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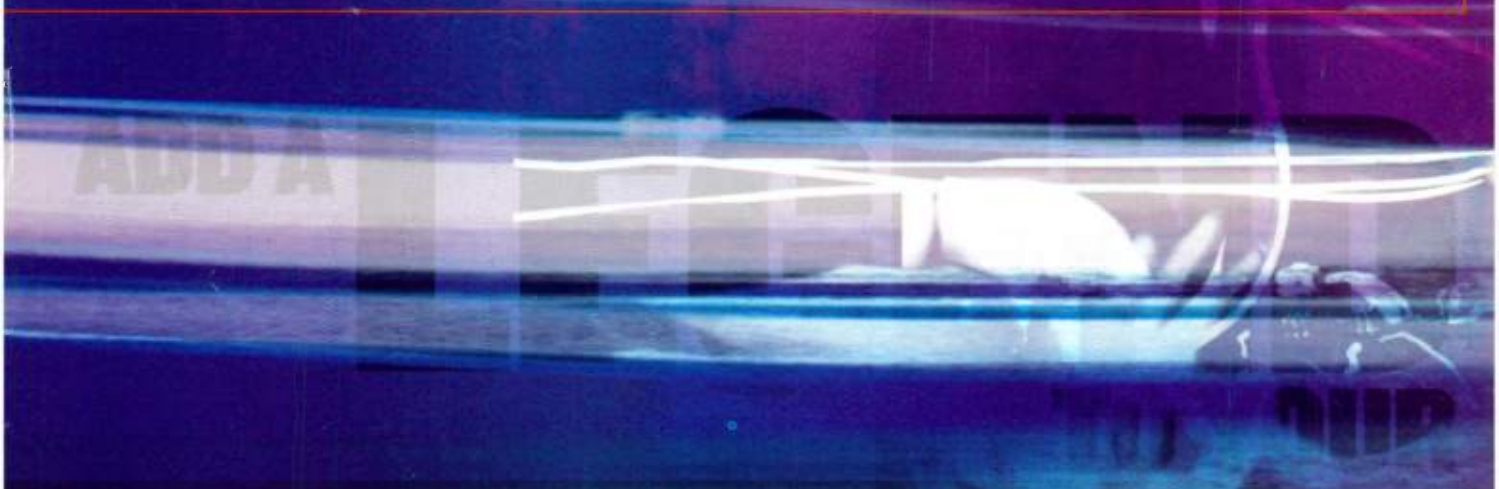

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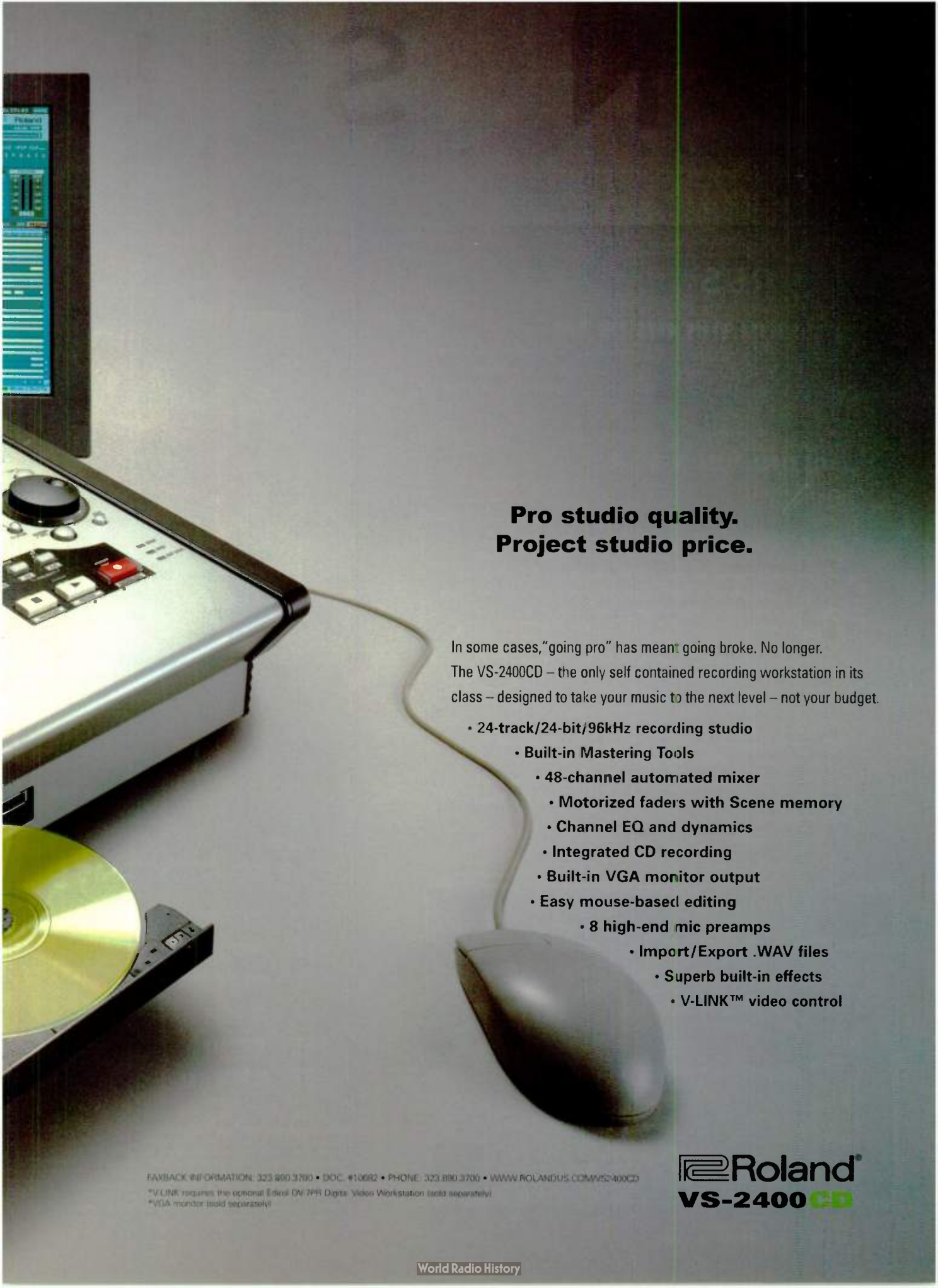

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I N S I

FEATURES

35 MASTER CLASS: BEATS, BASS, AND BLISS
Spectrasonics' three cross-platform virtual instruments—Stylus, Atmosphere, and Trilogy—combine to create a powerful ensemble. Here's how to unleash the full potential of these popular software-synthesizer plug-ins.
By Dave Hill Jr.

46 COVER STORY: PLUGGING INTO EQ
Desktop musicians can now choose from a wide variety of EQ plug-ins that use different types of algorithms and are designed for distinct purposes. These soft EQs are available at prices ranging from less than $70 to well over $700, leading us to wonder whether the price disparity always reflects a difference in quality. We ran seven EQ plug-ins through a battery of listening tests to get a taste of the latest offerings; the results may surprise you.
By Nick Peck

61 PRODUCTION VALUES: CAPTURING THE FEEL
Iconoclastic producer and engineer Joe Barresi has worked his magic for acts such as Queens of the Stone Age, the Melvins, and Powerman 5000. He has a knack for capturing killer guitar sounds and never loses sight of what makes music groove. In this interview, Barresi describes his techniques for recording guitar, his love of vintage (and modern) gear, how to time-correct drum parts in Pro Tools, and much more.
By Maureen Droney

Cover image courtesy of Apple

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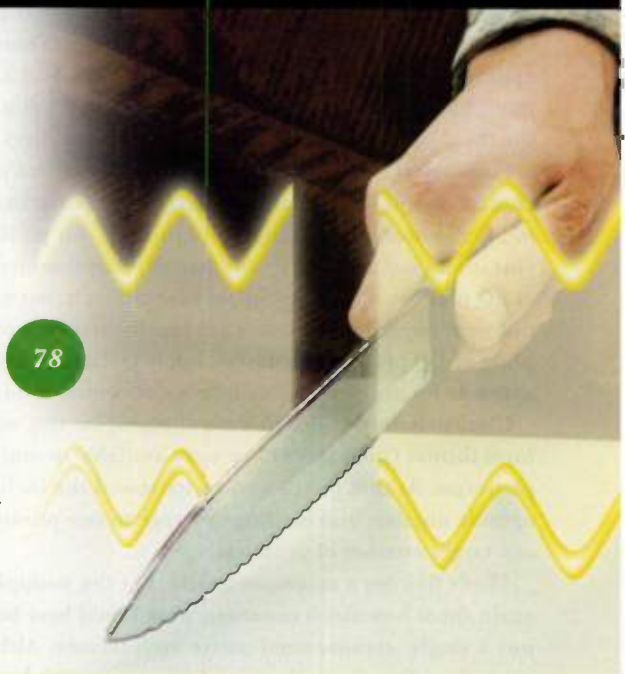

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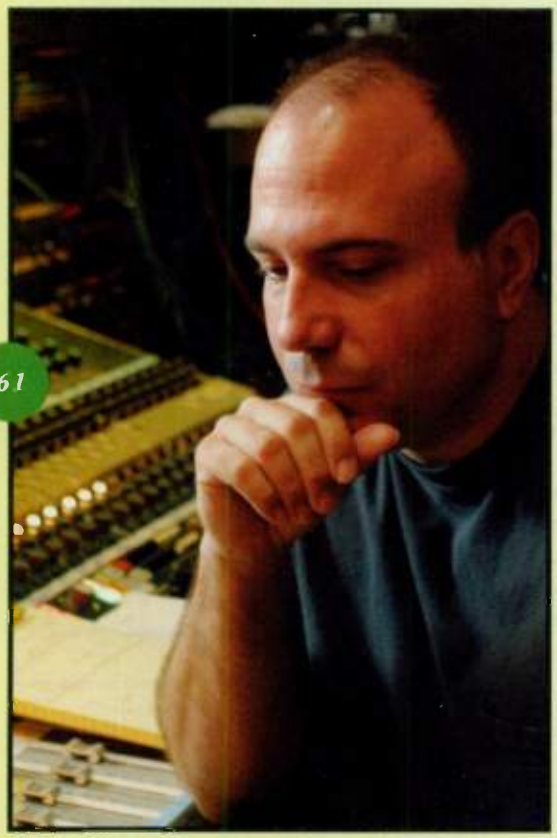

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Plugging In

DAN PHILLIPS

Several times over the years, I have raised objections about the overwhelming number of mutually incompatible plug-in architectures. There appear to be more formats than ever today, and although the variety of plug-ins is glorious, I don't think the flood of formats has enhanced our musical lives.

This subject came to mind again when **EM** decided to check out some representative EQ plug-ins for this month's cover story, "Plugging into EQ," on p. 46. Our intent was as much to discuss the general subject of EQ plug-ins as to round up specific products, but we did want to evaluate a small yet representative sampling of EQ plug-ins. We immediately realized that if we included plug-ins that were available for only one or two formats, we would soon be writing a book, not an article.

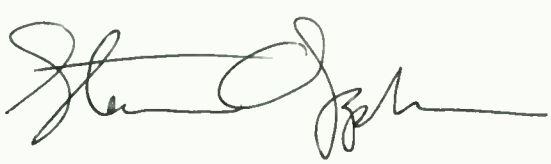
Ultimately, we decided to work with plug-ins that were either available in a cross-platform format (such as VST) or were available in multiple formats that included both platforms. At that point, we had narrowed the included companies down to a manageable number, and limiting coverage to one product per company allowed us to hit our target number of products.

That's fine for a magazine article, but the multiplicity of formats got me thinking again about how much easier our work would have been had we been able to deal with just a single, standardized native architecture. Although I've heard reasonable explanations for why such an architecture hasn't been developed, I'm unconvinced that it can't be done. Another solution would be to create separate architectures for native Mac and Windows programs. Microsoft has DirectX, and Audio Units may evolve into a fully supported standard for Mac OS X. But so far, no proprietary formats have been replaced by these OS-based systems.

With formats that run on DSP cards, such as TDM and the modified VST for UAD-1 and PowerCore, the only way around having multiple formats would be for all cards to use the same DSP chip set. I suppose that's possible, but I'm not holding my breath.

