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August 2002

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SETTING UP A GREAT HEADPHONE MIX

A PRIMEDIA Publication

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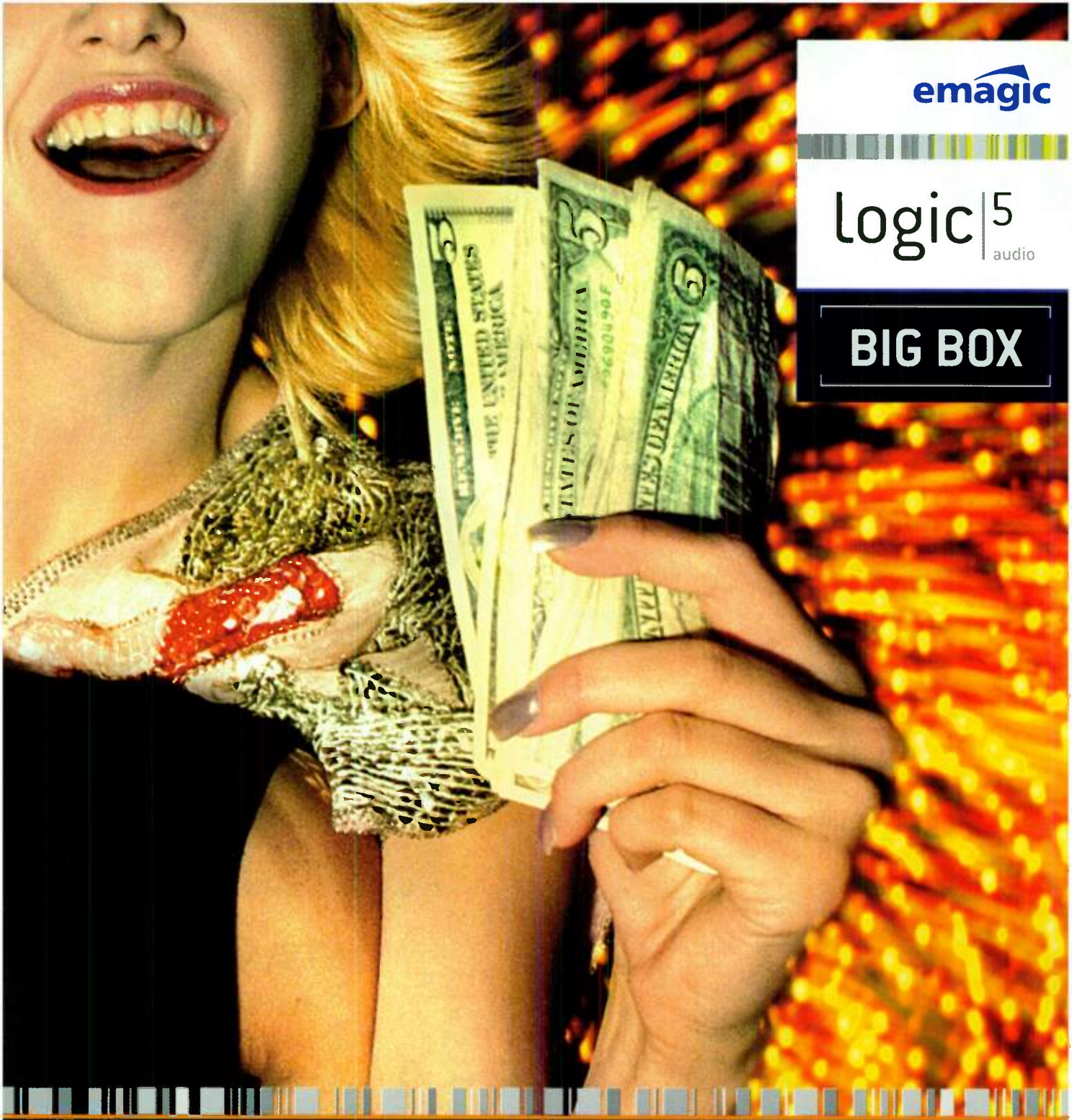

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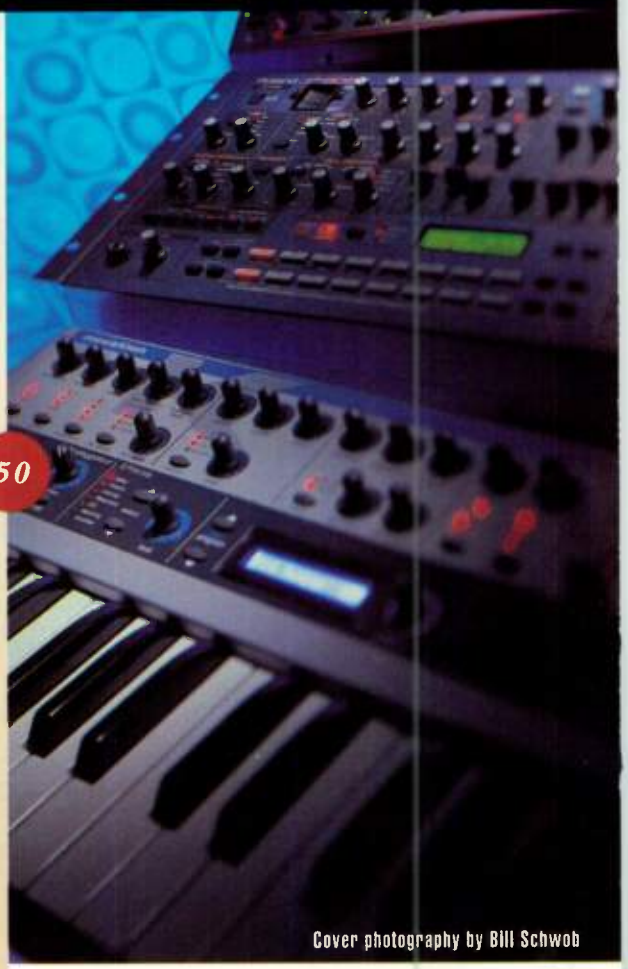
I N S I

FEATURES



Cover photography by Bill Schwob

DEPARTMENTS

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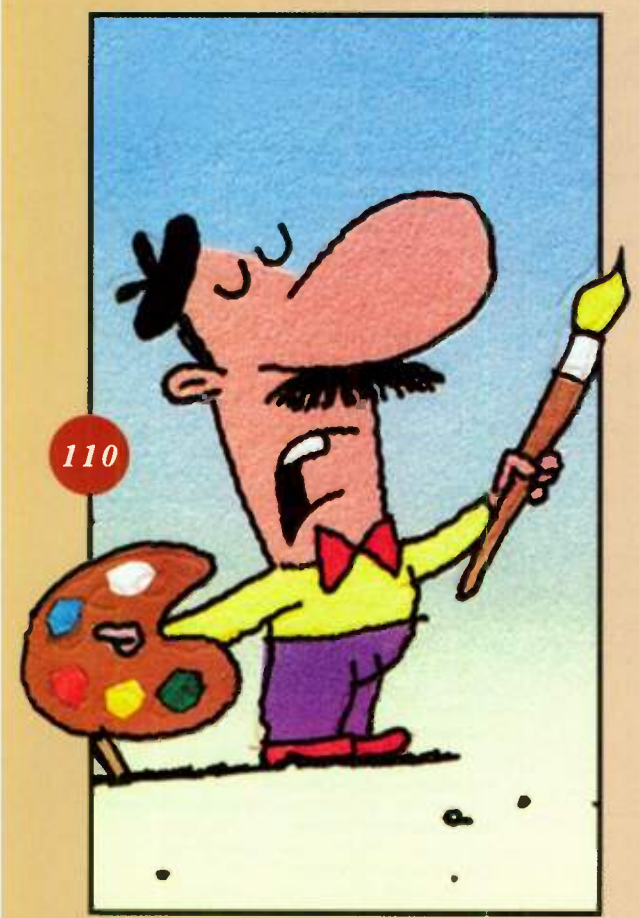
COLUMNS



REVIEWS

Says Who?


ANTHONY PIDGEON

The first reviewer loved the new signal processor, especially the preamp section. A later reviewer reported on the next-generation version of the same product and liked it except for the preamp, which he considered second-rate. It was the same preamp in both units. The manufacturer was furious because the second review was not as sweet as the first one. The editors stood behind both reviews. What's a reader to think?

Indeed, *think* is the operative word. For starters, think about who the reviewer is. Most **EM** reviewers write for us regularly, and after you read our magazine for a while, you'll learn about the sorts of products a particular reviewer likes, the sorts of projects he or she does, and the types of problems that drive him or her nuts.

I am convinced that the variety of opinions we publish is a strength, not a problem. We use dozens of reviewers, all of whom are in the trenches doing a wide variety of projects. That gives you a much better view of the big picture than if we just had a half-dozen editors write every review. All of our reviewers are knowledgeable and experienced and do serious work in personal studios. We try to make sure the right reviewer gets the assignment, based on our knowledge of the author and his world, and we want our reviews to reflect a realistic perspective.

Some reviewers work in environments where speed is paramount; others work slowly and meticulously on each track and mix. For those in the second category, the element of speed might be less important than having an unusual and creative feature. Still other reviewers emphasize audio quality first, second, and last.

Is the reviewer who demands top audio quality always the one to trust? Not necessarily; your favorite reviewer could be the one who praises low-priced products that sound good enough for most personal-studio projects and offer innovative features. On the other hand, if you go for top fidelity first and foremost, our critical audiophile might be your favorite.

Some reviewers are sympathetic regarding the financial and marketing reasons manufacturers make certain design decisions. Some reviewers are much harder to please; their contribution might be to cut through the hype and to accept no excuses. Each approach can be useful.

Each reviewer has a different application and approach to using gear, and each application could require different production values and approaches. Veteran reviewers often state that a product seems better suited to one type of user than to another, and we encourage that approach.

But our reviewers aren't you, and if one product were right for everyone, the other products wouldn't survive. Reading a review should be like listening to a knowledgeable friend tell you about a piece of gear he or she has been using lately. You would consider not only your friend's qualifications but his or her personality, approach, and prejudices. You'd talk with other friends, do some research to fill in the holes, and check out the product yourself, if possible. In short, you would think critically and make your own decisions.

Steve Oppenheimer
Editor in Chief

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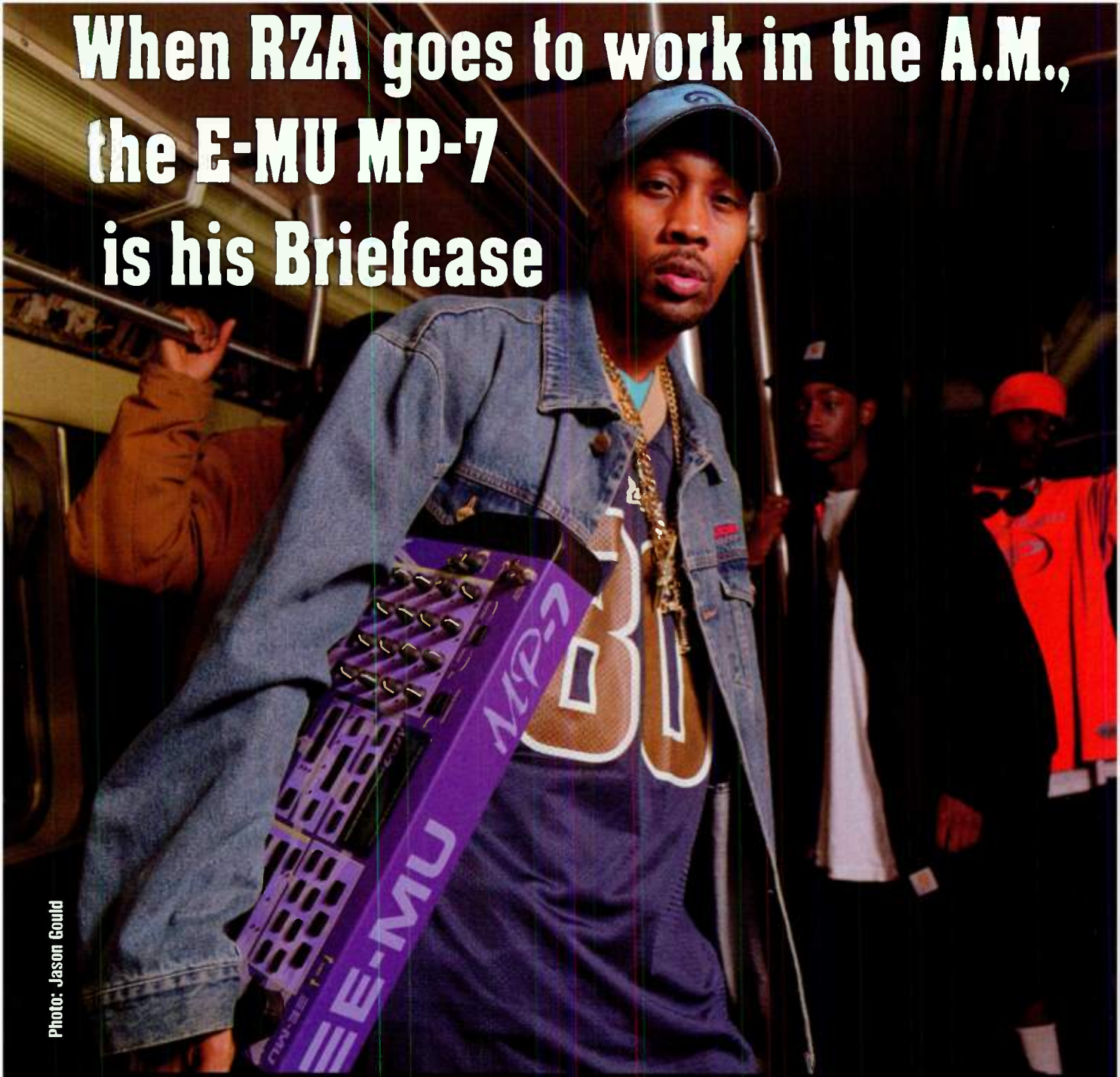
When RZA goes to work in the A.M., the E-MU MP-7 is his Briefcase



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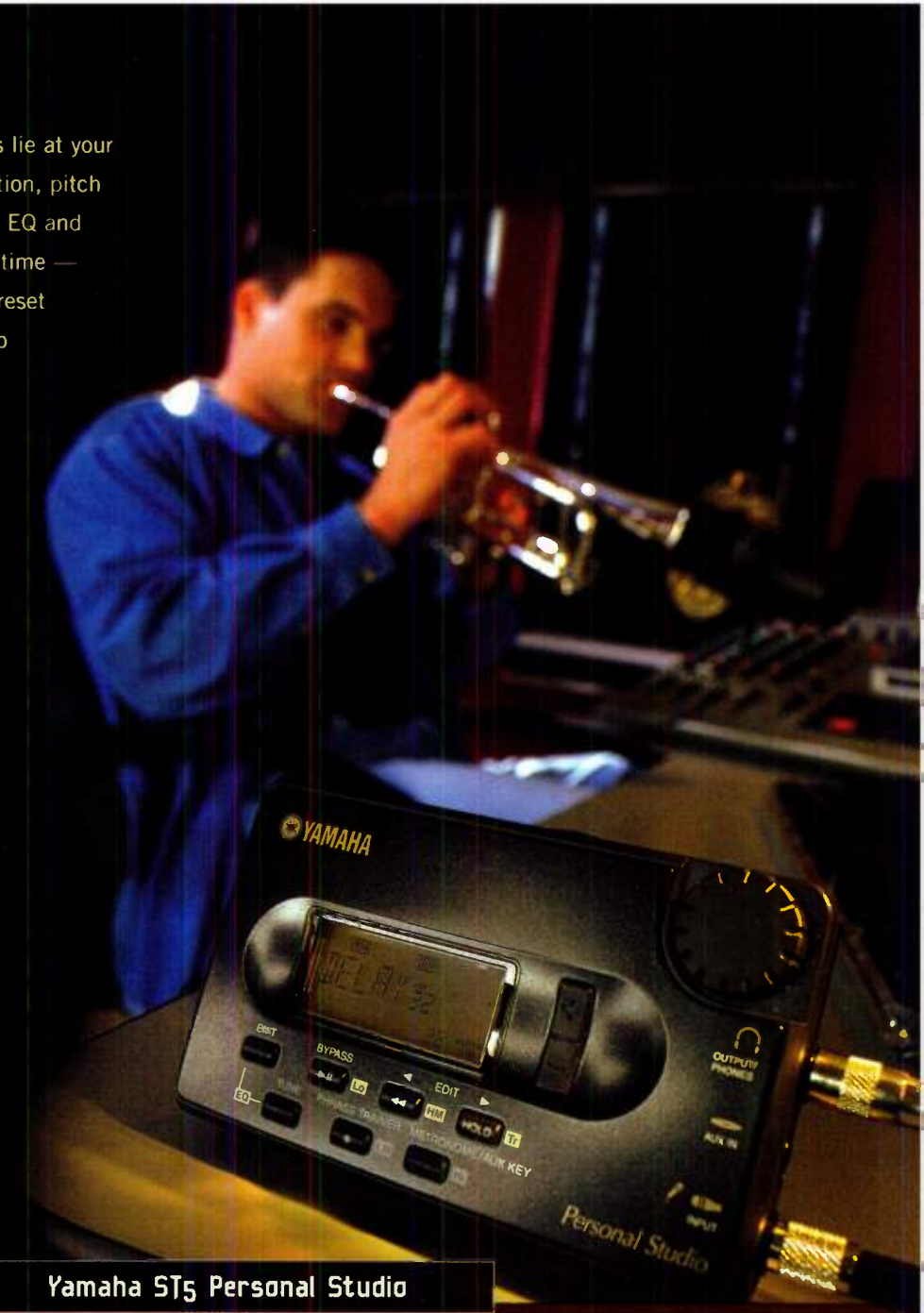

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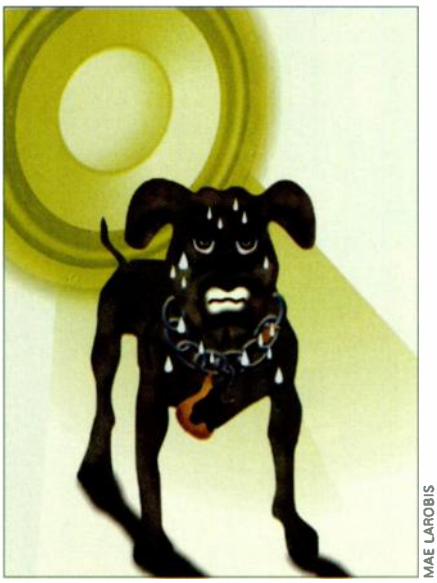

MAE LAROBIS

THOSE HONKY-TONK BLUES

The interview with Jon Brion ("Production Values: Thinking Outside the Boxes," June 2002) was insightful and fun.

Brion did trouble me with an incorrect way of achieving the honky-tonk piano sound. Detuning piano strings may give him the sound he occasionally looks for when recording, but it will not give the sound of the ragtime age; he will simply have an out-of-tune piano. The honky-tonk sound popularized in player pianos and nickelodeons from the first 30 years of the 20th century was created using an accessory called a mandolin rail.

The idea of the mandolin rail was to change the sound of a piano during a performance. The rail consists of a rod of wood spanning the strings of an upright piano. Fringed leather hangs from the rod. Each fringe is approximately two inches long and half an inch wide. Although steel buttons were often used, brass buttons affixed to the string side of the leather work best. The rail was usually hinged to pivot upward when not in use or to pivot down when in use. The felt from the piano hammer will hit the leather fringe, knocking the brass button against the piano string. The result is a metallic, honky-tonk piano sound.

Learning the historical techniques to achieve a particular sound is the best way to re-create it.

Howard Byrne
Assistant Curator
The Music House Museum
Acme, Michigan

IF YOU BUILD IT . . .

A lot of articles through the years, such as your recent "Sequencing with Style" (May 2002), have covered making MIDI instruments more expressive and therefore more realistically variable like their acoustic counterparts. Attempts at that are made through the use of alternate controllers, control surfaces, and continuous-controller devices. Sometimes the advances are incremental and may be nothing more than a hybrid of devices that already existed.

I need one such controller, mostly for generating Pitch Bend information with another controller or sequencer. It would be a simple control pedal with positive and negative values on either side of a center detente. The pedal would naturally return to the central or "neutral" position through springs or some other mechanism.

My use for the pedal would be to generate more sweeping Pitch Bend information when using my older Yamaha wind controller, the WX-11, but it could be effectively used with just about any kind of controller and probably for other uses, such as controlling filters. I have a lot of trouble generating the degree of Pitch Bend change with the WX-11 that I want for big sweeps and glissandi. Other wind controllers, past and present (the WX-7 and WX-5), have a thumb wheel for such use, but that is not a very natural-feeling or comfortable function, as it would compromise fingering and the secure holding of the instrument. There must be many keyboard players who feel somewhat uncomfortable with pitch-bend wheels and levers and dislike losing the use of one playing hand while controlling Pitch Bend, especially in a live multitimbral setup. One nice thing about such a pedal would be its versatility in accommodating the player: it could be used with either foot, depending on the facility of the player and any other control devices being manipulated simultaneously, and it could be used in real time or to edit a previously sequenced part.

The key features of such a device would be to generate positive (upward Pitch Bend) and negative (downward Pitch Bend) values and the automatic return to the neutral (in tune) position. The ability to "scale" the amount of value change per inch of pedal movement and to reverse positive and negative directions would be nice extras. Does anyone know of such a control pedal or care to take a stab at building one?

Tim Mulac
via e-mail

Tim—Right offhand I can't think of a pedal with a center detente. Perhaps one of our readers will help with this one.

However, I achieve essentially the same thing by using two CV pedals, spring-loaded so that they snap back to the top (zero position) when released. If you don't mind doing a little bit of surgery on the pedals, you can spring-load them yourself, using strong epoxy to hold the spring in place. Selecting the appropriate spring is a matter of taste; I like a moderately stiff spring with enough give to press the pedal to the metal but enough resilience for a quick snap back to zero upon release.

You then can program your synth patches to interpret the output of one pedal as positive values and the output of the other pedal as negative. I route the pedals to the CV-pedal inputs on a Peavey PC 1600 MIDI control surface and assign them to send Pitch Bend

Karl Steinberg, Chief Technical Officer, Steinberg Media Technologies AG

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there. The messages can be scaled in a sequencer, though for live performance, I still use my old Opcode Studio 5 MIDI interface/patch bay/processor, which allows me to do elaborate custom mapping and scaling. I scale the values differently for various musical pieces so that I can get small incremental pitch changes for some pieces and large, sweeping changes for others.

Admittedly, you do have to learn some fancy footwork to control two pitch-bend pedals along with whatever else you are doing, and you would have to play while seated (being a keyboard player, that is no problem for me), but it's a practical solution.—Steve O

RISKY BUSINESS?

I'm writing in reference to the May 2002 **EM** article "Peering into Cyberspace," regarding peer-to-peer file sharing. My question, however, deals more with copyright infringement. I'm an independent musician. If I were to remix a well-known artist's song and post it on a file-sharing network, would I be breaking copyright laws? I'm not selling the song or looking to distribute it, but I thought it would be a good way to get recognized because obviously people are searching for this well-known song. Please let me know how risky you think this is.

Keith M.
via e-mail

Keith—Posting a remix that includes copyrighted material without clearing the copyright and paying royalties does seem to be copyright infringement. I'm no lawyer, but it seems pretty obvious that you are breaking the law if you do that. The legal remixes you hear on the radio or in clubs are done by artists who pay royalties to use the original material. If they don't pay, they risk being sued.

Putting the remix on a file-sharing network raises the chances of the copyright holder finding out about it, because the file can end up anywhere—including on the computer of a record-label employee who is monitoring such things. But because you aren't selling the remix, you could take your chances and figure you are too small and poor for the record labels to go after you. The labels are pretty sensitive about it nowadays, but you aren't exactly a practical threat to their profits. So it comes down to how lucky you feel.—Steve O

HIGH FIDELITY

Your review of Ableton Live (June 2002) states, ". . . you should have . . . an ASIO-compatible sound card for the best possible fidelity. The software works with Sound Manager on the Mac and DirectX-compatible sound cards on the PC, but those output sources might not provide enough bottom end to really make your mixes bump."

There is some confusion between driver compatibility and sonic fidelity. The audio quality or sonic fidelity of a sound card is a function of the hardware and its A/D/A converters and not a function of the software's driver technology. In other words, a test tone played through the same audio hardware will sound the same, irrespective of whether the card is using ASIO, WDM, or Sound Manager drivers.

Many software customers already have a hard-enough time distinguishing the relative merits of one driver technology versus another's. Fortunately for them (and for hardware companies), it's never been a question of sonic fidelity.

Ron Kuper
Vice President, Engineering
Cakewalk

LESS RUBBISH, EH?

I'm a bit confused by the eight-page advertisement for the *Garritan Orchestral Strings* library that appears on pp. 64 through 76 of your May 2002 issue ("String Quest"). It looks just like a regular article but reads like advertising copy. So much for editorial objectivity.

Please, in the future, let product manufacturers buy ad space for this kind of self-serving rubbish.

John Slavney
via e-mail

John—I strongly disagree. Garritan's library blew us away to the point that it won the first **EM** *Editors' Choice Award ever given to a sound library. Many of our readers create their own sample libraries, and we thought they would like to learn how Gary Garritan, who had never published a sample library before, pulled it off. The article offered a lot of practical advice about every aspect of the project, and although you could nitpick about a phrase here or there, I certainly do not think it was rubbish or advertorial copy.—Steve O*

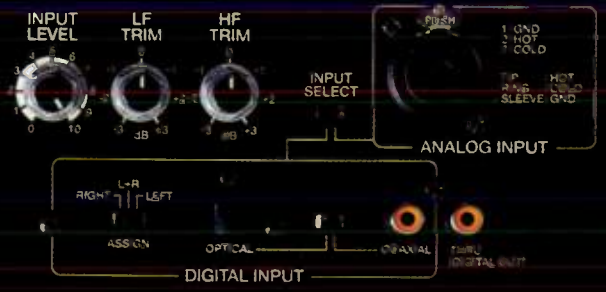
WE WELCOME YOUR FEEDBACK.

Address correspondence and e-mail to "Letters," Electronic Musician, 6400 Hollis Street, Suite 12, Emeryville, CA 94608 or emeditorial@primediabusiness.com. Published letters may be edited for space and clarity.

Roland

Roland DS-90A DS-50A

A DIGITAL STUDIO SHOULD HAVE DIGITAL MONITORS (DUH).



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As the first software solution to use streaming technology for playing huge samples off your PC's hard drive, **TASCAM GigaStudio**™ quickly became the world's leading sampler for professional composers and musicians. But today, there are a few more choices in samplers that stream audio. Why is Giga still considered the best sampling tool for power users? Here are four reasons to keep in mind:

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2. Sample Buffering. No hard drive on the planet is fast enough to stream samples with the blazing speed needed for real-time performance. Giga pre-loads a tiny portion of your samples into RAM to accomplish this task. Plug-in samplers have to load a much larger section of the sample into RAM, which can greatly affect the number of instruments that can be used in one session.

3. Standalone Application. GigaStudio can be used on a PC by itself as a standalone software application, or can be used on the same machine as your PC-based sequencer. Plug-in samplers need to be accessed within a DAW application, which can severely limit their professional performance capabilities.

4. The Best Libraries = The Best Sound. Put all the technology aside for a moment, and all that really matters is the sound. Giga libraries were specifically designed for the Giga platform. They take advantage of Giga's Dimensions functions like key switching, crossfading, velocity control and more. Plus, their incredible detail and sonic quality is optimized only in GigaStudio...with nothing lost in the translation.

So if you're into the very best that sampling technology has to offer, get into Giga. Visit your TASCAM dealer or check it out online at www.tascam.com, because when it comes to sampling, bigger and faster is always better. Period.

Giga Sound Library Spotlight

TASCAM/Christian Lane Ultimate Marimba & Vibes

NEW! With four sets of mallets to choose from, this 2-disc library features a great-sounding Marimba One 5-octave instrument and a Musser set of vibes. Multiple velocities, rolls, muted strikes and lots of extras truly make this the ultimate!

TASCAM/Jim Corrigan Nashville High-Strung Guitars

One of the coolest, most playable acoustic guitar collections for Giga. Recorded with incredible quality, this totally authentic collection of up and down strums and dynamically playable single strings for solo parts represents the sound of Nashville at its finest.

TASCAM/Christian Lane Ultimate Timpani

NEW! A 6 CD library built from a set of Hinger Touch Tone timpani with calf heads. Five mallets, eight velocity levels, individual right and left hand samples and incredible detail give this library a 5/5 star rating in Electronic Musician magazine!

TASCAM/Peter Ewers Symphonic Organ

The entire, historic, grand La Madeleine, Paris cathedral and the Cavaillé-Coll organ for GigaStudio! For the first time ever in any sampled pipe organ, the original cathedral ambiance is included via release triggered samples.

TASCAM/Conexant GM150/GM500 General MIDI Kits

You've never heard General MIDI like this! Two different collections (150MB and 500MB) of multi-megabyte instruments, including a complete set of acoustic instruments and synthesizer textures.

TASCAM/Gary Garritan GigaHarp

The sound of angels! Every string of a Salvi Pedal Harp sampled in stereo representing seven pedals, four attacks/velocities per string, two harmonics per string, glissando, hand-dampening and muffling.

Why GigaStudio is the and Best Sampler...Period.

There are hundreds of sample libraries that have been developed specifically to take advantage of Giga's streaming technology. Here's a small selection of the best.

TASCAM/Scarbee J-Fingered Bass

NEW! 1046 samples are dedicated to each of the 3 pick-up settings, providing a total of 3138 samples (1.15 GB)! The musicality of this handmade Celinder J Update 4 is expressed in every hammer-on, pull-off, grace-note, staccato-release and slide. Amazing!

Bigga Giggas/ Bigga Orchestral Brass

4 CD set that includes 341MB of tuba, 441MB of trombone, 302MB of french horn and 348MB of trumpet. All samples were recorded with multiple velocities at 24-bit/96kHz resolution.

Q Up Arts/David Torn Pandora's Tool Box

70 tracks of highly unusual sounds, divided into textural, riffic and rhythmic loops. Great for adding edge and unique personality to music production, sound for picture and multimedia projects.

TASCAM/Larry Seyer Acoustic Bass

Over 500 MB in size, every note of every string sampled in stereo at 4 velocities with no loops. Features finger-damped staccato release resonance samples that will play on the note-up (release) and body resonance volume control, fast and slow up/down slides, riffs, special effects, and more.

Dan Dean/Solo Brass

A 10 CD set of incredible solo brass instruments, with up to 8 levels of dynamics per note. Includes varieties of trumpet, trombone, french horn, tuba, cimbasso, euphonium and more.

Sonic Implants/ Hammond B3 Collection

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FRONT PANEL

Download of the Month

By Len Sasso

If you're a loop freak and you work on a Mac, Girl ($99) from Yowstar (http://girl.yowstar.com) should get your creative juices flowing. Girl can slice, dice, repitch, granulate, filter, delay, loop, and resequence your sound files in real time. The number of simultaneous files it can handle is limited only by your CPU and RAM.

Most of Girl's action takes place in the Mod window, where you select the file you want to process and set up the processing options. These include classic-style pitch shifting (in which speed changes with pitch), pan and volume LFOs, and amplitude envelopes. Next comes a parallel pair of multimode filters, each with its own frequency, resonance, and gain LFOs. The filters are followed by a feedback delay line, again with a dedicated delay-time LFO. However, things start to become really interesting when you get to the grain and sequencer sections.

The grain processor is basic, offering control over grain size, grain-sequencing rate, and random grain shifting. The step sequencer is an eight-step slice sequencer. You set the slice size by setting the number of slices into which the sound file will be cut. The sequencer will play the slices in any order and at any tempo. Combining that with the grain processor can mangle your loop beyond recognition. There are no provisions for MIDI control of Girl's settings, but most settings have computer-keyboard shortcuts.

Girl will record the output of any individual module or a stereo mix of the combined output of all modules. There is also a provision for syncing the different modules to one tempo, which makes it easy to combine and process several loops into a single loop. The MP3 file AtaGirl is a simple drum 'n' bass loop taken through several phases of processing. Yowstar does not specify minimum requirements, but Girl ran well given 64 MB of RAM on my G3/300 MHz with Mac OS 8.6.

TIPS

Cool Tip Of The Month

Grouping Tracks in MOTU Digital Performer

The **EM** *Cool Tip of the Month is presented courtesy of Cool Breeze Systems.*

When working with any DAW, it's important to learn how to group multiple tracks for mixing and editing. Grouping faders allows you to control the levels of several tracks at once, as you often do when mixing background vocal tracks or drum kits. You also might want to group the pan knobs for a special effect, especially when doing sound for picture, in which you might want a whole group of tracks to move through the sound field in sync.

You can create groups from Mark of the Unicorn Digital Performer's Mixing Board mini-menu. As an example, I'll group some background vocal tracks.

1. Open the Mixing Board from the Windows menu (Shift + M).
2. Go to the mini-menu and select Create Group (Control + N); the cursor will change to a plus (+) sign.
3. Select or deselect the tracks you want to group. A flashing green or black box will surround the fader or knob to display selections for the group. Once you have selected all tracks for this group, hit Enter to confirm it or double-click on the last selection.

Band on the Web

By Gino Robair

COURTESY JEFF TROTT

To be an independent recording artist today, you have to be involved in every aspect of the business, from writing, arranging, and recording to managing tour and promotional details. For singer-songwriter Jeff Trott, an active and compelling Web site is a vital means of disseminating information to promoters, booking agents, press contacts, and, most important, his fans.

Trott is probably best known for his songwriting collaboration with Sheryl Crow, which has yielded the singles "If It Makes You Happy" and "Soak Up the Sun." But Trott has also produced Stevie Nicks and Jeremy Toback and played guitar for Wire Train, World Party, Pete Droge, and Tears for Fears.

Like many songwriters, Trott is a multi-instrumentalist, covering guitar, piano, synthesizer, and mandolin on his solo release, *Dig Up the Astroturf*, for his Black Apple label. Trott cut the tracks at home. "I used a 16-track Ampex, 2-inch machine and a 1969 API board to record the bass, drums, and vocals," Trott says. "The tracks were later dumped into a Pro Tools|24 Mixplus system for overdubs and processing."

The songs on *Dig Up the Astroturf* are laced with pop hooks and orchestrations that suggest influences as diverse as the Beatles and Television. For example, the opening track, "Walk a Cloud," combines remix-style cut-and-paste effects with retro vocal harmonies, Wurlitzer electric piano, and backward guitar fills.

To get the word out, Trott has recently revamped his Web site (www.jefftrott.com), making it a fun place for fans to visit. For example, the Fan Q&A page lets visitors leave a question that will be answered by the artist on the Web page. Trott's site also includes bios of Trott and his band, audio examples, lyrics, tour info, and lots of photos. "That way if a promoter needs a photo, there are plenty to choose from," Trott says.

He is also looking for more direct ways to connect with fans, such as a chat forum that is in the works. "I'm interested in utilizing fan input, such as getting feedback about mixes, which is what this technology allows," Trott says. "This gives my listeners creative input into the music and makes for greater connectedness between us."

Key Changes

By Marty Cutler

BitHeadz (www.bitheadz.com) has released Unity Session 3.0.2, which corrects known bugs that interfered when the program was used with third-party products. The software synthesizer now works correctly when used in conjunction with Mark of the Unicorn's Digital Performer 3 and Griffin Technology's gPort. . . . **PSPaudioware.com s.c** (www.psp-audioware.com) offers its PianoVerb plug-in for VST (Mac/Win) and MAS (Mac) as a free download. The plug-in simulates reverberation produced by resonating piano strings. . . . Internet music software and publishing company **Recordare LLC** has announced the launch of its online store (http://store.recordare.com) for downloading MusicXML software and sheet music. . . . **BBE** (www.bbesound.com) announced licensing availability for its BBE MP technology. BBE MP restores high-order harmonics to heavily compressed MP3 audio. . . . **Yamaha**'s www.motifator.com Web site gives support for its Motif synthesizer. The site provides tips, support, a user forum, and more. . . . **M-Audio** (www.midiman.net) has released new WDM drivers for its Delta-series digital-audio interfaces. The new drivers support bass management for surround systems when used with Delta PCI sound cards with more than eight analog outputs. . . . **Emagic** (www.emagic@emagicusa.com) offers software that emulates Mackie's Human User Interface (HUI) hardware controller, thereby extending the Logic Control hardware's utility to Pro Tools systems as well as other digital-audio-recording software. HUI Emulator is a download that's free to registered Logic 5 (Mac) users. . . . **Digidesign** (www.digidesign.com) has licensed Sonic Solutions' NoNoise sound-restoration technology for use in Pro Tools TDM 2.0 and Pro Tools|HD systems. . . . **Sonic Solutions** (www.sonic.com) has launched Sonic Studio LLC to facilitate development and marketing of the company's digital audio workstations.

TIPS

Now adjusting one of the faders will move all faders in the group proportionally.

4. You can temporarily separate a fader from the group by holding down the Option key and dragging the fader. That helps to adjust one part of your group submix. Once you release the Option key and grab the fader again, the group is reconstituted.

5. To suspend or delete the group you have created, go to the mini-menu and select Suspend or Delete Group. If you'd like, you can set up a custom key command in the Commands window to open the Delete Group window. The Delete Control Group option is under Mix Commands.

For a streaming movie of this tip from the CoolSchoolOnline library, visit www.emusician.com/cooltip. Also, if you dare, take the quiz to review what you've learned!

—Steve Albanese

Velocity Switch Between Synths

What if you want an electric-piano sound to become a brass stab when you dig into your keys, but the brass patch is on another synth? If you have two synths with multitimbral banks and Velocity-switching capabilities, the answer is simple.

First, create a blank patch on both synths or build a patch with oscillator amplitudes set to zero. Next, create a Velocity crossfade combination on each synth that assigns the blank instrument to a restricted Velocity range. In the electric piano and brass example, assign a Velocity range of 1 to 64 to the electric piano on one instrument

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July 2002, *Electronic Musician* magazine

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B207SW

Rev Up

By Marty Cutler

E-mu

Software version 1.31 for E-mu's XL-7, MP-7, and Proteus 2500 is now available as a free download. The update provides a faster, more stable sequencing engine.

Knobs and List Edit events now support Control Change messages 1 through 119, and the expanded event range shows up for Thin and Erase commands. Saving Presets, Songs, or Patterns automatically assigns the new object as the default Preset.

Beats mode, a 16-track playback-only sequencer, allows you to trigger, latch, and unlatch loops and grooves that are assigned to the unit's trigger keys. The update provides a destination field for programmable triggers and knobs to control external devices, the internal synth, or both.

MIDI data from external controllers can be rechanneled on input. You can defeat the sequencer's response to System Real-Time messages. E-mu; tel. (831) 438-1921; e-mail info@emu.com; Web www.emu.com.

Sibelius Software

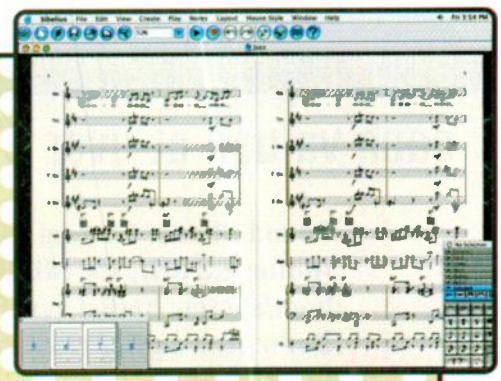
Sibelius 2 (educational edition $299, upgrade $149; professional edition $599, upgrade $199) comes on a hybrid CD-ROM. The Mac version is fully carbonized for OS X. Mac and Windows versions offer a host of improvements, including reorganized menus, enhanced playback features, and new keyboard shortcuts.

The Windows version sports translucent Keypad, Navigator, Mixer, and Properties windows so as not to obscure the underlying notation. Properties is now a permanent window with collapsible panels above the Keypad window, letting you edit any object in the score.

You can input text and time signatures as well as copy, paste, and more without using a mouse; Sibelius 2 automatically handles placement. The new moving cursor indicates staff position.

The new Flexi-Time feature enables input of any voice with a user-definable split point. You can subdivide metronome clicks and group irregular beats. You can map MIDI note numbers to create custom instruments anywhere on the staff.

The new Rubato feature subtly alters tempo. You get six Rubato settings. The Rhythmic feel feature lets you modify notated rhythms and accents to suit different musical styles. Sixteen settings include Reggae, Viennese Waltz, and Swing Sixteenths.



Multicopy lets you make more than one copy of text, musical passages, and other objects horizontally, vertically, or along the same staff. The program's Repeat command can repeat passages, text, lines, symbols, graphics, and individual notes. You can import lyrics directly from the clipboard and copy and paste lyrics to other parts of the score or to other programs. Your computer's arrow keys move between lyric syllables for editing.

Mac users can run Sibelius 2 with a PPC 604e/266 MHz CPU, 15 MB of free RAM, and OS 8.6 or OS X 10.1. The Windows version requires a 486/166 MHz computer with 32 MB of RAM and Windows 95, ME, 2000, XP, or NT4. Sibelius Software; tel. (888) 474-2354 or (972) 930-9552; e-mail infousa@sibelius.com; Web www.sibelius.com.

TIPS

and a range of 65 to 127 to the blank patch. On the other synth, set the blank patch to the lower values, with the brass patch appearing at Velocity ranges from 65 to 127. Assign both combinations to receive on the same MIDI channel.

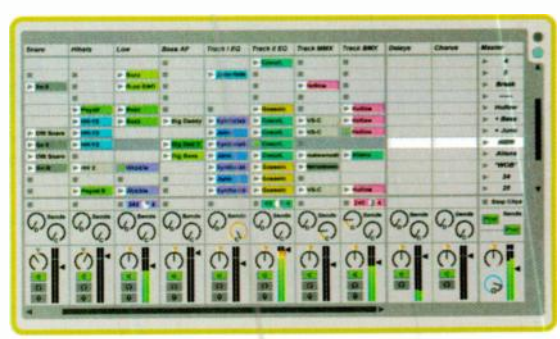
When you play the two instruments from your MIDI controller, the electric piano will appear with lighter keystrokes and the brass stab will show up with a more forceful attack. In fact, you can overlap Velocity ranges at the crossover point to create a Velocity crossfade.

—Marty Cutler

Default Template in Live 1.5

Ableton Live now lets you use a template to create a new performance Set. This feature, available in version 1.5, is especially useful if you use MIDI controllers or a multiple-I/O audio interface, because you don't have to re-create your favorite setups each time.

The Set template lets you route inputs and outputs from Live's mixer to your audio interface, map



Save time using default templates in Live 1.5.

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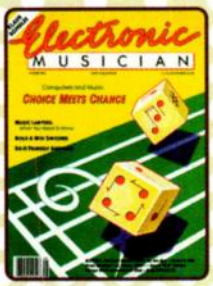
By Steve Oppenheimer



We took chances in our August 1987 cover story—or, more accurately, we discussed the elements of chance and choice in computer-assisted composition. Larry the O—the same character who writes our popular "Final Mix" column—gave a thorough explanation of algorithmic-composition software. He interviewed experts such as Laurie Spiegel and Joel Chadabe, described the various approaches (for example, random versus deterministic and generative versus transformational), and rounded up contemporary computer-assisted composition programs, including Intelligent Music's M and Jam Factory, Spiegel's Music Mouse, and Dr. T's Algorithmic Composer. Don Slepian followed up with story about cool things you can do with Music Mouse.

In the same spirit Tim Dowty's DIY program for the Commodore 64 provided random patch generation for Casio CZ-series synths. Paul Schmidt provided our other DIY story about a MIDI switcher. In 1987 MIDI patch bays and switchers were often more expensive than today's. Schmidt's simple switcher was a cost-effective alternative for those who enjoyed slaving over a hot soldering iron.

Terry Kennedy's story "When, How, and Why to Consult a Music Lawyer" told us how to prepare for meetings with an entertainment lawyer, explained the consulting process, offered advice on how to evaluate a lawyer, and reminded us about following up.

Mike Dwyer's article "A Grand Sample" covered the fundamental aspects of creating a grand-piano sample, including mic selection and placement, sampling and sampler-programming technique (using the Korg DSS-1 sampler as an example), looping, and processing. The tools have changed, but the concepts remain the same today.

Ben Kettlewell's interview with electronic-music pioneer Klaus Schulze was done by submitting written questions (the only way Schulze would agree to the interview), so Kettlewell could no ask follow-up questions. The interview its rom one topic o another, including Schulze's musical background, his compositional process, how the advent of digital synthesis affected his ideas, and how he created his latest album, *Dreams*. It's a decent interview but not one of my favorites.

In 1987 "First Take" was the title of our short-reviews section, which today is called "Quick Picks." (Starting with the July 2002 issue, I adopted the title for my column.) We had four "First Take" reviews in August 1987. Craig O'Donnell loved Korg's $299 KME-56 Mul igraph E , which combined four independent 5-band mono EQs and one 7-band stereo EQ in a single rackspa e. Ian Gary Campbell was pleased with JLCooper's $499 programmable, 8-In/8-Out, MIDI Switch Box Plus (MSB+). Steve Smith gave four out of five stars to Sonus's Yamaha FB01 synth-editing software for the Commodore 64/128 computer. And Walter Daniels gave top marks to Upwards oncepts' Mirage Multi-Temperament Disk, a version of the Ensoniq Mirage OS 3.2 that implemented alternative temperaments but disabled sampling.

We also had two full-length reviews. The most significant was Craig Anderton's enthusiastic evaluation of Passport's Master Tracks Pro 64-track MIDI sequencer for the Mac, Passport's first Mac product and one of its mos successful. In our other review, Jim Fiore lamented the Kawai R-100 drum machine's lack of dynamic voice allocation and programmable outputs but lauded its layout, documentation, MIDI implementation, and overdub functions. Overall, he felt that the R-100 was a good buy for $795.

TIPS

MIDI messages to hardware and Session View slots, and add effects to specific tracks. To create a template, define the Set you want and save it as LiveTemplate in the Ableton Preferences folder.

—Gino Robair

Processing Tom Fills

In a standard-instrumentation mix—drums, bass, guitars, and so on—kick and snare typically play from the beginning to the end of the song, giving the engineer plenty of time to solo and process the signals. Tom fills, however, are relatively short—usually just a few seconds—and may happen only once in a song. Even after setting up a loop around the fill, the engineer has precious little to work with. Furthermore, in a tape-based system, you must also wait for the machine(s) to rewind, lock up, and play again. That can be frustrating, to say the least. Those mixing on a DAW, of course, can create a longer tom-fill section—one more amenable to processing—simply by copying the fill and pasting it repeatedly into a new track. But what about those people mixing from tape-based recorders such as MDMs or analog multitracks?

Here's one solution: just before (or immediately after) recording the drum track, have the drummer play four bars or so of quarter notes on each tom at a slow tempo and record that. You can also record the drummer playing the precise fill over and over. Either way, when it comes time to focus on the toms during the mix, you can simply go to the solo-tom section of tape and do your EQ, gating, compression, or other processing with ease.

