003) was actually Ross Bagdasarian (see [www.rockabilly.nl/artists/dseville.htm](http://www.rockabilly.nl/artists/dseville.htm)). Although Mr. Seville was credited as being the Chipmunks' producer, it was Mr. Bagdasarian who created both Seville and the Chipmunks.

Research, anyone?

**Karen Derby**  
Mahopac, New York

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**Kevin Hodges**  
via e-mail

Contributing editor Larry the O replies: Kevin—your question is big and important. Let's start by breaking it down into two components: tools and techniques. Taking them in reverse order, the first question you need to ask yourself is whether you want to master.

Mastering requires a different set of skills than recording and mixing do. Mastering involves working at very fine level of detail: less than 1 dB of resolution is often at stake. The types of skills involved can be very different, too. For instance, one must know how to match EQs and levels between cuts in order to yield an overall coherent sound. Although I have mastered a number of albums and received good comments on my work, I'd never compare my abilities with those of someone who does mastering full-time for a living.

Finally, mastering engineers are familiar with everything that needs to be done in

order to submit a proper master to a replication facility. That means more than just formatting the master correctly; it also requires the creation of the right documentation, without which your replication could take longer and cost you additional money as the pressing plant tries to figure out what's going on.

There are good reasons for doing mastering yourself. One, of course, is to save money. Another is to gain experience and expand your skill set. Keep in mind that learning new skills often means that your first few attempts will be flawed (and sometimes disastrous), and you might not realize that is the case until the discs come back from the plant, at which point it becomes an expensive and troubling lesson. Having said all of that, I found it to be a worthwhile lesson to learn and was fortunate not to have had any disasters in the learning process.

The second point of discussion is mastering tools. Mastering is the last step in the chain. Using anything less than the best tools may achieve some of your mastering goals (with elements such as level and tone matching), but it will also introduce unwanted artifacts, such as a loss of clarity in the soundstage or, in the worst case, distortion—especially in the high or low end.

Today's DAWs that use 24-bit files are capable of producing fine-sounding masters, but not as good as the ones that can be achieved with the high-end tools found in a good mastering house. Even if your DAW

does not screw things up in some way, it may not offer the resolution needed for mastering. If you can't get resolution of at least 0.5 dB in level and EQ, you will find it difficult to do the fine detail work of mastering; 0.1 dB steps are what you'd really like.

You will also need to be able to place markers where you want the cuts to start and end, and to produce and document those start and end times, gap times, PQ subcodes, and more. It's possible to acquire tools that can do this, but I doubt that the ones you name are capable of it.

All of this assumes that you are making masters for replication. If you are simply burning one-offs for your own use or to give to people, you don't need to worry about much more than whether the finished product sounds okay to you.

As I said, it's a big subject and there is little information on how to do it, although I would recommend Bobby Owsinski's *Mastering Engineer's Handbook* (available from [artistpro.com](http://artistpro.com)). I hope this sheds a little light on things.

## ACCENTUATE THE POSITIVE

Larry the O's May 2003 editorial ("Final Mix: Is It Real or Is It Cynicism?") gives an example of possible reactions that a band might have when traveling to a club, only to find poor working conditions and a dismal crowd. In my opinion, the best response is the second one: here is an opportunity to work on new material and get paid, as well. With all the difficulties and struggles associated with becoming a successful musician, it's in one's best interest to deliver positive performances. The band can control its own responses to any given scenario.

**Ed Wolinski**  
via e-mail

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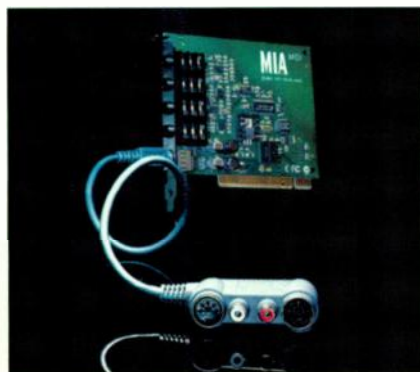




## ▼ ECHO DIGITAL AUDIO MIAMIDI

**E**cho's new MiaMIDI (Mac/Win, \$249) is a PCI expansion board that supplies two balanced 1/4-inch audio inputs, two balanced 1/4-inch audio outputs, 24-bit coaxial S/PDIF I/O, and MIDI In and Out. In addition to near-zero latency monitoring, the MiaMIDI features virtual outputs that make it appear to software as an 8-output audio device.

The MiaMIDI can simultaneously handle 2-channel analog and 2-channel digital audio I/O, and it supports ASIO, Core Audio, WDM, and GSIF drivers. A virtual mixing console for monitoring, metering, and setting levels is bundled with the hardware. On the PC, MiaMIDI requires Windows 2000, ME, or XP; it also works with Mac OS 8 or 9 or OS X. Echo Digital Audio; tel. (805) 684-4593; e-mail [info@echoaudio.com](mailto:info@echoaudio.com); Web [www.echoaudio.com](http://www.echoaudio.com).



## ▼ BITHEADZ UNITY SYNTH EXPANDER 1

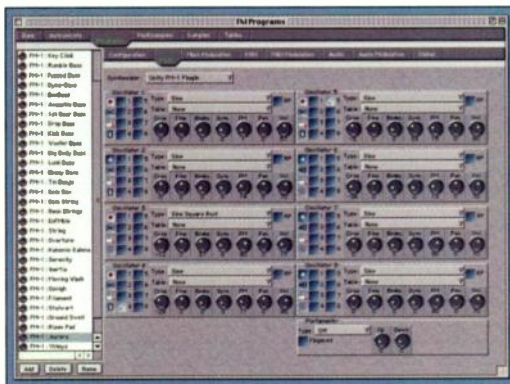
**U**nity Synth Expander 1 (Mac, \$199) is BitHeadz's collection of virtual instruments that you can use either stand-alone or as a plug-in for Unity Session, DS-1, or AS-1. Synth Expander 1 provides three physically modeled instruments, three digital synthesizers, and a library containing hundreds of sounds.

GL-1 is a glottal model that emulates two

eight-segment vocal tracts. You can specify each tract's length and reflection parameters and interpolate between the two models. In BR-1, a modeled brass instrument, you have control of the bore type, breath, lip, and noise parameters. EP-1 simulates an electric piano's tines, hammer, and preamp. FM-1 is an eight-operator FM synth with ten stereo oscillator waveforms. The remaining instruments,

VS-1 vector synth and WS-1 wavetable synth, allow you to shift the sound source among several stereo sample-playback oscillators.

Unity Synth Expander supplements the suite of synth plug-ins included with Unity Session. It requires at least a Mac G4/400 MHz, OS 9.2 or X 10.2, and 256 MB of RAM. BitHeadz; tel. (401) 886-7045; e-mail [info@bitheadz.com](mailto:info@bitheadz.com); Web [www.bitheadz.com](http://www.bitheadz.com).



## ▼ CLAVIA NORD MODULAR G2

**R**eleased in 1998, the acclaimed Nord Modular was the first hardware-based synthesizer configured entirely in software using a personal computer. All functions of a traditional modular synth appear onscreen, where you can arrange and interconnect virtual modules using virtual cables. Last December, Clavia surprised Nord Modular users and fans by suddenly announcing that the instrument was being discontinued.

Fear not, because Clavia has introduced the second generation, the Nord Modular G2 (\$2,499). With four audio inputs (including an XLR mic input and preamp), four audio outputs, and 24-bit, 96 kHz sound, the G2 offers improved audio quality and external processing capabilities. Four LCDs, rotary encoders with circular LEDs, and front-panel access to 80 parameters are just a few of the user-interface enhancements. Performance controllers now include Aftertouch, a mod wheel, and a pitch-bend stick. The Modular Editor (Win) provides new modules such as reverbs and delays, as well as the original 110

modules, with more on the way. (Clavia plans to offer a Mac version of Modular Editor in a few months.) A new, intelligent module-replacement function lets you swap one module for another without repatching the virtual cables.

In addition to a 37-note keyboard version, the G2 is available as a single-rackspace module called the Nord Modular G2 Engine (\$1,299). The rack model lacks the knobs, pedal jacks, and mic input, but it is well suited for use in the studio rather than on-stage. Modular Editor requires a Pentium III/233 MHz with 64 MB of RAM and 30 MB of disk space. Clavia/Armadio Enterprises (distributor); tel. (727) 519-9669; e-mail [info@armadilloent.com](mailto:info@armadilloent.com); Web [www.clavia.se](http://www.clavia.se).



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## ► MASTERWRITER MASTERWRITER

**M**asterWriter (Mac/Win, \$289), from the company of the same name, is a set of songwriter's tools designed to enhance the creative process. Its collection of nine integrated software modules includes a word processor, several useful dictionaries, *Roget's II* thesaurus, a stereo hard-disk recorder, a library of drum loops, and a database of more than 35,000 phrases and clichés.

In addition to the *American Heritage Dictionary*, MasterWriter provides dictionaries for finding alliterations and rhyming words and phrases. The developer says that the rhyming dictionary is the most comprehensive ever created, and interactive features make it fast and easy to use. A unique pop-culture dictionary lists all sorts of cultural

icons such as famous people and events, geographical locations, and household products, all of which can be sorted by the number of syllables in their names. The program can display all information for easy reference as you create song lyrics.

MasterWriter's Audio module has text fields to help organize your recorded songs and musical ideas. Users can subscribe to Songuard (first year free, then \$30 annually), a service that offers legal protection that begins the day you write and register a song. A 30-day trial of MasterWriter is available as a free download or on CD-ROM (\$9.95). PC users need a Pentium III and Windows 98SE (XP is recommended), and Mac users need at least a G3/266 MHz



and OS 9.2.2 or OS X 10.1.3 (10.2 is recommended). MasterWriter also requires at least 128 MB of RAM, QuickTime 6.0.2, a CD-ROM drive, and a microphone for audio input. MasterWriter; tel. (866) 848-8484; e-mail support@masterwriter.com; Web www.masterwriter.com.

## ▼ EDIROL PCR-30 AND PCR-50

**E**dirol has introduced two products that combine the functionality of a keyboard controller, a control surface, and a 16-channel USB MIDI interface. With their 25 user-assignable front-panel controls, the 32-key PCR-30 (\$225) and the 49-key PCR-50 (\$295) are well suited to controlling computer-based virtual instruments and other music software. Expression-



pedal and sustain-switch inputs supplement 8 knobs, 8 sliders, and 17 buttons (9 of which are assignable). Both keyboards offer 15 onboard memory locations to save and recall controller assignments, and both draw their power from your computer's USB port or the included wall wart.

Edirol has also released PCR-Editor (Mac/Win, free) for assigning controls to

specific MIDI messages (including NRPN and SysEx), so you can create an unlimited number of control maps. Templates for controlling software from most major music-software developers are available on Edirol's Web site. On the PC, the PCR-30, PCR-50, and PCR-Editor require at least a 200 MHz Pentium with 64 MB of RAM, a USB port, and Windows 98, 2000, ME, or XP. Mac users will need at least a G3/266 MHz, 64 MB of RAM, and Mac OS 8.5 or OS X. Edirol/Roland Corporation U.S. (distributor); tel. (323) 890-3700; e-mail edirol@edirol.com; Web www.edirol.com

## ▼ MOTU 828MKII

**M**ark of the Unicorn (MOTU) has announced a new edition of one of its most popular audio interfaces: the 828mkII (Mac/Win, \$795). Like the original 828, the 828mkII is a single-rackspace FireWire device, but it offers a much-expanded feature set while retaining its predecessor's price.

The 828mkII provides 20 inputs and 22

outputs simultaneously, including analog, ADAT, and S/PDIF I/O. Each of the two front-panel Neutrik TRS/XLR inputs features a preamp, phantom power, and a ¼-inch effects send, and both can accommodate mics or guitars. Four channels of 24-bit Lightpipe are available at 88.2 or 96 kHz. An ADAT sync input supplements the word clock I/O for sample-accurate transfers. According to MOTU, the 828mkII is

the first FireWire audio interface with on-board SMPTE synchronization; SMPTE Console software (Mac/Win) is included for time-code management.

Other features include sample-accurate MIDI In and Out ports, ten control knobs, and a backlit LCD. Because you can program the 828mkII from the front panel, it can operate as a standalone digital mixer. For computer-based mixing and monitoring, the application CueMix DSP (Mac/Win) is included, as is MOTU's DAW Audio-Desk (Mac only). The 828mkII works with Mac OS 9 or OS X and Windows 2000, ME, or XP. Of course, it also requires a computer with a FireWire port. Mark of the Unicorn (MOTU); tel. (617) 576-2760; e-mail info@motu.com; Web www.motu.com.



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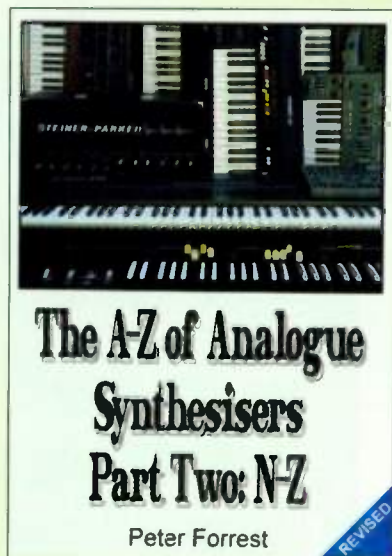


# GIGASTUDIO

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## SOUND ADVICE ▲▲▲▲



### ▲ SUSURREAL

With 384 data-packed pages, Peter Forrest's *The A-Z of Analogue Synthesizers, Part Two: N-Z* (\$41 postpaid; \$70 for both volumes), is not exactly light reading. So much small type crammed tightly onto every page might strain your eyes, but the wealth of up-to-date information you'll find there can't be denied. The book even manages to squeeze 88 color photos onto 16 pages, in addition to the black-and-white photos distributed throughout the text.

Forrest devotes large portions of *Part Two: N-Z* to major synth makers such as Oberheim, Roland, Sequential, and Yamaha. However, he commits a surprising amount of space to more obscure entries such as the Russian company Urals Vector Enterprises and the Dutch company Synton. *The A-Z of Analogue Synthesizers* features more than synths: electric pianos and organs are also described at length. (However, drum machines, vocoders, and synths that require guitar or wind controllers are omitted.) Eight pages cover various brands of theremins, and the Vako Orchestron (an early analog sample player) is described in detail. The author also includes his subjective ratings and information on

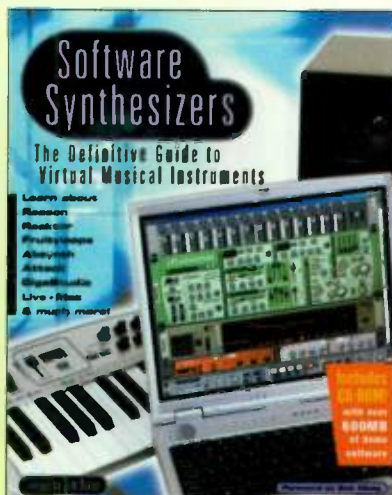
pricing. Susurreal; tel. 44-136-377-4627; e-mail [pforrest@vemia.co.uk](mailto:pforrest@vemia.co.uk).

### ▼ BACKBEAT BOOKS

Backbeat Books' *Software Synthesizers* (\$29.95), edited by frequent *EM* contributor Jim Aikin and taken largely from the reviews section of *Keyboard* magazine, is a comprehensive overview of more than 30 virtual instruments. In just a little more than 300 pages, Aikin and six additional authors examine software-based synths, sample players, drum machines, and workstations.

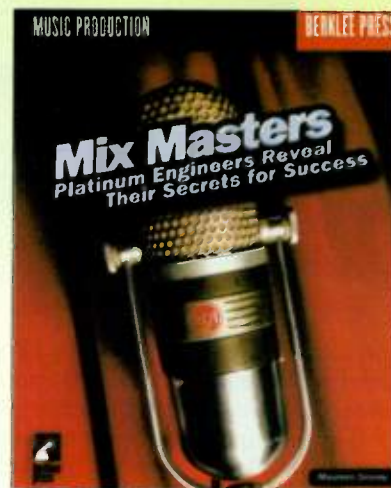
Anyone who is new to the field will appreciate the opening chapter, which explains the notion of soft synths and how to get started. For more advanced readers, "Design It Yourself" introduces two modular synths and a pair of programs for creating your own virtual studio tools. The final chapter clarifies basic synthesis concepts such as polyphony, frequency spectrum, signal routing, and physical modeling.

In a foreword, Bob Moog reflects on how music synthesis has changed in the past 50 years. Included with the book is a CD-ROM containing demo versions of many of the instruments discussed. Backbeat Books; (415) 947-6615; e-mail [books@musicplayer.com](mailto:books@musicplayer.com); Web [www.backbeatbooks.com](http://www.backbeatbooks.com).



### ▼ BERKLEE PRESS

The subtitle of Maureen Droney's *Mix Masters* (\$24.95) divulges its subject matter: *Platinum Engineers Reveal Their Secrets for Success*. The book is a collection of interviews with 27 hit-making studio engineers that appeared in *Mix* magazine between 1992 and 2003. Even if you aren't familiar with their names, you know their work: recordings by the Beatles, Elton John, Madonna, Christina Aguilera, Frank Sinatra, Willie Nelson,



and dozens of other stars, as well as numerous movie and television soundtracks.

Engineers from Geoff Emerick and Al Schmitt to Chuck Ainlay and Dave Way discuss recording techniques, equipment, and studio tales. (One of my favorite stories is from Dave Jerden, who attracted Brian Eno to his studio by falsely advertising a piece of gear he borrowed only an hour before he had to demonstrate it to his prospective client.) The best thing about *Mix Masters*, though, is its abundant advice on practical matters such as mixing, mic placement, effects, and EQ. Thanks to Droney's personal experience as a recording engineer, her interviews provide plenty of depth and insight. Berklee Press; tel. (617) 747-2146; Web [www.berkleepress.com](http://www.berkleepress.com).



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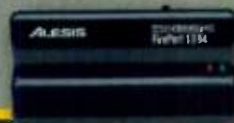
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## ► STEINBERG XPHRAZE

The latest software instrument from Steinberg is Xphraze (Mac/Win, \$249.99), a VST plug-in that combines sample-based synthesis with polyphonic phase generation. Xphraze works like a virtual groove machine, allowing you to interactively modify sampled loops in real time. Select a sample, adjust its parameters, and play a note or chord to trigger a rhythmic phrase that automatically matches your song's tempo. You can also synchronize phrase oscillators, envelopes, LFOs, and arpeggios to tempo.

Onscreen controllers let you change the timbre and phrasing of loops as they play and morph multiple parameters simultaneously. Select from 24 stereo insert effects and 6 types of master effects. Vector syn-

thesis routes the mix to any of four stereo outputs using any assignable modulation source.

Xphraze includes a 500 MB waveform library that comprises more than 200 sounds. It imports AIFF and WAV sounds and automatically maps imported multisamples. Xphraze is 4-part multitimbral, with as many as 256 notes per timbre. Minimum requirements for the PC are a Pentium III or Athlon/600 MHz, Windows 2000 or XP, and a Windows MME sound card (ASIO recommended). Mac users need at least a G4/400 MHz, Mac OS 9



or OS X 10.2, and an ASIO sound card. Both platforms need at least 200 MB of free RAM and a compatible VST host. Steinberg; tel. (818) 678-5100; e-mail [info@steinbergusa.net](mailto:info@steinbergusa.net); Web [www.steinbergusa.net](http://www.steinbergusa.net).

## ► SEVEN WOODS AUDIO SST-206 SPACE STATION

Next in the honey-I-shrunk-the-studio department is the SST-206 Space Station (\$1,195), from Seven Woods Audio. Smaller than most paperback books, the SST-206 is based on the Ursa Major Space Station, a 3U digital reverb and delay processor that was popular throughout the 1980s.

Despite its small size, the SST-206 provides 12 knobs and 24 indicator LEDs for hands-on, real-time control of all parameters. It has a 13-foot breakout cable and lets you access every control without leaving your studio's sweet spot.

The SST-206 was designed by Christopher



Moore, who developed the first Space Station in 1977, making it one of the earliest digital reverbs available to recording studios and performing musicians. In addition to re-creating the reverb and echo settings of the original model, the SST-206 features a new reverb program called simply Room. The new version's Motorola 24-bit DSP chip emulates the original's 11-bit floating-point converters and 7 kHz bandwidth. Its AES/EBU ports support 24-bit audio at 44.1 or 48 kHz, but no analog I/O is available. Seven Woods Audio; tel. (617) 489-6292; e-mail [moore@sevenwoodsaudio.com](mailto:moore@sevenwoodsaudio.com); Web [www.sevenwoodsaudio.com](http://www.sevenwoodsaudio.com).

## ▼ DIGIDESIGN DIGI 002 RACK

Digidesign has introduced its most affordable multichannel FireWire audio/MIDI interface ever. The Digi 002 Rack (\$1,295) can simultaneously handle eight channels of balanced analog I/O, eight channels of ADAT Lightpipe I/O, and two

channels of S/PDIF I/O, in addition to 16 MIDI channels in and 32 MIDI channels out. If you don't need Lightpipe, the optical ports can also serve as optical S/PDIF I/O. Four of the eight analog audio inputs have XLR mic connectors and preamps with 48V phantom power. Other than the absence of

control-surface controls, the 002 Rack is functionally very similar to the Digi 002, but in a 2U rackmount unit.

Because it connects with a FireWire cable, the Digi 002 Rack is well suited for use with laptop as well as desktop computers. Combined with the included 32-track DAW software Pro Tools LE (Mac), the Digi 002 Rack provides a complete, portable recording solution. Minimum requirements are a Mac G4/667 MHz, Mac OS X 10.2.3, and 384 MB of RAM. The company says a Windows version is forthcoming. Digidesign; tel. (800) 333-2137 or (650) 731-6300; e-mail [prodinfo@digidesign.com](mailto:prodinfo@digidesign.com); Web [www.digidesign.com](http://www.digidesign.com).



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## Humanoid or Vocaloid?

**M**any acoustic instruments can be simulated convincingly with various synthesis techniques, such as sampling and physical modeling. But one instrument has resisted most simulation attempts: the singing voice. That is because singing exhibits an unusually wide range of timbres, articulations, and transitions between sounds. In addition, singing usually communicates lyrics as well as melody, which results in a double layer of meaning not found in other instruments. Finally, the human ear is so attuned to the voice that the subtlest tonal shifts, errors, or anomalies are immediately apparent.

At the 2003 Musikmesse in Germany and the Audio Engineering Society convention in the Netherlands this past March, Yamaha demonstrated a new vocal-synthesis technology called Vocaloid ([www.global.yamaha.com/news/20030304b.html](http://www.global.yamaha.com/news/20030304b.html)), which achieves a new level of sophistication in this area. Using Visual C++ on a Windows computer, a team at the Yamaha Advanced System Development Center in Japan has written software that mimics the singing voice with surprising accuracy.

The team starts with recordings of professional male and female vocalists singing specially constructed phrases of nonsense words with all possible transitions between syllables. The transitions are slightly different depending on the combination of speech sounds called *phonemes*. Those differences are a big part of how we understand words and why a vocal track sounds natural or artificial. For example, the phoneme *p* sounds slightly different at the beginning of a word than it does at the end, and it affects the vowels next to it differently than, say, the phoneme *t*.

The recorded phrases are converted to the frequency domain using Fast Fourier Trans-

*Yamaha's  
vocal-synthesis  
technology sings  
a new tune.*

form and divided into separate phonetic transitions. Those elements are then stored in a phonetic database for use with the synthesis engine. Expressive elements such as vibrato, pitch bend, and attack are also extracted and stored in a separate database.

To create a vocal track, you enter music and lyrics into the score editor (see Fig. 1). The music can be entered manually or imported from a Standard MIDI File; the lyrics must be entered manually. Expressive elements can be imported from a MIDI File as Control Change messages or entered from a graphic palette.

The data from the score file is sent to the synthesis engine, which draws on the phonetic and expression databases to create the track. To sing the word *part*, for example, the software combines four elements from the phonetic database: *p* (as it sounds at the beginning of a word), *p-ar* (the transition from *p* to *ar*), *ar-t* (the transition from *ar* to *t*), and *t* (as it sounds at the end of a word). The two *ar* elements are blended together, and the resulting vowel *a* is lengthened to accommodate the melodic line.

Different pitches are derived by shifting the fundamental and overtones while leaving the vowel formants relatively untouched. The database elements were

originally sung at different pitches, limiting the amount of shifting the engine must do. A Pentium 4/2 GHz computer takes less than one-third real time to render the track and convert it back into the time domain. For example, a 1-minute track can be rendered in less than 20 seconds.

Yamaha intends to commercialize Vocaloid by licensing it to producers of vocal libraries and software marketing firms. The obvious applications include background vocals and rough sketches of arrangements. However, the potential for this technology is virtually unlimited. ☼



FIG. 1: The Vocaloid score editor lets you input a melody, lyrics, and expressive elements, such as vibrato and dynamics, which are then used to create a synthesized vocal part. This example depicts the first phrase of "Amazing Grace."

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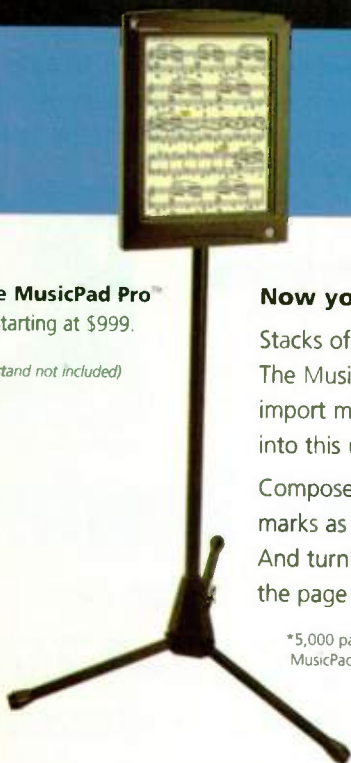
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MAUREEN DRONEY

## The fine art of Tweaking with Chris Vrenna.

**A**s a founding member of Nine Inch Nails, drummer-producer Chris Vrenna spent a lot of time exploring his dark side. He also spent a lot of time creating unique, intense, and dark sounds that fit the raging angst of Trent Reznor's songs. But since leaving NIN in 1996, Vrenna, who got his start on the Chicago industrial scene, has broadened his scope. He has worked as a producer, remixer, and programmer with bands and artists including Hole, Rob Zombie, Marilyn Manson, Smashing Pumpkins, U2, David Bowie, Weezer, and Nelly Furtado. His production of Cold's *13 Ways to Bleed on Stage* has recently gone gold.

He has also developed his own music, delving into soundtracks for movies (*Rollerball*, *She's All That*) and games (*Matrix II: Enter the Matrix* and American McGee's *Alice*, whose Vrenna soundtrack was deemed worthy of its own CD). In addition, he has developed his solo project, Tweaker. The first Tweaker CD, *The Attraction to All Things Uncertain*, was re-

leased in 2001 and was called a "riveting solo debut" by *Billboard*.

Since October of 2002, Vrenna has been back in tweaker mode, holing up in his home studio to write and record his second release, tentatively titled *2 A.M. Wakeup Call*. After hearing some of his richly melodic new tracks, it comes as less of a surprise to discover that Vrenna, despite his notoriously aggressive sonic style, is actually a classically trained percussionist who, in his teens, performed with orchestras and marching bands as well as with the *de rigueur* punk groups.

Except for his time on tour, Vrenna has spent the bulk of the past 15 years in the recording studio. He has applied all that experience to his home setup, which consists of what were originally two small back bedrooms in his house in the quaint Los Angeles neighborhood of Eagle Rock. I've always considered Vrenna to be the consummate modern electronic musician, but on this visit to his studio, something looked very different.

**By Maureen Droney**



# The Groove Is Out There

## What's with all the analog outboard gear?

[Laughs.] I know, I've done a complete 180° change. I was digital, digital, digital, and now I'm using all my analog outboard gear as plug-ins. For this project, I've been buying up used Digidesign 888 I/Os, with the old 16-bit converters. I don't use them for AD/DA; I'm only using the AES/EBU portion of them, which is 24-bit. Since I use a digital Yamaha 02R console, I'm breaking out 32 tracks' worth from my Pro Tools digitally, via AES, through the 888s.

That way, when I mix, I'll have 32 digital outs into the console, and I can save my two 24-bit converters for inserting analog outboard gear. I don't use a patch bay; I just hard-patch in with XLR, so it's superclean. I've been getting some awesome sounds that way, because I can easily use my analog chain. Like for kick drum, I'd use a dbx 160 and an API 560 graphic EQ, just like you would with an analog console.

**But why? With the abundance of plug-ins, more and more people are working entirely "in the box."**

Well, I've done all that. A lot of the VST stuff out there sounds thin when you compare it with analog. And mixing internally in Pro Tools still doesn't sound good. Even HD doesn't fix it. It's a higher sampling rate, so your files are bigger; but there's still not enough headroom in the mix bus. You can't pin needles the way you can when you're working on an SSL console with line gains you can really crank.

I'm always trying to get a better mix out of my house. Lately, rule No. 1 is to never set up a master fader in Pro Tools. I try to keep a 1:1 output from Pro Tools into the console, so I can keep all my faders at zero, where it sounds good.

## You're talking about gain structure.

I don't know the physics of it, but the further you have to pull the Pro Tools fader down, the fewer bits you end up with. Due to the lack of headroom, you can't clip that master fader at all. So if you're trying to squeeze 60 tracks out of the master fader of Pro Tools, every other fader ends up being at -40. And then your mix is tiny. No image, no depth. When I split everything out, got rid of the master fader, put everything through the console, and set all the Pro Tools faders at zero, all of a sudden my mix went "Whoa"! And it goes "Whoa" again when I mix and strap the analog gear across it. I can't believe it. I'm

turning into some kind of old-school asshole.

**You're a master at creating big, distorted walls of sound. But you once told me you'd learned that no matter what untraditional things you did to create that big, crazy sound, you had to record it with good technique. Otherwise, it would end up sounding small.**

Exactly. And now I've taken that approach further.

## But why is the gain structure such a problem? All gear has a sweet spot.

If you set it up right, yes. In Pro Tools, -18 is analog zero. But a lot of people don't know that—I didn't know that. And you're always told to print digital as hot as you can to get the best dynamic range. So everybody's printing every track clipping red.

But when you go to mix and you strap all your analog outboard gear over, if you use a zero digital signal you'll blow up your compressor, or your Neve channel, or whatever. So you've got to take all your analog gear and gain it way down, where it doesn't sound as good and it isn't in its efficient range. Suddenly, you've got the pad in, and the [good old gear] you're using sounds like shit. To interface with analog properly, you've got to print digital at lower levels.

I worked with [engineer-producer] Joe Ciccarelli, who brings his own little VU meters everywhere. He prints everything at 0 VU analog, and into Pro Tools at -18. When you look at his Pro Tools levels, they're barely hitting, but it works properly with the analog gear. You do lose a little dynamic range; your noise floor goes up a little. But as Joe says, "I'll take a little more noise to allow the analog gear to do its job in its optimal range."

## What are you doing right now, and what equipment are you using?

I'm doing rough mixes. I've got Digidesign DVerb running, which has a cool sound, and also Line 6 EchoFarm—another favorite. I use a couple of Waves Renaissance compressors and a Digi slap delay. That's pretty much it, because the way I'm working now, I carve my tone



FIG. 1: Although Vrenna uses Pro Tools and an assortment of plug-ins and software synths, he also relies on hardware, including the Clavia Nord Lead synthesizer (the red keyboard, center) and the Waldorf MicroWave XT synth (the orange rackmount device to the right).

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# The Groove Is Out There

outboard, like with the API Lunchbox. With the mix split out into my console, I can really hear the way things sound. When it's in an internal Pro Tools mix, everything gets crushed. Sometimes I've made mistakes recording tones because it sounded good within that context, then I split it all out, and it's like, "Why does it sound so crappy?" Now I try to get it right going in.

## What was your method for recording the new record?

First, we [Vrenna and partner Clint Walsh] wrote the whole record using the same sounds for each song. Doing that made me think more about making it work emotionally. I didn't want to

be fooled by all the sweeping and swirling of the filters and not realize that the chord wasn't even a good chord. I can fill it out and make it thick later. If it works on piano, it will work twice as well when the sound is pretty or trippy or whatever. Another thing: I always write in an order and sequence as we go because I like albums, not 12 songs that don't have any relation to one another.

The point was to write the whole record with the same set of sounds. We didn't want to have a great idea for a bass line, and then spend two days deciding what the bass sound should be. We wanted the songs to work structurally and dynamically and emotionally. When we got 12 of them, we went back and replaced the programmed drums with live drums.

## What were those temporary sounds?

We had a distorted patch in the Marshall JMP-1 preamp, a clean patch in

the Line 6 Pod, a bass patch in the Bass Pod, and one synth patch on the Roland JP-8000—my favorite bass keyboard because it has the most old-school, natural, Roland-y sound. We also used a string pad and an air pad from the Waldorf Microwave XT, a piano sample, and one bank of drum samples.

## That's a different approach for you. From your Nails days on, you've put a premium on constructing unique sounds.

I'm finding that the fewer choices I have, the better choices I make. With too many choices, I get option anxiety. It's "Let's get a synth bass," and there are all the synths in this room, plus samples, plus software synths, and I've forgotten what the bass line was going to be because now I'm inundated with a million bass patches. I actually sold a few keyboards before I started this record and ended up buying one, the Roland V-Synth, which is the greatest

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bizarre keyboard I've seen in years.

I'm still into sounds. The other conscious effort I'm making—although I use a lot of synth plug-ins—is to go back to my hardware synths. Because it drives me crazy when I'm watching TV and I hear something, and I know the patch. It's like, "That's Reason Factory User 4, but—that's interesting—he put a guitar riff over it." Since every kid with a PC is getting cracked software off Gnutella and is getting VST instruments, I figure I'll go get the Alesis Andromeda so I'll sound different.