With native software, though, the odds should be better. VST comes the closest to being a universal cross-platform native format; its development, however, relies on Steinberg rather than on an industrywide organization, which means that one company controls how plug-ins are written that ultimately have to run in a competitor's environment. VST probably won't completely win the day unless it is independently developed, as well as technologically equal or superior. Third-party plug-ins that are not written strictly to the specification—currently a bane of host-software developers—should simply be rendered incapable of launching at all. Then there will be no legitimate argument for not supporting VST.

Maybe the idea of one or at most two native formats is a lost cause, but I don't think so. Sooner or later, either one developer and its format will rise to dominance, the way that Adobe Photoshop and Quark Xpress have done to some extent, or native host-software developers will learn to cooperatively define how plug-ins should work within an audio-editing environment. If not, then music software will be stuck in the 20th century. And that's ancient history in the tech world.



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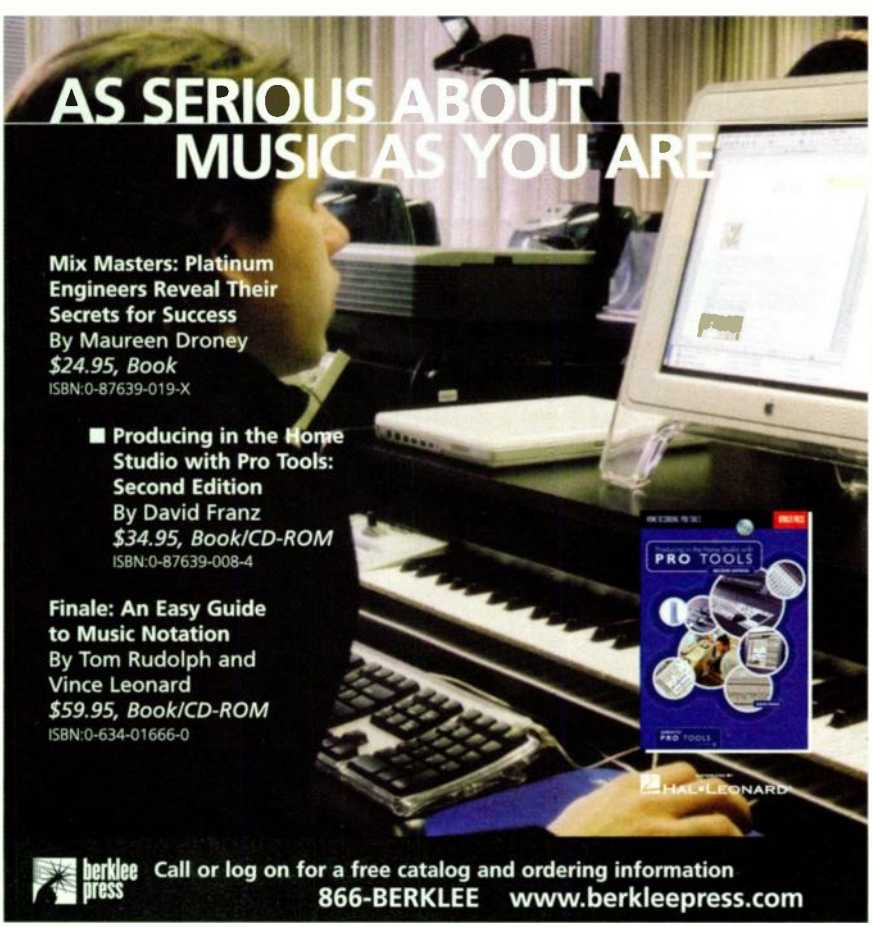

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music in the 18th, 19th, and 20th centuries may be a little less direct than I implied, but the connection is undeniable. Equal temperament was adopted primarily because it facilitated modulation to distant keys. The desire to modulate was an artistic response to the restlessness of the era. If composers hadn't felt the need to modulate, such an ugly tuning system would never have been tolerated.

Editor in Chief Steve O adds: You are correct that Bach did not use equal temperament when performing "The Well-Tempered Clavier." It appears—the point is debated—that he used a version of the Werckmeister or Kirnberger temperaments, and he may not have used the same temperament every time he performed.

MAYBE BABY

Nick Peck's review of Mackie's Baby HUI MIDI control surface (May 2003) was well written, even though I didn't agree with all of his opinions. I bought the Baby HUI for use with Steinberg's Cubase SX.

In the third paragraph, Peck states, "The Baby HUI's feature set is a subset of its big brother's, so any DAW that recognizes the original HUI will work with the Baby HUI." I wish this were true. The original Mackie MIDI map does not work for the Baby HUI with Cubase SX, although the program works perfectly with the original HUI. I contacted Mackie about this, and they directed me to Steinberg. I then contacted Steinberg and was greeted with silence.

I attempted to map the MIDI commands myself. With the help of a good soul in Steinberg's user forum, I made some headway: apparently, the Yamaha DM2000 MIDI map—also stored in Cubase SX—almost works. I was able to get faders, mutes, solos, pans, sends, and even the lower transport controls working. The upper transport commands, however, remain dead meat. Ironically, Steinberg had the Baby HUI working for Nuendo months ago, but has yet to support it in its new version of Cubase.

As far as I know, the problem still hasn't been fixed. I think that the public should know about it before anyone else makes this mistake.

Eric Bragg
Fountain Square House of Music

Author Nick Peck replies: Eric—Thanks for your insightful comments. As you can imagine, it's impossible for a reviewer to test a product of this kind with every possible DAW. I'm sorry to hear that the Baby HUI is not working as advertised for Cubase SX. I would think that it is in Mackie's and Steinberg's best interest to resolve this problem.

Assistant editor Matt Gallagher adds: Steinberg reports that the next major release of Cubase SX will offer support for the Baby HUI. At press time, Steinberg had not determined a release date for the next version.

EM ARCHIVES

I have all the issues of **EM** ever published, and they come in handy several times a year. Unfortunately, the magazines weigh a ton and are beginning to take up a large amount of space. Have you considered selling your back issues on searchable CD-ROMs or DVDs?

Dave Quick
via e-mail

Dave—I have long dreamed of offering an electronic **EM** *archive, complete with the original layouts and graphics, mostly because I want to use it myself. But creating even a nonsearchable version would be a big job. Our earliest issues (circa 1985 through 1988) were created before we switched to desktop publishing; we only began systematically archiving our files in January 1997. So to create a nonsearchable, digital archive, we would have to scan every issue before 1997 and create an electronic version of each story. To create a searchable version, we would also have to run optical character-recognition software and then proof and correct the OCR errors. On the other hand, although a 1997 through 2003 electronic edition would still require considerable work, it is a far more practical project and could be done from the existing files.*

In the end, it comes down to money and reader demand. If we have reason to believe that enough readers will buy a disc-based **EM** *collection to make it financially viable, we would seriously consider creating one. Otherwise, it's going to remain a dream. —Steve O*

ERROR LOG

July 2003, "Review: Analogue Solutions Black Coffee analog synth module," p. 122. The review incorrectly states that the module offers "an LFO with sawtooth and square waveforms." In fact, the Black Coffee's LFO offers triangle and square waves.

August 2003, "Production Values: The Groove Is Out There," p. 36. There is a factual error in the sidebar "Chris Vrenna: A Selected Discography." The Nine Inch Nails track "Perfect Drug" actually appears on the *Lost Highway* soundtrack (Nothing/Interscope, 1997).

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WHAT'S NEW

By Geary Yelton

M-AUDIO LUNA

The diversity of M-Audio's product line continues to grow with the release of a condenser microphone called the Luna ($249.95). M-Audio says that the lollipop-shaped Luna pays homage to traditional microphone technology by combining vintage sound and looks with state-of-the-art electronics. With its large diaphragm and cardioid pickup pattern, the Luna is intended for vocals, guitar, piano, and any other sound source that might be suitable for a condenser mic.

The Luna uses Class A FET electronics for quiet operation. It also has a solid-brass capsule and a 1.1-inch diaphragm that has been metalized with evaporated gold using a proprietary process. If you require matching mics, M-Audio says that all Luna mics deviate from a reference mic by no more than ±1 dB across the entire frequency range. The price includes a shockmount and a rugged hard-shell case. M-Audio; tel. (800) 969-6434 or (626) 445-2842; e-mail info@m-audio.com; Web www.m-audio.com.

MOOG MUSIC PIANOBAR

No, it isn't a place to hang out at happy hour and listen to old standards. The Moog Music PianoBar ($1,199), developed in collaboration with Buchla and Associates, is a solution for pianists who want to gain the advantages of MIDI without replacing their piano keyboards. It retrofits any standard 88-note acoustic piano keyboard to produce MIDI data without the need for permanent alterations. By transforming your piano into a MIDI controller, the PianoBar makes it possible to play external instruments and record your playing into sequencers, transcription programs, and other computer software.

The PianoBar has three components: the Scanner Bar, the Pedal Sensor, and the Control Module. The Scanner Bar is placed against the front of the piano, just above the keys, without touching them. It contains infrared sensors and converts key movements into Note and Velocity data. The Pedal Sensor sits beneath the piano's pedals and detects their motion. The sensors send key and pedal information to the Control Module, a sample-playback synth that converts it to MIDI data. The Control Module comes with over 300

instrument sounds and effects and is 16-part multitimbral.

When you play a MIDI sequence into the Control Module, LEDs in the Scanner Bar light up over the keys to indicate which notes are played, offering potential for learning new tunes. The PianoBar installs easily in less than five minutes without tools. Moog Music; tel. (800) 948-1990 or (828) 251-0090; e-mail admin@moogmusic.com; Web www.moogmusic.com.

ROGER LINN ADRENALINN II

Because it has a more powerful processor and more memory than its predecessor, Roger Linn's AdrenaLinn II ($499) can provide an enhanced feature set while offering a simplified user interface. Like the original AdrenaLinn, the AdrenaLinn II serves up guitar-amp modeling, effects processing, and an onboard drum machine. However, it doubles the number of available amp models from 12 to 24, adding classic rigs from Fender, Hiwatt, Marshall, Roland, Vox, and others. Drum sounds and preset patterns have also been improved. In addition, the maximum delay time has been tripled to 2.8 seconds, which is enough to create short loops in real time.

The AdrenaLinn II generates several unique effects, including random filtering and flanging, a simulated talk box, and tremolo sequencing. Effects modulation and delay times are always synced to the drum machine's tempo or MIDI Clock, and now you can use a footswitch to control tap tempo or select presets. The AdrenaLinn II also emulates classic filters such as those by Moog and Oberheim. An upgrade kit ($99) is available for owners of the original AdrenaLinn. You can take a virtual tour online and see video demonstrations of the AdrenaLinn II in action. Roger Linn Design; tel. (510) 898-4878; e-mail sales@rogerlinndesign.com; Web www.rogerlinndesign.com.

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The world's most affordable digital 32-channel* mixer.

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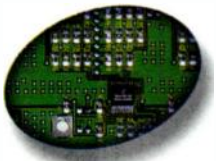
The DANALOG DDX3216 is more affordable than ever before. You get a professional digital mixing console with first-class features and optional accessories such as ADAT®, AES/EBU and TDIF cards. The best of all, it's as user-friendly as an analog mixer–it's Digital but with an Analog Feel. Now it's time for you to go digital.

32 channels, 16 busses, 8 aux sends, fully parametric EQs, super-fast motorized faders and awesome automation options

The ADA8000 option (available 3rd quarter 2003) adds 8 extra IMPs (Invisible Mic Preamps) to the 12 already built-in for a total of 20 premium mic preamps. Expandable to 28 IMP mic preamps with a second ADA8000.

4 powerful FX processors accessible from all 32 channels

12 studio-quality Invisible Mic Preamps (IMPs)



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New groups turn up the speed at Studio Méga.

With Logic 6 on any Power Mac.

"With the new options Version 6 offers, such as the Mix Groups and Edit Groups, we save precious studio time. Just as we do with the Channel Strip in the Arrange Window and the terrific Freeze function," says Thierry Rogen, owner of Studio Méga, one of the largest studios in France, where Sting's new CD Sacred Love was produced, among others. "Logic is the ideal workstation for us, and the EXS24 simply the best sampler on the market – the perfect combination." Functions such as Project Manager, Sample Accurate Display in the Arrange Window, or the Marquee Tool also considerably improve work speed at the studio. And those who mainly work on film music will especially appreciate digital video playback via FireWire and Video Thumbnail Track in the Arrange Window. Yet to become part of the world largest studios' basic equipment requires one quality more than anything: absolute reliability. This applies to security both of long-term investments and in daily operation. Logic once again impressively proves that it has that quality, as its Version 6 is used in the largest studios in the world. Move up into the large group of professional Logic users.