—Brian Knave

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WHAT'S NEW

By Marty Cutler

EVENT EZ8

Event Electronics' EZ8 ($199) provides ADAT digital I/O between your computer and Event's EZbus mixer and control surface. You can also add Event's EMP-8, which supplies an 8-channel microphone preamplifier with ADAT digital outputs. The card is also suitable for use with other ADAT Lightpipe–equipped mixers and standalone A/D converters. You can use multiple cards to add additional I/O.

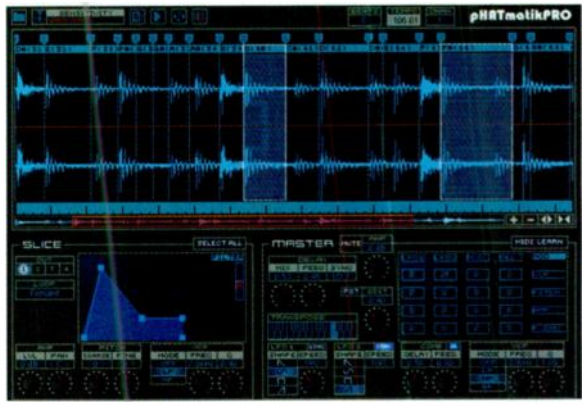
The EZ8 has eight 24-bit, 48 kHz channels. The card's S/MUX mode gives you simultaneous recording and playback of as many as four channels of 24-bit, 96 kHz audio. The EZ8 ships with a pair of two-meter optical cables. Event Electronics; tel. (805) 566-7777; e-mail info@event1.com; Web www.event1.com or www.eventelectronics.com.

BITSHIFT AUDIO PHATMATIK PRO

Bitshift Audio's pHATmatik Pro (Mac/Win; $99.95) is a VST Instrument that turns any VST 2.0–compatible host into a loop sequencer. The plug-in lets you change loop tempo, groove, and pitch independently and replace individual loop segments. You can also impose the feel of one loop on another groove. A 32-bit audio engine powers the software, and the plug-in can load AIFF and WAV files or import Acidized WAV files.

The program features an integrated browser that allows you to quickly preview directories. You can have as many as 16 independent loops running concurrently. PHATmatik Pro provides four stereo outputs; any slice in the loop can be sent to a different channel for processing in the host program. The software's processors include a resonant 2-pole, multimode filter with independent settings for gain, pitch, and ADSR for each slice. The Master Effects section gives you tempo-synced delay and LFOs, a comb filter, an additional analog-modeling multimode filter, and distortion. Most effects parameters can be controlled with MIDI Control Change (CC) messages, and parameters can learn incoming CCs.

You'll need a Pentium II/400 MHz machine with Windows 98, ME, 2000, or XP; or a Mac G3/333 MHz computer with OS 8.6. RAM must support the host program. Bitshift Audio; tel. (413) 623-0000; e-mail sales@bitshiftaudio.com; Web www.bitshiftaudio.com.



NOVATION D-STATION

The D-Station ($799) from Novation is a sound module that emulates the classic sounds of analog drum machines. The 1U instrument features TR-909 and TR-808 sounds derived from analog modeling and sample-playback engines.

The D-Station comes with 25 factory patches and 15 user locations. Tweaks made to individual instruments can be recalled from the front panel or with MIDI Program Change messages. The D-Station offers eight-note polyphony.

The front panel sports dedicated knobs for changing relevant drum sound parameters. For example, knobs for tuning, level, and snap are available for the snare-drum sounds. Controls for decay, attack, and tone are available for other instruments. Some instruments, such as toms, offer front-panel switches for creating low-, mid-, and high-instrument variations. The knobs send MIDI Control Change messages to transmit adjustments to external sequencers. Each instrument can selectively recognize MIDI Note Off messages to achieve gating effects. In addition, you can remap instrument note-number assignments for compatibility with General MIDI instruments and sequences.

The D-Station includes a DIN sync jack and provides MIDI-to-DIN sync conversion, so you can connect 24 ppqn DIN-sync compatible devices such as a TB-303. You get eight unbalanced ¼-inch analog outputs (a master left and right jack and six individual outs), a ¼-inch stereo headphone jack, and MIDI In, Out, and Thru. Novation USA; tel. (800) NOVATION; e-mail salesusa@novationusa.com; Web www.novationusa.com; www.novationmusic.com.

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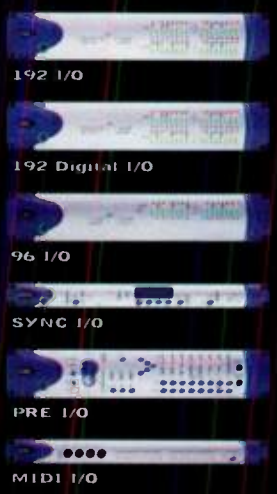

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▶ BRICHTMARK MUSIC

There are a number of programs for desktop music publishing that are able to produce high-quality scores. Although they offer the necessary tools, few of them provide the rhyme and reason behind creating beautiful, legible scores. Steven Powell's *Music Engraving Today* ($29.95) lays out the fundamentals of music engraving and how to use them to produce clear, playable scores and parts.

Part one covers engraving basics, including page fundamentals, rhythm, pitch, markings, and divisi. A section on musical genres covers scores for chorus, solo voice, orchestra, band, music for books, and commercial copy. A section on tools of the trade discusses notation programs, fonts, typography, page layout, and more.

Powell provides examples using Coda's Finale and Sibelius Software's Sibelius. Each step of the process is explained with examples and tips, and quizzes are provided at the end. Elkin Music International (distributor); tel. (800) 367-3554; e-mail brichtmark@aol.com; Web www.elkinmusic.com.

▼ HAL LEONARD

Ikutaro Kakehashi, founder of the Roland Corp., has released his autobiography, *I Believe in Music* ($27.95). Along the way, Kakehashi's book profiles major developments in the field of electronic music, including the advent of MIDI and the guitar synthesizer.

The book is peppered with anecdotes about the music industry and includes behind-the-scenes vignettes describing the development of landmark electronic musical instruments. For example, Kakehashi talks about Roland's DCB (Digital Communication Bus) and the emergence of the MIDI 1.0 specification. The book concludes with a tour of Kakehashi's favorite pipe organs and a collection of interviews with electronic-music pioneers such as Don Leslie (inventor of the Leslie cabinet) and Isao Tomita. Hal Leonard Corp.; tel. (414) 774-3630; Web www.halleonard.com.

▼ PROMUSIC PRESS

Despite remarkable advances in digital sampling technology, the Mellotron is still an extremely desirable vintage keyboard, primarily because of its unique sound. In *The Mellotron Book* ($24.95), author Frank Samagaio recounts the development of and the principles behind tape-replay instruments.

The lavishly illustrated book includes interviews with a number of famous Mellotron players, as well as descriptions of the numerous tape-replay instruments, such as the Chamberlin, the Novatron, the Birotron, and the prototype Digital Mellotron. The appendices include a list of sound libraries for the instrument, Mellotron advertisements, and albums in which the instrument appears. Hal Leonard Corp. (distributor); tel. (414) 774-3630; Web www.artistpro.com.

▼ PRESONUS FIRESTATION

The FireStation ($899.95) from PreSonus is a high-speed digital-audio interface that implements Yamaha's mLAN protocol and works on a standard FireWire bus. This allows you to daisy-chain as many as four FireStations or multiple hard drives. The interface gives you 24-bit audio at sampling rates of 44.1 and 48 kHz.

The FireStation features a built-in 10-channel analog mixer; the manufacturer states that, because it's analog, it eliminates latency problems as you monitor the audio. On the front panel are two inputs with built-in mic preamps, two instrument-level preamps, 48V phantom power, a 20 dB pad, a defeatable tube circuit, and a ¼-inch stereo headphone jack.

The rear panel has eight channels of analog I/O on balanced ¼-inch jacks; a pair of balanced ¼-inch preamp sends; a pair of unbalanced ¼-inch main outputs; ADAT Lightpipe I/O; and a port with an adapter for coaxial S/PDIF I/O and MIDI In and Out. With multiple units, MIDI I/O can be increased to 64 discrete MIDI channels. BNC jacks provide word-clock I/O, and the FireStation can act as master or slave for sync. The FireStation provides a ¼-inch footswitch input for punching in and out. PreSonus Audio Electronic; tel. (800) 750-0323 or (225) 216-7887; e-mail presonus@presonus.com; Web www.presonus.com.

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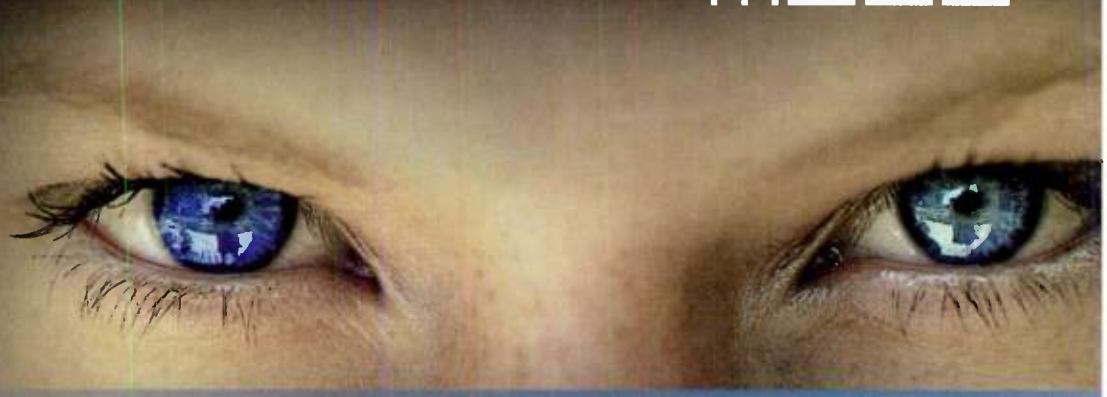

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Laboring to keep wind controllers in optimum working condition is necessary because acids from perspiration erode rubber parts and gradual degradation of reeds is inevitable. If your Yamaha WX5 MIDI wind controller needs a little TLC, WindWorks Design is happy to provide you with the essential tools to keep your instrument in shape. The WX5 Maintenance Kit ($29.95) gives you a spare reed, mouthpiece patches, a cleaning brush, a screwdriver set, and Silicone7 lubricant. Silicone7 ensures lubrication of moving parts without causing damage to wind-controller boots or rubbers; it is unaffected by moisture, salts, or mild acids.

The package includes instructions and a carrying case. The instructions explain how you should use the tools and parts, and they provide important setup information, which includes gain, calibration, and switch settings. The carrying case has extra room for additional mouthpieces and other accessories. WindWorks Design; tel. (585) 225-2023; e-mail whitfiel@aol.com; Web www.windworksdesign.com.

KORG KP-2 KAOSS PAD

Korg's KP-2 Kaoss Pad ($350) improves on its predecessor with more effects, greater sampling capabilities, and added features geared toward dance-music production. The KP-2 gives you as much as six seconds of 44.1 kHz audio for each of the two sampling keys.

The KP-2 features 100 effects programs, including pitch shift, distortion, filter, wah, tremolo, flanger, reverb, and gate. Many of the effects synchronize to tempo, and the Auto BPM feature can calculate tempo automatically, sync to MIDI Clock, or lock to the Tap switch. The instrument holds a variety of built-in synthesizer and drum sounds and patterns. You can also sample sounds through the unit's effects programs.

The Pad Motion feature records and reproduces sound alterations created by hand movement on the Touch Pad. You can now mute incoming audio but let the tail of the effect remain. The mute can also be used for manually gating an incoming signal.

The KP-2 provides MIDI In and Out ports, and it lets you record and play back moves from an external MIDI sequencer. Control assignments are programmable, so you can use the Kaoss Pad as a control surface for other MIDI devices or for a surround system. The KP-2 has stereo pairs of RCA jacks for analog line-level input and output, as well as a phonograph input. Korg USA, Inc.; tel. (516) 333-9100; Web www.korg.com.

SONIC SYNDICATE ORION PLATINUM

Orion Platinum (Win; $199) from Sonic Syndicate is a virtual studio that combines a sequencer, synths, samplers, effects processors, and a mixer. The program provides a maximum of 32-bit, 96 kHz audio and comes with a host of DXi and VSTi plug-ins. The manufacturer claims that Orion Platinum fully supports third-party plug-ins in those formats and has low latency for MIDI response.

Orion Platinum offers two sequencer types: the Polyphonic Piano Roll and the Monophonic Step Sequencer. Both sequencers support Velocity-sensitive step programming. You can use hardware MIDI controllers for input, as well as record and edit knob movements within either sequencer. Simply click on a synth parameter and move a hardware knob or fader, and you've assigned the controller.

The sequencers offer tracks for importing prerecorded WAV files, and you can render sequence output in WAV format. You can export audio files as 16-bit or 24-bit WAV files with 44.1, 48, or 96 kHz sampling rates. The mixer supports 128 audio channels. You get two insert effects, a 4-band parametric EQ per channel, and two effects sends with variable send levels for each channel.

Synths include the Ultran, a sample-playback synth that offers blending features for as many as four oscillators; Plucked String XT, which employs physical modeling to simulate plucked instruments; XR-909, an analog drum machine simulator; and Bazzline, which emulates the Roland TB-303. You also get a sampler that can load Akai S5000 and S6000 and Kurzweil samples along with accompanying keymaps and Velocity layers.

Orion requires a Pentium II/400 MHz computer with 64 MB of RAM and Windows 98, ME, NT, 2000, or XP. Sonic Syndicate; tel. 49-179-463-1826; Web www.sonic-syndicate.com.

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SOUND ADVICE ▲▲▲▲

▼ OMNIMAN SOUND LABS

More than 600 MB of construction kits for abstract hip-hop are on *Crate Digging*, vol. 1 ($39.99). The set comes on two CD-ROMs: one audio CD and a data CD-ROM of WAV files in Sonic Foundry's Acid format.

The construction kits offer beats, bass loops, special effects, chords, and melodies. In addition, there are more than 90 MB of single samples, consisting of basses, keyboards, pads, and more. Omniman prepares the samples with proprietary processing to imbue samples with an old-school, lifted-from-vinyl vibe.

Planet 3 Piano ($99.99) contains more than 1 GB of samples of a 1979 Yamaha C7 grand piano. The 24-bit, 44.1 kHz samples are available in Tascam GigaSampler, Steinberg Halion, and Emagic EXS24 formats. The instrument was captured with Neumann KM 56 microphones, Neve 1073 preamps, and Apogee 24-bit converters. The instrument offers four levels of Velocity, and samples include pedal resonance. Omniman Sound Labs; tel. (415) 922-1112; e-mail info@omniman.com; Web www.omniman.com.

PATCHMAN MUSIC

Patchman has released new sound banks for Yamaha's EX5 and EX5R synths. *EX5/EX5R*, vol. 1 ($39.95), relies exclusively on the synth's VL physical-modeling engine for expressive sounds suitable for wind and breath controllers.

The sound banks provide a total of 128 patches, ranging from jazz trumpet variations and soprano saxophone to exotic hybrid instruments such as Bow Piccolo and Flurinette. In addition to wind-controller assignments, patches make use of the EX5 controller knobs, so you can adjust reverb and delay levels, early reflection level, and three bands of EQ in real time. Patchman Music; tel. (216) 221-8282; e-mail matt@patchmanmusic.com; Web www.patchmanmusic.com.

▲ EASTWEST

Four sound categories in audio and WAV formats are in *Red Box* ($399.95), a 20-CD set of sound effects.

The first volume focuses on backgrounds, ambiences, and single sounds such as rivers, winds and storms. The second volume features human sounds and ambience—shouts, cheers, applause, laughs—recorded in streets, restaurants, museums, and other places. The third volume offers city sounds ranging from airplanes and motorbikes to industrial squeaks and squeals. The fourth volume contains special and unusual effects, such as saws, blowtorches, cartoon effects, and guns. EastWest; tel. (800) 969-9449 or (310) 271-6969; e-mail sales@eastwestsounds.com; Web www.soundsonline.com.

▼ TC-HELICON VOICEONE

TC-Helicon's VoiceOne ($1,299) offers voice modeling and four types of pitch shifting. The manufacturers claim that the unit conveys natural and accurate pitch shifting of vowels, hard consonants, and sibilants and that the unit boasts faster processing with fewer errors and artifacts than other pitch processors.

The VoiceOne provides 48 correction scales, with 50 user locations for storing your own. Pitch shifting is adjustable over 600 cents. Built-in customizable maps let you create your own harmonies.

The VoiceModeling feature changes vocal character and alters phrasing. An Inflection parameter gives you control over pitch contours, and the company's patented FlexTime feature allows you to shrink or stretch phrases without changing pitch. Independent adjustments let you dial in breathiness or growl. Real Vibrato models vibrato without LFOs. The Spectral parameter permits you to simulate changes in the singer's vocal tract such as dialing in an EQ curve that boosts highs while leaving consonants and sibilants untouched. The unit transmits front-panel adjustments using MIDI Control Change messages.

The VoiceOne offers 24-bit D/A conversion at sampling rates of 44.1 or 48 kHz. Stereo pairs of analog inputs and outputs are on balanced XLR connectors. You also get coaxial S/PDIF digital I/O and a ¼-inch footswitch jack. TC-Helicon; tel. (805) 373-1828; Web www.tc-helicon.com. ●

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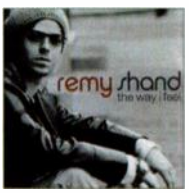
By Matt Gallagher

Sweet Soul Music

Motown artist Remy Shand resists the "neosoul" label that is often associated with his music. Shand, who hails from Winnipeg, Manitoba, learned to craft songs in large part by listening to his father's collection of vinyl records. "I grew up on Miles Davis and a lot of jazz fusion, as well as Marvin Gaye and Stevie Wonder," Shand says. "The one model I had to put those [styles] together was Steely Dan. I'm into that idea of perfection. It's weird to be put into this whole neosoul category, because I didn't make a hip-hop record."

Remy Shand's self-recorded album launches his major-label career.



The Way I Feel is a collection of silky-smooth, in-the-pocket R&B tracks that would sound right at home on vinyl. Shand had full control of the project as performer, engineer, and producer: "I basically did everything on the record but master it," he says. "I've always studied the great producers and the way that orchestration goes hand in hand with engineering."

Shand's studio is located in a condominium bedroom, and he recorded acoustic drums in the basement of a house. "I liked working in my own environment," he says. "I ended up recording half the record before I was signed just to show [the label] that I could deliver a disciplined product. They helped me buy gear for my studio."

Shand credits his father with sparking his interest in recording. "I was around his home-recording setup," he says. "He had this 4-track Tascam 244. I started fooling around with multitracking." Shand's father advised him to master 4-track recording before investing in more elaborate tools. "I spent five or six years working on a 4-track, making it sound like a 24-track studio. Once I moved on to other kinds of recording equipment, it was easy."

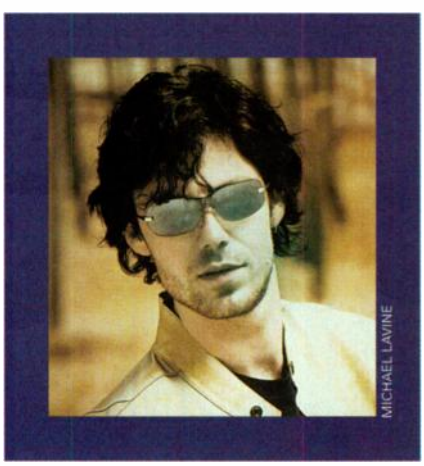
Shand recorded album tracks through a Roland VM-C7200 digital mixer to a Roland VS-880 and three VSR-880s, using their built-in effects "as well as an Ampex 16-track 2-inch machine. I used the best of both worlds," he says. A vintage Echoplex and a spring-reverb unit supplied additional effects. He warmed up vocal tracks with a pair of Avalon Design VT-737 preamps and used both high-end and low-end microphones. "I had some mics that I bought at thrift stores, some Neumann mics, and an AKG kick-drum mic," he says.

Shand believes that "drum tracks can change the essence of a recording. It's a matter of finding all the right components for a track." Besides recording live drum tracks to tape, he also gathered samples into his Akai S5000 sampler. "I used old beatbox samples. I took sounds from a Roland R-70 drum machine and a Rhythm Ace—one of those archaic drum machines with big bossa-nova push buttons."

Genuine vintage keyboards highlight the album. "I used a Fender Rhodes and a Wurlitzer," Shand says. "I have a Hohner Clavinet Model C and a D6. I have this Realistic [Concertmate] MG-1. It's a Radio Shack Moog." He also played a Hammond B-3, Korg CX-3, and Roland JP-8000. "For the strings, I used the [InVision Interactive] *Mike Pinder Mellotron* sample CD-ROM."

By design, the album's mixes resemble those of 1970s soul classics. "I mixed on [Yamaha] NS-10s and Tannoy speakers, but mostly, I used this set of home speakers," Shand says. "I grew up listening to records on these speakers." He still favors analog sounds over digital. "It's unpredictable what's going to sound warm and what's going to push that tape's envelope," he says. "My heart's yearning for those old 4-track tapes." ●

For more information, contact Motown Records; Web www.motown.com or www.remyshand.com.



***The Way I Feel*/Remy Shand**

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* As reported by Music Trades Magazine April 2002 issue.

BOTTOM FISHING

A big, deep bottom end is a key mix ingredient in today's hit records. True, some types of music—folk, for example—wouldn't sound right with gargantuan bass and drums pounding away. But urban, rock, pop, country, and other music styles are likely to feature a seat-warming bass line and throbbing kick drum.

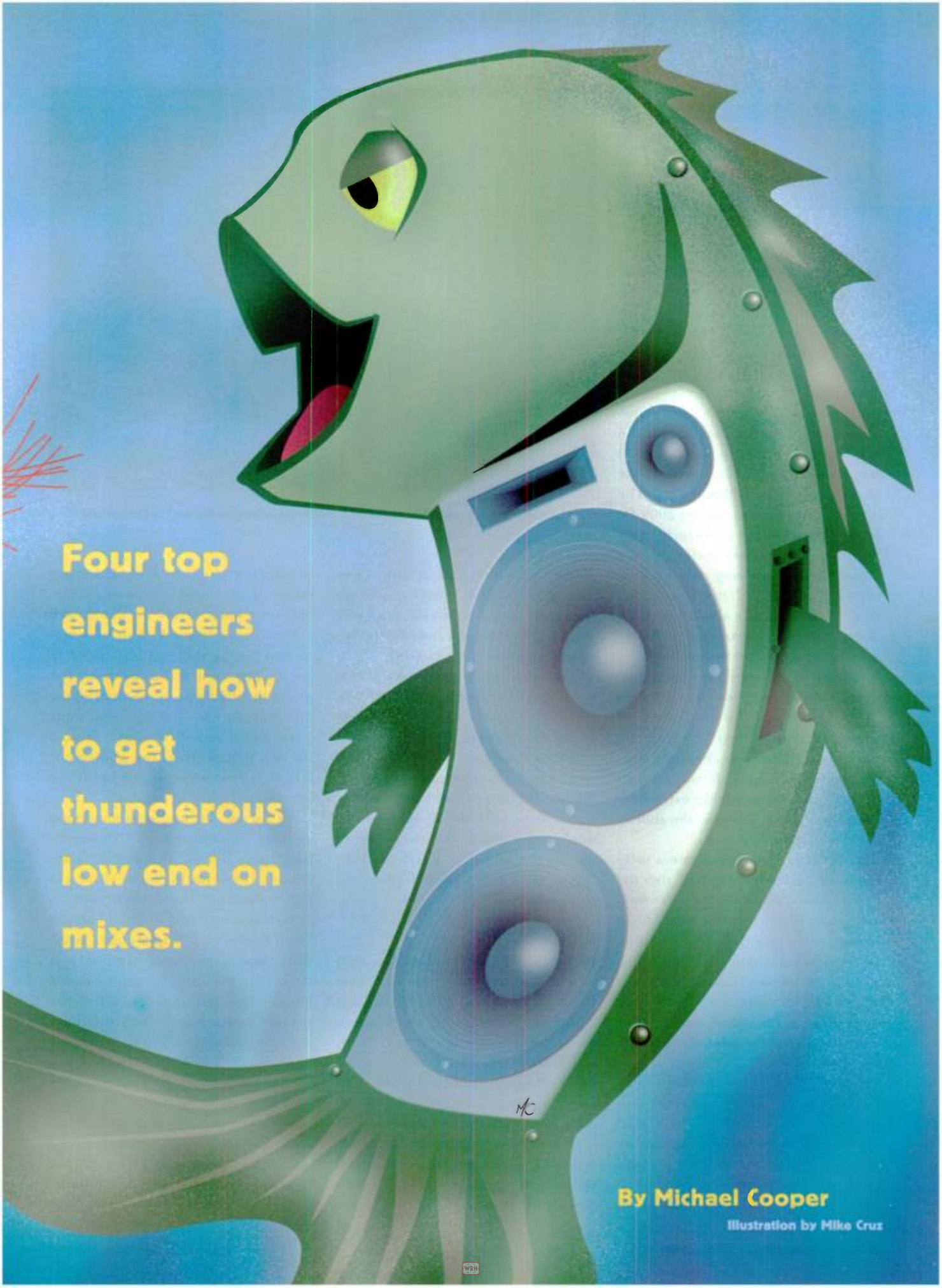
The challenge, of course, is getting a big bottom without the mud flaps. You want the low frequencies to sound huge but not murky. You want them to be deep and loud enough to vibrate your chair—at least with the subwoofer engaged—yet controlled enough that they don't clip boom-box speakers. At the same time, the lows must sound big on small speakers or else half the population will never hear your genius.

How does one achieve a mix with a monster low end? How do you know when the balance is just right and you haven't gone overboard? I interviewed four top recording and mix engineers—Joe Barresi, Chris Lord-Alge, Roger Moutenot, and Hugo Nicolson (see the sidebar "Lords of the Low End" for their credentials)—to find out how each approaches this challenge. Naturally, our discussions centered around recording and mixing bass and drums, as that's mostly where the thunder rumbles. I'll begin the quest for the perfect storm with recording tips, followed by mixdown techniques.

BEGIN WITH THE BASS-ICS

The surest way to avoid the "garbage in, garbage out" pitfall of mixing is to record a great musician playing a superior rig in the first place. Recording electric-bass guitar is no exception, and it makes no sense to cut corners early in the process.

"I'm a firm believer that the source is the key to the sound," Barresi says. "Certain amps work better than others, and certain DIs [direct injection boxes] work better on certain songs. You might even need to change strings and picks to get the sound you're after. If it takes all day to get a bass sound, then that's the way it goes." Barresi expresses a fondness for recording bass through an Acoustic 360 (the same model that Led Zeppelin's John Paul Jones liked to use), saying it has "the most insane amount of bottom end of any amp."



Four top engineers reveal how to get thunderous low end on mixes.

By Michael Cooper

Illustration by Mike Cruz

BOTTOM FISHING

MATT SILVA

Chris Lord-Alge prefers to use EQ rather than a subharmonic generator to beef up the low end of his mixes.

Moutenot is a big fan of trial-and-error experimentation at the source. "It's like, let me try this DI box, let me see if this amp is going to work, let me put this mic on the amp, and let me move the mic back and put it in this space," he explains. "It's all about getting the chain right."

Some engineers prefer to simultaneously mic the electric-bass cabinet and record the instrument through a DI box, combining the two signals at the mixing console (see "Master Class: The Bottom Line" in the August 2000 **EM** for more on that and other techniques in this article). Others prefer the old-school method of using only a mic to record bass tracks. After years of going direct, Nicolson now shuns the ultra-clean sound of DI boxes. He prefers to mic the bass cabinet with a (vintage) Neumann U 47 large-diaphragm condenser, placed "right on the cloth."

"I've always gone for kind of an old sound," Nicolson says. "I think the sound of a DI has less character than that captured by a mic. If you spend all of your time trying to make everything sound too clean, you lose the soul of the record a bit."

Barresi and Moutenot share a technique for miking bass cabinets: they use a spare standalone woofer as you would a large-diaphragm dynamic microphone to capture the sound. That is done simply by wiring the woofer's terminals to a mic pre or DI box (using standard 2- or 3-conductor cable) and then aiming the woofer at the sound source. (For more detail, see the sidebar "Speaking Volumes.")

Barresi recalls his introduction to the technique: "I once read that they recorded Paul McCartney's bass [during the Beatles era] by pushing another cabinet in front of his bass rig and using that as a 'reverse microphone.' I've since used the same technique, placing a 15-inch JBL in front of an Ampeg SVT cabinet." Barresi combines the signal from his "woofer mic" with that of a standard mic, mixing the two signals together at the console.

Moutenot usually prefers to use the woofer mic in tandem with a DI box. "I'll put the woofer right in front of the bass-cabinet speaker, about eight inches to a foot away, and it's awesome," he says. "Any clarity you want, you get from the DI." He then delays the DI signal so it's in phase with the signal from the woofer microphone. Moutenot recommends the Demeter VTDB-2b Tube Direct as "a really good DI box" for recording bass.

KICK START

Moutenot also used a woofer as a microphone to record all the kick-drum tracks on Paula Cole's last two albums, *This Fire* (Imago/Warner Brothers, 1996) and *Amen* (Imago/Warner Brothers, 1999). Depending on how much low end he wanted to capture (the amount is proportional to the speaker's size), Moutenot used a 10-inch to a 15-inch woofer to record the kick. After removing the front head from the kick drum, he secured the woofer to a spare snare-drum stand and angled it toward the open end of the kick. If a spare snare-drum stand wasn't available, Moutenot would secure the woofer with rubber bands to the kick drum's lugs so that the speaker was suspended in air, facing toward the inside of the drum. In either case, he also miked the kick with an AKG D 112 to add some clarity to the sound. Moutenot printed the two signals (from the woofer mic and D 112) to separate tracks for the greatest flexibility at mixdown.

"In a sense, the woofer is sometimes my EQ," Moutenot says. "If I want a little more bottom that doesn't have the top, I favor the woofer or blend it in just so there's this nice round tone."

Barresi is inclined to use a Yamaha NS10 woofer as a "super-duper large-diaphragm microphone" to record kick drum. He mounts the cannibalized woofer to a mic stand, situates the speaker so that it faces the kick drum's opening, and wires a 2-conductor cable to the woofer's terminals. "The last time I did that," says Barresi, "I ran the signal into a DI, padded the DI down, and routed the signal to a mic preamp in a Neve console."

Barresi often uses more than one mic to record kick. His miking techniques vary, but he'll "always have a mic that's

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JESSI MACDONALD

When recording bass, Hugo Nicolson prefers miking the cabinet to using a DI box.

outside the kick drum," he says. "Sometimes I'll put a mic three or four feet out to capture more of the low-end wave." To reduce cymbal bleed into the distant mic, he builds a tunnel between the mic and kick drum by draping a blanket over some flanking mic stands. He occasionally varies that technique by placing a second kick drum at the far end of the tunnel. "I'll put a mic inside the second kick and drape a blanket over both kicks so I don't get a ton of cymbal bleed in the mic," Barresi says. The second kick serves as a low-frequency resonator, bolstering the bottom end of the kick the drummer is playing.

Barresi uses a lot of compression on kick drum while recording to tape and when mixing. "I've been really happy with the Focusrite Red compressor," he says. "I'll put that on a bus for all of my kick mics and commit them all to one track while I'm recording. I've also used a Teletronix LA-3 or a Urei 1176 on kick."

Nicolson is also a big fan of recording bottom-end instruments with compression, noting that it makes it easier to balance levels. He prefers to use a dbx 160X compressor on electric bass and a vintage 1176 or Fairchild compressor on kick drum. But when it comes to miking techniques, Nicolson's approach runs counter to Barresi's. "The fewer the mics on everything, the better," Nicolson says. "I just keep things really simple." He typically places a Neumann U 47 or an AKG D 112 at the entrance to, or slightly inside, the kick drum's shell (with the front head removed).

BODY DOUBLE

On many records, what seems to be one huge sound is frequently a combination of two or more different sounds. Lord-Alge points out that it's quite common for engineers to beef up the bottom end of a recording by adding Roland SP-808 drum-machine hits, loops that are varisped down in pitch, or what have you. Another technique is to double the electric-bass-guitar part with a unison synth-bass track.

"One of the new trends is having a subchannel for the bass that's just a subharmonic synth," says Lord-Alge. "You put a little bit of that in just to get it really thundering."

Of course, it's not appropriate to double bass parts with synthesizers in every style of music. Moutenot never uses synthesizers in that way, and Barresi—who works primarily with organic "stoner rock," alternative, and rock bands—almost never resorts to using them.

"It's pretty much taboo," Barresi says. "There might be a section of a song, like a part of a verse, where we might add some synth bass in order to give it a little more push. But for the most part, everything I record these days is a four-piece band: two guitars, bass, and a drummer."

TECTONIC SHIFT

Barresi further beefs up bass and drum tracks at mixdown with signal processors. One of his favorite techniques is to use a subharmonic generator or pitch shifter to detune the pitches down an octave.

"I definitely use some of that when I'm mixing," Barresi explains, "but never in the tracking stage. I like the Furman Punch-10 [Model PCH-10], which is basically like the original dbx 120 subharmonic synth but a little bit tighter sounding on things like kick drum. I usually put a bit of the kick and maybe the toms through the Furman, and sometimes I put the bass through it, as well. The Furman is stereo in and out, and it has a subwoofer output for suboctave stuff. It has a limiter built in, which I like because I can tighten up how much of the bottom is really coming out of the box itself and not have to go out to another piece of gear."

Barresi also likes the dbx 120, but he uses it for processing bass guitar instead of drums. He prefers the original 120 to the reissued 120A because the older unit has a dedicated control for tweaking a band in the 20 Hz area, out of the way of other bass-frequency bands. "The dbx unit offers a lot more control than the Furman," Barresi says. "It seems to work better on bass guitar."

When he can find a studio that has one, Barresi prefers to work with the discontinued Publison Infernal Machine, which, he says, "blows away" all

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other boxes that do octave dropping. He likes to use the Publison to detune drum-room mics, bass guitar, or toms, mixing the processed sound in with the original, dry sound.

Barresi also likes AMS processors for pitch-shifting duties. "On a lot of the Melvins records," he says, "I pumped the drum-room mics back through an AMS DMX 15-80S sampling delay and dropped it down an octave. On slower things, you can hear the sound of the cymbals and kick in the room drop, and it sounds incredibly low and bizarre.

"The guy I learned this from was Jason Corsaro, who I think is probably the most innovative engineer around. He did the [eponymous] Power Station record [Capitol, 1985], which has a drum sound that's just phenomenal. He got a lot of the sounds in a small room, but it sounds huge. He did it with a Publison, detuning the room and the toms. He also engineered Soundgarden's *Superunknown* [A&M, 1994], which I think has probably the greatest bottom end of any record around. That was a lot of the same kind of thing, pumping the bass through a subharmonic generator. But he'd actually reamp the bass back to a P.A. and mic the P.A. up."

Of course, one man's pleasure is another man's pain. Mix engineer Lord-Alge doesn't like to use subharmonic generators. "I'm not into any of that," he says. "They can run away on you. If it's built into the track and that's the kind of thing the producer is looking for, then great. But I can generally go in there and get what I want with EQ."

Moutenot "sometimes, but rarely" uses a subharmonic generator. "I rely on tape speed to get deep bottom end," he says. "I cut Paula Cole's record at 15 ips on an analog multitrack with Dolby SR, which really gave me a lot of what I was looking for."

PLEASIN' TO SQUEEZE

Most engineers use compressors to beef up bass tracks, but not always in the way you might think. Barresi often uses an LA-2A as much for its saturation characteristics as for its dynamics processing capabilities. "You can turn the LA-2A into an amazing, smooth fuzz box," he says. "I prefer turning the input up a bit but not limiting it that hard. That gives you some grit from the tube. I'll also use a dbx, an RCA BA6A, or an 1176 to compress the track further." In addition, Barresi likes to mix with a Tube-Tech LCA 2B stereo compressor placed across subgrouped drums, feeding mostly kick, snare, and toms into the compressor.

Moutenot and Nicolson both like to subgroup drums and bass at mixdown and send them through a stereo compressor. But on separate bass tracks, Moutenot usually uses relatively small amounts of compression. "If it's a rock song," he says, "I'll lean toward using an Empirical Labs Distressor on the bass. I usually go for what I've found to be kind of a Fairchild preset: Distortion 3 in, 6:1 [ratio], and 4 and 4 on the attack and release." (The Distressor's attack and release control-knob settings are not marked in milliseconds or seconds, because the time-constants ranges vary with the unit's different presets.)

To say that Moutenot likes the Distressor would be an understatement—he owns ten of them. Moutenot also likes to use a vintage LA-2A or Neve compressor on bass. On Paula Cole's album *Amen,* he used a Collins (an old Army tube compressor) to process Tony Levin's bass-guitar tracks.

Lord-Alge owns mostly vintage compressors and asserts that, in general, "you can't beat blackface 1176s" for processing bass-guitar tracks. Then again, if a bass track's dynamics are "all over the map," Lord-Alge uses a Distressor to rein them in. "The Distressor is for mangling things that really need to get hammered," he says. He also uses a Distressor on a kick-drum track when "the dynamics are too overwhelming for the song. I'll flatten it out a little bit so you can hear all the syncopation."

THE GREAT EQUALIZER

One of the most powerful tools for sculpting a huge bottom end on a mix is equalization. Though acknowledging that the proper use of EQ is highly contextual (that is, dependent on what each song needs), the four engineers I interviewed nevertheless offered general suggestions on how to approach the

COURTESY ROGER MOUTENOT

Roger Moutenot used a "woofer mic" and an AKG D 112 to record all of the kick-drum tracks on Paula Cole's last two albums, *Amen* and *This Fire.*

task in order to achieve a desired effect.

Lord-Alge usually leans toward using shelving, as opposed to bell-curve, EQ on bass instruments and especially on drums. "When you're equalizing bass," he says, "the worst thing you can do is start messing too much with adding the wrong frequency in the low end. You don't want one note to stick out in the whole range. You want the broadest boost possible." To make the bass audible on small speakers, Lord-Alge sometimes boosts around 400 Hz. But that doesn't mean he thinks in terms of frequencies while applying EQ to mixes. Rather, his approach is purely instinctual. "I close my eyes and turn the knob until it feels right," he says, "and don't get too technical about it."

Moutenot is in the same camp. "I just don't have methods to my madness," he

SPEAKING VOLUMES

A woofer, like any loudspeaker, typically converts electricity into sound pressure. However, it can also be made to work in reverse. When sound pressure is applied to the speaker's cone, the woofer acts like a dynamic microphone, albeit a very large large-diaphragm dynamic. The mass of the woofer is much bigger than a typical mic's diaphragm, resulting in poor high-frequency and transient responses (which is not a problem for this particular application). Also, it takes relatively high sound-pressure levels to produce any output from the woofer. But the bottom end it captures is deep.

"The output is not incredibly loud, as you can imagine," says engineer Roger Moutenot. "You need a lot of force to get the speaker to move." Moutenot likes to use a 10- to 15-inch woofer as a "reverse mic" to record kick drum and bass guitar. To do this, he first removes the female XLR connector from the end of a mic cable, connects the cable's bare wire for pin 2 (positive) to the woofer's positive terminal, connects pin 3's negative lead to the woofer's negative lead, and leaves the ground (pin 1's lead) unconnected at the woofer's end (see Fig. A). Then he plugs the cable's male XLR connector in to the mic input on a mic preamp to amplify the signal. The line-level output of the preamp is patched to a mixer and, from there, to a multitrack recorder.

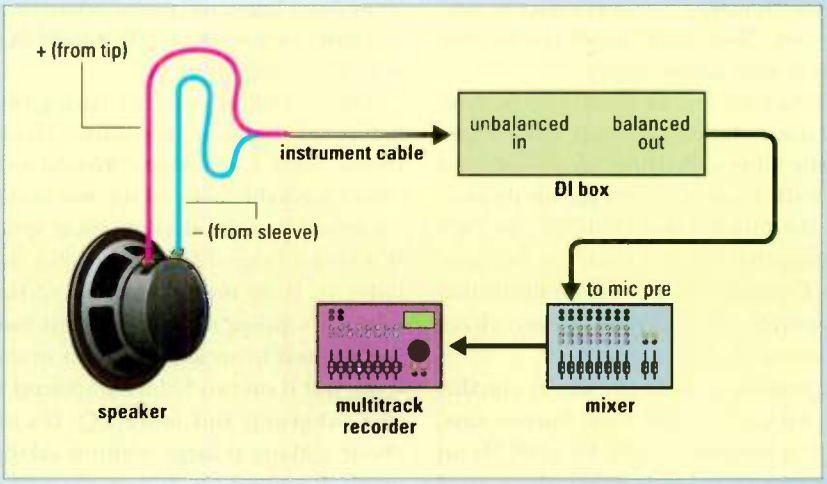

FIG. B: Joe Barresi's reverse-mic setup connects the woofer to the DI box with a 2-conductor instrument cable.

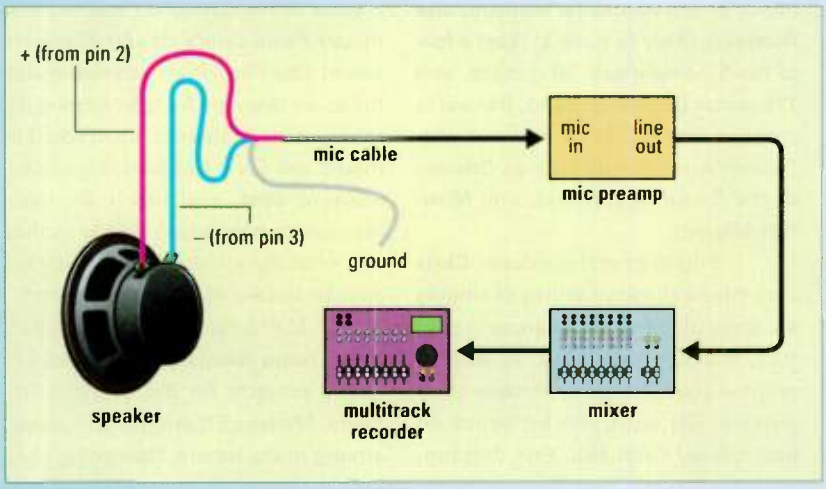

FIG. A: Roger Moutenot uses a woofer as a reverse microphone.

Engineer Joe Barresi often employs a slightly different setup for his reverse mic. He uses a 2-conductor instrument cable (rather than a mic cable) to connect the woofer to a DI box that is placed before the mic preamp (see Fig. B). Barresi connects the instrument cable's positive (tip) lead to the woofer's positive terminal and the cable's negative (sleeve) lead to the speaker's negative terminal. At the other end of the cable, he patches the tip-sleeve phone plug to the unbalanced input of a DI box. The balanced output of the DI box is then routed to a mic input on a mixer, which routes the signal to a multitrack recorder.

says. "I keep my eyes closed, and I'm not even looking when I reach for the EQ—if I EQ at all." Moutenot does admit that he fairly often rolls off the highs on bass guitar. "It makes it sound cleaner to me," he says. "You just hear all the bottom and not the garble up top."

Before he tweaks the EQ on individual tracks during mixdown, Barresi generally adds a shelving boost—often 3 to 4 dB from 40 to 60 Hz on down—on the mixer's master stereo bus. "I'll approach it that way first," he explains, "so I'm adding a lot less on individual channels. That creates fewer phase problems."

Speaking specifically about equalizing kick drum and bass, Barresi says, "If I'm boosting a little bit at 60 Hz on the kick to make it pump through, I might need to use a (highpass) filter at around 25 Hz to cut some subbottom. That keeps the superbottom out, which is important because I'm adding some back with the dbx 120 or Furman. But I definitely won't roll any of that stuff off on the bass. I want the bass to be full-range all the way."

Barresi prefers to use a wide- rather than narrow-bandwidth boost on bass guitar, boosting as needed around 300 Hz for a rounder and warmer sound or around 700 Hz for more edge and growl. "I'll probably add a little top around 3 kHz to make it poke through," he says, "and pull everything off the top end around 10 kHz and above. Sometimes I'll add some distorted bass in, as well, because that can give it some clarity, and I'll use my main (original) bass track for the subbottom, warm, round part."

Nicolson notes that getting the kick and bass to complement each other is a big part of getting the bottom end of a mix in proper perspective. That said, he has no set rules for equalizing the two instruments. In fact, he feels that getting the correct fader levels is generally more important than tweaking the EQ of individual sounds.

GAINING GAIN

For situations in which you can't get the bass to cut through by tweaking the EQ, Lord-Alge has a solution: bring the track up on two faders. "I'll print the bass—the exact same performance—on two tracks just to have more juice, more gain hitting the console," he says. "It makes a huge difference. Sometimes one fader isn't enough." He usually EQs both tracks the same way.

What's the benefit of using two faders for the same bass part? "Headroom," says Lord-Alge. "Would you rather push the fader all the way to the top or put it at the absolute sweet spot? It makes a huge difference where the fader is. If an important part of the mix isn't going to 'happen' on one fader, bus it to an aux that adds to the level, put it on two faders, and send it to a subgroup and more EQ. It's all about making it large without taking up all the mixer's headroom."

Barresi, too, usually ends up with the bass on more than one fader at mixdown. Part of his process typically entails reamping the bass track in order to make it distort. "I'll just reroute the DI track back through a pedal and an amp and remic it," he says. "Or I might use a Sovtek head and a Palmer PDI-03 speaker simulator." To preserve the original, clean DI track, Barresi will *mult* it (split its signal into two audio paths) before reamping it. "I normally have three tracks of bass: DI, amp, and reamp," he says.

JUDGMENT DAY

I've discussed a lot of techniques for beefing up the bottom end. But all the signal processing in the world will get you nowhere if you can't accurately assess the end result. If you really want a killer bottom end on your mixes, you need to mix in a familiar control room that has good acoustics, a reasonably flat frequency response, and accurate reference monitors.

"Don't even think you're going to get the bottom in the ballpark if your monitors don't make sense," says Lord-Alge. "And trying to get the bottom end right in a room that you're not already familiar with—whoa, you're already wrong. It's like saying, 'I'm not

LORDS OF THE LOW END

Whether he's tracking the alternative band the Melvins, mixing Anthrax (I'm referring to the speed-metal band here), or producing Fu Manchu, **Joe Barresi** is likely to have at least a few of his 50 amplifiers, 30 guitars, and 175 guitar pedals on hand. Barresi is perhaps best known for his work with "stoner rock" bands such as Queens of the Stone Age, Kyuss, and Monster Magnet.

Engineer and producer **Chris Lord-Alge** has mixed scores of albums for some of the biggest names in pop, rock, country, and blues, as well as original soundtracks for dozens of hit movies. His work can be heard on projects by Faith Hill, Eric Clapton, the Black Crowes, Neil Diamond, Hole, the Dave Matthews Band, Savage Garden, Green Day, B. B. King, and many others.

Roger Moutenot has many credits to his name. He tracked and mixed Paula Cole's double-Platinum album *This Fire*, which was nominated for seven Grammy Awards. Among the other artists Moutenot has tracked or mixed are Elvis Costello, Lou Reed, Rosanne Cash, and 10,000 Maniacs. Moutenot's production credits include four critically acclaimed albums by the eclectic indie-rock band Yo La Tengo.