I'm using a lot of my older synths, like the Waldorf Microwave XT for nice sine-wave dub basses. And of course, modeling synths like the Clavia Nord Lead (see Fig. 1).

#### **I don't know many drummers who program their parts first.**

That's how I've always done it. I'm usually limited by budget, and if I go to a big studio to do drums, we don't have time to sit there saying, "Hmmm. What should the beat be?" I map it all out with samples and nitpick the fills until it's a perfect programmed performance. I also do that when I produce. The drummer has to know which fill he's going to play on every song before we walk into the studio. Drums are still the most expensive thing to do on a project because that's where you usually need a good room and a lot of mics and mic preamps.

#### **Is it ever difficult to play what you've programmed?**

Sometimes. [Laughs.] Actually, quite often. A couple of times on this record I had these great beat ideas that took me a while to figure out how to play. But that's the beauty of doing drums in your own house. You are able to take more time.

#### **You did all the drums here?**

I went to a friend's studio because I needed huge drums on a couple of tracks. Everything else I did here. Engineer Bill Kennedy came over for a couple of days and helped me. Mics in the bathroom—the typical home recording.

#### **What were those bathroom mics?**

An AKG 414 and a Neumann U47 FET. And a pair of the big Crown PZMs. That was a Nine Inch Nails trick on the *Downward Spiral* stuff: just a PZM and an AKG D112 on the kick for a cool lo-fi sound.

#### **PZMs on the walls?**

Yeah, or they sound really good on the floor, in the hallway outside the drum room. I vary it: doors open or

closed. Sometimes I stick a 414, in omni mode, way up into a skylight for a crazy high-end sound. Sometimes I open all the doors and put the mic out in the TV room—a "down the hall" version of the classic big-room studio sound.

Then Sennheiser 421s on the toms, a vintage AKG D12E that I found on eBay for the kick—one of the square ones where the cable was permanently attached and came out the back of the mic.

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# The Groove Is Out There

Another great mic, at a great price, is the Røde, the little NT4, that has the fixed stereo pattern. I bought it to use as a drum overhead mic because I didn't have room for two mic stands. It has a very clean sound, and since it's so directional, it doesn't pick up the fact that it's in such a small room.

## What other instruments are on your new record, and how did you record them?

Acoustic guitar . . . we did a whole day of 12-string. We used the Røde stereo mic on it, set so it was getting both the body and the neck, and it was really sweet. For the other acoustics, we used an AKG 451 through the Vintech X73 mic pre/EQ—the Neve 1073 kind of thing, which is just awesome. For a quarter of the price of a vintage 1073 module, the sound is remarkably similar. And a tube compressor, the ADL [Anthony DeMaria Labs], which is kind of like a Universal Audio LA-2A. For electric guitar, always the Vintech. Straight into the Vintech, then straight back out. We've got a whole stack of combo amps.

My drum-loop setup is my Avalon DI—the fattest of all DIs—through the API mic preamps, through the API EQ. Then insert any of your favorite compressors: a dbx, or an Universal Audio 1176, or the Empirical Labs Distressor if you want something a little spanky. We take bass direct through an Avalon and into an API graphic EQ and a tube compressor like the ADL.

For keyboards, here's something else I picked up from Joe Ciccarelli: Summit tube DIs. My synth printing is generally from that through the GML mic preamps, because they sound so open. I almost sold them because I never used them. Now they're one of my favorite mic pres for warming up the keyboards. I just use them for gain. I use a pair of API 550As for EQ, and then straight into Pro Tools through the Apogee A/D.

The piano was samples—we got a new roof instead of making a down payment on a Bøsendorfer! We did a shoot-out of sample libraries. In the end, I mostly used the Kurzweil K2000's Stereo Grand Piano factory patch. It has a really nice roundness to it. We also liked some of the GigaStudio and Miroslav Vitous library pianos.

## I always thought you started as a punk drummer. But actually, you studied drums for a long time.

My dad thought I had a natural inclination, and he got me drum lessons when I was five. All the teachers said I was too young, except one jazz guy who said he'd try me. It was practice-pad only for the first six months, then you got your rudiment sheet and your *Stick Control for the Snare Drummer* book. It was six months before he put me on a kit. I took lessons for 12 years, and even when I was in Nails, during *Downward Spiral*, I went and took refresher lessons. It's nice to get different perspectives from people, and everybody I've ever sat down with has taught me at least one thing that has stuck in my repertoire of skills.

## And you played in orchestras?

I was in junior "phil." That was my first European tour, playing Aaron Copeland's music on symphonic percussion, timpani, and snare. Counting that rest bar for 112, waiting for the one triangle hit. If you blew it, you were screwed.

## Well, that certainly teaches concentration.

I also did dinner theater and musicals. In school I did jazz band, marching band, and drum and bugle corps, where I played tri toms. It was like that movie *Drumline*. You're playing with eight other guys, and if one guy is out of sync, you get marked off. You're doing back-sticking and playing on other people's drums,

throwing your sticks in the air, doing all this crazy dancing.

## You've started writing for game soundtracks. How is that work different from album work?

It's similar to movies in that it's a score, and you're trying to write a theme or underscore as people are playing the game. If it happens to have a pre-cut scene, then you have to score for picture, as you would for a movie. But for game play, once you drop into a level, if you figure it out quickly, you might be there only five minutes. Or people like me [laughs] could be in it two hours. You need to write music that can run through the whole time. It's not really locked to any particular action in the game. You have to write something that's moody and goes along with both the theme of the level and the theme of

## CHRIS VRENNA: SELECTED DISCOGRAPHY

### Composer/co-composer

Chris Vrenna, "Take the Pill" from *Matrix II: Enter the Matrix* game soundtrack (Atari, 2003)

American McGee, *Alice* soundtrack (Electronic Arts/Kabuki Digital, 2001)

Econoline Crush, "By the Riverside" from *Brand New History* (EMI, 2001)

Tweaker, *The Attraction to All Things Uncertain* (Six Degrees, 2001)

Nine Inch Nails, "Perfect Drug" from *Natural Born Killers* soundtrack (Nothing/Interscope, 1997)

### Producer/additional production credit

Cold, *13 Ways to Bleed on Stage* (Geffen, 2000)

Rasputina, *How We Quit the Forest* (Columbia, 1998)

### Remixer

P.O.D., "Set It Off" from *Scorpion King* soundtrack (Universal, 2002)

Nelly Furtado, "Turn Off the Light" (DreamWorks, 2001)

U2, "Elevation" from *Tomb Raider* soundtrack (Elektra/Interscope, 2001)

Weezer, "Hash Pipe" (Geffen Records, 2001)

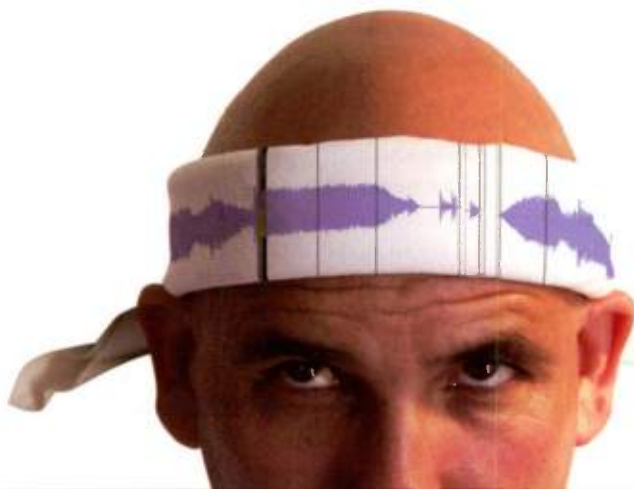
Xzibit, featuring Dr. Dre and Snoop Dogg, "X" (Loud Records, 2000)

Rob Zombie, "Return of the Phantom Stranger" (Interscope, 1999)

Skinny Puppy, "Dys Temper" (Netzwerk, 1998).



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## The Groove Is Out There

the game. But it can't get overbearing or so repetitive that people get bored.

### And it can't have a finite ending.

Right. You may want it to loop for hours, until you get to the next point that will trigger the next piece of music, and on and on. I always try to make sure that the end of the piece and the beginning are the same instrumentally, so that when it ends and loops back to that beginning, you never even hear that it stopped.

It's challenging. The main thing is, you don't want the people to go to the option screen and shut the music off! You have to stay out of the way of the action and the sound effects, but at the same time you're setting the mood.

### How do you approach doing remixes?

They're all different. I just did a remix of Cold's new single that was a B-side, where I got to do whatever I wanted. There was no ulterior motive other than that they wanted a cool version. But those are rare lately. Now we need a format: "It's a hip-hop track but we want a rock version," or "It's a rock track, but we want a dance version." Labels aren't spending money just for the art of it. So I tailor it to what the label needs. That's not necessarily negative, and it can be challenging—especially because the integrity of the artist is always on my mind. They can only be pushed so far into other genres before the red flag goes up. I don't ever want to do something that isn't true to who the artist really is. That would hurt more than help them. Fans smell a rat quickly.

### Are you looking to buy anything in the near future?

The thing I'm most excited about now is the Yamaha 02R96. My 02R has been the most stable and reliable piece of gear I've ever bought. It never crashes. If I get a new digital console, that would be it. But I'm also looking at the new API 8200 series, which I can't wait

to hear. You buy a master section, the 7800, and it's a master fader with an insert, switching for two sets of speakers, and a talkback system. Then you can add single-rackspace units that have actual API op amps and Jensen transformers. You get volume, pan, and send knobs; a mute button; and an insert switch. The inserts are all balanced and ribbon connected, and you can daisy-chain eight of the units. So you can do all your riding and muting within Pro Tools but get the sound of an API Legacy. That's got to be awesome.

### What about upgrading to Pro Tools HD?

I'm using Pro Tools 24 Mix Plus, and I'll run this rig until somebody puts a gun in my mouth. I can't afford HD right now. The software investment alone would be another \$30 grand! Plus, MP3 is the new winning format. Why would I spend \$30,000 to upgrade to HD when the new format isn't even CD quality? Actually, maybe I should start making my records at 16-bit, 44.1 kHz. I'm doing them at 24-bit, 48 kHz now; what am I even wasting my hard-disk space for?

But seriously, considering how cheap Mix Plus systems are getting on eBay, you can put together a really nice setup for very little money.

### What do you think is going to happen in the near future of the record industry?

My philosophy is just to go forward. I don't think major labels are going to be willing to drop two years and \$2 million to make a record anymore. People are going to have to learn how to do it in a house. Labels are going to want White Stripes records, where they don't have to spend money. Why bother? "Okay, we'll give you \$20 grand to make a record, or \$50- or \$100 grand. Not \$2 million."

You have to be able to make powerful sounding records in your house. And the people who know how to do that—who, like me, make guerilla records—are going to be in a stronger position.

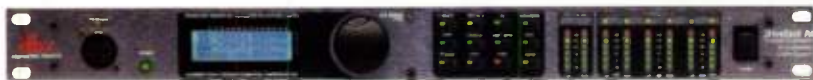
**Maureen Droney** is *Mix* magazine's Los Angeles editor. Her book *Mix Masters, a series of interviews with Platinum recording and mix engineers*, has recently been released by Berklee Press.

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Shareware and  
freeware tools  
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audio need.



By Dennis Miller  
and Gregory D. Moore



# Too Much Good Stuff



What a great time to be a computer musician. There's never been more software available than today, and the range and quality are better than ever. What's more, many of the most interesting applications are coming from small, independent developers who are releasing their work for free or for very low registration fees. Talk about some great bargains!

We've scoured the Web for the past few months, checking out all sorts of tools that creative programmers have made available for little or no money. We'll focus primarily on newer software, though a few of our old favorites have received major face-lifts recently, and we'll include them as well. We won't be looking at many digital audio sequencers or audio editors, as we assume most **EM** readers are well equipped in those categories. Nor will we cover many of the excellent shareware utilities—patch editors, studio-management tools, and the like—though you will find some programs in those categories in the “Short Takes” sidebars accompanying each section of the article. Rather, we'll be looking primarily at programs that offer unusual or unique ways of dealing with sound.

## SHAREWARE DEFINED

In the past, *shareware* referred to software that had all or most of its features intact right out of the box. By registering, a user might get a printed manual, early news about updates, or even just a good feeling for doing the right thing. Today, shareware is just as likely to mean a crippled demo; for exam-

ple, one that doesn't allow you to save your work.

We're covering programs that have all or most of their features working or, at the very least, provide enough features to allow you to get some serious work done. Though several of the programs we're reviewing do have fewer features than their registered counterparts, we aren't including any software that doesn't let you save your work or that will “intermittently add a test tone to your audio files.”

In corresponding with the various developers, we ran into several situations where the authors of the software had not yet decided the precise means by which they intend to release their work. For example, some of the programs that have been in perpetual beta do not yet have a clear registration policy. It is our understanding, however, that none of the software presented here will time out or stop working prior to the release of a new upgrade. But we can't predict the future, and especially with shareware and freeware, it is hard to know when a developer might lose interest or move on to other projects.

In the pages that follow, you'll find roundups of both Windows and Mac software. In some cases, a program runs on both platforms, but we'll review it only once. We hope that there is something for everyone in these roundups, and we are fairly certain that every reader will discover some new and unusual tools for making music. Just remember, if you try out a shareware program and decide it works for you, register it! It's the right thing to do.

Illustration by Peter Neumann



# Windows Shareware Roundup

Great opportunities

abound for getting  
good stuff cheap.

By Dennis Miller

The Windows world has always been a great environment for shareware and freeware, and the current situation is better than ever. Maybe

that's because the PC has been around longer than the Mac, or because many developers prefer it as a platform. Logically, the greater number of PC users represents a vast potential audience for shareware developers. For whatever reason, you'll find Windows shareware and freeware of nearly every shape and size, from VST and DirectX plug-ins to audio editors to sequencers to complete composition and production platforms.

This roundup will include several modular synthesizers, some "programming environments" for moving well beyond the fixed limits of traditional modular soft synths, one multitrack and one stereo audio editor, programs that can convert graphic images into control data for synthesizing sound, and various other entries. In addition to the main write-ups, I'll list some more programs worth trying out in the sidebar "Short Takes."

Several applications I considered including were simply too crippled to be of use to most people. For example, FAsoft's n-Track Studio 3.21 is a very powerful multitrack audio editor, but the free version can mix down only two tracks at a time; that, and other rather severe limitations in the free version, kept it from making the cut.

Clearly, hard work and creativity are alive and well in the music-software development community, and these programs represent just the tip of the iceberg. So now, on with the show!

## **FREWARE**

We'll start out with a group of applications that you have no excuse for not trying. Who ever said you can't get something for nothing?

**Additive Synth 1.0 (Win).** Though most of the main synthesis techniques have been modeled in software—FM and analog being the two most common—additive synthesis hasn't gotten the attention it deserves. Perhaps that's because there aren't as many "legacy" hardware devices to use as models for a plug-in (Kawai's K5000 and the Technos

Axcel Resynthesizer being notable exceptions), or because controlling the frequencies and amplitudes of a huge number of oscillators independently can be a frustrating and time-consuming experience.

Causal Agency's Additive Synth, a VST plug-in that offers 32 oscillators, is one of the few sophisticated additive-synthesis plug-ins around. Though it has some kinks yet to be worked out, the intuitive interface and versatile feature set make this a powerful tool for creating a wide range of sounds.

As the famous French mathematician Fourier noted nearly 200 years ago, any periodic sound can be reduced to a set of sine-wave components (called partials) at varying frequencies and amplitudes. Therefore, given enough oscillators to generate sine waves, it should be possible to synthesize any periodic sound. The main problem is how to set the frequencies and highly varying amplitudes of each oscillator independently. Some tools allow you to extract the relevant information from a preexisting sound and apply it to the oscillators, but for total control, there's nothing like being able to set the parameters for each oscillator manually. That's where Additive Synth comes in.

On Additive Synth's main page, you can toggle each of the 32 oscillators and draw envelopes to control their amplitude and phase (see Fig. 1). You can also create an envelope to detune the oscillators from their base frequency (the fundamental frequency is derived from the MIDI note that you play, and the upper partials are *harmonic*, that is, in whole-number multiples of the fundamental). But many sounds have partials that evolve in a similar fashion, and you can save lots of time by grouping oscillators and using one envelope to control all the oscillators in that group.

For example, you could select all the upper partials in your sound and create a single envelope that makes them fade in later than the lower partials and also fade out more quickly—that's generally what happens in brass sounds. Or, to quickly create a square wave, which is the sound a clarinet most resembles, you could set all the even partials to zero and then set the odd partials' amplitudes in inverse proportion relative to their number (partial 3's amplitude is one-third that of the fundamental; partial 5's is one-fifth; and so on). These and other options make working with such a large number of partials more manageable and efficient.

Additive Synth also offers built-in effects that can be applied

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on a per-oscillator basis. Included are a delay, flanger, phaser, and reverb. You can have only one effect on any given oscillator, but that's still more control than you'll find on any soft synth I've ever seen.

Additive Synth does have a few shortcomings. Among these is that it crashes with certain hosts. For example, when used as an effects plug-in under Cakewalk Sonar 2.2 and Cakewalk VST-DirectX Adapter, Sonar instantly crashes. A work-around is to load Additive Synth via Sonar's Insert/DXi Synth menu option, but even then, when you save your project and subsequently reload it, Sonar will crash. Other problems have been reported with Orion Pro, though I wasn't able to test that host. On the other hand, Additive Synth worked fine during numerous sessions with Sonic Foundry Acid 4.

I also noted that Additive Synth occasionally plays several repeated notes even when sent a single MIDI Note On. It sounds as if the delay feature is enabled even though it's not turned on.



**FIG. 1:** Additive Synth is a VST plug-in that provides independent control of the amplitude and phase of up to 32 oscillators. Multiple oscillators can be grouped in various ways if, for example, you want to use the same envelope on the entire group.

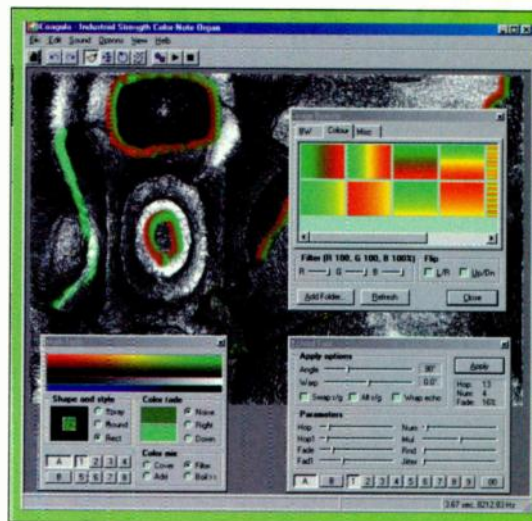
This happened intermittently and may have been a result of CPU overload.

Despite its shortcomings, the plug-in is capable of creating some very interesting sounds, and for the price, it is a worthwhile tool to have on hand. Also look forward to future enhancements, which the author says he is hard at work on.

**Coagula 1.6 Lite (Win).** Like many other PC owners, I've long envied Mac people for their ability to use one particular piece of software: U & I's MetaSynth. Though not nearly as powerful or flexible as MetaSynth, Rasmus Ekman's Coagula is a very cool "image synth" that can add some unique tricks to your sonic arsenal. Every time I look at this software, it has gained new features, which convinces me that I can put off the purchase of a Mac just a little longer.

Like MetaSynth, Coagula can load a bitmap-image file and extract from it information that is used to synthesize (or "render") a new audio file. In brief, the program scans the image and uses each pixel's horizontal position for time and the pixel's vertical position for frequency. Color information is used to determine stereo position, and, in effect, amplitude. Although the program uses only sine waves for synthesizing sounds, careful tweaking of its many parameters allows you to create a vast range of material.

Coagula includes a large number of tools for manipulating existing images or creating new ones, and its many filters are especially handy for quickly processing the current image. You can produce amplitude fades, glissando effects, and all manner of random frequency tricks using the included filters, which are nothing more than BMP files, and you can use your own filters by adding a BMP file to one of the filter folders. There are also tools for zooming,



**FIG. 2:** The Brush tool in Coagula is used to paint on an existing image or create a new image. Other settings allow you to determine how the image will be rendered as a new sound file.

rotating, flipping, skewing, and otherwise altering an image.

To create a new image, you'll most likely start with the versatile Brush tool (see Fig. 2). Sprinkle a little red and a dab of green on a blank screen, then render the image, and you'll hear a granulated sound with clear stereo separation. Or, draw a series of horizontal lines at equally spaced intervals, and you'll get something resembling an organ sound. You can use gradients so that multiple shades and hues are applied as you sweep around the screen. You can save up to 16 customized brushes of various shapes and sizes.

In addition to using the filters, you can modify an existing image using the Echord (for "echo-chord") tool. This feature will make multiple copies of an existing image in a single pass. Its many parameters offer the ability to alter the copies in a variety of creative ways.

Coagula provides many options for controlling the final rendered output. For example, you can choose the total duration of the output file, set an overall amplitude-scaling factor, and modify the smoothing that is used to shape the amplitudes derived from successive pixels. You can also define the frequency range that the synthesizing oscillators will cover, from the Nyquist frequency (one-half the sampling rate) on down to





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subaudio levels. In addition, you can set the scanning resolution Coagula uses to analyze the graphics files.

There's a bit of a learning curve to really master this program, but getting started takes no time at all. If you're a musician with a strong visual sense, you'll feel right at home with Coagula.

**Quartz AudioMaster Freeware 4.6 (Win).** If you're looking for a program that allows you to produce music with a variety of media, Digital Sound Planet's Quartz AudioMaster Freeware (QAMF) 4.6 might be the one. Though it offers only a very modest set of audio- and MIDI-editing features, its attractive and well-designed interface is an ideal place to undertake your sonic adventures.

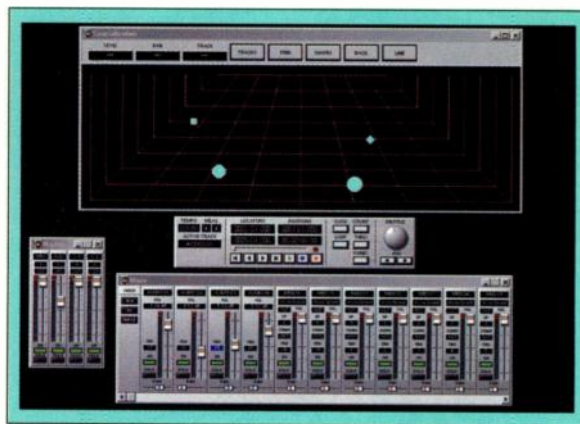
QAMF supports 16 MIDI tracks with a resolution of either 48 or 96 ppqn. A piano-roll window (with a right-mouse-button tool set reminiscent of Cubase's) can be used to enter or edit note data,

and an event list is also available for the same purpose. You can toggle the piano roll to display General MIDI drum names, note numbers, or the traditional keyboard, and though the program doesn't preview notes when you enter them, you can trigger notes by clicking on the keyboard display along the left of the screen. Among other interface niceties is the ability to reorient the keyboard so that notes appear in either ascending or descending order.

QAMF imports MIDI files very effectively. When you load an existing MIDI file that contains multiple channels of data in a single track, the program will automatically split all the data out to new tracks and assign them to successive MIDI channels. If you prefer, you can use the Expert import setting to make the track and channel assignments manually.

The program supports up to four audio tracks and allows you to use its own proprietary QAM-format effects plug-ins, four of which (Phase Shifter, Reverberator, Stereo Chorus, and Stereo Delay) are included (VST and DirectX plug-ins are not supported in the free version). Audio-editing features are limited, but the waveform display that appears when you click on an Audio Element (QAMF's name for the portion of a sound file you want to play) in the main screen helps make selecting regions and defining loop points easy. There's a shuttle wheel for moving through the file, but the time-stretching and pitch-shifting features of the full version are missing.

Working in the Mix



**FIG. 3:** The Spatialization window in Quartz AudioMaster Freeware lets you see each track represented as a different object. You configure a track's pan and volume settings by moving its object on the grid.

Grid (the main track window) is very quick and efficient. Each track has high-, mid-, and low-band EQ settings in addition to volume and pan controls. You can save the EQ settings as presets for later recall. There are also two aux buses on which you can route each track to an effects plug-in.

Moving Audio (or MIDI) Elements around couldn't be easier, though it would be great if you could just type the start location and the file would snap to that point. You can toggle a grid display, which makes lining up Elements on successive tracks easy, and also toggle the waveform display for all (but not individual) tracks.

If you've got all your audio tracks configured and decide you need to add a few seconds of silence at the beginning of a project, use the Insert Bars command to insert as much time as you need. This command is found in the Tracks menu, where you'll also find commands to swap the contents of two tracks, erase and copy tracks, and access the DSP (effects) menu. You can save all or parts of individual tracks complete with their settings for use in other projects or for distribution over the Web, a service that Digital Sound Planet supports at its site.

QAMF's Spatialization window is one of the most intuitive interfaces you'll find for panning and adjusting the levels of a track (see Fig. 3). Each track is assigned a graphic object such as a ball,

## CONTACT INFORMATION

Many of these programs are available from multiple locations. Where possible, we've listed the program's home page.

**Causal Agency** e-mail [scalar@causal-agency.com](mailto:scalar@causal-agency.com);  
Web [www.causal-agency.com](http://www.causal-agency.com)

**Digital Sound Planet** e-mail [info@digitalsoundplanet.com](mailto:info@digitalsoundplanet.com);  
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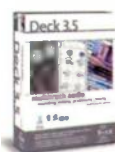


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diamond, or square (you get to choose), and as you move the object around on the grid, the level and pan position of the track is updated in real time. The objects themselves get bigger or smaller as you move them to the front or back of the grid, which is a handy visual cue. By giving each track an object of a different color, it's easy to distinguish one track from another. If you do lose sight of which object represents which track, the Find command will point it out to you. Nicely done!

QAMF provides a vast number of configuration options. For example, you can map the keys on your computer keyboard to specific MIDI notes or program commands, toggle a prompt asking whether you want to keep each successive recording take (or simply have every take added to the current project), and even choose whether new recordings are saved in memory or on disk. You can also choose whether imported files are kept in their original directory or copied to the default program directory, and determine how often the program will update its display while playing back.

The included help file covers all ver-

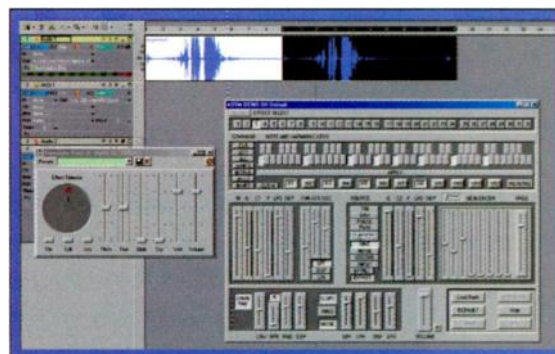
sions of the program, and it's sometimes hard to tell what the limits of the free version are. But you can get contextual help for nearly every element of the program. And because most functions are very intuitive, you should be up and running in no time.

**Sound 2D Warper (Win).** Here's one you won't find on the shelf at Guitar Center: Victor Khashchanskiy's Sound 2D Warper lets you load an audio file, display it as a spectral plot, then manipulate the spectrum and resynthesize the sound. Or, you can load a BMP graphics file, manipulate it, then use the image to synthesize a sound as well. It's a simple concept, but one that can produce a huge variety of interesting results.

There aren't a lot of features to tweak in Sound 2D Warper. Besides choosing a graphics or sound file, you can change the resolution of the grid on which you'll make your modifications (see Fig. 4). The grid contains a number of control points that you move to warp the image appearing on the screen. You can assign up to 999 points for either the horizontal or vertical axis (or both), though at the maximum settings, it's virtually impossible even to see (much less move) an individual control point.

In addition to adjusting the new sound file's amplitude and sampling rate, the only other option is to change the window size. This feature affects the resolution of the spectral plot—the larger the window size, the finer the resolution, and the more pixels that are used to represent the spectrum (higher window sizes result in lower frequencies). A multiple undo feature allows you to backtrack through the changes you've made to the very start of the current session.

Don't expect to use Sound 2D Warper to do your next remix, but if you're open to a little experimentation, it's



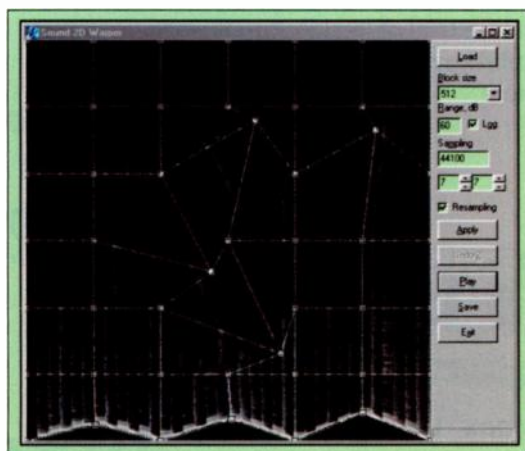
**FIG. 5:** 4ormulator is a powerful vocoder that offers a unique approach to configuring its two filter banks. The Edit window (right) is where you set the frequencies for the filters.

definitely worth a look. And if you like the feel of this one, try out the developer's other two free programs: Bitmaps & Waves, which uses a technique similar to Sound 2D Warper's but with more features, and Enrhythmizer, which can modulate a sound file in some very unusual ways.

## SHAREWARE

This is shareware the old-fashioned way, and we like it. Lots of features, no annoying limits on session time, and help files or documentation to move you along. There are clear advantages to registering in every case, but you'll get lots of mileage out of all these programs, and most important, you can save your work.

**4ormulator Vocoder Extreme Basic 3.1 (Win, \$49).** Vocoderes are all the rage these days, but Richard Wolton has created a vocoder with a difference. Unlike most other vocoders, 4ormulator offers a wide range of options for configuring and modulating the band-pass filters that are used to analyze the input source sound, and unique ways to configure the bank of filters that is used to create the output. You can employ up to 260 filters in a bank, "tune" them to any equal-tempered interval, and modify their center frequencies using an LFO with adjustable rate and depth. Though you can't save your own custom settings in the unregistered version, its 32 presets provide a wide variety of sound-shaping options that can do wonders to whatever audio is on the track to which you apply this VST or



**FIG. 4:** Sound 2D Warper allows you to load an audio file, convert it to a spectral plot, then manipulate the plot and resynthesize the sound. You can also load a graphics file and manipulate it, then use the image to create a new sound.

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MX122 MiniMix PRO  
5 Channel Mic/Line Mixer



RM65b HexMix  
6 Channel Mic/Line Mixer



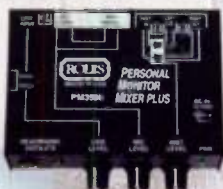
RA53b 5 Channel  
Headphone Amp

## Headphone Amps



RA62b 6 Channel  
Headphone Amp

## Accessories



PM350b Personal Monitor Mixer  
3-Channel Personal Monitor Amp



MX54s ProMix Plus  
3-Channel Stereo Mic Mixer



MX56s PLAYMATE  
4-Channel Mic/Line Mixer

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DX plug-in. And, of course, you can record the output of any patch you make directly in your host software.

4ormulator's interface is split into two screens (see Fig. 5). The opening screen is where you'll find knobs and sliders for adjusting parameters such as volume, wet/dry mix, and global coarse and fine pitch (no increments are shown on the sliders). There's a Glide control for adjusting the time it takes for a change to the Pitch parameter to kick in; a very high setting can produce beautiful, cascading sounds. You can also pick from among the 32 presets by clicking on the Effects Selector, which is a dial-like interface. As you hold the mouse button down and move around the dial, the different preset numbers appear. Release the mouse when the number you want is showing, and it will be loaded.

The second work window is the Editor, which is where the fun really begins. Among the screenful of controls are areas for adjusting the two band-pass-filter banks. Filter 1 represents the bank of filters that is used to extract spectral information from your source sound, and filter 2 is the bank that modifies the carrier signal that will pass through it, under the control of the data derived by filter 1. Though you can set the center frequencies of the bandpass filters only in half-step increments, you can apply a global fine-tuning parameter for more exact control.

The large keyboard in the middle of the screen is used to determine how many filters will be used by filter 2. Filter banks in 4ormulator are made up of sets of filters whose frequencies are "harmonically" related; that is, their frequencies are whole-number multiples of the base frequency. By enabling a note on the onscreen keyboard, you define a fundamental frequency for a set of filters, and you then specify how many additional filters will be in that set by

clicking on one or more of the buttons (marked H) found under the keyboard. Here again there are a total of 260 filters, and you can employ them "dynamically"—10 sets with 26 filters each, 20 sets with 13 filters each, and so on.

The filter-tuning system is unique and takes a bit of getting used to, but the power it provides for creating unusual effects is huge. For example, you can take a song in a major key and jam it through a bank of filters tuned in a minor key; the results can be quite surprising. Unfortunately, you can't automate the controls using MIDI Control Change messages; that would be a useful enhancement for a future release.

Using a looping drum track as a carrier, I got interesting results with nearly all the presets. Preset 11 was especially tasty, with its delicate ringing quality, as was preset 17, with its sweeping-frequency effect. Number 14 conjured up some serious dissonance. Several presets produced a variety of resonator and comb-filter effects, while others offered varying amounts of distortion.

This is one "demo" that packs a punch, and I would recommend that you give it a serious look.