Technology with soul.

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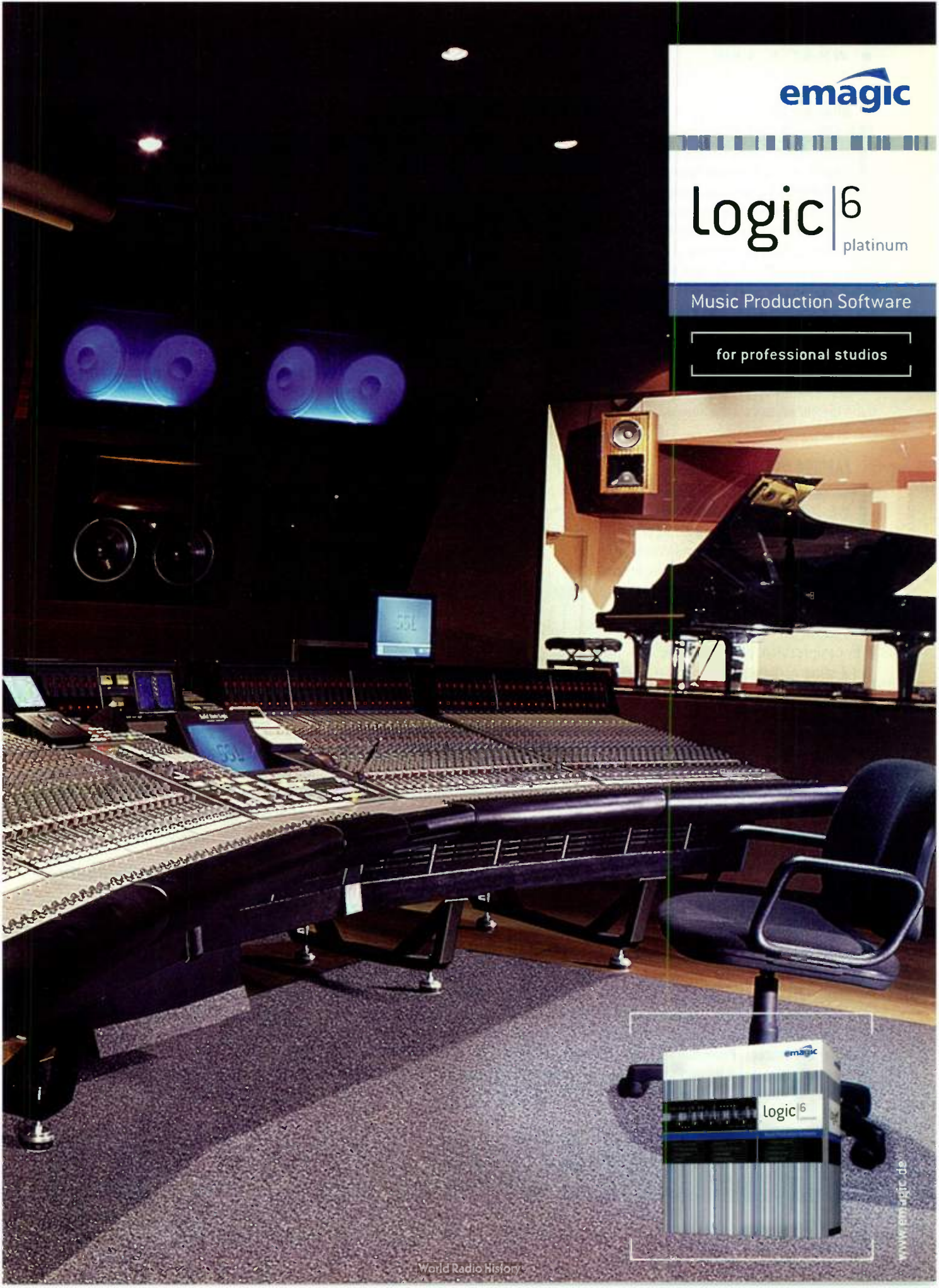
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▶ BOSS GS-10

The Boss GS-10 ($595) is a sophisticated multi-effects processor and USB audio interface in a 5-pound tabletop unit. Unlike other guitar and bass processors, however, this one has built-in speakers and provides 11 simultaneous effects. Its COSM-based effects are derived from the Boss GT-6 and GT-6B and feature 48 different guitar and bass amplifier models. An auxiliary input lets you plug in a CD player or drum machine to accompany your guitar through the built-in stereo speakers.

The GS-10 has separate front-panel sections for the preamp, compression, overdrive and distortion, delay, chorus, reverb, FX-1, and FX-2. In addition to the usual wah, chorus, and ring-modulation effects, the presets include Defretter, Feedbacker, Pedal Bend, Slow Gear, Humanizer, and Harmonist. The GS-10 stores 300 presets, 100 of which are user-programmable.

Connect the GS-10 to your Mac or PC, and the included GS-10 Editor software (Mac/Win) displays all its parameters onscreen as a virtual stompbox pedalboard. Cakewalk's DAW Music Creator (Win) is also bundled in for PC users. In addition to USB, MIDI In and Out, and two ¼-inch control jacks, the GS-10 provides a guitar or bass input, XLR or TRS mic input, guitar-amp output, coaxial S/PDIF I/O, and stereo RCA in and out jacks. Roland Corporation U.S.; tel. (323) 890-3700; Web www.rolandus.com or www.bossus.com.

▶ YAMAHA 01X

The Yamaha 01X ($1,699) is much more than just a digital 28-track mixer. It's a 24-bit, 96 kHz, mLAN audio interface supporting Mac OS 9, OS X, and Windows XP platforms. For DAWs and virtual instruments, it operates as a control surface with motorized faders. The 01X also provides two 32-bit dynamics processors with compression, gating, limiting, and 4-band parametric EQ on all 28 channels.

As a control surface, the 01X provides extensive control for most popular DAW programs right out of the box. You can mix, control transport functions, arm tracks, edit plug-ins, and select windows from the 01X's front panel. The 01X includes VST and AU software plug-ins for mastering, vocal processing, and pitch correction. The included Studio Manager software (Mac/Win) lets you control every parameter from your computer, and a VST channel strip lets you copy parameters from the 01X to your VST host. You can even disconnect the 01X from your computer and use it in live performance as a standalone digital mixer with automation.

The 01X supplies eight high-quality mic preamps, two XLR inputs with 48V phantom power, six TRS mic/line inputs, a high-impedance instrument input, stereo S/PDIF I/O, two FireWire ports, and two pairs of MIDI ports. If you need additional I/O, optional mLAN channel expansion units let you add another 16 analog or digital audio inputs. MLAN provides audio and MIDI networking of as many as 63 devices on a single FireWire cable. Yamaha Corporation of America; tel. (714) 522-9011; e-mail infostation@yamaha.com; Web www.yamaha.com.

▼ TC ELECTRONIC POWERCORE FIREWIRE

Addressing the needs of laptop computer users, TC Electronic is now shipping the PowerCore FireWire (Mac/Win, $1,795), an outboard version of the original TC PowerCore PCI card. Like its predecessor, the single-rackspace DSP accelerator runs plug-ins written especially for the PowerCore platform without draining the host computer's resources. PowerCore FireWire contains a floating-point PowerPC and four Motorola DSP chips that deliver twice as much signal-processing horsepower as the PCI version. That allows you to run more simultaneous plug-ins within any VST- or Audio Units–compatible host application.

The PowerCore FireWire comes bundled with nine plug-ins that handle dynamics and effects processing—including a virtual TC Finalizer, channel strip, reverbs, and EQ—as well as an emulation of the Roland SH-101 synthesizer. It is also compatible with third-party plug-ins from Sony, Waldorf, and other developers. You can use the FireWire and PCI-card versions of the PowerCore in the same system.

On the Mac, the PowerCore FireWire requires at least a G3/400 MHz with OS X 10.2 and 256 MB of RAM. On the PC, you'll need a minimum Pentium III/500 MHz, Windows XP, and 256 MB of RAM. Both platforms, of course, require a FireWire port and compatible audio software. TC Electronic; tel. (805) 373-1828; e-mail infous@tcelectronic.com or infous@tcelectronic.com; Web www.tcelectronic.com/powercore.

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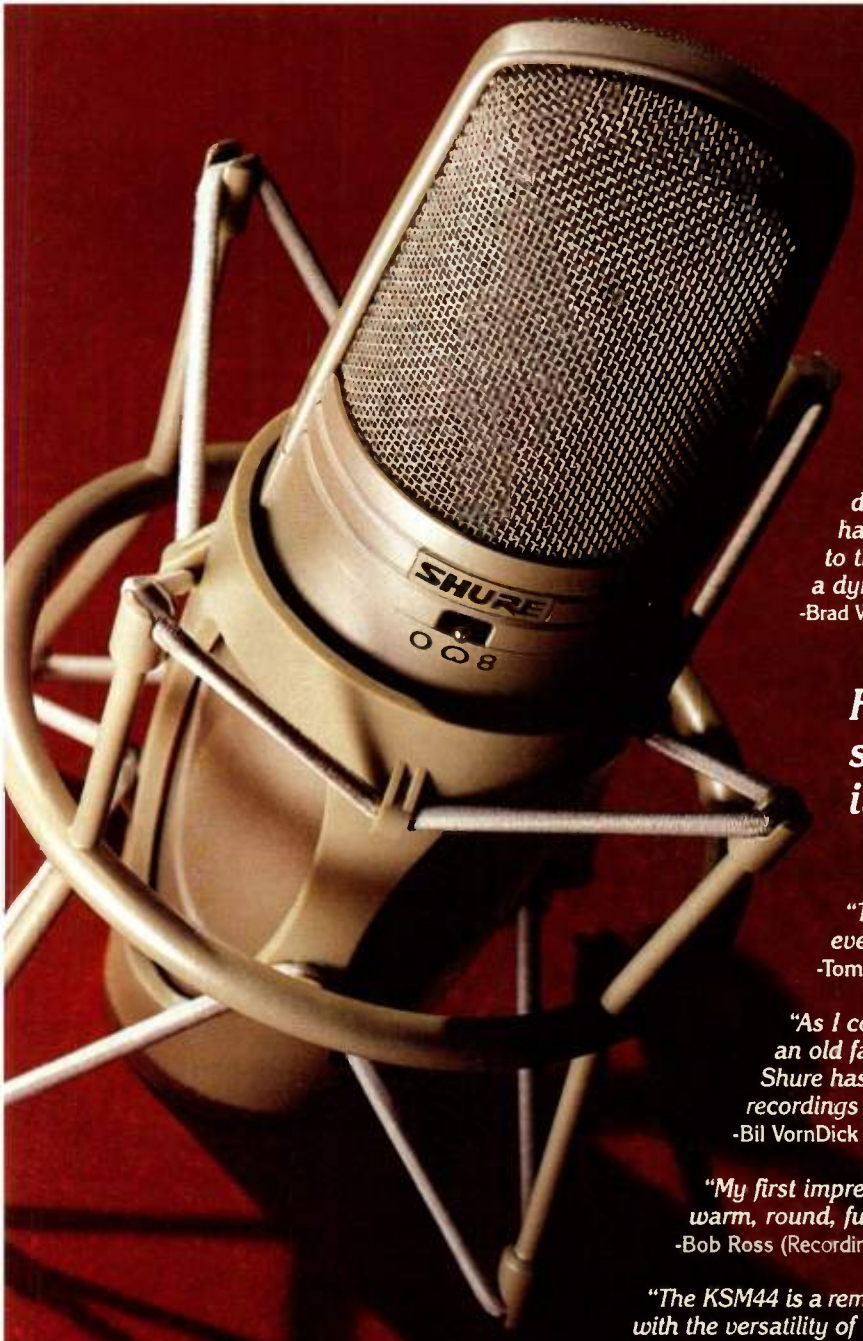

"The KSM44 has amazing presence on vocals. It's a great all-around condenser mic."
-Eddie Kramer (Jimi Hendrix, Led Zeppelin, Kiss, the Beatles, ...)

"I found the KSM44 to have an excellent natural quality with good presence and a nice open top end. This mic is so smooth in the midrange, even a banjo sounded good!"
-Joe Chiccarelli (Beck, U2, Elton John, ...)