U.K.-based engineer and producer **Hugo Nicolson** has tracked or mixed projects for Björk, Dido, Embrace, Melissa Etheridge, and Jewel, among many others. Upcoming projects include mixing the soundtrack for George Clooney's next feature film.

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BOTTOM FISHING

really familiar with driving this car, but I'm going to get in this race anyway.'"

Lord-Alge goes on to note his preferences for studio monitors: "I have Yamaha NS10s and a $300 sub made by Infinity. That's rig No. 1. Rig No. 2 is a pair of M&K [Miller and Kreisel] MPS-2510P powered monitors and their big powered sub, which is situated right underneath the console. M&K makes the best powered speakers, I think. They are just unbelievable. The low end is a little bit over the top, but I'd rather have it that way. That way I know I'm not going too far."

When asked about the monitors Moutenot prefers to check the bottom end on, he says, laughing: "You're going to freak out: NS10s—that's all I use, except for Sony headphones. I'll put my hands on the NS10's white cone and feel what's happening with the speaker. I've used them for so long that I can tell what's going on with the bass. I've tried so many other speakers where I go, 'Man, the bottom end on these is awesome.' But after a week, they're making me do things I don't want to be doing."

> **"It's all about getting the chain right."**
>
> ***—Roger Moutenot***

Nicolson also checks the bottom end on NS10s. "I know that sounds really stupid because NS10s are crap on the super-low end," he says. "But at high volume, you can judge the bass end on NS10s pretty well. If you're really driving the NS10s and it still sounds good, then you know you're on a winner—you don't have too much or not enough. I also have a pair of KRK 6000s that I switch to."

Barresi's favorite reference is his car stereo, but he also uses NS10s to judge the low end of his mixes. "If the bottom is distorted on NS10s and the notes aren't ringing out true," he says, "then you've probably gone too far because the speaker can't handle what you're doing. I also walk around the control room when I'm mixing. There are certain areas where the bottom end is superapparent. You might want to sit there for a while to listen to what the bass is actually doing and to check if any notes are dropping out.

"I'm not a big fan of mixing with subwoofers," Barresi adds. "If I'm hearing too much low end, then I'm adding less and am usually disappointed in the final result."

THE LOWDOWN

In the end, of course, determining how big the bottom should be on a mix depends on the style of music and the song in question. "Some poppier songs don't dictate having this massive low-end thing," Lord-Alge says. "Sure, you want to have something solid down there, but I don't ever want it running away on me. It just mushes the whole record up."

When in doubt, it's usually best to err on the side of having too much bass rather than having too little. "I find it's easier in mastering to get rid of bottom than to add it," Barresi says, "so I'm not afraid to put a little extra down there. If it does get out of hand, then it's easy to filter some of that out." On the other hand, you can't boost something that's not there to begin with.

If your budget doesn't allow for mastering, your best bet is to make sure your mixes sound good on as many different systems as possible. Then again, that's a good idea whether or not you'll be mastering the project. "If you can get it to make sense on lots of different systems," says Lord-Alge, "then you're in good shape."

Michael Cooper *does not have a big bottom. He is an* **EM** *contributing editor and the owner of Michael Cooper Recording in beautiful Sisters, Oregon.*

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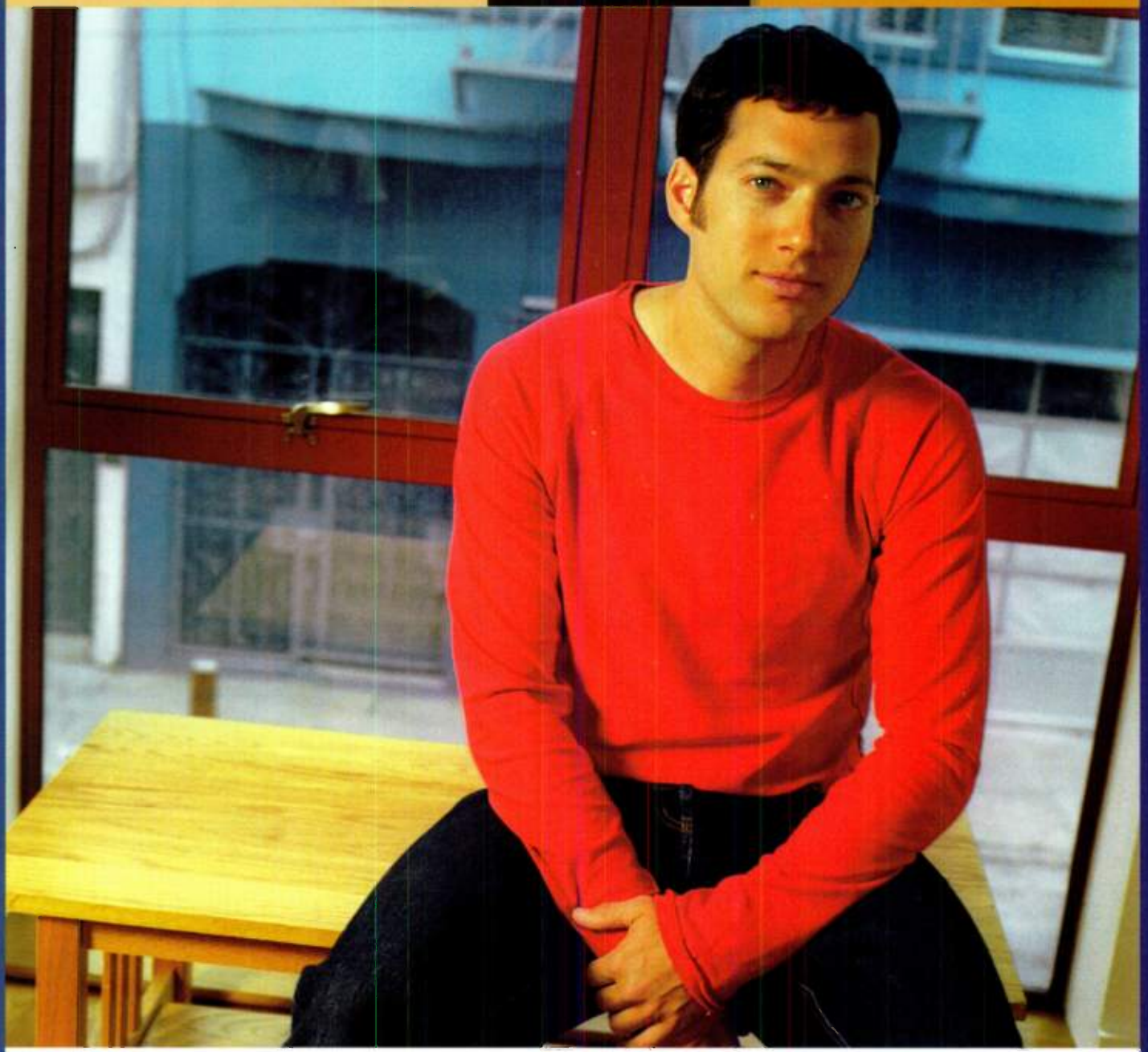

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Yet the sound-generating circuitry remained just that—circuitry. What put the analog in synthesizer? It was the vast collection of microchips, resistors, capacitors, and circuit boards that changed the sound of music, if not forever, then probably at least for the rest of your life.

By the 1980s, advances in microprocessor technology led to the development of digital synthesizers such as the Yamaha DX7 and the Korg M1. Those instruments and their progeny offered alternatives to the sound, expense, and eccentric behavior of the previous generation of synthesizers. Unfortunately, one of the capabilities that was lost in the process was the breadth of control that analog synthesizers offered. Panels full of knobs and buttons gave way to more economical user interfaces: tiny displays with a few buttons for changing pages and parameter values. Electronic musicians temporarily lost the immediate, hands-on control that analog synthesizers gave us. After a few years of digital synthesis techniques such as FM, wavetable, and sample playback, we also began to long for the warmth and fullness of analog synthesizers.

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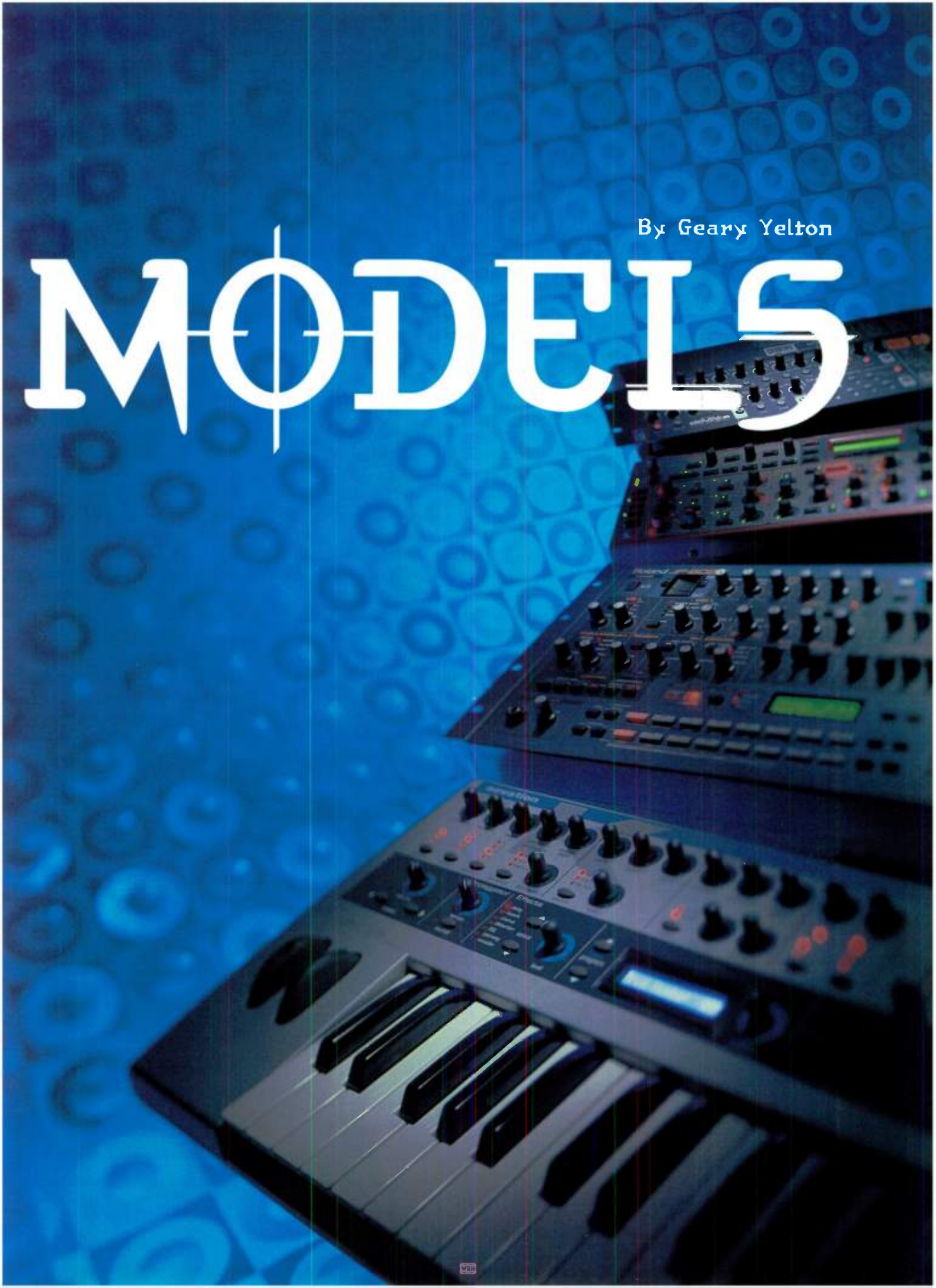
MODELS



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Physical modeling now makes it possible to emulate any type of sound production that programmers understand well enough to describe in detail to a computer. Instruments that employ physical modeling reproduce the originals by simulating their components using digital signal processing (DSP). The computers inside musical instruments have become so powerful that musicians no longer need machines that contain specialized oscillators, filters, envelope generators (EGs), and amplifiers. Instead, analog-modeling synthsesizers duplicate those functions digitally.

For this article, I assembled a group of ten analog-modeling synths from Japan, Sweden, England, and Germany. The instruments represent every hardware-based virtual-analog synth platform that was shipping at the time this was written, though some specific instruments are missing. Some instruments—such as the Korg MS2000, Nord Rack 3, and Waldorf MicroQ—are available in keyboard and rackmount configurations; only one of each was included. Some synths that I wanted to include were not available at the time of this writing; for example, the Access Virus B and Indigo had been discontinued, but the Virus C and Indigo-2 weren't shipping yet. Neither were the Hartmann Neuron, the Waldorf Q+, or the latest version of the Red Sound DarkStar. In addition, **EM** was unable to get its collective hands on the Novation Supernova II or Alesis Andromeda A6 by the time I needed them.

Nonetheless, the instruments we assembled represent a wide range of what's available in music stores today. Nearly half of them—including the Clavia Nord Rack 3, the Novation K-Station, the Red Sound Elevata, and the Roland SH-32—were introduced just this year. The Clavia Nord Modular, the Korg MS2000, and the Roland JP-8080 have been around for a while. The others—the Korg Electribe A, the Waldorf MicroQ, and the Yamaha AN200—first shipped a year or two ago. Some are keyboards, and the rest are desktop devices, rackmount units, or combinations of the two.

CLAVIA NORD MODULAR

First introduced more than four years ago, the Clavia Nord Modular ($1,999) is a fusion of hardware and software that emulates a modular analog synthesizer. Unlike traditional modular instruments, the Nord Modular is extremely compact and doesn't require dozens of wires to connect a fixed number of modules assembled by hand; you simply connect a huge variety of onscreen modules by clicking and dragging virtual patch cords with the computer's mouse.

The Nord Modular's hardware is a tabletop unit that you can play (but you can't program) without a computer. Its Velocity-sensitive, two-octave keyboard doesn't generate Aftertouch data, and it lacks any left-hand controllers for Pitch Bend or Modulation. On the front panel are 18 assignable knobs, 18 buttons, 32 indicator LEDs, a rotary data dial, a Master Volume knob, and a 32-character LCD (see **Fig. 1**). On the back are four assignable outputs and two inputs—all of them unbalanced ¼-inch TS jacks—as well as a ¼-inch stereo headphone jack, a control-pedal jack, and a footswitch jack. Two MIDI In and two MIDI Out ports let you connect one pair directly to your computer's MIDI interface and the other to an external MIDI controller.

The software half of the Nord Modular is the Modular Editor, an application for Windows and the Mac OS, in which you program and modify Patches (see **Fig. 2**). I used the Modular Editor with Mac OS 9.1, which requires the use of Open Music System, and I thoroughly enjoyed the experience. When you connect the Modular to your computer and open the Editor, all the synth's Patches are quickly transferred from the synth to the computer. When you change Patches on the Modular, every detail immediately shows up on your computer's display. Likewise, when you open a file on the computer, it is instantly transferred to the synthesizer.

Programming the Nord Modular is very much like programming a real modular, except all the modules and patch cords exist only in software, and many more of them are available. More than 100 types of modules are organized into In/Out, Oscillator, LFO, Envelope, Filter, Mixer, Audio, Control, Logic, and Sequencer categories. When you're creating or modifying a Patch, you create each module by simply dragging its icon into the Patch window. Modules automatically line up in neat rows and reposition themselves to make room for new modules.

To connect one module to another, click on an onscreen jack and drag a

FIG. 1: The Clavia Nord Modular emulates traditional modular analog synthesizers by combining hardware and software.

FIG. 3: The Nord Rack 3 packs a ton of real-time programming power into a compact tabletop or rackmount module.

virtual patch cord to another onscreen jack. Initially, you specify parameter values with onscreen knobs; later you can assign the hardware unit's knobs to control any parameters you might need to change in real time. When you click on an onscreen knob, its value is conveniently displayed. If you make a mistake, the Editor supports 16 levels of Undo and Redo, which is a real godsend when you're editing complex Patches.

With so many modules to choose from, the selection is extremely varied. Among the oscillators, for instance, you can select from standard waveforms, FM operators, noise generators, synced noise, formants, percussion, and sine-wave banks. Filters include practically every response and slope you can think of, as well as vocal simulation, a 16-band vocoder, a 14-band filter bank, and parametric and shelving equalizers. Envelope generators are as simple or as complex as you desire. Effects processors include chorus, phaser, compressor, delay, and overdrive. Because the Nord is modular, modulation possibilities are virtually endless. Many popular types of synthesis are at your disposal: subtractive, additive, FM, AM, and ring modulation.

From the factory, the Modular contains 500 Patches that do a fine job of showing off its capabilities. They range from excellent electronic textures and instrument emulations to 16-step sequenced grooves and external-sound processors. Almost 1,400 Patches are included on the installation CD-ROM, categorized by type. If that's still not enough, you can download even more from Clavia's Web site (www.clavia.se) and other online sources. I only wish that each Patch had a text file attached for the sake of documentation.

The Nord Modular's processing muscle is provided by four DSP chips (expandable to eight) called Sound Engines. Each Patch uses a single Sound Engine, and four Sound Engines make the Nord Modular four-part multitimbral. Which and how many modules you use in a Patch determine how much processing power is required and hence the Load on a Sound Engine, which in turn affects polyphony. The Load for each Engine is indicated in the Editor as a percentage.

Two alternate versions of the Nord Modular provide functionality that's similar to the original. The Nord Modular Rack ($1,899) is identical, minus the keyboard, and works equally well as a tabletop or rackmount device. The Nord Micro Modular ($749) is a much smaller model with only one Sound Engine; it offers less polyphony, no multitimbral Performances, and a much lower price. All three models feature the same voice architecture, Program compatibility, and superb sound.

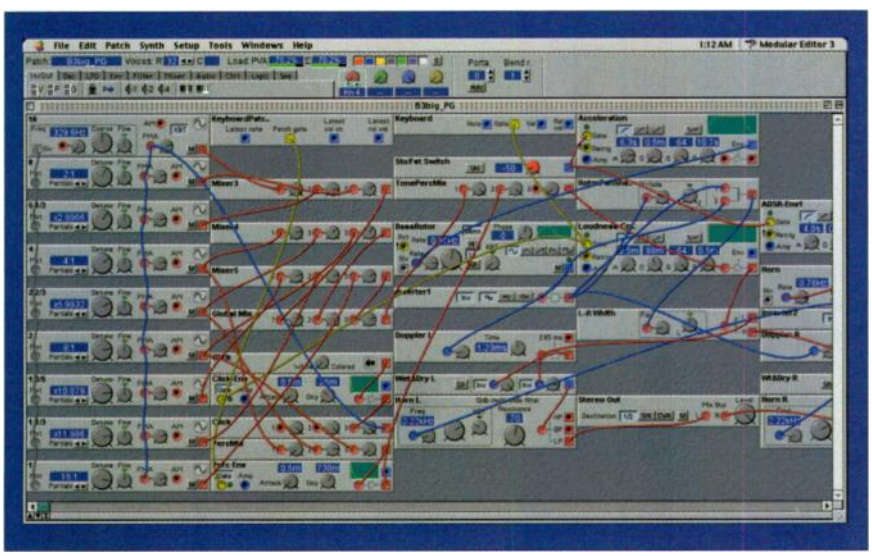

FIG. 2: In the Modular Editor software that runs on Macs and PCs, dozens of virtual modules are on hand, making it possible to design whatever functional configuration you want.

CLAVIA NORD RACK 3

Last year Swedish synthesizer-maker Clavia released the Nord Lead 3. It was the third in a series of keyboard instruments that began with the original Nord Lead, which introduced the world to virtual analog synthesis in 1995. As promised, this year Clavia introduced the Nord Rack 3 ($2,499), a rackmount version of the Lead 3. Except for the lack of a keyboard, Mod wheel, and Pitch Stick, the Rack 3 is identical to the keyboard model, with the same architecture, user interface, and external connectors. Consequently, the majority of my comments apply to both models.

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Like all Nords, the Rack 3 is housed in bright red rolled steel (see **Fig. 3**). If you choose not to install the rack ears, the Rack 3's sloped front makes it quite comfortable to use as a tabletop unit. Most parameters have dedicated knobs, buttons, and indicator LEDs on the front panel. All but 5 of 31 knobs are of the infinite-rotary-encoder variety, each with 15 red LED segments that encircle the knob like the spokes of a wheel and indicate the knob's position at a glance. A larger rotary data dial is available to change Programs and parameters that appear in the 32-character LCD, and four Slot buttons below the display let you select any of four Programs in a multitimbral Performance.

Accompanying almost all of the 42 buttons are green and red LEDs that indicate their status. Either LFO Rate knob, for instance, has ten LEDs that indicate waveform, sync status, and other parameters. On a darkened stage, the Nord is lit up in red and green like a Christmas tree. Among the instruments in this article, the Nord 3 definitely wins the prize for providing the most visual feedback.

Like its predecessors, the Nord 3 combines virtual analog with two- and four-operator FM synthesis to produce a varied range of timbres. Two oscillators generate the usual four basic waveforms, as well as noise and synced noise (variable pitched waves with fixed formats). Oscillator 2 also generates dual sine, a combination of two sine waves tuned an octave apart for use in FM synthesis. The harmonic content of most waveforms is continuously variable by means of either the Oscillator Shape knob or a modulation source. A 3-character LED displays oscillator pitch data such as frequencies, intervals, and FM partials.

In addition to lowpass, highpass, bandpass, and band reject, the Nord 3's two filters offer two other filter types. Classic is a lowpass response with a nonlinear rolloff slope varying between 12 and 24 dB per octave, and its resonance peak is only half that of the standard lowpass filter. Another filter type, distorted lowpass (Dist LP), is a 2-pole filter with an oversaturation control. You can switch the lowpass, highpass, and bandpass slopes between 6, 12, and 24 dB per octave. The two filters can be combined into more complex filter types, including a Multi Peak type that works like a comb filter. All those choices greatly contribute to the Nord 3's tremendous timbral variety.

Eight Banks of 128 Programs contain an immense range of synthesized sounds, and 256 Performances contain multitimbral combinations in layers and splits. All locations are in RAM, so you can replace any of the factory Programs and Performances with your own.

The sound of the Nord Rack particularly impressed me when I realized that it had no effects processors. Most of the sounds are rich and complex, and many make good use of the onboard arpeggiator. An innovative Sub Arpeggio feature can play a separate pattern for every note you play in a chord, creating much more complex arpeggios than previous Nord arpeggiators could.

Using a feature called Morph Group, you can simultaneously control as many as 26 parameters with a single modulation source. By setting up the right combination of parameters and defining their ranges, you can effectively morph from one sound into another using keyboard range, Velocity, Aftertouch, the Modulation Wheel, or a control pedal.

Practically my only criticism of the Nord Rack 3 is that it generates too much heat, so you need to give it lots of space in your rack setup. Extra space is also required because all the connectors are on top when it is mounted in a rack.

Clavia calls the Nord Rack 3 an advanced subtractive synthesizer. Incorporating FM as well as virtual analog synthesis, it's a fine instrument for developing new sounds from the ground up. Its large collection of factory Programs are consistently high in quality, its depth of hands-on control is exceptional, and its timbral versatility is outstanding.

KORG ELECTRIBE A

The Electribe A (EA-1; $399) is the analog-modeling component of Korg's Electribe line of budget-minded groove machines. It's also the least expensive synth in this roundup by far. As such, it lacks many of the bells and whistles you might expect to see in a modern synthesizer. No bigger than an average phone book, the EA-1 still provides enough front-panel control to make it highly interactive in real time (see **Fig. 4**). Although its synthesis capabilities are limited, the compact EA-1 provides extras such as a Motion Sequencer and Tap Tempo. Its real strength, however, is pattern-based sequencing.

You can store as many as 256 Phrase Patterns in memory and arrange them into a maximum of 16 Songs. Each Pattern can be up to 64 steps and 4 measures long. Like other groove boxes, the EA-1 begins playing a Pattern when the previous one is complete. You can enter notes either by step sequencing or by real-time loop recording. If you record in real time, of course, your input is automatically quantized to conform to the 16 steps of each measure.

FIG. 4: The bitimbral, duophonic Korg Electribe A blends analog synthesis with pattern-based sequencing.

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KORG

ANALOG SUPERMODELS

The EA-1 is two-note polyphonic and two-part multitimbral, so each timbre is monophonic, and there's no need to distinguish programs from performances. Programs don't exist separately from Patterns, and each combination of a synth sound, Pattern, and Motion Sequence is called a Part. To edit a sound, then, you need to select the Part that contains the sound you want to edit. Each Part is assigned to its own audio output.

A Part has two oscillators, a lowpass filter, an amplifier, and three simultaneous effects. Each of the oscillators generates either sawtooth, square, or triangle waveforms. You can offset the pitch of one oscillator relative to the other, and you can control the balance between them. In addition to oscillator sync and ring modulation, a type of modulation called the Decimator resamples Oscillator 1's output at Oscillator 2's frequency, which effectively adds grit to the sound. A knob in the oscillator section controls the rate of Portamento.

You can process external sounds by routing them into the Audio In jack. You can route audio through the effects, of course, but you can also decimate and ring-modulate external sounds, for example. If mixer channels are in short supply, pressing the Audio In Thru button routes the external audio signal through the EA-1 unaffected.

FIG. 5: The Korg MS2000 is a fusion of synthesizer, sequencer, and vocoder that provides plenty of hands-on control.

Instead of a multistage envelope generator, the resonant lowpass filter has knobs for EG Intensity and Decay. EG Intensity changes the fixed envelope's modulation depth and is capable of negative modulation, effectively closing rather than opening the filter. With negative modulation from the envelope, the Decay parameter controls Attack time. The Amplifier section has a Level knob for controlling the Part's output and a Distortion button; distortion can be turned on or off, with no control over distortion level. The Amplifier provides no envelope modulation whatsoever.

The Effects section offers Tempo Delay and Chorus/Flanger. Tempo Delay provides an echo that can sync to Pattern tempo or an external MIDI Clock. When you select Chorus/Flanger, turning the Depth knob changes from one effect to the other. The effects are nothing fancy, but at least they add animation to the sound.

By pressing the Keyboard button, you can play notes and trigger Patterns using the row of 16 buttons at the bottom of the EA-1's front panel. Whether you play the buttons or a MIDI keyboard, the Electribe doesn't respond to MIDI Velocity or Aftertouch; all notes have identical Velocity. When you write a Pattern, though, you can select notes to accent.

Nonsynthesis parameters, such as Pattern and Song settings, are selected with the aid of a front-panel matrix. You maneuver the matrix using up and down buttons and a row of four buttons that are labeled Pattern, Song, Global, and MIDI. Once you select the parameter you want to edit, you simply need to turn the data dial in order to change its value. If the Pattern parameter is selected during playback, you can use the data dial to change Patterns on the fly.

FIG. 6: The expressive Novation K-Station is simple to program, and its sounds are rich and punchy.

The Electribe A is so squarely oriented toward dance music that I question its suitability for any other musical style. Just try a few of the factory Patterns and you'll see what I mean; most of them definitely put the "electronic" in electronica. The factory Patterns, which can be rewritten by the user, make good use of the instrument's limited resources.

If you're accustomed to programming sounds with complete control over the envelopes and modulation routing, the EA-1 will probably disappoint you. The idea is to create sounds within a limited architecture. Indeed, most of the timbres do sound rather primitive compared to what all the other synths in this roundup are capable of producing. Nonetheless, the EA-1 sounds modern, and it makes sounds that might be hard to reproduce using more complex synthesizers.

KORG MS2000

The MS2000 ($1,150) is a physically modeled instrument that was designed to combine the personalities of the Korg MS-20 analog synthesizer, VC-10 vocoder, and SQ10 analog sequencer made in the late '70s and early '80s. The MS2000 is 4-note polyphonic and 2-part multitimbral, and its 44-note keyboard transmits MIDI Velocity but not Aftertouch. A version without the keyboard, the MS2000R, operates as a desktop or rackmount device and provides a Keyboard button to enable entering notes using the 16 Program buttons.

The MS-2000's well-organized front panel contains 35 knobs and 49 buttons for hands-on control of synth timbres

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and sequencer functions (see **Fig. 5**). Buttons that light up, dozens of LEDs, and a bright, 32-character LCD contribute to the abundant visual feedback. Printed on the front panel are a list of all editable parameters and several handy block diagrams that illustrate signal flow in the synthesizer and vocoder.

Programs are arranged in 8 Banks of 16. You select a Bank with increment and decrement buttons and then select from a row of 16 Program buttons. In LCD Edit mode, you use the same 16 buttons to select parameter pages. Whenever you turn a knob or touch a button, the affected parameter is instantly shown in the LCD. If the synth is in Program Play mode instead of LCD Edit mode, the controls react to your changes, but the parameter values aren't displayed. When you return a knob to the position of any parameter's programmed value, however, an Original Value LED lights.

Two oscillators generate traditional analog waveforms, as well as a Vox wave, which emulates a human voice, and can apply other mod sources, as well. A pair of ¼-inch Audio In jacks lets you process external sounds or use the MS2000 as a 4-voice, 16-band vocoder. A switch toggles between line- and mic-level input.

The resonant filter provides lowpass response with 12 or 24 dB-per-octave rolloff in addition to bandpass and highpass responses with 12 dB-per-octave rolloff. You can change filter cutoff with any modulation source, and the filter can track the Mod Sequencer as well as the keyboard.

The front panel's Virtual Patch section provides buttons for connecting eight modulation sources to eight destinations. Four Virtual Patch knobs let you control modulation depth for four selected sources. When you turn a knob, LEDs light to indicate the modulation routing being affected.

Two effects processors provide delay and modulation effects but no reverb. Modulation effects are chorus/flanger, phaser, and ensemble, and the delays are StereoDelay, CrossDelay, and L/R Delay. To change effects types, simply press the Mod FX button and select an effect from a parameter page in the display.

Using the Mod Sequencer, you can store one 3-track sequence for each Program. Each track controls pitch, step length, filter cutoff, panning, or 1 of 26 other parameters. Specify the track's length, and then adjust each of as many as 16 knobs to specify the value of each sequencer step. Using the step sequencer is intuitive enough, but just as it was on analog sequencers in the 1970s, specifying pitch with knobs can be tedious. If one track is controlling pitch, playing a note on the keyboard transposes the sequence as it plays. The Mod Sequencer provides a degree of sound-shaping control that distinguishes the MS2000 from most other synthesizers.

A feature called Motion Rec lets you record front-panel knob movements into a Mod Sequence. Rather than continuously recording knob turns, however, Motion Rec records a knob's position at the beginning of each step.

Thanks to the miracle of physical modeling, the MS2000 sounds warmer and fatter than some real analog synths I've played. Although most of the factory patches have a dance-music orientation, there are enough classic analog timbres to satisfy almost any electronic musician. The bass sounds alone are sufficient reason to want an MS2000 in your studio or onstage. I only wish the polyphony exceeded four notes; fortunately, a MIDI overflow mode lets you link two MS2000s together for additional polyphony.

FIG. 7: From Britain, the Red Sound Elevata combines an unconventional form factor with a distinctive sound and a quirky user interface.

NOVATION K-STATION

The K-Station ($899), one of the latest models from U.K. synth-maker Novation, is a compact, eight-voice, analog-modeling instrument with a two-octave keyboard (see **Fig. 6**). Although it is based on the sound-generating engine of Novation's flagship Supernova II, the K-Station is not multitimbral, and it lacks the Supernova's extensive modulation routing, multimode filters, and overall complexity. Nonetheless, the K-Station is full of great sounds. Despite its econosynth status, the K-Station's architecture offers some unexpected extras, including three audio oscillators per voice, a 12-band vocoder, and the ability to process external audio more flexibly than most synths.

Like compact synths in days of old, the uncomplicated K-Station is refreshingly straightforward to operate. You can control dozens of performance-oriented parameters with the front panel's 25 knobs, 4 sliders, 29 buttons, and Pitch-Bend and Mod wheels, and they all add up to an effective hands-on user interface. Every control transmits MIDI Control Change (CC) or

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FIG. 8: The Roland JP-8080 comes very close to sounding like an analog synthesizer, and it offers similar programming possibilities.

nonregistered parameter number (NRPN) messages. When you turn a knob or push a slider, the 16-character LCD instantly shows you the precise value of the parameter you're changing. Pressing the Menu button accesses pages that range from Program-specific parameters such as arpeggiator patterns and effects settings to global parameters such as Pitch-Bend range and Velocity curve.

Each of the three identical oscillators produces the four basic analog-synth waveforms—sine, triangle, sawtooth, and variable-width pulse waves. All waveforms except the pulse can be doubled within an oscillator, producing a thickening that sounds like even more oscillators. Just as you can modulate pulse width, you can modulate the phase offset of doubled waveforms. Ring modulation and FM provide inharmonic timbres, and a noise source generates unpitched sounds.

Another sound source is external audio. Because the K-Station responds to input levels, audio signals can trigger note events. If you plug an amplified drum in to the audio input, for example, you can set the sensitivity threshold so that every beat you play will trigger the envelopes, which in turn will open the filter and the amplifier. If you'd rather use the K-Station as an effects processor for external sounds without triggering events, you can do that, too. Combined with the vocoder, such capabilities make the K-Station's input stage quite flexible.

Each voice contains a resonant lowpass filter (which Novation calls a Warm Liquid filter) that can be modulated by an ADSR, a dedicated LFO, and key tracking. A switch changes the filter's cutoff slope from 12 to 24 dB per octave. For hands-on control, both EGs share the same set of four sliders. The remainder of the K-Station's modulation routing is minimal but effective.

I was very pleased to discover that the K-Station's effects section provides seven effects simultaneously. Delay, reverb, chorus/phaser, distortion, panning, vocoder, and one band of EQ each offer between two and eight programmable parameters—not an overabundance of parameters, but enough to contribute to sound design.

The LCD is small, but it's bright and easy to read. When you change Programs, instead of displaying each Program's name, it reads "Prog Number" followed by a 3-digit number ranging from 100 to 499. On an instrument capable of displaying 16 characters, I expected to see names instead of just numbers. I hope that Program naming will be addressed in a future update. Half the Program locations are blank, so there's plenty of room to store your own timbral creations. I imagine that the K-Station will sell well enough that plenty of third-party Programs will soon be available, but I wish that Novation's programmers had already filled the slots.

Novation obviously sacrificed features to keep a ceiling on the K-Station's cost. Perhaps the most bewildering shortcoming is the lack of footswitch or pedal inputs. Fortunately, every parameter receives MIDI CC or NRPN messages, but that doesn't help you if the K-Station is your only MIDI instrument. At the price, though, the K-Station's fat sound and intuitive user interface make it a definite winner.

RED SOUND ELEVATA

From the British company Red Sound, the Elevata ($899) is an analog-modeling synthesizer with an unusual name and shape. The combination rackmount and

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desktop unit gets its name from its adjustable, "elevating" front panel (see Fig. 7). With the base chassis lying flat, the front panel swings up to one of four angles, from parallel to perpendicular. The 45- and 60-degree angles are convenient for desktop use, and the 90-degree angle turns the Elevata into a 3U rackmount device.

The rear panel is on the back of the base chassis, where you'll find the power button, two main and four assignable analog outputs, and MIDI In, Out, and Thru ports. Also on the rear panel are a pair of ¼-inch analog audio inputs, an input for the optional 11-band Vocoda ($49), and a DIN connector for the optional external joystick ($49). The chassis contains EPROM bays for future expansion. Because the Power button is located in back, it can be difficult to reach if the Elevata is rackmounted.

On the front panel are 21 knobs, 39 buttons, a joystick, and an 8-character LED display. Because of the unusual typeface on the front panel, most of the labels are difficult to read. You can simultaneously change two assignable performance parameters with the *x-y* joystick, which has a Hold button to freeze its value at any position. The ⅛-inch stereo headphone jack on the front panel seems like an odd choice when you consider that most studio headphones use ¼-inch plugs. As you'll soon see, it's not the only odd choice in the Elevata's design.

You can change Programs and selected parameter values with a knob just below the LED display, but when I first turned it to change Programs, nothing happened. I discovered that you need to push it every time you want to change Programs, but not when you change parameter values. My initial confusion quickly became annoyance. I expected that when a Program was shown in the display, turning the knob would change the Program number, and when a parameter was shown in the display, turning the knob would change its value.

Most of the front panel is divided into functional sections: Oscillators, Mixer, Filter, LFOs, Envelopes, Output, and Multitimbral Parts. Each section has a Menu button to access parameters that don't have a dedicated knob or button. You step through the menus with the same two buttons used to Save and Compare, which sounds rather hazardous, but I never encountered any problems.

FIG. 9: The Roland SH-32 is a tabletop synthesizer with independent synthesis and percussion channels and a sophisticated arpeggiator.

There are dedicated buttons for the basic 7-pattern arpeggiator and for the Sound Wizard, a feature that randomizes parameters in an attempt to suggest new programming possibilities, kind of like tossing the dice to see what comes up. One nice twist is that you can choose which parameters are randomized. You can select whether the Audition button plays a single note, a bass pattern, or a chord pattern, but when you change Programs, Audition always defaults to playing a low note.

The Elevata is 16-note polyphonic and 8-part multitimbral. It stores 128 factory ROM Programs and 128 User Programs, but because it doesn't receive MIDI Bank Change messages, you can change only User Programs with Program Change messages. There are 10 preset multitimbral setups and 80 user-programmable multitimbral setups; the manual never mentions how to save or retrieve them, but it's no more difficult than saving or retrieving Programs. Eight dedicated buttons conveniently let you select individual Parts for editing within a multitimbral setup. In conjunction with the Menu button, you can quickly change parameters for each Part.

Two oscillators produce a waveform that's continuously variable from sawtooth to pulse wave. You can change the waveshape either by turning the Waveform knob or by modulating it with one of two ADSR generators or two LFOs. You can vary pitch and pulse width in the same manner, and the Oscillator menu lets you select additional waveform variations. You can also sync the oscillators and apply ring modulation.

One downside is that the Elevata's output level is considerably lower than that of any synth I've heard lately. For most sounds, I had to boost the signal at least 6 dB to get it to match my other synths. As a result, signal-to-noise ratio might become a factor when you're recording multiple layers of Elevata tracks. You can improve the situation by editing the Volume levels of individual Programs and then resaving them.

The Elevata shares a problem with the Novation K-Station: the display is large enough to read "PROG 128," but Program names are not displayed. Although the Elevata has programming potential, not one of the factory sounds cries out, "Take me home!" The 12 dB-per-octave filter sounds a bit thin and anemic. To put it bluntly, the Elevata won't be your first choice when you're looking for thick, juicy sounds, but it might present a nice timbral contrast to your other, fatter synthesizers. It definitely has its own personality, and among synthesizers, that's a plus.

ROLAND JP-8080

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FIG. 10: Although its user interface seems a bit out of date, the Waldorf MicroQ is a powerful little synth with a big, fat sound.

synthesis. Descended from the JP-8000 keyboard synth and first introduced in 1998, the standalone module focuses firmly on emulating an analog synthesizer by means of physical modeling, and it does that well. The JP-8080 is ten-note polyphonic and two-part multitimbral, and it offers a wide range of features such as an arpeggiator, a vocoder, external audio processing, sound morphing, real-time loop sequencing, and SmartMedia storage.

The JP-8080 is a 6U-rackmount unit that works well as a tabletop synth if you remove the rack ears (see Fig. 8). On the back panel, two ¼-inch inputs, two ¼-inch outputs, three MIDI ports, and an IEC power-cable jack are recessed deeply enough to accommodate the necessary plugs in a rackmount configuration. The logically organized front panel is densely populated with 30 knobs, 60 buttons, 12 sliders, 69 indicator LEDs, and a clearly backlit, 32-character liquid-crystal display. Like many of the other desktop units, the JP-8080 features a Preview function that lets you play an octave of notes from the front-panel buttons.

For the most part, the JP-8080's architecture is typical of an analog synthesizer: two oscillators, a multimode filter, two LFOs, and three envelope generators. Three Banks of 128 Preset Patches are supplemented by one Bank of 128 User Patches. Anyone who's serious about synth programming is going to wish for additional User locations; fortunately, the SmartMedia card slot makes user storage practically unlimited. There are 192 Performances and 64 user-programmable Performances. Each Performance contains two Patches and parameters such as the key mode and arpeggiator settings. Because the Patches are saved as part of a Performance, you can edit them without affecting other Performances that use the same Patches.

Two oscillators offer variable pulse wave, sawtooth, triangle, and noise waveforms. Oscillator 1 also generates Super Saw, Triangle Mod, and Feedback Osc. You can continuously modify each waveform's harmonic content and other parameters with two Control knobs; their precise functions depend on which waveform is being modulated. For example, for the pulse wave, they control pulse width and pulse-width modulation; for noise, they control a dedicated filter's cutoff and resonance.

The resonant filter operates in lowpass, bandpass, and highpass modes, and you can switch the slope from 12 to 24 dB per octave. The filter and amplifier have dedicated ADSR generators, and a two-stage EG modulates pitch. The Effects section includes Bass and Treble knobs, a Multi-FX Level knob, and Delay Time, Feedback, and Level knobs. The tone controls and delay are applied globally to the JP-8080's output, and the multi-effects are applied to individual Patches in a Performance.

Instead of selecting the Multi Effects Type in the Effects section, you make the selection in the Patch menu, like most other parameters that lack dedicated controls. Considering that there are only 13 types of effects, I'd much prefer to see a rotary knob or at least a dedicated button to step through the effects choices. All the multi-effects types are variations on chorus, flanger, phaser, and distortion.

Like many of the synthesizers in this roundup, the JP-8080 is capable of processing an external input. A pair of line-level inputs is on the back panel, and a ¼-inch mic-level input is on the front panel; a front-panel switch selects the source. Using the External Trigger function, an external audio signal can trigger the envelopes as though they had received a MIDI Note On message. The external inputs also provide access to the Voice Modulator, which is Roland's name for a stereo 12-band vocoder. When you use the Voice Modulator, polyphony is reduced to eight notes.

The Real-time Phrase Sequencer (RPS) lets you trigger a sequenced pattern by playing a single note, either on your MIDI controller or by pressing a front-panel button in Preview mode. When you record in RPS, you can overdub notes into a loop as it repeats. An RPS loop can be from one to four measures long, and you can control the quantization and gate time of patterns you play back. The JP-8080 makes it easy to record, edit, and copy RPS patterns. As long as you have enough notes to spare on your MIDI controller, RPS lets you do practically anything you can do with a real analog step sequencer and more.

A function called Motion Control records any knob and slider movements you make into a sequence. The maximum length of recording is eight measures, and a sequence can be either played back once or looped indefinitely. Like RPS, Motion Control lets you overdub, so you can layer control data over previously recorded data. The JP-8080 has two storage locations for control sequences (which are called Motion Sets), but you can store four more on a SmartMedia card. Every control on the JP-8080 sends MIDI CC messages, and every function responds to them, so it's also

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ROLAND SH-32

The SH-32 ($595) was designed to be a 21st-century update of the SH series of synthesizers Roland made in the 1980s. With its lab-white metal housing and cluttered front-panel graphics, the SH-32 is a tabletop unit that looks more like medical test equipment than a musical instrument (see **Fig. 9**). Sporting 8 knobs, 17 sliders, and 55 buttons, the SH-32's front panel is jam-packed with real-time sound-editing controls. In Manual mode, every parameter is defined by the controls' positions, which is useful for creating new Patches from scratch.

At the heart of the SH-32 are two oscillators that generate 67 waveforms; most are variations on the traditional waveforms most commonly used in subtractive synthesis. The SH-32 organizes them into groups such as saw, square, pulse, triangle/sine, and noise in addition to a group of more complex waveforms classified as Spectrum. A suboscillator is also available, but using it disables pulse-width modulation, ring modulation, and oscillator sync.

Other elements of the SH-32's analog-modeled architecture include a multimode filter, three EGs, and two LFOs. The filter offers lowpass, bandpass, and highpass types, as well as a peaking type that boosts harmonics around the cutoff frequency. You can switch the filter slope from 12 to 24 dB per octave and invert the filter's response to its dedicated ADSR generator.

The SH-32 provides one processor for insertion effects and another for global reverb and delay effects. A choice of 35 insertion effects includes EQ, auto-wah, overdrive, distortion, compression, limiting, chorus, and flanger. Some of the more unusual effects are Slicer, which chops a sound into rhythmic slices, and Isolator, which can cut a selected frequency range by as much as 60 dB. Most effects have four user-variable parameters. In Performance mode, you must select which insertion effect will apply to all four Parts.

The SH-32 contains two banks of 64 Preset Patches and two banks of 64 User Patches, but the User Banks are identical to the Preset Banks. Apparently, Roland is in the habit of providing redundant data just in case users accidentally delete their favorite Patches stored in User locations, but creative timbre programming is one reason people love Roland synthesizers; I'd much rather see another 128 Patches. You can replace any of the 64 Performances, each of which combines either four Patches or three Patches and a Rhythm Set.

The Rhythm Sets operate independently of the analog-modeling synthesis. Each Rhythm Set contains 88 drum and percussion sounds, but there's a lot of duplication among the four Sets. Two Preset Sets and two User Sets are heavy with TR-808 and TR-909 sounds, with a few TR-707, CR-78, and original percussion sounds thrown in for good measure. Synthesized percussion effects have names such as Zap, Zing, and Blip. In the Roland tradition, the Rhythm Sets sound consistently excellent.

SYNTHS AND SENSIBILITY

One obvious trend that I've observed is smaller instruments. None of the synths that I gathered for this article had a full-size keyboard. Even if I had acquired a synth with a 61-note keyboard, I don't think it would have given me a richer synthesizing experience than some of the instruments I played. Nearly half were tabletop models with no keyboard at all. Their tabletop design is significant in that it has become so common; even models with small keyboards are quite at home on a tabletop or packed tightly together on a keyboard stand. Most tabletop synths are designed to be rack-mountable, as well, but only the Roland JP-8080 comes with rack ears installed (they are removable).

As front-panel controls have grown more numerous, synthesizers have still managed to become smaller. Instruments that are more compact have many advantages, not the least of which is that you can pack more of them into a smaller space and thus put more of the knobs you need to turn and buttons you need to press within easy reach. A three-tiered keyboard stand, instead of holding three full-size keyboards, can now hold from six to nine instruments.

Another common thread running among these instruments is that their displays are all rather small. Not one of them has a generous display, but then again, neither do real analog synthesizers. A detailed display is a lot less necessary when the front panel is filled with dedicated controls. Kudos go to the Waldorf MicroQ for the densest display in the group. Also, when the MicroQ has been dormant for a while, the LCD runs animated screen-saver graphics. The MS2000's 32-character, bright yellow-green display is the best balance of density and legibility. The Elevata's red LED display is actually larger, but it shows only eight characters. The K-Station's light-blue-on-bright-blue LCD is the brightest of the LCDs, but it displays just 16 alphanumeric characters.

A more disappointing observation is that none of the synths have digital-audio I/O of any kind. The older instruments can be forgiven because digital-audio ports have only recently become features that users expect, and most of the newer synths in the roundup are economy models that cut corners whenever possible. I just hope that whatever replaces the higher-end synths includes digital-audio outputs.