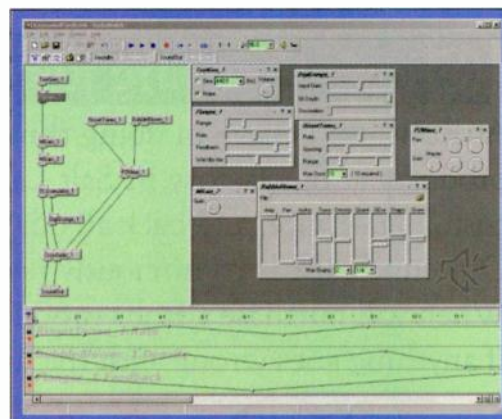
**AudioMulch 0.9b12 (Win, \$50).** Ross Bencina's AudioMulch (AM), described as an "interactive music studio" by its author, is a powerful resource for building a vast number of performable or "self-playing" instruments. More than just your average modular synth, AudioMulch includes several unusual sound-generating and processing modules that move it into extraordinary realms. Though technically still in beta, the software is under active development and should remain available indefinitely. Registering means that you don't have to download each new beta version as it comes out.

AM calls its modules Contraptions, and by combining them into any arbitrary configuration, you can make a wide range of devices that synthesize or process sound. There are six main categories of Contraptions—Input/Output, Signal

Generators, Effects, Filters, Buses, and Mixers—and all are accessible via the right mouse button. You can also use existing VST plug-ins in your designs; just tell AM where to find them.

As expected, some of the most unusual processes are found in the Effects group. Here you'll find oddities such as the DLGranulator, which uses a delay line to granulate its input. Among other things, you can control the grain duration (from 5 to 500 ms) and also determine whether successive grains will overlap or not by adjusting the Interonset control. Of the 12 total parameters, all but InGain, Mix, and Quant have "range sliders" that allow you to set a range within which AM will pick a value randomly. You can also freeze the effect's output on a small range of audio; talk about a bad stutter!

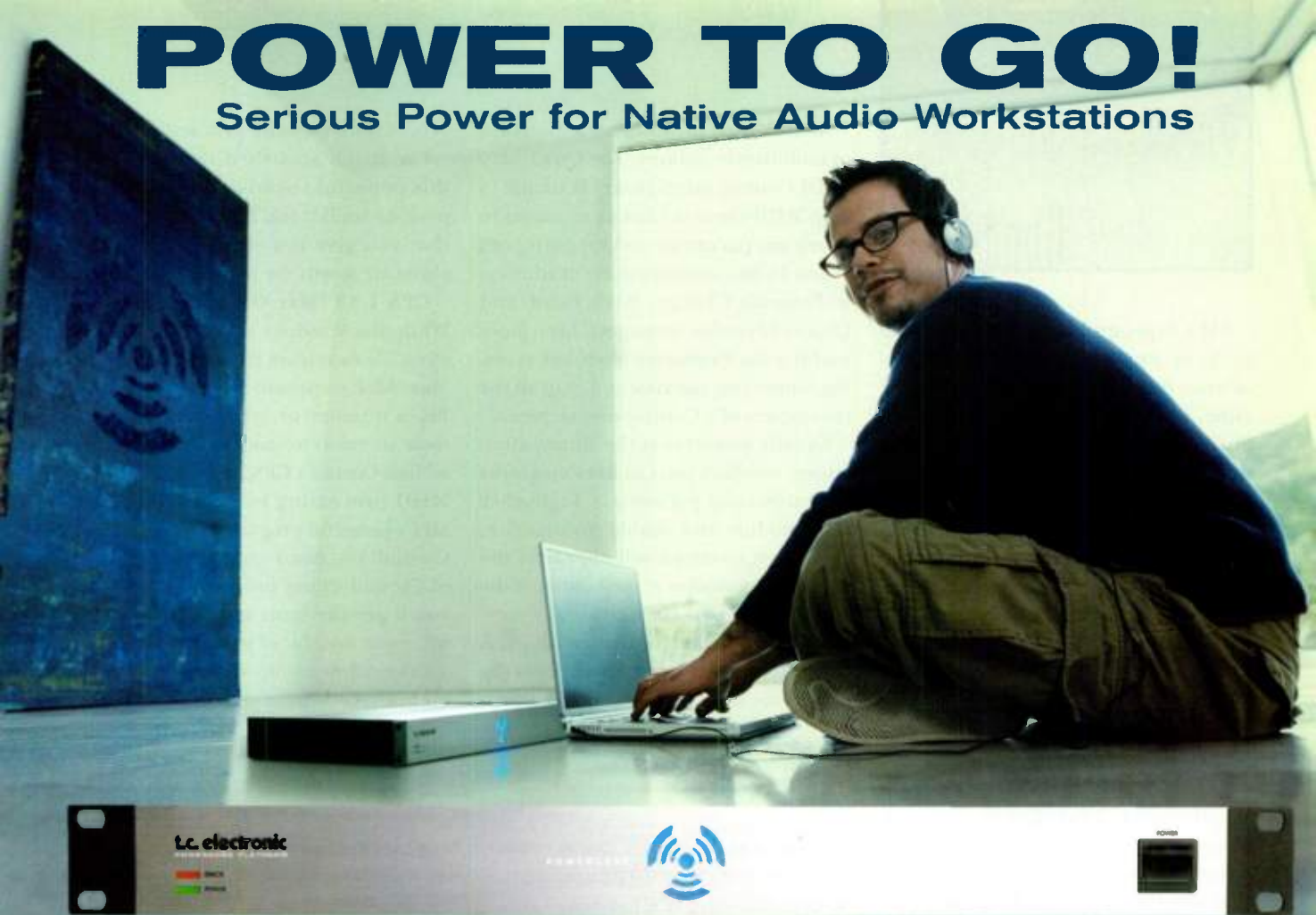
The DigiGrunge effect is used to distort sound in one of two ways. You can modify its bit depth (from 1 to 24 bits, with 14-decimal-point precision) or use the Decimate parameter to modify the sound's sampling rate. As the Decimate-parameter value gets higher, you are, in effect, lowering the sampling rate, and any frequencies in your sound that are above the Nyquist frequency (that is, above one-half the sampling rate) will be aliased (wrapped around) and added back into the audio. This one definitely begs for time-varying control, and fortunately, it is available (more on this later).



**FIG. 6:** Ross Bencina's AudioMulch is a powerful toolkit for designing modular instruments. The Automation window (bottom) is where you configure time-varying controls for the parameters of the modules you are using.

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AM's Arpeggiator has a few unusual tricks up its sleeve. It provides two oscillators that can be assigned waveforms (sine, square, or sawtooth) and transposed independently. A Random parameter can randomize the selection of notes, and a variety of controls allow you to keep the sequence of notes from ever repeating intact. Among the other effects, especially noteworthy are those that pay tribute to computer-music great Jean-Claude Risset; for example, RissetTones, which simulates Risset's famous "never-ending" glissando.

AudioMulch provides an abundance of modulation options. The Quick-Map MIDI Control menu makes it simple to map MIDI Control Change messages to nearly any parameter and supports both 7- and 14-bit controller data (in addition to Program Change, Pitch Bend, and Channel Pressure messages). Even more useful is the Parameter Modulation dialog, where you can view and map all the parameters of a Contraption at once.

Equally powerful is the Automation screen, on which you can draw envelopes for automating parameters. Right-click on a module and enable Automation, and a new envelope will appear in the Automation window at the bottom of the screen (see Fig. 6). Then create any number of breakpoints for that envelope. A cursor scrolls across the Automation display as the sound plays, which makes it

very easy to fine-tune your settings.

I've barely scratched the surface of this powerful sound-design and composition toolkit and highly recommend that you give it a try. The examples alone are worth the price of admission.

**CPS 1.30 (Mac OS X, Win, \$150).**

While the Windows world waits for Cycling '74 to release its much-acclaimed Max/MSP composition software on the PC, a number of other development tools are ready to stand in. Among these is Niels Gorisse's CPS, a set of audio and MIDI processing routines based on MIT's powerful programming language, Csound. You don't need any knowledge of Csound to use the software, though you'll get the most out of it if you're willing to do a bit of tweaking.

Like other composition "environments," CPS provides a number of

## SHORT TAKES

We could fit only a fraction of the interesting software we found into this roundup, so here is a list of more cool tools to try out.

### Audio Arpeg (Win; freeware)

Web [www.analogx.com](http://www.analogx.com)

Arpeggiate your audio files as if they were MIDI using this DX plug-in from developer AnalogX. Stutter and delay effects are especially easy to accomplish.

### Density 1.2 (Win; freeware)

Web [http://web.tiscali.it/no-redirect-tiscali/\\_flat/density.jsp.html](http://web.tiscali.it/no-redirect-tiscali/_flat/density.jsp.html)

Flavio Tordini's program is a real-time granular synthesizer that runs on top of Csound, which you'll need to have installed on your system. You can choose from three different Csound Instruments and control numerous grain parameters, including density, length, and pitch.

### dfx Geometer (Mac, Win; donationware)

Web [www.smartelectronix.com/~destroyfx](http://www.smartelectronix.com/~destroyfx)

Definitely not your average waveshaper! The blocky green interface with the real-time waveform display is just too cool.

### FreeverbToo 1.55 (Win; freeware)

Web [www.sinusweb.de](http://www.sinusweb.de)

Sinus's plug-in works under multiple host formats and is one of the best bargains you'll find anywhere. Based on the code of the legendary plug-in creator Jazar, FreeverbToo sounds great and includes some unique fea-

tures, such as the ability to "freeze" the reverb tail so it never fades out.

### KTGranulator (Mac, Win; freeware)

Web [www.smartelectronix.com/~koen](http://www.smartelectronix.com/~koen)

We love granulators of all shapes and sizes, and this one is as powerful as most we've seen. There are lots of parameters to adjust, including grain duration and pitch. Try out the new beta version while you're at it.

### MIDI Mouse Mod 1.03 (Win; freeware)

Web [www.analogx.com](http://www.analogx.com)

Send up to four 7-bit MIDI controller streams simultaneously using AnalogX's free software. If you have a loopback device on your computer, you can send data into your sequencer for recording. Otherwise, the program's output is intended to control an external MIDI device.

### Pd 0.36-0 (Mac OS X, Win; freeware)

Web [www.crcs.ucsd.edu/~msp/software.html](http://www.crcs.ucsd.edu/~msp/software.html)

We'd need a book to do justice to Miller Puckette's seminal graphical music programming language. Pd is available for all major computing platforms, and numerous users have created "extensions" that give it even more capabilities.

### RatHole 3.1 (Win; freeware)

Web [www.genevoice.com/demos.htm](http://www.genevoice.com/demos.htm)

GeneSys's software compresses files in a variety of formats. It uses a lossless technology and can achieve up to 80 percent compression.

### SayIt 2.03 (Win; freeware)

Web [www.analogx.com](http://www.analogx.com)

AnalogX's standalone program lets you enter a line of text, then render it to a WAV file while adjusting the sound's pitch and speed! You can transform the sound further using the Modulation and Cascade controls.

### scuzzphut6 (Win; donationware)

Web [www.djmarko.pwp.blueyonder.co.uk/plugins.html](http://www.djmarko.pwp.blueyonder.co.uk/plugins.html)

Don't let the name stop you from trying this one. It's a VST effects plug-in from developer scuzzphut with two delay lines, two highpass or lowpass filters (with the cutoff frequencies of each controllable by one of the two LFOs), and a 16-step pattern gate. Set filterdelay1's delay parameter to the tempo of your music (if it's metered), then set filterdelay2's delay parameter to double that rate to get a nice groove going.

### Smudger (Win; freeware)

Web [www.genevoice.com/demos.htm](http://www.genevoice.com/demos.htm)

This DirectX plug-in from GeneSys transforms a sound's spectrum to produce LFO-like effects.

### Triangle 1 (Win; freeware)

Web [www.rgcaudio.com/triangle\\_1.htm](http://www.rgcaudio.com/triangle_1.htm)

RGCAudio Software offers this gem of a VST software synthesizer free to the music community. It provides great sound and a variety of features.

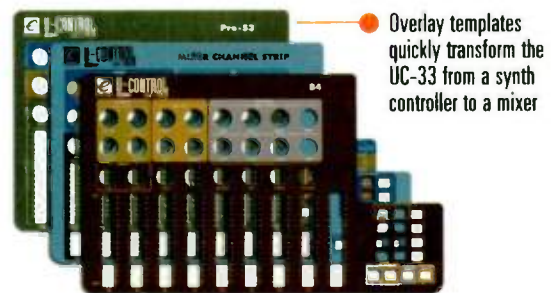


# The power of music software in your hands

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The UC-33 is the affordable, easy-to-use remote USB controller for any computer music system or MIDI setup. It allows instant and simultaneous control of up to 47 different parameters and with 33 memory locations, changing setups is fast and easy. Powerful 'snapshot' feature instantly makes all controllers live for real-time, on the fly editing. Use the UC-33 with a conventional MIDI setup, for live performances, or as a remote control for your existing studio rack. 30 pre-configured presets allow immediate control of the most popular virtual instruments and host applications like Cubase SX, Propellerhead Reason, Native Instrument's B4 and more.



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sound-generating and processing modules (called Objects) that you can combine in any configuration. Right-clicking on the screen brings up a menu where you'll find 20 categories of Objects (Csound users will immediately recognize opcodes such as loscil, pluck, and rand; see Fig. 7). You get a massive amount of tools to work with, including signal generators, effects, MIDI modules, math and control functions, filters, and a whole lot more. And if you can't find what you're looking for, you can add your own Objects, though that would require some programming chops.

All of the Objects include a description that you access by double-clicking on them, and "tooltips" also appear when you hold your mouse pointer over an Object's inputs and outputs. There's an excellent manual in both HTML and PDF versions, and a very thorough overview of the program at the developer's Web site. Even more help is available through the included tutorials and example files that cover many aspects of the program. What's more, if you try to place an illegal value into an Object, CPS's excellent error handling will inform you of the problem.

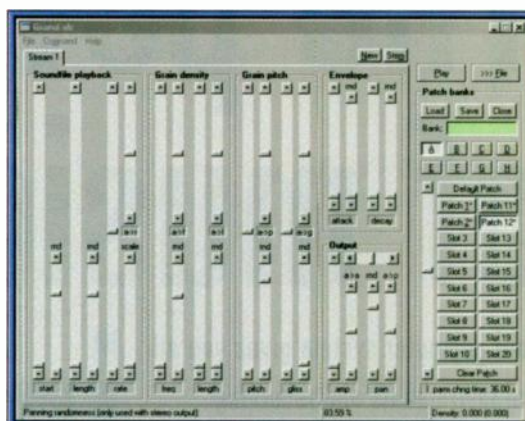
Table Objects, which derive from Csound and are implemented in a simi-

lar fashion, are among the most useful programming modules. You can put a variety of data into a Table, such as an audio file for use in a sampling patch, a series of MIDI note numbers that an Object could draw from randomly, or a custom scale or microtuning that an oscillator could use for frequency. And as with Csound, you can use table-generating routines to automatically fill a Table. The Buzz generator, for example, fills a Table with a band-limited pulse train, and the Periodic generator will create a single cycle of a composite waveform that uses multiple sine waves at frequencies you specify.

A large number of Display Objects are available for designing custom graphical interfaces for your patches. These include faders, number boxes, buttons, and checkboxes. It's easy to alter the resolution of a fader; just Shift-double-click on the Object to open its Settings dialog and change its Drag range. You can also specify whether an Object will "fire off" its default value when a patch first loads or wait until it is triggered by some other event. Adding an AutoStart module to the patch will also force it to begin running as soon as it is loaded.

CPS supports the use of Sub-patches, which can contain entire working designs or just a component that you might want to reuse, such as a multi-effects device. Sub-patches also help keep the screen from getting too cluttered.

And here's a twist that even Max/MSP doesn't offer: load CPS and double-click directly on the blank screen, then type a number, and you've created a Number Box Object (Number Boxes are used to feed a value to a parameter of some other Object). Or double-click and type the name of an Object, and



**FIG. 8:** GranuLab's many sliders can be manipulated in real time, even while the program is recording to disk. All of the parameters can operate under MIDI control.

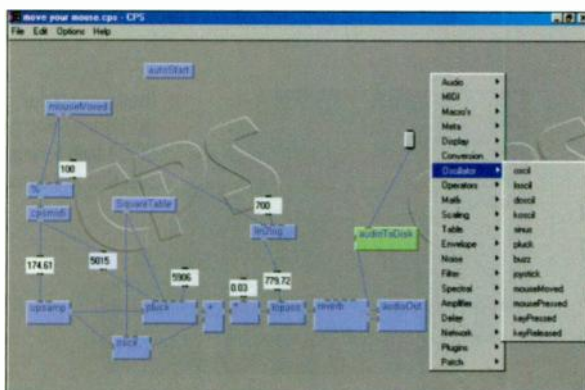
the Object will immediately be inserted into the patch.

Though only a fairly small number of examples are included, their range is broad and their sound is great. Relaxx, for instance, is a complex filtered-noise patch that has a switch for toggling between wind and wave sounds. My personal favorite is Move Your Mouse, which uses the x and y coordinates of your mouse to control the parameters of several Objects, including the frequency of an oscillator and the cutoff frequency of a lowpass filter. I added an Audio To Disk module to the preset and recorded several minutes of sweeping gestures that I hope to find a home for in some future composition.

A Mac version of CPS is due out around the time you read this, and if you're involved with creating music for games or other multimedia projects, be aware that the registered version includes an SDK for using CPS with Macromedia Director and Shockwave. Other benefits of registering include an SDK for using CPS as a VST Instrument plug-in; full e-mail support; and more.

If you're a tweaker at heart, CPS is a great place to build your musical creations. Who knows, it may be the only composition software you'll ever need!

**GranuLab 1.0 (Win, \$20).** Here's a synth with a difference: Rasmus Ekman's GranuLab is a standalone granular synthesizer that can generate synthetic waveforms for splicing and dicing or granulate preexisting audio files. The



**FIG. 7:** CPS is a programming interface for composition. It provides numerous modules that can be connected in a vast number of configurations.

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program has sliders for a large number of grain parameters and lets you use MIDI Control Change messages to manipulate any parameter (see Fig. 8). Coupled with the interactive Gesture window, this lets you create highly animated granular textures and output them as WAV files. If you're a gigging musician, you could use GranuLab to add some real variety to your set.

Like other granulators, GranuLab allows you to specify the base frequency, length, and pitch of the grains it produces. But beyond that, you can add varying amounts of randomness to any parameter, which ensures that your textures will vary over time. If you're using an audio file as a source, the Soundfile Playback options will come in handy. Here you can set the start and end points within the file from which grains will be selected.

You can also change the rate that GranuLab scans through the file to get slow-motion or speedup effects without changing the pitch of the sound. The default scan rate is adjustable between  $\pm 2\times$  normal speed, but a second slider allows you to scale that rate, producing, in effect, a scanning rate between  $\pm 1.3\times$  normal and  $\pm 23\times$

the original playback rate. Also, the file can be scanned backward or forward or even frozen at a specific time.

Another control, found in the Rate section as well as in other parameters, lets you use the amplitude of a source audio file to modulate a parameter. For example, the file's amplitude could modulate the scan-rate setting, pan position or output levels, or the grain pitch.

Unlike the limitations of recording a soft synth in a sequencer, controls can be manipulated as GranuLab records its output to disk. Just be sure to change the name of the file that is created after making a recording, as the program always uses the name *granny.wav* by default. You can also store custom settings in GranuLab's Patch Banks. Each of the eight banks can hold up to 20 Patches; a Patch is the entire set of slider values in place at the moment you stored it.

Once you name a Patch, it will appear on a list in the Gesture window. This screen allows you to morph among up to four Patches in real time by moving your mouse. The process is like vector synthesis, popularized by various Korg synths some years back. If you hit upon a mix of Patches that sounds especially good, just hold down the Shift key and close the window, and the settings will be exported to the sliders in the main window.

The registered version lets you have up to eight "grain streams" running at once. That would tax nearly any modern computer, but it's nice to know the potential is there.

**SynthEdit 0.9437 (Win, \$20).** Jeff McClintock's SynthEdit is a robust construction kit for building synths, samplers, and effects. As with Native Instruments' Reaktor and Applied Acoustic's Tassman, you construct soft devices by wiring together modules in various configurations. But unlike the others, SynthEdit has the ability to create VST



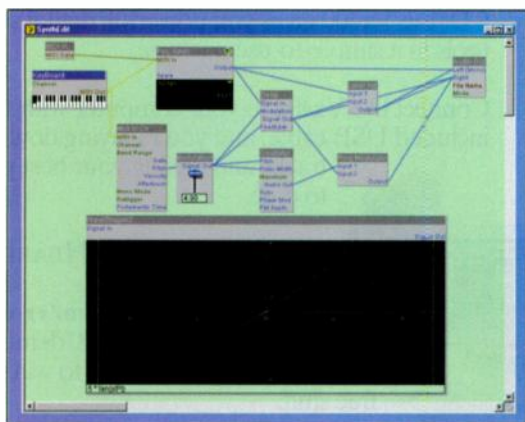
**FIG. 10: Wave Flow** is a stereo audio editor with a wide range of features. You can have as many files open at one time as you want.

plug-ins from your designs that you can use in your audio software. You can even include existing VST plug-ins in your plug-ins; for example, if you wanted to build a multi-effects device or a plug-in that contained multiple VST Instruments, each on its own channel.

SynthEdit includes more than 80 modules that you can freely interconnect. The program will tell you if you are attempting to make an impossible connection; for example, trying to control the attack rate of an envelope using a MIDI Note trigger. That type of control interaction is not impossible, however—just insert a MIDI-to-CV converter module between the two other modules, and you're set.

SynthEdit's architecture uses a layer called a Container, which offers some real advantages. For example, you can add MIDI automation to every module in your device simply by adding a single MIDI Automator module to the Container. You can also change the number of audio ins and outs the device will have, which is very useful if you're making a VST Instrument (some hosts support only plug-ins with a limited number of ins and outs).

SynthEdit's two waveshaping modules are about the easiest to use I've ever seen. The WaveShaper module offers 11 control points for manually creating the transfer function, and WaveShaper2 has a text interface for entering control values (see Fig. 9). Either module can be expanded to fill the entire screen, which makes assigning values easy.



**FIG. 9: SynthEdit's WaveShaper2 (bottom)** has an intuitive interface for entering control values. All instruments and effects that you create can be saved as VST plug-ins.

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2 mic/line inputs w/ preamps

dimensions: 6 in x 1.75 in x 9.25 in

weight: 2.95 lbs



**M-AUDIO**

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Among the MIDI modules are a SoundFont player, a drum sequencer, a step sequencer, a MIDI file player, and a module that can remap up to four types of controllers at once. There's

also a Patch Select module that allows the users of your plug-ins to save presets, and a MIDI Monitor for watching the action. The step sequencer could use a bit of work; entering notes isn't as easy as it should be.

If you're a fan of ring modulation, you'll be happy to see the dedicated RM module, but you can also use the Level Adjust module for doing ring or amplitude modulation (RM uses bipolar signals, while AM uses unipolar sig-

nals—that is, signals whose amplitudes remain above zero). You'll also find a variety of effects and filters, and though there's no reverb, you can get one contributed by a user at the SynthEdit Web site (and you can always roll your own with the included all-pass filters).

You can also add LEDs, volt and peak meters, and a scope if you want to visualize the signal flowing through your design. SynthEdit allows you to encapsulate complex instrument or effects designs into Prefabs and share them among patches, so you could build a whole set of metering tools into a single, reusable component.

Every module has a dedicated Help button that takes you directly to the manual page for that module. The help file also includes explicit instructions on how to make and optimize a VST plug-in, even explaining how to embed a "nag user" message in the interface if you intend to make your plug-in shareware.

SynthEdit doesn't have its own dedicated MIDI drivers like, for example, GigaStudio, so you'll need a loopback device (such as Hubi's) to play it directly from your sequencer. But exporting your devices as VST plug-ins is so simple that this shouldn't be a real problem.

Registering removes the word *SynthEdit* that appears in your plug-ins' interface, but that's about the only real limitation. However, with so much power for such little money, this is one program you should seriously consider investing in.

**Wave Flow 4.9 (Win, \$25).** Xavier Cirac's Wave Flow is a stereo audio editor with a large feature set and some very sophisticated tools for working with sound. The program uses a modular-windows interface that allows you to keep as many files open on the screen as you want (see Fig. 10). Though the shareware version is an exact replica of the registered version, the developer gives you his assurance that you will "be a happier person" upon registering, and the very reasonable fee gets you technical support, early news of new releases, and discounts on future versions.



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Wave Flow includes more than 60 tools for shaping sound that are spread among a variety of categories. Filters represent one of the largest groups—in addition to more than a dozen preset filters (including highpass and lowpass with a variety of fixed cutoff frequencies), you'll find less common choices such as Median, Average, and Top Hat (these filters can be helpful for various types of noise reduction). If you still come up short, you can design your own filters in the Advanced Filter window. This screen provides options for setting the high and low cutoff frequencies, as well as deleting, boosting, decreasing, or passing the frequencies within a range. There's a ratio control that is used to set the amount of boost or decrease, as well as more esoteric options such as specifying the characteristics of the Fast Fourier Transform that is used in the filtering.

In addition to a flanger, reverb, and echo, you'll find more than a dozen

other functions in the Effects menu. Among these are a compressor, an expander, a noise gate, two "metallizers," a gapper, two choppers, and a Robotic Voice effect. Though there aren't a lot of adjustable parameters in many of the effects—the choppers have only one preset setting each, for example—the range of effects should allow you to accomplish much of what you need.

Even more thrills can be had with the speed up/slow down, invert, normalize, and reverse commands. For simulating a variety of grunge effects, you can even add any of five different types of digital noise to your music. You can also save a highlighted selection to a new file, automatically find zero crossings (to facilitate setting loop points), or access your sound card's mixer directly from within the program. Clearly, this is a comprehensive set of tools for the modern sound sculpture.

Wave Flow also offers several uncommon utility functions. For example,

using the Concatenate Multiple Files command, you can select any number of files on your hard drive, and the program will combine them, one after another, into a new audio file. Or, you can create numerous new files by splitting a single file into small chunks and choose exactly how large (in bytes) each chunk should be. There are also tools for controlling your system's CD player and printing the waveform display that appears onscreen.

Many of Wave Flow's settings can be customized. For example, you can select colors for the different program elements, toggle the display of VU meters, disable the Undo feature, and request a confirmation before exiting. The program's controls are large, colorful, and easy to manipulate, which helps make Wave Flow a comfortable and efficient environment for working with sound.

*Dennis Miller is an associate editor of EM.*



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These new collections combine Emagic's highly praised Software Instruments and products for TDM users in three compact and competitively priced packages. The Vintage Collection is ideal for all those who love nostalgic, original sounds together with easy handling and new creative possibilities. With the Synth Collection you

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# Mac Shareware Roundup

Share the wares of  
creative software  
developers.

By Gregory D. Moore

My search for Mac shareware yielded a number of pleasant surprises. The first was finding programs of such high caliber. Several of these have as many or more

features than more expensive commercial programs and offer sound quality that is equally stunning. The second surprise was the range of tools available. While there are many dozens of effects and soft-instrument plug-ins, there are also programs, such as PulsarGenerator from the Center for Research in Electronic Art Technology (CREATE), that offer ways of working with sound that you probably haven't come across before.

Perhaps the biggest surprise is the realization that there is a sharp divide between the Mac OS 9 and OS X worlds. Though many musicians are still working with OS 9, others are well into the brave new world of OS X Core Audio, CoreMIDI, and Audio Unit (AU). In fact, it seemed that each day there was something new appearing in the OS X world, and programs were updating version numbers faster than I could keep track. The Mac is in a wonderful state of evolution, and it's going to be fun to see how things develop (see the sidebar "Mac OS X Freeware and Shareware Links" for some sites to watch).

## WHAT WE'RE COVERING

This roundup will include Mac shareware, freeware, and (in one case) donationware. As in the Windows roundup, we're looking primarily at newer programs, many of which are offered by lesser-known manufacturers. Though numerous "hall of fame" shareware and freeware programs are still going strong, they've been well covered in the past (see the sidebar "Mac Shareware Hall of Fame" for an overview of these tools).

Note that several of the freeware programs included here are scaled-back versions of commercial software. Yet far from being just demos or crippled applications, they are fully functional and useful programs in their own right. And if you want to upgrade, there is a clear path to satisfy your appetite for additional features.

Finally, if you don't yet have an OS X AU host, you may want to explore Granted Software's Rax (covered later),

which will run all the AU programs mentioned here. Though I hope you'll enjoy reading about these programs, I assure you they are a lot more fun to play with than to read about.

## FREWARE

This category of software is about the best bargain you'll find. Free, no strings attached. What more could you ask for?

**Crystal 2.2 (Mac OS 9: VST; OS X: VST, AU; Win).** Green Oak Software's Crystal is an amazing soft synth, with stunning sound quality, that stands up well against any commercial soft synth regardless of price. Yet its creator, Glenn Olander, offers Crystal for free as a labor of love. Moving beyond a simple modular synthesizer, Crystal features subtractive and FM synthesis as well as wave sequencing, granular synthesis, and SoundFont playback.

Crystal is a plug-in for the Mac and the PC that requires a VST host under OS 9.x and OS X or an Audio Unit host under OS X. A G4 (or Pentium II/500 MHz) is the minimum CPU. Even with a fast processor, you may want to record tracks to disk if you plan on using many Crystal tracks.

Crystal's extensive controls are accessed from five different areas: the Modulation page, three Voice pages, and the Mixer page. There is also a utility page that remains visible at all times and that provides extensive editing functions, such as setting voice levels, toggling voices on and off, and copying and pasting voices and patches. A Revert function lets you do A/B comparisons between the original and the edited patch.

Crystal refers to an oscillator sound component as a Voice and allows up to three Voices per patch. You set up parameters for a Voice by selecting its page. This is also where you can select banks and patches. An oscillator can employ any of several waveforms or any SoundFont you have on your system (none are included). You can also combine samples with Crystal's internal sounds to create new timbres. Filter and amplitude envelopes are also available for each Voice.

Each Voice has a dedicated FM and hard-sync oscillator that further expands its sound capability. Various parameter options appear depending on the waveform type that is selected. For example, with SawSquare or WarmSaw, a Mogrify control appears that lets you re-create classic hard-sync sweep sounds. With sampled waveforms, Granular and Wave Density parameters are available for exploring granular synthesis.



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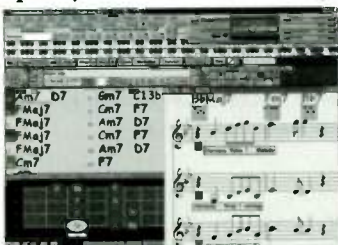
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We've enhanced the Guitar Window by adding fret display support for other instruments, including mandolin, ukulele and banjo. You'll see authentic chord voicings and melody display on the fretboard for all of these new instruments. The StyleMaker has been enhanced with support for GM2 instruments, so you can make styles that use the new instruments and have correct instrument voicings displayed on the

fretboard. Guitar chord diagrams can now be included in the notation display, leadsheet, and printout. Choose from Folk, Pop or Jazz Guitar Chord Diagrams.

Bass players will now see bass tablature and correctly displayed bass parts on the new bass fretboard.

The program's user interface has been enhanced, with a single dialog for all program options and song settings, right mouse support, simplified menus, additional hot keys and more.

All of the styles are enhanced! We've improved/updated EVERY Band-in-a-Box style that we've made with the newest StyleMaker features including guitar and other fretted instrument voicings, consistent volume levels, edited patterns and more.

New options for song navigation during playback, include fine control over the song looping during live performance. As the song is playing you can get it to endlessly loop the last or middle choruses with a simple hot key. Load and play an entire MIDI file in Band-in-a-Box, including interpreting the Chords with the Chord Wizard.

Harmony notation display has been enhanced. Harmonies can now be displayed or printed with separate notation tracks for each voice. View or print each harmony on a separate track. And much more...

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### BAND-IN-A-BOX PRICES...

#### FIRST-TIME PURCHASE

✓ **Band-in-a-Box Pro Version 12...** \$88

Includes Version 12, Styles Sets 1-3, Harmonies Set 1, Soloist Set 1, Melodist Set 1 and bonus software *SlowBlast!* (Windows® version only)

✓ **Band-in-a-Box MegaPAK version 12...** \$249

The MegaPAK contains "the works" – version 12 **PLUS** Styles Sets (1-32), all Soloist Sets (1-9), Melodists (1, 2), The MIDI Fakebook, PowerGuide Instructional CD-ROM, and bonus software *SlowBlast!* (Windows® version only)

#### UPGRADES

Includes Band-in-a-Box Version 12 upgrade **PLUS** Styles Set 30

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✓ **MegaPAK UPGRADE from Previous Version...** \$149

From Earlier Version or crossgrade...\$159

#### ADD-ONS FOR BAND-IN-A-BOX...each \$29

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✓ **NEW! Styles Set 31** – 20 Country Rock Styles

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**SOLOISTS SETS:** Soloist Set #9 – Blues Guitar, Country Piano & More...\$29

Soloists Sets #2-8...each \$29

**The MIDI Fakebook for Band-in-a-Box...** \$29

**COMPREHENSIVE CD-ROM VIDEO INSTRUCTION FOR BAND-IN-A-BOX:**

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The real fun comes on the Modulation page (see Fig. 1), where you have six different multistaged envelope generators with a graphical editor, six LFOs, and a modulation matrix. Envelopes can be one-shot or can be looped for interesting evolving patterns. You can select from more than 90 modulation parameters on the modulation matrix, including any MIDI source, LFO, or envelope generator to target any number of parameters. Such extensive modulation control is what allows Crystal's sound to evolve and be so animated. It also allows for some interesting functions, such as wave sequencing. Crystal lets you use the 8-stage envelope generator to sequence among 8 different predefined sampled waveforms. On any Voice page, you can select the degree of crossfade as the program sequences through the waveforms.

The Mixer page is where you combine Voices and add effects such as chorus, flanger, delay, and reverb. Crystal offers a frequency-band splitter that divides the signal into four frequency bands, each of which can be processed separately.