"I tested the KSM44 on vocals, bass, guitar, and drums, and haven't stopped using it since. It's hard to describe, but there is an immediacy to the KSM44 that is very appealing – sort of like a dynamic mic, but more elegant."
-Brad Wood (Smashing Pumpkins, Liz Phair, Better Than Ezra, ...)

For a mic with such low self-noise, it sure creates a lot of buzz.

"The KSM44 is the quietest microphone I have ever used, and one of the best sounding too."
-Tom Jung (Pro Audio Review, DMP Records, ...)

"As I compared the KSM44 to a mic I consider to be an old favorite, my ear immediately chose the KSM44. Shure has a fantastic studio mic that I can use for critical recordings – it's going to become a standard, very fast."
-Bil VornDick (Alison Krauss, Bela Fleck, Mark O'Connor, ...)

"My first impressions of the KSM44 were warm, round, full – dare I say it? Fat!"
-Bob Ross (Recording Magazine)

"The KSM44 is a remarkable achievement. I am especially impressed with the versatility of this microphone and have yet to find its limits."
-Steve Albini (Nirvana, Page and Plant, PJ Harvey, ...)

"I was given the KSM44 prototype early-on, not knowing its intended purpose - so I tried it on everything. Guess what, it worked on everything!"
-Chuck Ainlay (Trisha Yearwood, Mark Knopfler, George Strait, ...)

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The KSM44 multi-pattern studio condenser microphone has become quite the conversation piece in studios around the world. Maybe that's because its incredibly low self-noise (7 dB) lets you record only what you want to hear. Or maybe it's the three polar patterns and the design of the externally biased dual-diaphragm cartridge. Once you experience it for yourself, you'll be talking, too. To discover what makes the KSM44 so buzzworthy, call 1-800-25-SHURE or visit www.shure.com.

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REV UP ▲▲▲▲

▼ CAKEWALK SONAR 3

Cakewalk's popular DAW programs Sonar and Sonar XL (Win) have evolved into Sonar 3 Studio Edition ($299) and Sonar 3 Producer Edition ($499). These programs have undergone major renovation and now support dozens of innovative features. One of the highlights is a new workspace that features a Track Inspector Pane, improved toolbars, preset color themes, and XP-style dialogs. New real-time editing enhancements let you roll out loops without affecting the audio stream and alter audio, MIDI, and automation data during playback. VST-DX Adapter is included for support of VST instrument and processing plug-ins.

The new mixing console offers user-controllable strip widths and dynamic display filtering. A new dynamic busing architecture improves performance; you can route buses to other buses or to the main outputs, and insert buses and sends on the fly. Preconfigured templates allow one-click setup for subgroups, effects sends, headphone mixes, and master buses. MIDI enhancements include unmerged and preset inputs and the capacity to import MIDI Groove Clips and Project5 patterns.

Sonar 3 Producer Edition provides integrated Ultrafunk equalization for each channel. It also includes the Ultrafunk Sonitus:fx Suite, which offers multiband compression, parametric EQ, delay, reverb, and additional dynamics and effects processing. Also bundled with the Producer version is VSampler 3.0 DXi, a virtual sampler that imports Akai, Giga, HALion, and other sample formats.

Minimum requirements for either version are a Pentium III/1.2 GHz with Windows 2000 or XP, 256 MB of available RAM, a 7,200 RPM hard drive with 100 MB available, and a WDM-compatible sound card. Cakewalk; tel. (888) CAKEWALK or (617) 423-9004; e-mail sales@cakewalk.com; Web www.cakewalk.com.

▶ SAMPLETANK 2

SampleTank 2 (Mac/Win) is a significant upgrade of IK Multimedia's sample-playback VST Instrument. SampleTank 2 XL ($499) ships with eight CD-ROMs of samples, and SampleTank 2 L ($299) ships with four CD-ROMs of samples. Both versions provide three sound engines that you can toggle on the fly. SampleTank Time Resynthesis Technology (STRETCH) lets you manipulate tempo, tuning, and spectrum to realistically transpose samples by large intervals. Pitch-Shift/Time-Stretch synthesis is best suited to loops and grooves, and traditional sample playback is also available.

In addition to including a library of native sounds, SampleTank 2 imports WAV, AIFF, and Sound Designer II files as well as Akai and SampleCell instruments. You can manipulate over 50 synthesis parameters and edit individual samples and multisamples. For real-time editing, four Macro knobs tailor themselves to the current instrument. User-assignable MIDI CCs can control SampleTank parameters, and MIDI Program Change messages can select and load sounds.

SampleTank 2 is 16-part multitimbral and gives you extensive control over mixing parameters. Assign five simultaneous effects from a selection of 32, including parametric EQ, multifilter, and amp and cabinet simulation borrowed from the company's AmpliTube plug-in. Enhanced browsing features help you find and load instruments quickly by entering your own keywords into the sound database or searching with factory keywords.

Currently registered users can upgrade to SampleTank 2 XL from Sample Tank DJ, L, or XL for $249, or from SampleTank SE or LE for $349. If you've registered since May 1, 2003, you should be eligible for a free downloadable upgrade without the sample discs. SampleTank 2 supports VST, MAS, RTAS, HTDM, and Audio Units on the Mac, and VST, RTAS, HTDM, and DXi in Windows. Minimum Mac requirements are a G3/266 MHz and Mac OS 9 or OS X 10.2.4. PC users will need at least a Pentium II/400 MHz and Windows 98SE, 2000, ME, or XP. Both platforms need a minimum 128 MB of RAM and a compatible host application. IK Multimedia; tel. (866) 243-1718 or (772) 466-9763; e-mail ikmus@ikmultimedia.com; Web www.sampletank.com.

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NEW! FW-1884

The only DAW control surface with built-in FireWire audio-MIDI interface!

It's an 18-input, 24-bit/96kHz* Firewire audio I/O box...and a 4-in/4-out MIDI interface! *And* a fully-mapped controller for Digital Performer™, Nuendo®, Logic™, Sonar™ and Cubase™!

Why spend extra on audio and MIDI I/O boxes? Our new three-in-one FW-1884 has everything you need to maximize workstation productivty in a single intuitive tool. For far less than the cost of a piecemeal approach.

Fire up the FW-1884 at a TASCAM dealer or visit our web site for more information.

Assignable foot-switch jack for punch-ins or MIDI control.

Eight analog outputs for L/R and 5.1 surround sound matrices.

Fourteen DAW short-cut buttons including Save, Revert, All Safe, CLR Solo, Marker, Loop, Cut, Delete Copy, Paste, ALT/CMD, Undo, Shift and CTRL. Your mouse and keyboard will feel very neglected.

Eight channel inserts.

Channel strip rotary encoders can be assigned to 8 Auxes or Pan via keypad.

Eight channel strips with 100mm, touch-sensitive motorized faders, Mute, Solo and Select buttons, Pan, trim and access to 4-band parametric EQ.

Add banks of eight channel strips with FE-8 expanders.

Separate Phones, Monitor and Solo (AFL/PFL) controls.

Weighted jog/shuttle.

◀ NUDGE ▶ No more mouse-and-keyboard juggling: Dedicated transport buttons plus Nudge, cursor, In/Out/Set, Locate, function and Bank Switch keys.

Eight channels of ADAT® lightpipe I/O and stereo S/PDIF inputs & outputs.

Four MIDI inputs and four MIDI outputs for sound generation and timing.

Extra Firewire port so you can connect to external hard disks or daisy-chain to our FE-8 expander.

100mm, touch-sensitive motorized Master fader. Varoom!

Word Clock in and out for accurate sync with computer systems.

Eight balanced ¼"/XLR analog Mic/Line inputs with studio-grade, high-headroom, low-noise mic preamps and switchable phantom power. XLR Input 8 is even switchable from Mic/Line to Guitar level.

TASCAM

TEAC 50th anniversary

* Full 96kHz operation on all analog I/O channels with compatible DAW software.

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www.tascam.com

DJ AND PRODUCER

PERSONAL CREATIVITY

▶ KORG MICROKONTROL

Combining a MIDI keyboard with a USB control surface, Korg's microKontrol (Mac/Win, $350) is a versatile controller that weighs less than six pounds. In addition to 37 minikeys, an assignable 5-way joystick (*x-y* axis with a switch), and 16 trigger pads, the microKontrol provides 8 knobs and 8 sliders paired with 8 LCDs. The microKontrol serves as a USB MIDI interface for controlling soft synths, plug-in effects, and DAWs.

The Velocity-sensitive keyboard's octave-shift and transposition functions cover the full range of 127 MIDI notes. You can tailor its touch response with eight Velocity curves, and an expression-pedal input is available. The microKontrol's knobs and sliders can transmit any MIDI CC message, including RPN and NRPN. Each 8-character LCD displays the associated parameter name or value, and its backlight color changes to indicate whether it's displaying data for a knob or a slider. The 16 Velocity-sensitive trigger pads can send a variety of MIDI messages, and you can assign the joystick to send a different message for each of its four directions.

You can save 12 software templates in the microKontrol's internal memory and instantly enable them using the pads. An included CD-ROM contains templates for popular sequencers, as well as librarian software that lets you manage your own templates. The microKontrol is powered by USB, six AA batteries, or an included wall wart. Minimum requirements are OS X 10.2 on the Mac, Windows XP on the PC, and a USB port. Korg USA, Inc.; tel. (516) 333-9100; Web www.korg.com.

▼ AKG EMOTION/TRIPOWER SERIES

Now you can have wired or wireless operation in the same microphone. AKG's new Emotion/TriPower series are wired microphones that offer the option of wireless operation by removing the XLR output and replacing it with the new TM 40 UHF transmitter plug-in module ($198). The TM 40 is compatible with all of AKG's WMS40 UHF receivers, and you can also plug it into the D 880M and C 900M microphones.

The TriPower microphones—the new models in the Emotion/TriPower series—include the D 3700M ($195), D 3700MS ($210), D 3800M ($252), D 3800MS ($266), and C 5900M ($398). The S models each provide an on/off switch. Whereas the D 3700M is a dynamic cardioid, the D 3800M is a dynamic supercardioid, making it a better choice for use on loud stages. The D 3800M also features a humbucking coil that rejects electrical interference. The top-of-the-line C 5900M is a supercardioid condenser mic with switches for high-frequency rolloff and a –6 dB pad. All Emotion/TriPower models ship with a metal road case and an unbreakable stand clamp. AKG Acoustics U.S.; tel. (615) 620-3800; e-mail akgusa@harman.com; Web www.akgusa.com.

▼ ROCKTRON XPRESSION

Electric guitar and bass are prime candidates for multi-effects enhancement, and Rocktron designed the Xpansion ($449) with those instruments in mind. The 1U Xpression stores 128 factory presets, including effects such as pitch-shift, reverb, compression, chorus, and 4-band parametric EQ. It also features effects that are modeled after classic stompboxes, such as flanger, phaser, tremolo, and rotary speaker. Speaker-simulation capabilities let you connect the Xpression directly to a studio preamp or P.A. mixer.

You can use a MIDI pedal and footswitch to control effects parameters, control time-based parameters with the Xpression's front-panel Tap button, and easily switch from direct analog feed to full effects routing. Separate input and output controls accommodate the levels of various instruments, regardless of whether they have passive and active pickups.

Additional features include Hush noise reduction, mic-position modeling, dynamic tube reactance modeling, and 24-bit internal processing with as many as ten simultaneous effects. Rocktron Corporation; tel. (800) 432-7625 or (269) 968-3351; e-mail info@rocktron.com; Web www.rocktron.com.

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▲ EDIROL UA-1000

If you're a Windows XP user in the market for a computer audio interface, your choices are legion. If your computer doesn't have FireWire and you want high-speed operation, though, your choices are limited. Edirol has introduced the world's first multiport USB 2.0 audio interface, the UA-1000 (Win, $945). Unlike slower USB 1.1 devices, the UA-1000 delivers ten input and ten output channels of 24-bit, 96 kHz audio.