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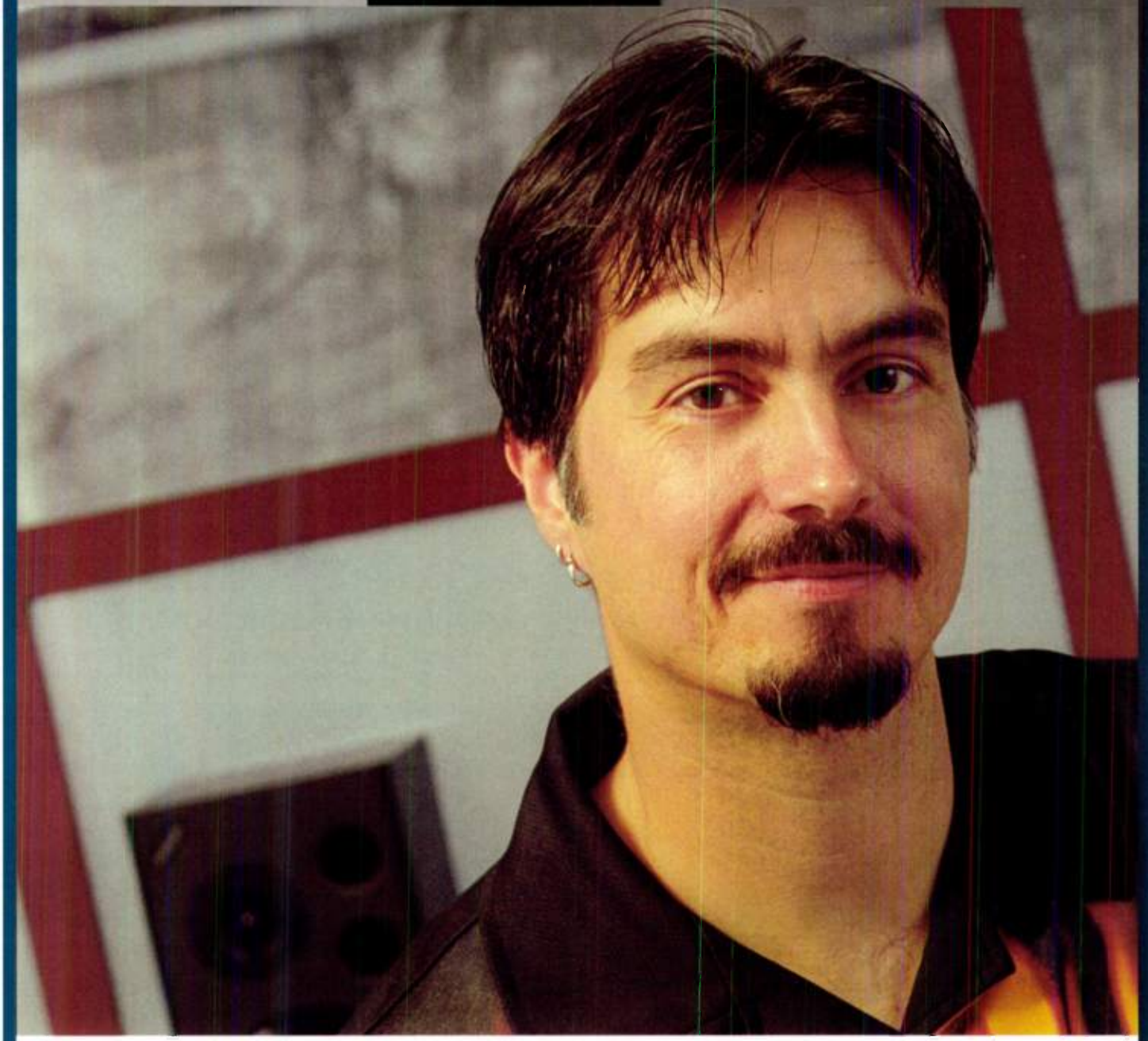

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Analog-Modeling Synthesizer Specifications

	Clavia Nord Modular	Clavia Nord Rack 3	Korg Electribe A	Korg MS2000
Retail Price	$1,999	$2,499	$399	$1,150
Maximum Polyphony	(32) notes	(24) notes	(2) notes	(4) notes
Multitimbral Parts	(4)	(4)	(2)	(2)
Oscillators (per voice)	almost unlimited	(2)	(2)	(2)
Suboscillator	almost unlimited	none	none	none
Oscillator Waveforms	(4) basic, noise, synced noise, formants	(5) basic, noise, synced noise	(3) basic	(4) basic, (64) DWGS, noise
Oscillator Sync	yes	yes	yes	yes
Ring Modulation/FM	yes/yes	yes/yes	yes/no	yes/yes
Filters	almost unlimited	(2)	(1)	(1)
Filter Types	lowpass, static or dynamic multimode, vocal, vocoder, resonant bank, parametric and shelving EQ	lowpass, bandpass, highpass, band-reject	lowpass	lowpass, bandpass, highpass
Filter Resonance	yes	yes	yes	yes
Filter Slope (dB per octave)	12, 18, 24	6, 12, 24, nonlinear	12	12, 24
Envelope Generators	almost unlimited	(2) ADSR, (1) AD	(1) D	(2) ADSR
LFOs	almost unlimited	(2)	none	(2)
LFO External Sync	yes	yes	no	yes
Number of Keys/ Note-Entry Buttons	(25) keys	none	(16) buttons	(44) keys
Velocity Sent	yes	no	no	yes
Aftertouch Sent	no	no	no	no
Aftertouch Received	Channel	Channel	no	Channel
Portamento	yes	yes	yes	yes
Left-Hand Controllers	none	none	none	(1) Pitch-Bend wheel; (1) Modulation wheel
Sequencer	32-event, 16-step control; 16-note	none	(256) user patterns; (16) songs; (65,500) events; tempo tap	16 steps × 3 tracks
Arpeggiator	none	(4) preset patterns, Sub Arpeggio	none	(6) preset patterns, Mod Sequencer control of pitch
Effects	modules include: chorus, compressor, delay, expander, overdrive, phaser, waveshaper, ring mod	none	(1) distortion; (1) tempo delay or chorus/flanger	(1) modulation: chorus/ flanger, ensemble, phaser; (1) delay; (1) EQ
Vocoder	16-band vocoder	none	none	16-band vocoder
Single Programs	(500) RAM	(1,024) RAM	(256; inseparable from patterns)	(128) RAM
Drum Kits	none	none	(256; inseparable from patterns)	none
Multitimbral Programs	none	(256) RAM	none	none
Audio Outputs	(4) unbalanced ¼" TS; (1) ¼" stereo headphone	(4) unbalanced ¼" TS; (1) ¼" stereo headphone	(2) unbalanced ¼" TS; (1) ¼" stereo headphone	(2) unbalanced ¼" TS; (1) ¼" stereo headphone
Audio Inputs	(2) unbalanced ¼" TS	none	(1) unbalanced ¼" TS	(2) unbalanced ¼" TS
Controller Inputs	(1) sustain footswitch; (1) assignable pedal	(1) sustain footswitch; (1) "Not in Use"	none	(1) assignable footswitch; (1) assignable pedal
MIDI Ports	(2) In, (2) Out	In, Out, Thru	In, Out, Thru	In, Out, Thru
Special Features	Modular Editor software	none	Motion Sequencer; external audio processing	Mod Sequencer; external audio processing
Options	DSP expansion ($499)	none	none	footswitch, pedal
Display	16-character × 2-line backlit LCD	16-character × 2-line backlit LCD	3-character LED	16-character × 2-line backlit LCD
Power	fixed 3-pin AC	removable 2-pin AC	9V wall wart	9V wall wart
Weight	14.5 lb.	13 lb.	2.75 lb.	15.6 lb.
Dimensions	18.6" (W) × 3.5" (H) × 10.4" (D)	19.00" (W) × 5.00" (H) × 6.25" (D)	11.8" (W) × 2.1" (H) × 8.9" (D)	28.8" (W) × 5.8" (H) × 14.5" (D)
EM Review	August 1999	February 2002 (Nord Lead 3)	November 1999	August 2000

	 Novation K-Station	 Red Sound Elevata	 Roland JP-8080	 Roland SH-32	 Yamaha AN200	 Waldorf MicroQ
	$899	$899	$1,595	$595	$630	$995
	(8) notes	(16) notes	(10) notes	(32) notes	(5) notes AN, (32) notes AWM2	(25) notes
	(1)	(8)	(2)	(4) synth or (3) synth and (1) rhythm	(1) AN, (3) AWM2 rhythm tracks	(16)
	(3)	(2)	(2)	(2)	(2)	(3)
	none	none	none	(2)	none	none
	(4) basic, noise	continuously variable from sawtooth to pulse, noise	(6) basic, noise	(7) groups, (64) types, (63) rhythm waveforms	(12)	(4) basic, (2) wavetables, noise
	yes	yes	yes	yes	yes	yes
	yes/yes	yes/no	yes/yes	yes/no	no/yes	yes/yes
	(1)	(1)	(1)	(1)	(1)	(2)
	lowpass, EQ	lowpass, bandpass, highpass	lowpass, bandpass, highpass	lowpass, bandpass, highpass, peaking	lowpass, bandpass, highpass, band-eliminate	lowpass, bandpass, highpass, notch, comb
	yes	yes	yes	yes	yes	yes
	12, 24	12	12, 24	12, 24	12, 18, 24	12, 24
	(2) ADSR; (1) AD	(2) ADSR	(2) ADSR; (1) AD	(2) ADSR; (1) AD	(2) ADSR	(4) ADSR
	(2)	(2)	(2)	(2)	(1)	(3)
	yes	yes	yes	yes	yes	yes
	(25) keys	none	(13) buttons	(13) buttons	(16) buttons	(37) keys
	yes	no	yes	no	no	yes
	no	no	Channel	no	no	Channel
	Channel	Channel	Channel	Key, Channel	Channel	Key, Channel
	yes	yes	yes	yes	yes	yes
	(1) Pitch-Bend wheel; (1) Modulation wheel	none	none	none	none	(1) Pitch-Bend wheel; (1) Modulation wheel
	none	none	real-time loop recording (RPS); (48) user patterns	none	(16) step; (256) preset patterns; (128) user patterns; (10) songs; swing; reverse; tempo tap	none
	(6) preset patterns	(7) preset patterns	(4) preset patterns; (90) rhythms	(32) steps; (64) user Arpeggio Styles; (64) user Rhythm Styles	none	(16) steps; (15) ROM patterns, (1) user pattern
	(7) simultaneously: delay, reverb, chorus, distortion, EQ, panning, vocoder	chorus, flanger	(1) 2-band EQ; (1) delay (5 types); (1) multi (13 types)	(35) insertion effects; (10) reverb/delay	(1) distortion; (1) EQ; (1) multi: delay, reverb, flanger, chorus, phaser, amp simulator	(2) processors (7 types: chorus, flanger, phaser, distortion, delay, sample reduction, overdrive)
	12-band vocoder	optional	24-band Voice Modulator	none	none	vocoder
	(400) RAM (half are blank)	(128) ROM, (128) RAM	(384) ROM; (128) RAM	(128) preset; (128) user	(256; inseparable from patterns)	(300) RAM
	none	none	none	(2) preset; (2) user	(1) preset	(20) RAM
	none	(10) ROM; (80) RAM	(192) ROM; (64) RAM	(64) RAM	(inseparable from patterns)	(100) RAM
	(2) unbalanced ¼" TS; (1) ¼" stereo headphone	(6) unbalanced ¼" TS; (1) ¼" stereo headphone	(2) unbalanced ¼" TS; (1) ¼" stereo headphone	(2) unbalanced ¼" TS; (1) ¼" stereo headphone	(2) unbalanced ¼" TS; (1) ¼" stereo headphone	(6) unbalanced ¼" TS; (1) ¼" stereo headphone
	(1) unbalanced ¼" TS	(2) unbalanced ¼" TS; (1) unbalanced ¼" TS vocoder input	(1) unbalanced ¼" TS mic-level; (2) unbalanced ¼" TS line-level	none	none	(2) unbalanced ¼" TS
	none	(1) external joystick DIN	none	(1) footswitch	none	(1) sustain footswitch; (1) assignable pedal
	In, Out, Thru	In, Out, Thru	(2) In, (1) Out	In, Out	In, Out	In, Out, Thru
	none	*x-y* joystick; Sound Wizard	Motion Control; SmartMedia storage	Chord Memory (64 user chord forms)	Free EG; computer software	Random Sound
	none	Vocoda conversion kit ($49); external remote joystick ($49)	none	footswitch	none	none
	16-character backlit LCD	8-character LED	16-character × 2-line backlit LCD	3-character LED	4-character LED	20-character × 2-line backlit LCD
	9V wall wart	9V lump-in-the-line	removable IEC 3-pin AC	9V wall wart	12V wall wart	removable IEC 3-pin AC
	8.8 lb.	10 lb.	9.94 lb.	4.25 lb.	3.5 lb.	10 lb.
	21.00" (W) × 3.25" (H) × 12.00" (D)	19.00" (W) × 2.00" (H) × 8.25" (D)	5U × 3.5" (D)	11.9" (W) × 3.6" (H) × 9.0" (D)	13.31" (W) × 2.04" (H) × 8.22" (D)	24.5" (W) × 13.0" (H) × 3.7" (D)
	n/a	n/a	July 1999	n/a	n/a	n/a

The SH-32's Arpeggiator is more elaborate than most, providing 64 preprogrammed Styles that you can overwrite. Most Styles are rhythmic motifs rather than simple patterns containing notes of equal length. Some play only one note at a time, whereas others can turn a chord into a complex theme that can inspire compositional ideas. Many Performances combine arpeggios with Rhythm Patterns that are applied to a Rhythm Set, forming instant grooves you can play by holding down any note or chord.

By pressing the Preview button, you can enter notes on the two bottom rows of buttons as though they were a one-octave keyboard. Unlike many desktop synths, the SH-32 lets you specify the Velocity value of notes you enter in Preview mode by holding a note and pressing the Value up or down buttons.

Pressing the Chord button accesses a feature called Chord Memory, in which each note plays a complete chord. Sixty-four Chord Forms are provided, enough for just about any chord you'll need. If you need a chord that isn't preprogrammed, you can replace any of the factory chords with your own. Because there's no quick way to switch from one type of chord to another (unless the one you want just happens to be next on the list), Chord Memory seems useless. When I asked about the applications of Chord Memory, Roland said that the feature isn't necessarily for the musically literate. Chord Memory provides an instant musical vocabulary that's especially useful in combination with the Arpeggiator.

Roland calls the SH-32's synthesis engine the Wave Acceleration Sound Generator; it is said to be the end result of analyzing and emulating vintage synths, analog-modeling synths, and other music gear. Nonetheless, the SH-32 doesn't sound like any analog instrument I've ever heard. Instead of imitating analog warmth, its overall timbral character is decidedly cold and digital; that's not necessarily a bad thing, but if sounding analog is the goal, the SH-32 falls short.

Radical sounds abound in the SH-32. Although many of the timbres are appropriate for throbbing, in-your-face dance music, others are fine for styles that are more traditional. Many of the Patches make good use of stereo panning to give them animation. Among the clangorous effects and trance-style arpeggios are some nice pads and sweeps, but don't expect them to sound warm and creamy. The SH-32 makes some of the rudest, harshest musical sounds I've ever heard, but that might be just what you're looking for.

FIG. 11: A member of Yamaha's Loopfactory family, the AN200 is an analog-modeling synthesizer that features sampled rhythm instruments and phrase-based sequencing.

WALDORF MICROQ

From veteran German synth-maker Waldorf, the MicroQ ($995) packs a lot of synthesizer into a relatively small package (see **Fig. 10**). For this review, I borrowed the keyboard model; a rackmount version and a scaled-down MicroQ Lite are also available. Unlike the rack, the keyboard version has a three-octave keyboard, Pitch-Bend and Modulation wheels, buttons for octave transposition, a Program Select section, and sustain pedal and control-pedal jacks. A ¼-inch stereo headphone jack is on the keyboard model's back panel rather than on the front, as on the rack model.

Of all the instruments covered in this article, the MicroQ is the most complete standalone synthesizer. With features such as 25-note polyphony, three oscillators, two multimode filters, four EGs, two effects processors, extensive modulation routing, a sophisticated arpeggiator, and a 40-character display, there's nothing micro about it unless you compare it to Waldorf's flagship synthesizer, the Q.

The MicroQ's program RAM contains 300 Sounds, 100 Multis, and 20 Drum Maps. (Although I usually favor standard nomenclature, I'm glad that the MicroQ's sounds are called Sounds rather than programs or patches.) As many as four Instruments are layered into each Sound, and as many as four Sounds are in each Multi. Multis are ideal for use with sequencers because you can play 16 Instruments on 16 MIDI channels.

The MicroQ is one fat synthesizer. Kicks have plenty of thump, and leads cut through the thickest mix. Basses are laden with bottom, and pads are appropriately atmospheric. The MicroQ's Sound library is obviously the product of deep and creative patch programming. Most manufacturers put a synthesizer's signature sound in the first

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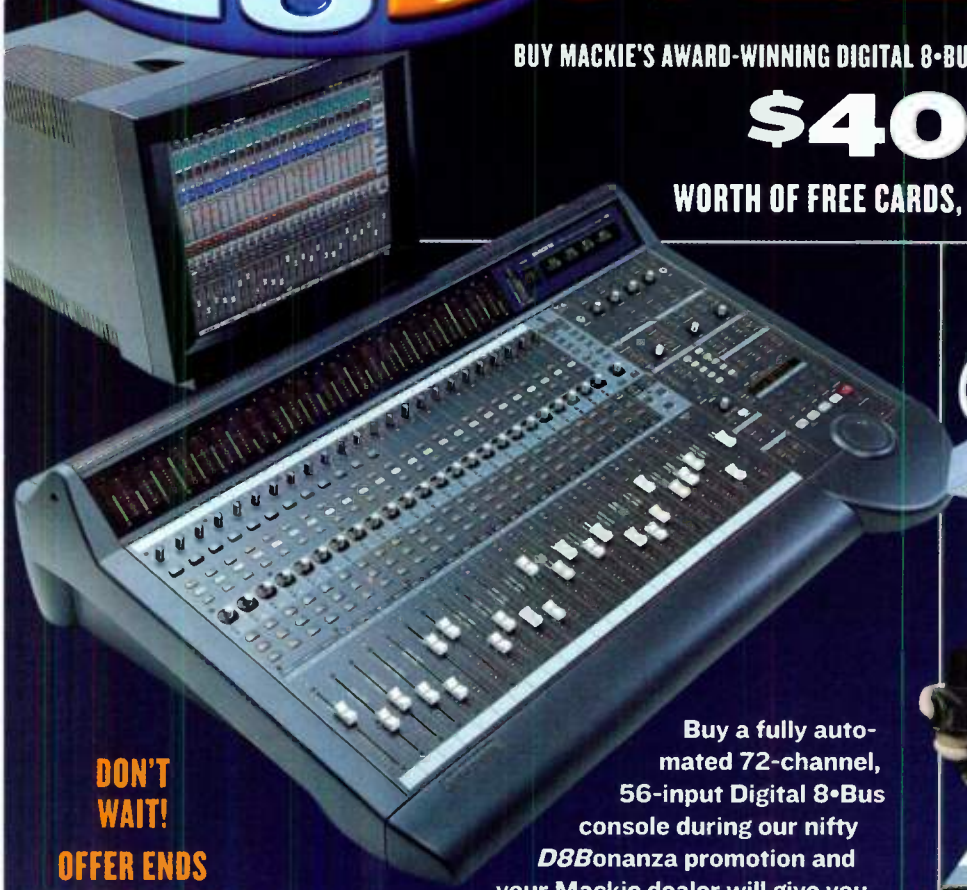

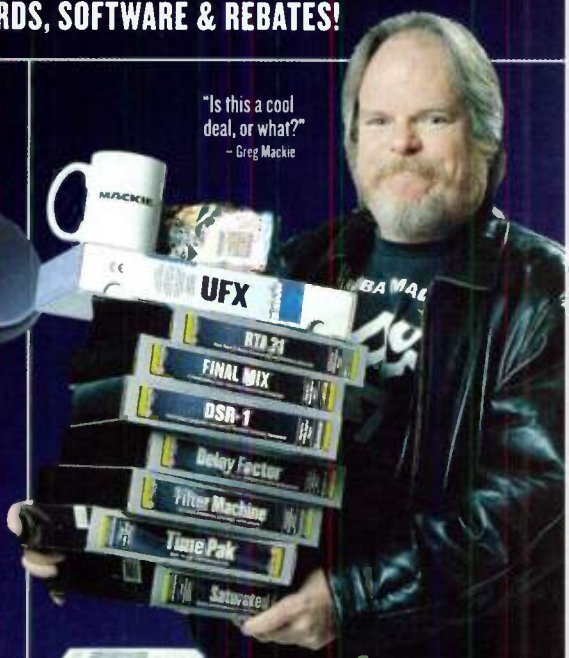

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memory slot; instead of a creamy pad or a bodacious bass, Sound A001 on the MicroQ is a thunderous kick drum with plenty of reverb called LosAngeles2019. On many Sounds, the Mod wheel produces some wonderful variations—so many, in fact, that I wish the instrument had a third wheel just for vibrato. One of my favorite Sounds, the kotolike Meteor, has an acoustic complexity that kept me enthralled for what seemed like hours.

The MicroQ has some of the juiciest filters I've ever heard. Both resonant filters offer lowpass, bandpass, highpass, and notch modes with 12 and 24 dB-per-octave cutoff slopes. A fifth filter type provides positive and negative comb filtering, which produces sounds that most synthesizers can't achieve. Additionally, a Drive control lets you oversaturate the filter for warm distortion.

Although I loved the MicroQ's sound, I was frequently perplexed by its arcane user interface. I had to consult the manual just to turn the power off (hold down the Power button for four seconds). None of the knobs are dedicated to particular functions. You navigate your way through a maze of parameters by referring to a matrix of 50 parameter names printed on the front panel. (Half the lettering is gray on a dark blue-gray background, so it can be difficult to find what you're looking for until you learn your way around.) Six knobs and a data wheel rotate infinitely, and their functions change depending on the selected parameter. Not until you turn a knob does the affected parameter appear in the main display. Four cursor keys assist in maneuvering through the matrix.

Thanks to its thick sheet-metal housing, the MicroQ is a surprisingly heavy ten pounds. Its relatively sharp, hard edges protrude as if they were rack ears, but the MicroQ is almost four inches too wide to mount in a standard rack. Waldorf might want to reconsider its design with product liability in mind; if someone were to accidentally fall on one of the protruding metal corners, they could be seriously hurt. (When my brother was a small child, he had a bad run-in with a coffee table.)

At the 2002 winter NAMM show, Waldorf announced a 75-voice version that is called the MicroQ Omega. A 50-voice expansion for existing MicroQs is also forthcoming.

YAMAHA AN200

A component of Yamaha's Loopfactory series, the AN200 ($630) is a combination analog-modeling synthesizer, phrase-based sequencer, and sample-playback rhythm machine. Yamaha calls it a Desktop Control Synthesizer, but you might call it a groove box. The AN200 has 5-note polyphonic analog modeling—enough to play chords—and 32-note polyphonic AWM2-based sample playback. Almost all the sampled sounds are percussion, bass, and synthesized effects that you can use for backing tracks.

FIG. 12: The AN200 Editor's graphical interface resembles a hardware front panel, but it presents more controls than the actual hardware.

Most knobs on the AN200's front panel are devoted to editing virtual-analog Voices (Yamaha's term for programs), and most buttons control the sequencer (see Fig. 11). Sequences are assembled in a linear fashion, one Pattern after another. Each of the Patterns contains one synth track and three sampled rhythm tracks, and you can play each track's sounds using MIDI. If you don't have a MIDI controller handy, just press the Keyboard button to play the Pattern-Select buttons as though they were keys on a one-octave keyboard.

I had great fun just running the AN200's sequencer and changing Patterns on the fly. Each Pattern finishes before the next Pattern begins on the downbeat of the next measure. The AN200 stores 256 Preset Patterns and 128 User Patterns. The excellent library of presets runs the gamut from Aphex Twin–like ambiences to instant Kraftwerk-in-a-box. During playback or editing, you can transpose Patterns and change their tempo, and a Swing function changes their rhythmic feel. To create your own Pattern, enter notes in step time by turning the bottom row of eight knobs or loop-record in real time either by pressing the buttons or by playing a MIDI controller.

Each Voice is stored within a Pattern. To edit a Voice, you must first select the Pattern that contains it. You can't select Voices separately from Patterns, but you can copy a Voice from one Pattern to another. The Scene buttons let you switch between two variations on the same Voice. Turning the Scene knob morphs from one Scene to another and allows you to select numerous stages between the two Scenes.

The AN200's analog-modeled architecture is simple and straightforward, and its sound is warm and fat. Two oscillators provide a handful of basic waveforms. A single resonant filter offers lowpass, bandpass, highpass, and band-eliminate responses, and you can select 12, 18, or 24 dB-per-octave lowpass slopes. You can apply the filter to the rhythm tracks as well as the synthesized Voice. The filter and amplifier each have dedicated ADSR generators, and you can apply negative envelope modulation to the filter. The effects, in addition to distortion and EQ, let you choose from delay/reverb, flanger/chorus, phase-shifter, or guitar-amp simulator.

Free EG is Yamaha's name for a sequencer that records control changes

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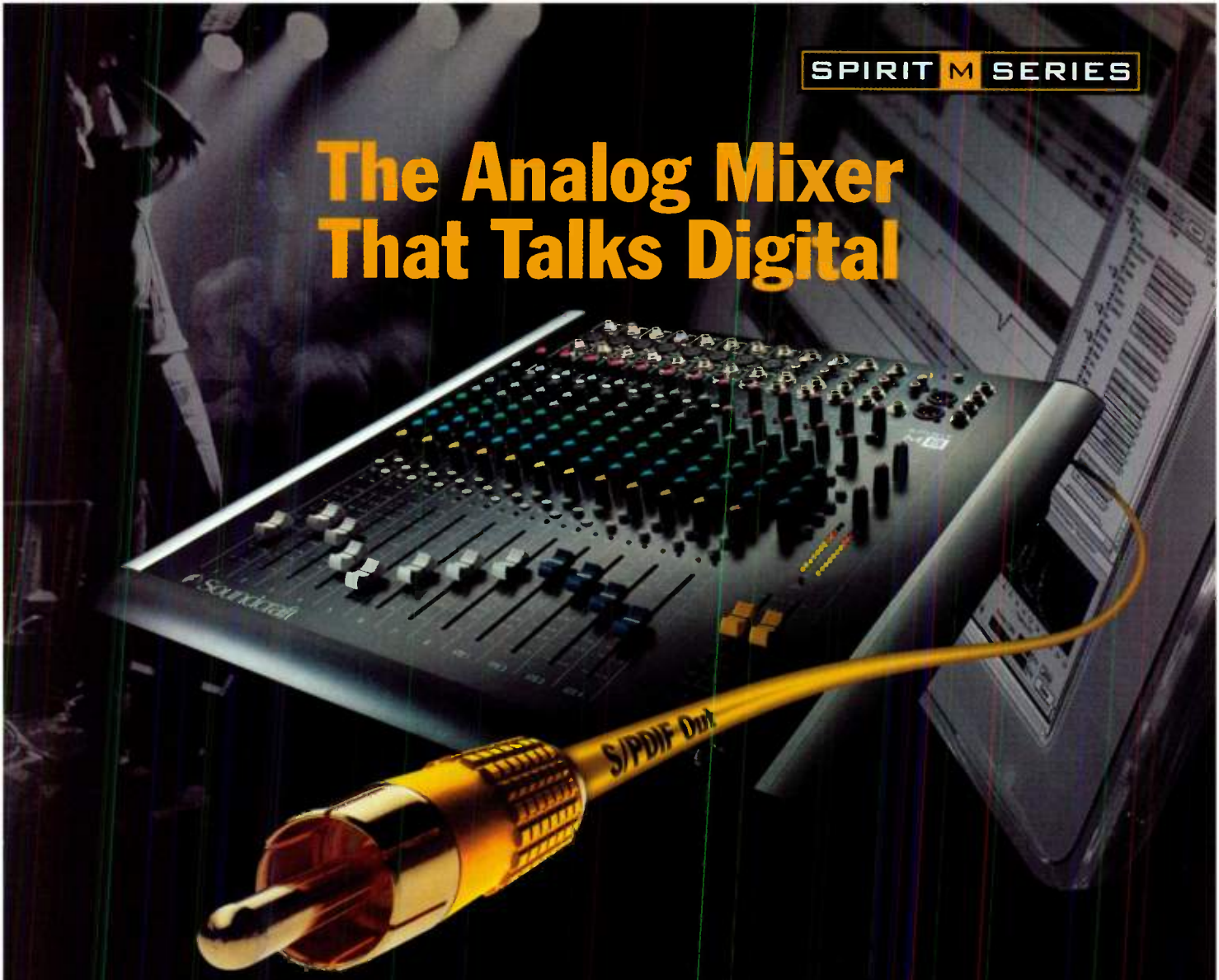

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in real time. When you enable recording, play a Pattern, and begin turning knobs, Free EG records any live edits you make to the Voice. A maximum of four knobs are recorded, each on a separate Free EG track, or if you prefer, you can record four separate takes of turning the same knob. Because all the AN200's knobs transmit MIDI CC messages, you can record control changes into an external sequencer without the one-knob-per-track limitation.

The AN200 ships with a dual-platform CD-ROM containing the AN200 Editor application with its own 72-page PDF manual. The Editor presents an on-screen control panel that's more detailed than the hardware unit's front panel (see **Fig. 12**). Rather than the 18 knobs on the AN200 itself, the software user interface provides 45 knobs for Voice and Pattern editing. Using the Editor on your computer, you can create and edit User Patterns and assemble them into songs, one phrase at a time, and then transfer them to the AN200 for playback.

The AN200 owner's manual is a little unusual in that it's organized into 92 tips and an appendix. Such a tutorial approach, although quite helpful when you're learning to use the AN200, takes some getting used to. When you're simply scanning the manual for information, finding quick answers can sometimes be difficult. I'd prefer to see a manual that offers a tutorial section and a reference section.

Yamaha was an early pioneer of physical-modeling synthesis, including analog modeling. Consequently, I'm somewhat surprised that the AN200 is Yamaha's only current model devoted to analog modeling. I certainly hope the company has plans to introduce an instrument to replace the popular AN1x keyboard. Fortunately, most of the AN1x's features are available on the AN200, but in a desktop form factor. If you already own an expandable Yamaha synth such as the S80 or CS6x, the PLG150AN plug-in board can add most of the AN200's synth engine to those instruments. If I were in the market for a groove box, though, the AN200 would probably be at the top of my list.

THE SUM OF THEIR PARTS

Like real analog synths, every instrument in this roundup has a very distinct personality. None of them closely resembles the others, and all of them have features that make them stand out from the crowd. Granted, all things are not equal; most notably, prices range from $399 to $2,499. Some, such as the Novation K-Station and the Waldorf MicroQ, are amazing instruments for the price; others, such as the Clavia Nord or the Roland JP-8080, are simply amazing instruments.

More than half of these instruments are sound modules that lack keyboards, but they aren't necessarily the least expensive models; at $2,495, the Clavia Nord Rack 3 is the most expensive of the lot and worth every penny. The Red Sound Elevata module, though priced the same as the K-Station keyboard, is the biggest disappointment in the bunch. The Korg Electribe A and the Yamaha AN200 are groove machines with synth engines that focus their functionality on built-in sequencers. The Clavia Nord Modular is a timbre-programming powerhouse that should provide years of making sounds that no other instrument is capable of producing.

If you're looking for acoustic piano or any other sample-based sound, analog-modeling synths are not for you. They have a timbral character that's out of place in certain styles of music and perfectly at home in others. If you love the sound of analog synthesizers, you might discover a new love in the sound of virtual analog.

I WANT ONE OF EACH!

Almost every instrument in this roundup is worth owning, some for better reasons than others. When I'm shopping for a virtual analog synth, I want something that can do everything a real analog synth can and then some. I want an instrument that sounds great and offers jaw-dropping factory programs, plenty of hands-on control, and flexible programming capabilities.

If I had to narrow my choice down to just one synthesizer, it would be a tough decision. If I had enough money, it would probably be a toss-up between the Nord Modular, the Nord Rack 3, and the JP-8080. They all sound fabulous, and they all offer wonderful programming depth. I really wish I could afford all three!

If I had less than $1,000 to spend, I'd have a difficult time turning down the K-Station, but I'm a knob tweaker at heart, and the MicroQ offers tremendous bang for the buck. I'm not too crazy about its user interface, but its programming depth would make it worth learning every detail. If I had a little more cash, the Korg MS2000 would certainly enter the running. All three instruments sound great.

If I were on a really tight budget, I might choose the Roland SH-32, but more likely, I'd keep saving up for a MicroQ or a K-Station. On the other hand, the SH-32 offers a lot for the money, and you might like its sound and its looks better than I do. If I were in the market for a groove box, I'd happily choose the Yamaha AN200; I love its sound, and it's a lot of fun to play.

The choice you make comes down to what kind of music you play, how much programming you want to do, and what you can afford. With the possible exception of the Elevata, there isn't an instrument here that I wouldn't recommend; the exact model would depend on your needs. Real analog synthesizers have their place, but today's virtual analog synthesizers can do just about anything a real analog can do and much more.

Geary Yelton *is an associate editor for* **EM.** *He's gradually making the transition from owning a ton of gear to having a totally virtual electronic-music studio.* *Special thanks to George Rendulic and Michael Ragan of Guitar Center in Charlotte, North Carolina, for the loan of the K-Station and the MicroQ.*

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Shell Game

How to make VST Instruments run properly in Digital Performer.

One of the most revolutionary developments in computer-based music production is the proliferation of virtual electronic instruments—synthesizers, samplers, drum machines, and modeled acoustic instruments that exist only in software. Virtual instruments are made possible and practical by the combination of powerful personal computers and music software that features a plug-in architecture. A sequencing program such as Mark of the Unicorn (MOTU) Digital Performer 3 (DP3) typically serves as a host application, and you can open and manipulate plug-ins within the host. A plug-in might be an effects processor such as reverb, a dynamics processor such as compression, or a virtual instrument such as an emulated Fender Rhodes.

On the Macintosh, three native plug-in architectures have been introduced to extend the capabilities of audio and sequencing programs. Virtual Studio Technology (VST), MOTU Audio System (MAS), and Real Time Audio Suite (RTAS) all work in real time, and none require any additional hardware. All are open architectures, so they're supported by a variety of third-party developers.

What if you're a Digital Performer user and you want to play VST Instruments? Because MOTU software doesn't directly support VST plug-ins, you need a third-party VST host known as a *shell* or *wrapper*. In this article, I'll investigate three VST shells as well as a dozen instrument plug-ins that are available for VST but not for MAS. I'll evaluate whether and how well each plug-in works with each VST shell in DP3 and make recommendations about configurations that might work well for you.

VST VERSUS MAS

Steinberg got the plug-in-architecture ball rolling in 1996 by introducing VST effects plug-ins for its popular sequencer Cubase VST. Steinberg made VST an open format, and third-party developers got into the game by producing VST-compatible plug-ins to use with Cubase VST. Eventually, VST support became a significant feature of additional host programs such as Steinberg Nuendo, Emagic Logic Audio, BIAS Peak VST, and TC Works Spark. In 1999 VST 2.0 introduced support for instrument plug-ins, eliminating the need for virtual instruments to run as separate, stand-alone applications.

Illustration by Colin Johnson

Don't make the mistake of assuming that VST is a true standard and that it works equally well in all hosts; it isn't and it doesn't. The VST 2.0 specification doesn't require plug-ins to operate with any host other than Cubase VST. Consequently, using VST Instruments in other programs can be problematic. When **EM**'s reviewers test VST plug-ins in hosts other than Cubase, they often report that some features and functions are disabled; you might face the same limitations when running those plug-ins using a VST shell in Digital Performer.

MOTU introduced MAS as an open format after VST was introduced. Conceptually similar to VST, MAS is proprietary in that it runs in just two programs from MOTU, Digital Performer and AudioDesk. MAS instruments are designed to work only in Digital Performer (AudioDesk is designed for audio rather than MIDI, so it doesn't use instruments).

Many plug-in developers who produce VST Instruments also offer MAS versions. A few MAS instruments, including IK Multimedia SampleTank and Ilio Stylus, work exactly like their VST counterparts. However, most MAS instruments don't operate as plug-ins; instead, MAS routes MIDI to and audio from standalone programs running concurrently with Digital Performer. That type of software includes virtual instruments from Native Instruments, Koblo, and BitHeadz.

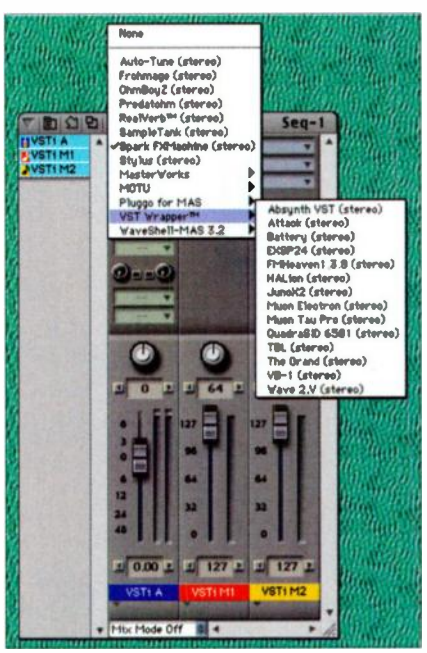

FIG. 1: As Audio Ease VST Wrapper runs invisibly in the background, DP3's Insert mini-menu lists the contents of the VstPlugIns folder.

VST is supported by the other two major sequencing programs for the Mac—Cubase VST and Logic Audio—so why doesn't MOTU support VST in Digital Performer? Jim Cooper, director of marketing for MOTU, says, "Part of the answer is in the history of VST and MAS. After Steinberg introduced VST, MOTU was the first company to develop a competitive native plug-in format, before Steinberg made VST an open format. By the time Steinberg allowed other companies to host VST plug-ins, MOTU already had a thriving community of MAS plug-in developers eager to support Digital Performer directly." By then, he says, the existence of MAS eliminated the need for DP3 to support VST directly.

Furthermore, according to Cooper, MAS plug-ins can be more tightly integrated with DP3 than can their VST counterparts. "MOTU works closely with MAS plug-in developers to ensure the quality and stability of their MAS plug-ins," he adds. By offering a proprietary application programming interface (API, which provides MAS plug-ins with "hooks" into Digital Performer), MOTU retains technical control, keeping open the door to future innovation in Digital Performer's plug-in architecture.

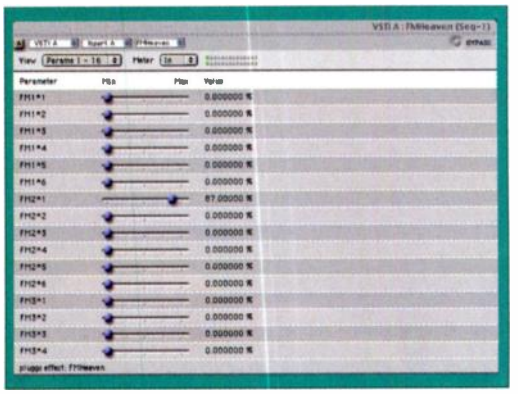

FIG. 2: Whenever Cycling '74 Pluggo doesn't know parameter names, it displays sliders with generic labels in its parameter windows.

THREE FLAVORS

DP3 users have at least three shells from which to choose if they want to use VST plug-ins. Each shell has its strengths and weaknesses. Which one is right for you depends on your working style, what plug-ins you want to use, the availability of RAM and processor resources on your computer, and the amount of money you want to spend. You can use more than one VST shell at the same time, but I recommend that they don't share the same folder of VST plug-ins.

The most popular shell is Audio Ease VST Wrapper ($50); its sole purpose is to enable Digital Performer to open VST plug-ins. Another popular choice is Cycling '74 Pluggo ($74). Opening VST plug-ins in DP3 is just one of the many things Pluggo can do; it also comes with literally dozens of proprietary plug-ins, including a few soft synths of its own. The third choice is the version of Spark FXMachine that's bundled with two audio editors from TC Works, Spark and Spark XL ($499 and $749, respectively; see the sidebar "To Be Continued" for more on a standalone version of FXMachine). FXMachine is a useful routing matrix for VST plug-ins, and like Pluggo, it offers plenty of other functions.

START ME UP

When you install a VST shell, its corresponding plug-in is placed in the MOTU Plug-Ins folder in your System folder's Extensions. During installation, you'll be asked to specify the location of a VstPlugIns folder. Like other MAS plug-ins, VST shells will then load automatically whenever you run Digital Performer.

Because plug-ins consume RAM, you should increase DP3's memory size in

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the Finder by opening the Get Info dialog box. Also note that the more plug-ins you have installed, including those in your VstPlugIns folder, the longer it will take the sequencer to open. Happily, the strain on your CPU is determined by the plug-ins you have open rather than the plug-ins you have available.

To use VST instruments, you won't need to set up any new devices in FreeMIDI or Open Music System, but make sure that you enable Inter-application MIDI in FreeMIDI preferences. Otherwise, your plug-ins cannot receive MIDI data.

After you first install a VST shell, test it with small groups of plug-ins and then add new ones no more than two at a time. All it takes is one errant plug-in to bring the whole system crashing down. Once you have a group of stable plug-ins that work well together, you'll know that if you add a plug-in and trouble ensues, the new addition is probably to blame. If you're depending on a plug-in's compatibility with a particular VST shell, download the demo versions of both and try before you buy.

To record and play a VST instrument, add an audio track (either a stereo voice or an aux track) to Digital Performer's Sequence Editor window. In the new track that appears in the Mixer window, insert a plug-in (see **Fig. 1**). If you're using Pluggo or VST Wrapper, select a plug-in from its submenu; if you're using Spark FXMachine, just insert FXMachine. Then go back to the Track List and add a new MIDI track. In the Output column for that track, you'll see that one of your choices will be the name of the plug-in you selected, either a VST Instrument or FXMachine. If it has a submenu with a choice of MIDI channels, pick the one you want as the track's playback destination. If you're using FXMachine, go to its window, click on the Add button, and select an instrument from the file dialog. If all goes well, you're ready to record.

FIG. 4: Emagic EVP73 is a VST plug-in version of the Fender Rhodes electric piano. In all three VST shells, the menus at the top of the window were obscured by graphic distortion.

VST WRAPPER 3

VST Wrapper, from the Dutch company Audio Ease, is an inexpensive solution for DP3 users who want to open VST plug-ins as though they were MAS plug-ins. As I write this, it's the most recently updated of the three shells in this article, and it's compatible with most VST Instruments. Version 3 can load and save standard VST banks and presets, typically allowing you to select patches from a mini-menu in VST Wrapper's upper-left corner. The number of presets and how they're organized varies with every plug-in.

Although VST Wrapper offers no frills, it has conveniences such as the ability to recognize the contents of folders within the VstPlugIns folder. That lets you group all of your reFX instruments together, for example, and put a bank of presets in the same folder as the instrument it supports. If the VST folder contains only one plug-in, VST Wrapper doesn't appear as an insert. Instead, the plug-in itself appears in the Insert mini-menu as though it were a MAS plug-in.

When you save a sequence that contains an instrument plug-in and then reopen the file, the plug-in should be right where you left it with all its settings intact. If it's a sampler, it should load the samples when you open the file. If a plug-in supports multiple output buses, VST Wrapper 3 does, too.

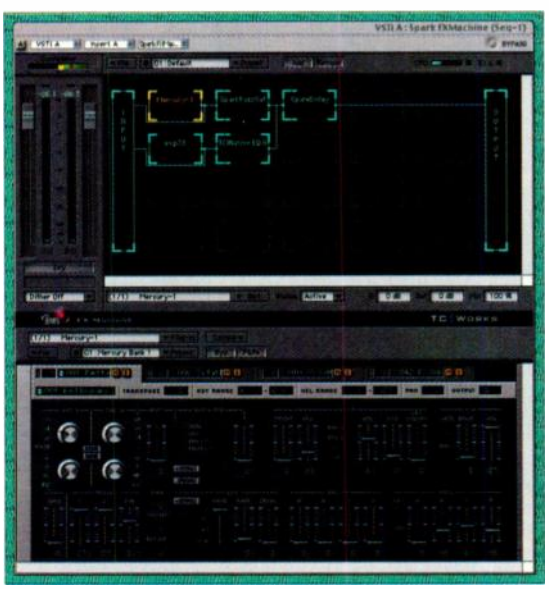

FIG. 3: TC Works Spark FXMachine provides a versatile matrix for routing plug-ins (top), but even TC Works Mercury-1 doesn't quite fit in its plug-in window (bottom).

PLUGGO 2.1

Pluggo, from Bay Area developer Cycling '74, is a plug-in manager that includes more than 75 plug-ins of its own. It has the ability to route MIDI, sync, and control signals between plug-ins, which means you can use Pluggo's modulation plug-ins to modulate VST Instrument parameters. As of this writing, the current version is nearly a year and a half old, and Pluggo will be updated to version 3.0 very soon.

When you open some VST Instruments in Pluggo, you can make parameter changes using the controls in the plug-in's user interface (its control panel); other VST Instruments require you to make edits in Pluggo's parameter windows (see **Fig. 2**).

Pluggo's View menu lets you choose from parameter windows and the plug-in's original interface. If a plug-in has lots of parameters, you can choose from several parameter windows. Each window contains several sliders, and occasionally the sliders have cryptic labels

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The DPS24 is the only affordable integrated hardware digital workstation that offers 24 tracks of recording without data compression. Most types of data compression throw out portions of your audio during recording, and use a mathematical algorithm to approximate the original audio upon playback.

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It's important to know what you're getting when you invest in any recording solution. The DPS24 was designed from its inception as a professional production tool and not simply a scaled-up portable studio.

We combined a 24bit/96kHz linear 24-track hard-disk recorder, a 46-input moving-fader automated digital mixer, a sample-accurate multi-track graphic waveform editor, 4 stereo multi-effects processors, ak.Sys TrackView and VST plug-in platform software, and a CD mastering and archiving suite, without creating the performance or user interface compromises found in many integrated workstations.

Utilizing our Q-Link navigation design, the DPS24 offers access to any major function with one button press. The Q-Channel strip of automated LED rotary controls enables instant access to any channel strip on the mixer.

Features like two banks of inputs to eliminate re-patching, balanced channel inserts which enable external mic preamps to bypass the on-board preamps, multi-function Q-Knobs for realtime effects control, and up to 24 channels of ADAT I/O offer professional production capabilities that give you the real-world advantages you need to bring your artistic vision to its full potential.

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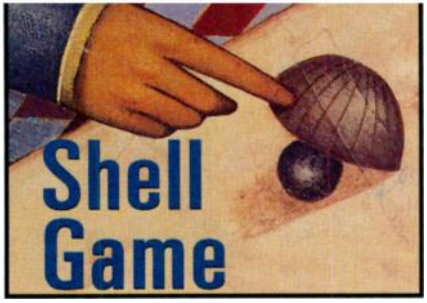

such as P1 or P2. Even if the instrument has a menu for selecting different programs, you might have to use Pluggo's menu for program selection because selecting in the interface's window has no effect.