Overall, Crystal is one of the best-sounding soft synths available. Its ability to combine so many different synthesis types makes it useful for a wide range of interesting and complex evolving sounds. Kudos to Glenn Olander for providing such an amazing free gift to the music community.

**Finale NotePad 2003a (Mac OS 9, Classic, Win).** MakeMusic (formerly Coda Music Technology), the maker of Finale, offers a free notation program called Finale NotePad 2003a that is surprisingly useful for simple notation needs (see Fig. 2). It offers many of the features of Finale 2003 and includes a very elegant and nearly foolproof notation-entry feature. A serial number that is required for installation will be sent to you when you download the program.

Upon startup, a wizard guides you through the setup of a new document, including the title, credit, instruments, key, and time signature. Be sure to select the instruments in the order you want to display them, as altering the setup is not possible later. Once setup is finished, NotePad presents a formatted page of sheet music where you can begin entering notes.

The note-entry process is extremely intuitive: just select a note value and click on the staff where you want the note to appear. Extensive keyboard

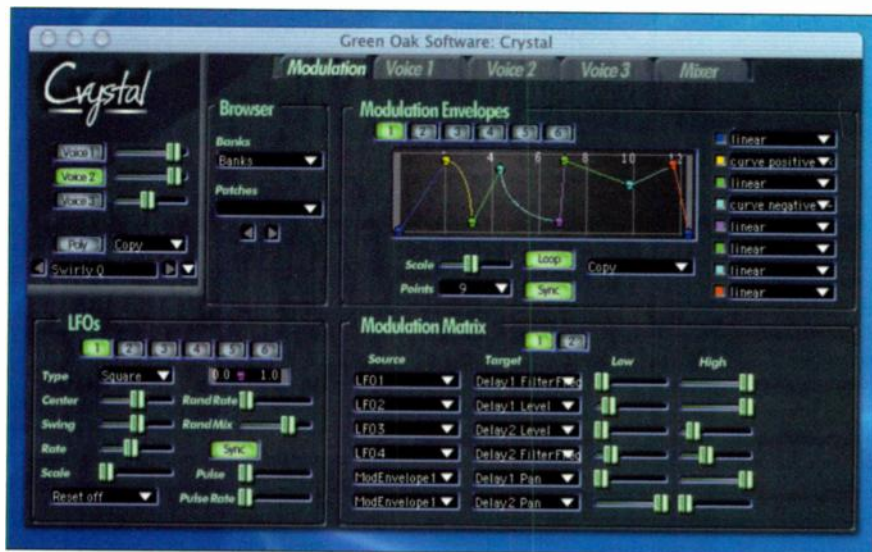


**FIG. 2: Finale NotePad makes it easy to enter notes that look sharp and clean when printed.**

shortcuts make note and value selections very fast. NotePad keeps track of the note values you enter, so it's impossible to accidentally enter too many or too few notes in a measure. Entering articulation and dynamic markings and correcting mistakes is just as easy. For example, to delete a note, simply place the cursor over it, press the Delete key to select the Eraser tool, and click on the note. Then press a numeric key to select the next note value. A message bar displays helpful information as you roll the cursor over each tool, and you can choose to have notes displayed in concert pitch or transposed.

NotePad 2003a can open any 2003-family file from Finale, Finale Guitar, Allegro, or PrintMusic. What you won't get with NotePad is the ability to save your music as a MIDI file or the ability to enter notes from a MIDI instrument. However, if you simply want to enter and print fast, beautiful music notation, then NotePad is an elegant way to get the job done.

**Inspector 1.05 (Mac OS 9: VST; OS X: VST, AU; Win: VST).** Elemental Audio Systems' aptly named Inspector is a powerful spectral analysis, metering, and level-monitoring tool. Inspector comes in two plug-in formats: VST for OS 9 and OS X and Audio Unit for OS X (a Windows VST version should be out by the time you read this). Don't be deceived by the pretty meters and graphics; Inspector is a serious tool that can provide vital information about your audio. It has both peak and RMS



**FIG. 1: The Crystal Modulation page offers extensive signal-routing possibilities.**



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meters with programmable caution and warning zones that help you visualize and monitor your recording levels. It monitors level clipping, balance, and headroom and has a Master Alarm that informs you when thresholds you've set have been exceeded.

The first thing you'll notice on loading

Inspector is the Spectral Display (see Fig. 3). This window is cleverly arranged to provide maximum information in a compact design. It allows you to visualize (on the same screen) what is common to both channels and what is different. The left-channel spectrum is in blue; the right-channel spectrum is in red (areas common to both channels are in purple). A disable button allows you to turn off the display and reduce CPU load.

The peak and RMS meters to the right of the Spectral Display are another example of compact yet informative design. The large peak meters

are on the inside and smaller RMS meters are on the outside, with the scale from -96 dB to 0 dB running down the center. Levels of 0 dB will cause the clip meters to remain lit until they are reset (by clicking on either one of them). The meters are divided into three colored zones: green (normal), yellow (caution), and orange (warning). You can customize the range of the caution and warning zones. In addition, a Balance meter indicates the balance between the left and right channels using color codes, which gives you a historical picture over time.

## SHORT TAKES

Here are a number of other programs that are worth a look. Some are excellent tools for OS X testing and setup, while others are just great-sounding and good fun.

### **Amazing Slow Downer 2.5.7 (Mac OS 9, OS X, Win; shareware)**

Web [www.ronimusic.com](http://www.ronimusic.com)

Learn a musical passage by slowing the music down without changing its pitch. You can tweak a variety of parameters to optimize the sound.

### **Audacity 1.1.3 (Mac OS 9, OS X, Win; freeware)**

Web <http://audacity.sourceforge.net>

An open-source multitrack audio editor that has numerous built-in effects, frequency analysis, and support for VST plug-ins.

### **Frequency 1.0 (Mac OS X; freeware)**

Pandaa, Jonas Åström

Web <http://home3.swipnet.se/~w-34826>

A graphical spectral editor that lets you brush harmonic content to create unusual effects.

### **iMIDI 0.2b (Mac OS X; freeware beta)**

Web [www.grantedsw.com/imidi/index.shtml](http://www.grantedsw.com/imidi/index.shtml)

iMIDI uses Rendezvous and TCP/IP to provide MIDI ports between computers on a LAN. The ability to set up a MIDI network opens up some intriguing possibilities.

### **MadShifta 1.0 (Mac OS 9, OS X, Win; donationware)**

Web [www.smartelectronix.com/~bram](http://www.smartelectronix.com/~bram)

This VST effects plug-in is a pitch-shifter with an unusual interface and powerful capabilities.

### **mda VST Effects Plug-ins (Mac OS 9: VST; OS X: VST, AU; Win: VST; freeware)**

Web [www.mda-vst.com](http://www.mda-vst.com)

A suite of 30 VST effects that range from a Leslie simulator to a talk box. Some have been ported as AU effects.

### **MidiClock 1.2 (Mac OS X; freeware)**

Web [www.grantedsw.com/midiclock/index.shtml](http://www.grantedsw.com/midiclock/index.shtml)

A MIDI clock source for synchronizing MIDI applications, even between two computers. It can also transmit MIDI clock signals to additional MIDI end points.

### **MIDIKeys 1.6b2 (Mac OS X; freeware)**

Web [www.versiontracker.com/dyn/moreinfo/macosx/16702](http://www.versiontracker.com/dyn/moreinfo/macosx/16702)

This soft MIDI keyboard lets you play notes with the computer keyboard. It also allows you to view incoming MIDI notes as they play on the keyboard. A great setup and test tool.

### **MIDIMonitor 1.1.4 (Mac OS X; freeware)**

Web [www.snoize.com/MIDIMonitor](http://www.snoize.com/MIDIMonitor)

MIDIMonitor presents a useful window on all incoming MIDI messages and includes a filtering capability for selective viewing of specific MIDI data.

### **SimpleSynth 0.7 (Mac OS X; donationware)**

Web <http://pete.yandell.com/software>

A simple soft synth for OS X that uses Apple's QuickTime Instruments or SoundFonts.

### **Sonosphere 0.7 (Mac OS X; freeware beta)**

Web [www.dropcontrol.com/~naotokui/sonosphere](http://www.dropcontrol.com/~naotokui/sonosphere)

A live performance tool that offers one of the most interesting musical 3-D-graphic interfaces. 3-D spheres represent sound processors, and the interaction of the spheres creates intriguing musical effects.

### **SupaPhaser 2.0 (Mac OS X; donationware)**

Web [www.smartelectronix.com/~bram](http://www.smartelectronix.com/~bram)

This 23-stage phaser with saturation can be used to create incredibly deep phasing effects.

### **SynthTest 1.2.1 (Mac OS X; freeware)**

Web [www.versiontracker.com/dyn/moreinfo/macosx/17038](http://www.versiontracker.com/dyn/moreinfo/macosx/17038)

An OS X application that lets you select a MIDI input, an AU MusicDevice synth, and an AU effect. You can open and edit the synth and the effect.

### **SysEx Librarian 1.04 (Mac OS X; freeware)**

Web [www.snoize.com/SysExLibrarian](http://www.snoize.com/SysExLibrarian)

As its name implies, this program lets you back up and restore patches to and from your MIDI synths.

### **USB Monitor 1.1 (Mac OS X; freeware)**

Web [www.grantedsw.com/usb-monitor/index.shtml](http://www.grantedsw.com/usb-monitor/index.shtml)

A simple tool that shows the name of a USB device as it is being plugged in or removed.

### **The Virtual Theremin (Mac OS 9, OS X, Win; freeware)**

Web [www.bbc.co.uk/science/playground/theremin1.shtml](http://www.bbc.co.uk/science/playground/theremin1.shtml)

This virtual simulation of the theremin is more of a toy than a tool. Good silly fun.

### **VoiceBox 1.3 (Mac OS X; shareware)**

Web [www.realmacsoftware.com/voicebox.html](http://www.realmacsoftware.com/voicebox.html)

Type in a sentence, and a Mac voice reads it back with the option to save to disk.

### **Zoyd (Mac OS X; freeware)**

Web [www.u-he.com/zoyd/index.html](http://www.u-he.com/zoyd/index.html)

Four waveshapers, a noise generator, more than a dozen filters, and some very unique oscillators make this hot new modular synth worth watching.



# New Sounds



## Hit Zone

\*99<sup>95</sup>  
Audio/WAV  
(Includes Audio  
CDs & Acidized WAV CD-ROMs)

From deep inside the war-riddled Pop Chart bunker, come the beats that'll bump the charts for a thousand years. "Hit Zone" is a true Top 40/R&B/Hip Hop assault. Bases, beats, keys, licks, guitars, fx, & more; bust out of the studio & onto the charts. "Wow. The attitude, mastery, and sheer force of this collection of sounds have left me with a great new plethora of ideas and concepts to work on." - Reasonfreaks



## Dirt Keeps the Funk

\*99<sup>95</sup>  
Audio/REX/WAV  
(Includes Audio  
CD & REX/WAV CD-ROM)

The mothership has landed! Inspired by Parliament, Funkadelic and other P-funk pioneers, the live played loops and grooves on this unique CD are sure to shake any booty. *Dirt Keeps The Funk* is jam-packed with bubbling, Bootsyric bass guitar lines, laid-back drum beats, wah-wah rhythm guitars, go-go style percussion and psychedelic synth riffs.



## Off the Hook 2

\*99<sup>95</sup>  
Audio/WAV  
(Includes Audio  
CDs & Acidized WAV CD-ROMs)

Big Fish's own smooth soul brother producer Anthony Myers is back with his posse and has produced a package that rivals even Volume 1! Nasty R&B construction kits, beats, hits, sounds, keys, guitar, bass, percussion, a demo of Abelson's Live and more await your skills and your music. "The quality of the included samples is probably the best of all products on the market..." - Interface Magazine



## Tower of Funk by David Garibaldi

\*99<sup>95</sup>  
Audio/WAV  
(Includes Audio  
CD & Acidized WAV CD-ROM)

As one of the original pioneers of funk, David Garibaldi is a true drum legend. His unmistakable style was the foundation of the 1970's icon funk/R&B band *Tower of Power*. The 800 blazing grooves & fills in this collection capture the essence of funk drumming; digitally recorded using a combination of choice microphones, tube analog processors then carefully mixed- David's best.



## LA Riot 5

\*99<sup>95</sup> \*199<sup>95</sup>  
Audio CD-ROM  
Formats: Audio or Kontakt/  
HALion/EXS/Acid/Mach V CD-ROM

Looky, looky. Just when you thought it was all over, the L.A. Riot producers have come back for an encore! These 4 CDs again set the new standard by bumpin' out more construction kits all with matched BPM and tempo sets, drumloops, brand new bomb banks, scads of vocals, guitar licks, scratches, basslines, FX and so much more, you gotta get on it quick!



## LA Drum Sessions

\*99<sup>95</sup>  
CD-ROM  
(Includes 3 Acidized WAV CD-ROMs)

*LA Drum Sessions* is just that: session drummers laying down phat, thick, lucious beats, in about every style you can think of. All divided up into folders of related loops by style & tempo; different recording setups; 3 versions of each performance: dry, room-mic only & mixed. Over 80 categories of styles; over 6000 loops; Jazz, Rock, Disco, 60's Fun, Funk, Punk, Country, Blues, Texas Shuffle & more.



## Brush Artistry

\*99<sup>95</sup>  
Audio/WAV  
(Includes Audio  
CD & Acidized WAV CD-ROM)

Loops & samples that feature the wonderful sound of brushes! A full variety of brush patterns, including traditional swing, be-bop swing, ballad swing, jazz waltz, bossa nova, samba and country, as well as modern six-eight, folk, funk and latin styles. Multiple tempos and more.



## Methods of Mayhem II

\*99<sup>95</sup>  
Audio/REX/WAV  
(Includes Audio  
CD & REX/WAV CD-ROM)

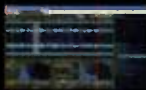
Prepare your ears for another onslaught of grinding guitar riffs, spooky soundscapes, darkish drum loops & nasty noises in general. *Mayhem 2* is the perfect remedy for any mix that's in danger of becoming too pretty. Hundred's of drum & noise loops, 300 drum sounds, more than 270 savage guitar & bass guitar riffs, eerie soundscapes & background noises, ugly sound effects and much more!

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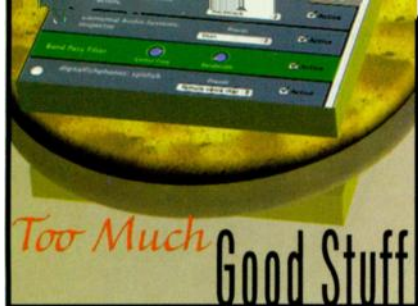
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The clipping displays consist of several numeric indicators that keep track of the number of clipping incidents in your audio file. Clip Incidents shows the number of times a group of one or more consecutive samples exceeds 0 dB for each channel, and you can set the Inspector Alarm to notify you when the audio has clipped beyond the threshold you specify. Consecutive Clips and Clipped Samples keep track of the longest run of consecutive clips and the actual number of clipped samples, which could indicate a more audible clipping error.

The Headroom meter displays the remaining headroom for each channel, and when the threshold you set is reached, the alarm goes off. When any of the alarms go off, they will trigger the Master Alarm, which is a large red indicator that is sure to grab your attention. Simply click on the values to reset any alarm.

Spectral Display, in conjunction with the peak and RMS meters, gives you an excellent visual indication of your audio levels. However, the real power of Inspector lies in the level-tracking numbers and the alarms that will warn you if



**FIG. 3:** Inspector's compact design shows a tremendous amount of information in a single window.

any threshold levels you set have been exceeded. If this were a hardware device, it would cost a fortune. The fact that a tool with this power is being given away for free is astonishing.

**MidiPipe 0.5.5 (Mac OS X).** In the early days of MIDI, hardware MIDI patch bays and processors were powerful devices used for keyboard splitting, transposition, message-type conversion, and MIDI effects such as delays and harmonizers. These devices were sometimes complex and cryptic to program and often added significant latency to the signal. Nico Wald's MidiPipe is an intriguing work in progress that in many cases replaces the function of a MIDI processor by making use of the new OS X 10.2 CoreMIDI functions. Most important, this utility adds a great deal of functionality, is much easier to use than its hardware predecessors, and can modify MIDI messages in real time for use both in the studio and onstage.

When you first open MidiPipe, you'll see a list of MIDI processing functions (called Tools) on the left and a column for Pipes on the right (see Fig. 4). The Pipes column is a virtual rack that holds the Tools you select. MidiPipe will work with an external MIDI controller, a software source such as MIDIKeys, or its own virtual keyboard. The keyboard can be used both to send MIDI data and as a monitoring device, as it provides a visual indication of any MIDI signals being received or transmitted.

To add a Tool, double-click on it or drag it over to the Pipes column. Once Tools are loaded, you can rearrange them as needed. Because MidiPipe is still in development, some functions have yet to be implemented, such as the Tool and Pipe menu functions. For example, to delete a Pipe, you must use the Mac's Delete key, as the Delete and Cut options in the Pipe menu aren't currently enabled.

MidiPipe gives you a large number of Tools to work with, including a message-type converter, a delay, Message and Channel Filters, and a Transpose Tool. There's also the Channel Router, Keyboard Split, Randomizer, (virtual) Keyboard, MicroTuner, and Set and Duration Tools. You can combine the



**FIG. 4:** MidiPipe 0.5.5 provides an extensive number of powerful MIDI-processing functions, such as the new MicroTuner with visualization.

Tools into various configurations to create many useful applications, such as making custom keyboard tunings and unusual keyboard splits, rerouting and filtering MIDI channel and system messages, or converting one type of controller to another (such as having a footpedal control Pitch Bend). You can also create multiple processors for a single MIDI input by designating a different MidiPipe number for each MIDI output channel and sending each process to a different synthesizer voice.

Unfortunately, one of the most interesting functions, Delay, didn't work with any of my software or even when I sent data to an external MIDI device. As it turns out, Delay works only with MIDI interface drivers and applications that support scheduled events, such as Propellerhead Reason. Delay could potentially work with both the Transpose and MicroTuner Tools to create some very interesting effects that aren't readily available even from effects processors. Nevertheless, MidiPipe is useful even in its current state of development and offers powerful real-time processing and relatively low latency.

**PulsarGenerator 2001 1.0.01b (Mac OS 9).** PulsarGenerator is a real-time interactive sound-synthesis program created by Curtis Roads and Alberto de Campo of the Center for Research in Electronic Art Technology (CREATE) at the University of California, Santa Barbara. It's a computer-music composition tool that's designed to be

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manipulated in real time using the computer itself as a controller rather than an external device. If your focus is on pop music, this may not be for you. But who's to say the next big hit won't be made of looped pulse trains?

In order to use PulsarGenerator, it is necessary to understand a bit about pulsar synthesis and its associated terminology, some of which can be a little intimidating (the documentation calls panning "spatial trajectory," for example). Some of the math diagrams might also frighten away certain users, though on close examination, they're not all that complicated. Fortunately, there's a good bit of documentation on both PulsarGenerator and pulsar synthesis, though it is scattered about in various documents, on the Web, and in the onscreen help.

Pulsar synthesis generates a train of sound particles called pulsars. A single pulsar consists of a *pulsaret*, which is a band-limited pulse followed by a duration of silence. Repetitions of pulsar signals create a *pulsar train* that can last seconds or minutes. Pulsar synthesis is named after spinning neutron stars that emit periodic signals, coincidentally in the same range of frequencies (0.25 to 642 Hz) that pulsar synthesis uses to generate rhythms and tones. Frequen-

cies below 18 Hz are heard as rhythm. With frequencies between 18 and 30 Hz, pulsar synthesis generates a fluttering sound. Frequencies above 30 Hz are perceived as distinct tones.

PulsarGenerator has several graphic windows that represent various components of the pulsar, including its waveforms and envelopes (see Fig. 5). You can tweak parameters in real time to control the pulse train as it's playing. The fundFreq parameter determines the frequency of the pulse train and whether it is a rhythm or a pitch. Some of the other parameters are analogous to more traditional synthesis parameters, such as formFreq, which acts like an oscillator to determine the pitch of the pulsaret (the pulsaret parameter controls the waveform). PanN and ampN are panning and amplitude controls.

Other controls don't relate to general synthesis parameters as easily; for example, pulseMask, a probability function that determines if and when pulsars are emitted. However, the manual suggests that in a certain range, this parameter causes "an analog-like intermittency, as if there were a loose connection," which is probably something we can all relate to.

PulsarGenerator's Control Panel offers start and stop commands and mixing controls for up to three different pulse streams, the maximum allowed. There is also a Burst Ratio that sets the ratio of pulsar-to-silent intervals. At the bottom is the Cyclebar, which shows the current position within the pulse train. Here you can also record a pulse to a sound file or play pulse trains in reverse. The Tables Bank is where you store and load wavetable sets (up to 16

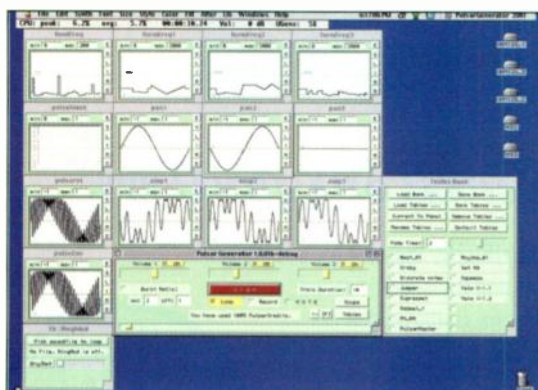


**FIG. 6:** Spark ME 2.8 is a free editor from TC Works that is packed with useful editing functions and features, such as the ability to view QuickTime movies.

wavetables in a bank), and the Scope gives you a visual representation of the pulsars as they play.

Getting to know the extensive keyboard shortcuts seems to be a key element in successfully manipulating PulsarGenerator in real time. The program's greatest strength is also its weakness. PulsarGenerator is designed as a real-time compositional instrument that uses the power of the computer and its own envelope generators to shape the sound and composition. However, by focusing on the computer as the input device, it limits the interactive expression that could be possible with a more dedicated instrument controller. Nevertheless, PulsarGenerator is a complex instrument itself with plenty of sonic and compositional possibilities to explore.

**Spark ME 2.8 (Mac OS X).** TC Works' Spark ME is a free stereo audio editor that is meant to be an introductory teaser to TC Works' line of more feature-rich editors, which cost up to \$599 depending on the version. This free version has a respectable number of features and is one of the stablest and most robust editors currently available for the Mac OS X platform. As a native application, it has been designed to utilize the new OS X 10.2 Core Audio, which results in low latency and fast response. Spark ME has a large list of features, including playlists, sampling-rate conversion, VST effects hosting, and QuickTime movie import. And most



**FIG. 5:** PulsarGenerator windows show various components of the pulsar, including the waveforms and envelopes that control the sound.

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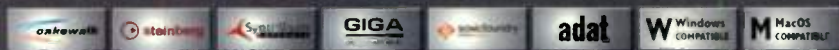
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important, Spark ME works with any professional audio interface.

Spark ME's main window consists of a File menu, the Playlist menu, and the Wave Editor (see Fig. 6). The Wave Editor offers graphical waveform editing and is split into two parts: an overview and a zoomed-in region. You Option-click to zoom in and Option-Command-click to zoom out. You can even zoom down to the individual sample level and draw the waveform, which might be useful if you need to remove a pop or click.

Editing couldn't be easier: click on the waveform to create an editing point, then Shift-click on another point to make an area selection. Holding the Shift key down while moving over the window allows the start or end points to be adjusted. Pressing Return confirms the selected area, which can then be heard by selecting Play Selection from the Options menu. Selected areas can easily be turned into Regions by pressing Command-R. Regions can then be organized into a playlist for CD preparation and exported as a Roxio Toast playlist.

Spark ME can process audio in a number of ways. It has a well-deserved

reputation for its sampling-rate conversion tools, and it supports a variety of rates between 11 and 192 kHz. Other processing options include gain change, reverse, invert, normalize, and find peak. Fade-ins or fade-outs, which include a number of curve options, are especially easy to perform. Files can also be saved at various bit depths from 8 to 24 bits and in several different formats, including AIFF, WAV, SDII, RAW, and Sonic Foundry's

W64. The program can import but not save MP3 files. The ability to import QuickTime movies (but not MPEG movies) is a nice touch, but it would be helpful if you could see the frame numbers as well as the time.

Spark ME comes with only one VST EQ plug-in but can access any that you have in your VST folder. (A fun set to try out is mda-vst's VST effects plug-in suite. Note that the VST folder is stored in a different place in OS X than in OS 9.) Spark ME has an extremely nice VST plug-in interface that includes a preview option and the ability to save and load both individual plug-in settings and banks. If you install the Spark XL demo, all of its VST plug-ins will show up in Spark ME as well. Though you can't preview the XL plug-ins, they will process audio.

Also note that the XL plug-ins don't show up in the VST plug-in folder, so they are not easy to remove. Moreover, there's no uninstall for the Spark XL demo, and even trashing the Spark XL demo will not remove these plug-ins.

The documentation included with Spark ME is rather sparse, and there is no online manual (a two-page getting-started guide is available in the Support section of the



FIG. 8: The CellSynth circular window uses a unique matrix interface. A Filter Cell is shown here open for editing.

company's Web site). TC Works should consider allowing the download of the full Spark XL manual to educate users both about Spark ME and about the features of its other versions. As it is, you're basically on your own, and there are many hidden features that the casual user may overlook at first. For example, Command-clicking will start playback immediately from the point on which you click, and in order to play back only a selected area you must turn on Play Selection in the Options menu. Nevertheless, Spark ME is a powerful tool, and its professional quality makes it well worth exploring.

**The fish fillets channel insert package 1.1 (Mac OS 9: VST; OS X: VST, AU; Win: VST).** If you're hungry for even more great-sounding plug-ins, we offer you Digitalfishphones.com's The fish fillets channel insert package. This new offering appeared just as this article was being completed. Even if you're not hungry, don't let the name turn you off, as the sounds it makes are delicious!

The first course is BlockFish, a compressor with soul. As the developer says, "It likes to bite, but it can be tamed easily once you've learned how to use its potential." BlockFish offers a versatile range of sounds, which can be clean, smooth, dense, punchy, loud, crunchy, or fat. By smoothing out the dynamic response of your source, it effectively increases the level of the track while adding warmth. BlockFish provides simulations of either VCA or



FIG. 7: The fish fillets channel insert package provides subtle analog-style dynamic processing and saturation. The front panel of BlockFish opens to reveal the circuit controls.

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optical circuits. A great deal of effort has been made toward creating an accurate simulation of gentle analog-style compression and saturation that doesn't squash the sound (as do conventional digital compressors). This allows the music to "breathe."

One of the coolest features is the ability to open the virtual front panel and tweak the circuit-board trim pots to achieve a variety of different sounds (see Fig. 7). What a concept! For those of you old enough to remember messing around with analog effects, you'll have great fun with this.

The second course is SpitFish, a simple de-esser designed to smooth out the harsh sibilant *ess* sounds from vo-

cals that might otherwise overload the recording. It can also be used to tame other sounds in the upper frequency range, such as crash cymbals. The response of the compression is gentle and effective.

The last dish is FloorFish, an expander/gate that's useful for various applications from slight expansion to noise reduction to gating. It was designed to clean up drum tracks by raising the level of the track only when an amplitude threshold is reached. It is especially useful for eliminating track bleed. What makes this different from a noise gate is that because it's also an expander, you don't have to eliminate the bottom noise floor completely unless you choose to do so. FloorFish also allows you to scan the source frequency and thus adjust

the transition curve accordingly.

This unique package of plug-ins is great fun and will add superb analog-style sound to your digital effects rack. And if this free offering sounds a bit fishy to you, it comes with an excellent PDF manual so you can read all about it in great detail.



**FIG. 9:** More Feedback Machine is the ultimate virtual-delay device. It should satisfy even the most extreme desire for control.

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## SHAREWARE

Developers of the next group of programs aren't asking much. They're letting you try out their software before buying to be sure it suits you. Though these applications may be missing a few features, you can still get a good idea of what they are all about.

**CellSynth 1.7 (Mac OS 9, Classic, \$95).** Living Memory's CellSynth is a powerful modular synthesizer for the rest of us, as the "Sync Different" theme on the manufacturer's Web site indicates. The program consists of a monophonic modular software synthesizer, sample player, sequencer, and effects processor, and utilizes a unique



FIG. 10: Rax hosts AU music devices and effects. You can stack as many effects and create as many racks as your computer can handle.

matrix interface. CellSynth can be played as a live MIDI performance instrument with its output recorded to disk, or the audio can be routed to your

## MAC SHAREWARE HALL OF FAME

These are time-tested freeware and shareware gems that have earned a place in our select Hall of Fame. You'll find a few very deep programs among the other, more utilitarian offerings.

**Csound 4.23 (Mac OS 9, OS X, Win; freeware)**  
Web [www.csounds.com](http://www.csounds.com)

The famous sound-programming language. Csound has a rich history and is the basis for numerous other programs.

**Delay Lama 1.1 (Mac OS 9, Win; freeware)**  
Web [www.audionerdz.com](http://www.audionerdz.com)  
The famous singing-monk VST Instrument that offers vocal synthesis from within a 3-D animated interface.

**iTunes 4 (Mac OS X; freeware)**  
Web [www.apple.com/itunes](http://www.apple.com/itunes)  
Apple's audio player now features AAC audio compression as well as access to the iTunes Music Store, where you can try and buy songs for 99 cents.

**Pro Tools Free 5.01 (Mac OS 9, Win; freeware)**  
Web [www.digidesign.com](http://www.digidesign.com)  
This version of Digidesign's workhorse audio editor offers up to 8 tracks of audio, 48 tracks of MIDI, real-time plug-ins, and many other pro features. An OS X version has been announced but has yet to be released.

**QuickTime 6.3 (Mac OS 9, OS X; freeware)**  
Web [www.apple.com/quicktime](http://www.apple.com/quicktime)

Apple's free multimedia player now offers MP4 with AAC audio compression that is more efficient than the MP3 codec. The full version of QuickTime (\$30) allows sampling- and bit-rate conversion and a wide selection of audio formats and video codecs.

**SoundApp 2.7.3 (Mac OS 9; freeware)**  
Web [www.spies.com/~franke/SoundApp](http://www.spies.com/~franke/SoundApp)  
A sound player and conversion utility that supports an extensive list of formats and bit rates.

**SoundHack 0.892 (Mac OS 9, OS X; freeware)**  
Web [www.soundhack.com](http://www.soundhack.com)  
Tom Erbe's sound-processing program offers numerous esoteric processing functions, many of which are not found elsewhere. A must-have in every musician's toolbox.

**SuperCollider 3 d5.1 (Mac OS 9; freeware)**  
Web [www.audiosynth.com](http://www.audiosynth.com)  
A music programming language for real-time audio synthesis with extensive support for I/O devices. It is currently being ported to OS X. Even the included examples sound great.

**thonk\_0+2 (Mac OS 9; freeware)**  
Web [www.audioease.com/Pages/Free/FreeMain.html](http://www.audioease.com/Pages/Free/FreeMain.html)  
An offering from Audioease that uses granular synthesis to mangle and enrich your sounds.

www.propellerheads.se

**REASON**

For more Reason 2.5 details: [www.propellerheads.se](http://www.propellerheads.se)

**propellerhead**





REASON



propellerhead



favorite sequencer for recording via ReWire. The synthesizer section of CellSynth is fully operational, but the Automation, Event Sequencers, and ReWire capability are disabled until registered. The \$95 shareware fee is a bargain when you hear and see what this monster soft synth can do.

CellSynth runs in both OS 9 and with limited functionality in Classic. MIDI control of CellSynth works only in OS 9 with OMS 2.0. CellSynth does not yet support OS X 10.2 CoreMIDI, so MIDI access is not available. A well-designed downloadable PDF manual provides a very thorough introduction to the program and includes numerous diagrams

and graphic examples. However, several features and changes have been added to CellSynth since the manual was written, and no update has appeared. CellSynth also has an online Apple guide and a Shortcut tip list. And it makes extensive use of pop-up windows that explain functions as you roll the mouse over them. We wish more programmers made their software this easy to understand.

Due to the expandable nature of its modular structure, CellSynth requires a fair amount of CPU power, particularly for its more complex matrices. I found that some programs bogged down when tested on a Mac G3/400, though I certainly had a lot of fun playing with CellSynth even on this older machine. The manual warns that both reverb and hard-disk recording utilize a lot of processing power and suggests not using reverb on slower machines.

When you first load CellSynth, it

## CONTACT INFORMATION

Many of these programs are available from multiple locations. Where possible, we've listed the program's home page.

**Center for Research in Electronic Art Technology (CREATE) at the University of California, Santa Barbara** e-mail [info@create.ucsb.edu](mailto:info@create.ucsb.edu) or [clang@create.ucsb.edu](mailto:clang@create.ucsb.edu);  
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looks like a Go game board with its unusual 6 x 6-square Matrix (see Fig. 8). However, it quickly becomes apparent that the Matrix is an extremely powerful concept. Underneath its lean surface is a deep and flexible interface. Within each Matrix square, you place what the program calls Cells. Each Cell is a complete modular component that can be moved around in the Matrix and connected to other modules in the same way modular-synthesizer components are patched with cables.

You assign Cells by selecting them from the two palettes of seven Cells each that appear at the top and bottom of the Matrix. The top palette offers seven different Generator Cells, including waveforms, noise, a harmonic generator, and a sample player that supports AIFF, WAV, and MP3 files. At the bottom are the DSP Cells from which you select various effects processors, including filters, a phaser, a delay, a reverb, and a vocoder. The DSP Cells can be combined in various configurations to create any number of more complex effects. Clicking on a Cell opens up an editing window where you can view and edit parameters. To employ a Cell, select it and drag it onto the Matrix.