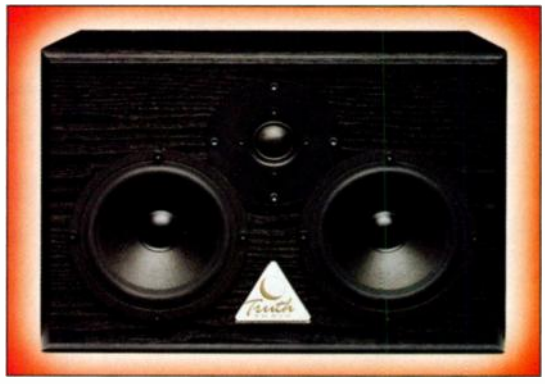
In addition to four front-panel XLR/TRS combo jacks paired with phantom-powered mic preamps, the UA-1000 has four unbalanced ¼-inch inputs on the rear panel that double as balanced insert jacks for effects sends and returns. One input works with high-impedance instrument signals, too. Analog outputs are on eight balanced ¼-inch TRS jacks and a ¼-inch stereo headphone jack. The UA-1000 also offers 8-channel ADAT Lightpipe, optical and coaxial stereo S/PDIF I/O, and MIDI In and Out.

The UA-100 is a 1U rackmount device that is compatible with ASIO 2.0, MME, and WDM drivers. Minimum system requirements are a Pentium 4/1.2 GHz computer with a USB 2.0 port, Windows XP, and 128 MB of RAM. Edirol/Roland Corporation U.S. (distributor); tel. (360) 594-4273; e-mail info@edirol.com; Web www.edirol.com.

▶ TRUTH AUDIO TA-1A

The newest active monitor speaker from Truth Audio is the TA-1A ($899), which closely resembles the acclaimed TA-1P passive monitor. Like its unamplified sibling, the biamplified TA-1A contains two 5-inch woofers and a 1-inch dynamic tweeter. The two low-frequency drivers feature a mineral-filled polycone design with 14.6-ounce magnets. The high-frequency driver has a tuned chamber and a cloth dome, and its voice coil is immersed in magnetic fluid.

Amplification is supplied by Class A/B electronics with a balanced J-FET input and a DMOS power output. According to the manufacturer, the TA-1A's low-frequency output is 100W RMS and 144W peak, with a frequency response of 30 Hz to 1.6 kHz (±2.5 dB). The high end puts out 70W RMS and 90W peak, and its frequency response is stated at 1.5 kHz to 20 kHz (±1.5 dB). THD at full power is less than 0.1 percent, and each TA-1A cabinet weighs 27 pounds.



Forthcoming models include the TA-3P, a passive monitor with two 8-inch woofers; the TA-3A, a similar biamplified model; and the TA-SW, a powered subwoofer with a 12-inch low-frequency driver. Truth Audio/Wave Distribution (distributor); tel. (850) 267-1255; e-mail sales@wavedistribution.com; Web www.truthaudio.com.

▼ ART DPS II

The ART DPS II ($319) is a 2-channel tube preamp for mics and instruments that offers 24-bit, 96 kHz A/D conversion and variable input impedance. Based on a 12AX7A gain stage, the DPS II's tube technology is similar to that of the company's DI/O preamp. The unit's Variable Valve Voicing (V3) technology supplies several new tube settings specifically tailored for vocals, guitar, bass, and acoustic instruments. Variable input impedance lets you adjust how the unit affects pickup loading, so you can change the tone of electric instruments and better match ribbon microphones. Mic/line switching is automatic.

You can drive the DPS II's mic preamp as high as +20 dB without clipping, resulting in a dynamic range of 120 dB. Six-stage LED meters on the front panel monitor input levels. Output limiting prevents overshoots and normalizes levels before digital clipping occurs. An insert loop on each channel allows for external processing and provides direct access to the DPS II's A/D converter.

Digital audio ports include coaxial or optical S/PDIF and ADAT Lightpipe, and the DPS II syncs to ADAT or external word clock. The digital and analog outputs, which have independent gain controls, can be used simultaneously. ART (Applied Research and Technology); tel. (585) 436-2720; e-mail cserve@artproaudio.com; Web www.artproaudio.com.

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THE NEXT GENERATION OF INSPIRATION

We probably could have rested on our laurels and just done a minor repackaging of the incredibly successful Motif Music Production Synthesizers.

Instead we started from scratch developing the core of our newest synth from the ground up. The heart of the Motif ES is a brand new tone generator chip featuring 128 notes of polyphony, new filter algorithms and massive DSP power. To compliment all this sonic power, the ES has the largest and most musical wave ROM ever featured in a workstation keyboard. New features like Phrase Factory™ with over 1700 arpeggios, Mega Voice technology and Real Time Loop Remix makes it easier than ever to create great tracks. Its advanced Integrated Sampling Sequencer lets you add audio tracks into your songs. The latest in digital technologies including support for 512 MB of DIMM Sample RAM, USB storage hosting and 2nd generation mLAN computer connectivity guarantee future expandability. We added bigger and better knobs, sliders and transport controls, even a ribbon controller. In fact, ES might stand for Every Suggestion we ever heard for improving Motif.

And when we were done developing all this cool cutting edge technology there was nothing left to do, but give this brand new beast a name. Try as hard as we could, there was no better name for the most powerful synth workstation on the planet than Motif.

- **E**xpanded **S**ystem – 128 Notes Polyphony, 175MB* ROM, 8 dual insert effects, 16 three band part EQs, two system effects plus master effects
- **E**mulative **S**ounds – Mega Voice technology and new triple strike piano
- **E**xceptional **S**ampling – Up to 512MB sample RAM using DIMMs
- **E**xpressive **S**ynthesis – New synth engine with enhanced filters and envelopes
- **E**xtensive **S**equencing – 226,000 note sequencer with pattern and song modes, includes Phrase Factory with over 1700 arpeggios and Real Time Loop Remix
- **E**fficient **S**torage – USB hosting and SmartMedia™ storage
- **E**xpansion **S**lots – New affordable mLAN option and 3 PLG slots
- **E**xtended **S**uppert – Supports Mackie and Logic control protocols for integrating with software DAWs

* when converted to 16 bit linear format

YAMAHA

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▼ STUDIO ELECTRONICS MODMAX

Following in the footsteps of only a few other synth manufacturers, Studio Electronics has entered the stompbox arena with the Modmax Filter ($359), Modmax Phasor ($359), and Modmax Ringmod ($379) pedals. All three units are based on discrete analog electronics and provide a wide-range line-level input that accommodates electric guitars and other instruments. Built using classic analog circuits, Modmax pedals provide modulation capabilities with invertible polarity and a type of signal distortion called Effect Soak.

The Modmax Filter provides switchable lowpass, highpass, and bandpass modes as well as continuously variable resonance. You can select whether the Phasor produces 2-, 4-, or 6-stage phase shift, and whether the Ringmod pedal generates triangle, sawtooth, or square carrier waveforms. All three pedals offer a 2-stage envelope follower and a voltage-controlled exponential LFO with triangle, square, or sample-and-hold waveforms.

For real-time control capabilities, each Modmax pedal provides 13 knobs, 6 slide switches, indicator LEDs, and a footswitch. Each unit also has an unbalanced ¼-inch input, unbalanced ¼-inch output, and a 9 VDC power connection. Studio Electronics; tel. (818) 776-8104; e-mail analogia@studioelectronics.com; Web www.studioelectronics.com.

▲ KRK SYSTEMS ST SERIES

KRK Systems has begun shipping its passive project-studio monitors, the ST8 ($249.99) and ST6 ($199.99). The ST8 features an 8-inch aluminum woofer and a 1-inch silk tweeter. The woofer's cone is made of double-layer anodized aluminum, resulting in low distortion characteristics. The shielded cabinet's 0.875-inch construction is designed to control sound reflection and standing waves inside the monitor, and its dual ports ensure an extended bass response. KRK says that the ST8's frequency response is 52 Hz to 20 kHz (±2 dB), and that its maximum SPL is 109 dB at 1 meter. The ST8's maximum power handling is rated at 120W, and each 15.25-inch-high cabinet weighs 26 pounds.

The smaller ST6 features virtually identical construction, but with a 6-inch low-frequency driver and a cabinet that's 13 inches high. The ST6's stated frequency response is 62 Hz to 20 kHz (±2 dB), and its maximum SPL is 107 dB at 1 meter. The ST6 can handle a maximum of 100W and weighs 21 pounds. KRK Systems; tel. (805) 584-5244; Web www.krksys.com.

▼ PRESONUS EUREKA

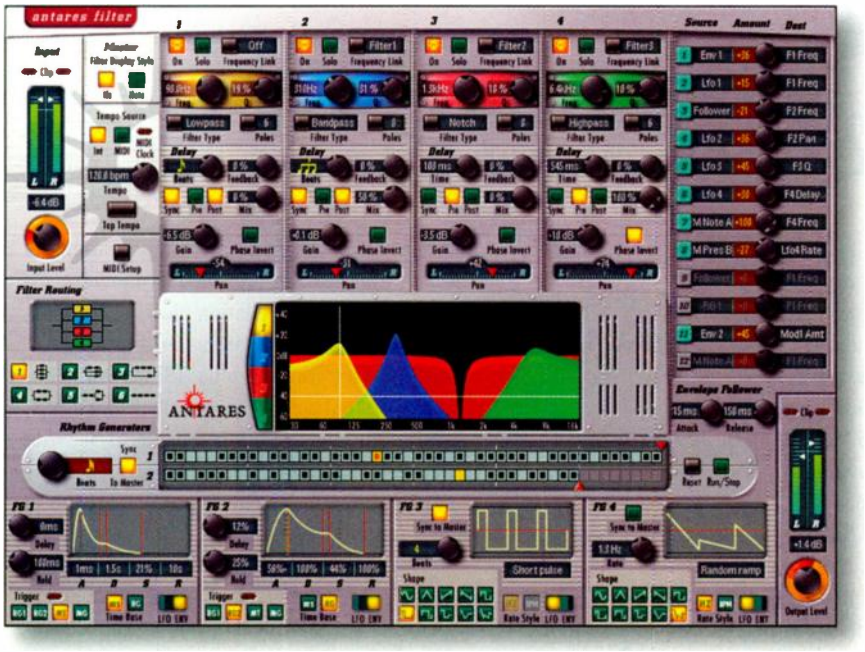
The newest Class A mic preamp from PreSonus is the single-rackspace Eureka ($699.95), a channel strip with variable impedance and simulated tube saturation. The Eureka's compressor has controls for variable threshold, attack, release, and gain makeup. The sidechain's highpass filter is well suited for de-essing and other frequency-dependent compression tasks. The 3-band parametric EQ has overlapping bands, and you can swap the order of the compression and EQ stages in the signal path.

The Eureka has separate inputs for mic-, line-, and instrument-level signals, and you can use its XLR and TRS outputs at the same time. An optional 24-bit, 96 kHz AES/EBU or S/PDIF output card ($299.95) is also available. The Eureka also features balanced send and return jacks, phantom power, adjustable gain-reduction or output metering, and a soft-knee compression mode. PreSonus Audio Electronics; tel. (800) 750-0323 or (225) 216-7887; e-mail presonus@presonus.com; Web www.presonus.com. ●

World Radio History

Introducing Antares Filter

QUAD RHYTHMIC MULTIMODE FILTERS



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>> Four warm, analog-sounding **stereo** multimode filters
>> Lowpass, highpass, bandpass and notch modes
>> Variable slope: 12dB/oct – 48dB/oct
>> Four independent delay sections
>> Multiple filter routing options
>> Four Envelope Generators and four multi-shape LFOs
>> Envelope Follower
>> Two Rhythm Generators
>> Powerful Modulation Matrix
>> Extensive MIDI control
>> Every time-based parameter syncable to internal master tempo or MIDI Clock
>> Tracks (or entire mixes) that pulse with life and character

Think of it as the audio equivalent of a brilliant surgeon — who's a **really** good dancer.

Antares's new Filter plug-in gives you everything you need to shape your tracks with surgical precision or animate them with an almost limitless variety of tempo-synced rhythmic effects.

A DANCING STURGEON?

SONIC SURGERY

At the core of Filter are four stereo multimode filters that provide all the warmth and smoothness you'd expect from classic analog filters. With low-pass, highpass, bandpass and notch modes, variable cutoff slope, four independent delay sections, and a variety of filter routing options, you'll have the power to create dynamic filter effects that range from extremely subtle to just plain extreme.