A few words of warning about Pluggo are in order. The bundled plug-ins aren't actually VST plug-ins, and they don't work without Pluggo. Pluggo often doesn't recognize the contents of folders within the VstPlugIns folder, so support files should be at the same hierarchical level as the VST Instrument. Also, if you have a dual-processor Macintosh, you need to disable multiprocessing for Pluggo to work.

SPARK FXMACHINE 2.0

Spark FXMachine, from German hardware and software developer TC Works, is a plug-in that provides a visual matrix for arranging and routing VST plug-ins. The FXMachine window looks like a chessboard, and you can open a different plug-in in each square (called a *slot*). By default, the size of the matrix is four rows of five slots, but it can expand to whatever size you require. The number of plug-ins you can load is limited only by CPU resources.

To add a plug-in, simply select the slot, click on the Add button, and choose a plug-in from the file dialog. The plug-in's user interface will appear in a window below the matrix (see **Fig. 3**). In the current version, you can't resize the window to accommodate plug-ins with large control panels.

In FXMachine's matrix, you can route an audio signal from one plug-in to another in series, which is ideal if, say, you want to route an instrument plug-in to an EQ plug-in and then to an effects processor plug-in. You can arrange plug-ins in whatever order you desire, and FXMachine will automatically make the audio connections. Each slot indicates signal level with its own stereo LED meter, and you can specify the mix level for each plug-in. In addition, stereo master-level meters accompany a pair of master faders.

As I write these words, there are three versions of Spark FXMachine. The version that should most interest Digital Performer users ships with Spark and Spark XL. At present that version is the only one that includes the MAS plug-in to open FXMachine within Digital Performer.

WELCOME TO MY LABORATORY

For this article, I tested every combination of three VST shells and a dozen VST Instruments in Digital Performer 3.02 with FreeMIDI 1.46. My computer is a Power Mac G4/400 MHz with more than a gigabyte of RAM, and my audio hardware is a MOTU 2408mkII. I'm running Mac OS 9.1 and more than 50 MAS plug-ins in addition to the VST shells.

I tested each plug-in for its ability to remember saved programs and the most recent parameter changes, to respond to recorded MIDI Control Change (CC) messages, and to react to track automation. For the track-automation test, I enabled automation and then changed parameters on the fly; if it worked, my changes were duplicated on playback. By the time I had completed my testing, however, I'd discovered that VST Wrapper doesn't support track automation at all.

VIRTUAL REALITY 101

Thanks to physical modeling, Emagic **EVP73** (Emagic Vintage Piano; $99) emulates a Fender Rhodes Stage Piano Mk II more organically and offers more expressive dynamic response than a sample-playback instrument can. In fact, EVP73 is one of the best instrument emulations that I have ever heard.

EVP73's user interface even looks like a Rhodes control panel, but unlike the original, it provides knobs to control decay and release times, modify bell intensity and damper volume, and change the stereo spread. Tremolo controls let you vary the rate, intensity, and stereo phase of the effect that helped define the famous Rhodes sound. To keep a lid on processor usage, you can change the polyphony from as few as 1 to as many as 73 notes.

Although EVP73 doesn't include any factory programs, VST Wrapper and FXMachine were able to save and open user programs; Pluggo couldn't. All three of the VST shells perfectly memorized every parameter setting. In addition, they revealed an odd graphic distortion that showed the top of the plug-in window as a solid black or textured block; the only way to reveal minimenus was by clicking on where they should have been (see **Fig. 4**). Another display bug in FXMachine made some of the onscreen graphics disappear completely, including FXMachine's scrollbars. None of the shells responded to control by MIDI CC messages, and only Pluggo supported track automation. Because Pluggo can't save and open programs, though, VST Wrapper is the best choice.

Emagic **EXSP24** ($179) is a VST-based sample player that closely resembles EXS24, a sampler designed specifically for Logic Audio. EXSP24 includes almost 600 MB of well-rounded content that runs the gamut from guitar, bass, drums, pianos, and Hammond B-3 to an assortment of synths and loops. EXS24 also imports samples and

FIG. 5: Inspired by the Roland Alpha Juno-1, reFX JunoX² is a great-sounding soft synth that anyone can afford.

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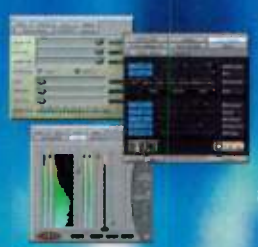
Bomb Factory

Bomb Factory's plug-ins recreate the sound of vintage audio gear with such sonic precision it's uncanny. It's just like the real thing!



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Digidesign offers plug-ins for mastering and processing of the highest quality, and creative tools that can take your sound to a whole new level.

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DUY plug-ins are made for the creative artist in you, not the computer technician. Shape your sonic landscape the way you see fit.

PROSONIQ
PRODUCTS SOFTWARE

Prosoniq offers a wide variety of plug-ins for your computer, including the Orange Vocoder, perhaps the best analog vocoder effect you've ever heard.

SYNCHRO ARTS

Synchro Arts offers excellent, easy-to-use plug-ins for music, multimedia and more. Their VocAlign Project has become a studio staple!

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From one of the world's most popular and respected plug-in developers comes the Renaissance Collection, offering excellent emulation of vintage analog hardware with simple intuitive controls. The Renaissance Collection puts the three most-needed processors into your studio: equalization, dynamics, and reverb, all with classic interfaces and profound power "under the hood." Incredible power for an unbeatable price.

Renaissance Equalizer
Two to six bands of audiophile EQ. Its selectable filter types respond like classic analog/tube hardware adding air and smoothness while maintaining clarify and space. *"For hard singers like Michael Jackson, Blackstreet, and My Town, the RenEQ gives me the warm sound I am looking for." – multiplatinum and Grammy Award winning producer/artist Teddy Riley*

Renaissance Compressor
Recreates the warm sound and simple operation of classic analog hardware. Features Adaptive Release ControlTM, and Opto/ Electro modes with brickwall limiter on the output. *"The most forgiving and transparent compressor I use. It's the only plug-in I trust with the all-important lead vocal."– Technical Grammy nominee Juan Patino*

Renaissance Reverberator
The classic sound of professional reverb with intuitive controls. Finally, a pro reverb that eliminates the need for outboard hardware. *"Hands down, one of the best reverb plug-ins available today." - MIX*

McDSP

McDSP plug-ins have been called the best thing to happen to Pro Tools since Pro Tools. Each plug-in package offers both mono and stereo versions.
Analog Channel emulates the sounds of high-end analog tape machines, analog tape, and analog channel amps in 2 plug-ins.

Vintage and modern compressors.
CompressorBank is 6 plug-ins: basic compression (CB1), compression with pre-filtering (CB2), and compression with pre-filtering and static/dynamic EQ (CB3).

Practically every great EQ ever made! FilterBank emulates the sound of vintage and modern equalizers/ filters. FilterBank is 20 plug-ins with 2, 4, and 6 band configurations.

The MC2000 multi-band compressor plug-in offers the sounds of vintage and modern compressors in two, three, and four band configurations. The MC2000 is 6 plug-Ins: the CompressorBank (CB1) is configured in 2, 3, and 4 bands.

kantos 1.0

From the company that revolutionized vocal intonation processing comes kantos 1.0, a software-based synthesizer that finally liberates you from anything that stands between you and the music you hear in your mind.

ANTARES

kantos 1.0 is controlled by audio — any pitched monophonic audio, like your voice, or a musical instrument — live, in realtime. kantos 1.0 analyzes incoming audio and instantaneously extracts pitch, dynamics, harmonic content and formant characteristics. This information is then used to control the kantos 1.0 sound engine in ways never before possible with a conventional MIDI synth.

Whether you are looking for an alternative to traditional controllers, or are looking to produce electronic music with a level of sonic innovation and dynamic expression that's simply not otherwise possible, kantos 1.0 will, quite literally, change the way you make music.

WaveMechanics

FilterFreak & Mbox– Audio with Attitude™

Though Wave Mechanics has only been around a few years, their world-class professional plug-ins for Pro Tools have already garnered heaps of praise from audio engineers and producers — not to mentioned a TEC Award nomination! The company was founded by the engineering team that created the legendary H3000 Ultra-Harmonizer and the DSP4000 line of hardware signal processors from Eventide.

FilterFreak is the first in the brand-new SoundToys line of studio processors created by the DSP Gurus at Wave Mechanics. Using carefully crafted analog filter models with a super fat 8-pole design, FilterFreak is a truly killer filter plug-in. The amazingly versatile modulation section includes a tempo-locked LFO, enveloper follower, ADSR, and a random generator. With single, dual, and quad versions, FilterFreak is built to be abused. Crank up the input gain to add dirt, or turn up the resonance until the filters self-oscillate. You won't be disappointed.

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- Up to 256 note polyphony (CPU dependent)
- FreeMIDI, OMS, PC-300 & OS X CoreMIDI compatible
- RTAS, DirectConnect & ReWire support

Over 2 gigabytes of content are included along with the famous Black & Whites stereo Steinway samples. Unity Session plays 24-bit Gigasampler files from RAM or hard disk. Play Retro AS-1, Unity DS-1, Sound Designer II, AIFF, SampleCell II, DLS, SoundFont II and Physical Models at the same time! Working in both OS9 and OSX environments, Unity Session is an instrument so pure in sound and so dedicated to the art of creating music that it has united the acoustic past with the electric present to bring you the virtual future of sound generation and creation.

IK's Music Creation Powerhouse

IK's suite of Pro Tools plug-ins offer a total solution for creating fully-mastered music anywhere.

IK MULTIMEDIA

Thanks to **AmpliTube's** unique Pre, EQ, Amp, Cabinet and Mic emulation you can produce a mind-blowing 1,260 amp combinations in real-time crafting your preferred guitar tone from tons of physically modeled vintage and modern amps! Plus, you'll have a complete selection of stomp boxes and post-effects.

A full-featured expandable sound module, **SampleTank** gives you access to thousands of high-quality multisampled sounds in a flash. Work with an unlimited number of sound modules with 16 multitimbral instruments each, 128 notes of polyphony, 4 effects per voice, 28 DSP effects, a search engine, 15 native sound libraries, AKAI CD conversion and much more…

The **T-RackS** plug-in has what you need to create superb, tube-toned masters and remixes. Its rich ,warm sound starts with algorithms based on true analog circuitry. A familiar interface makes it easy to control its EQ, compressor, limiter, soft-clipping output stage, and a complete mastering suite. Enhance frequencies in a mix, stereo image, dynamic range and more. Plug-in T-RackS and feel the power of analog mastering.

TrakMaster

Focusrite

TrakMaster is a single-channel multi-functional processor designed with the project-studio owner in mind.

The "master" starts with a phantom powered Class A mic/line/instrument preamp and a high pass filter. Next up is the optical compressor for getting those tight, punchy tracks that are critical in any recording — the compressor not only sounds great but is incredibly simple to use. Three rotary pots (Compression, Release and Makeup) let you quickly dial in the compression you're after while a "Comp In" switch allows the compressor to be bypassed. If required, the compressor can even be moved in signal flow to follow the EQ.

The newly designed 3-band EQ is clean, quiet, and musical, and can be optimized for vocal or instrumental work at the touch of a button. Boost/Cut controls are provided for the mid- and high-bands and switches are included to alter the frequency selections for instrument or vocal tracks. Add the unique Tube Sound technology that simulates tube based devices and the option of adding a 24-bit/96kHz digital output to connect to your S/PDIF gear and TrakMaster is a great complement to any Mbox studio.

GLYPH

Portable Storage Solution for Mbox™

Glyph's new Companion™ sets the standard in storage solutions for micro studios. It's been engineered specifically for Digidesign's Mbox. Companion is a high performance hard drive system with a dual port, 6-pin FireWire interface in a small, portable case that couples with the Mbox. The Companion's reliability and ease of use allows you to unleash the full potential of your micro studio.

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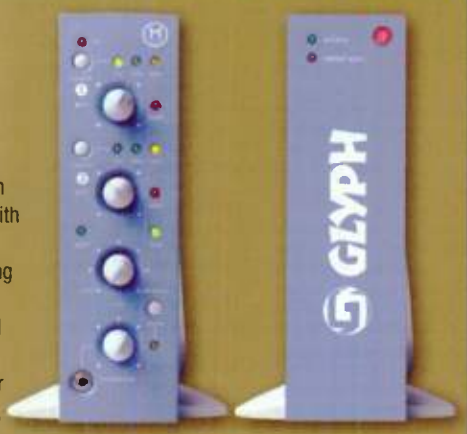
- Stylized form and functionality with the speed and ease of FireWire connectivity.
- Comes complete with Glyph's outstanding 24 hour advance replace warranty at no additional charge, along with our unrivaled tech support and service.



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banks that are in Akai and SoundFont2 formats.

EXSP24's user interface resembles a hardware-based sampler, with plenty of buttons, knobs, and sliders; it also has pop-up menus for less frequently used parameters. EXSP24's architecture provides four resonant lowpass-filter slopes, two ADSR generators, two multiple-waveform low-frequency oscillators (LFOs), portamento, and flexible modulation routing.

When I reopened a sequence with EXSP24 in either VST Wrapper or FXMachine, it had no problem loading programs and samples and recalling parameter changes. Neither type of automation worked, however. On the other hand, Pluggo succeeded with track automation and MIDI CCs and with recalling parameter changes. Unfortunately, although Pluggo loaded the samples when I reopened a DP3 file, it couldn't load the program parameters. For use with EXSP24, then, I declare a tie between FXMachine and VST Wrapper.

FMHeaven ($70), from U.K. developer LoftSoft, employs the type of synthesis made famous by the Yamaha DX7. FMHeaven comes with 12 banks of 32 programs, and it imports DX7 and TX81Z banks. It features six oscillators (corresponding to Yamaha's six operators), each with a choice of eight waveforms for creating complex tones. Any oscillator can modulate any other oscillator, and each oscillator has its own four-stage envelope generator with rate and level parameters for each stage. FMHeaven can play 16 simultaneous programs on 16 MIDI channels.

FMHeaven didn't do terribly well with any of the VST shells, however. I had the best luck with VST Wrapper; reopening a sequence file recalled programs, parameter changes, and MIDI CC data without difficulty. When I tried to use the mouse for parameter control, I couldn't break it free from whatever parameter I was editing, and I had to force-quit. Obviously, track automation is out of the question.

FXMachine had similar problems, and when I reopened a sequence, FMHeaven's user interface didn't appear, even when I double-clicked on its slot. Pluggo allowed recall of MIDI CCs and track automation, but the only way to recall a program was to insert a program change message. Most unfortunately, sustained sounds caused the processor to quickly overload in Pluggo. I'm sorry to say that I can't recommend any of the VST shells for use with FMHeaven, but VST Wrapper works if you avoid changing parameters with the mouse.

Electron ($75) is one of two virtual synth plug-ins you can download from Muon Software. Electron includes a bank of 32 assorted programs, a bank with 20 basses, another with 28 leads, and a fourth with 23 pads. Instead of emulating traditional instruments or classic synths, almost all the factory programs are synthetic timbres; regrettably, they sound a bit lackluster.

Each of Electron's 16 voices has three audio oscillators, and each oscillator produces just one waveform—sawtooth, variable pulse, or square. Two resonant multimode filters share a Mix control that determines their relationship, and you can modulate the two LFOs from a number of sources. One ADSR generator always controls amplitude, but you can route either envelope to additional modulation destinations. An alternate view provides an *x-y* controller screen in which you can modulate 2 of 32 parameters simultaneously in real time. Every programmable parameter responds to MIDI CC messages.

Electron worked great in FXMachine except that it didn't support track automation. VST Wrapper didn't remember saved banks or display the program name, but it did remember the program; it also recalled parameter changes and MIDI CCs. In Pluggo there was no way to load programs or banks. Pluggo remembered all its previous settings when I reopened a file, though, and unlike the others, it recalled both types of automation. Verdict: FXMachine, hands down.

Muon **Tau Pro** ($30) is a monophonic synthesizer plug-in designed for playing lead and bass parts. Each of two oscillators produces five types of sawtooth, five types of pulse, and sine waves, all of which you can modulate with an LFO. A resonant lowpass filter offers three cutoff slopes (18, 24, and 36 dB per octave), and an effects processor provides delay, chorus, and flanging. In place of the usual envelope parameters, an EG

TO BE CONTINUED

Unfortunately for anyone who does not need a full-fledged audio editor, you can't get Spark FXMachine's MAS plug-in without buying Spark or Spark XL, but that's about to change. A new standalone version of FXMachine ($199) is expected to be released around the time this article appears. It will include the MAS plug-in, 21 additional plug-ins, and full support for OS X. That's good news for Digital Performer users. Among the updated version's new features, its plug-in window will automatically resize itself to fit any plug-in's user interface.

Pluggo 3.0 ($199) should be shipping by the time this article hits the streets. The just-out version will feature RTAS support and plenty of new plug-ins, including at least 19 Essential Instruments that were originally written for Pluggo by French developer More Electronic Sounds (MES). Among the types of synthesis possible with Essential Instruments will be analog modeling, FM, wavetable, and granular synthesis, as well as drum and percussion synths, theremins, sampling, and waveshaping.

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Program for Windows® & Macintosh®

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** NOTE: Band-in-a-Box for Macintosh® is currently available at version 8.0*

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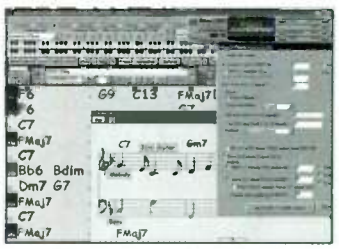

NEW FEATURES IN BAND-IN-A-BOX VER. 11 FOR WINDOWS

THE LATEST VERSION OF BAND-IN-A-BOX ADDS 50 MORE NEW FEATURES! First off, you'll get the **"MIDI File Chord Wizard"** that reads any MIDI file and interprets the chords for you to be displayed in Band-in-a-Box. We've added new **"Jazz Music Fonts"** for music, chords, lyrics and titles, giving you the option of authentic-looking jazz notation and symbols. We've added a **"Direct-to-Disk" Audio Rendering** feature that allows you to directly convert your Band-in-a-Box song to an audio .WAV file in 5-10 seconds, rather than having to wait 3-4 minutes for the song to render in real time!

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The **Guitar Styles** gave been enhanced with a **Jazz Guitar "highest-4-strings-comping mode"** that has voice leading on the highest four strings to simulate a "sax section." The Melodist now composes songs for **BeBop tunes** and **Jazz Ballads**. The **main window chordsheet now has selectable fonts**, font size, and number of rows.

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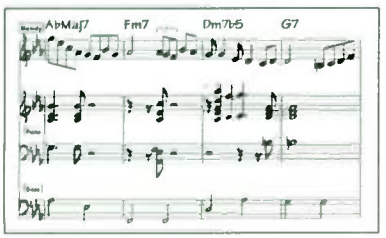

Display and print Multiple Tracks of Notation at once

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Mod knob determines the depth of a preset envelope, and an EG Decay knob determines its final stage. Accent Threshold and Level knobs control the filter's response to Velocity, simulating certain vintage Roland instruments that are popular in dance-music production. Overdrive and ring modulation are also provided.

All three shells remembered the program and parameter changes saved with a sequence, and all three recorded and played back MIDI CCs correctly. Only FXMachine remembered the most recent bank, and only Pluggo recorded track automation. Pluggo had the same problem it had with Electron, though, because there was no program list and no way to load a bank. (Pluggo didn't display program names of either instrument.) The victor is FXMachine, without a doubt.

VIRTUAL REALITY 202

One of three downloadable VST Instruments from German developer reFX, **JunoX²** ($30) is an emulation of the Roland Alpha Juno-1. It's marketed as a synth for techno, dance, and pop music, but JunoX² is capable of producing an assortment of diverse timbres. It has two audio oscillators generating 15 waveforms, a 7-waveform suboscillator, a flexible LFO, an 8-mode filter, and an invertable ADSR generator (see **Fig. 5**). All the parameter controls send and receive MIDI CC messages. Most parameters are displayed in real-world values; for example, envelope times range from 5 ms to 4 seconds, and filter frequency is from 0 Hz to 22.1 kHz.

JunoX²'s 128 factory programs run the expected gamut from leads and basses to pads and effects. Most of the sounds are interesting and worthwhile, and you can download an additional bank of 128 programs from reFX's Web site. JunoX² sounds amazing, especially when you consider what a bargain it is; I expect to use it a lot. I just wish it were optimized for AltiVec processors.

JunoX² worked beautifully in FXMachine, recalling programs and parameter changes and responding to MIDI CCs and track automation. It ran just as well in VST Wrapper, except that track automation didn't work. I had no luck with Pluggo; when I tried to reopen a sequence, DP3 quit with a Type 2 error. The winner, and still champion: FXMachine. If track automation isn't an issue, though, VST Wrapper works just as well.

ReFX **QuadraSID 6581** ($60) imitates the Sound Interface Device (SID) chip found in the Commodore 64 computer that was popular during the 1980s. The original SID was able to produce a

broad palette of unique sounds, and SID emulators are now all the rage. QuadraSID actually emulates four SID chips, each being capable of generating four different sounds, resulting in 16-part multitimbral operation. The four virtual chips can play monophonically, polyphonically, or in unison, and you can load several instances of QuadraSID.

Each QuadraSID voice features an oscillator with programmable wavetables, noise generation, a resonant multimode filter, an 8-point envelope generator with looping, a flexible LFO, ring modulation, portamento, an arpeggiator, and a modulation matrix that includes MIDI CC messages as modulation sources. QuadraSID is sophisticated enough to keep an experienced synth programmer busy for a long time.

QuadraSID worked well in both VST Wrapper and FXMachine, but neither program recorded track automation. Pluggo recorded track automation, but as with JunoX², DP3 suddenly quit when I tried to reopen a file with a QuadraSID track. Although I had no problems with FXMachine, QuadraSID takes up a lot of onscreen real estate, and I didn't like scrolling in FXMachine's fixed window size. I therefore award the gold medal to VST Wrapper.

You can tell by the name of **The Bass-Line** (TBL; $25), also from reFX, just what to expect: an analog emulation that specializes in synth bass. TBL works very much like a traditional monosynth in that it has no program memory other than retaining its previous settings. You can control all parameters with MIDI

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CC messages, which makes it easy to record and edit automation. When you modulate parameters in Play mode, changes are momentary; in Edit mode, they're memorized.

TBL's solitary oscillator can morph between five waveforms. There are no user-programmable envelope generators, but the lowpass filter has an Env-Mod knob, which controls the depth of modulation from a fixed envelope, and a Decay knob. The sole VCA knob controls Accent. Velocity can control filter cutoff, Accent, and distortion level.

All three shells recalled program changes, parameter changes, and MIDI CC data. Only FXMachine recorded track automation, which makes it the preferred choice again.

VIRTUAL REALITY 303

At the moment, Steinberg **Halion** ($399.99) is easily the most powerful VST-only soft sampler for the Mac. Its most notable feature is its ability to stream samples from a hard disk, playing them without first loading the entire sample into RAM. With sufficiently capable hardware, Halion can play 16 different programs, called Instruments, on 16 MIDI channels. It reads sample data in many formats, including Akai, E-mu, GigaSampler, SoundFont, REX, AIFF, and WAV. Halion's four CD-ROMs provide more than 1.7 GB of content, most of which is devoted to four high-quality instruments.

Halion demands a fast computer and a fast hard drive, and using it with a VST translator certainly doesn't improve its performance on marginal machines. Still, even DP3 fans with lowly Mac G4/400 MHz computers like mine can use Halion so long as they don't get too ambitious with the number of samples they load or the number of notes they play.

Teamed with VST Wrapper, DP3 had no problem recalling Halion programs and parameter changes and loading samples when I reopened a file. The window resized beautifully when I switched from one Halion page to another. Neither track automation nor control by MIDI CCs worked, however. FXMachine also restored Halion programs, parameters, and samples, but it put a greater load on the processor, as indicated by DP3's Performance meter. Pluggo simply crashed whenever I tried to load Halion. Consequently, VST Wrapper is the best choice for using Halion in Digital Performer.

The Grand ($299.99) is Steinberg's grand-piano plug-in, and it's presented with a unique and sophisticated user interface. Rather than being packaged as content for a sampler, The Grand is a VST Instrument that plays only the sound of a Kawai grand piano sampled with no loops. Presented on three CD-ROMS, The Grand emulates a piano's nuances and resonances.

User parameters are few. You can specify a Velocity curve and select from natural, bright, soft, and hard timbres. You can select well-tempered or concert tuning and specify the polyphony and amount of simulated room ambience. The subtle influences of dynamic response, hammer attack, sostenuto pedal, and damper pedal are also taken into account. Like a piano, The Grand offers no frills such as presets or effects processing.

It's too bad that The Grand doesn't get along with Mac VST shells. DP3 crashed every time I tried to load The Grand into VST Wrapper. In Pluggo and FXMachine, it loaded and played without difficulty, but DP3 crashed whenever I tried to reopen a sequence with an instance of The Grand. I've been told that I might have better results by dedicating a hard drive to The Grand, but that seems a bit extreme. Maybe a faster computer would help, but based on my experience, I can't recommend

MINIMUM SYSTEM REQUIREMENTS

Audio Ease VST Wrapper 3
Mac 604e/120; 256 MB RAM; OS 8.5.1; MAS 2.1; FreeMIDI 1.4

Cycling '74 Pluggo 2.1
Mac PPC 604/150; 64 MB RAM; 20 MB disk space; OS 7.5.5; VST or MAS host; MAS 2.1; FreeMIDI 1.42

Emagic EVP73 1.0 and EXP24 1.5
Mac G3/233; 128 MB RAM; OS 8.6; VST 2.0–compatible host

LoftSoft FMHeaven 1.4.9
Mac G3/233; 128 MB RAM; OS 8.5; VST 2.0–compatible host

MOTU Digital Performer 3.02
Mac 604e/120; 128 MB RAM; OS 8.5.1

Muon Electron and Tau Pro
Mac G3/400; 128 MB RAM; OS 8.5; VST 2.0–compatible host

ReFX JunoX² 1.3.0, QuadraSID 1.4, and The BassLine 1.5
Mac G3/266; 64 MB RAM; OS 9.1; VST 2.0–compatible host

Steinberg Halion 1.1.1
Mac G3/266; 128 MB RAM; OS 9.1; VST 2.0–compatible host; fast EIDE hard disk

Steinberg The Grand 1.00
Mac G3/400; 256 MB RAM; 1.3 GB disk space; OS 9.0; VST 2.0–compatible host; 100 MHz bus

TC Works Mercury-1
Mac G3; 64 MB RAM; OS 8.6; VST 2.0–compatible host

TC Works Spark 2.0
Mac G3; 128 MB RAM; OS 8.6

Waldorf Attack 1.01
Mac PPC 604e/300; 64 MB RAM; OS 8.6; VST 2.0–compatible host

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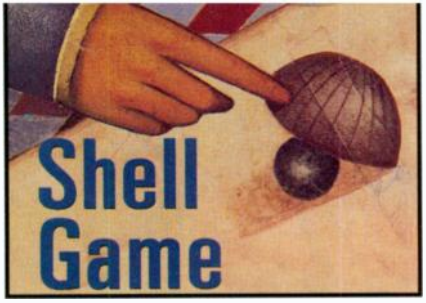

using The Grand with any of the shells.

Mercury-1 ($199), a virtual analog-modeling instrument from TC Works, emulates a traditional monophonic synthesizer. Visually reminiscent of pre-MIDI Roland synths, Mercury-1 has two audio oscillators, a square-wave sub-oscillator, a resonant lowpass filter, two ADSR generators, an LFO, overdrive, and ring modulation.

Although Mercury-1 is monophonic, it is four-part multitimbral, allowing you to play four voices on four different MIDI channels. All four program names appear on tabs at the top of the control panel, and you select which instrument to edit by clicking on its tab. The plug-in includes 128 factory Programs in categories ranging from sound effects and classic synths to basses and lead synths. Programs are selected in a Program Browser window rather than in a mini-menu.

Not surprisingly, TC Works Mercury-1 worked perfectly in TC Works FX-Machine. Programs and parameter changes were recalled, automation was total, and output routing was flexible. In VST Wrapper, everything worked except track automation. In Pluggo, however, Mercury-1 didn't work at all because it immediately overwhelmed the CPU when I tried to load it. The best choice is FXMachine, but VST Wrapper is fine as long as you record MIDI CCs for automation.

Waldorf **Attack** (distributed by Steinberg North America; $149.99) is an analog-modeling synthesizer disguised as a drum machine. Rather than playing back samples as most drum machines do, Attack synthesizes all its waveforms from the ground up using an analog-modeling, subtractive-synthesis architecture. Attack is ideal for re-creating the sounds of classic analog beatboxes such as the Roland TR-808, but it can play leads, basses, pads, and sound effects equally well.

Attack's installation disc includes 700 sounds assembled into 31 Kits ranging from acoustic and Latin emulations to presets named Electro Brain Kit and 23rd Century Kit. Every Kit features 12 monophonic sounds, each mapped to a single note, and 12 sounds you can play polyphonically over the entire range of MIDI notes. Maximum polyphony is 64 notes, depending on what your CPU can handle. One particularly useful feature: when the cursor is over an on-screen knob, the MIDI CC number that controls that knob is displayed along with its value, making it easy to assign continuous controllers (see **Fig. 6**).

Attack worked quite well in VST Wrapper. When I reopened a sequence, programs were fully restored, changes were intact, and MIDI CCs had firm control of their intended parameters. Although I could assign Attack's six audio buses wherever I please, VST Wrapper didn't support track automation. FXMachine

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also scored high points, but I couldn't get Attack to reappear by double-clicking. FXMachine's fixed window size is a mighty tight squeeze, so you'll be scrolling around a lot. Changing parameters with the mouse resulted in slow response, and automation still didn't work. At least FXMachine didn't freeze my computer whenever I tried to load Attack like Pluggo did. In the end, VST Wrapper was my first choice.

THE ENVELOPE, PLEASE

Using VST Instruments in any program other than Cubase VST, including DP3, is a mixed bag; some work perfectly, some are rather quirky, and some don't work at all. Given the parameters of my testing, FXMachine gave the best performance, and VST Wrapper came in a close second. When I began testing VST shells, I had no idea which one would perform best. I expected VST Wrapper 3 to do well because it was the most recent release. I am a little surprised that a version of Spark FXMachine that is over a year old did so well with so many instruments. I just hope that the next version will be as robust as the current one.

FIG. 6: Waldorf Attack displays the selected parameter's value and associated MIDI CC number.

After I'd completed testing, Audio Ease told me that support for track automation had been stripped from the current version of VST Wrapper because it had caused problems with about 20 percent of the plug-ins they tested. If you just want to play VST Instruments and don't need track automation, VST Wrapper offers two advantages over FXMachine. The limited size of FXMachine's window for

plug-ins quickly becomes tiresome, and the size of VST Wrapper's window adapts to fit the plug-in's panel. In addition, VST Wrapper is a lot less expensive than Spark or Spark XL. On both counts, however, the next version of FXMachine should do a lot to level the playing field.

If track automation is important to you, select a shell based on which VST instruments you want to run. If you use Attack, get VST Wrapper; if you use Mercury-1, get FXMachine. Better yet, if you can afford it, get both; that way you'll have one for large plug-in windows and the other for almost everything else.

Pluggo is chock-full of all kinds of useful plug-ins, but version 2.1 is not well suited for hosting VST Instruments. Just be glad that an update is right around the corner. If you're already a Pluggo user and you want to make the jump into third-party VST Instruments, you might want to wait for Pluggo 3.0.

THAT'S A WRAPPER

From both a marketing and a technical perspective, MOTU's reasons for not supporting VST in DP3 make perfect sense. MOTU would rather concentrate its quality-control and programming resources on enhancing and improving its own plug-in architecture than on enhancing and improving support for a format designed by a competitor, and who can blame the company? A strong plug-in platform results in a powerful sequencer. There are wonderful MAS plug-ins that don't exist in the world of VST, plug-ins that really perform as though they were true extensions of Digital Performer. Most MAS plug-ins work well, and if it ain't broke, why fix it? The current proliferation of plug-in formats proves that there's room for more than one, and for DP3 users, MAS's tight integration with its host is very beneficial.

The simple truth, however, is that more developers support VST than MAS. Those who support both formats are more likely to provide a MAS version that communicates with a standalone application rather than a plug-in that opens within the host. Fortunately, Digital Performer users can have it both ways. Like Logic Audio users, they can play soft instruments specifically tailored to their sequencers of choice without the need to envy users of Cubase VST.

Not every VST Instrument works with Pluggo, FXMachine, or VST Wrapper, but most of them do. The availability of those three programs ensures that even if VST Instruments are developed a step ahead of similar MAS plug-ins, DP3 users will be able to stay on the forefront of virtual-instrument technology. At least one and preferably two VST shells should be in every Digital Performer user's tool chest. ❦

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RECORDING MUSICIAN

In the Cans

A great headphone mix can make the difference.

By Randy Neiman

One often overlooked aspect of the recording process is the headphone monitor mix—what the performer hears while recording. As anyone who has overdubbed a part knows, being able to hear what's going on in the cans is essential to laying down great tracks. When saddled with a poor headphone mix, even a first-rate musician cannot deliver an optimum performance. Clearly, this is a case in which the recording engineer must be on the ball.

MIKE CRUZ

The challenge, of course, is that one size doesn't fit all—a mix that works for, say, the lead singer may not work at all for the percussionist. In this article, I'll provide practical tips for setting up headphone mixes for a variety of instrumentalists. A good headphone mix doesn't just ensure that the artist is comfortable and performs well; it also limits some of the problems headphone monitoring can create, such as listening fatigue and headphone "bleed" into open microphones. There's a nice side benefit, as well: engineers who know how to deliver an inspiring headphone mix are usually highly regarded by recording artists!

CANNED HEAT

Inexperienced engineers have been known to send a different mix—mono, pseudostereo, sans effects, or what have you—to the artist, all the while happily monitoring the main stereo mix in the control room, oblivious to what's feeding the cans. Therefore, the first order of business is to make sure you're hearing the same thing the artist is. Put on a pair of headphones yourself—the same model the performer is wearing, if possible—so you can monitor exactly what's going to the artist.

Be aware that headphones are actually

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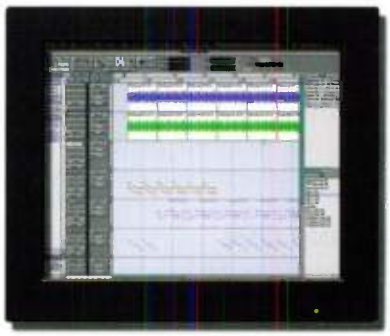

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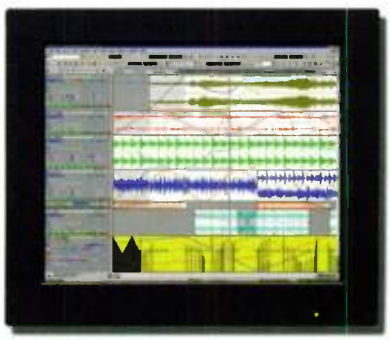

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biphonic rather than stereophonic (as speakers are) and thus create a different listening environment. That actually can be helpful to the musician because headphones allow for greater localization of sounds. That is, you can spread things out more than you would in a stereophonic mix, helping the musician feel he or she is more "inside" the music, with each instrument clearly discernible in the biphonic field.

Also keep in mind that, because of the small diaphragms used in headphones, the higher frequencies tend to sound very bright. That can lead not only to a much earlier onset of listening fatigue but also to excessive bleed or sound leakage from the phones to an open microphone, particularly with nonenclosed or foam-covered headphones and when recording vocals, acoustic instruments, as well as other sources with low sound-pressure levels (SPLs). Fortunately, aggressive high frequencies can be tamed with equalization.

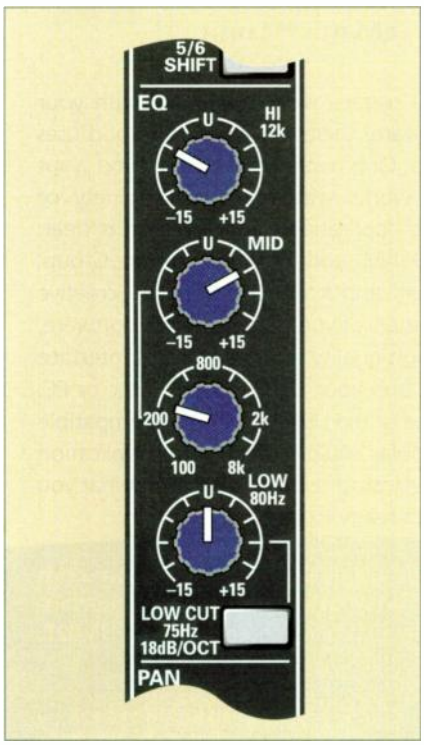

FIG. 1: Equalizing the click track can help minimize click bleed from headphones into open mics during intros, outros, and other quiet passages. Shown are suggested settings for a 3-band EQ with sweepable mids.

Many musicians tend to crank their monitor levels up high, especially during setup. You should therefore mute or disengage any channel that is being plugged in, unplugged, patched, or otherwise dramatically changed, because the resulting pops can be upsetting, and even physically damaging, to the artists. It's a good idea to use a talkback mic to advise players of any noticeable changes you plan to make.

GOING LIVE

Creating a usable headphone mix for a *live* session—one in which all the musicians are playing at once—not only requires good ears and the ability to manage a console effectively but also usually involves some degree of political savvy. Naturally, each instrumentalist wants to hear the mix in a particular way to suit his or her personal preferences and to better focus on the aspects of the music he or she needs to hear to effectively perform a part. Who gets satisfaction in that regard can lead to some controversy.

In general, the members of the rhythm section (drums and bass guitar) play off one another, so bass guitar, kick drum, and snare should be dominant; lead instruments and vocals, which are potential distractions, should be kept lower in the mix. Vocalists and lead instrumentalists, on the other hand, need to focus more on the melodic parts, which usually are in the upper mid frequencies. Ideally, your console will have enough aux sends to allow for at least two separate mixes.

Another method that works well and is favored in most larger facilities is the "More Me" setup (see the sidebar "More Me, Please!"). In that case, a stereo mix of the entire group is sent along with certain instrument feeds to a number of miniature mixers. Players can then adjust the mix according to their individual needs.

TO EACH HIS OWN

Following are guidelines for creating different headphone mixes for specific instrumentalists. Don't hesitate to ask musicians if they have any personal requests. Some people prefer a dry mix when tracking, whereas others find that some reverb can help them get more "into" the track.

Drummer. The rhythm section provides the basis for the overall timing and feel of the song, so be particularly sensitive to the needs of the drummer regarding levels, balance, and such. Elements the drummer usually needs to have loud in the phones include bass guitar, click track (assuming there is one), and any key rhythmic elements—electric rhythm guitar, for example.

Vocals and solos are often more distracting than helpful and thus should be kept low in the mix or even muted. (Obvious exceptions would be a vocal or other lead cue that indicates an upcoming break or chorus, or a section of the song in which the drummer must interact musically with the vocal or some other lead element. In that case, you can sneak in the cue just when it's needed.) Likewise, acoustic instruments, keyboard pads, and so on can often be kept very low or left out altogether.

Though bleed from headphones to the overheads, snare, hi-hat, or other mics is rare, because of the relatively high SPLs generated by the drum kit, be careful when using click tracks, especially during intros and outros—any click bleed that sneaks in during quiet passages can create havoc during mixdown. Use EQ to soften or round out the click track (see **Fig. 1**). I typically dial out anything above 3 kHz with a shelving filter and then boost somewhere between 220 and 500 Hz, depending on the sound of the click. (An equalized click is also helpful when tracking low-SPL sources such as vocals and acoustic guitars.)

Percussionist. For a steady-state part—a shaker or tambourine that plays on every chorus, for example—the percussionist may need nothing more than drums and a chordal instrument to indicate the song's form. Some vocal, mixed very low, may also be helpful as a guide to the song form.

Naturally, for percussion parts that are more random or that are just for sweetening—a triangle hit here, a cabasa roll there—the player needs to

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hear pretty much a complete mix. On the other hand, it usually still helps to emphasize kick, snare, and possibly hihat or ride cymbal and to de-emphasize vocals, leads, and pads.

Bass guitarist. An ideal headphone mix for the bass player is typically heavy on kick and snare and light on vocals and solos. If keyboards (especially pianos or bass-synth patches) are involved, those may feature somewhat prominently, so the bassist can play off of, or around, the riffs. When recording fretless bass, it's important that the player be able to hear a pitched instrument (other than vocals) prominently as a pitch guide.

Because the bass is usually recorded either direct or line-out from a preamp or amp, or with a mic in close proximity to the speaker, bleed is rarely a problem.

MORE ME, PLEASE!

Larger commercial recording facilities often provide separate miniature mixers so that musicians can dial up their own individual headphone monitor mixes. In a typical setup, that requires a series of distribution amps and a separate mini mixer for each musician. (See **Fig. A** for a simpler, more affordable More Me setup.) The quality of the mixer is not all that critical, as most currently available models provide adequate line-level mixing capabilities.

The following hypothetical More Me setup (see **Fig. B**) shows signal routing to one or more Mackie 1202-VLZs—an excellent mini mixer for this application. This setup would be useful for a live tracking session of a band consisting of drums, bass, guitar, stereo keys, stereo horns, and a vocalist.

Begin by putting together a nicely balanced stereo mix, complete with effects. It should sound much the way you want the final mix to sound, with the following exceptions:

1. Mix a little bit heavy on the rhythm-section elements. That's because all the players need to be able to follow the timing easily.

2. Mix light on the melodic instruments, especially the vocals. (You could also opt to leave the vocals out of the baseline mix.)

3. Pan each instrument into a more restricted area than you would for the final mix. That is, don't put any element far on either side of the stereo field.

4. EQ the mix so the highs are less bright than you would want them to be in a commercial mix. The reason for doing that is higher frequencies more readily result in headphone leakage and listening fatigue than lower ones.

Now you have a baseline stereo mix that everyone can work from. Feed this baseline mix to a stereo input on each mini mixer—in this case, Line In 11–12 (which corresponds to the "fader" on channel 8). Next, take direct outputs (or insert sends) from the kick and snare tracks and route them to channels 1 and 2, respectively. Do the same with the bass, guitar, stereo keys, and stereo horns, routing them to channels 3, 4, stereo 5–6, and stereo 7–8, respectively. Finally, route the vocal track to stereo channel 9–10, plugging in to the top (L) jack, which is mono.

With that setup, the musicians can independently add more kick, snare, bass, guitar, keys, horns, and/or vocals to the baseline mix, depending on each of their needs. In addition, they can pan individual elements (except those going to the stereo channels) far left or right in the baseline mix so that they can hear them more easily without adding too much gain. As you might expect, musicians tend to add more of their own instruments to the mix, hence the phrase "more me."

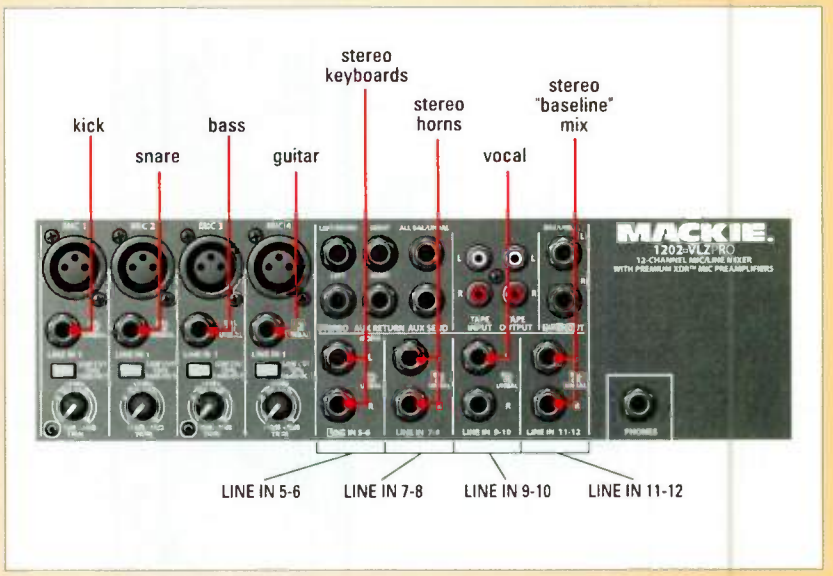

FIG. B: A "More Me" setup allows each musician to adjust levels, panning, and EQ for his or her own headphone monitor mix.

FIG. A: The Oz Audio Q-Mix HM6 is a handy headphone matrix mixer that can drive six pairs of headphones. A simple, affordable, and rugged solution for setting up a More Me mix, the HM6 provides stereo main inputs (for the baseline mix), four separate "inject" inputs, and a separate effects send with stereo returns.

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Exceptions are miked acoustic and upright basses. Again, be mindful of those higher frequencies.

Keyboardist. Electronic keyboards are typically recorded at line level, in which case mic bleed is not an issue. On the other hand, when recording piano, harpsichord, or other acoustic keyboards, you may run into mic bleed, so remember to EQ the headphone mix accordingly. Usually, dialing out extreme highs and lows with shelving EQ will take care of general bleed, and you should also EQ the click.

Keyboard parts run the gamut from rhythm section to pads and solos, so each session must be taken on a case-by-case basis. Still, here are some general guidelines. For rhythmic parts, feature the snare drum and bass guitar prominently. Depending on the arrangement, it may also help to highlight the hi-hat or ride cymbal. Pads generally require more chordal information, whereas solos often play off of vocals and other lead instruments.

Acoustic guitarist. Acoustic-guitar parts range from soft, fingerpicked ostinatos to rhythmic strumming to sweetening parts that "converse" with the vocal. Headphone bleed is often a problem—usually from the vocals but sometimes also from headphone feedback—so equalization may be necessary.

▼

Use EQ to soften or round out the click track.

Someone laying down a rhythmic strumming part usually requires a balanced drum feed and some bass and vocal; parts such as solos, pads, and percussion may only get in the way. Most importantly, make sure the acoustic guitar is not too loud in relation to the rest of the mix—to lay down an accurate part, the player needs to clearly hear the core rhythmic elements.

Fingerpicked parts, on the other hand, typically need to be a bit louder than the rest of the tracks to let the performer focus on the subtleties of his or her playing. If the part plays against the vocal, you might also need to bring up the vocal as a guide. In that case, use the final vocal take when possible.

Electric guitarist. Generally speaking, "crunchy" electric-guitar parts require a headphone mix containing more of the rhythmic elements, strumming parts need more chordal material, and solos often work off the vocals and other lead instruments. If reverb, delay, or other effects will be added to the final mix, it's important to give the player enough of those effects to allow for a contextual reference. Just be careful not to print the effects to tape! Headphone bleed

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usually isn't a problem here, thanks to high signal-to-noise ratios.