Each Cell has small grayed-out red and green arrows on its sides that, when selected, allow connection from an adjacent component either as a modulation control (red arrow) or as an audio connection (green arrow). This makes simple experimentation easy but also allows advanced users to construct complex patches with extensive parameter control. In fact, the sounds from CellSynth are uncannily reminiscent of the rich, fat sounds from a real modular synthesizer.

CellSynth goes beyond the modular-synthesizer analogy, however, to include digital effects and samples. The included digital effects can be greatly expanded by combining modules. For example, to create a flanger, simply modulate the comb filter with a slow-moving oscillator. CellSynth can also work as a sample player with editing functions and key ranges for each sample. Loops can be synced to bars, and

samples can be automatically tuned and stretched to fit bars and also processed with DSP Cells.

CellSynth has an extensive range of MIDI-controlled parameters that allow real-time control via a MIDI controller or sequencer (registered users can use the built-in Automation Sequencer to perform mix and effects automation). There is also a Step Sequencer that can be used to perform sample-and-hold-style modulation. The one notable limitation of CellSynth is its lack of response to MIDI Velocity (you can use MIDI controllers for expressive control). We hope that future releases of the program will address this shortcoming. Overall, though, CellSynth is an audio treat that really is different. This is one download you don't want to miss.

**More Feedback Machine 1.0 (Mac OS 9: VST; OS X: VST, AU; Win, \$20).** If you enjoy effects programming, Urs Heckmann's More Feedback Machine (MFM) is the Holy Grail of software digital-delay processors. This incredible beast has more knobs and features than most software synthesizers (see Fig. 9). MFM offers four delay lines that can be fed back into each other using a 4x4 feedback matrix. Each delay has filters that can be applied to either the input or the delay feedback. To control unruly feedback, each delay line has a limiter/compressor/saturator, and to modulate the delay lines and filters, there are two LFOs and a step sequencer that allows sample-and-hold-type modulation.

MFM is sure to satisfy your lust for control. In addition to the features just mentioned, each delay has a delay time of up to 2,000 ms; a lowpass, highpass, bandpass, or notch filter with filter cut-off and resonance; a dual-polarity feedback matrix; and output-level and pan controls. The LFOs and step sequencer can modulate most of these parameters. You can use the delay lines in various configurations, including two stereo delays, two independent stereo filters, and four independent mono effects. Using any of these configurations and the numerous modulation, filter, and feedback parameters, you can create an



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**Spider Audio** and **Spider CV** are utility devices for creative signal path routing. You can now process one synth with several different effects simultaneously, or trigger multiple instruments from one matrix pattern.

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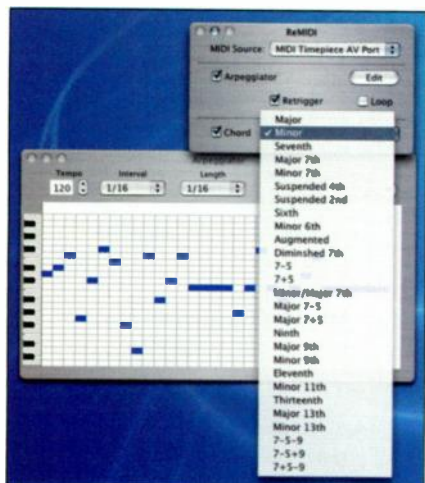


extraordinary number of sound effects.

Even with the processing demands of MFM, the CPU overhead is relatively low on a G4. However, further optimization for the G4 is planned and will be available to registered users. The program has no manual, but the developer maintains an extensive online manual at his Web site that includes detailed information, diagrams, and tips. This is by far the ultimate software digital delay.

**Rax 0.3.3b (Mac OS X, no fee).** Granted Software's Rax (in late beta) is a virtual synth/effects rack and a live performance Audio Unit host. It's one of the first AU hosts that makes good use of the new OS X 10.2 Core Audio and CoreMIDI functions and is an excellent choice for hosting some of the many AU instruments and effects featured in this article (see Fig. 10). The release notes make it clear that Rax is only a preliminary release and is not intended for "real" applications. However, anyone exploring the new world of OS X and Audio Unit will find this an invaluable tool even in its current state.

For those new to Audio Unit, both



**FIG. 11: ReMIDI allows you to play chords using the notes as the root of the chords. You can also add the Arpeggiator to play chord sequences.**

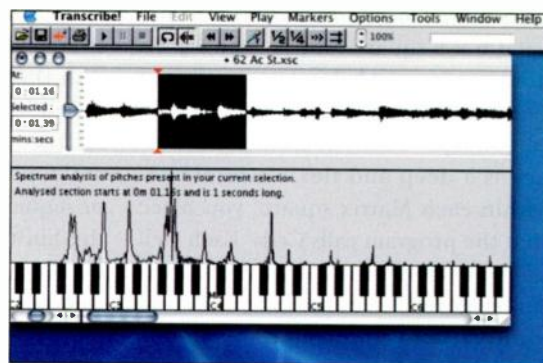
effects and synthesizers go into the User/Library/Audio/Plug-ins/Component folder. Once there, Rax and other AU programs will recognize them. Regardless of what MIDI source you choose, whether it is an external MIDI device, a sequencer with CoreMIDI support, or a software MIDI keyboard such as MIDIKeys, be sure to make it active before loading Rax. Otherwise, it won't be recognized.

When you first load Rax, you will need to select a synthesizer from the Music Device list. I suggest exploring the built-in Apple DLSMusicDevice, Crystal AU, or Urs Heckmann's new Zoyd monophonic synth. You then add effects to the rack from the Effect menu. To open an effect for editing, click on the white sphere next to its name, and an editing panel for the synthesizer or effect will appear. Rax processes the signal from the top down, and you can move effects around in the rack once they've been loaded.

In addition to AU effects you add to the Library, there are several great AU effects built into the new OS X 10.2 Core Audio. These include Matrix Reverb, Digital Delay, Parametric EQ, Peak Limiter, and a number of filters, all freely accessible from within Rax. You can stack as many effects onto the rack as your CPU power will allow, and on my Mac G3/400, I was able to stack three or four simple effects on a synth without any problem. You can create as many racks as you want and have each one respond to a single MIDI channel or to different channels. You can also save and load a virtual rack with its synthesizer and effects for reuse.

Rax is a fun and useful tool for exploring OS X Audio Unit devices as well as for live performance applications. Keep your eyes on the Granted Software Web site for future developments.

**ReMIDI 0.4b (Mac OS X, no fee).** ReMIDI (pronounced "remedy") from Granted Software is a performance assistant consisting of an arpeggiator and



**FIG. 12: Transcribe assists transcription by using spectral analysis to extract pitches from an audio file segment.**

a MIDI chord tool that is still in beta development. When you first run the program, there's not much to look at. But don't let that fool you: there's a lot of fun to be had with this software.

ReMIDI is designed for use between your MIDI triggering device and a MIDI application. It allows you to create simple arpeggios or arpeggiated chordal sequences, and supports transposition, looping, and retriggering. You can use the computer keyboard to trigger arpeggios, which gives a number of useful performance options such as octave-shifting and transpositions.

Clicking on the Edit box will open the Arpeggiator, where you enter notes using a piano-roll interface (see Fig. 11). You can specify Tempo, Interval (note value), Length (note sustain duration, that is, legato or staccato), and Notes (number of notes in the sequence). Rests are created by Control-clicking in the piano roll (rests are indicated in red). You can also save and load sequences in ReMIDI's ARP format, but not as Standard MIDI Files.

I ran into trouble when I set the length of notes to a value longer than the time interval: the program hung, and I was unable to stop playback even by turning the Arpeggiator off. A reset button would be a welcome addition. I'd also like to have the ability to create polyphonic arpeggios (though polyphony could get out of hand if used with the Chord tool).

ReMIDI's Chord function lets you select chords that will be played when a single note is pressed (the triggering note becomes the root note of the





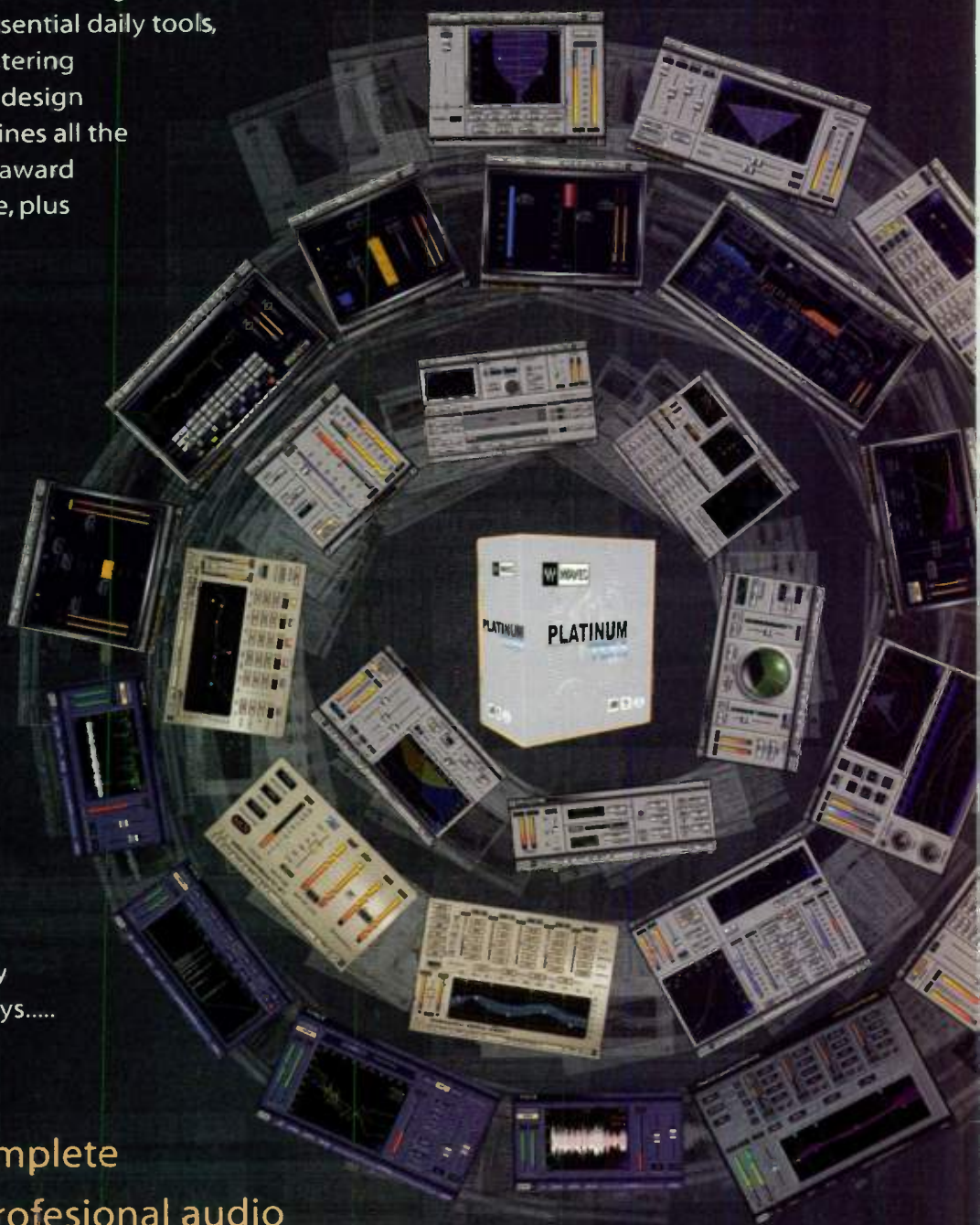
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chord). This is a fun little tool by itself (try using some of your favorite synth pads), but it can also be used in conjunction with the Arpeggiator. Possible applications include live performance, composition, or recording MIDI arpeggios and chords for use by a MIDI sequencing application. Though there are 29 chords to choose from, it would be nice if you could use different inversions or create your own chords. An intelligent chord function, where chords are determined by the notes on a scale, would also be useful. These additions would make ReMIDI an even more powerful tool.

**Transcribe 6 (Mac OS 9, OS X, Win, \$40).** Seventh String Software's Transcribe 6 is an unusual spectral-analysis program given that its function is to assist in music transcription. By extracting pitch and harmonic information from the spectral analysis of a section of an audio wave, it helps you determine the notes that are being played. The program doesn't perform the transcription for you, but displays spectral peaks across a keyboard indicating the notes and harmonics in the audio segment (see Fig. 12). Transcribe can also slow

the music down without altering its pitch when playing back, which makes it much easier to hear individual notes within a fast passage of music.

Transcribe can open files in AIFF, WAV, and MP3 format or extract audio directly from a CD under OS X and newer Windows versions. You can play back a passage at any speed between one-twentieth and double the normal speed, or add processing such as EQ. When you locate a phrase you want to analyze, highlight it with the cursor, and the notes in the spectral analysis are immediately displayed on a virtual keyboard with the waveform shown above each note. The process is extremely easy and very fast. Because the extracted pitches are highly accurate, it's very easy to determine the notes being played. Though Transcribe is pretty much a one-trick pony, it sure beats transcribing audio by ear!

#### DONATIONWARE

Here's a deal you can't pass up. If you like the program, just send a few dollars to the developer, and everyone will be happy.

**Ambience 1.0 (Mac OS 9: VST; OS X: VST, AU; Win).** Ambience is a dedicated high-end reverb plug-in that rivals many commercial reverbs in both the scope of its controls and the quality of its sound. It is an extraordinary offering from Magnus Jonsson of Smartelectronix, who spent two years developing the underlying algorithm. When you first hear Ambience you immediately realize that it has a distinctive character, adding both ambience and depth that go beyond your typical reverb plug-in. It can create sounds from cupboards to cathedrals and everything in between. The AU version I tested didn't come with any presets, but those are planned for release soon.

The real power of Ambience lies in its wide range of parameters, which allow you to precisely tailor its sound to the source ma-

#### MAC OS X FREWARE AND SHAREWARE LINKS

Here are a few Web sites to watch for new shareware and freeware releases.

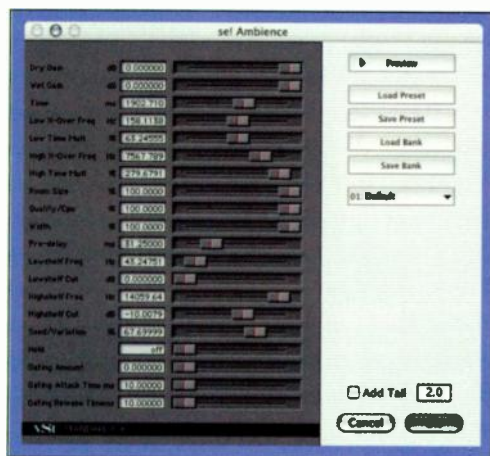
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terial and the virtual space you are creating. Aside from the ubiquitous wet/dry, room size, and reverb-time controls, Ambience offers low- and high-frequency crossover filters and separate control of the low and high reverb times (see Fig. 13). It also offers low- and high-shelf filters that allow you to effectively emulate realistic frequency falloff of acoustic spaces. There is also a variation parameter that changes the resonance and echoes of the algorithm. This setting provides numerous sound variations, some subtle and others more distinct. Special effects such as hold and gating are also possible. Overall, there's tremendous control in shaping the sound to emulate various ambient spaces.

Ambience gives you the ability to adjust the CPU load, albeit at the expense of real-time performance. It doesn't make use of AltiVec acceleration on the Mac, and you can often hear a very slight looping in the reverb tail with certain sounds (this is also occasionally true of hardware reverbs). You can overcome this somewhat (particularly with slow-attack sounds) by combining Ambience with other plug-ins, such as chorus and delay, effectively increasing the density and smoothness of the overall sound.

Ambience is an extremely high-quality reverb, but it is not free, so don't forget to make a donation if you choose to use this gem.

*Gregory D. Moore programmed many of the effects heard on the Sony DSP series effects processor. He also created audio demos and animation for Sony and can be reached at [synergy543@aol.com](mailto:synergy543@aol.com).*



**FIG. 13:** Ambience 1.0 allows control of numerous reverb parameters usually found only on higher-end hardware reverberators.



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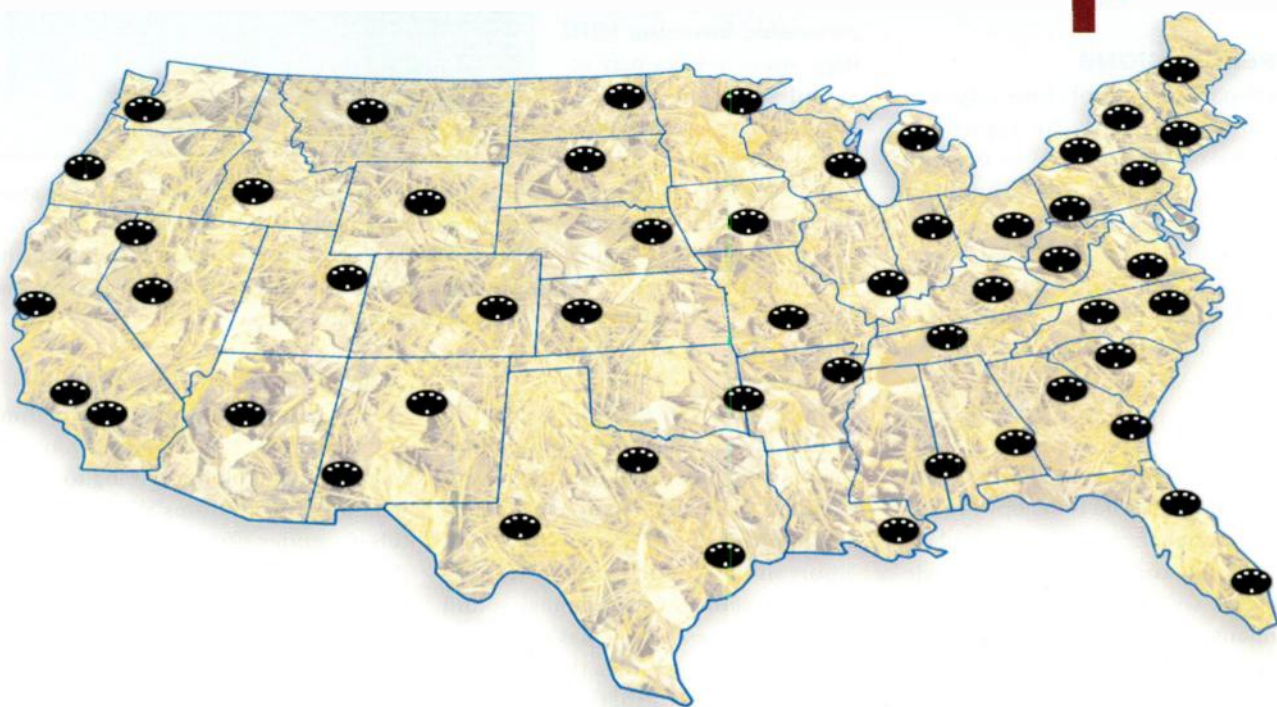
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# All Over the Map



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power of your  
studio gear  
and add  
fun to live  
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**M**IDI has been with us for 20 years now, and a large part of its success has come from its malleable nature and the way that it lets you separate notes and control gestures from the actual production of sound.

No MIDI event is etched in stone; you can always change any detail of your composition at any time in any of several ways, including substituting one kind of event or parameter for another. That process, which is known as *re-mapping*, is nothing more than the reassignment of MIDI data. You can change an event's placement in time, its pitch, or a specific value, and you can even change one type of MIDI data into another.

Most sequencers provide several tools for reassigning MIDI messages. You can often set up controls that accept a MIDI message from one source, change the message type, and route the message

to a new destination as you play. In Cakewalk Sonar, you use the StudioWare Panel; Emagic Logic furnishes the Environment; Digital Performer offers Consoles; and Steinberg's Cubase SX has the Input Transformer. These features are all designed to let you change MIDI data in some way. Certain programs even have ready-to-go MIDI-mapping plug-ins, such as arpeggiators, harmonizers, and MIDI delays.

To demonstrate MIDI's creative flexibility, I've assembled a grab bag of tips that you can apply with a basic MIDI setup and a good software sequencer.

**By Marty Cutler**

Some of these ideas involve using simple editing techniques to help you refine your MIDI projects. Other tricks involve substituting one type of data for another to expand your MIDI palette. In the right setting, any of these tips can add a little pizzazz to your next project and encourage some fruitful experimentation.



# All Over the Map

## REPERCUSSIONS

Drum parts are an obvious target for microediting, and the typical sequencer offers an array of tools for precisely tailoring just about any rhythm track. All of the major sequencers also have specialized groove-quantizing tools that are derived from analysis of live performances.

I keep a library of drum grooves as Standard MIDI Files or in my sequencer's native file format. The grooves typically contain all drum-kit elements in a single track. My first step after loading the file is to copy the data to a new track, leaving the original as a muted safety backup. Next, I "explode" the track so that each percussion instrument occupies its own track. Most sequencers let you separate your data into individual tracks using note number as the criterion (see Fig. 1). At the very least, you can cut all notes of a single pitch and paste them into a new track. Some sequencers can automatically name your drum-kit instruments as soon as you create the split. If not, take the time to name each track; you'll thank yourself later if you need to remap those notes to a different pitch.

Next, see if you can better serve the groove by reassigning kit elements to different samples or synth patches on

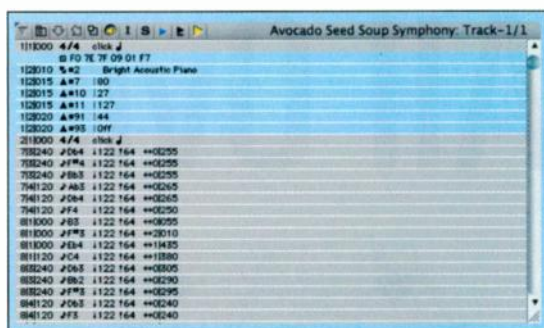
the same or a different MIDI instrument. Do that before altering the timing or Velocity. Because of differences in a sampler's or synthesizer's capabilities for processing incoming MIDI data, some devices may respond sluggishly to Note On messages, while others may differ in their Velocity response. Those variations shouldn't inhibit your choices if an instrument sounds right to you; you can always adjust individual rhythm elements in order to get the proper feel.

Once you've decided on the instrument, play the file back with the other elements included. You may then want to adjust the MIDI data to correct any timing problems. If a drum sound lags, simply shift its timing earlier. It's possible that your new sample may sound rushed if the new device has a snappier reaction to Note On data than the original device did. In that case, shifting the new sounds back by a few sequencer ticks should correct the feel.

## SENSITIVITY FOR DRUMMERS

Next, evaluate your new sound's Velocity response. Does it sound weak or too strong when compared with the rest of your well-balanced kit? Before adjusting the Velocities, it's wise to investigate any use of Velocity scaling in your sound source. That should be adjusted before making other changes.

If you need to adjust Velocity data, most sequencers offer at least two ways to accomplish that task. You can add or subtract values, or you can adjust the Velocities up or down by a percentage. Whichever you choose, bear in mind that extreme increases can level out the relative differences between events and leave you with little of your original dynamic range, so use discretion.



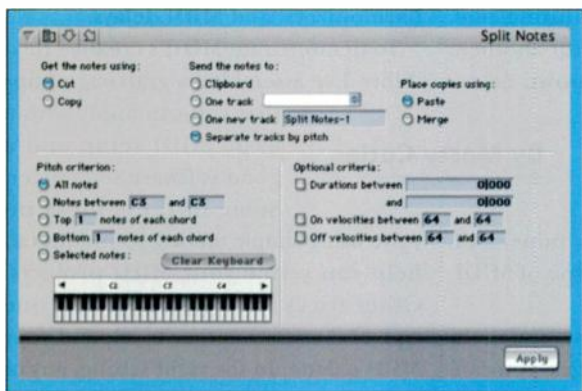
**FIG. 2:** The MIDI track shown in this Event List has a small System Exclusive Dump (in Hex) followed by a Program Change, Volume, Pan, and Expression message, along with Control Change messages regulating reverb and chorus send levels on a General MIDI synthesizer.

Chronic tweekers may find a number of other reasons to fine-tune rhythms and dynamics. For example, you may want to apply a bit more swing to the hi-hats or rush the toms slightly during fills. Consider sifting out the snare hits that have softer Velocities and putting them on a separate track. You can then remap those events to a softer sample that better suits ghosted snares. Now that the individual drum elements occupy discrete tracks, it's easy to apply groove quantizing, additional time shifting, or even note-by-note editing.

One of my favorite tricks is to add subtle amounts of Pitch Bend to snares. Drummers rarely strike snares with the same force every time, and the bend information imparts a bit of variety to the sound. Make sure the snare is on its own MIDI channel so that the Pitch Bend doesn't stretch your other drum sounds. I usually place a single, small Pitch Bend event before the onset of the note and another event with a value of zero after the sound's release. By the way, riding the Pitch Bend wheel on a track of high toms can provide a pretty decent talking-drums performance.

## READY TO PLAY

If you find that you spend too much time preparing your synthesizers for playback from song to song, you should get into the habit of setting up your songs with embedded MIDI data in your sequencer tracks (see Fig. 2). It's easy to store Bank Select and Program Change messages at the beginning of



**FIG. 1:** The ability to split a MIDI drum track by pitch allows easy reassigning and editing of individual drum-kit elements.

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# All Over the Map

your tracks so that your choice of sounds is recalled each time you load the sequence. However, there are many other parameters that you can have ready with a few mouse-clicks. Reverb levels and other effects settings, instrument panning, and initial instrument volumes are typical adjustments that you can insert into a MIDI track.

If a track features a lead instrument with lots of Pitch Bend, you'll want to insert a Pitch Bend value of zero at the onset of the song, so that stopping a song during a passage and playing back from the beginning doesn't leave you with an out-of-tune instrument. The same procedure holds true for controls such as MIDI Volume, Aftertouch, and Modulation. You don't want your synths to immediately begin playing with vibrato, do you?

You can even dump the entire contents of your synthesizer's memory, including programs and multitimbral setups, into a sequence to give each song a unique batch of sounds that are ready to go when you press Play. It's best to reserve separate tracks for setup data. If you need to move your sequences to another studio, the data

may be irrelevant to the hardware at hand; or if you opt for external signal-processing gear, you may need to print your tracks dry. In those cases, you can simply mute or delete your setup data without affecting your sequenced performances.

MIDI guitarists might want to set up a multitimbral arrangement in which a single synthesizer plays six monophonic parts and matches the Pitch Bend range of the controller. Individual synthesizer quirks and inconsistent MIDI implementation can make for slow progress when the muse strikes. In this day of software synthesizers, some of us still have hardware dinosaurs that always power up in Omni mode. You can insert an Omni Off message at the beginning of that device's track so that it will ignore messages intended for your other synths.

## OH, BEHAVE

Not all synthesizers respond to controller messages in the same way. In fact, a single synthesizer often responds differently from one patch to another. One pad sound might open its filter smoothly when you send Aftertouch, whereas another might hardly budge, or it might instantly open its filter all the way. You can edit the patch's programming to elicit a more accurate response, but it's often much easier to just change the controller data in your tracks.

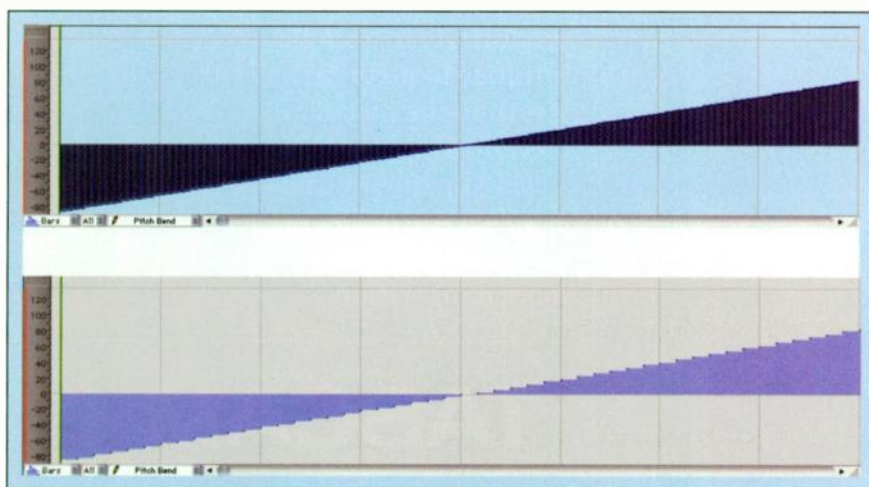


FIG. 3: Before and after data thinning: notice that the reduced amount of Pitch Bend retains the same general contours as the unedited version.



FIG. 4: Cakewalk Sonar's StudioWare Panel can map one MIDI message type to another. Here, it is receiving Expression on MIDI channel 1 and outputting Aftertouch on MIDI channel 1.

Sequencers typically offer several ways to adjust controller data: adding or subtracting, scaling by percentage, and compressing and limiting. Adding and subtracting just increases or decreases values by a specified amount. Percentage scaling often works better than adding or subtracting because it lets you preserve the relative values of your controller data. Compressing or limiting the data works best when the majority of the performance works fine but needs to have extreme values leveled out, such as when the upper ranges of your Aftertouch messages affect the filter response too drastically. As with Velocity edits, it's wise to exercise caution, because extreme values can level out the subtleties in your performance.

## CONTROL PATROL

As any MIDI guitarist readily knows, guitar controllers (and guitarists) can be somewhat overzealous when bending notes. A guitar controller that has Pitch Bend enabled is constantly sending Pitch Bend messages; simply repositioning your fingers on the fretboard can send unnecessary data. Excess Pitch Bend—or any other MIDI controller messages, for that matter—can eat up





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# All Over the Map

synth pad or keyboard-type sound.

Another prime bandwidth hog is Aftertouch (Channel Pressure). Keyboard players naturally adjust the pressure on the keybed as they play. So, if you aren't using Aftertouch as part of your sequencing scheme, be sure to set up your sequencer to ignore Aftertouch on input. Another way to thin controller data is to quantize it. If your sequencer lets you quantize controllers (without affecting note data), you can effectively remove redundant events, although you should apply that technique with caution.

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## CHCHCH CHANGES

Because of production costs, companies that manufacture MIDI keyboards and other controllers are often forced to cut corners on the hardware capabilities or MIDI features that they offer. A prime example is the inexpensive MIDI keyboard that doesn't send Aftertouch. Installing a pressure-sensitive mechanism under a synthesizer keybed adds considerable expense to a product, so Aftertouch response is often one of the first features to go.

If your keyboard lacks Aftertouch but has an expression-pedal jack or a Modulation Wheel, however, you need not be left out of the party. Your sequencer can remap just about any MIDI control message to any other. In this instance, I prefer to use an expression pedal and let my sequencer remap Control Change (CC) number 11 to Aftertouch (see Fig. 4).

I could use my keyboard's Mod Wheel, changing CC 1 to Aftertouch, but I find a pedal easier to control than a Mod Wheel. An expression pedal is a vital tool for the MIDI guitarist because it frees your hands for playing. If you don't have a pedal handy, you can always record the Mod Wheel into a track and remap the Modulation data to your choice of Control Change data afterward.

## BETTER MOUSETRAP

I own a portable digital studio (PDS) and a computer DAW, and the combination gives me unbeatable flexibility. I can record tracks when I'm away from home and digitally transfer tracks



FIG. 5: In the Mixer Strip (Center) in Digital Performer's Mixing Console, incoming MIDI data passes through the transposition plug-in and then is fed to the arpeggiator. The windows surrounding the strip are the programming controls for the transpose function (left) and the arpeggiator (right).

to my computer workstation for further editing and processing. Still, space is a precious commodity in my studio. Although I'd rather use a MIDI control surface than a mouse for mixing, the last thing I need is another piece of gear.

My Korg D16 occupies the space in which a control surface would normally be and for a good reason. It is my control surface. In fact, anyone with a PDS that offers MIDI automation can convert the device to a control surface for external MIDI gear. Check your PDS MIDI-implementation chart; it's more than likely that several buttons output MIDI Machine Control, the faders send CC 7 (Main Volume), and the track-panning knobs send CC 10 (Pan Position). Furthermore, because each fader transmits over a different MIDI Channel, incoming MIDI Volume messages do not interfere with each other, extending your mapping possibilities.

Moreover, you can map each fader and knob to control multiple parameters on a single device. You can, for example, control filter-cutoff parameters or pulse-width modulation on several software synthesizers. The trick is to find out which message your PDS is sending. In your sequencer's remapping tools, select that message as an input and assign the desired CC message as an output. You will probably also need to set up a target track or device for the transformed data.



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# The Old Two and Four

*Six classic backbeats to get your creative juices flowing.*

By Richard Alan Salz

**W**hat would rock 'n' roll be without the backbeat? Well, among other things, it would be much harder for the average listener—and dancer—to follow. Chuck Berry (and later, the Beatles) had it right when they sang, "It's got a backbeat, you can't lose it."