CONTROL FREQ

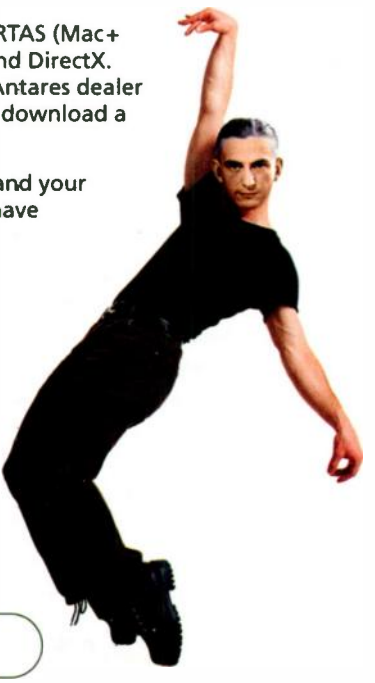
Since filters sound the coolest when they're whizzing around, we've given Filter a modulation section that would make many a full-blown synthesizer jealous. Pretty much everything that matters can be modulated. Control sources include four multi-shape LFOs, four Envelope Generators with delay and hold times, two Rhythm Generators, an envelope follower and a slew of MIDI controllers. All routed through a Mod Matrix with more than enough patches to get yourself into serious trouble.

FEETS, GIT MOVIN'

To really get you dancing, Filter includes two drum-machine style Rhythm Generators for loop-based grooves or complex polyrhytnms. And to make sure everybody stays in step, every time-based parameter—from tempos, to delay times to envelope rates—can be locked to Filter's internal master tempo or your host's MIDI clock.

Filter will be available for RTAS (Mac+PC), VST (Mac+PC), MAS and DirectX. Check it out at your local Antares dealer or drop by our web site to download a fully functional demo.

Then get out your scalpel and your tap shoes and prepare to have some serious fun.



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World Radio History

TECH PAGE

By Scott Wilkinson

2 WILL GET YOU 5.1

Dolby elicits multichannel sound from two speakers.

In EM's March 2001 "Tech Page," I discussed a technology called Dolby Headphone, which convincingly simulates 5.1-channel surround sound in conventional stereo headphones. Now, the company is applying the same idea to audio systems with two speakers. Dubbed Dolby Virtual Speaker, the system accepts a 5.1-channel input and creates the illusion of having five speakers around the listening position.

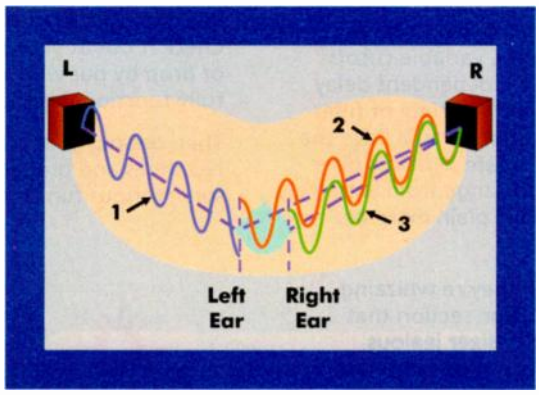
Like Dolby Headphone, Dolby Virtual Speaker uses head-related transfer functions (HRTFs) derived from acoustic studies with actual five-speaker setups to re-create the sonic signature of each speaker, which depends in part on its location with respect to the listener and within the room. The Dolby HRTFs take into account both direct and reflected sound, and they allow the virtual speakers to be placed with pinpoint accuracy at 0°, ±30°, and ±105° at a reasonable distance from the listener. By contrast, most other surround-simulation systems use much simpler HRTFs based on the direct sound only, which create only a general sense of envelopment without precise speaker locations.

But Dolby Virtual Speaker must do even more, since the listener's ears are not isolated, as they are with headphones. To address this problem, the system uses a technique called *crosstalk cancellation:* sounds from the right speaker are also sent to the left speaker, filtered to mimic the response rolloff caused by the head partially blocking the higher frequencies, and delayed just enough to be out of phase with the right-speaker sounds at the listener's left ear (see **Fig. 1**). As a result, the left ear doesn't hear sounds from the right speaker, and vice versa. Of course, using two speakers instead of headphones requires the listener's head to be in the sweet spot, equidistant from the speakers, for the simulation to be effective. However, the Dolby algorithms allow much more latitude in the listener's position along the centerline than other systems, thanks to the fact that the complex HRTFs allow lower-order crosstalk-cancellation filters to be used, which reduces audible phase artifacts.

All this takes some serious DSP power to accomplish in real time. While most surround-simulation schemes assume there will be little processing bandwidth available (constraining them to using simple HRTFs), Dolby looked at dedicating lots of processing to the system. For example, the acoustic path from each virtual speaker to each ear is simulated by a 7,000-tap, finite impulse-response (FIR) filter. That many large filters would normally require excessive processing power and introduce pronounced latency, but Dolby's convolution algorithms and the decreasing cost of DSP bandwidth eliminate these problems.

The Dolby Virtual Speaker algorithms have been implemented by all major IC manufacturers, including Analog Devices, Motorola, Texas Instruments, Cirrus Logic, and Sanyo. In addition, the algorithms can run as software on a PC with an Intel Pentium II or III or an AMD K6-II CPU running at a clock speed of at least 400 MHz. The specific DSP requirements vary from platform to platform, but in general, Dolby Virtual Speaker requires about 20 MIPS (million instructions per second) and 32 to 64 KB of coefficient storage to operate in real time.

The most obvious musical application is to use Dolby Virtual Speaker with computer audio systems, which would allow composers in cramped quarters to monitor multichannel mixes without having to set up an actual 5.1 system. In the consumer-electronics realm, Denon has announced it will include Dolby Virtual Speaker in some of its A/V receivers, including the new D-M71DVXP. Clearly, this technology has a lot of potential to bring the surround-sound experience to those who wouldn't otherwise be able to enjoy it.



COURTESY DOLBY LABS

FIG. 1: In crosstalk cancellation, sounds from the right speaker are also sent to the left speaker (1) and delayed just enough to be out of phase with the right-speaker sounds at the listener's left ear (2), which means that only the right ear hears the sounds from the right speaker (3).

World Radio History

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World Radio History

By Matt Gallagher

OK Recorder

The Silent Kids' debut album, *Tomorrow Waits* (Two Sheds Music, 2003), unleashes the Atlanta-based quartet's supercharged, psychedelic brand of indie pop-rock. The band consists of Jeff Holt (bass); Beth Kargel (keyboards and samples); Michael Oakley (vocals, guitars, keyboards, and samples); and Scott Rowe (drums). Holt, Oakley, and Rowe tracked the album in their homes and in the band's rehearsal space.

The Silent Kids' budget-minded approach carries the day.

Oakley recorded everything on his 8-track Tascam Portastudio 488 mkII cassette recorder. He used room acoustics to his advantage and relied on a minimal amount of gear, accurately capturing the Silent Kids' raw, garage-band aesthetics. "Recording magazines always say you have to have a nice preamp and outboard effects to get a good vocal sound," says Oakley. "I think you can do just fine with a couple of guitar pedals as long as you set it up correctly."

Production began in Oakley's house. "We set up the drums in a spare room and ran the guitar and bass through a 4-track and just listened on headphones," Oakley says. "We wanted to use all four inputs on my 8-track for the drums. We experimented with mic placement." Oakley uses three Shure SM57s, two SM58s, and a Sony ECM-MS907 stereo condenser mic.

"For a different sound, we'd record at our drummer's house—which has carpet, whereas mine has wood floors." Oakley used his laundry room as a reverb chamber. "It has a nice tile floor," he says. "Sometimes I'd put the guitar amp in a bathroom and mic it from far away. But most guitar tracks were done with an SM57 right on the speaker.

"After we did the drums, the bass player would lay down a scratch track, then I'd do the guitar and vocal tracks, and then he'd do the bass parts last," Oakley says. "I had only two tracks for guitars, so I had to have all of my effects ready and everything mapped out. I did most of that stuff live through trial and error. A lot of these textures had to go on part of a vocal track. I had to make sure I wasn't accidentally taping over a vocal or a guitar. We didn't bounce anything down."

The band augmented its basic power-trio sound with homemade samples and loops. "I have a Sony MiniDisc that I use for field recordings," Oakley says, "and I have [Sonic Foundry] Acid software. For 'Lost in the Petrified Forest,' I recorded a drum pattern with just one mic, threw it in Acid, looped it, slowed it down, and used that as the basis for the track. I used some oregano from our spice rack as a maraca, and recorded the guitars direct." At times, he triggered drum samples from a laptop. The band's thrift-shop keyboards include a late-1970s model Realistic Concertmate MG-1.

Tomorrow Waits was mixed and mastered at Atlanta's Glow in the Dark Studios. "I know you're not supposed to have the same guy mix and master [your album], but we did it anyway," Oakley says. "We had to do some creative equalizing because I had to track everything through a set of bass-heavy headphones.

"The engineer was amazed when I told him we didn't use any preamps," Oakley adds. "You don't need a ton of money to throw away to make something sound decent. If you're into recording, you can get caught up in buying new stuff all the time, because you can never have the perfect setup. I'm just trying not to fall into that trap." ●

For more information, contact Two Sheds Music; P.O. Box 5455, Atlanta, Georgia 31107-0455; e-mail info@2sheds.com; Web www.2sheds.com or www.silentkids.com.

KIM FITZGERALD

***Tomorrow Waits*/Silent Kids**

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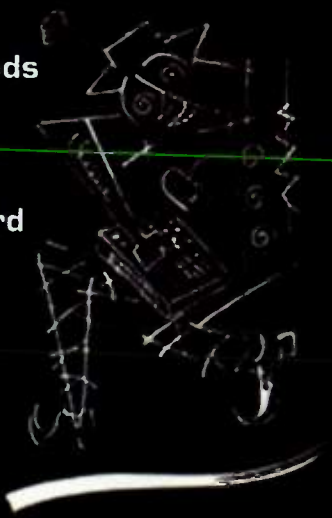

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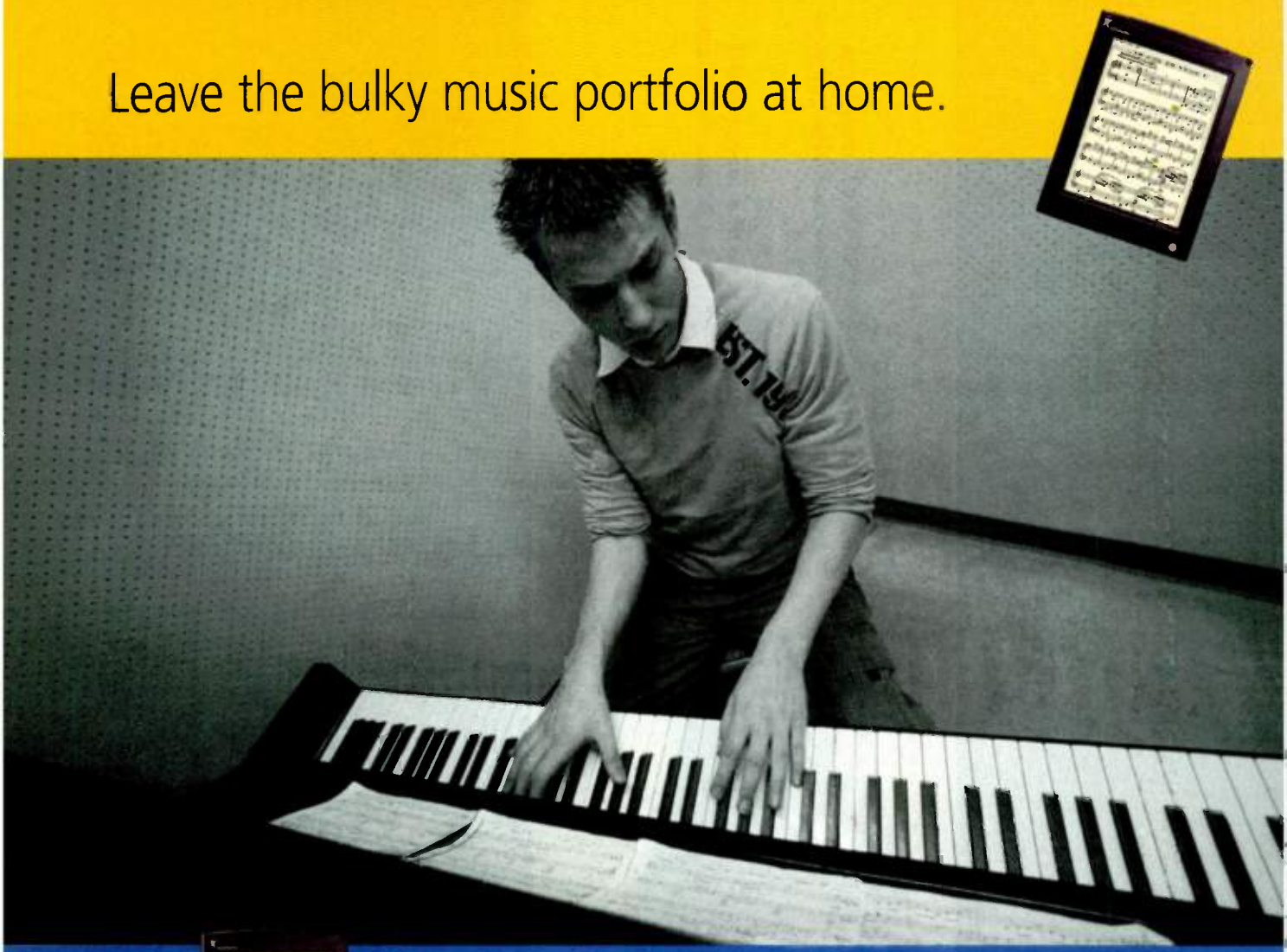