Vocalist. Creating a great headphone mix for the lead vocalist can be a challenge, as singers tend to have different preferences. For example, one may want a finished full-band mix, and another may prefer to sing only to an acoustic-guitar track. In addition, because of the relatively low SPLs and close proximity of the headphones to an open mic (usually with lots of gain added), headphone bleed is often a problem.

As a general rule, keep percussive elements low in the mix, especially snare and cymbal parts that can create lots of high-frequency bleed (and usually aren't necessary for singers to keep their timing anyway). As long as the singer can hear the song's basic rhythm, you should be fine; most of the time, there's no need for "accessory" percussion parts at all.

The main goal is almost always to find the right instruments and the right balance of those instruments to keep the singer on pitch. Note that a headphone mix heavy on the low end will often cause singers, especially those less experienced at recording, to sing a little sharp as they attempt to "compensate" for the excessive lows. The solution there is simply to provide more of the midrange elements—those between, say, 800 Hz and 2 kHz—being careful not to let in too much of the higher-frequency sound.

▼

Too little effect can trigger "overinflection."

Perhaps most critical is finding the right level for the vocal in relation to the other instruments. If the voice is too loud in the cans, the vocalist may not sing forcibly enough; if the voice is too quiet, he or she may strain. In addition, too much or too little vocal in the mix can also contribute to pitch problems.

If the vocal is to be processed in the final mix with reverb, delay, or whatever, it is appropriate to add some of the same, or similar, effect(s) to the voice in the headphone mix, again to provide context. Be careful, though—too little effect can trigger "overinflection," and too much, especially too much reverb, may induce the singer to "cheat," resulting in weak vocalization, pitch problems, or both.

Weak vocalists often ask for more effects than are appropriate. In that case, it's best to give them what they ask for—after all, providing only the amount you think is right confers no advantage, and it may lead to discomfort for the singer, a substandard performance, or both. If you feel strongly that a singer is

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hurting the performance by using too much effect, try dropping the level a smidge during the take—a sneaky tactic, yes, but justifiable as long as it helps the performance.

Backup vocalist(s). Pitch is usually the main concern when recording backup vocals, so you may find that a minimum of instruments—acoustic guitar or piano and lead vocal, for example—yields the best results. I usually pan the lead vocal a bit to one side of center and the backup to the other side. Keep the lead vocal strong in the mix and then find a level—usually slightly below the lead—that is optimal for the backup singer or singers.

If you are recording a group of singers in one pass with a stereo pair of mics, pan the backups opposite the lead voice, but also try to pan the stereo signal so that it matches the arrangement of singers in the room—you don't want the person standing on the far left of the semicircle to hear him- or herself on the right side of the stereo image.

CAN DO

In the end, your ability to dial up an optimal headphone mix for any given instrumentalist will have a profound effect on the quality of the tracks and performances you get from your recording sessions. With experienced studio musicians, the job may be as easy as asking what they want and giving it to them; newbies, on the other hand, may not even realize they have a say in the matter, in which case it helps tremendously for you to have an idea of what kind of mix will coax out their best performances. Hopefully, this article has provided insight into how best to proceed in either case and how to minimize bleed and other problems that can plague you during mixdown.

Randy Neiman *is an independent producer, engineer, educator, and author who resides in the mountains of Northern California. Additional contributions were made by Robin Hood Brians and Jim Chapdelaine. You can reach the Great Baldini through e-mail at audioguru@mail.com.*

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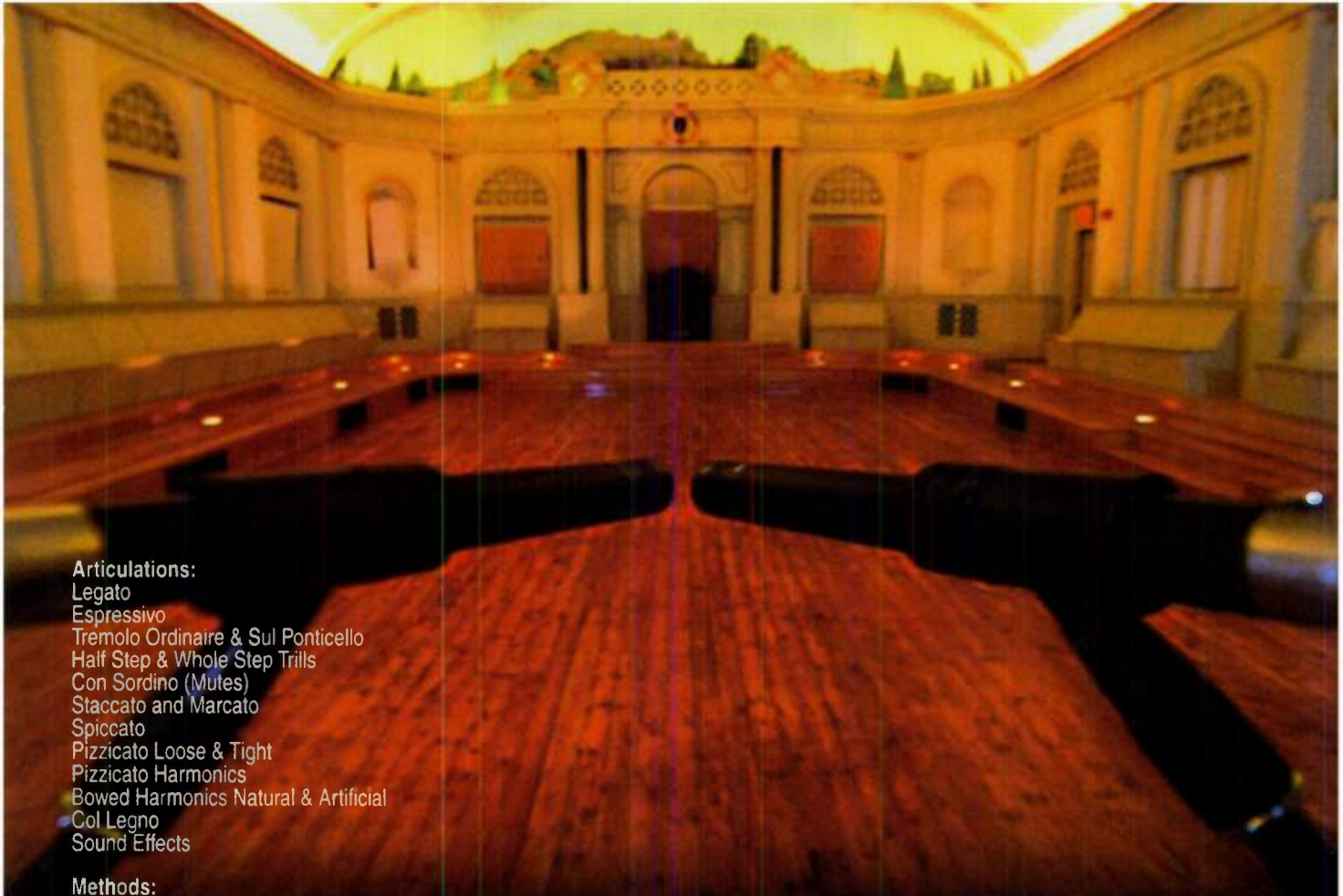

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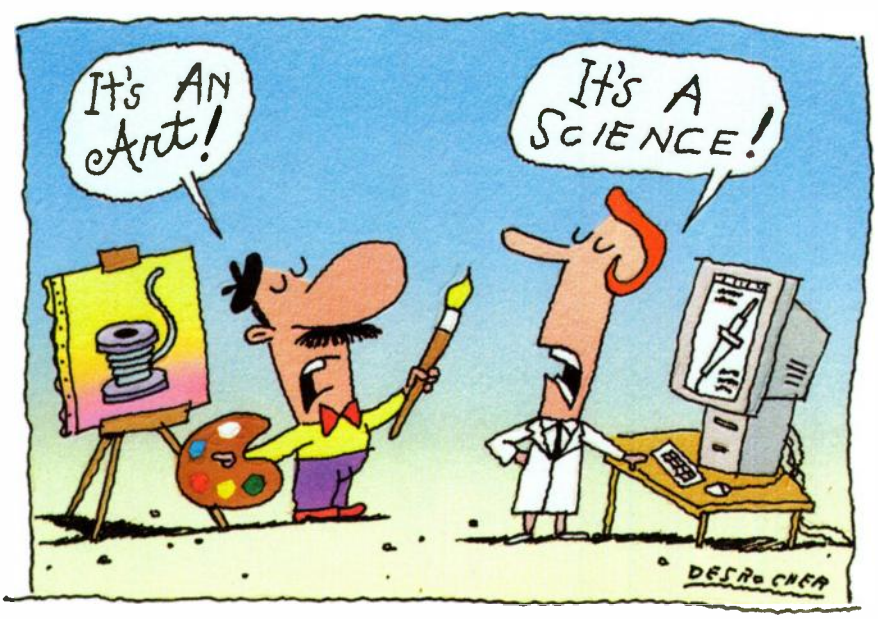
Getting Connected

The overlooked art and science of soldering.

By Peter Miller with Paul Howard

Over the past 15 years, many fundamental music-technology concepts have been explained in our "Service Clinic" and "Square One" columns. (The latter was originally called "From the Top.") Of course, EM's readership has continued to grow, and we don't want to leave new readers behind. Rather than trying to reinvent the wheel, we've decided to periodically reprint previously published material in the form of "Square One Classics." These articles clarify the essential, unchanging concepts that make it possible to be an electronic musician.



JACK DESROCHER

When a customer brings an electronic instrument into my shop, one of the first things that gets checked is the connections. Broken solder joints are by far the most common cause for the malfunction of electronic musical instruments.

Why are poor connections so pervasive? Partly because there are so many connections: a synthesizer or a mixer may have thousands of solder connections. Some integrated circuits commonly found in electronic instruments have dozens of pins, each with a solder connection to a printed-circuit board. Even the simplest electronic components have at least two connections.

One way to look at solder connections is as electronic components. A poor connection can have the characteristics of a resistor, a switch, or a semiconductor. Even connections of the highest quality have some resistance, which might be appreciable, depending on the application. A fractured connection often acts like a pressure-sensitive switch. If a connection has more resistance in one direction of current flow than in the other, the result is a crude semiconductor.

Bad solder connections have the

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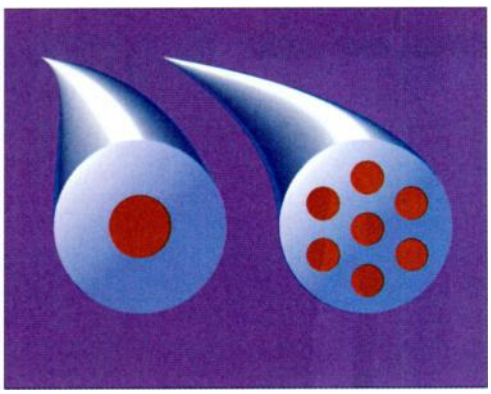

FIG. 1: Some techs feel that multicore solder (above, right) provides more reliable flux activation because the multiple smaller cores respond quickly to heat. However, single-core solder (above, left) is more commonly used. Good-quality solder of either type should yield excellent results.

effect of adding more components to the circuitry of an electronic instrument than its designers intended. Not surprisingly, this causes the instrument to go "tilt."

CORE ISSUES

When you solder, always remember that you are working with molten metal, and apply commonsense safety rules accordingly. Protect your eyes by wearing goggles. Keep solder out of your nose and mouth, cover any sores or cuts before handling solder, and wash your hands when you finish your work. Avoid breathing solder fumes and make sure you have plenty of ventilation. Finally, keep food and drink out of the soldering area.

Electronics service techs work with solder every day, but not everyone knows what it is made of. The type used for electronics is called rosin-core solder and is composed primarily of a combination of tin and lead; the former is for conductivity, and the latter is for low melting point. Important: never use acid-core solder for electronics work; it is designed for building things such as gas tanks and will destroy electrical connections.

The most commonly used proportion of tin to lead is 60 to 40. This 60/40 mixture goes through three phases: its original solid state, a plastic puttylike stage when the solder is solidifying, and a molten-liquid stage. During its plastic phase, solder is highly susceptible to fracturing due to uneven cooling within the connection. For this reason, a 63/37 tin/lead combination, called *eutectic,* is preferable; it has no noticeable plastic phase and significantly reduces the incidence of internal, hidden fractures. It's especially important to use 63/37 solder for PC boards with plated-through holes.

You may have noticed the smell of pine trees while soldering. This is from the rosin contained in the hollow center of the solder. Rosin is the brittle, hard resin that remains after turpentine is distilled; when it is molten, rosin becomes a detergent. It flows rapidly and freely throughout a molten solder connection and attaches itself to contaminants.

Another name for the core is *flux,* which is suggestive of its rapid flow through the connection due to capillary action. When solder cools and solidifies, rosin is displaced to the surface of the connection, taking contaminants with it. The most common type of solder has a single core, but you also can get multicore solder, which responds more quickly to heat because each core is small (see **Fig. 1**).

The size of solder that you need to use depends on the type of project that you're working on. For IC and small-component work, and even for some larger components, 0.037-inch diameter solder should be fine. However, 0.025-inch solder is considered acceptable, and it's easier to handle.

CLEANLINESS

You must clean solder connections before and after soldering. Cleaning beforehand is a good policy because of the many contaminants present on the surfaces of the metals being bonded. Rosin's detergent action is not perfect and will not remove all contaminants. The best way to preclean connections is with a cotton-tipped swab and alcohol or acetone. You can prepare component leads for soldering by burnishing them with steel wool or braided wire to remove oxidation.

Cleaning connections after soldering is also important. Remember that rosin is merely a carrier, transporting contaminants to the surface of the connection. Few people realize that rosin is corrosive and, in time, will eat into a connection. Acetone is useful for removing rosin, and the best time to do so is soon after a connection has cooled and solidified.

THE RIGHT TOOL

You need a proper soldering iron for making good connections. Don't bother with anything less than a well-made 30W iron with a three-wire power cord; a cheap iron is a bad investment. The tip of the iron should look like a good solder connection, smooth and mirrorlike. A thin layer of solder should already be on the tip; the procedure for applying solder to the tip is called *tinning* the tip.

The tip size you need depends on the size of the work. For ICs and other small solid-state components, use a small (say, 1/32-inch) tip to avoid creating solder bridges between components. For other types of components, such as resistors and capacitors, an

FIG. 2: This Weller DS 800 electronic desoldering station provides a closed-loop, temperature-controlled hollow tip through which solder is sucked into a reservoir by an internal pump.

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intermediate-size tip is better. Soldering electromechanical components, such as audio jacks, calls for a larger tip, perhaps an ⅛-inch.

Tip temperature should be electronically controlled at 600 to 700 degrees Fahrenheit, depending on the application. Lower temperatures are preferable for semiconductors and other heat-sensitive components. Tip temperature is critical and should not be allowed to fluctuate.

Keep the soldering iron in a solder station when not in use. The solder station should have a heat-resistant sponge on which you should periodically wipe the soldering-iron tip clean. Wet the sponge with distilled water to avoid contaminating the soldering-iron tip with the minerals that are normally present in tap water.

To clean and tin the tip, apply solder liberally to it, then wipe it gently on the sponge. The same detergent action that cleans solder connections also keeps soldering-iron tips clean. Replace tips regularly, because they are constantly subject to the corrosive effects of rosin.

HEAT THE CONNECTION

When making solder connections, heat the connection first, not the solder; then, apply solder to the connection, not the soldering iron. Heating the connection thoroughly ensures proper detergent action and allows rosin to do its work. If a connection is hard to heat, apply a small amount of solder to the soldering iron tip to act as a catalyst to heat the connection, then apply solder to the connection.

Inspect all solder connections carefully. There are several telltale visual clues you can use to spot a bad, or "cold," connection. This type of connection was not heated properly to begin with, and detergent action never occurred. A cold connection is usually obvious: it has a pitted, dull appearance and is spherical in shape, indicating poor capillary action. A good connection is shiny and smooth and has a graceful, gentle slope from the center of the connection to its perimeter. You can see your face in it.

From the perspective of the service technician, a bad connection often requires resoldering. Dirty or fractured soldering connections can be found in instruments built by the most reputable manufacturers. You may find several poor connections. Fracturing can occur because of manufacturing flaws or mechanical stresses caused by users, such as dropping.

Resoldering is sometimes known as reflowing. This means that the connection is heated until the old solder is molten, and then new solder is applied to clean the connection.

Resoldering several strategic connections in an instrument may completely solve the problem. Resoldering is also a highly effective preventive measure. Learning how to decide which connections to rework out of hundreds in a given instrument comes only with experience; connections that look good may contain hidden flaws.

A good place for you to start looking for fractured connections is with components that are subject to mechanical force, such as connectors mounted on printed-circuit boards. Some of the worst culprits are ¼-inch phone connectors. Due to their length, they exert powerful forces on connections to printed-circuit boards. Phone connectors were designed for use with telephone switchboards, in which ease of insertion and removal are paramount, rather than for the rigors of musical applications.

Another common source of fractured connections is heavy components that are not mechanically attached to the circuit board. Large electrolytic capacitors or power resistors fall into this category.

OUT WITH THE OLD

Some connections are so bad that the old solder must be removed and replaced with new. Removing old solder is sometimes accomplished with a braided copper wire coated liberally with rosin, known as *solder wick*. Solder wick is pressed gently against a molten connection, and the old solder is then drawn into the braid through capillary action. Although inexpensive, braid can present the danger of overheating the work and can leave solder in the hole, making safe removal of the lead component problematic. Still, with practice you can learn to avoid most of these problems.

Some people use a simple vacuum bulb to remove solder, but the results are unpredictable, and I don't recommend this approach. Another unreliable method involves a plunger-type vacuum device with an internal spring. You place the suction tip over the solder joint, heat the joint with the soldering iron, and trigger the plunger to create suction. This method brings about some of the same problems as using a solder wick.

The most professional way to remove solder is to use a desoldering station that has a closed-loop, temperature-controlled tip with an axial bore, through which the solder can be sucked into a reservoir (see **Fig. 2**). An internal (or, in some models, external) pump provides the suction that draws molten solder from the connection. The suction is controlled by a trigger in the grip of the desoldering assembly.

When you use a desoldering station, be sure to select a tip that matches the diameter of the lead to be desoldered. Proper tip maintenance is crucial to obtaining good results. For example, unlike soldering tips, desoldering tips should be lightly filed to remove debris. Do not use a conventional file, however, or you will damage the tip; a light-duty file is usually provided with the unit. You must clean the bore of the desoldering device at regular intervals with a large-diameter rod, empty the solder receptacle, and replace the filters.

Peter Miller *has specialized in the repair of electronic musical instruments for more than 30 years. He has owned and operated CAE Sound (located in San Mateo, California) since 1980 and has designed custom audio electronics for groups such as Tuck and Patti, Counting Crows, and the Grateful Dead.* **Paul Howard** *is a former service tech at CAE Sound.*

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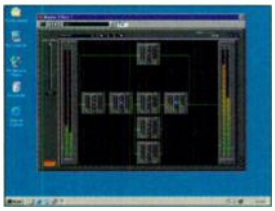

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REVIEWS

ANTARES

VOCAL PRODUCER AVP-1

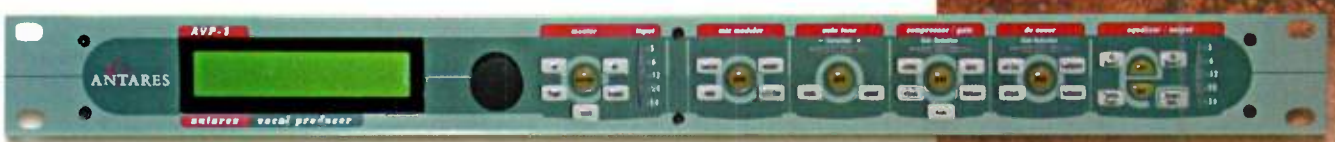
Pandora should have opened this box.

By Sean Carberry

Since the 1997 launch of its much-lauded Auto-Tune plug-in, Antares has become best friend to scores of pitch-challenged vocalists. Auto-Tune has saved countless singers the embarrassment of hearing their raw performances, and it has spared hordes of listeners, as well. It has also rescued the butt of many an engineer or a producer who didn't have time to wait around for a singer to turn in a "perfect" performance or who simply needed to fix a section of an otherwise stellar track.

Antares followed up with a hardware version of Auto-Tune, the ATR-1, and then set to work creating another alchemic device, the AMM-1 Microphone Modeler, which uses a proprietary technology called Spectral Shaping Tool to—at least, in theory—make a signal from, say, a Shure SM57 sound like it came from coveted transducers such as the AKG C 12 or Neumann U 87. (The ATR-1 and the AMM-1 were reviewed in the February 1999 and October 2000 issues of **EM**, respectively.)

Now Antares has upped the ante with the Vocal Producer AVP-1—the Leatherman of vocal processors. Combining Auto-Tune, microphone modeling, tube modeling, equalization, compression, de-essing, gating, and doubling in a single-rackspace box, the AVP-1 arms engineers with enough weapons to handle almost any vocal



The Antares Vocal Producer AVP-1 packs a load of processes—Auto-Tune, microphone modeling, tube modeling, equalization, compression, de-essing, gating, and doubling—into an affordable, easy-to-use, 1U box.

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performance. Furthermore, despite its name, the Vocal Producer is hardly limited to vocal applications: it will happily tackle any sound source. At $599, it is within reach of most musicians and engineers.

BOX FULL

With this unit, the question is not so much what's in the box, but what's not in it. Unlike most other "voice processors"—those ubiquitous channel-strip-type boxes outfitted for direct recording of vocals—the AVP-1 does not provide a mic preamp. I initially thought of that as a liability, given the all-in-one nature of the unit. But considering the modest price and how much processing you get, Antares's approach makes sense. The AVP-1 clearly is intended for the mixing rather than tracking environment.

With its 30-plus buttons and knobs, the AVP-1 looks a bit intimidating at first. Thankfully, everything is clearly labeled. From left to right, the front panel provides a 2-line, 20-character LCD; a Data Entry knob; master controls; and separate modules for Microphone Modeler, Auto-Tune, the compressor/gate, the de-esser, and the equalizer/output (which includes the doubler). Each module has its own set of controls, which minimizes annoying menu scrolling—thank you, Antares. Each module also provides its own on button, which is encircled by other buttons controlling the parameters for the given effect.

The AVP-1 is a breeze to operate. Simply push a button, and the display shows the related parameters. Turn the Data knob until the effect is set to your liking, and you're done. Move on to the next parameter and dial away. Once you're happy with the settings, you can save them in one of 35 memory locations. The AVP-1 ships with a wide range of factory-programmed presets, all of which can be overwritten with your own creations.

The unit's rear panel provides one unbalanced ¼-inch line input, two unbalanced ¼-inch outputs (the second one is for a doubled track), MIDI In and Out ports (allowing for real-time automation of most parameters), and an assignable ¼-inch footswitch jack that permits toggling of selected functions. Power is provided by a wall wart.

DIGRESSION

Pardon me while I digress for a moment, but after years of playing with multi-effects processors designed for guitar racks, I have come to expect the worst from boxes that perform more than one function. Typically, the more they offer, the lower the quality of each function. On top of that, I hate studio gear that is crammed to the brink with buttons, knobs, menus, and whatnot, because often it demands too much attention and concentration to interface with.

Vocal Producer AVP-1 Specifications

Inputs	(1) unbalanced ¼" line
Outputs	(2) unbalanced ¼" TS (second one for doubler output)
Other Ports	MIDI In and Out; (1) unbalanced ¼" footswitch
Frequency Response	10 Hz–20 kHz (±0.2 dB)
Total Harmonic Distortion + Noise	<0.005% (@ 1 kHz)
Dynamic Range	100 dB
Maximum Gain	+24 dB
Displays	(1) 2 × 20-character LCD; (4) 5-LED indicators for input level, output level, compression gain reduction, and de-esser gain reduction; (1) 4-LED tuning-correction indicator
Power Supply	9 VAC external (wall wart)
Dimensions	1U × 5" (D)
Weight	4.5 lb.
PITCH CORRECTION	
Auto-Tune	chromatic and 24 diatonic scales, all user customizable; retune speed; pitch-detection sensitivity
MODELING	
Microphone Modeler (available models)	(1) handheld dynamic; (1) studio dynamic; (1) small-diaphragm condenser; (2) small-diaphragm condenser; (1) large-diaphragm condenser; (2) large-diaphragm condenser; (3) large-diaphragm condenser; (1) kick-drum mic; (1) snare-drum mic; (1) cymbal mic; (1) telephone
Tube Saturation Drive	0 dB–12 dB
COMPRESSOR	
Threshold	–36 dB–0 dB
Ratio	1:1–99.99:1
Attack	1 ms–200 ms
Release	20 ms–3,000 ms
Knee	continuously variable
GATE	
Threshold	–96 dB–0 dB
Ratio	1:99.99–1:1
DE-ESSER	
Threshold	–40 dB–0 dB
Ratio	1:1–99.99:1
Attack	1 ms–200 ms
Release	20 ms–3,000 ms
Highpass Frequency	2.971–20 kHz
EQUALIZER	
Parametric EQ (2 independent bands)	6 dB lowpass; 6 dB highpass; 12 dB lowpass; 12 dB highpass; bandpass; notch; low shelf (variable slope); high shelf (variable slope); peaking
Double Tracking	stereo or variable mono mix

REASON

FIVE REASONS FOR GETTING REASON 2.0

Malström Graintable Synthesizer

1. Malström Graintable Synthesizer

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2. NN-XT Advanced Sampler

Reason 2.0 ships with an easy-to-use, but highly advanced sampler screwed into the rack. The NN-XT is every bit as versatile as any hardware sampler, and an excellent tool for both instrument emulation and sonic experiments.

NN-XT Advanced Sampler

3. The Orkester NN-XT Sound Library

Apart from the original 500 megabyte soundbank, Reason 2.0 includes a huge orchestral library for the new NN-XT sampler. The Orkester NN-XT library covers all the orchestral essentials, giving you a massive selection of pristinely recorded strings, woodwinds, horns and percussion.

4. The Detachable Sequencer Window

In Reason 2.0, the main sequencer can be pulled out the rack to be placed anywhere on your screen. On any of your screens. Resize and customize your sequencer window as you desire.

5. Support for Mac OS X

Reason 2.0 fully supports the Mac OS X platform, an environment that's tailor-made for computer musicians. Experience ultra-low latency and ultra-fast processing.

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However, I was astonished by how simple the AVP-1 is to operate. About a minute after hooking it up and patching in a vocal track, I was happily tweaking away, exploring all of the sounds and functions the AVP-1 has to offer. The only time I had to resort to the manual was when I wanted to try the doubler and I couldn't get any output. It turned out I had assumed the output controls were part of the equalization section and overlooked them. Once I got that straight, I never looked back.

MODEL BEHAVIOR

The AVP-1 can be used for tracking, of course, but I stuck with the manual's recommendation and used it exclusively for mixdown. This not only allowed for more experimentation, but it also made testing easier and didn't annoy the musicians.

I started by multing a vocal so I could compare live to Memorex, so to speak. First, I carefully compared the original track to the signal going though the box with all processing bypassed. As I expected, I heard a difference: the original signal had more depth, clarity, and air. That said, the sound quality of the AVP-1's bypassed signal was by no means bad.

Next, I worked with Microphone Modeler. There are a variety of choices for source mic and output mic. The source mics comprise many of those commonly found in personal studios, including models from Audio-Technica, CAD, and Shure. The output microphones are labeled generically as "handheld dynamic" or "large-diaphragm condenser #1" rather than by specific model names. By comparison, the standalone AMM-1 Microphone Modeler provides more than 100 modeled mics listed by make and model. The AVP-1 also lacks some of the more advanced MIDI functions found in the AMM-1.

In each case, the mic model evoked the general character of the mic selected. To my ear, though, the models sounded more like different equalization settings than different mics. Some sounded good, but others sounded a bit artificial. Then again, if all you have to work with is an SM57, the Microphone Modeler definitely expands your sonic options.

I also tried the modeler on miked instrumental sources. The drum-mic models sounded quite good, and I got some cool guitar sounds by changing mics, as well. Granted, I had to do a little guesswork because the AVP-1 does not provide the source mics I had used while tracking the instruments I ran through the box. But once I found a close source, I simply auditioned different output mics until I found what I liked.

DESAFINADO

To be honest, I have never liked pitch correction, no matter what the price

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or pedigree of the device. Frequently, the side effects are worse than a slightly out-of-tune performance. Even so, there are cases for which pitch correction is necessary, and the AVP-1 does an admirable job of easing a vocal to where it should be pitchwise. However, it was often a challenge to dial in the "just right" settings—those that would satisfactorily correct the pitch without making the track sound like the one on a certain Cher single or otherwise tipping the AVP-1's hand.

Fellow engineer Ducky Carlisle set up some blind listening tests for me. Using a vocal he had tracked, he switched back and forth between the original performance and the Auto-Tuned one. We could hear the differences, both good and bad: the processed vocal sounded less clear and a bit grainier, but more in tune. We could also hear the subtle tugging of the pitch correction.

SQUISH AND STOMP

Inexpensive dynamics processors, be they analog or digital, rarely suit my fancy, so I wasn't too surprised when the AVP-1's compressor failed to thrill me. Often it was too noticeable, even at subtle settings. But with tweaking, I was able to tame the unit's compressor to the point where it did what I wanted.

Thankfully, adjusting the compressor's parameters is a snap, and the display makes it easy to see what you are tweaking. I particularly liked the threshold control; turning the Data Entry knob moves the vertical threshold line from left to right in the display while the signal level is indicated by horizontal lines moving across the display, making it clear how much compression you are applying.

The AVP-1's gate worked flawlessly. It was easy to adjust and did exactly what it was supposed to with no chatter or other nonsense. I rarely use gates, but given that one is integrated into the AVP-1, why not take advantage? The gate worked wonderfully on vocals, and it handled percussion duties with aplomb.

▼

In a hurry?

The Vocal Producer is your savior.

The unit's de-esser was a bit tougher to master: either I heard too much compression or not enough. After some time spent tinkering with the controls, though, I found a setting with a low ratio (2:1) and a quick attack and release (5 ms and 20 ms, respectively) that worked pretty well for mild de-essing. Heavier settings, however, sounded artificial.

BANDS ON THE RUN

The AVP-1's equalizer section consists of two bands that allow for every conceivable type of processing. Shelf, rolloff, peak and notch, and bandpass

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options with all the requisite parameters allow for tremendous flexibility. Although I would have preferred another band or two, I was able to cover a lot of ground with the two bands.

The more equalization I used, the more I heard unpleasant side effects. For example, when I cut or boosted by more than 6 dB, I could hear extensive phase shift and a loss of clarity and detail in the signal. But honestly, given the unit's multiple functionality and low cost, I would have been surprised had I not heard those things.

TWIN POWERS

Once I figured out how to turn on the doubler (push the on button, dummy), I set to work trying to channel John Lennon. The doubler has a few options and some important settings to consider. For instance, it has a mono/stereo option you can use to mix the doubled sound in with the original or send it to a separate output. The latter, of course, allows for fun stereo vocal sounds as well as increased processing options.

The way the doubler works is determined by the Auto-Tune settings. If you are simultaneously using Auto-Tune, the second output will carry the original, uncorrected sound. If Auto-Tune is not engaged, the second output will carry the source patched through the current Auto-Tune settings. In other words, when using the doubler, you need to be aware of the Auto-Tune settings. For example, if you are using a heavy amount of Auto-Tune to fix a problematic vocal, the doubler will bring the out-of-tune vocal back into the mix, likely making things worse.

As long as the source isn't too off-pitch, though, the doubler makes life easy. In a hurry or dealing with a vocalist who can barely get through one track, much less two? The AVP-1 is your savior.

After I auditioned each effect on its own, it was time to start stacking things up. I cycled through the various presets, all of which wisely have Auto-Tune bypassed. In general, the more functions I used simultaneously, the more the signal quality deteriorated. The sound became more artificial, and I heard more phasing and hash and less clarity. That is typical of budget-priced digital multiprocessors.

FAVORITE SPORT

The AVP-1 is simply great for extreme vocals—one of my favorite sports. The more I played with the AVP-1, the more I liked using it as an effect. If you've got it, flaunt it. Try using the wrong settings for the mic modeler, squashing the dynamics to dust, cranking up the tube emulation, or even creating some artificial vibrato with Auto-Tune. Now we're talking extreme.

I got my favorite sound by taking a vocal and modeling it through a kick-drum mic with the tube saturation on full. I compressed the signal aggressively and got a wonderfully twisted vocal sound. Admittedly, the signal did have a fair amount of digital hash, but I was going for a demented sound, so that didn't bother me much.

I also got some cool sounds on other instruments. For instance, I took a clean guitar track, multed it through the AVP-1, and changed the mic from an SM57 to "large diaphragm condenser #2." I then added a touch of tube saturation, some compression, and an equalization boost around 4 kHz. The result was a nice, sparkly, "British" sound.

RACK OF ALL TRADES

The Antares Vocal Producer AVP-1 is one of the most comprehensive standalone voice-processing devices ever devised. Indeed, there is nothing really comparable on the market, at least not with both microphone modeling and automatic pitch correction.

The AVP-1 also gives novice engineers the opportunity to learn more about signal processing. Thanks to its user-friendly interface, wealth of processing options, and clear, comprehensive, and informative manual, the AVP-1 is a great route to the world of effects—including cutting-edge stuff. I can also see the AVP being useful in a live setting, where the pitch correction, dynamics, EQ, and mic modeling allow the engineer to quickly polish a vocal sound, and where the compromises in resolution and detail will not be re vealed by the P.A. system.

In general, devices that offer severa processes are primarily designed fo people seeking multiple functionalit in a single, low-cost box. From tha standpoint, it's difficult to beat th AVP-1. If you are on a budget an looking for a number of effects, can't think of anything else that of fers this much processing power an flexibility. In that context, my bee about sound quality really isn't a bi deal. If I were equipping my persona studio and I had a small budget and large wish list, I would be hard pressed to come up with a better so lution than the AVP-1.

PRODUCT SUMMARY

Antares
Vocal Producer AVP-1
voice processor
$599

FEATURES	5.0
EASE OF USE	4.5
QUALITY OF SOUNDS	3.0
VALUE	4.5

RATING PRODUCTS FROM 1 TO 5

PROS: Provides an unprecedented combination of processing options, including real-time pitch correction, microphone modeling, tube modeling, parametric EQ, compression, gating, de-essing, and doubling. Intuitive controls and layout. Easy to use. Versatile. Fully programmable. MIDI automation. Great for extreme sounds.

CONS: Average sound quality. Surfeit of options can sometimes complicate mix process.

Manufacturer

Antares Audio Technologies
tel. (888) 332-2636 or (831) 461-7800
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Web www.antarestech.com

Sean Carberry *is technical director of* The Connection *on National Public Radio*
Thanks to Ducky Carlisle at Room 9 from Outer Space and Milt Reder at Rear Window Studio for their assistance. Carberry can be reached at www.carpedonut.com.

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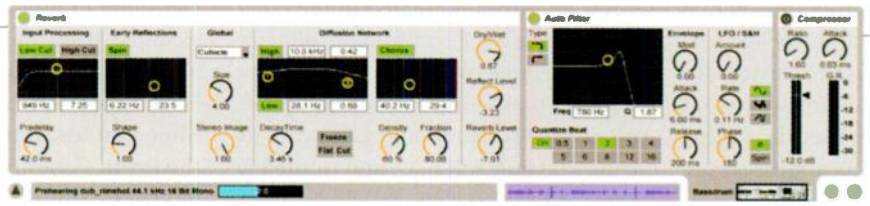

Real Time control

All mixer and FX parameters can be fully automated and operated using any MIDI controller.

live. sequencing instrument

Time Warping

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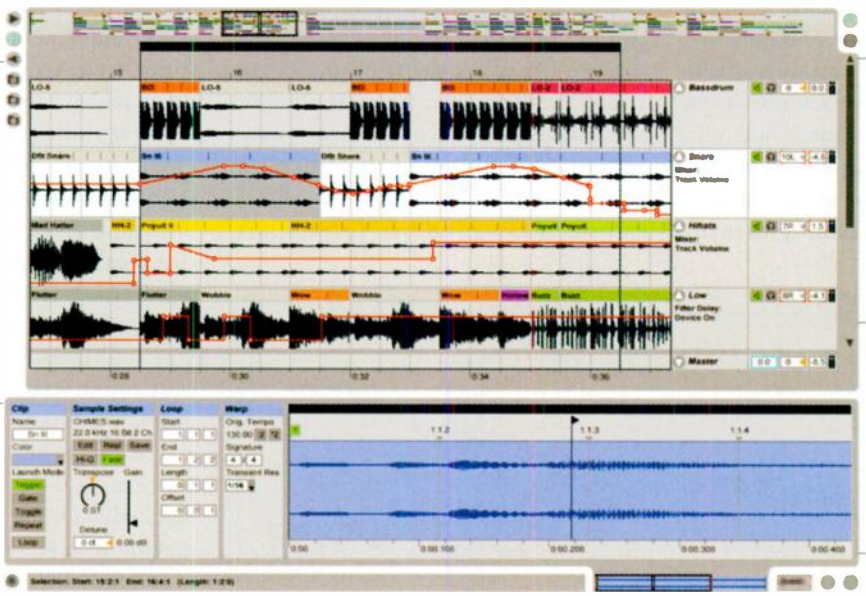

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Launch Modes

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Tweak with a Capital T

You've never heard audio get so stretched and turned inside out and still play in time. Until Live.

"Every now and then a program redefines what music is all about - like Sound Designer, Acid or Reason. Live is that kind of program. Its ability to record your performance for later editing bridges the gap between stage and studio." ***Craig Anderton***

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NOTEHEADS

IGOR ENGRAVER 1.6 (MAC/WIN)

An intelligent newcomer enters the notation scene.

By Brian Smithers

Igor Engraver from NoteHeads is a recent entry in the field of high-end music-notation software. In price and in its feature set, it takes direct aim at well-established programs such as Coda Music's Finale and Sibelius Software's Sibelius. Originally available for the Mac (see **Fig. 1**), Igor offers Windows and Mac users nearly identical functionality as of version 1.6, and scores are completely portable between platforms.

Igor's biggest selling point may be its well-developed sense of interpretive MIDI playback. NoteHeads has gone to great lengths to build "musical intelligence" into the program, and even on a simple General MIDI software synthesizer, Igor plays scores back with attention to articulations, dynamics, and other markings. Synthesizer profiles called Matrices are provided for many common sound modules to maximize their expressive potential, and NoteHeads distributes a free (unsupported) program called Matrix Maker by António Nunes for creating and exchanging Matrices for nonstandard synths and setups.

For a relative newcomer, NoteHeads has done a good job of covering all the expected features of a notation program, from quality output to e-commerce. The company's Web site allows users and other musicians to set up their own free home pages to sell their works, and a free viewer lets potential customers see and hear the music before they buy.

GIVE PIECE A CHANCE

A new Igor work is created in the Piece window (see **Fig. 2**), a two-pane alternative to the "wizards" some programs use to start a new score. In the right pane, you create Musicians and assign the instruments they will play, and in the left pane, you create Layouts, which represent the parts played by each Musician as well as the score itself.

This approach has some interesting ramifications. For example, Igor does not require you to "extract" parts from a score—they coexist from the beginning. Furthermore, parts and scores are dynamically linked so that updates to one are reflected in the other. I'm sure I'm not the only one who will be happy to say good-bye to the part-extraction process. (In fact, I have co leagues who regularly bypass the part extraction process of their well-known notation program for reasons of qualit and efficiency.)

It's also possible to recombine Mus cians into different scores to create, fo example, band and orchestra versions o a work. At first glance, that looks like huge time-saver, but after using it, I'm somewhat less enthusiastic. It's not tha the feature doesn't work the way it's in tended to; rather, it's less practical tha it seems. To take the band-orchestra ex ample a step further, both scores woul have clarinet parts and flute parts, bu the band clarinet and band flute part would almost certainly be different fror their orchestral counterparts, mos likely picking up large parts of the or chestral violin parts. Still, if there ar any parts at all that are identical be tween orchestrations, you may save little time. In general, the usefulness c this feature depends on the kind c music that you work with; for som people, the feature could come in hand You could easily create a choir piec with and without an organ accompan ment, for instance.

In a rather odd design decision, th Piece window's various buttons ar blanked out when they are not available making it look as though something wrong with the window. It's customary t merely gray out a button or menu iter when it doesn't apply—for example, Delete button when nothing has bee selected. Once you get used to Igor approach, it doesn't matter, but to a be ginner, it's quite curious.

FINALLY, A HECKELPHONE!

Igor boasts an amazingly long list of in struments (more than 300) for Musician to play. When you create a Musician, yo

Minimum System Requirements

Igor Engraver

MAC: PPC; 32 MB RAM (G3 with 64 MB RAM recommended); OS 8.5; OMS for playback

PC: Pentium II: 64 MB RAM; Windows 95/98/ME/XP

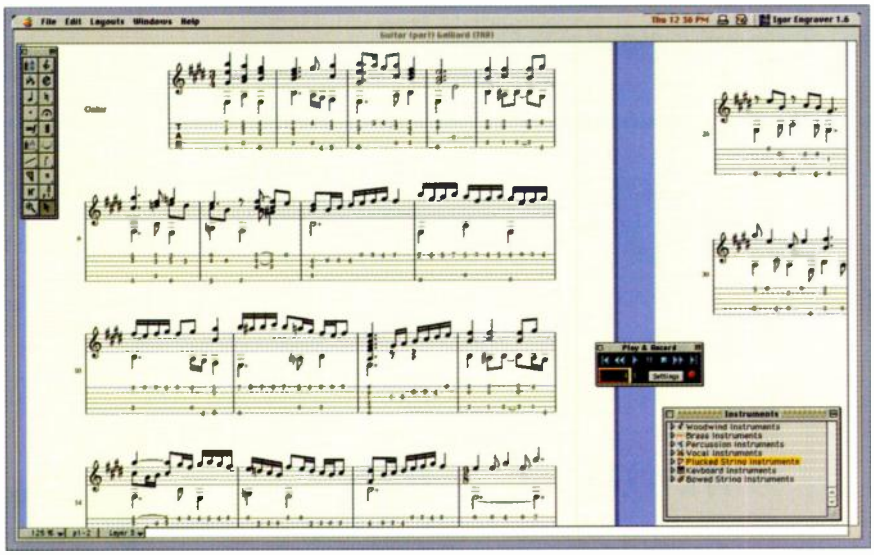

FIG. 1: Igor Engraver 1.6 looks different in the Mac version (shown here) than in the Windows version, but it is functionally the same on both platforms. The two versions offer the same extensive set of high-end music-notation tools, including flexible and intelligent handling of tablature.

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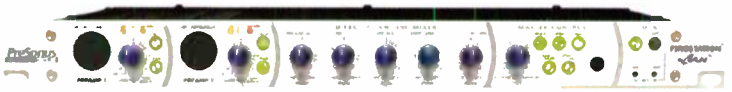

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choose one or more instruments from standard categories such as Bowed Instruments or Woodwind Instruments, but the list goes on for days, including everything from zither to automobile-brake drums to Moog bass to contrabass saxophone. Do you have any idea how few contrabass saxophones there are in the world?

This may seem like extreme overkill, but it's justified by the fact that each instrument definition contains not just information about appropriate clef, transposition, and instrument name (full and abbreviated in six languages) but also proper range, suitable synth patch, and intelligent performance information. For example, a trill means something different on timpani than it does on a clarinet, and Igor treats them differently. Some articulations even trigger patch changes, such as when switching between *pizzicato* and *arco* strings. That kind of information in the instrument definitions is subsequently interpreted by the Synth Matrices.

As a woodwind doubler, I had hoped that Igor's approach would solve the age-old problem of switching instruments in the middle of a piece. All I would have to do is assign alto flute, bass clarinet, piccolo, and baritone saxophone to a single Musician and then switch between them, right? Unfortunately, it's not that simple, and I was unable to get the display I wanted with the proper playback. That's rarely a smooth process in any notation program, though, especially if you want proper playback of the various instruments.

The most notable absence from Igor's list of instruments is a drum kit. It's hard to justify having eight tuba definitions and one for an Ondes Martenot (talk about rare!) without accounting for a drum kit. Credit is due to the manual's author for clearly laying out a moderately complex work-around, but this is one shortcoming that needs fixing right away. (According to NoteHeads, a drum-kit editor is planned for a future version.)

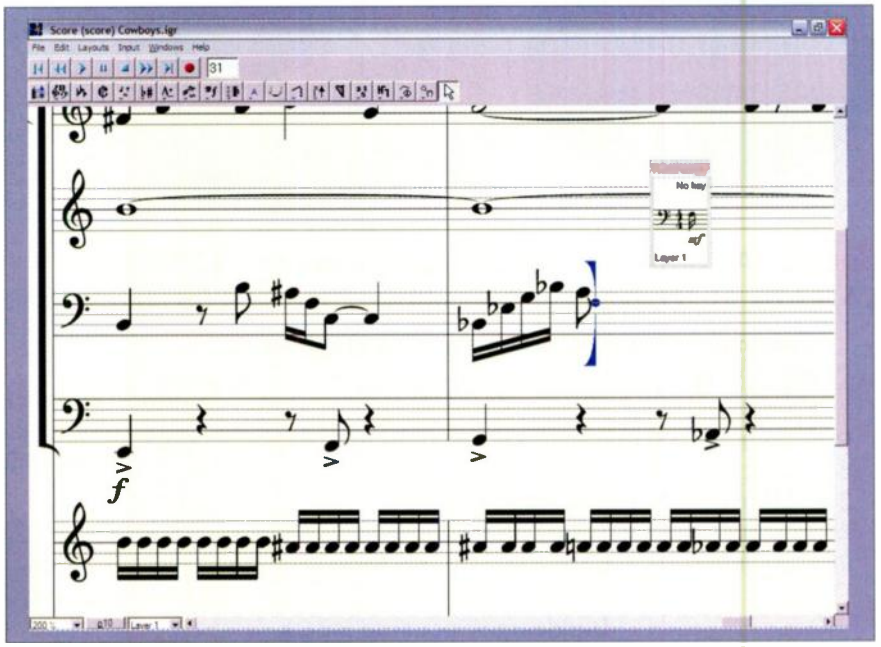


FIG. 3: In Input mode, the blue caret (cursor) indicates the current note entry position while the small Music Entry window indicates the current pitch, duration, and other parameters.