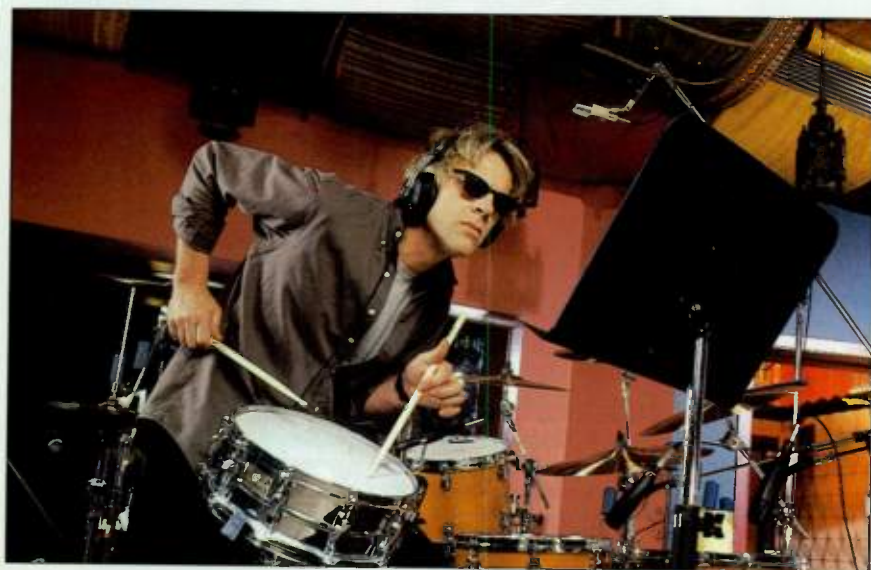
Thankfully, the backbeat comes in an infinite variety of flavors. The only requirement is that it be rock solid and reliable as a heartbeat. In this article, I will detail the key ingredients that go into making backbeats—in particular drums,

tunings, playing styles, miking, and processing. I will then show how you can produce them in your own personal studio. The point is not so much to copy what has already been done (though that's always a great way to learn), but to expand your bag of tricks and become inspired to go the extra mile in your quest to create the perfect snare sound.

Here I have selected a diverse group of backbeats that span a wide range of snare sounds. I'll start with high-pitched snare-drum sounds and progress to lower-pitched ones. Keep in mind that there are many ways to create a particular sound, especially once the variables of signal processing are introduced. Still, helpful ground rules do exist. For example, always try to get the best possible sound on tape (or hard drive) rather than relying on processing after the fact.

Remember that the snare drum must complement the song—for example, a dry, high-pitched snare will sound silly on a heavy-metal track, no matter how well it is recorded and mixed. As the producer-engineer, it might be up to you to suggest an alternate snare to a drummer who shows up with an inappropriate drum.

Finally, remember that tuning is the best way to deal with a poor-sounding



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Marvin Gaye's final opus helped legitimize the drum machine's place in pop and soul music.

difficult (there is hardly a drum module or keyboard that doesn't have a TR-808 snare sound onboard), you can also create the sound yourself using a real drum.

Start with a piccolo snare 3 to 4 inches deep and 12 to 14 inches in diameter. Tune the top head to a defined note that works with the key that the song is played in. The bottom head should be tuned evenly but should be fairly slack, and the snares should be somewhat loose. Mic the drum with a standard dynamic mic such as a Shure SM57. But rather than aiming the mic at the area on the head where the stick hits, aim it toward the rim of the drum with the capsule looking down at the head from above. Instruct the drummer to strike the drum consistently in the same spot and to strive for even dynamics. Also, the player must avoid hitting the rim or playing rim shots—this is not the place for a “rimmy” attack.

The objective is to capture a soft sound with a minimum of attack. If you have access to a noise gate featuring adjustable attack and decay parameters, set the gate so it's a bit slow to open, which will help you miss some of the initial attack. Put the decay on a medium-length setting.

The key element of the 808 snare sound is a “fizzy” character combined with a distinctive “snap” and a fairly short decay. A bit of moderate compression can help to even out the sound and tame any unwanted peaks. Make sure to roll off low frequencies below

400 Hz, especially if you are trying to emulate the sound of an 808 snare that is tuned to a higher pitch.

## YACHT DANCE

Another high-pitched snare sound that I really like is on XTC's “Yacht Dance,” from their album *English Settlement* (Virgin, 1982). The snares are disengaged on this track, making the drum sound more like a timbale or a high-tuned tom than a snare. A liberal dose of reverb has been added to give the drum some acoustic space and sustain in the mix. Compression helps the initial stick sound maintain clarity yet still merge smoothly into the sustained portion of the sound.

The key to achieving this sound lies in tuning the drum so that it will produce a sustained, pitched note. Experiment with tuning to find the drum's



**Always try to get the best possible sound on tape rather than relying on processors.**

maximum resonance. Because the snares are “off,” the drum will already have more sustain than it would with the snares engaged. A shallow drum is not necessary for this sound—most snare drums, except for unusually deep-shelled ones, can be tuned to a sufficiently high note without choking. An excellent mic would be the Sennheiser MD 421, which will help to smooth out the sound.

Position the mic so that it aims toward the spot at which the stick hits the head. Make sure to capture both the low-pitched component of the snare sound (a *doink* sound) and the drum's decaying resonance. It's particularly important that the pitch of the drum work with the song key. Ideally, the drummer should play consistent rim-shots in order to give a nice snap to the sound.

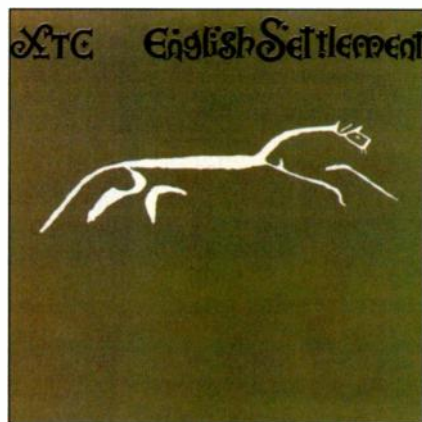
At mixdown, compress the snare using a fast attack, medium ratio, and medium threshold so as to ensure a strong attack and long sustain. The ideal reverb for this drum is an EMT plate. If you don't have access to a real plate, use a digital simulation—most contemporary multi-effects processors provide a number of convincing plate-reverb algorithms. In my experience, though, Roland and Lexicon units work better for this type of sound than TC Electronic and Yamaha processors. Make sure to roll off a good bit of the high end to get the sound of a real plate—as a rule, digital simulations are overly bright as compared with the real thing.

## DON'T STAND SO CLOSE

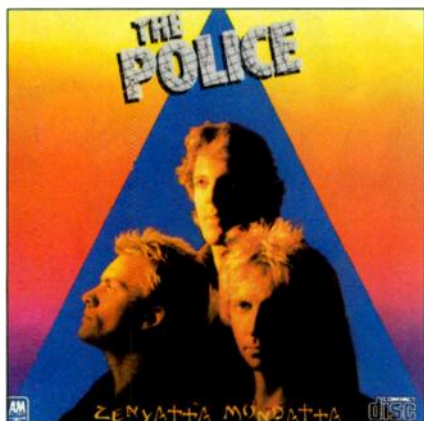
One of my favorite snare-drum sounds from the '80s can be heard on the Police's *Zenyatta Mondatta* album (A&M Records, 1980). On the opening track, “Don't Stand So Close to Me,” Stewart Copeland plays sidesticks through much of the tune, switching abruptly to rim-shot backbeats during the choruses.

Copeland's recognizable snare-drum sound derives less from signal processing than from drum type and tuning and playing style—his powerful and consistent rim-shots account for much of his signature sound. As for processing, the snare sound is fairly dry, mixed with a touch of plate reverb only.

Copeland was using a 14-by-5-inch brass-shelled snare drum at the time,



On XTC's hit song “Yacht Dance,” the backbeat features a snare drum with snares disengaged.



The Police's drummer Stewart Copeland's distinctive snare sound derived primarily from his technique and tuning.

and that's a good place to start if you're going for that sound. Copeland said he likes all of his drum heads tuned taut, both for the sound that it creates and for better playability. So start by tensioning the batter head until the drum begins to sound choked, then back off

a bit. A Shure SM57 or similar dynamic mic, positioned so it is "looking" at a combination of top head and rim, will work fine. Compression, if used during tracking, should be set to a fairly slow attack so as to let through the initial transient of the stick hitting the rim. Try a low to medium ratio, which will help even out the overall sound. You might also need to compress further during mixdown.

#### GIVE IT AWAY

Another great snare sound can be heard on "Give It Away" from the Red Hot Chili Peppers album *Blood Sugar Sex Magik* (Warner Brothers, 1991). Produced by Rick Rubin and engineered by Brendan O'Brien, this song has drummer Chad Smith positively smacking the backbeat home. The snare sound is interesting, comprising a mid to high tone, a sharply gated sustain, and a load of artificial ambience.

Smith's signature Pearl drum was a

fairly standard, steel-shelled, 14-by-5-inch model. Any good-quality steel snare drum should suffice—in this case, the sound of the drum is less important than the attendant processing.

The key element here is the attack. A standard dynamic mic such as a Shure SM57 or Sennheiser MD 421 will work fine, but a small-diaphragm condenser such as an Audio-Technica AT 4051 or Neumann KM 184 will do an even better job of capturing the attack. During mixdown, gate the track using a very fast attack (to ensure the transient passes through unscathed), a medium-long sustain (assuming your gate has a sustain parameter), and a fairly short decay. The rest of the sound is generated using reverb.

For the reverb, I recommend a small chamber or room sound. Grainier is better in this instance, so antiques such as Quantec Room Simulators, 12-bit Roland units, and ART O1As are fine. The important thing is to use a reverb

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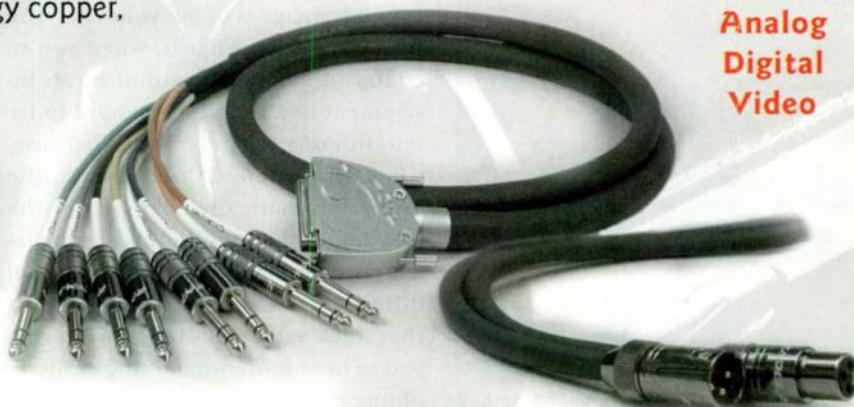
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that has a fast attack and short decay. Use the reverb's decay parameter to determine how long the snare-drum sound is. The reverb should be panned hard left and right for maximum stereo effect.

If the snare sound still lacks excitement, add a compressed combination of the snare and reverb. Route both the snare and reverb to an aux send and from there to a compressor channel. Return the compressor's output to a channel input (or aux return) that is routed to the stereo mix, and pan it dead center. Now bring up the level just to the point at which you can begin to hear the compressed signal and then back off a bit.

## D'YER MAK'ER

A near-legendary low-pitched snare sound can be heard on "D'yer Mak'er" from Led Zeppelin's *Houses of the Holy* (Atlantic, 1973). One reason drummer John Bonham's snare drum sounds so big on this track is that the recording made good use of the room's natural ambience. Tracked by the Rolling Stone's mobile truck at Mick Jagger's country estate, Stargroves, and mixed at Electric Ladyland studios by Eddie Kramer, this track has a distinct room sound that has rarely been matched—you can really hear the identity of the room stamped upon the tracks.

Though Bonzo was well known for using oversized drums and tuning them



John Bonham's killer snare sound on Led Zeppelin's "D'yer Mak'er" owes much to the huge, high-ceilinged room the drums were recorded in.

tautly, the snare on "D'yer Mak'er" sounds neither oversized nor excessively tensioned. But it does sound as though it was hit hard. As was common for the period, the drums were minimally miked—a kick mic placed within a foot or two of the drum, a tom/snare mic positioned looking down at the snare, and stereo room mics in the far corners of the room. Note that the modern "fix it in the mix" attitude did not yet hold sway—engineers were accustomed to getting the sound that would be on the record *during* the tracking. Committing to the final sound early in the recording process not only required that the drums sound great from the git-go, but also made it easier to choose the tones and textures of other instruments when it came time for overdubs.

Most of the drum sound you hear on "D'yer Mak'er" comes from the room microphones; the mics closer to the drums were used more to augment the room sound. Of course, most personal-studio recordists don't have the luxury of huge, high-ceilinged rooms to record in. Fortunately, there are techniques that can help you arrive at a bigger, better room sound, even in a small, boxy space.

First comes placement—both of the microphones and the drums. All rooms suffer to some extent from what are known as room modes, which are cancellations or augmentations in the frequency response that correlate to the room's dimensions. Room modes can work for or against you. The simplest way to get room modes working to your advantage is to use your ear—yes, in the singular. That is, when you're trying to gauge the sound of an instrument in a room, it's helpful to listen with one ear only. That's because, when you listen with both ears, the brain automatically triangulates the location of the sound source using localization cues such as time-of-arrival differences. Using one ear prevents that automatic calculation, allowing you to hear more what a single microphone picks up, thus giving you a better idea of what will print to tape (or hard drive).



Though highly processed by today's standards, the snare sound on the Red Hot Chili Peppers' song "Give It Away" still slams.

The important thing is that the room mics capture a good balance of the elements of the drum kit. Due to room modes, the balance of elements can shift dramatically as you move around the room. So if, while listening with one ear, you're unable to find a spot in the room from which a good balance can be heard, move the drums to a different location and try again.

An easy way to enlarge the apparent size of a room is to slightly delay the room tracks—5 to 25 milliseconds should suffice. That will approximate the time the sound waves would take to reach the room mics were they positioned in a large room. Make sure to delay both the left and right channels equally.

To best approximate Bonzo's snare sound on "D'yer Mak'er," find the biggest room you can and place the drums at one end and the room mics at the other. Add spot microphones for kick and snare. For processing, use an optical, tube, or optical-tube compressor on the room-mic tracks. The Urei LA series is highly regarded for this task, but other models will also work. Use a slow attack on the compressor so as to let the transients through, and turn the threshold down low so you can really load up on the room sound.

Richard Alan Salz is a producer, engineer, and composer living in southern Vermont.

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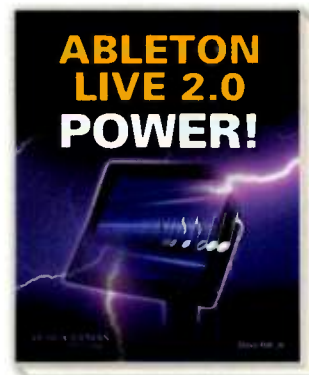
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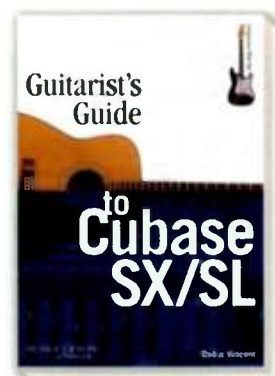
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# Loud, Louder, Loudest!

*What is this thing called loudness?*

By Dave Moulton

**L**oudness is like happiness: we all know when we're experiencing it, and the concept, at first glance, seems like a simple one. But when we start exploring what it is and how to control it, we find that it isn't simple at all. In fact, we can't even really measure it! Despite these difficulties, we must press on, as loudness management is at the heart and soul of good audio and expressive musicianship.

Loudness isn't a physical quantity,

but rather a subjective sensation that humans have as part of our hearing—a sensation relating roughly to the size or proximity of a sound source. As a sound gets louder, we sense that it is nearer, bigger, or more powerful. All that probably has its origins in the theory of perception for survival, and it almost certainly predates human evolution.

It would be handy if such sensations simply and easily correlated with physical quantities such as sound-pressure level (SPL), but they don't. Though there is *some* correlation between loudness and SPL, our casual linking of the two often leads to some serious confusion.

Loudness has the same sort of relationship to amplitude that pitch has to frequency. In both cases, as we change one quality, the other generally changes as well, and we casually use the physically objective quantity to stand in for the subjective one. However, we can change frequency without changing pitch and vice versa, and we can also change loudness without changing amplitude. Furthermore, the loudness of a sound varies dramatically as a function of its spectrum. There is much more to subjective loudness than a simple correlation with amplitude.





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This private convention is the best we've ever been to, and worth *much* more than the price of your membership.

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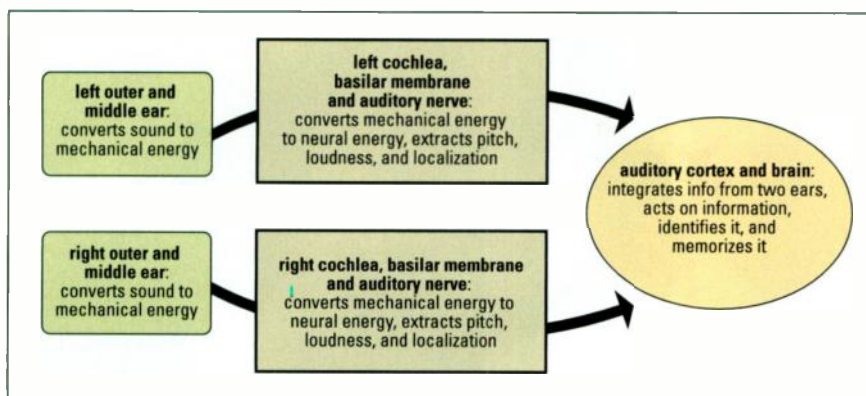
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**FIG. 1:** This figure is a simplified overview of the auditory system and indicates the various processes that occur as part of hearing.

In addition, the range of loudness levels that we can perceive, from so soft that we can barely hear it to so loud that we can't stand the pain, involves an amplitude range so huge that it challenges the capability of our technology to approach it.

## HEARING 101

Our auditory system is a complex array of features that includes a pair of ears, two auditory-nerve bundles, and an elaborate processing network in the brain that is responsible for memory, identification, perception, and action. It's a complicated system, and we don't understand it very well yet (see Fig. 1).

Fig. 1 shows a simplified representation of our hearing system. A key point in the system is the *basilar membrane*, housed in the cochlea. The basilar membrane is a suspended resonant skin surface, with tens of thousands of nerve endings embedded in it. These nerve endings are one end of the *auditory nerve*, the bundle of nerves leading to the auditory cortex in the brain, with numerous neural processing points along the way.

The basilar membrane can be thought of as a mechanico-neurological transducer or a vibration-to-neural impulse converter. In plain English, it's the point where the sound energy that enters the ear is converted into neurological impulses.

Different areas of the membrane vibrate at different frequencies, which explains in part how we derive pitches

from complex sounds. When a particular area of the membrane resonates, it causes the nerve endings in that vicinity to fire, that is, to generate the electrical impulses that constitute neural activity. Specific regions on the membrane correlate with sensations of highness and lowness, and taken together lead to the sensation of pitch (see Fig. 2).

Fig. 2 shows a stylized, simplified basilar membrane that is being excited by a sound with multiple frequency components. Each gray zone represents a vibrating area of the membrane. The sense of pitch of the sound arises from the specific collection of vibrating areas, which we perceive as a neurological template for, say, E-flat above middle C.

As the vibrating area gets larger or smaller due to amplitude change, the perceived pitch changes. From that, we speculate that the position of the edge of each vibrating area is what is used to define pitch. And it is this activity on the basilar membrane that leads us to the concept of loudness.

## HOW WE HEAR LOUDNESS

Loudness seems to be related to how many nerve endings are fir-

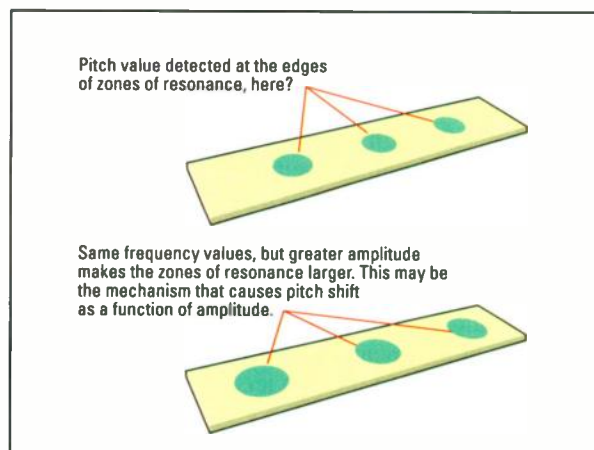
ing, which depends on how big the vibrating area is and how rapidly the nerve endings are firing. Both of these are related to the magnitude of the sound wave that enters the outer ear and is transmitted to the basilar membrane.

The path from the outer ear to the basilar membrane also has an effect on our sensation of loudness. The eardrum is, in fact, a muscle. When exposed to extremely loud sounds, it tightens, acting like a slow-attack, slow-release audio compressor. Meanwhile, the middle ear houses three bones that mechanically transmit the vibrations at the eardrum to the cochlea. Those bones, in combination, add some mechanical "gain" to the amplitude. They also function as a comparatively fast-acting limiter, slipping apart slightly (but still held together by cartilage) when their motion is extreme.

In combination, the gain limiting can be as much as 40 dB (more on decibels shortly) and for the most part, we are not aware that it is taking place. A kind of neurological feedback loop probably helps to maintain our perceived loudness by adjusting it for the amount of limiting that is occurring at any given time.

## OUR HEARING RANGE

The range of amplitudes that we are able to sense is huge. At the middle of



**FIG. 2:** This pair of graphics shows multiple sensory zones on a basilar membrane and illustrates the concept of pitch shift related to amplitude change. Gray zones represent distinct vibrating areas of the membrane.

COURTESY DAVE MOULTON



## Drum Series I

Get ready for the drums of your dreams. Recorded at famous Blue Jay Studios near Boston, all drums and all cymbals are **Stereo** and make heavy use of **Multi-Velocity Samples**. Separate snare samples for left hand and right hand included. **Studio kits, Small Ambient kits, Rock Ambient kits,**

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-BRAD LYONS *Sweetwater Product Specialist*

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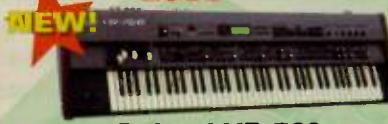
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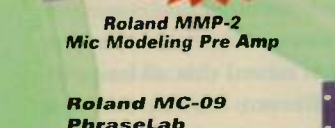
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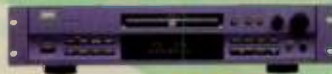
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# REVIEWS

Y A M A H A

AW2816

*Pro recording  
made more affordable.*

By Mark Nelson

The AW4416 was heralded as Yamaha's first professional recording studio in a box, and it has lived up to its promise admirably. It offers a 16-track digital recorder, 44 input channels, flexible routing, extensive onboard dynamics and EQ, and even a rudimentary sample sequencer. The new AW2816 offers fewer features at a lower price, but in this case, less is more.

The AW2816 fits squarely between basic, stripped-down portable studios and full-featured units costing thousands more. It provides 16 physical tracks with 8 virtual tracks each, 9 motorized faders, EQ and dynamics on each channel, 2 multi-effects processors, mix automation, and built-in CD-R mastering—all the tools you should need to take a project from conception to completion. Like the AW4416, the AW2816 can also operate as a programmable MIDI control surface. And it's easier to use than its predecessor.

## FIRST APPEARANCES

The AW2816 looks and feels good (see Fig. 1). Although the patch bay is in the



FIG. 1: The Yamaha AW2816 features a mixer with 28 inputs, 18 output buses, 9 motorized faders, and extensive automation; 24-bit, 16-track digital recording with a stereo master track; 2 multi-effects processors; and a built-in CD burner.

108

Yamaha AW2816

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BIAS Deck 3.5 (Mac)

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Access Virus C

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Audix SCX-25

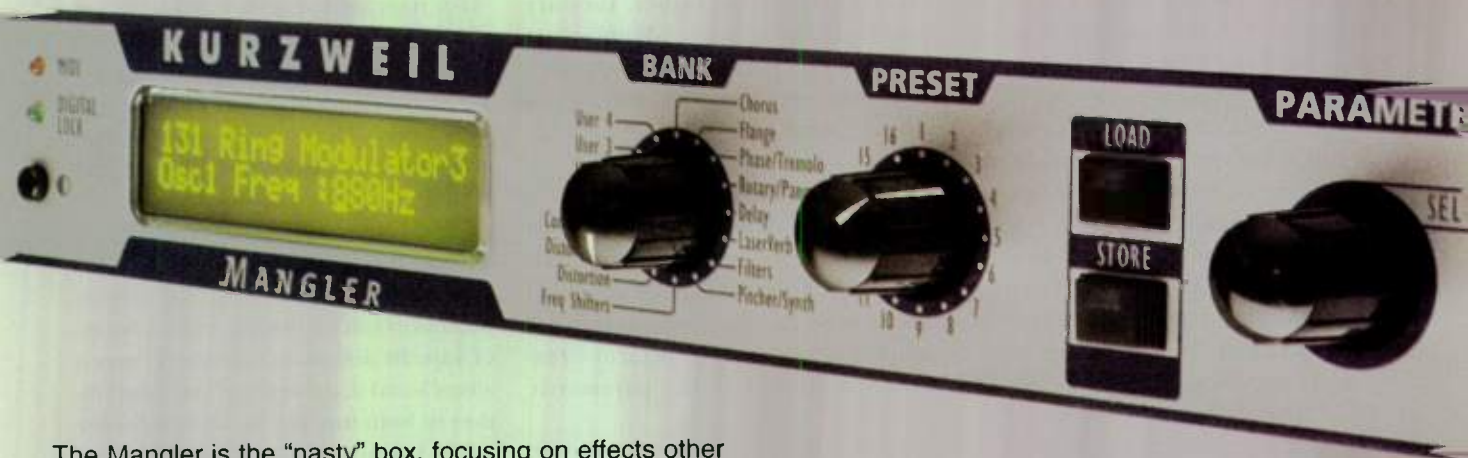
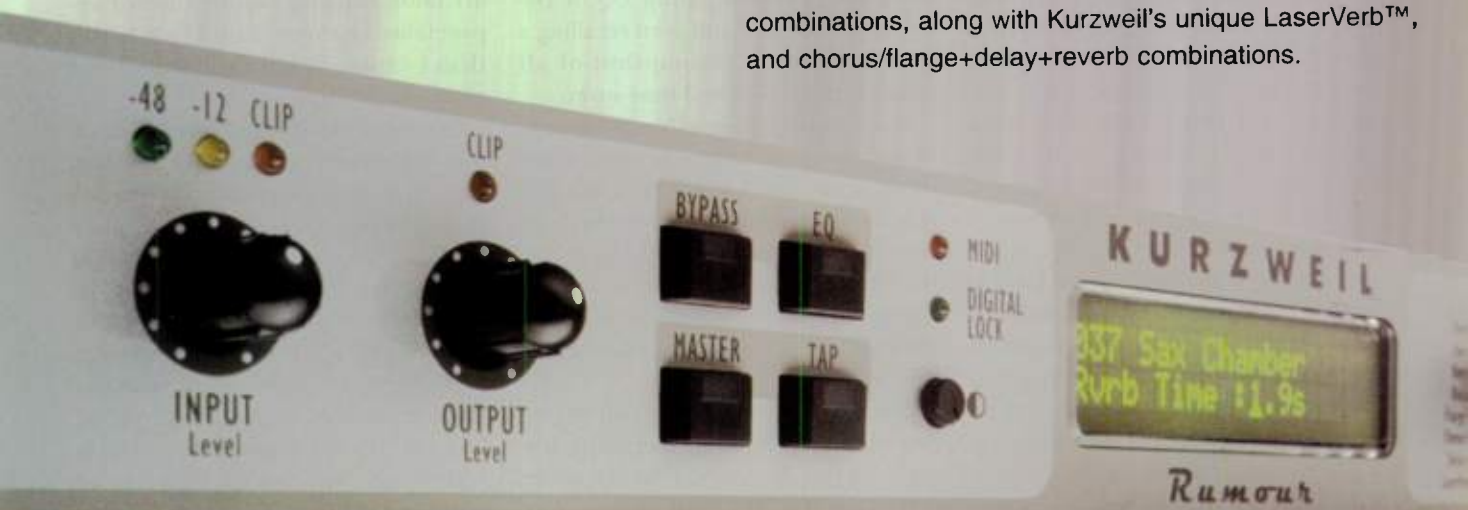
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Quick Picks: Antares Tube (Mac/Win); Little Labs Red Eye; Steinberg Virtual Guitarist Electric Edition (Mac/Win)

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The Rumour is the "nice" box, featuring a comprehensive set of Kurzweil's finest reverbs and reverb variations, including gated, reverse, and reverb/compression combinations, along with Kurzweil's unique LaserVerb™, and chorus/flange+delay+reverb combinations.



The Mangler is the "nasty" box, focusing on effects other than, but not excluding reverb. These include chorus, flanger, phaser, tremolo, rotary speaker, panner, delay, filters, LaserVerb™, Pitcher™, synth trigger, ring modulation, distortion and compression effects, and many combinations.

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back, inputs and outputs are clearly labeled on the top surface. Because the rear of the unit is angled slightly, it's easy to peer over the top and find what you're looking for.

Only inputs 1 and 2 have XLR microphone jacks with phantom power, but all eight analog inputs have balanced TRS jacks that function as mic preamps (see Fig. 2). In addition, input 8 has a second, unbalanced 1/4-inch high-impedance jack for recording an electric guitar or bass. Plugging into it overrides the TRS in—a nice touch that makes for quick repatching. Each input has a dedicated trim pot and peak LED but alas, no status light for phantom power.

A bank of eight motorized faders manages channel input levels, track output levels, aux bus sends, and much more. A ninth motorized fader handles the main stereo output, and two small knobs control a pair of stereo returns. The returns default to the internal effects, but they'll take any pair of analog or digital inputs, boosting the number of available inputs at mixdown to a very respectable 28. Although you can choose other routings, auxes 1 through 4 are routed to the four Omni outs, and auxes 5 and 6 feed the dual internal effects by default. The AW2816 lacks dedicated channel inserts, though you can easily set up an insert-return loop using one of the four Omni outputs and an input channel.

Functions are neatly laid out among the banks of buttons flanking the large central display, clustered below the Data/Jog and Shuttle wheels, and lined up above the faders. Buttons for global

operations pertaining to file maintenance, the CD recorder, MIDI, and so on are located in the upper left corner. Those dealing with the mixer are below the transport buttons, and locate functions are above. Each button has an associated display screen, and five function buttons access nested menus. You can assign common tasks to the function buttons, such as Song Save, Shutdown, toggling EQ or Dynamics on and off, and even recalling a specified Scene (a snapshot of all mixer settings)—a real time-saver.

Many button presses must be confirmed with a second press, which slows down work flow. Luckily, you can disable the warnings that appear when you save or recall Scenes. Dedicated buttons make Scene management a snap. Scene number, location, and stereo level are always displayed, regardless of the current window.

Considering that you can automate just about everything, including the eight analog inputs, the mixer alone makes the AW2816 hard to beat. Aux levels and effects parameters are not directly automated; rather, they are saved as part of a Scene. Adding an option card can increase your choices, but it does not change the number of inputs at mixdown.

## EQ AND DYNAMICS

Although the AW2816 is missing some of the AW4416's hands-on control, it does retain the same EQ and dynamics architecture. Every input and recorder channel—even the two returns—features a dedicated 4-band parametric

equalizer. Dynamics processing is available on all channels except the returns.

Adjusting EQ and dynamics involves several steps: select a channel, access the appropriate menu, navigate to a virtual knob, and then make adjustments using the Data wheel. To simplify the process, I used the extensive EQ and Dynamics preset libraries. As with most digital EQs, it took a lot of (virtual) knob twisting before I heard appreciable changes. The EQ is better than I expected, but I still wish it had more character.

Dynamics choices include compression, expansion, gating, and ducking. You can set key-in sources to the selected channel's pre- or post-EQ level, aux 1 and 2, or the pre- or post-EQ signal of the adjacent channel; that's a pretty interesting bunch of choices. With a little preplanning, you can accomplish some very sophisticated dynamics, such as program-dependent ducking or de-essing. Like the EQ, the dynamics sound quite digital; whether that's a problem depends on your taste (thousands of happy 02R users can't all be wrong).

For improved processing capabilities, you might want to consider Yamaha's Y56K option card (\$1,049), if only for the Renaissance EQ and Renaissance Compressor. The combination of Waves' effects with the AW2816's recording and mixing would be unbeatable.

## THE FULL EFFECTS

The two full-featured multi-effects processors can be configured in a variety of ways. By default, they reside on stereo auxes 5 and 6, though you can insert either or both into any input or recorder track. Various presets occupy the first 40 slots in each effect library, leaving another 88 user locations. Presets include the usual halls, rooms, chambers, and plates, as well as chorus, flange, delays, and so on. Modulation effects, an amp simulator, filters, and a handful of dual effects (such as Delay+Reverb and Distortion/Delay) round out the selections. The presets lack subtlety, but you have ample opportunity to adjust them to your heart's content.

I do wish Yamaha had included additional chamber, room, and plate reverb



**FIG. 2:** On the rear panel, the AW2816 provides plenty of analog ins and outs, coaxial S/PDIF I/O, and ports for MIDI, SCSI, a serial computer interface, and a 1/4-inch footswitch, as well as a port for installing an optional I/O card.





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presets as starting points—or even better, why not just fill all the user slots and let me overwrite the ones I don't like? I didn't have time to explore every effect, but overall I give them a thumbs-up for flexibility and control. In terms of quality, they range from so-so to so

sweet. I might like the effects a lot more if I had a few months to create and store my favorites.

## RANK AND FILE

The AW2816 comes with a 20 GB hard drive and an ATAPI CD-R/RW drive in-

stalled. The unit can accommodate standard laptop-sized 2.5-inch IDE drives as large as 64 GB. Its SCSI-2 interface lets you connect third-party burners, magneto-optical drives, or hard disks. All recording and playback streams to and from the internal drive; external media can be used only for backup and restoring operations.

With eight virtual tracks per song and almost unlimited undo and redo, you can consume disk space pretty quickly. Large songs can be split apart and backed up to multiple CD-Rs or CD-RWs. An optimization routine saves space by erasing the undo buffer. Yamaha also included a defragmentation feature, albeit an extremely slow one.

I'm impressed with Yamaha's well-thought-out file management scheme. Although the AW2816 uses a proprietary file system, it reads and writes WAV files, which is handy for archiving or transferring projects between studios. In addition, the AW2816 will format media to the FAT16 file system. Similarly, audio data from sample CDs or even commercial music CDs is easily transferred for use in internal tracks.