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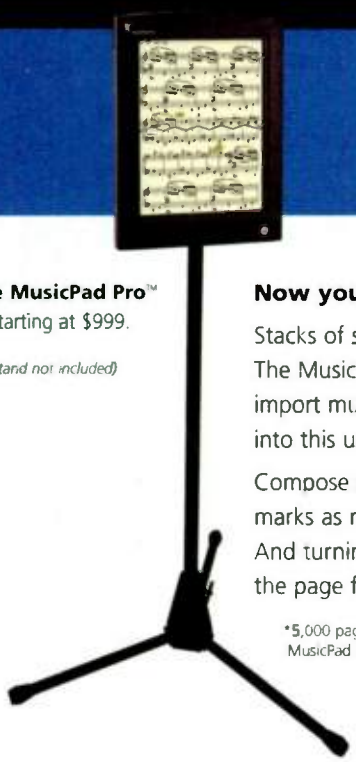

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World Radio History

Beats, Bass, & Bliss

Inside tips on using Spectrasonics' virtual instruments.

Spectrasonics' three virtual super-instruments, Atmosphere (Dream Synth Module), Stylus (Vinyl Groove Module), and Trilogy (Total Bass Module), are out on the street, and word has it that **EM** readers have been rollicking in beats, bass, and bliss ever since. Developed by sound guru and Los Angeles session ace Eric Persing, and brought to you by his company, Spectrasonics, these comprehensive virtual instruments have served to raise the bar for sample quality, realism, and musical expression. Each module includes more than 3 GB of sample data and hundreds of diverse factory patches. But as Persing points out, "Customization is really where it's at. These instruments are merely a starting point for you to get creative and make your own patches and sounds."

By Dave Hill Jr.

For this article, I'll assume that you already own and use at least one of these programs, and I'll focus on power tips, improved customization, and getting even more bang for your not-so-virtual buck. If you own all three instruments, perfect. Boot up your DAW host, connect your MIDI keyboard, and load up an instance of each module. Once you get through the main article, have a look at the three "Quick Tips" sidebars for even more inside information.

GENERALIZATIONS

Before I get into specific tricks about each instrument, here are a few general tips that apply to all of the Spectrasonics instruments.

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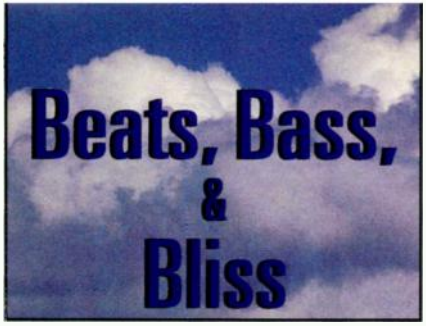

Update is great. Visit the Spectrasonics Web site (www.spectrasonics.net) on a regular basis for updates, news, and bonus tips and tricks. At the time of this writing, Eric Persing was gearing up to record video tutorials for Atmosphere and Trilogy. The Stylus video is already online and is definitely worth downloading. Spectrasonics currently supports nine different host formats for each of the three plug-ins and offers free premium-level tech support for registered owners to boot.

Join the community. There's a healthy and active Yahoo users group for Spectrasonics instruments. It's not officially sponsored by Spectrasonics, but the participants are very knowledgeable and many great tips and ideas are exchanged there. Persing and the Spectrasonics staff often participate in the discussions, too. When you visit, be sure to check out the Files section, which includes a lot of useful downloads that end-users have created, including full context-sensitive Layer directories, utilities for various host environments, and much more.

FIG. 1: Working in Logic 6.x (or 5.x), you can automate any parameter by choosing it from the drop-down menu (on the right).

Gimme room. If you own all three of these plug-ins, your hard drive might be squealing a bit at the sheer size (almost 10 GB!) of these instruments. To alleviate the pressure, you may want to consider transferring the goods to a second hard drive. (An iPod is a cool way to bring these instruments around in your pocket, as it will provide ample space for all three instruments.) Whatever secondary storage option you choose, Mac users will need to create an alias pointing to the DAT file in your Audio Units, MAS, RTAS, or VST folder (where your Spectrasonics plug-in resides).

FIG. 2: Atmosphere is one of the most versatile of the Spectrasonics virtual instruments and offers a vast range of sonic possibilities.

Dats da life. Windows users can also move their DAT files thanks to Spectrasonics' downloadable application SpectraMove (available to registered users). This utility will assist you with the tricky Windows Registry updating process.

Patch and play. Spend your first couple of hours with the plug-ins going through the factory-made patches. As you discover a particularly interesting pair of sounds, save the patch. Patches are only around 300 to 500 KB, and they retain both your chosen name and the name of the original patch. That way, you can recall your favorite layers from the instrument's sample library and minimize your sound-design time.

Save me. Saving (and carefully naming) your patches is the key to personalizing your patch library. By creating subfolders (the manual calls this a "favorites list"), you can better categorize your sounds according to type. That will help you to zero in more quickly on the sound you're after. I typically make categories (folders) called "pads," "leads," and "strange," but you might also add "percussive," "filtered," "sound-fx," or anything else you can dream up.

Reset. Control- (or Command-) clicking over any knob resets its value. That can be especially helpful when detuning Atmosphere or Trilogy layers. Alternatively, you can reset a patch you're unhappy with by using the Up and Down Scroll Arrows to reload the original version.

Automate. Lots of subtle expression and mixing possibilities are available, because all the plug-in platforms of the three instruments support MIDI-controller automation of the onscreen faders and knobs. Additionally, the latest Spectrasonics Audio Units update enables Logic 5 or 6 users to automate each parameter in the three modules directly or using the Logic Control surface (see **Fig. 1**). Audio Units is Apple's new OS X effects and instrument plug-in format.

Easy as A and B. When auditioning Trilogy or Atmosphere patches, take time to mute A and then B to listen to each layer on its own. That will help you learn what's in the core library of layers, since you can quickly mix and match any of the layer elements. You can create more than a million combinations per instrument using this common method. Pay especially close attention to Trilogy's B layers, which are chock-full of secondary bass-guitar noises such as string squeaks, rattles, and the all-important string release (the good kind). See the section on Trilogy in this article for more on this topic.

The missing Link. Beware when editing layers when the Link button is on (Atmosphere and Trilogy only). That forces A and B to accept all parameter changes. Link can, however, be very handy; for example, it can be especially useful when you want to quickly adjust attack, start, and release times to rapidly change the sound from a pad to a percussive sound or vice versa.

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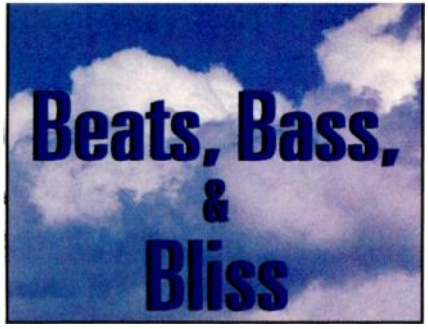

BEAT GARDEN

Offering more than 1,000 included loops, Stylus is more loop centered than its Spectrasonics cousins Atmosphere and Trilogy. It also allows you to load only one patch at a time. You can, however, take advantage of the thousands of one-shots that come with Stylus by loading additional instances of the plug-in for extra hits, fills, and layering support. For instance, you can create an incredibly flexible drum machine using one Stylus with a Kicks patch, one with a Snares & Toms, and one with a Hi-Hat menu.

You can load additional Stylus claps, snaps, effects, percussion, and more with relatively low CPU drain. These one-shots also work quite well when integrated with Stylus's loops and its mighty Zone Edit feature, which can act as a live, automatable, loop-tweaking tool. Here's how to get this done:

Load an instance of Stylus on track 1 of your DAW host. Open the Groove Control Stylus Breakbeat MIDI Files folder and locate the file called 120-Bosso Club a (you'll see the extension ".mid" if you have See Extensions enabled). Drag this MIDI file to the track corresponding with Stylus. Next load the patch called 120-Bosso Club a GC, which you'll find in the Breakbeat Groove Control/120–121 bpm folder.

Set playback to a four-bar loop and press Play. You should hear a cool Latin-rock-style brush groove. Click once on the Zone Edit button, which will glow blue. While the loop is playing, repeatedly move the Pan slider first right and then left. Let go every once in a while and watch the slider snap back into position. When the loop repeats, you will see the slider move automatically. Voilà! Miniautomation. Though this pseudo-automation technique will be limited to the length of the pattern (in this case, four bars), it is still a powerful trick.

Just for fun, grab and move the Fine and Coarse vertical pitch sliders in the same manner. Remember to let go occasionally. By now your beat should be percolating with panning and tuning changes. You can also use this technique with filter type, cutoff, resonance, Velocity, level, ADSR, and filter- and pan-modulation controls.

Another approach to using Zone Edit is to stop playback and edit individual Groove Control slices. For this example, load a fresh Groove Control loop and import the corresponding MIDI file into your sequencer. You will notice that each slice of the loop will be mapped across your keyboard but will vary in appearance depending on how many slices the loop contains.

FIG. 3: By increasing the sample's Start offset knob (in the lower-right corner of the Amp Env settings area), you can begin a sample's playback at a later point in the waveform's development.

Let's say that you would like to help anchor the groove by raising the volume of the kick drum occurring on the downbeat of measure 1 and measure 3. To do this, stop your sequencer and locate the first kick drum in the loop by auditioning your lowest keyboard keys. Once you hear the kick drum fire, activate Zone Edit and increase the Level slider (drag it to the right).

Now lower the Coarse pitch by a couple of semitones to add a little low end. Next, locate the slice firing on the downbeat of measure 3. Repeat the steps from above, then turn up the Level and lower the Coarse tuning by two semitones as well. If you have trouble finding a note you are looking for, click in your sequencer's Step Edit or Score window to determine which MIDI note corresponds to the sound you're after.

When you play back your groove, you should hear a lower, louder downbeat in measures 1 and 3. Using this technique, it would be easy to replace a snare or kick drum by grabbing each slice and turning its level all the way off (to the leftmost position). As an experiment, stop playback again and

TRILOGY QUICK TIPS

Creating unusual patch combinations within Trilogy is the first step toward taming the massive Trilogy core library and customizing your own sounds. Here are a few ideas.

Mix an acoustic bass on Layer A and an electric-bass release noise on layer B, then adjust the volumes for each layer.

Mix two of the exact same waveform patches. Detune one layer by a few cents using the fine-tuning knob in order to get a fatter tone. Or use Coarse tuning to create layers that are separated by a fixed interval. Perfect fourths, fifths, and octaves are especially nice.

Load the low end of a Taurus pedal in Layer A and a Martin acoustic-bass release noise on Layer B. You may need to lower the synth's amplitude-envelope release value to eliminate any tail in the synth sample.

Use an upright- or electric-bass sample as an "attack helper" (transient) for a bass synth on Layer A and a synth bass on Layer B. Lower both the sustain and the release for Layer A.

Combine a Juno 60 suboscillator with an ARP Odyssey on the top. Though the ARP Odyssey has a lot of "pointy" character, it can lack bass-worthy depth.

To give a smooth fretless bass more character and low-end support, mix it with a Minimoog on Layer B.