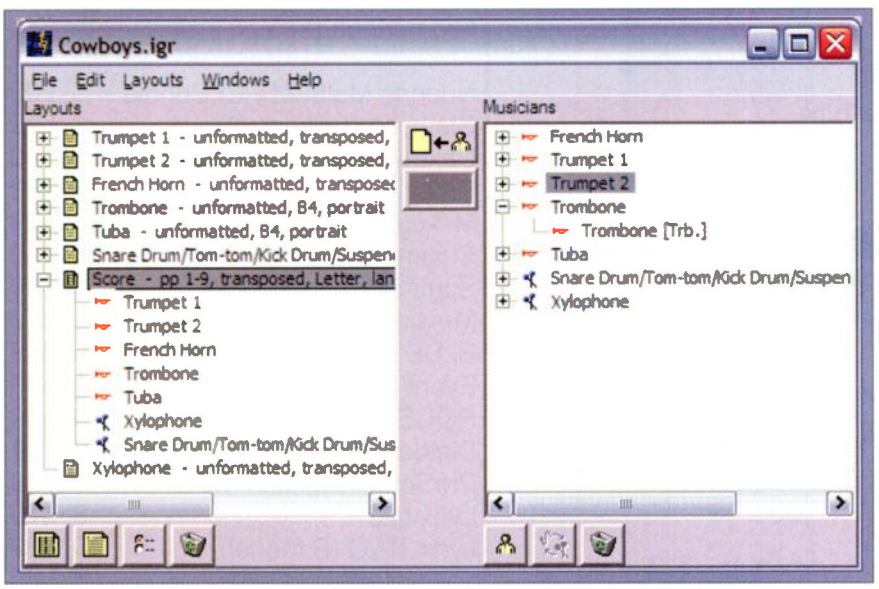


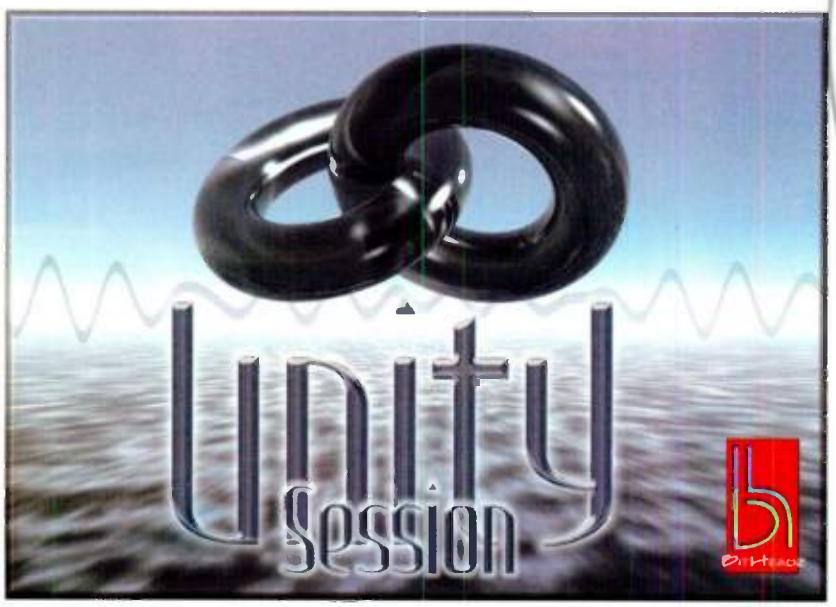
FIG. 2: The Piece window is the heart of Igor Engraver's score creation. Musicians are created and assigned instruments in the right pane and then assembled into part and score Layouts on the left. The program lets you produce multiple scores from the same set of Musicians.

NOTE ENTRY

When I edited my first Igor score, I was initially put off by the sight of 20 palette icons. Palette-based entry is slow and tedious for most functions, and when I determined that there weren't even any shortcut keys to choose among the different palettes, my heart sank.

Fortunately, NoteHeads agrees with me, and the palettes are mostly there for users who are just getting acquainted with the program. Serious music entry happens in Input mode, in which note values, pitches, articulations, and dynamics can be entered from the computer keyboard or a MIDI keyboard. Double-clicking on any bar displays the blue Input Caret (a cursor that shows the current point of insertion) and the Music Entry window, which shows the current pitch,

Obsession.



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rhythmic value, key, time signature, and more (see **Fig. 3**).

Notes are entered by selecting a rhythmic value with the numeric keys, choosing a pitch with the up and down arrow keys, and pressing Enter to enter the note. Pressing Alt + Enter enters the note lowered a half step, and pressing Control + Enter enters the note raised a half step. Even quicker, you can use the Function keys (F1 to F8) to select and enter pitches in a single keystroke. Adding the Control key to a Function key enters a lowered note, and adding both Control and Alt to a Function key enters a raised note. That is efficient but backward from the behavior of Control + Enter and Alt + Enter. (The Mac version is more consistent: adding Control to a Function key raises the note.)

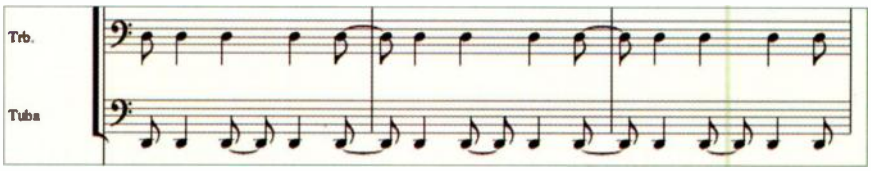

FIG. 4: With Igor Engraver, you can create this trombone figure by simply typing in a series of 11 quarter notes. The program is smart enough to break the quarter note into two tied eighth notes across each bar line. I wish it could also be set to automatically break the second quarter note of each measure as shown in the manually edited tuba part.

DOTTING THE Is

Dynamics and articulations can be entered concurrently with notes using single-key commands in Input mode. Simply press T after entering a note, and it will be tied to the following note. Pressing L starts and ends a slur, and C and D are used to begin and end crescendo and decrescendo "hairpins," respectively.

If you prefer, you can enter notes on one pass and then go back and enter articulations and dynamics. In Input mode, you simply use the right- and left-arrow keys to walk through the score while entering the markings with the same mnemonic keys. To enter a crescendo hairpin, for example, select a passage and press C; a hairpin will appear with grab handles for making adjustments.

Igor offers a couple of interesting and powerful entry techniques. One, called Mirroring, allows you to use the rhythms of one staff as the basis for entering notes in another staff. For example, when a brass section is playing a harmonized line, you simply enter the notes for the Second Trumpet part while Igor applies the rhythms of the First Trumpet part. That sort of thing happens often enough that Mirroring could be a real time-saver.

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If NoteHeads could incorporate a way to turn Mirroring off and on for the occasional independent rhythm without time-wasting mouse-clicks, I'd really fly.

I'VE GOT RHYTHM

I especially like Igor's ability to notate a rhythm that ties across a bar line without forcing you to manually break and tie the note. For example, to get two eighth notes tied across a bar line, you can simply enter a quarter note: Igor sees that there's not enough room in the first measure, breaks the quarter note into two eighth notes, and ties them together (see **Fig. 4**). Creating such a figure manually is time-consuming in almost any notation program. It would be even better if Igor could be set to break syncopated quarter notes between beats two and three—that's a common practice.

I also love the user-definable Key Bindings, which allow you to reassign any or all of Igor's key-based commands. For example, on a notebook computer, where you don't have a separate numeric keypad, using the numeric keys to choose durations while using the F-keys to enter pitches could mean holding your right hand over your left hand, which is not a comfortable way to work. That really aggravated me until I realized I could customize all those hotkeys into a comfortable arrangement on my notebook keyboard.

I assigned all of the pitches to keys A through G and all of the durations to a cluster under my right hand; efficient note entry was just at my fingertips. The only real drawback is that there are so many key bindings that changing one assignment almost always has a domino effect. In my case, reassigning the pitches often required changing two other assignments to make the A through G keys available. NoteHeads could make the process easier by adding "sort by assignment" and similar editing functions to the Key Bindings window.

THE OTHER SHOE

Igor Engraver provides excellence in the "big three" requirements of a notation program: print quality, feature set, and user interface. Igor's output is of professional caliber, even on an inkjet, and it prints on any size paper. The program's list of features is way beyond the scope of what I can list here, but it includes harp diagrams, quarter-tone (even sixth-tone!) accidentals, staves with user-definable numbers of lines, and alternate music fonts. Almost every aspect of score layout, appearance, and playback can be customized.

Igor's user interface is well conceived, and once I learned my way around, I was able to be reasonably efficient. There are, however, some eccentric behaviors that stand between Igor and the big leagues. Some are real obstacles; others are merely annoying.

As an example of the former, Igor has no efficient method for navigating a score. None of the keys that you might think would be used to move around a score—PageUp, PageDown, the arrow keys, Home, or End—have any effect. A Hand Tool allows you to grab and move the page with the mouse, but it requires selecting the Hand Tool with the mouse and then switching back to the pointer when you're done positioning the page.

Clicking on the scrollbars works as expected except that it often moves a

PRODUCT SUMMARY

NoteHeads
Igor Engraver 1.6 (Mac/Win)
music-notation software
$295

FEATURES	3.0
EASE OF USE	3.5
DOCUMENTATION	3.5
VALUE	3.0

RATING PRODUCTS FROM 1 TO 5

PROS: High-quality output. Support for multiple languages. Extensive feature list. Excellent playback. Cross-platform files. Parts and score are dynamically linked (no extraction required).

CONS: Poor score-navigation tools. Some dialogs are poorly implemented. No Help file.

Manufacturer
NoteHeads Musical Expert Systems
e-mail info@noteheads.com
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page to a point halfway offscreen, making you fine-tune the page position. There is a Go To Page button, but the resulting dialog box requires that you manually delete the current page number and type in the target page number. At that point, you would expect to be able to hit Enter and be taken to the new page, but instead you need to tab the highlight to the OK button and hit Enter or click on the OK button with the mouse. If you're drawing a quick lead sheet, the lack of navigation tools is no big deal, but if you're doing a sizable score, it's way more than a molehill.

Less serious idiosyncrasies include the fact that scores don't remember their window layouts. I have to maximize the Score window each time I open one. More often than not, the score opens partially offscreen. The Time Signature dialog requires you to select the current time signature with the mouse (Tab doesn't work) and enter the new value and then click on OK (Enter doesn't work). If you change your mind, you must click on Cancel, because the Escape key doesn't work. To delete selected objects in a score under Windows, you must right-click and choose Delete Objects or remember that a Mac's Delete key is equivalent to a PC's Backspace key, because you can press your PC's Delete key all day, and nothing will happen.

Igor includes a well-written manual with useful tutorials, but the program provides no Help file at all. Multiple Undo is available, but if you undo off the current page, you'll be flying blind, because the page won't scroll to follow your undoing. I also found some display issues on my notebook that weren't present on my desktop, such as an odd, imprecise blob of a cursor when I tried to use the Note Entry palette.

THE FINAL SCORE

I like Igor Engraver well enough that I hope these eccentricities are fixed soon. In its conception and in much of its current behavior, it deserves to be considered in the company of the high-end notation programs. To its credit, NoteHeads has an efficient "patch-as-you-go" scheme built in to Igor. Under the Edit menu, a Check for Patches function searches the NoteHeads Web site for updates. More than once, I inquired about an issue and found that a patch was waiting online or in the works.

If you're looking for an alternative notation program, especially one that supports multiple languages, check out the demo version of Igor. It's the full version in a 30-day trial with nothing disabled. While you're at it, subscribe to the users mailing list. You'll have direct access not only to experienced users but also to the NoteHeads representatives themselves, from techies to developers to the head honchos.

Brian Smithers *is a musician and writer in Orlando, Florida. He teaches at Full Sail Real World Education in Winter Park.*

ROGER LINN DESIGN

ADRENALINN

A studio full of equipment in an innovative stompbox.

By Richard Alan Salz

Adding to a long list of groundbreaking products—including the LinnDrum, the LM-1, the Linn 9000, and the Akai MPC-series workstations—Roger Linn has now developed the AdrenaLinn, a guitar-effects processor that includes a programmable 32-step filter, a drum machine, time-domain effects, and amp modeling. All of that is packed into a sturdy cast-aluminum box that's about the size of a paperback book. What makes the AdrenaLinn unique is how everything works together.

The AdrenaLinn features 100 ROM-based factory presets and an additional 100 user-editable presets that initially contain data identical to the factory presets. Those presets control the effects (including filter and delays) and which amp model is in use. The amp-modeling section includes ten amp simulations, ranging from Fender Champ to Mesa/Boogie Dual Rectifier. Also included are fuzz box and direct-injection simulations.

One thing to keep in mind is that the AdrenaLinn is a very deep box, and it can take a while to understand the interface. Fortunately, the manual is well written and concise.

ON THE SURFACE

The AdrenaLinn's control surface has four main rotary encoders (one of which is a volume knob with an associated LED to indicate clipping), four buttons, two stompbox-style momentary (foot-activated) push buttons, and a three-digit numerical display (see **Fig. 1**). A legend that covers most of the front panel lists the unit's functions. LEDs indicate the status of the device.

The rear panel has a ¼-inch input, two ¼-inch outputs (left and right), MIDI In and Out jacks, and an input for a 7.5 VDC wall-wart power supply. The only things missing are a dedicated headphone output and digital I/O.

COURTESY ROGER LINN DESIGN

FIG. 1: The compact multifunction AdrenaLinn from Roger Linn Design offers amp modeling, a step-programmable drum machine and filter, effects, and more. The device provides flexible audio-routing options that make it useful onstage and in the studio.

The main rotary encoders control a wide variety of parameters depending upon the mode the AdrenaLinn is in, but their nominal functions are Preset, Drumbeat, Tempo, and Volume. There are status LEDs that light up next to the function that is in use.

The two footswitches (labeled Start and Bypass) can have multiple functions, as well. Besides starting and stopping the active drum machine or filter sequence, the Start button can provide a one-measure hi-hat count-in. If the drum machine or filter sequence is playing, holding down the Start button causes the AdrenaLinn to play to the end of the measure and stop.

The Bypass footswitch acts as a conventional effects bypass, but you can also use it to set the tempo of the drum or filter sequence: instead of tapping in time with the tempo, you hold the footswitch down for an entire measure of the tempo that you want to sync with. In addition, the Bypass footswitch can be configured to switch between two presets.

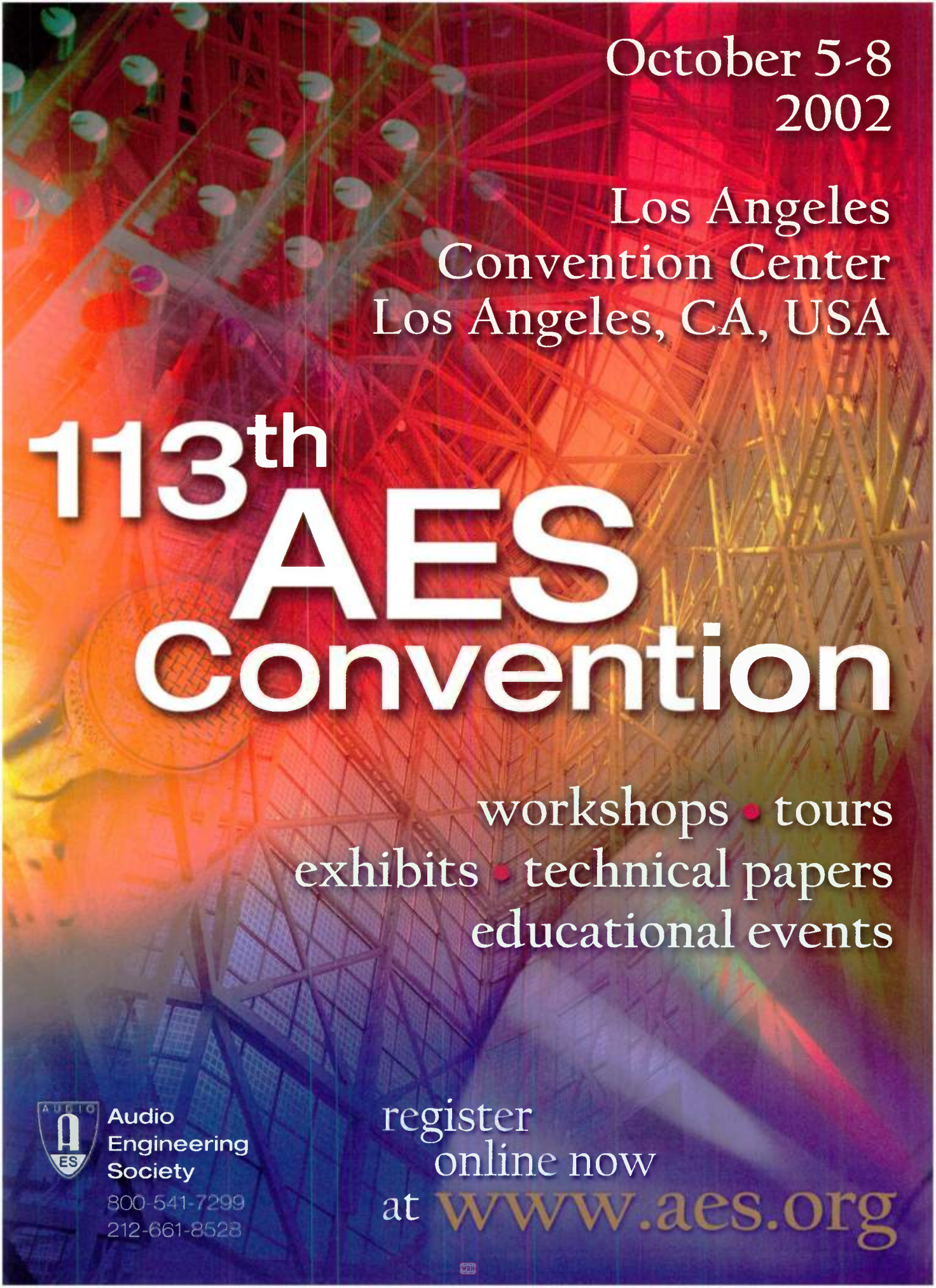
DA DRUMS

The drum machine offers nine kick drums, nine snares, and nine hi-hats. Five other groups offer three drum sounds each, mostly assorted percussion and toms. The drums are well recorded and punchy, and in many cases, they sound as though they could have come from a standalone percussion module.

The drum machine's output can be routed internally through the filters, amp models, or delays. Although you can't access the individual drum sounds through MIDI, you can sync the AdrenaLinn to incoming MIDI data.

Patterns are created using the Step-Programming mode. Any step of a pattern can contain four voices (bass, snare, hi-hat, and percussion), and like the original LinnDrum, the AdrenaLinn provides only three volume levels for each voice (except for the percussion voice, which plays at just one volume). Panning and volume are controllable, but pitch and decay are not.

The AdrenaLinn can also be programmed and controlled from a module in Emagic's SoundDiver (see **Fig. 2;**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the module is available for download from the Roger Linn Design Web site). SoundDiver is a cross-platform application, so PC and Mac users are taken care of. According to the manufacturer, options for other editors are being explored.

The AdrenaLinn's drum machine offers 100 factory drumbeats and 100 user-created drumbeats. The presets range from normal rock and pop to fairly wild electronic beats, with some slightly stiff hip-hop and R&B beats in between. The presets are certainly good enough for a rough demo or, better yet, something to jam over.

FILTERS AND EFFECTS

The filter module is controlled by a 32-step sequencer, though alternate note resolutions will move the number of steps down to 16 or 24. Modulation level and envelope-generator trigger parameters can be set for each of the steps. The sequencer is configured so that it is synced with the drum machine; alternatively, it can be synced with MIDI.

The first element of the filter is a low-pass filter that can be configured for 2-pole (12 dB Oberheim-style) or 4-pole (24 dB Moog-style) operation. Cutoff frequency and resonance parameters are programmable.

An envelope generator controls the filter's attack and decay settings. An LFO section—with sine, triangle, sawtooth, pulse, and random waveforms—is available for autopanning, filter sweeps, and chorusing. An amplitude envelope generator that tracks the input signal provides autowah and Mutron-style envelope effects.

The filter section responds to MIDI Control Change messages in addition to Velocity and note number. The filter's cutoff frequency can be raised (and in some cases lowered) in response to incoming MIDI data.

Overall, both filter configurations sound impressive and excel in capturing an analog sound. By dialing in copious amounts of resonance, I easily created a dead ringer for Jerry Garcia's '70s-era envelope-filter tone. Rolling off some of the treble on my guitar enhanced the effect of the filter envelope.

Other effects include flanger, inverted flanger, pitch (for harmonization and vibrato), volume (for tremolo effects), and delay. Those effects can be combined to produce other effects such as autopanning, vibrato, and chorus. Conspicuous in its absence is reverb: the manufacturer told me that was because of the unit's digital signal-processing limitations. In my opinion, it is much better to have no reverb than a poor reverb.

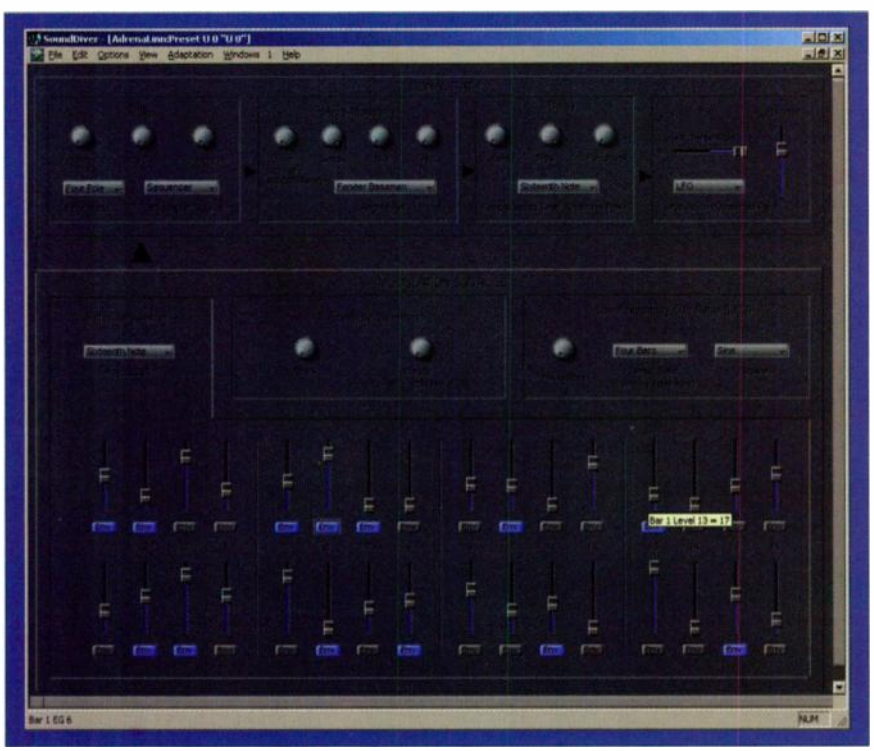

FIG. 2: Emagic's SoundDiver editor/librarian offers a module for editing the AdrenaLinn on a PC or a Mac. Having access to numerous parameters on a single screen makes programming quick and easy.

SUPERMODELS

The AdrenaLinn's amp models also sound good. The unit has a decent collection of amps and preamps, as indicated by the preset names: Fender Bassman, Fender Deluxe Reverb, Old Small Fender, Early Marshall, Classic Marshall, Modern Marshall, Vox AC-30 Top Boost, Matchless Chieftain, Mesa/Boogie Dual Rectifier, Soldano, Fuzz Box, and Clean Console. Each model has drive, bass, mid, and treble controls that model the actual range and frequency response of the device being simulated.

It's difficult to compare the sound of a modeling device to an actual amplifier because there are so many variables, such as speaker age, room characteristics, and microphone placement. The main thing an amp modeler provides is the vibe and overall tonality of the simulated amp.

The amps I used for comparison are a Mesa/Boogie Dual Rectifier (through a Marshall 4×12 speaker cabinet loaded with Celestion 75W speakers); a Marshall JCM 800 2210, which I compared to the Modern and Classic Marshall models; and a 1970s Fender Vibrolux silverface model, which I compared to the Deluxe Reverb simulation. I also used a Bedrock 1200-series head as the target for the Vox AC-30 model because it has a bit of the midrangy Vox sound.

Of all the amp models, the Dual Rectifier model came closest to the sound and feel of the original. The tight and aggressive tone produced by the AdrenaLinn was similar to the tone of my Dual Rectifier, especially at high gain settings. The Marshall model was good, but at times it sounded a little honkier and thinner than the real thing. The

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Fender sounds were good as well, lacking only spring reverb to complete the illusion. As for the Vox AC-30 model, it had the same midrange push as my Bedrock, but a different tonal balance. That's not surprising, because the Bedrock is an EL 34–based amplifier, and the Vox AC-30 uses an entirely different tube complement. Still, it made for an interesting comparison.

I tried the AdrenaLinn plugged directly in to a Mesa/Boogie Strategy 400 tube power amp connected to two 4×12 slant cabinets. I was able to get some devastating tones out of that rig, which to my ears sounded better than the '80s Marshall 9001 tube preamp that I often use. Though it would be tricky to use just the AdrenaLinn for a live gig, it could be done, especially in conjunction with a MIDI pedalboard. I suspect most users will use it with a regular combo or preamp/power-amp setup rather than as the sole preamp stage.

The AdrenaLinn sounded great on two vintage synths—a Fender Chroma Polaris and a Moog MG-1. Both synths have mono outputs and lack onboard effects. The AdrenaLinn breathed new life into both synthesizers, animating them in a way that made them sound much more modern without robbing them completely of their identity. The AdrenaLinn is a great tool for "stereoizing," not to mention adding a programmable sequencing filter to any mono instrument.

THE RUBBER MEETS THE ROAD

For testing presets, I used a few different instruments: a Paul Reed Smith CE-24, a Warmoth Gecko five-string bass, a Moog MG-1, and a Fender Chroma Polaris. I patched the AdrenaLinn directly into my Neotek IIIc console and monitored using a combination of Fostex NF-1s and Urei 809s.

Moving through the various presets can be disorienting because their range is startling. While playing guitar through the AdrenaLinn, I had to remind myself that I was listening to a guitar and not a sequenced synth! That's how radical the AdrenaLinn can get.

I don't mean to give the impression that the AdrenaLinn is capable of only bombastic, highly modified sounds. Some of the more restrained presets, such as the Fender Deluxe, simply sound like a good amp with a decent mic in front of it. Some of the vibrato/tremolo and flanger programs are well within the bounds of good taste and would fit easily into many production styles.

However, the extreme sounds are what make the AdrenaLinn such a compelling box. Presets such as Filter Sequence–Ascending bring sonic and rhythmic textures to the guitar that recall the work of Pete Townshend and producer Glen Ballard (especially his work with Alanis Morissette).

My final application was using the AdrenaLinn as a processor during mixdown. The AdrenaLinn is my choice for taking a boring track and making it interesting. For example, the flanger is an excellent tool for bringing a stale rhythm guitar track to life. Even compared with my dedicated outboard processors, the AdrenaLinn's flanger is impressive. Furthermore, the sequenced-filter programs can produce some wacky effects when used on vocals.

The AdrenaLinn's only downside as a standalone processor is the mono input. Of course, you could get around that by using two units locked together by MIDI—a cost-effective solution, considering the quality of the processing.

RUNNING HIGH

The AdrenaLinn is not only a revolutionary product but also an exceptional value. Getting a programmable filter, an amp modeler, and a drum machine of this quality in one box is remarkable. The programmable filter alone is worth the price.

For both stage and studio use, the AdrenaLinn is ideal. It's a great idea generator, the kind of tool that inspires you to write new material and create new sounds. The AdrenaLinn is an all-around winner.

Richard Alan Salz *is a producer living in Southern Vermont.*

PRODUCT SUMMARY

Roger Linn Design
AdrenaLinn
guitar-effects processor
$395

FEATURES	5.0
EASE OF USE	4.0
AUDIO QUALITY	4.5
VALUE	5.0

RATING PRODUCTS FROM 1 TO 5

PROS: Great sound. Sequenced filters. Excellent-sounding presets.

CONS: Mono input. No headphone jack. No digital output.

Manufacturer
Roger Linn Design
tel. (510) 898-5433
e-mail support@rogerlinndesign.com
Web www.rogerlinndesign.com

AdrenaLinn Specifications

Preset Rhythm Patterns	(100) factory, (100) user
Preset Effects/Filter Patches	(100)/(100)
Filter Sequencer	(32) steps
Amp Models	(12)
Effects Types	(8)
Analog Inputs	(1) unbalanced ¼" TS
Analog Outputs	(2) unbalanced ¼" TS
MIDI Ports	In, Out
AC Adapter	7.5 VDC (wall wart)
Display	1.50" (W) × 0.75" (H) 3-digit LED
Dimensions	7.25" (W) × 1.50" (H) × 4.50" (D)
Weight	2 lb.

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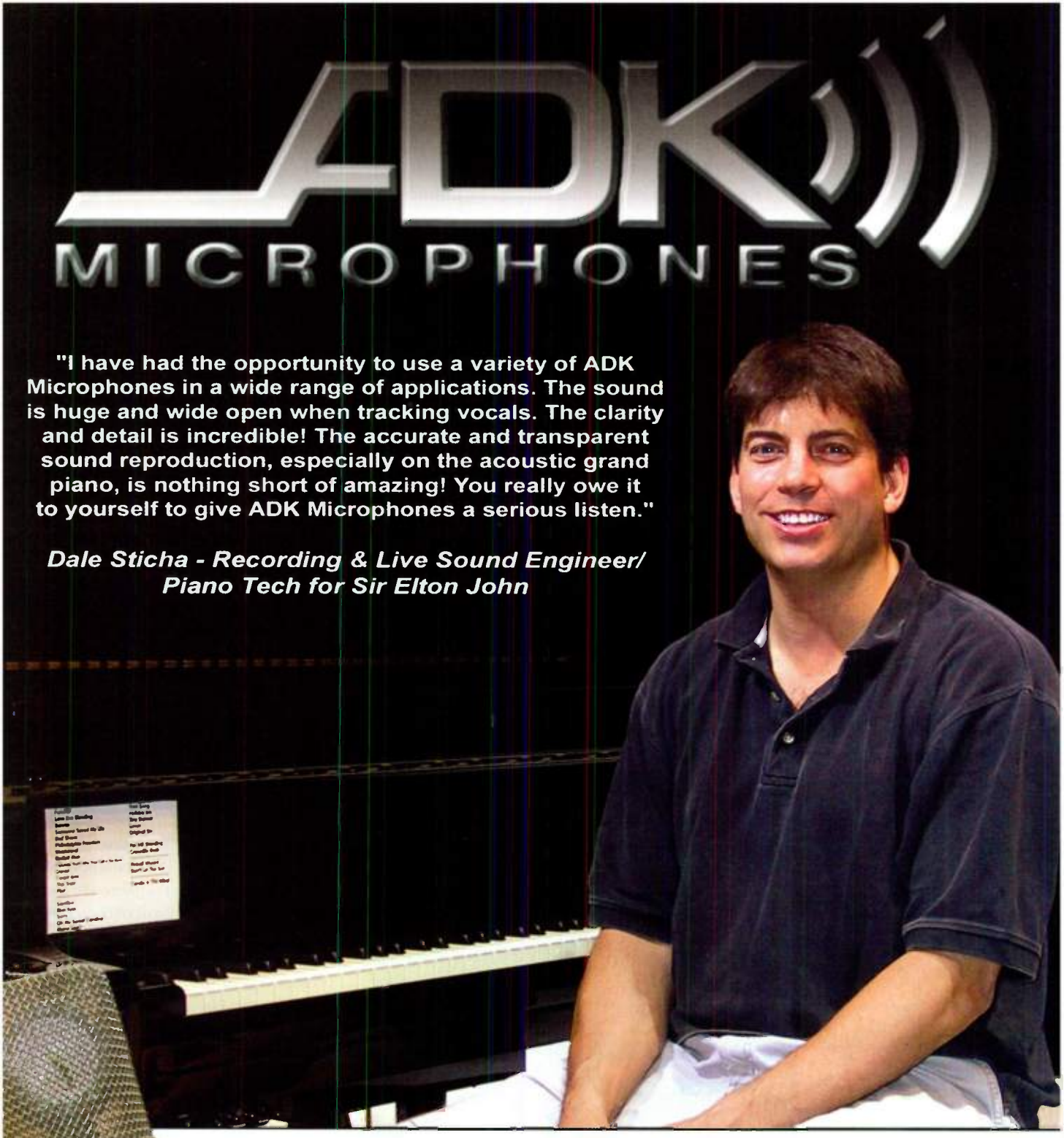
Dale Sticha - Recording & Live Sound Engineer/ Piano Tech for Sir Elton John



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SOUND QUEST

INFINITY 2.05 (WIN)

Find a vast programming environment at your fingertips.

By Len Sasso

The rapid rise in desktop computing power has spawned a number of programming environments dedicated to music. Languages such as Csound and Cycling '74's Max, originally designed for institutional minis and mainframes, have been ported to desktop computers and enhanced with graphic interfaces and advanced audio-processing capabilities. Other programs, such as Native Instruments' Reaktor and Sound Quest's Infinity, have been developed specifically for the desktop musician. Those programs and others like them offer unlimited freedom of expression but require significant dedication to achieve it. In the words of the Infinity manual, "Make no mistake here, when building patches in Infinity you are programming."

Infinity is an object-based graphical programming environment for Windows, similar in format to Max/MSP for the Mac OS. Version 2 adds extensive audio processing to Infinity's already robust MIDI capabilities. There have also been major upgrades to the user interface and programming structure. Among them is a new Explorer-style Tree View that lets you browse through SubPatches without opening and closing scads of separate windows. The number of objects for creating your own patches has more than doubled to 360, and the number of prebuilt synthesizers, effects processors, and SubPatches has also grown significantly.

In this review, I'll concentrate on Infinity's audio-processing capabilities. For a review of the MIDI side of Infinity, including MIDI and automation sequencing, see the September 2000 issue. (To find past articles about other programming environments, see the sidebar "Further Reading.")

Minimum System Requirements

Infinity
Pentium II/333; 64 MB RAM;
Windows 95/98/ME/2000/NT 4.0/XP

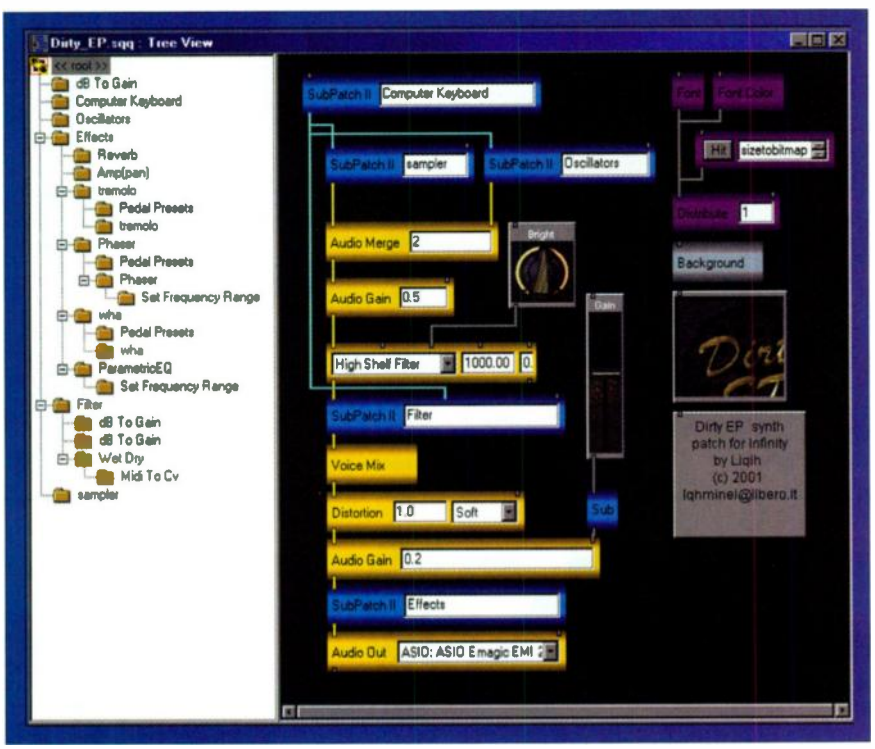

FIG. 1: Infinity patches are typically made up of numerous SubPatches. In this figure, each SubPatch of the Dirty EP patch is represented by a folder in the Windows-Explorer-style file tree on the left. Clicking on any folder displays the SubPatch structure in the patch window on the right.

USE IT OR LOSE IT

Instruments created in Infinity can operate as standalone soft synths; they can also be used in any suitable VSTi or DXi host. Audio effects can be used in any VST or DirectX host, and MIDI effects can be used in any application supporting Cakewalk's MFX MIDI plug-in standard. What's more, Infinity can host plug-ins in VSTi, DXi, VST, and DirectX formats. That means you can use plug-ins in any of those formats in an Infinity patch, and then use that patch as a plug-in in any of those formats. Infinity supports any MIDI interface with Windows drivers and any audio card with MME, DirectSound, or ASIO drivers.

The Infinity package includes an installation CD and two printed manuals: the version 1 manual covers Infinity basics and MIDI programming, and the version 2 manual covers audio and all changes since version 1. Installation requires a serial number contained in the package, but no other form of copy protection is involved. Updates, additional documentation, and links to third-party developers and user groups are available on Sound Quest's Web site.

FROM HERE TO INFINITY

It's unusual to begin a product review with a discussion of its documentation, but with software as extensive as Infinity, documentation is a key issue. Infinity's is outstanding. For one thing, there are four separate paths to Infinity: an automated demo with individually playable segments covering various aspects of Infinity's operation and an animated HTML tutorial giving you a quick-start look at Infinity programming. Extensive online help is available, including step-by-step tutorials and complete descriptions of all Infinity

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Aardvark

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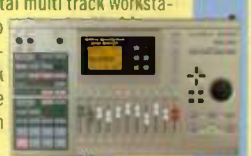
The MRS-1044 is a digital multi track workstation featuring 10 audio tracks, a programmable stereo drum track and a programmable bass track and built-in CD burner.



ZOOM

Roland VS2480CD 24 Track

The VS-2480 is the first self-contained recording workstation to offer 24-track/24-bit digital recording with 64-channel digital mixing, onboard effects processing, CD burner & 80 gig drive.

Roland

Korg Triton Studio Pro X 88-Key Workstation

The TRITON STUDIO Pro X features Korg's HI (Hyper Integrated) synthesis system and best PCM sounds. Its high-capacity 48 Mbyte PCM ROM, with 429 multisamples and 417 drum samples, covers every need imaginable!

KORG

Korg Triton LE Synthesizer

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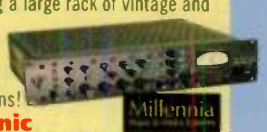

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Mackie MDR24/96 Digital Multi Track

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MACKIE

Avalon VT-747SP

AVALON DESIGN

The Avalon VT-747SP combines a creative STEREO tube-discrete Class A spectral-opto-compressor with a musical six band program equalizer, L-R output level and gain reduction metering and internal regulated power supplies in a 2U space.

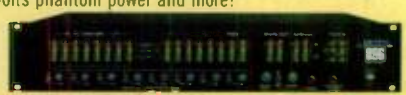
Presonus Digimax 8 Channel Microphone Preamp

PreSonus

The Digimax combines 8 channels of pristine mic preamplification with 24 simultaneous digital and analog outputs.

Mind Print DTC Preamp

MindPrint DTC 2-Channel Dual Tube Preamp w/48 volts phantom power and more!



Mark of the Unicorn 896

Mark of the Unicorn, Inc

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GENELEC

Sonar 2XL Audio/Sequencing Software (Mac/PC)

SONAR 2XL offers fully integrated multitrack recording, editing, mixing, and delivery of audio and MIDI.

SONAR XL

Steinberg Nuendo

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FIG. 2: The Dirty EP control panel illustrates the flexibility of Infinity's graphic interface. You can create your own backgrounds, pictures, and control elements (knobs, switches, and so forth); Infinity comes with a large graphics library to get you started.

objects, menus, and features; in addition, there are 270 pages of detailed, printed documentation.

Infinity's automated demo is part of the downloadable Infinity demo package, which includes a feature-limited version of the Infinity software. If you are on the fence about buying Infinity, I strongly suggest downloading the demo. You'll see that Infinity really is accessible to anyone willing to make the effort (see the sidebar "Infinity 1, 2, 3").

For users with some experience with graphical music programming, the HTML tutorial is the place to start. It gives you a quick rundown of how Infinity works, what makes it different, and how to build devices in various categories. The manuals and online help provide complementary views of Infinity. Details such as the function of each of an object's inputs and outputs are in the online help, putting them under your fingertips where you need them. Larger concepts—processing priorities, for example, and why things work as they do—are discussed in the manuals. I perused the manuals away from the computer for a few hours and found it to be time well spent.

INTO THE BRIAR PATCH

Like most graphical user interfaces for music programming, Infinity uses the model of objects connected by patch cords. The objects do the processing and the cords carry information between objects. The structure is hierarchical in that any combination of objects and their connections can be collected together in a SubPatch, which then appears as an object with its own inputs and outputs.

Fig. 1 shows a typical patch in Tree View. The file tree on the left allows you to select the root patch or any of its SubPatches for viewing and editing in the patch section on the right. The patch shown is an electric piano and is one of several Infinity patches available from Dash Synthesis, a Web-based group of synth and sound designers (www.dashsynthesis.com). The patch's blue and yellow objects (center) constitute the actual electric piano, and the purple and gray objects to their right are for the panel graphics (see **Fig. 2**). You can guess from the size of the tree on the left (each folder represents a SubPatch) what a tangled mess the patch would be without SubPatches.

▼

Infinity really is accessible to anyone willing to make the effort.

In addition to using SubPatches within patches, Infinity allows you to use patches that are stored on your hard drive as SubPatches. That helps save on memory by letting you store a patch once and use it in numerous different applications. It also gives you the added flexibility of changing the SubPatches used in a patch without doing any reprogramming. For example, you could design a synth without any built-in effects and provide a menu on its control panel for selecting among various effects saved on your hard drive.

Panel graphics are just another part of the patch in Infinity. There are four graphic objects: Background, Bitmap, Display, and GraphicWin. The first two let you import BMP-format bitmaps, and the other two are for drawing your own graphics. GraphicWin allows you to manage as many as 49 layers of graphic elements that can be addressed and automated from within the patch. In addition to background graphics, you can use your own BMP graphics for control elements, such as knobs and sliders, or use the large graphics library supplied with Infinity. The control panel in Fig. 2 illustrates those options.

In any programming environment, debugging is a fact of life, and Infinity provides a full assortment of debugging tools. The simplest is the Print object, which sends any message it receives to Infinity's Print Window. You can have multiple Print objects, and the Print Window shows the output of all Print objects since it was opened. That allows you to track the history of messages passing through one or more cords. In addition to the Print object, there are frequency-spectrum, oscilloscope,

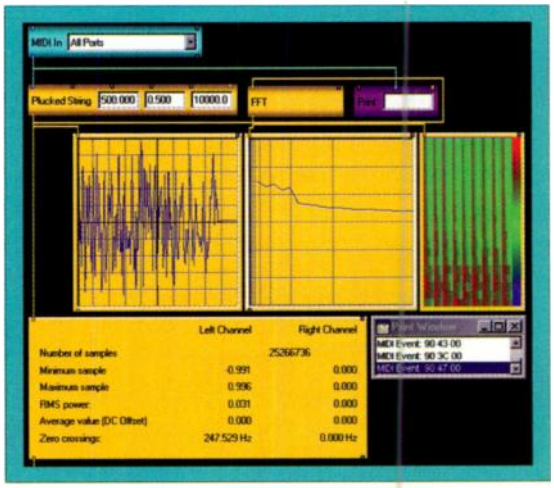

FIG. 3: Infinity contains several audio-display objects for monitoring and debugging. Three—Oscilloscope, Frequency Display, and Sonogram (center)—provide different graphic views of the signal; the Statistics object (bottom left) provides numerical data.

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histogram, and audio-statistics displays. **Fig. 3** shows examples of each display applied to a plucked-string sound. The audio-display objects can also be used as eye candy on Infinity control panels.

Beyond data display, Infinity has step- and trace-debugging modes. They allow you to set break-points anywhere within a patch and execute processing one message at a time after a break-point. With each message, the cord flashes, and the source and destination objects as well as the message content appear in the Print Window.

SOUND AND EFFECT

For sound processing, Infinity has four categories of objects: sources, filters, transformers, and delays. Rather than offering several objects of the same type with different characteristics (such as separate oscillators with different waveforms and modulation inputs), each category usually gives one object of each type that can be configured many ways.

For example, one Oscillator object offers all the standard waveforms and the option of defining your own custom waveform. The Oscillator has FM, pulse-width modulation, hard-sync inputs, and a built-in amplitude-envelope generator. Other objects intended primarily as sound sources include a Plucked-String object for Karplus-Strong-style physical modeling, a Sample player with as many as 128 key zones and 8 Velocity zones per key zone, a wavetable player, a six-operator FM oscillator, and a noise generator. Audio-rate control sources include an Envelope Follower (which actually generates envelopes), an LFO, and a Ramp generator.

Filters make up Infinity's largest class of processors. All the usual suspects are included, and as with the sources, fewer objects with more options is the strategy. Although all the filters' parameters can be modulated using the objects' event inputs, there is a special class of Infinity filters called *modulatable*, the parameters of which can be modulated on a sample-accurate basis using audio inputs. Generic finite-impulse-response (FIR) and infinite-impulse-response (IIR) filters are also provided for building a variety of theoretical filter types.

Infinity's complement of delay objects includes an allpass filter (for dispersion effects associated with reverb processing), two time-based delays (with and without modulation), and two sample-based delays (one with multiple taps). Other audio processing includes smoothing, panning, distortion, table lookup, and basic mathematical operations.

For all of its audio-processing power, Infinity's weakest area is in sample playback and management. No real tools are provided for granular synthesis, frequency-domain processing, pitch and formant shifting, or time stretching. Furthermore, though the Sampler object offers flexible key- and Velocity-zone mapping, sample maps cannot be saved to disk for loading into another Sampler object. Sound Quest is making an active effort to address all those areas, however, and improvements are sure to come in future releases.

PRODUCT SUMMARY

Sound Quest
Infinity 2.05 (Win)
MIDI and audio programming environment
$399
Upgrade from Infinity 1.0 $169

FEATURES	4.0
EASE OF USE	3.5
DOCUMENTATION	4.5
VALUE	4.0

RATING PRODUCTS FROM 1 TO 5

PROS: Powerful audio-processing and MIDI capabilities. Excellent user interface and documentation. Large factory library of examples and SubPatches.

CONS: Limited sample manipulation capabilities. Sample maps cannot be saved to disk for reuse.

Manufacturer
Sound Quest, Inc.
tel. (800) 667-3998 or (250) 478-9935
e-mail isupport@squest.com
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FIG. 4: This layered-bass VST Instrument was created in Infinity from within Cubase. The instrument was configured by combining two other VST Instruments, Neon and VB-1, with a feedback delay and a distortion stompbox created in Infinity.

GETTING PLUGGED IN

You can use Infinity's plug-in features to enhance and even combine plug-ins in any format supported by Infinity, and then use the resulting patch as a new plug-in in any of the supported formats. That means, for one thing, that Infinity can function as a plug-in translator between supported formats. The VST Instrument shown in **Fig. 4** combines two VSTi instruments and two Infinity-built effects into a super VSTi instrument.

To build the patch in Fig. 4, I first created two VSTi Host objects and set them to host two free Steinberg plug-ins: Neon

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and VB-1. The idea was to build (as quickly as possible) a layered bass instrument that would play VB-1 sounds and layer them with Neon sounds above a certain Velocity threshold. Once I had the threshold circuitry working properly, I decided to drop in a distortion stompbox—which is one of the Infinity factory-effects patches—after Neon. Finally, I built a little feedback delay to process the VB-1 output and added an Oscilloscope object to display the fina

INFINITY 1, 2, 3

Here's a brief look at programming with Infinity. I will start with the simplest possible synth patch and add enhancements until I have a basic FM synth.