## TRACK RECORD

All of the session information—mixer settings, routing, recorder settings, audio data, and so on—is managed as a Song. The Song menu is where you select sampling rates and bit depth; choosing 48 kHz instead of 44.1 kHz elicits a warning that you won't be able to create a CD, because the AW2816 can't convert sampling rates. You can burn a 16-bit CD from a 24-bit project, but the last 8 bits are truncated. Dithering is another option; you can selectively dither individual buses at different word lengths (including the ever-popular 17 and 23 bits), which might also be handy when sending data to digital recorders connected through the S/PDIF and outputs provided by any cards installed in the option slot.

The Quick Record screen greatly speeds up routing and patching. Quick Record has been significantly improved since the AW4416; it automatically arms tracks, zeros the mix parameters for the recorder tracks, and opens the Meter

AW2816 Specifications	
<b>Mixer</b>	
<b>Number of Channels</b>	28 (input 1–8, digital input 1–2, playback 1–16, effects return 1–2)
<b>Faders</b>	(8) channel, (1) stereo master (60 mm, motorized)
<b>Analog Inputs</b>	(2) XLR balanced mic (ch. 1 and 2); (8) balanced TRS ¼" mic/line (ch. 1–8); (1) unbalanced ¼" high-impedance (ch. 8)
<b>Analog Outputs</b>	(2) RCA L/R main; (4) ¼" unbalanced Omni (assignable); (2) ¼" TRS balanced L/R monitor; (1) ¼" stereo headphone
<b>Digital I/O</b>	coaxial S/PDIF
<b>Control Ports</b>	(1) MIDI In, (1) MIDI Out/Thru, (1) MTC Out; (1) SCSI mini-DB50 (backup only); (1) 8-pin DIN To Host; (1) ¼" footswitch
<b>EQ</b>	(1) 4-band parametric per channel; 40 presets
<b>Dynamics Processors</b>	(1) per channel (except returns): compressor, expander, gate, and ducking; 40 presets
<b>Effects Processors</b>	(2) multi-effects (reverb, delay, chorus, flanger, phaser, autopan, tremolo, pitch shift, rotary, distortion, ring modulation, filter modulation)
<b>Sampling Rates</b>	44.1, 48 kHz
<b>ADCs/DACs</b>	24-bit, 64× oversampling/24-bit, 128× oversampling
<b>Internal Processing</b>	32-bit
<b>Libraries (memory locations)</b>	(16) Automix per song; (20) patch; (64) channel; (128) EQ; (128) dynamics; (128) effects
<b>Recorder</b>	
<b>Physical Tracks</b>	16 mono and 1 stereo mixdown
<b>Virtual Tracks</b>	(8) per mono physical track
<b>Recording Resolution</b>	16-bit, 24-bit (set per song)
<b>Sampling Rate</b>	44.1, 48 kHz (set per song)
<b>Hard Drive</b>	20 GB, 2.5" IDE
<b>Max. Songs per Disk</b>	30,000 (max. 6.4 GB per song)
<b>Simultaneous Record/Playback Channels</b>	8/16
<b>Markers/Quick Locate Points</b>	(99) per song
<b>Scene Memory</b>	(96) per song
<b>Undo/Redo Levels</b>	15
<b>General</b>	
<b>Option Ports</b>	(1) mini-YDGA1 (24-bit)
<b>Display</b>	320 × 240-pixel, backlit LCD
<b>Power Supply</b>	120 VAC internal (IEC connector)
<b>Frequency Response</b>	20 Hz–20 kHz (+1, –3 dB, mic/line in to stereo out)
<b>THD</b>	<0.02% (@ 1 kHz, line in to stereo out); <0.2% (@ 1 kHz, mic in to stereo out)
<b>Dynamic Range</b>	104 dB (typical)
<b>Dimensions</b>	18.89" (W) × 5.55" (H) × 16.89" (D)
<b>Weight</b>	20.94 lb.

screen. You can also assign inputs to tracks using the Patch screen (and save the assignments as a Library) or go with the default bus assignments. With eight buses, six auxes, and a variety of analog and digital ins and outs, you can patch just about anything anywhere.

Punching in and out is straightforward. You might prefer to use the optional footswitch, though I found it easier to automate the process. Depending on the situation, I set in and out points on the fly or used the Marker Adjust menu to specify a location. I particularly liked the option to create a tempo map in the Song menu and edit locations relative to measures and beats. I only wish it were possible to adjust the crossfade time to smooth over the transition between the original and punched-in takes.

Options for locating are well implemented; 99 editable markers per song ought to be enough, eh? A nifty Roll-back function moves as much as five

seconds before the current location at the press of a button. You can directly enter a location (in bars and beats, minutes and seconds, or SMPTE), or you can scrub audio with the Shuttle wheel or the Jog function, which loops a short segment of audio before or behind the current location to help you zero in. For even greater precision, the waveform display allows pinpoint accuracy.

## LETTER TO THE EDITOR

Although it is designed primarily as a desktop recorder, you can do a fair amount of editing on the AW2816. Don't expect quick results, however; editing requires an awful lot of button pushing. Choose from three basic types of edits: Tracks involve an entire track or stereo pair; Parts refer to portions of a track or track pair that fall between a specified start and end point; and Regions represent a portion of continuously recorded audio. Editing choices vary for Tracks, Parts, and Regions but

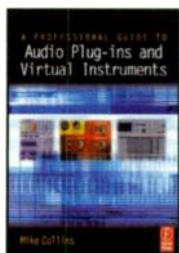
include basics such as Copy, Erase, Delete, and Move, as well as options such as pitch-shifting and time compression and expansion.

Because an adjacent pair of tracks is the largest editable unit, making wholesale changes (such as dropping a chorus) is time-consuming. Nonetheless, the many editing options add quite a bit of value to what is already an impressive recorder. Surprisingly, you can perform edits on selected virtual tracks while leaving the active track untouched. In addition, you can export Tracks (individually or all at once), Parts, or Regions to the internal CD writer or a SCSI device as WAV files.

## IN THE MIX

Mixing on the AW2816 is a ball. You can automate practically everything as an Automix, from fader moves to pans and EQ changes. With only eight faders controlling 16 recorder tracks in addition to eight inputs, you'll need

# learn master create

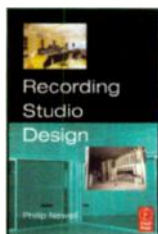


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to develop the habit of working in stages. Although the aux sends don't respond directly to automation, levels are saved as part of a Scene, as are dynamics and effects parameters. The ability to record as many as 16 different Automixes per Song encourages experimentation, though you can bounce only one as a stereo track.

I wish I could be as positive about burning CDs (which Yamaha calls Mastering). On the surface, it looks pretty impressive: the bundled recorder supports track-at-once (TAO) and disc-at-once (DAO) recording of CD-R and CD-RW media at what appears to be a healthy speed. However, there's no way to preview playlists, nor can you make level or EQ adjustments to the stereo tracks once they're recorded.

Before it will write a CD, the AW2816 creates a disc image file. That requires as much free space on the hard drive as the finished CD, which isn't necessarily a big problem, but the process is tedious:

an 8-minute demo recorded at 24 bits took almost 30 minutes! On a more encouraging note, once the file is written, burning multiple discs is a snap.

### MIDI MATTERS

The AW2816 redeems itself with its MIDI features. Virtually every parameter responds to MIDI messages, providing extensive remote-control options. MIDI data can be routed to the MIDI Out port, to the To Host port (for older Macs and PCs with serial interfaces), and to the option slot. The unit even has a dedicated port for sending MIDI Time Code (MTC).

It gets much, much better: engage the MIDI Remote function and the AW2816 becomes a programmable MIDI control surface. You can independently select continuous controller data to be sent by as many as four fader banks in addition to the On buttons, all of which are saved in an Automix. Not only can you automate faders and

effects, but you can also send real-time controller data to any MIDI source at the same time. Use that capability to control filters on an analog synth, automate patch changes on a drum machine, trigger samplers, automate MIDI-controlled lighting for a live show, or perform other tasks. A growing number of templates for controlling popular sequencers, synthesizers, and samplers are posted online.

### THE BIG PICTURE

Offering a wealth of features at an attractive price point, the AW2816 is a solid value for the serious home recordist and project studio owner. Along with the stereo master track, 16 tracks of uncompressed audio should be sufficient for most projects; if it isn't, syncing to a second unit or desktop workstation is a piece of cake. Furthermore, the mix automation is first-rate. EQ and dynamics on every channel and dual internal effects processors add

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## PRODUCT SUMMARY

### Yamaha

AW2816

digital audio workstation

\$2,399

FEATURES	4.0
EASE OF USE	3.0
AUDIO QUALITY	3.5
VALUE	3.5

#### RATING PRODUCTS FROM 1 TO 5

**PROS:** Records on eight tracks at once. Flexible signal routing. Uncompressed 44.1 and 48 kHz recording at 16 and 24 bits. Mix automation with motorized faders. MIDI control-surface functionality.

**CONS:** Complex user interface. Audio muted when editing. Limited effects automation. Cannot preview CD playlist. CD burning can be time-consuming.

### Manufacturer

Yamaha Corporation of America

tel. (714) 522-9011

e-mail [info@yamaha.com](mailto:info@yamaha.com)

Web [www.yamaha.com](http://www.yamaha.com)

quite a polish. And don't forget that you can use any of the Omni outs, option outs, and the S/PDIF in and out to connect outboard gear. The MIDI Remote feature puts the AW2816 over the top; with very little effort, you can turn it into the hub of your studio or live rig. In fact, I'm seriously considering doing just that.

I'm not thrilled with every aspect; in particular, the mastering functions are weak. Then again, it's always best to have any critical project professionally mastered anyway. Like every digital mixer and standalone desktop recorder, the AW2816 can be difficult to learn. But Yamaha has done a lot to smooth things out, with welcome changes to the Quick Record functions, as well as a quick-start video and a manual that actually makes sense. If you're looking for a solid value in a digital recorder, take a close look at the AW2816.

*Mark Nelson lives and works in Southern Oregon's Applegate Valley. He has recorded scores of people you have never heard of and a few you have.*

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Photo courtesy of Ed Dzubak, three-time Emmy winner and enthusiastic REALTRAPS customer.

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# BIAS

## DECK 3.5 (MAC)

### *A stable and easy-to-use multitrack audio editor.*

By Len Sasso

As its name implies, BIAS's Deck is a multitrack audio editor based on the paradigm of a tape-recorder/mixing-console combo. Version 3.5 makes Deck available for Mac OS X, and the update adds features such as 5.1 surround mixing capabilities, the ability to import OMF files, and fader linking in Deck's Mixer.

Deck does not require a particularly fast computer or a lot of RAM, because it primarily plays audio files, which it streams from your hard drive. It does support VST effects plug-ins, and if you use a lot of them you will want a faster computer. On my Mac G4/800 PowerBook, I easily ran 24 tracks, with effects, and the CPU meter stayed below 20 percent.

## ONE BY ONE

All audio tracks and mixer channels in Deck are mono. That makes it a good choice for live recording, mixing, and manipulating mono tracks. Deck automatically converts stereo audio files into Sound Designer II split-stereo format, and to use them you need to drag each channel to its own mono track. If you use a lot of prerecorded stereo audio files—from sample CDs, for example—Deck may not be well suited to your needs: when you want to use an insert plug-in, you need to use a separate insert for each channel in order to maintain the stereo image. The two channels of a stereo file cannot be linked, so it's easy to get them out of sync by moving or chopping one and not the other. Deck does provide options to minimize that inconvenience. On the other hand, you can do some interesting things with unsynchronized channels, as the MP3 example **EMWEB CLIPS** Crisscross shows.

Most of Deck's action takes place in its Tracks and Mixer windows (see Fig. 1). The Tracks window is for arranging regions of audio data on horizontal tracks along a timeline. The Mixer window is for controlling the playback volume, pan position, and

effects on each of those tracks. The left column of the Tracks window contains all the Mixer window settings (except for effects), and you can change the Mixer settings in either location. This allows you to fill the screen with the Tracks window and still have control over the mix.

Deck distinguishes between two kinds of tracks: Playback tracks and Work tracks. Only Playback tracks play audio, and they are always at the top of the tracklist, followed by the Work tracks. The maximum number of

## Minimum System Requirements

### Deck 3.5

G3/266 MHz; 128 MB RAM; Mac OS 8.6

Playback tracks is 64, but you can set the actual number in Deck's preferences. Playback tracks are indicated by a number in the oval display to the left of the track name. You can have up to 999 Work tracks, indicated by a W in the same oval display.

Work tracks, which can be created as needed, hold audio regions that you may want to use in the future, such as alternate takes. Any track can be instantly swapped with any other using a pop-up menu in the Tracks or Mixer window. This allows you to swap various Work tracks to test different arrangements, as well as reorder your Playback tracks. All data, including mix automation, is swapped.

## TOOLS OF THE TRADE

Deck has two modes—Range and Object—for working with audio regions in the Tracks window. The Range tool allows you to lasso rectangular segments of audio data across multiple tracks. Once selected, the segments can be dragged or nudged vertically and horizontally, or simply sliced out to create new regions.

One very nice feature of Range mode is that the computer keyboard's Arrow keys can be used to move the range around without moving the actual data. That allows you to, for example, select a perfectly cut drum loop, then move the range around as a cookie cutter to select the same amount of time in another audio file. Having done that, you can nudge the range back and forth to home in on a perfect loop in that file.

The Object tool allows you to select individual regions for resizing and moving. Multiple, noncontiguous regions can be selected and altered as a group. Resizing regions is possible because a region is simply a pair of pointers in the audio file. Moving its end points just moves the pointers, causing a different part of the audio file to be played.



**FIG. 1:** Deck's Tracks window (top) can hold up to 64 playable tracks and 999 nonplaying Work tracks. The Mixer window's channel strips (bottom) provide a visual mixing surface. But aside from plug-in control, all of the Mixer's functions can be carried out in the Tracks window.



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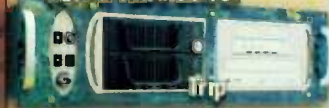
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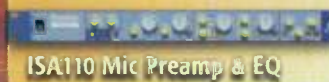
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Creating regions not only allows you to rearrange audio clips, but also is the first step in creating crossfades. Deck's crossfade strategy is powerful and simple. Once two regions are butted up against each other, you simply use the Range tool to select the crossfade range, then invoke a default crossfade shape or select a custom one. The only thing you need to be aware of is whether there is data in the audio files in the crossfade area beyond the region boundaries. You can also set up a default crossfade time and use it to crossfade butted regions without having to select the crossfade range. That technique can be applied simultaneously to multiple regions and is great for quickly smoothing out transitions between regions. The MP3 example Crisscross processes a one-bar stereo guitar loop by changing the length of one of the channels and crossfading all the butt splices.

In addition to crossfades, fade-ins, and fade-outs, you can create volume and pan automation in real time or after the fact. Real-time automation can be entered with a MIDI controller or using the onscreen faders. After-the-fact automation is entered graphically, directly on the tracks with the mouse. However entered, automation is part of the track and is not anchored to audio regions.

BIAS has added extensive support for

MIDI automation using the Tascam US-428 USB control surface. While not offering full MIDI integration, Deck does support synchronized MIDI file playback using QuickTime or an external MIDI device.

## ASSET MANAGEMENT

With Deck, you can record audio input simultaneously on as many tracks as your audio interface supports. Theoretically, you can multitrack record your whole band in one pass, or you can overlay individual parts. Because you are in the digital domain, you can bounce tracks if need be without any loss in audio quality. You can record as many takes as you want, moving earlier ones to Work tracks for later comparison.

Alternatively, you can import audio files from your hard drive in all the popular formats. As mentioned earlier, stereo files will automatically be converted into SDII-format split-stereo files. Fig. 2 shows Deck's Audio Import window. The Finder section at the top is for locating audio files. If the selected file has regions and loops defined in a format that Deck understands, they can be imported individually.

One major drawback to Deck's import feature is that files cannot be auditioned—the Play button is permanently grayed out. According to BIAS, that is due to changes in the way OS X handles audio, and Deck may be modified to restore auditioning in the future.

When importing audio, you can choose whether to simply refer to the original or to make a copy in another location. Files on nonvolatile media such as CDs, as well as files that are not in Deck's audio format, will be translated and copied automatically.

Deck's audio Library window, seen on the right in Fig. 2, shows all the audio regions that have been recorded, imported, or created by operations in the Tracks window. In

PRODUCT SUMMARY

BIAS

Deck 3.5 (Mac)

multitrack audio editor

**\$399**

upgrade from 3.0 \$149

<b>FEATURES</b>	<b>3.5</b>
<b>EASE OF USE</b>	<b>3.5</b>
<b>DOCUMENTATION</b>	<b>2.5</b>
<b>VALUE</b>	<b>3.0</b>

RATING PRODUCTS FROM 1 TO 5

**PROS:** Simple user interface. Easy to learn and use. Easy on CPU and RAM.

**CONS:** Can't audition audio before loading. Manual is inaccurate and out-of-date. No key commands for horizontal zooming and scrolling.

Manufacturer

BIAS (Berkley Integrated Audio Software)

tel. (800) 775-BIAS or (707) 782-1866

e-mail [sales@bias-inc.com](mailto:sales@bias-inc.com)

Web [www.bias-inc.com](http://www.bias-inc.com)

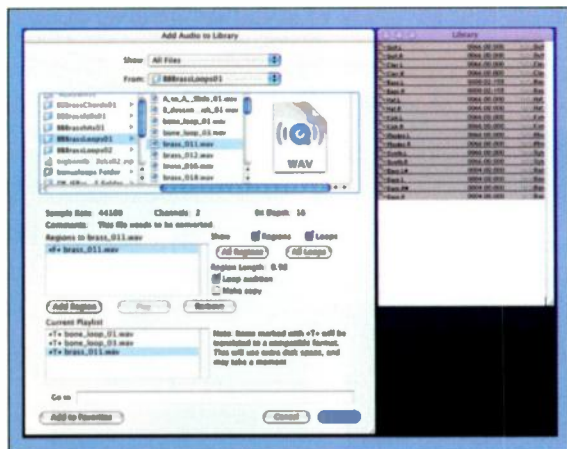
short, all available audio regions are there for dragging onto tracks. Audio regions can be deleted from the Library window without affecting the actual audio data on your hard drive. Deck also has a destructive Compacting process for automatically getting rid of unused audio data. That, of course, should be used with caution.

## STACKING THE DECK

Deck is a simple but effective multitrack audio editor. It is best suited to mono tracks, although stereo tracks can be handled with a little extra effort and care.

If you work extensively with stereo tracks, need sophisticated loop-management tools, or use MIDI instruments, a similarly priced midlevel digital audio sequencer might be a better choice (although those typically don't offer 5.1 surround mixing or OMF support). As an audio editor, Deck is well designed, efficient, and reasonably priced.

Len Sasso can be contacted through his Web site at [www.swiftkick.com](http://www.swiftkick.com).



**FIG. 2:** The Add Audio To Library dialog and associated Library window control Deck's audio file and region management. Only audio references are added to the Library; the audio files remain on your hard drive and do not take up RAM.

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# A C C E S S

## VIRUS C

*A much-loved synthesizer  
just gets better.*

By Rob Shrock

**T**he Access Virus has been around through three incarnations—first the Virus A, then the B, and now the C. The original Virus was one of the earliest and most popular virtual analog synthesizers, digitally generating and processing sounds by crunching numbers rather than by manipulating voltages. The latest generation continues the tradition of providing all the functions of a real analog synth and more, packaged in a compact form that offers plenty of hands-on control (see Fig. 1).

Four models—the tabletop Virus C, Rack XL, Virus kc (five-octave keyboard), and Indigo 2 (three-octave keyboard)—have identical DSP engines that physically model analog synthesis. (A TDM software version of the Indigo is available for Pro Tools, too.) The user interfaces are identical as well, with the exception of the Rack XL's conservative five-knob front panel. For this review, I tested the tabletop Virus C.

The Virus C's new DSP chip is an incremental step up—though a large one—from the previous Virus B units. Polyphony has been increased from 24 to 32 dynamically allocated notes. Flexible modulation routing has always

been a significant element of the Virus architecture and sound; the number of simultaneous modulation sources has doubled to six, and modulation destinations have grown from six to nine. There are now 98 simultaneous effects in multitimbral mode, and each of the 16 parts has 3-band EQ, phaser, chorus, analog boost, ring modulator, and distortion modules. A global effects section provides reverb and delay.

### VIRUS SCAN

I especially appreciate the Virus C's 32 knobs, 35 buttons, and 69 LEDs. Having access (pardon the pun) to so many simultaneous controls encourages the user to experiment and minimizes the need to navigate too deeply into buried menus. The functions and parameters are better organized in the Virus C than in the B models. Many of the dedicated knobs are self-explanatory, but you'll still need to spend some time acquainting yourself with the interface, as some functions are not immediately intuitive. For example, you navigate System and Multi Edit parameters using a combination of the Part, Parameter, and Value buttons. If you don't have the manual to guide you, however, it's sometimes confusing to perform a simple operation (such as changing the LCD contrast) that doesn't have a dedicated knob or button.

I'm quite unimpressed by the Virus C's display. The red-on-red LCD looks cool, but the only good viewing angle is directly overhead. No matter what the contrast setting, leaning back from the synth really cuts down on readability, and the useful viewing range becomes even more limited when you move from side to side. The LCD is the only substantially weak

spot of an otherwise stellar synthesizer.

As with previous generations, all models of the Virus C provide three pairs of outputs and a pair of unbalanced inputs (see Fig. 2). The inputs let you route an external source to the Virus's filter, Saturation (a type of filter distortion that adds overtones), vocoder, and effects processor. The most obvious use for the inputs is processing drum loops and the like, but the Virus's Saturation and filters sound so good that you can also use them to subtly or dramatically alter piano, guitars, or vocals in real time.

The nearly 200-page manual is well written except for a couple of minor inaccuracies and a few grammatical and syntactic errors in the translated German text. The manual does a fine job of detailing the Virus's various features and functions without becoming a labored dissertation. It supplies an excellent introductory tutorial that acquaints you with the Virus and explains the basics of traditional analog subtractive synthesis. A PDF tutorial document on the Access Music Web site is a superb resource for analog synth programming and a must-read for synthesizer enthusiasts.

### ANATOMY OF A VIRUS

The Virus ships with 512 Programs and 128 Multi setups, but you can delete the internal demo and increase the number of Programs to 1,024. All 1,024 Programs are supplied on CD-ROM, but you can overwrite any of them with user sounds. Because the factory sounds are so good, though, you'll want to keep them available; to that end, the Virus ships with a Virus-only version of Emagic's SoundDiver editor-librarian software for the Mac and Windows.

SoundDiver Virus really helps with certain aspects of programming, and its librarian functions are essential for Program management. The Access Music Web site continually offers downloads of new Programs from professionals and hobbyists alike. Even before you start creating your own sounds, the number of available Programs for the Virus is easily in the thousands. SoundDiver Virus is a more elegant way to keep up with Programs and Multi setups than simple SysEx dumps.



FIG. 1: The Access Virus C is the third incarnation of a tabletop synth module that has inspired legions of enthusiastic fans. Plenty of front-panel controls make the Virus C a tweaker's delight.

Each Multi, including layers and splits, can contain as many as 16 Programs. Each Multi has its own tempo, volume, transposition, detuning, and output assignments that override those at the Program level. It's a drag that you can't offset any filters or envelopes at the Multi level—a feature found in units as simple as the Roland Sound Canvas. However, the Virus C provides so many RAM locations that it's not a big deal to edit a Program and save it to a new location for use in the Multi, and you can still modulate Programs in Multi mode.

A single Virus sound can have as many as three oscillators (four if you count the suboscillator). But because engaging oscillator 3 reduces the polyphony from 32 to approximately 24 notes, many Programs use only two oscillators. A variety of waveforms are available, with many steps in between that gradually change the shape from one form to another. The Virus lets you step through wavetables as you can in the PPG Wave and Korg Wavestation. Noise, FM, ring modulation, and sync features are also available for all three oscillators.

The Virus's filters are simply outstanding. The dual resonant, multimode filters can operate independently in low-pass, highpass, bandpass, or band-stop modes, either in series or parallel. They offer four filter slope and routing choices: Serial-4 (two poles per filter); Serial-6 (four poles for filter 1 and two poles for filter 2); Parallel-4 (two poles per filter), and Split (identical to Parallel-4,

but with an independent input to each filter). When the filters are in Split mode, oscillator 1 is linked to filter 1, and oscillators 2 and 3 are routed to filter 2; the results are panned hard left and right, respectively. A dedicated Filter Balance knob adjusts the output between the two filters; modulating the Balance sounds very cool.

Regardless of the filter routing, the Saturation stage always follows filter 1. Ten Saturation types range from mild to wild. You can modulate Saturation using a knob, envelope, or LFO. In addition to creating distorted sounds, the Saturation effect is useful in subtler ways to simply fatten up timbres. Modulating Saturation has become a staple of the Virus sound, and it's not likely to fall out of fashion for a while.

Each Program has three LFOs. An envelope mode allows each LFO to complete one cycle and then stop, which is useful for further modifying a sound's attack transient stage. LFO 1 and 2 can be synced and assigned to any destination. A modulation matrix provides six sources and nine destinations for more elaborate mod routings. In addition to the mod matrix, Note Velocity has its own dedicated modulation routing.

Using knobs to modulate Virus parameters in real time is a gas. For me, it has made electronic music fun again, because I can work more quickly than I can using software. Because the latest OS increases the internal clock's resolution, the Virus can follow a multitude

## PRODUCT SUMMARY

### Access

Virus C  
analog modeling synth module  
\$1,995

FEATURES	4.0
EASE OF USE	3.5
AUDIO QUALITY	5.0
VALUE	4.5

#### RATING PRODUCTS FROM 1 TO 5

**PROS:** Killer sound. Smooth parameter control. Excellent arpeggiators. Random Program creation.

**CONS:** LCD hard to read at certain angles. Somewhat complex menus and interface. Arpeggio patterns only in 4/4 meter. Scrolling through sounds by category requires two hands. Lump-in-the-line power transformer. No digital audio I/O.

### Manufacturer

Access Music/GSF Agency/TSI  
International Sales (distributor)  
tel. (310) 452-6216  
e-mail [gsf.agency@gte.net](mailto:gsf.agency@gte.net)  
Web [www.access-music.de](http://www.access-music.de)

of sequenced modulations and drastic tempo changes simultaneously without the slightest hiccup when it's synced to MIDI Clock.

## CONTAGIOUS SOUND

The Virus C is one of the best-sounding synths I've ever laid my hands on. I've

## USING THE VIRUS AS AN EXTERNAL PROCESSOR

If you're a fan of electronic-music timbres, I suggest wiring the Virus's inputs to your patch bay so that you'll always have them readily available as part of your everyday working setup. (The TDM version also allows you to process external signals.) As much as I love plug-ins in general, I find processing with hardware more desirable because it's more immediate, it allows me to process sounds *before* they're recorded, and it simply sounds better. (I've recently become enamored with taking some of my detailed orchestral string sequences and processing

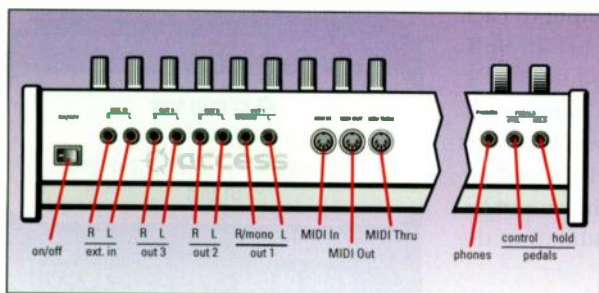
them through the Virus for a sort of updated Electric Light Orchestra sound.)

I like to route good sounds from other synths through the Virus to create even better sounds. You can use your sequencer to record any parameter modulation you apply. You can also route external sources into the Virus unaffected, bypassing the internal DSP engine and simply mixing the external input with the Virus's output without an external mixer.

Whether or not you're processing an external source, the Virus can boost its input level as much as 20 dB before and an addition-

al 36 dB after A/D conversion. It can accommodate a wide range of levels, from a microphone to an electric guitar to a turntable, but significant input-level boosts can increase the source's noise. If you're using extremely low-level sources, then it's better to use a preamp or other high-quality gain stage. Still, it's convenient that the Virus's inputs can deal with just about any source level when necessary. The Virus has a phono-input setting with a special EQ curve to accommodate the frequency response of record players—perfect for DJs who want to use the Virus alongside a turntable.





**FIG. 2:** On the Virus C's rear panel are connections for analog audio, MIDI, a pair of foot controllers, and an external power supply.

either owned or used a variety of classic synths over the years, and I have a great collection of modern software instruments, but the Virus C is my favorite. Ballsy basses, sweet pads, otherworldly atmospheres, screaming leads, vocoder effects, pulsing arpeggiated beds, electronic percussion—you name it, the Virus C does it. The Virus can transparently float in the background like a sheer veil or stand shoulder-to-shoulder with heavy-metal guitar. This synthesizer is so versatile and sounds so impressive that it might never go out of style.

The Virus has become the first place I turn for synth basses, pads, and arpeggios. The subbasses can rumble the pictures off the walls; when I layer them with some of the throatier bass Programs, the combination sounds killer on everything from a huge audio system with a subwoofer to a little Auratone mono cube speaker. I used to spend a lot of effort programming and processing to create massive bass sounds that still sounded good on little speakers, but thanks to the Virus, now it's a piece of cake.

I love the Virus's transparency. Some synths are all meat, and others are thin as air; the Virus can be both. I have found and created pads that are so diaphanous that you hardly know they're there. I've used them to outline chord structures behind an acoustic guitar and voice, for example, without disrupting the basic feel of a simple duo. I set up the Saturation and oscillator balance to slowly fade in the sound's thicker elements. The result is like a transparent ghost that can slowly materialize into a solid form—a production technique that doesn't make the guitar and voice sound overproduced.

The Virus's envelopes have a very fast

attack—somewhere around 20  $\mu$ s—allowing the Virus to sound extremely punchy. Coupled with the signature Saturation stage, the Virus can rip and roar with the heaviest guitar rigs. Bases thump and lead sounds blaze. Nasty industrial sounds are usually just a few knob turns away. If the en-

velopes aren't enough, a Punch parameter adds even more oomph to the attack.

The Virus supplies a handful of analog drum and percussion sounds, but most are haphazardly scattered around the various Banks. It can emulate practically any analog drum machine, and several synthesized collections are available on the Web. I usually prefer the punchiness and beefiness of the Virus's sounds to most of my analog drum samples. Granted, a lot of ready-made analog drum samples are out there, but if you don't have a collection of vintage

drum machines, it's refreshing to have so much control over percussive sounds rather than being limited to a sample's static nature.

## FLOWING ARPEGGIOS

One of the features that first attracted me to the Virus was its implementation of arpeggiators. Forty preset patterns are available, some of them quite complex. All are geared toward 4/4 meter rhythms, however; perhaps a future OS update will provide programmable arpeggiators that support odd rhythms. The next update, which should be available by the time you read this, will include 24 additional patterns.

In the past few years, the Virus's stock arpeggio patterns have become classics heard on many hit tunes. The usual suspects are accounted for: up, down, up/down, random, as played, and block chords. You can specify the Velocity, octave range, swing percentage, clock multiplier, and note length.

Sixteen arpeggiators are available in Multi mode, with one assigned to each

## Virus C Specifications

<b>Sound Engine</b>	analog synthesis modeling
<b>Polyphony</b>	(32) notes
<b>Multitimbral Parts</b>	16
<b>Analog Audio Inputs</b>	(2) unbalanced 1/4" TS
<b>Analog Audio Outputs</b>	(6) unbalanced 1/4" TS; (1) 1/4" stereo headphone
<b>Digital I/O</b>	none
<b>MIDI Ports</b>	In, Out, Thru
<b>Additional Control Inputs</b>	(1) 1/4" TS switch; (1) 1/4" TS pedal
<b>Program Memory</b>	(1,024) Programs; (128) Multis (all rewritable)
<b>DSP Resolution</b>	24-bit internal; 24-bit D/A; 16-bit A/D
<b>Oscillators</b>	(3) main and (1) suboscillator per voice; sawtooth, pulse, sine, triangle, and 62 spectral waves; FM
<b>Filters</b>	(2) multimode (lowpass, highpass, bandpass, band-stop); (4) serial/parallel configurations
<b>Envelope Generators</b>	(2) ADSTR (T = time)
<b>LFOs</b>	(3) with (68) waveshapes
<b>Modulation Matrix</b>	(6) sources; (9) destinations
<b>Arpeggiators</b>	16
<b>Effects</b>	(98) simultaneous: boost, chorus/flanger, delay, distortion, EQ, phaser, reverb, ring modulator, vocoder
<b>Power Supply</b>	external in-line adapter
<b>Dimensions</b>	18.50" (W) × 2.95" (H) × 7.28" (D)
<b>Weight</b>	6.28 lb.

part or with multiple arpeggios assigned to a single channel. You can have 16 independent arpeggios running on a single sound, allowing you to create ostinatos that are truly inspiring—you have to hear it to fully appreciate it.

Although the arpeggiators lack a dedicated tempo knob, you can assign one of the two soft knobs to control tempo. However, I'd rather leave the soft knobs for more important assignments, such as number of octaves or note length. Unless you're viewing the Edit menu, tempo isn't displayed in beats per minute (bpm); rather, because the soft knobs are unaware of what parameter you're editing, tempo is shown in arbitrary values from 0 to 127. Most of the time you'll probably want to sync the Virus to a sequencer anyway, so perhaps it's not a big deal; tempo chases MTC flawlessly.

#### CATCH THE FEVER

I love this box. I had grown bored with tweaking electronic sounds, but the

Virus C helped me regain my enthusiasm by making it so simple and intuitive to grab knobs and start turning. I haven't even mentioned the vocoder, which offers as many features as almost any dedicated vocoder. I also like the Random button that generates new timbres on the fly when you're feeling stuck; I've created some great sounds using that feature as a jumping-off point. It's just impossible to cover this synth thoroughly within the scope of a review.

I do have a few criticisms: I'm not crazy about the LCD screen, and I'd rather have a dedicated internal power supply than the Virus's lump-in-the-line external supply. Digital audio ports would be a welcome addition. And as great as the arpeggios are, I hope for even more features in future OS updates.

Access Music has maintained an excellent policy of frequently updating its products, old and new alike. The company obviously wants to add as much power and as many features as

the original hardware design will allow, which has led to significant updates for Virus A and B owners in the past. That policy makes me even more comfortable investing in a Virus product, because it's been demonstrated that I can expect more features in the future.

But it's the filters, Saturation, arpeggiators, and modulation capabilities—and especially the sounds—that make the Virus C so desirable. If I could own only one synthesizer strictly for electronic sounds, it would be the Virus C. Its tabletop form factor is perfect for me because it's compact enough to transport easily, yet it's very easy to program. Whenever I put the Virus up against most of my other synths—hardware or software—it makes them sound kind of puny. The Virus C's heavyweight, professional tone puts it in the league of the elite.

*Producer and musician Rob Shrock has worked with Burt Bacharach, Elvis Costello, Dionne Warwick, and many others.*



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# A U D I X

SCX-25

## *A versatile large-diaphragm condenser mic with a natural sound.*

By Richard Alan Salz

If you're in the market for a big, impressive-looking microphone, you probably won't be interested in the Audix SCX-25. On the other hand, if you're looking for a big-sounding mic that's small enough to fit where most large-diaphragm microphones can't, the SCX-25 might just rock your world.

The SCX-25 large-diaphragm condenser is the top-of-the-line offering from Audix, a company that during the 1990s built an enviable reputation based largely upon its rugged, well-priced, and great-sounding dynamic microphones. The transition from manufacturing dynamic microphones to manufacturing condenser mics may seem like a move up in terms of complexity, but actually, making a first-rate dynamic mic is in many ways the greater challenge, at least from an engineering standpoint. (Consider how many companies make good-quality dynamic microphones—you can pretty much count them on one hand—as compared with the legions of condenser-microphone manufacturers.) That's because condenser mics often employ additional electronic components (equalization circuits, for example) to enhance the final sound, whereas dynamics, not being powered, must reproduce the sound using only mechanical means (that is, the diaphragm, magnet, and voice coil).

Given the exceptional quality of Audix's premium dynamic mics (not to mention its line of studio reference monitors), it's not unreasonable to expect great things as well from the company's flagship large-diaphragm condenser. Unlike most of the large-

diaphragm mics that have flooded the market in recent years, the SCX-25 is designed and produced by Audix in the U.S.A. The company provides a one-year warranty with the mic.

### LOLLIPOP, LOLLIPOP

The SCX-25 is a side-address, externally polarized (true) condenser mic with a fixed cardioid polar pattern. True to its minimalist design, there are no pads or low-cut switches, and the microphone preamplifier is transformerless. The mic's solid-brass body is quite small (less than 6 inches long) and has a matte black finish punctuated by shiny brass rings around the top of the body and capsule head. All of the metalwork and laser engraving is very well done, and though the mic weighs only 6 ounces, it has a solid and substantial feel.

The SCX-25's capsule is mounted in the capsule head with an innovative suspension system that shock-mounts the capsule within an internal brass ring. According to Audix, this eliminates the need for an external shockmount.

For the most part, the transformerless preamplifier section of the SCX-25 employs surface-mount topology, with a few "through hole" parts populating the circuit board. The mic's gold sputtered diaphragm is just shy of being 1 inch in diameter.

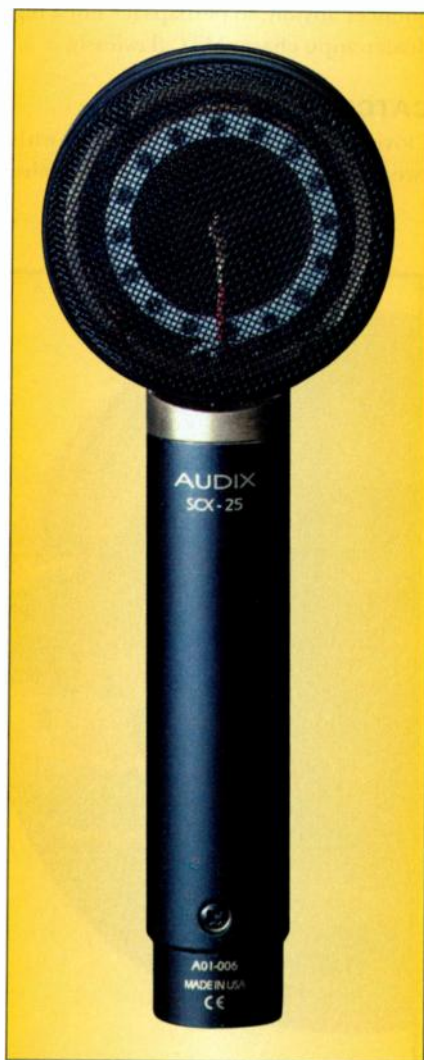
The SCX-25 comes in a very nice, foam-rubber-lined wooden case and includes a nylon microphone clip and Cordura carrying pouch. Incidentally, the foam in the case is cut to hold two SCX-25s, allowing you to carry a pair of the mics in a single case.

I checked out an unmatched pair of SCX-25s on a variety of sources. All testing was carried out using the following equipment for monitoring and recording: a Neotek IIIc console, Urei 809 and Fostex NF-1 monitors, a D.A.V. Electronics Broadhurst Gardens (solid-state) microphone preamp, a Peavey VMP-2 tube preamp, an MCI/Sony JH-24 multitrack recorder, and a Studer A 80 RC master 2-track recorder. I found that the SCX-25 mated nicely with both solid-state and tube-based preamps.

### VOICE OF REASON

The SCX-25 proved a nice departure from the overhyped midrange response that characterizes so many inexpensive condenser mics these days. Ostensibly, such "presence boosts" increase intelligibility and clarity. To my ear, though, they often result in an edgy or brittle sound. In addition, recording multiple tracks with such a mic can cause a buildup or "hump" in response at the boosted frequencies.

The SCX-25 eschews presence boosting in favor of a clean, natural-sounding midrange. In my tests, the mic worked great on both male and female vocals, maintaining enough bite to cut through a mix, yet never sounding



The Audix SCX-25 is a compact and very versatile large-diaphragm condenser microphone with a smooth, unhyped, natural sound.

shrill or strident. Only dull-sounding voices in serious need of brightening would likely be an uncomplementary match with the SCX-25.

The SCX-25 also features a natural-sounding low-end response, and bass boosting from the proximity effect is noticeably less pronounced than with many other large-diaphragm condensers. I put the SCX-25 up for a closely miked and quietly sung vocal track, and both the singer and I were very pleased—the sound was big, yet not lumpy or bloated with boosted bass.

### PIANO FORTE!

Except for some seriously high-dollar microphones, the SCX-25 is one of the best mics I have used to record piano. When I miked up my Hallet Davis spinet, which admittedly is lacking in bass response and sounds a bit pinched in the mids, the SCX-25s captured that piano's every flaw. I was happy to hear the substandard tones reproduced

through my monitors—it meant the mics were doing their job well.

To test the SCX-25s in a more professional setting, I took them along to a local venue that often hosts jazz and classical concerts. The venue has a wonderful 1940s Steinway D concert grand, which I have had the pleasure of both playing and miking several times. Through the well-tuned P.A. system, the sound of the Steinway was the best that I had ever heard it in that hall. By the way, the house engineer is now seriously considering buying a pair of SCX-25s.

### SLAPHAPPY

The SCX-25 proved a very good choice for a variety of percussion and drum-miking duties. It sounded especially good on afuche (cabasa), tambourine, triangle, and gourd shaker, capturing plenty of high-end detail yet never sounding spitty or harsh. Though in a cluttered mix you might find it necessary to dial in a bit of 2 to 4 kHz to

sharpen the sound a bit, for the most part the tracks were ready to roll just as they went to tape.

To test the SCX-25s as drum overheads, I positioned them as a spaced pair above my studio's GMS kit. I was very pleased with what I heard—the SCX-25s sounded nearly as good as the large-diaphragm condensers I normally select for overhead duties (Microtech Gefell MT 711Ss), which are quite a bit more expensive. Indeed, in some circumstances, depending on the musical arrangement, I could see preferring the sound of the SCX-25s over that of the Microtech Gefells.

Next, I pulled the mics back into the room, about ten feet from the drum kit. The SCX-25s provided a nice picture of the kit in the room, but the sound was a bit short of exciting, perhaps due to the lack of presence boosting. Impressively, though, the SCX-25s faithfully represented the slightly dull nature of my tracking room.



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USA

619.233.6715

According to Audix, the SCX-25 can be damaged by the high SPLs generated inside a kick drum. Just the same, I tend to like the sound of large-diaphragm condensers on bass drum, so I engaged in a bit of experimentation. I began by positioning one of the SCX-25s about two feet back from the outside edge of the front of my 22-inch maple kick drum. In that position, the mic captured a nice, woody tone with a good dose of low frequencies, albeit with a large amount of leakage from the other components of the drum kit. Next, I moved the microphone a bit closer (about one foot away) from the outside of the drum. That reduced the leakage, but it did seem like the mic was starting to near its limits, as it sounded a bit edgy and strained.

Clearly it was time to bring out the Sonotube! As I described in "Recording Musician: Get Your Kicks" in the July 2002 issue of *EM*, I sometimes employ a large Sonotube (a thick cardboard cylinder used for pouring concrete forms) as a tunnel to extend the kick drum, thus allowing capture of the bass wave without much leakage from other drum-set components. In this application, using a 4-foot Sonotube, the SCX-25 really delivered the goods, sounding quick and meaty at the same time. Still, this Audix microphone would not be my first pick for kick-miking duties.

### HORNS OF PLENTY

I like my brass to sound warm and melodic—nothing sounds worse to me than

the square-wave brass sound of early digital recordings. Therefore, when recording horns, I lean toward warm-sounding mics. The SCX-25 again proved itself an appropriate and most worthy performer. It sounded really nice on trumpet and trombone, at least as long as I didn't position the mic too close—as I learned with the kick drum experiments, the SCX-25 is not too amenable to high SPLs at close range. Moving the horns back a bit from the microphone proved to be the key to getting a nice sound.

### GUITAR GODS

To test the SCX-25s on my Jean Larrivee Jumbo cutaway acoustic guitar, I started with the pair in an XY coincident arrangement positioned a couple of feet back from the guitar. The SCX-25s sounded good that way, but I found that moving them in closer and spacing them apart in a neck/bridge configuration provided a sound that was quite a bit more pleasing. I liked the sound best when the bridge mic was about 8 inches from the guitar and the neck mic was roughly 12 inches back and aimed at the neck/body junction.

I also tried the Peavey VMP-2 tube preamp with the above setup, and the combination worked really nicely for a solo guitar piece. However, I would not recommend a tube preamp with the SCX-25 if you need the track to cut through a full mix—a clean, solid-state preamp would be the better pick for maintaining the needed clarity. Indeed,

### SCX-25 Specifications

Element	pressure gradient transducer
Diaphragm	0.98", 5µ, 24-karat-gold sputtered Mylar
Polar Pattern	cardioid (fixed)
Frequency Response	20 Hz–20 kHz (+5/–2.5 dB)
Dynamic Range	121 dB
Maximum SPL	135 dB (@ 0.003% THD)
Sensitivity	27 mV/Pa
Signal-to-Noise Ratio	80 dB
Self-Noise	14 dB
Power	48V phantom
Dimensions	5.83" (L) × 2.01" (D)
Weight	6 oz.



though the SCX-25 does a good job of capturing a natural acoustic-guitar sound, its relatively flat midrange response makes it not the mic of choice for getting that bright, jangly, percussive sound that is sometimes called for (in commercial country mixes, for instance).

A side benefit for the engineer: the SCX-25's diminutive size makes it easy to position the mic out of the musician's way. In addition, its light weight lets you move the mic stand as far back as the boom permits, thus allowing more space around the performer.

Keeping in mind the SCX-25's SPL-handling restrictions, I also tested one on a Paul Reed Smith CE 24 played through a vintage Silvertone 1484 amp. The Silvertone is a small tube combo with a single 12-inch speaker loaded in a semiopen cabinet. To my delight, the Audix did a better job of faithfully reproducing the sound of the amp than anything I had previously tried. And I got an even better sound by putting the second SCX-25 behind the amp, positioned a couple of inches away from the open part of the cabinet (with the polarity reversed on that channel, of course). Combining the two channels, I was rewarded with a really nice, thick-sounding guitar track.

I also got really good results using the SCX-25s as room mics for recording electric-guitar amps. At distances ranging from 10 to 25 feet away from a Mesa/Boogie Dual Rectifier played through a Marshall 4x12 cabinet, the pair of SCX-25s sounded great. The soundstage was wide and deep—this mic produces a noticeably better sense of stereo depth of field than other mics I have tried in its price range—and again the tonal warmth was a nice change from the typically brittle sound of many comparable mics.

## LITTLE BIGGY

The Audix SCX-25 is a welcome change from the usual fare in affordable large-diaphragm condenser mics; those looking for a compact microphone that eschews the usual midrange "presence peak" will find it an especially appealing alternative. A very versatile and easy-

**PRODUCT SUMMARY**

**Audix**  
**SCX-25**  
 large-diaphragm condenser  
 microphone  
 \$799

AUDIO QUALITY	4.0
VALUE	4.5

**RATING PRODUCTS FROM 1 TO 5**

**PROS:** Warm, smooth, natural sound with an unhyped midrange response—not strident like many other affordable large-diaphragm condensers. Very versatile; works well on most sources and exceptionally well on piano, vocals, and brass. Small size makes for easy positioning. Internally shock-mounted.

**CONS:** Limited SPL handling. No attenuation pad or highpass filter.

**Manufacturer**  
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 tel. (800) 966-8261 or (503) 682-6933  
 e-mail [info@audixusa.com](mailto:info@audixusa.com)  
 Web [www.audixusa.com](http://www.audixusa.com)

to-position transducer, the compact SCX-25 boasts a warm, smooth, full, and natural sound, making it a good pick for a variety of instruments and a great pick for several. In particular, those in need of an excellent piano microphone need look no further for an affordable choice. As an overhead drum mic, the SCX-25 provides a transparent and full-sounding presentation that is up there with the best. It is also a great choice for a sizable range of vocal-recording duties, whether for male or female singers.

Though the SCX-25 is not well suited for extremely high-SPL applications, it does work very nicely when positioned a prudent distance from high-SPL sources. At just under \$800, the SCX-25 doesn't quite qualify as a budget mic; however, its faithful sound reproduction and high-quality construction make it an excellent value at that price. I wouldn't be surprised if, thanks to the SCX-25, Audix soon became known as much for its condenser mics as for its excellent dynamics. ☉

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Little Labs' Red Eye is a great-sounding, well-featured, and very versatile recording tool providing DI, reamp, and splitter functions.

Re-amp Level knob for adjusting the guitar level/impedance output (for feeding guitar amps and/or effects). Between the two jacks are four button switches: Re-amp/DI (selects function), Local/Exp In (selects whether the reamp source is rear-panel female XLR or Expansion In TRS jack), Phase Invert (polarity reverse), and Earth Lift (ground lift). There is also a tiny internal-push switch (reachable with a thin pointed tool such as a jeweler's screwdriver) labeled Pad. The Pad out setting is for use with low-level devices (for example, an active DI without gain); the Pad in setting is for use with +4 dB line-level input.

The Red Eye's rear panel provides a second balanced 1/4-inch Instrument input (parallel with the front-panel input); a balanced XLR Line Level input (source jack for the reamp when the front-panel Local/Exp In jack is selected); a balanced, transformer-isolated XLR Mic Level output (for the passive DI); and an Expansion output and Expansion input on balanced 1/4-inch TRS jacks. The Expansion I/O allows you to daisy-chain multiple Red Eyes to create a multiple-out reamp, or to use the unit in conjunction with an active DI or multiple-out guitar splitter (such as the remarkable Little Labs PCP Instrument Distro).

The Red Eye is an entirely passive device utilizing a custom transformer to do its DI and reamp duties. After analysis and testing of the top UTC and Jensen transformers, designer Jonathan Little decided to wind his own transformers so as to obtain improved tone and higher input impedance. So where's the red eye, you ask? There is none. According to Little, "Red Eye stands for 'reamp/DI.' And because you can use the unit in all phases of production, it will work overtime, hence the red eye!"

## Fuel Injected

To test the Red Eye as a DI, I used a Grace Designs Model 101 as both a mic-level pre-

amp and a comparison DI. On electric guitar, the Red Eye yielded comparable output levels, thicker low mids, and more bass punch, though with a shade less transparency. A Stewart ADB-1 active DI, again running into the Grace 101, delivered higher output, but the Red Eye's DI tone was more balanced and pleasing overall, with improved midrange clarity.

The Little Labs Red Eye was a winner on fretless bass, providing significantly more warmth and authority than the comparison DIs. In fact, I liked the tone so much that I neglected my writing duties for a while so I could just sit and play. On my bass I use flatwound strings coated with nylon tape, which often add a faintly artificial buzz to the treble response when run direct. I noticed instantly that, in contrast to the brighter Grace 101, the Red Eye smoothed out this high-end problem without diminishing the airiness of the highs (as the Stewart active DI did).

Unlike other Little Labs products, which ship in a standard foam-rubber-lined plastic carrying case, the Red Eye comes in a less roadworthy cardboard box. However, the sturdier plastic case is available separately for \$45. The manual for the Red Eye was in revision during the review period, but based on Little Labs' other product manuals, I expect that very helpful documentation will accompany the product.

## Passive Aggressive

The Little Labs Red Eye is a cut above most DI boxes, in terms of both sound quality and features; in addition, it doubles as a reamp and splitter. Of course, given all the extras, it's no surprise that the Red Eye's price is also a notch up from the competition's. But for those who appreciate quali-



Steinberg's Virtual Guitarist Electric Edition is a VST plug-in that supplies electric guitar sounds for sequencing realistic rhythm-guitar parts.

ty, durability, and versatility, Little Labs' Red Eye is certainly worth the extra bucks.

## Overall EM Rating (1 through 5): 4.5

Little Labs; tel. (323) 851-6860; e-mail [littlelabs@littlelabs.com](mailto:littlelabs@littlelabs.com); Web [www.littlelabs.com](http://www.littlelabs.com)

## STEINBERG

### Virtual Guitarist Electric Edition (Mac/Win)

By Geary Yellon

One of the greatest challenges of sequencing is playing realistic guitar parts with a MIDI keyboard. Last year, Steinberg introduced Virtual Guitarist, an innovative pair of VST Instrument plug-ins that rather effectively substitute for a rhythm guitarist when you're sequencing tracks. Like the original edition, Virtual Guitarist Electric Edition (VG EE; \$249.99) provides real-time guitar parts for nonguitarists by combining a MIDI playback and processing engine with a large collection of samples. VG EE is a collaborative effort between programmers in Sweden, Germany, and the U.K., and it actually encompasses two separate plug-ins: a VST Instrument and a VST effects processor called Virtual Guitarist Electric FX.

## Turn On and Tune Up

Like its predecessor, VG EE provides sampled rhythm patterns called Players. The Players follow the tempo and meter of the host sequencer, changing whenever the sequence changes. You control what chords they play by playing them on your MIDI keyboard. (I suppose you could also trigger them from a MIDI guitar, but that would be a bit twisted.)

After you select one of the 29 Players, you must wait a few seconds while it loads from disk. Once they're loaded, each Player is divided into eight variations called Parts, which load instantly when you click a selection arrow, send a MIDI Program Change, or play a particular note you've specified on your keyboard. The variety of Players is impressive—everything from 70ties Funk and White Soul to Monster Heavy and Classic Rock. I especially like the Player called RnB—Rock'n'Roll, which



sounds very much like the Rolling Stones.

Whereas the first Virtual Guitarist featured samples of acoustic and electric guitars, the Electric Edition concentrates on an amazing collection of vintage electric guitars and amplifiers belonging to German axe man Thomas Blug. The Fender guitars include a 1953 Esquire and 1956 Stratocaster, and the Gibsons include a 1958 Les Paul and 1963 ES-335. The amplifiers feature a 1963 Vox AC30, 1964 Fender Super Reverb, and three 1968 Marshall stacks, as well as a recent-model Mesa/Boogie Triple Rectifier. They all sound quite good, but you can't directly select a specific guitar or amp; instead, you select Players that were recorded with a particular combination. Still, you never know exactly what that combination is. Each Player's guitar is depicted on-screen, but the amp is never identified.

### Pause for Effects

In most respects, the Electric Edition is identical to Virtual Guitarist. Its user interface and most of the included manual are almost exactly the same. The most significant difference, other than its selection of Players, is an onscreen multi-effects pedalboard comprising eight stompboxes: AutoFilter, chorus, delay, flanger, phaser, reverb, tremolo, and wah pedal. Some Players make extensive use of the effects, and others have only one or two Parts in which they're obvious. You can use the separate VG Electric FX plug-in to process any DAW track or audio input, including a real electric guitar.

Why would a guitarist want VG EE? It's great for developing ideas and comping parts you might never think of otherwise. In addition, VG Electric FX is specifically tailored for electric guitar sounds. Although I play guitar, I use Virtual Guitarist frequently, and the pedalboard plug-in is a nice bonus. Its effects are handy when I want to load them as a group, but I do wish it offered a distortion effect. I suppose that because the guitars were sampled with the optimum distortion for each style, there's little need for a separate distortion effect.

Despite their similarities, I had some technical problems with the Electric Edition that weren't an issue with Virtual Guitarist. When I installed VG EE on my dual-processor, 1 GHz Power Mac G4, it simply refused to run in Cubase SX under Mac OS X 10.2.6. No matter how many

times I reinstalled, a message read, "Sorry, but the plug-in failed to install." Almost ironically, VG EE ran perfectly well in MOTU Digital Performer 3.11 using Audio Ease VST Wrapper on a G4/400 running Mac OS 9.2.2. After numerous requests for technical support, Steinberg eventually told me that VG EE has a problem running on dual-processor Macs; the development team is working with Apple on a solution.

I like Virtual Guitarist Electric Edition and

recommend it. It sounds outstanding, and the CPU load is perfectly acceptable. I'd certainly have rated it higher if it had worked on my dual-processor Mac, though. Unfortunately, there's no downloadable demo to ensure that VG EE works on your computer. ☹

### Overall EM Rating (1 through 5): 3

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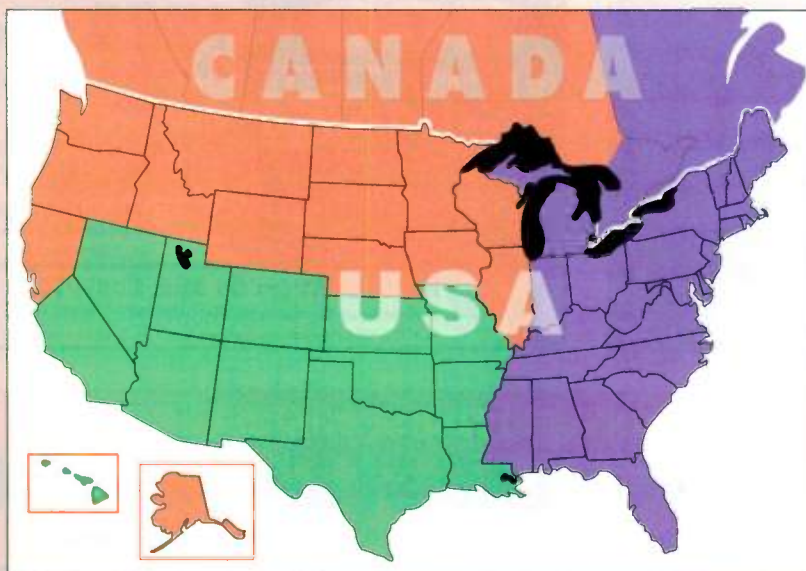
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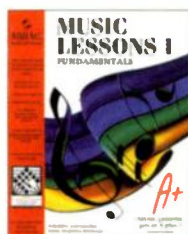
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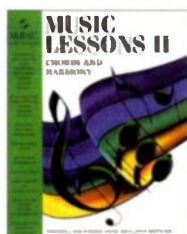
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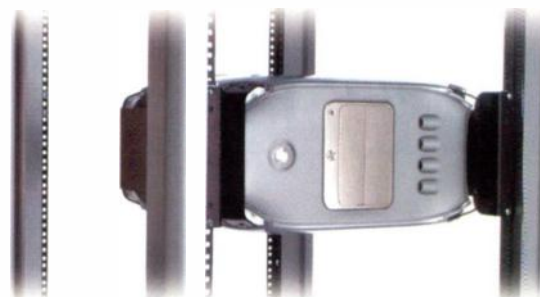
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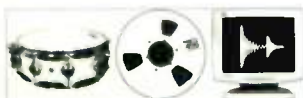
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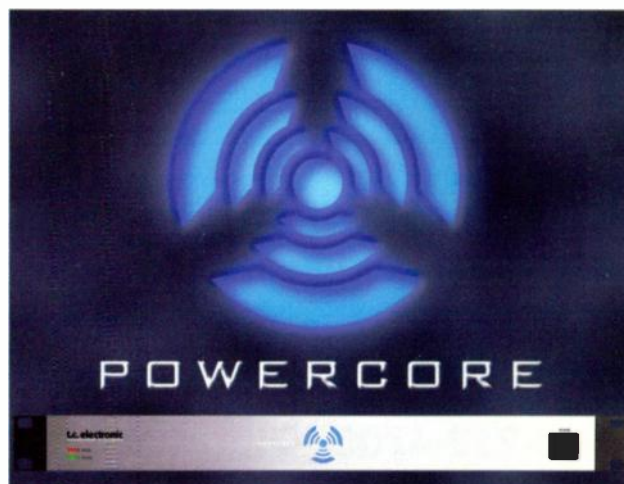
One Perfect Channel: the Grace Design Model 101 is a single serving of the critically acclaimed Grace Design 801 microphone preamplifier, and it's the perfect complement to your MOTU 828mkII — or any other MOTU audio interface. The Model 101 is Grace Design pedigree throughout with fully balanced and transformerless design and no electrolytic capacitors in the signal path. The included instrument DI input is designed to accommodate a wide variety of high-impedance input sources, making it an ideal choice as a DI box that flawlessly preserves any input signal. The 101 delivers incredible bandwidth, headroom and resolution that produces remarkably natural, musical and detailed sound. The ultimate mic preamp for under \$1000.



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## ADAM Audio P11A Studio Monitors

**Two-way shielded active monitors for your MOTU system**

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DP4, MachFive and the new 828mkII lead an impressive array of new studio tools for Mac OS X

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## The new 17-inch PowerBook G4

17 inches of pure professional audio computing pleasure

With a display resolution of 1440-by-900 pixels, the new 17-inch PowerBook G4 delivers an eye-popping 1.3 million pixels on screen — the same viewing area as a 19-inch CRT monitor. You see more tracks, more mixer faders, more plug-ins, more virtual instruments, more everything in your Digital Performer virtual studio. At 15.4 inches wide, it sits perfectly on top of your MOTU 828mkII FireWire audio interface. The 1-GHz G4 processor delivers serious CPU horsepower — enough to run as many instances of MachFive and other virtual instrument plug-ins as you need, with plenty left over for your favorite plug-ins. Back up your projects to DVD-R with the built-in SuperDrive. The MOTU studio is now more powerful and portable than ever.

Remove the 828mkII's rack ears and slide it right underneath your TiBook — the perfect desktop system!

## Waves Native Platinum

The ultimate Waves processing bundle for every MOTU studio

No studio is complete without Waves processing, and now Waves brings its entire line of award-winning plug-ins to the Digital Performer Mac OS X desktop. From the classic L1 UltraMaximizer to the exquisite Renaissance Series to the Masters and Restoration bundles — all of the Waves processing you've come to depend on every day can now be at your fingertips in the most advanced native audio recording system available. When only the very best signal processing will do, Waves plug-ins deliver.





## You Oughta Be Committed

**A**mong the moral weaknesses ascribed to men in some sweeping generalizations is a fear of commitment. As with many generalizations, there is a grain of truth in this, but I fear it is a modern malady. An examination of history shows that a widespread fear of commitment developed subsequent to the invention of the 16-track multichannel tape recorder.

In the male-dominated recording world of the '60s, the availability of large numbers of tracks—later to blossom to 24 and 48 and on into the vast realm of the DAW—represented a kind of freedom, a panoply of available options that allowed a man to set sail off into the Wild Punch Sea without a thought to the track-cleanup process destined to follow.

Ah, youth!

It does stand to reason that maintaining options allows for finer crafting; this I allow. And, ah, it is true that I, too, have been known to patch and comp and save numerous takes, and it is indeed from this knowledge of the delicious, doomed delight of the apple's taste that I speak.

Hear me!

There would be no limit innate on your track count, nor a reason you should not go wide, but that each and every option you maintain—each spare take, each choice postponed—is a choice that must be made later.

Believe!

I tell you true, editing is a beast that feeds on option maintenance and grows in the shadows to a creature of frightening proportions. And then there's the mix. Oh great Hera, you never saw such a mess!

In another time and place, such options were unknown. Go back far enough, and we find that musicians even had to play tunes correctly all the way through. How did Armstrong do it?

Behold!

In the Age of the Birth of Modern Album—making, to wit, in the salad days of the Beatles with George Martin at Abbey Road, track limitations heralded such combinations (odd by today's standards) of piano, bongos, maracas, and



guitars mixed to one track. Crude as crude dare be, those hardy souls lived by the sword of constant irrevocable decisions in the recording process. Yet they produced works of genius.

The art, as usual, is in the choices and finesse. In music, if it feels right, it most likely is. Nay, 'tis not so easy to precisely replicate good instrument sounds as one might expect, nor reliable to inspire once more a musician who did groove on an effects preset on a particular day.

Once upon a midnight dreary, as I pondered weak and weary over preparations I conducted for a voice-over session, I had chance to engage in several

discussions with engineers concerning the use of compression in voice-over recording. To my surprise, the several quite qualified professionals generally shied away from compressing voices when recording VO.

Plainly, these people have made it work for them; but for myself, I have scarcely seen the day when a close-miked voice did not require light to moderate compression. I will admit—in fact, proclaim—that I favor peak limiting set to just below the clip point of an A/D converter. I am unafraid to make my choices! (Sometimes.)

And what could be the cost of such bold behavior? To commit oneself is a brave thing. For the possibility exists that you might, perhaps, be wrong. That can be bad.

Your flexibility is limited. Of course, that is the point, is it not? And you may simply change your mind about what is the best sound for a track as the context evolves around it. But nothing truly great ever came about without risk, and committing to a recorded sound is a type of risk, if a bodily benign one.

In the end, ideas can be refined; but moments must be captured, and doing so entails committing to decisions that cannot later be undone. Without doubt, it is the fool who fails to apply the wondrous technology we employ daily for purposes both surgical and amusing. Yet the ability to postpone decisions does not equate to the need, or even desirability of doing so. ☺

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# Introducing the 828mkII

24-bit 96kHz resolution. DSP-driven mixing and monitoring.  
Front-panel programming. Stand-alone operation.



## 828mkII feature highlights

- **CueMix DSP™** — the 828mkII delivers DSP-driven digital mixing and monitoring for all 20 inputs. Connect mics, guitars, synths and effects processors, and monitor everything from the 828mkII's main outs, headphone out or any other outputs with no separate mixer needed.
- **Front-panel control** — access your entire mix, or any 828mkII setting, directly from the front panel.
- **Stand-alone operation** — program your mixes at the studio and then bring the 828mkII to your gig — no computer needed. Need to tweak the mix? Do it on site using the back-lit LCD and front-panel controls.
- **Multiple CueMix DSP mixes** — create different monitor mixes for the main outs and headphones. Add send/return loops for outboard gear — with no latency.
- **Front-panel mic inputs** — connect a pair of mics or any TRS input with front-panel convenience.
- **Mic/guitar/instrument sends** — insert your favorite outboard EQ, compressor, amp or effects processor to the two mic/guitar inputs, before the signal goes digital.
- **20 inputs / 22 outputs** — there's no channel sharing in the 828mkII; the mic inputs, SPDIF I/O, headphone out and main outs are all handled as separate channels.
- **Support for 96kHz ADAT optical digital I/O (S/MUX)** — provides 4 channels at 88.2 or 96 kHz.
- **Sample-accurate MIDI** — connect a MIDI controller and/or sound module with no separate interface needed. MIDI I/O is sample-accurate with supporting software.

## Basic features

- **Expandable 24-bit 96kHz audio interface** for Macintosh and Windows with 20 channels of input and 22 channels of output (simultaneously).
- **2 mic/guitar inputs** with phantom power and sends.
- **8 TRS analog inputs** with switchable input levels.
- **8 TRS +4dB analog outputs** — perfect for surround.
- **Separate TRS main outs** and front-panel headphone jack, each with independent volume control.
- **8 channels of 24-bit ADAT optical input/output** with sample-accurate ADAT SYNC.
- **MIDI I/O** — no separate MIDI interface needed.
- **24-bit S/PDIF digital input/output** up to 96 kHz.
- **Sync** — word clock in and out; built-in SMPTE (LTC) in and out; sample-accurate ADAT sync input.
- **Compatible** with virtually all audio software on Mac OS 9, Mac OS X and Windows Me/2K/XP.
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