The top left of Fig. A shows the simplest synth you can build with Infinity. It uses three Infinity objects: MIDI In, Oscillator, and Audio Out. When you play a key on your MIDI keyboard, this patch plays a sine wave at a pitch corresponding to the MIDI note number at a level controlled by the note's Velocity. It holds the note until you release the key. The Oscillator object can recognize MIDI events and adjust its behavior accordingly; it also has a pop-up menu for selecting its waveform.

Infinity objects have inputs at the top and outputs at the bottom. An object's inputs and outputs are color-coded: yellow for audio, blue for MIDI, and gray for regular Infinity messages (numbers and text). The Oscillator has one MIDI input, three regular inputs, and three audio inputs. The regular inputs are for setting oscillator parameters, and the yellow inputs are for modulation options. The second gray input (the third input from the left) can be used to set the oscillator's overall level and to define an amplitude envelope.

At the top right of Fig. A, I've added an object called a Message that is used to send messages to control another object's behavior. This Message object is cabled to the level/envelope input of the Oscillator. The message in the object is ".5; 10 1 0 500 .25 0 10 0 0." That's actually two messages separated by a semicolon. The first message, ".5," is a floating-point number and causes the Oscillator to set its level to .5. (The level is relative to unity gain or 0 dB, the Oscillator's default level. A setting of .5 corresponds to –3 dB.)

The second message is called a List. Lists count as one message but can contain many numbers separated by spaces. The Oscillator object uses a List at its third input to set up its amplitude envelope. Each envelope stage takes three parameters: duration (in milliseconds), level, and shape. In this case, the envelope has three stages: a 10 ms attack to full level (10 1 0), a half-second (500 ms) decay to 25 percent level (500 .25 0), and a 10 ms release segment to off (10 0 0). (The last zero in each segment indicates a straight line.) The resulting envelope is an ADSR envelope because the level of the next-to-last stage of any envelope is understood as a sustain level.

At the bottom left of Fig. A, I've added a number of objects that, taken together, provide FM of the Oscillator object by the LFO object just above it. (Note that the LFO object is just another oscillator, that its output is audio, and that when set to audio-range frequencies, the result is standard FM.) In brief, I've set up another envelope message; the Envelope Follower object converts that to an envelope signal (audio), and the Audio to Event object samples the envelope signal every 10 ms to generate events that follow the envelope contour. Those events are multiplied by two to control the overall envelope amount. In addition, the MIDI note number is converted to a frequency (in hertz) and multiplied by 1.25 to set the LFO frequency. The LFO object's output is patched to the FM input of the Oscillator object.

So far, everything is controlled by entering numbers and selecting from pop-up menus in the objects making up the Infinity patch. For more complex patches, that approach would be unwieldy (though it's not a bad way to start when you're experimenting with a new process). Infinity provides a full spectrum of control-panel objects and graphics. The elementary control panel at the bottom right of Fig. A shows how a control panel for the basic FM synth might look. Of course, incorporating the controls requires extra structure, making the patch harder to decipher.

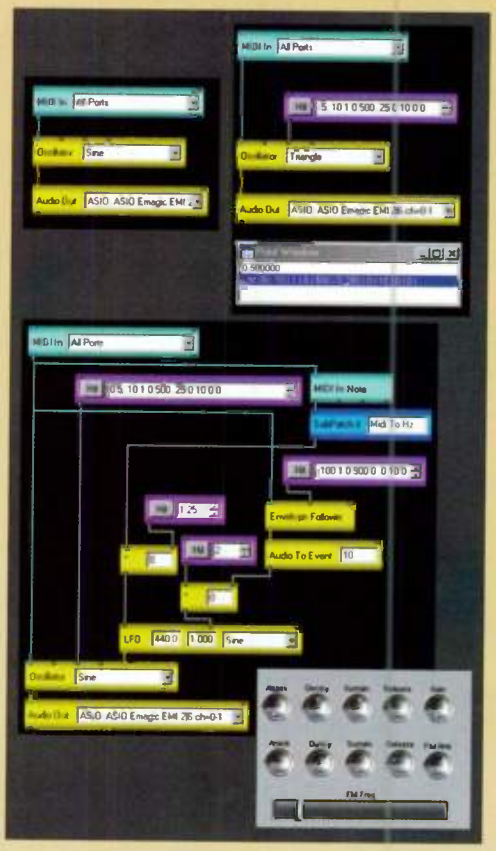
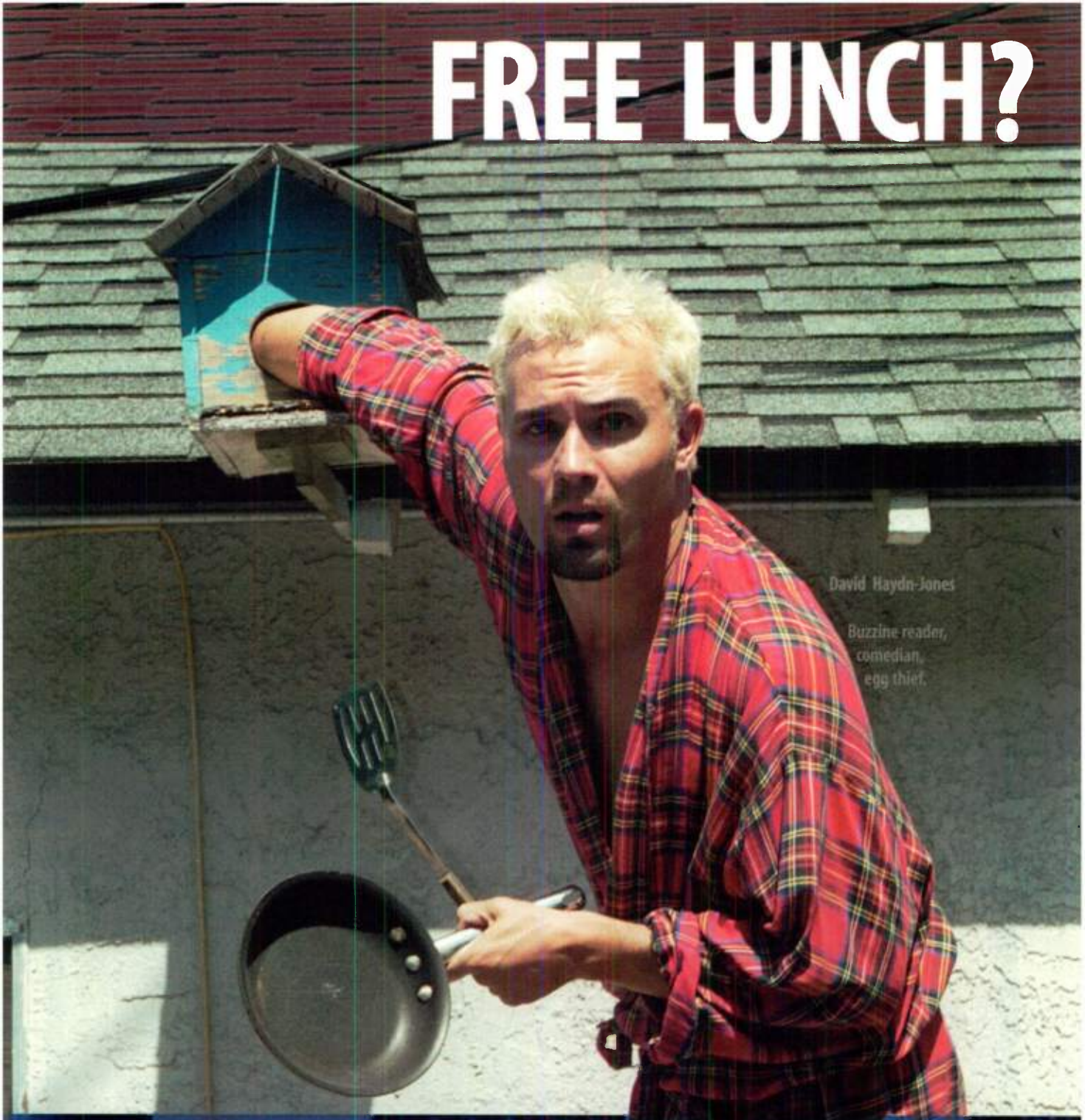


FIG. A: This simple FM synth starts with a sine-wave oscillator with MIDI in and audio out (top left), adds gain and amplitude-envelope controls (top right), and uses an LFO object operating in the audio-frequency range to generate FM (bottom right). The lower-right inset shows a possible control panel for the synth.

FREE LUNCH?



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output. Even with some serious fumbling around, the whole process took only about an hour, and none of the SubPatches had more than 15 objects.

Once I had the layered bass patch working correctly in Infinity, I registered it as a VSTi synth in Cubase and Logic. Infinity does that for you with a single selection from its File menu once you have chosen your desired VST hosts in Infinity's preferences. The plug-in worked in both VST hosts with no problems. The file LayerBass.mp3 on the EM Web site was made in one pass using the layered-bass VSTi.

The question that naturally arises is whether you can distribute your Infinity-built VST plug-ins to other VST users. At this time, only other Infinity users will be able to use them as VST plug-ins. However, Infinity comes with a freely distributable Infinity Player that supports instruments and effects plug-ins. Sound Quest is planning to release a pro version of the Player (called Omega) in the near future that will support the use of Infinity-built plug-ins in any VST host.

MAKE THE CALL

If you have any inclination to find out what creating your own MIDI and audio applications under Windows is all about, Infinity is certainly an excellent place to start. As mentioned, the documentation makes getting started as easy as possible, you can learn a great deal from the provided examples, and you can actually design some creative musical tools without too much struggle

If you have some experience with music-programming applications such as Reaktor, Max/MSP, or Csound, you will have no problem getting up to speed with Infinity. Although there are plenty of idiosyncrasies to master, the basics are the same. Infinity offers a broad spectrum of objects for both MIDI and audio processing, and if you are a C++ programmer, you can create your own where needed. (Infinity comes with an extensive Developers Kit for that purpose.)

At $399, Infinity is certainly fairly priced and right in line with other applications of its type. Given that you can get your feet wet by downloading the free demo version, a visit to Sound Quest's Web site is well worth the trip.

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SRS LABS

PRO 220

A spatial enhancer that produces w-i-i-i-i-d-e stereo effects.

By Michael Cooper

The SRS Labs Pro 220 is a 2-channel processor that enhances the spatial aspects of stereo source material based on the way the human ear localizes natural sounds. At the heart of the Pro 220 is the proprietary Sound Retrieval System (SRS) technology, which analyzes stereo signals for sum and difference content. The sum is what is common to left and right channels (referred to as L+R); the results are in the center of the stereo field. The difference signals—left channel minus right channel and vice versa—consist of ambience, reverberation, and echo signals originating from effects processors or indirect sounds picked up by microphones.

The Pro 220 allows you to independently adjust the amount of sum and difference signals for stereo program material. That not only affects the width of the stereo image but also changes the apparent level of ambient effects: widening the image adds ambience and narrowing the image makes the mix seem drier.

The Pro 220 can also synthesize a stereo image from mono tracks. The 3D Mono feature uses patented filters to put six specific frequency bands 90 degrees apart: three bands create sum (L+R) content, and three create difference (L–R and R–L) content. That creates a pseudostereo signal that is fed into a specific SRS processor, designed for mono, with a predetermined mix that the user cannot change.

IN CONTROL

The front panel has three continuously variable knobs for processing stereo input—Space, Center, and SRS Level (see **Fig. 1**). The fourth continuously variable knob, 3D Mono Level, works only on mono sources.

The Space knob controls the amount of difference signal sent to each output. Turning this knob clockwise increases the amount of perceived echo, reverberation, and ambience while widening the stereo image. Turning the Space knob counterclockwise makes the perceived sound drier and narrows the stereo image. A fully counterclockwise setting removes the spatial effects without attenuating the input signal.

The Pro 220's Center knob controls the amount of sum signal in the output. A clockwise turn increases the level of center-panned tracks in a stereo mix, which are typically lead vocals, bass drum, and bass. A counterclockwise turn of the Center knob reduces the output level of center information. A fully counterclockwise setting preserves the original input signal so that none of the summed signal is added.

The SRS Level knob controls the combined output of the Space and Center controls. Turning the SRS Level fully counterclockwise completely attenuates the source signal and SRS processing. You can also bypass the SRS effect entirely with the SRS/Bypass switch. This front-panel switch has a status LED that tells you whether SRS processing is active or bypassed. Two other LEDs, one each for left and right SRS channels, turn green when the SRS output level reaches –20 dBu and red when the SRS output exceeds +13 dBu.

The 3D Mono Level knob controls the left and right output levels of the Pro 220's 3D Mono processing section. Turning the 3D Mono Level knob fully counterclockwise completely attenuates the mono source signal and processing. Engaging the front-panel 3D Mono/**Bypass switch** bypasses the 3D Mono effect so that only the dry source is passed. The status LED lets you know whether the 3D Mono process is active or bypassed. As in the SRS section, two additional LEDs, one each for the 3D Mono block's left and right channels, turn green when the 3D Mono output level reaches –20 dBu and red when the output exceeds +13 dBu.

You can adjust the SRS Level and 3D Mono Level controls so that the unit's processed-output levels are equal to those of the bypassed levels. That facilitates A/B comparisons of processed and unprocessed sounds. A power switch is the final element on the unit's front panel.

BRINGING UP THE REAR

The Pro 220 has separate analog I/O for the SRS and 3D Mono processors (see **Fig. 2**). The unit offers RCA and unbalanced ¼-inch jacks: there are stereo pairs for the SRS inputs and outputs, a single RCA and ¼-inch input, and stereo pairs for the outputs of the 3D Mono processor.

You can use the ¼-inch and RCA outputs simultaneously, but only one type

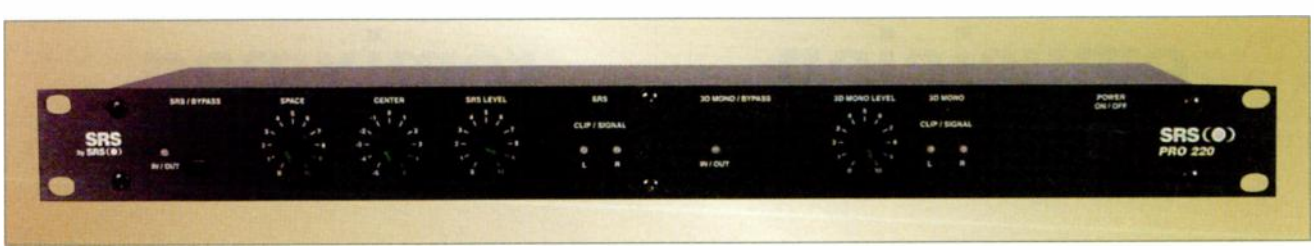
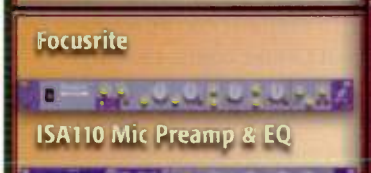


FIG. 1: The SRS Labs Pro 220 can dramatically widen the stereo image of a mix. It can also create spacious stereo tracks from mono signals.

The Professional's Source



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of input per channel can be used at a time. Unfortunately, the Pro 220 accepts just semipro, –10 dBV nominal line levels. A captive two-prong AC cord rounds out the unit's rear panel.

The Pro 220's slim owner's manual suggests that you process individual tracks by patching the unit to an unpowered recording console through inserts or by placing it in-line between the mixer's multitrack bus outputs and your recorder. It is often preferable to send tracks to the Pro 220 using aux sends, for reasons I'll discuss shortly. You may also choose to patch the line-level output of musical instruments or preamps through the Pro 220 or place the unit between your mixer's main outputs and your P.A.'s amp in a live setting.

FIG. 2: The Pro 220 offers RCA and unbalanced ¼-inch ins and outs.

SPACE: THE FINAL FRONTIER

I tested the Pro 220 on individual tracks, effects returns, and complete mixes. When I used it on stereo drum overheads, the SRS processing widened the stereo field but thinned out the bass drum's low end and made the cymbals sound beady and cutting: it sounded as though I had boosted the EQ around 6 kHz.

Next, I patched the left and right outputs of my Dynacord DRP20 digital reverb into the Pro 220's SRS inputs. Surprisingly, the SRS processing made the reverb sound narrower and muddier. The Pro 220 also changed the signals' timbre too much, by boosting the reverb's bass and the lower range of the high frequencies. However, the SRS processing sounded excellent on synth pads, making them sound incredibly wide.

In all applications, you should hard-pan the left and right SRS outputs because the processing is not mono compatible. Collapsing the image to dead center almost completely cancels out the sound. That is important to consider if there's a chance your music will be played on mono AM radio or TV. For that reason and because SRS processing can significantly alter the timbre of the tracks, I routed tracks to the Pro 220 using aux sends. That let me retain my mono-compatible dry tracks in the mix and add a touch of SRS processing by way of effects returns to sweeten the mix.

When used on an entire mix, the Pro 220's SRS processing can widen the stereo image dramatically. Again, mono incompatibility is a consideration. But moderate use of the Pro 220's SRS processing won't skew the spectral balance of your mix nearly as much as some other spatial enhancers on the market.

It's too bad the Pro 220 can't accept professional levels. If it could, remastering applications would be one of its greatest strengths. Users could boost the level of center-panned tracks on mastered mixes and simultaneously cut the level of stereo effects and hard-panned instruments by simply cranking the Center knob and turning down the Space control.

Conversely, it would be possible to all but eliminate the lead vocal, kick drum, and bass by cranking the Space control and turning the Center control fully counterclockwise; all that would remain of the vocal would be the effects-return components. Intermediate Space and Center control settings can be used to fine-tune the balance of finished mixes as long as you're working with semipro levels and have a good stereo parametric equalizer to counter timbral changes introduced by the Pro 220's processing.

MONO A MONO

The Pro 220's 3D Mono effect is more mono compatible than its SRS processing, but it's not without fault. Collapsing the 3D Mono left and right outputs to center doesn't cause a noticeable drop in level, but it does significantly reduce high frequencies. When I used it on some kinds of source material, such as lead vocals, I could also hear a slight phasiness when the 3D Mono effect was collapsed to mono.

That said, the hard-panned 3D Mono effect sounded great on lead vocals when added to a mix using an aux send. Adding just a little bit of the effects return made the vocal spread out beautifully, contributing a wonderful sense of space without additional reverb or perceived delay. Collapsing the entire mix to mono caused little timbral change to the vocal, as the original dry signal contributed the most to the overall vocal sound.

The 3D Mono effect also lent a wide, natural-sounding stereo image to a mono acoustic-guitar track. I could make the sound even wider by daisy-

Pro 220 Specifications

Inputs	(3) RCA; (3) unbalanced ¼"
Outputs	(3) RCA; (3) unbalanced ¼"
Maximum I/O Levels	+18 dBu
Nominal I/O Levels	–10 dBV
Frequency Response	20 Hz–20 kHz
Total Harmonic Distortion	<0.1% (active); <0.01% (bypass)
Signal-to-Noise Ratio	≤90 dBA
Input Impedance	10 kΩ
Output Impedance	200Ω
Dimensions	19.00" (W) × 1.75" (H) × 5.75" (D)
Weight	7 lb.

PRODUCT SUMMARY

SRS Labs
Pro 220
spatial enhancer
$299.95

FEATURES	4.0
EASE OF USE	4.5
AUDIO QUALITY	3.5
VALUE	3.5

RATING PRODUCTS FROM 1 TO 5

PROS: Widens stereo image. Synthesizes stereo signals from mono tracks. Independent bypasses and output level controls for SRS and 3D Mono processing. Low price.

CONS: Accepts only –10 dBV nominal input levels. Unbalanced I/O. Insufficient headroom for remastering applications. SRS process isn't mono compatible and can cause significant timbral shift. Mono playback of 3D Mono effect dulls the sound.

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chaining the 3D Mono outputs through the SRS stereo inputs and then routing the SRS outputs back to the mixer. However, the combined effect was decidedly incompatible with mono playback, and the acoustic-guitar track's timbre was changed dramatically so that the highs and low mids were accentuated significantly.

I also tried adding the 3D Mono effect to electric bass guitar. Although it was not artistically my finest moment, the results suggested that the effect holds great promise for processing synth bass.

SPACING OUT

The SRS Pro 220 offers good value. You won't want to apply it indiscriminately on every type of track, but used in moderation on vocals and select instrumental tracks, it can add that extra dimension you've been searching for on your recordings.

Quick Picks

WIZOO

Platinum24 Latin Percussion

By Dan Phillips

I'm always on the lookout for good-sounding, expressive percussion samples; when I received a copy of Wizoo's *Platinum24 Latin Percussion* sample collection, I was eager to put it through its paces. The collection is available as a set of three CD-ROMs in Akai S1000 format for $149, with native versions for Halion, Giga, and EXS-24 on the way. I reviewed the Akai set using an E-mu E6400 Ultra sampler and a Roland S-760 sampler.

The collection includes outstanding single-hit samples from four general categories of percussion: drums, shakers, wooden percussion, and metallic percussion (my categories, not Wizoo's). Drums include two banks each of Congas, Bongos, and Timbales, along with one bank each for Pandiero and Tambourim. Shakers consist of cabasas, maracas, caxixis, and an eponymous Shakers bank. Claves, guiros, castanets, vibraslaps, and, of course, wood blocks make up the wooden percussion. Metallic percussion includes cowbells, agogos, triangles, cymbals, tambourine, wind chimes, and, finally, a catchall Metal bank. Almost all instruments are recorded at multiple Velocities and with multiple performance styles, offering a high degree of expressive potential.

Multiple articulations and dynamics give Wizoo's *Platinum24 Latin Percussion* sample CD-ROM an impressive degree of expression.

Hit Parade

This basic set of samples is presented in three ways; each is intended for different playing and sequencing approaches. The Percussion sets offer a single keyboard layout containing all of the instruments used in a particular musical genre, with a few variations each for Afro-Cuban, Brazilian, and Latin Pop (as well as a few General MIDI kits). Each set is made up of several distinct patches so that you can swap out various elements. For instance, you can easily use the congas from the Brazilian bank with the sounds from the Afro-Cuban bank.

The Instrument banks are my favorites. These go into greater depth for each instrument, typically with multilevel Velocity-switched dynamics and a wide array of different performance styles. For example, all of the Conga, Tumba, and Quinto banks offer open, mute, slap, slap mute, heel, tip, open flam, and muted flam variations for each drum—each with four levels of Velocity! The keyboard layouts are well thought out, making it fairly simple to sort through the large number of samples. For instance, all of the Conga, Tumba, and Quinto banks place the open samples on C, the mute samples on C♯, and so on.

Finally, the drums (excluding the other percussion instruments) are also available as Chromatic sets. These banks assign each sample to its own key, so you can change dynamics using MIDI note numbers instead of Velocity.

Hit or Miss

I experienced a few strange compatibility problems. On the E-mu E6400, three individual samples were marred by strange, loud beeps. The Roland S-760 normally does quite well with Akai disks, but in this case, I found some curious confusions with the sample start and loop points, requiring trial-and-error editing before I could hear the sounds at all. Wizoo notes that all samples play correctly on the S1000.

Platinum24 Latin Percussion is superb. The samples themselves are clear and punchy, but even more important, the multiple articulations and Velocities make for satisfying playing and extremely expressive programming. At this price, the set is a must-have for anyone who's serious about percussion programming.

Overall EM Rating (1 through 5): 4.5

Wizoo GmbH; tel. 49-421-701-870; e-mail info@wizoo.com; Web www.wizoo.com

COOL BREEZE SYSTEMS

Cool School Interactus, vol. 6 (Mac/Win)

By Marty Cutler

Mark of the Unicorn's (MOTU's) Digital Performer digital audio sequencer has always provided an elegant user interface and thorough, well-written manuals. Nonetheless, the sheer density of its features can be intimidating to a first-time user. Furthermore, MOTU's aggressive upgrades have encompassed more new features than experienced users have the time to futz with. Sometimes it's easier to have someone there to help you along. Cool Breeze Systems offers its *Cool School Interactus,* vol. 6, instructional CD-ROM (Mac/Win; $79.95), which strives to guide greenhorns through setting up Digital Performer 3 all the way to employing its power-user features.

Installing the CD-ROM copies three applications to your hard drive. The Browser application opens the main body of instruction. CSI Interface Tutorial outlines Browser's features and navigation capabilities. Finally, the Locator app (which also appears in Browser) allows you to shuttle through quizzes, a glossary, and a searchable index of subjects. It also enables you to access information on other Cool School CD-ROMs.

The Main Course

Browser starts at the Topic window. Clicking on any main topic, with the exception of the Introduction, opens an interactive replica of Digital Performer. Selecting Introduction opens up two panes: a list of subtopics and nested subtopics. At the top right of the screen is a handy pull-down menu that lets you jump to one of the eight main topics. Below the pull-down menu is

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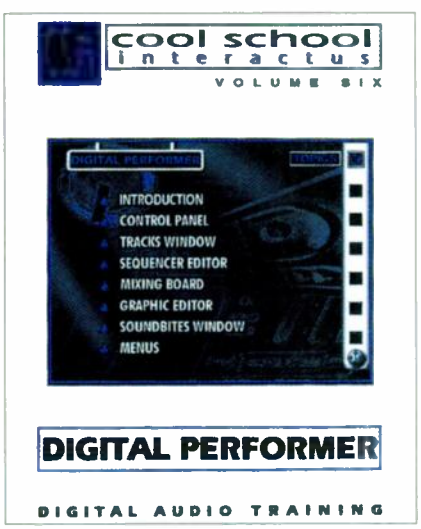
the Media Tube, containing a series of boxes that hold text, video, or rendered signal-flow images. Another box with a camera icon includes one or more images of ancillary hardware and software with descriptive text information.

Windows with text offer three buttons: Print, Tub It, and Expand. Expand enlarges the text windows. The Tub It button copies the contents of the text files to a clipboard for printing before exiting the program. Unfortunately, the Tub It button doesn't copy information to the Mac's Finder clipboard. I'd prefer to switch to the Finder and paste text files into a single document for later printing and reviewing.

Other topics open interactive mock-ups of Digital Performer screens. Clicking on relevant sections of the screen works as it would in Digital Performer and opens a box containing a basic description in the lower-right corner of the screen. For instance, I selected Strip Silence from the mock Audio pull-down menu. A pane on the lower right of the screen stated that this opens the Strip Silence dialog box, followed by a brief description of Strip Silence. It would have been more effective if the dialog box opened as it would in Digital Performer.

Below the mock-up screen are videos that narrate and demonstrate the sequencer's features. For instance, the Mixing Board section has six movies related to mixer functions. Most of the movies clearly illustrate basic procedures, but some gloss over significant details. For example, a movie that explains FreeMIDI setup illustrates manual configuration of the system but doesn't take into account devices that may not appear in the FreeMIDI device list.

One video showed a quantizing plug-in that was already assigned to the track, thereby skipping its selection from the Mixer pull-down menu. Another movie refers to an interactive tutorial for Digital Performer's Song mode that I couldn't locate. Song mode is one of Digital Performer's more powerful tools and deserves more than a passing mention. Some videos demonstrate functions with narrative and then quickly execute the task onscreen. It's more effective to narrate procedures on a step-by-step basis.



Cool Breeze Systems' *Cool School Interactus*, vol. 6, provides an interactive tour of Mark of the Unicorn's Digital Performer 3 digital audio sequencer.

School's Out

Cool Breeze Systems markets the CD-ROM as a product that everyone, from neophytes to Digital Performer gurus, can use—an ambitious if not impossible scope to cover on a single CD-ROM. I found few revelations for the advanced user, and beginners could fare quite well just by exploring Digital Performer with its context-sensitive Help engaged.

As such, *Cool School Interactus*, vol. 6, falls short of its goal. Still, some people will readily respond to multimedia instruction, and this course presents a more organized approach to assimilating information than does a random investigation of Digital Performer.

The course is also a convenient and a relatively inexpensive way to audition Digital Performer's capabilities before you lay down hard cash for a MOTU system. Educators will find the CD-ROM easier to present as a guided course when multiple workstations aren't available. The company even offers additional information at its online Cool School. My cavils aside, teachers and beginners will discover that the course is a convenient way to get up to speed with much of what Digital Performer has to offer.

Overall EM rating (1 through 5): 2.5

Cool Breeze Systems; tel. (614) 481-4000; e-mail coolbreezesys@ee.net; Web www.coolbreezesys.com

PSPAUDIOWARE.COM

VintageWarmer 1.1 (Mac/Win)

By Len Sasso

PSPaudioware.com's VintageWarmer ($149) is a plug-in emulation of an analog multiband compressor. It is available in VST and DXi formats for the PC as well as VST and MOTU Audio System formats for the Macintosh. All PSPaudioware products are distributed through download from the company's Web site, and you can also purchase a backup CD-ROM of a title for $9.90 plus shipping charges. In addition, demonstrations are available at the Web site.

VintageWarmer is equally at home in tracking and finalizing applications. It offers single and multiband compression, brickwall limiting, and saturation effects typical of analog tape recorders. Performance (the number of instances you can use at one time) depends on your system and host. Minimum requirements call for a Pentium II or G3/300 MHz, and on my G3/300 MHz, I had no trouble running four instances of VintageWarmer on four separate soft synths.

Slam Dunk

The key to understanding VintageWarmer lies in its two operating modes: Single-Band and Multiband. Both modes begin with a signal-level control (called Drive) with a range of ±24 dB. In Single-Band mode, the entire signal is first passed through high- and low-shelving filters and then compressed. That is typically the mode you use for tracking operations and is the mode employed in the factory tracking presets (the last 12 of 29) supplied with VintageWarmer. In Multiband mode, the signal is first split by parallel low-, medium-, and high-band filters, each containing its own compressor. The mixed output is then passed through a hard-knee limiter. You generally use Multiband mode for mixing and finalizing applications, and it's in use in the first 17 presets.

Three MP3 files that are available on the EM Web site illustrate both uses. The first file, Cold, is a short 4-track mix without processing. The second one, WarmTracks, applies single-

The VintageWarmer control panel has large ergonomic controls that can be configured for horizontal or rotary action. The extremely realistic analog-style meter bridge provides professional-quality metering.

band warming to each of the four tracks. The last file, Finalize, applies multiband warming as well as limiting to the WarmTracks mix.

VintageWarmer offers a complete set of front-panel controls for managing all EQ, compression, and limiting parameters. Some control functions change with the mode—for example, the High and Low Freq knobs set the shelving frequencies in Single-Band mode but set the crossover frequencies in Multiband mode. To reduce control-panel clutter, VintageWarmer has a back panel (accessed by clicking on the VintageWarmer logo on the front panel) with controls for functions that are used less frequently. In a nice touch, the Fine Adjust control can be used to restrict the ranges of critical front-panel controls down to 12.5 percent of normal. Range reduction is especially useful for tweaking the factory presets without destroying their intended function. Back-panel settings are saved with presets, but the factory presets all have Fine Adjust set to 100 percent, so flip around back before tweaking them.

Meter, Meter on the Wall

PSPaudioware has taken particular care in designing its analog-style meters, which are switchable between VU and pseudo peak-meter (PPM) format. The meters are available in a separate package, Vintage Meters, as a free download from the company's Web site.

VU metering is an averaging process that has a standardized "integration" time of 300 ms. However, you can adjust the integration time on VintageWarmer's back panel from 30 to 3,000 ms. The 0 VU reference level can also be adjusted from 0 to –24 dBFS. (The professional standard is –14 dBFS.) PPM differs from digital peak metering by incorporating a short attack and release envelope. Typical attack and release times are 10 ms and 1,000 ms, respectively. Back-panel controls are also provided for these settings, and true digital peak metering can be achieved by setting the attack time to 0 ms.

VintageWarmer's meters include overload LEDs. These count the number of consecutive samples at maximum level (0 dB); they light up on a count of three (the count can be adjusted on the back panel). Once lit, the LEDs slowly fade but remain a dark red until you click on them to reset them.

The meters can be inserted at three positions in the signal path, as selected by the Pre/G.R./Post switch at the top of the control panel. The Pre position displays the levels after equalization. G.R. (Gain Reduction) shows the gain or reduction resulting from VintageWarmer processing, with the rest position being 0 dB in that case. Post shows the levels at VintageWarmer's output.

VintageWarmer is effective and easy to use. I was always able to find a factory preset that came close to the sound I was reaching for, and it was easy to tweak the rest of the way. I quickly became addicted to it for punching up tracks and finalizing a mix. The manual is clear and covers all the VintageWarmer functions, although you won't find any extended EQ and compression tutorials there. ❁

Overall EM Rating (1 through 5): 4.5

PSPaudioware.com s.c.; tel. 48-601-963-173; e-mail sales@pspaudioware.com; Web www.psp-audioware.com

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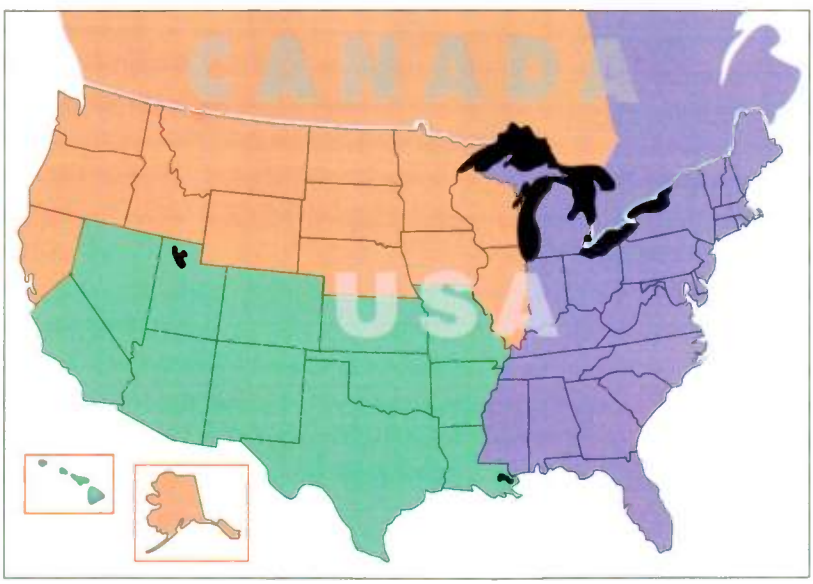

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Bomb Factory Vintage Effects

A third Sweetwater exclusive. Eight authentic effects give your recordings the warm, vintage sound you're looking for. Includes the SansAmp PSA-1, four moogerfooger effects developed with Bob Moog, Voce Spin, Voce Chorus/Vibrato and the infamous Tel-Ray Variable Delay.

BitHeadz Unity Session

First in a new generation of virtual instrument technology. Even more tightly integrated with Digital Performer. PowerPC G4- and Velocity Engine-optimized to deliver way more sounds per CPU cycle. One integrated environment with sampling, analog synth emulation, physical modeling, and Gigasampler file streaming. A complete rack of synths for DP3 in a box.

Radikal SAC 2.2

Completely redesigned. Smoother faders. Higher resolution encoders. Dozens of enhancements made specifically for DP3. The Radikal Technologies Software Assignable Controller gives you automated, touch-sensitive mixing. The ultimate hands-on experience for Digital Performer.

THE COMPLETE MOTU STUDIO

Avalon VT-737 SP

Avalon's award-winning "preamp powerhouse". This industry-standard, all-in-one analog dream machine combines an easy-to-use musical Class A tube preamplifier with a harmonically rich opto-compressor (4 dual triode tubes) and a 100% discrete all-transistor Class A four-band passive sweep equalizer. Compressor link for perfect stereo tracking. Unlimited dynamic range from four high-voltage power circuits. Add that Avalon sound to your MOTU studio and take your music to the top.
PLUS an exclusive Sweetwater offer:
FREE Avalon VP-1 vent panel and T-shirt with every VT-737SP.

BIAS Peak 3

Burn Red Book CD's. Read and write MP3's. Batch process hundreds—or even thousands—of files. Ultra-fast non-destructive waveform editing. Run stand-alone or as an external editor launched directly from within DP. Unlimited undo/redo with complete graphic edit histories for multiple audio documents. Dozens of unique DSP and looping tools like Convolve, Repair Clicks, Loop Tuner™, Loop Surfer™ and Guess Tempo™ and more. Hot swap real-time effects in series, parallel, or hybrid combinations using the Peak's new Vbox™ SE VST™ matrix. Runs native on Mac OS 8.6 thru Mac OS X. Optimized for Apple's G4 Velocity Engine. The ultimate editing, processing and mastering companion for Digital Performer.

Propellerhead Reason 2

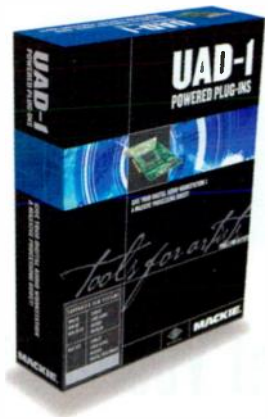
Welcome to the Age of Reason. Version 2. Simply put, Reason is the first software synth to equal and surpass the power, glory and attitude of real hardware synths. All the power of hardware samplers, analog synths, drum machines — you name it — without the hassle. A complete rack of sound-generating virtual equipment for your Digital Performer desktop studio.

Tannoy Ellipse 8

Tannoy's new Ellipse 8 monitor is the first of an entirely new generation of studio monitors featuring Tannoy Wideband technology. Frequency response up to 50kHz. Exceptionally wide sweet spot. Discrete power amps. Striking appearance. The perfect monitor for your MOTU-based studio.

Mackie UAD-1 Powered Plug-ins

UAD-1 is a PCI card that allows you to run dozens of sophisticated effects plug-ins inside Digital Performer without bringing your Mac to its knees. What's the secret? A custom-built, monster DSP. It's like adding an extra $20,000 worth of effects gear to the dozens of native plug-ins included with DP. UAD-1 ships with this growing list of powered plug-ins:



Real Verb Pro
The most flexible, natural sounding reverb available. Design your own rooms, down to the smallest detail.

Pultec Program EQ
Stunningly realistic recreation of this classic analog EQ. Dangerous amounts of boost with musical results.

1176LN Limiting Amplifier
Another analog classic reborn inside Digital Performer. Apply liberally with host CPU cycles to burn.

Teletronix LA-2A Leveling Amplifier
This beauty defines "vintage audio gear". If you want warm, authentic analog in your DP mixes, this is it.

Nigel
A complete palette of guitar tones combined with every effect a guitar player could possibly ever need.

CS-1 Channel Strip
Whopping punch on a single DP plug-in insert: EQ, compression, delay and reverb all in one plug-in.

Cool School Interactus

From Cool Breeze Systems, the leader in pro audio interactive training. Cool School Vol. 6 for DP3 is like having a DP product specialist looking over your shoulder, with click-for-click simulations, over 2 hours of movie tutorials and "AutoPlayer" mode. Just sit back and soak up the info.

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Authorized Reseller

FINAL MIX

By Larry the O

You Bet Your Bottom Dollar

We've all seen the bumper sticker "Real Musicians Have Day Jobs." A song tells us, "Keep your day job / 'til your night job pays" ("Day Job" by the Grateful Dead), and a poet laments, "Though the treasures of Babylon flow from your Muse, / even so you're late with your rent check."

Okay, so I'm not much of a poet, but the idea is clear: singing for your supper doesn't work as well nowadays as it did for Chaucer's road show. Making your nut as an independent musician—or even something closely related—is *tough*. Some musicians make a living in the commercial sector, but those trying to present an artistic vision of almost any sort have a very hard time finding gigs that pay much.

Why?

One reason is that the nature of earning from both performances and recordings is changing. There has been a precipitous decline in venues offering live music. Depending on your viewpoint, there is a case to be made for a DJ being a live musical performer, but there is a qualitative difference between the feeling I get from a DJ and that I get from a live band. Perhaps it has to do with band members generating the source material while interacting with each other in real time. But I digress.

The old business model for earning money from recordings has all but crumbled, and the new one is not fully formed. With all the "free" music going around, marketing music for sale is a whole different challenge from before.

But I believe there's another underlying problem (at least in the USA; having lived in only one country, I can't speak for the rest of the world), which has been at work for many years now: music is often seen as not having fiscal worth. In commercial gigs, the value of music is tangible: a jingle for this ad, a score for that TV show. But value of the "pure" musician's work is not so easily measured. The payoff is much more subtle; it is in the emotional and ritual function music plays in a culture, the experience it presents to a listener. Music can weave spells, work magic, transport people, change lives. Yet a band charging a seven-dollar cover agonizes over whether it's scaring people away by asking so much—so how much is life transformation really worth?

For local performing bands, gig income often is proportional to the amount of alcohol people consume. As much as I like a good drink, there's still the moral dilemma of feeling like I'm promoting alcoholism in order to earn a living as a musician!

Most gigs, across many genres, simply aren't very profitable. But the fallout from this fact makes things worse. With lots of hungry musicians out there, lowballing drives prices even further down. When musicians are making little money, studios and other services associated with musicians also feel the pinch and fall prey to lowballing, too. May the Good Dog keep me from owning a studio where I have to buy the latest widgets to attract clients who want to pay less than the starving studio across town charges.

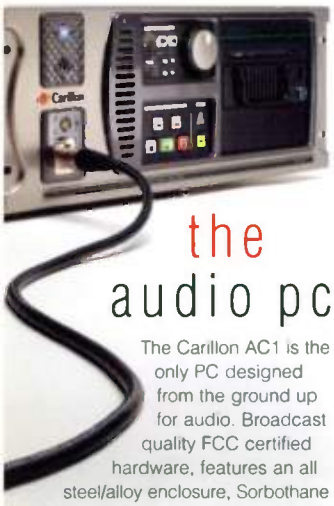
So, many of us toil at day jobs of varying quality and try to keep mustering enough energy on evenings and weekends to keep playing music, even though it leaves us with no life and screws up romantic relationships. It's a pretty ugly reality: frustrating, demoralizing, and brutal. Given all the other rigors associated with the musician's lifestyle, especially in performing, it is, tragically, not surprising that so many people get chewed up, burnt out, bitter, or just worn to a frazzle trying to make money from music over a number of years.

The situation is so deeply entrenched that I've never seen a way through it. The only solution I can see is to try and find ways around the problem: clever alternative approaches and niche markets that may not make you rich but might earn enough to provide a decent living.

Good luck making your night job pay. ❀

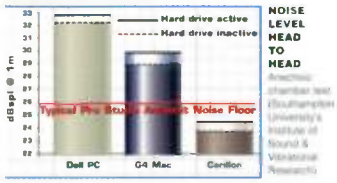
We welcome your feedback. E-mail us at emeditorial@primediabusiness.com.

STEVE CURL



the audio pc

The Carillon AC1 is the only PC designed from the ground up for audio. Broadcast quality FCC certified hardware, features an all steel/alloy enclosure, Sorbothane vibration damping & the very best components including our own Ultramute PSU. Ultra low noise performance & a host of audio specific features, like front panel patching and inexpensive 'real controllers', have earned praise from journalists & name professionals alike.



Mike Hedges *Producer: U2, Phil Collins, Manics, Travis etc.*

"The Carillon AC1 is silent, robust and portable. I can keep it switched on in the control room without even thinking about fan noise."

Chris Nutall *Sound Designer AIR Studios (with Tim Wise-Lott)*

"The AC-1 is really fast and it doesn't crash. It's also extremely quiet. I'm now using it for all my DSP work"

Ivor Taylor *Technical Director: Grand Central Post.*

"Since installation the Carillon has sat there and worked 24 hours a day, 7 days a week without faltering."

Mark Knopfler's Celtic and American influences spirited him towards Nashville and a famous association with Chet Atkins in the early 90s. He's worked in the town regularly since, and early on, top producer/engineer Chuck Ainlay was recommended.

Albums for the likes of Lyle Lovett had already earned Ainlay a fine reputation and having produced each Knopfler album from Golden Heart onwards, he is now a vital element of the artist's sound on record.

Always an early adopter of leading edge technology, Ainlay is also one of the world's leading surround mixers. This was an important factor in his choice of the 96 kHz Nuendo platform - that and Nuendo's "32 bit floating point operation which means processing and plug-ins don't degrade the sound quality".

For the follow-up to Knopfler's acclaimed Sailing to Philadelphia, Ainlay specified a Nuendo loaded Carillon AC-1 2GHz Pentium 4 PC system with two Nuendo 9652 audio cards and three Nuendo 8 I/O 96 kHz 24 bit converters. A striped RAID 0 array with four 73GB SCSI drives provides ultra fast high bandwidth drive access and a 60 GB removable IDE is used for transfer and back up. AES/EBU connections come by way of Nuendo's DD8 format converter and a Midex 8 and Houston enhance MIDI and hands-on control respectively.

Chuck Ainlay's' AC-1 specification

- Intel P4 2 GHz • Win. XP Pro
- 1 GB 400MHz RDRAM
- 20 GB system drive & 60 GB drive in removable caddy. (EIDE Seagate Barracuda Softsonics)
- 4x 73 GB Seagate Cheetah Ultra 160 SCSI drives in RAID 0 array
- Neovo 18" LCDs & Matrox G550 dual head 32MB video card
- 2 x Nuendo 9652 audio cards
- 3 x Nuendo 8 I/O 96kHz AD/DA converters
- Nuendo DD8 format converter
- Steinberg Houston controller
- Steinberg Midex 8
- Rosendahl Nanosync
- Steinberg Nuendo Software
- Nuendo Surround Edition
- TC Works Surround Reverb
- Steinberg GRM Tools 1&2
- Steinberg Plug Ins: Desser, LM4, Magneto, Mastering Edition, TLA EQ, Voice Machine & The Grand
- Native Instruments B4

"The system runs like a dream and despite having to cope with massive audio files, operates at near zero latency. And I love details like the custom keys - even though I'm using Nuendo all the time, they're a boon."

"The Carillon computer rocks! The hardware is beautifully designed and barely audible. It's also really well configured - working with upwards of 50 tracks of 24/96 in Nuendo, the processor is just ticking over"

Chuck Ainlay
Producer/Engineer

Our true "turnkey" systems include manuals, tutorials & help written for each system as an entity. Expertly optimized and configured, they're

TOTAL SYSTEM INTEGRATION

ready to run so you can focus on making music. Reviewing the VST Songwriter, *SOS magazine* said "I had absolutely no operational problems during the course of my review"

VST Foundation System	$1599	ProTools LE Workstation	$2649
VST Audiophile System	$1749	Reason Workstation	$1749
VST Four by Four System	$1899	Nuendo Workstation	$5399
VST Songwriter System	$1999	UltraSampler (Gigastudio)	$3049

Cubase SX · Nuendo · digidesign · Logic · SONAR · Sibelius · HALion · NI · TASCAM GIGASTUDIO

Cubase SX Pro Recordist	$2849	Barebones Systems from	$1199
Sonar Foundation System	$1579	Configure custom systems online with:	Carillon system builder
Logic Pro Songwriter	$2879		

Please visit **www.carillonusa.com** for full specifications

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