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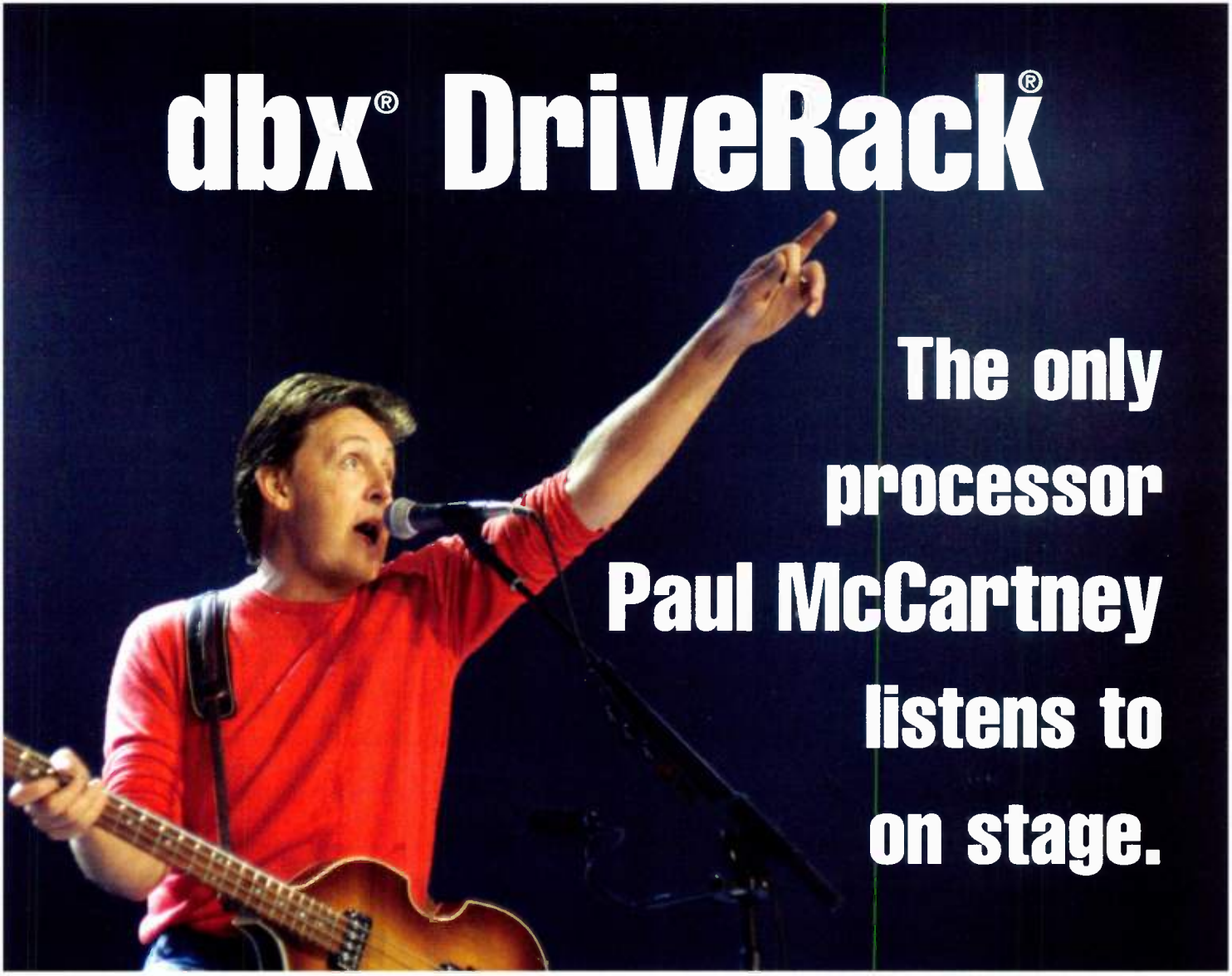

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lower the volume of select slices one at a time at random intervals. The pattern will now sound more complex dynamically.

For one last trick, select a few hi-hat sounds (say G♯1, A1, and B1) and activate a highpass filter for each one. Set the cutoff to around 5,000 Hz and the resonance to around 93. (Note: I am referring to the individual Filter, not the Master Filter section.) When the groove plays, you will hear syncopated chirpy highs.

PERCUSSION SECTION

To create the illusion of a percussionist improvising on the spot, load a Groove Control Perc Loop and its corresponding MIDI file, then make sure your Zone Edit is off. Turn on the individual HPF (highpass filter), and lower the cutoff to around 20 Hz. Now turn the First Modulation Source to Random and turn the Filter Modulation Depth knob all the way negative (or positive—it's up to you). When you play the loop, it will sound as if the conga player is jamming in real time. The modulation amount will determine whether the random accenting is subtle or dramatic—less will sound more realistic.

For a more complete percussion section, add three or four percussion loops (one cabasa, one bongo, and one cowbell) and repeat the steps for each instance. Results will vary because of the random factor, but you'll often produce hypnotic and strangely human-sounding material.

BASS IS THE PLACE

Trilogy unites the three kingdoms of low end: acoustic, electric, and synth bass. Its core library contains nearly every sound made by a bass guitar, double bass, or synth bass. You'll find DI and miked recordings as well as finger squeaks, rattles, buzzes, harmonics, slides, and note (string) releases. The possible combinations can make for some very unique sounds. Persing explains, "I didn't realize how important the release [of the finger off of the string] of the bass was. You can add that release to a synthesizer, say a Moog Taurus or SH-101, and create the illusion that the bass sound was played with a string."

To do this, open an acoustic-bass patch such as Martin Acoustic Bass Guitar Full Range, then replace Layer A with a synth-bass waveform (such as one of the Minimoogs). You will need to adjust the volume of the release noise on Layer B to suit your taste. Notice also how the Velocity of your keystroke changes the sound of the release—the harder you hit it, the more rattle you get.

All of the Electric Basses in Trilogy were sampled through a direct box. Though that's great for getting a punchy and clean "studio"-type tone, you'll find that if you run Trilogy's Electrics through an amp, you can achieve a whole new range of authentic rock tones that often fit in a track even better. IK Multimedia's Amplitube works particularly well with Trilogy, as do Amp Farm from Line 6 and Nigel from the Mackie UAD-1 card. Better yet, try sending Trilogy out to a real bass amp and miking it up!

GOT LIVE

Trilogy is easily the most performance-oriented of the three Spectrasonics instruments. To take full advantage of the True Staccato patches, you will need a 76- or 88-key MIDI keyboard and a fair amount of practice. In Trilogy, you can dynamically affect your bass sound in several ways. For example, playing louder or softer triggers up to 12 different samples per key.

Also, if you place your hands three octaves apart and load any of the True Staccato patches, you will find sustaining bass samples (from B♭1 to A4) for your left hand to play, while your right hand can trigger staccato bass tones (from B♭4 on up). That allows you to eliminate the uninspired repeated-note "machine-gun" sound that often occurs when repeating the same sample on a single key and better simulate what a real bass player might play. Note that

ATMOSPHERE QUICK TIPS

To apply filter sweeps manually, set the Filter Modulation control source to your mod wheel and increase the modulation depth. Then move the wheel. Also try reversing the polarity by clicking on the LED to invert the way the modulation is applied—this works for Trilogy, too.

Because LFOs 1 and 2 are different for Layers A and B, and LFOs 3 and 4 are universal for the plug-in, keep one layer stable and one moving by using LFO 1 or 2. To create complementary motion, set a modulation source to LFO 3 and 4 for both layers, and then reverse the polarity for one of the layers.

Create gradual motion in pads by assigning LFOs as the source for Filter and Amp modulation. Use a depth between 10 and 20 and a rate around 4 Hz. You will also need to increase the Filter and Amp modulation depth.

To make "chopperlike" stuttering sounds, max out the LFO's rate and depth. Then choose that LFO as the source for amplitude or pan modulation. For softer "blades," back off on the depth.

For smoother layer blending, assign Layers A and B to opposite filters. For instance, if you apply an HPF to Layer A, try using one of the lowpass filters (LP1, LP2, or LP3) on Layer B. Keep the resonance at about 9 o'clock, and then "sweep" the cutoff until you find the sweet spot. Increase resonance to taste.

The Key knob (filter-keyboard tracking amount) can help you brighten up darker or muted-sounding patches that are in the higher register of the keyboard.

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each True Staccato patch also features additional bass slides and effects samples in the lowest register of the keyboard beginning with B♭0 (A♯0) and below.

NOT JUST FOR BASS

One surprise is that, although Spectrasonics does not promote it as such, Trilogy is a very capable Poly and Lead synth. That is because of the included raw waveforms from Moogs, ARPs, and Oberheims that you can program to create very fat analog pads and lead sounds.

To start experimenting with this idea, turn off Solo Mode and begin playing in higher ranges; also try playing chords. When you pan different multi-oscillator layers from different brands of synths, you'll get a rich combination that goes far beyond the idea of only a bass tone.

Be aware that for leads, not all the vintage synths were multisampled into their highest ranges, so you may experience some aliasing on really high notes (the samples are being stretched beyond their intended ranges). However, this can add a nice grit effect that you may find useful.

BLISS IN THE BOX

With more than a thousand possible synthesizer layers, Atmosphere is capable of 1 million possible synthesizer combinations (see **Fig. 2**). As if that weren't enough, each layer can be filtered, modulated, automated, and reinvented over and over again. Get to know these layers by studying Persing's patch programming and layer combinations. To see which layers make up a given patch before you load it, use the Layer display to scroll though the presets. For instance, if you go to Ambient/Bell Harmonics/Shivering Timbers, you will see that there are two layers—Steel Morphing and Outglassed. If you look at the very next patch, Castilia (directly below Shivering Timbers), you will see only a single layer named Castilia and a second empty layer. These single-layer patches give you room to add another sound.

When making your own sounds, start out by combining sounds in similar categories. For example, try pairing two Belltones, two Pads, or two Noises, and then get more adventurous as you get more comfortable with the library. Here are a few combinations that inspired me.

In Layer A, choose Pads/Airy Pads/Big and Slow Air/Big and Slow Air. For Layer B, load Pads/Airy Pads/Air Glass/Green Glass. EM WEB CLIPS The file Glassy_Eye.mp3, available at the **EM** Web site, uses this pad.

For a slightly warmer, more organic-sounding pad, try changing Layer B to Pads/Glassy Pads/PPG Warm Glass Pad/PPG Warm Glass Pad. You may also want to increase Layer B's amplitude-envelope's attack because this layer's default is higher than Layer A's. In this instance, I found that I wanted to hear the Big and Slow Air layer first. You should also lower the PPG in

Layer B by an octave (to –12) using the Coarse tuning control. Note that other common pad intervals, such as a fifth below (–7) or an octave above (+12), sound excellent as well. You can hear this pad online in the MP3 files Warm_Glass and Warm_Glass_Low.

Now let's get an idea of what happens when you mix two dissimilar sounds by combining a Noise layer with a Belltone. For Layer A, select Noises/Morphing Noise/Epileptic Seizure/Epileptic Seizure; for Layer B Belltones/Plucked Airbell/Fairlight Ankluvox. Reduce the level and amplitude-envelope attack for Layer A. The resulting patch sounds like a science-fiction- or horror-movie melody tone. You can hear an example of this patch in the file Docking_Sequence.mp3.

To make this patch a little more practical, let's swap the Noise layer (Layer A) with Noises/Synth Noise/Prophet Noise/Prophet 5 X-Mod Noise. I like this one as is, but by increasing Layer B's cutoff frequency to about 5,000 Hz, you can quickly add an airy quality. If the breathy sound in Layer A is getting out of hand, try switching its filter to the highpass filter. That way you will still hear the airy hiss but will leave yourself some room in the lower register (for other instruments). Check out Twilight_Sequence.mp3 to hear this patch.

By applying filter and amplitude modulation, you can add flutterlike motion to your sound. For Layer A, increase the Filter Envelope Depth to about 3 o'clock and the Amp Mod level to high noon. Next, map both the Filter Mod and Amp Mod sources to Wheel/LFO 1. I chose LFO 1 since LFOs 1 and 2 are layer specific and better for flutter or vibrato-style effects because they restart the oscillation phase every time a Note On message is sent. Now as you play and roll your mod wheel, you will hear a vibrato effect. Adjust LFO 1's rate to match the tempo (or a subdivision of the rhythm) of your song.

For some more experimental combinations, try mixing a Vinyl layer such as Vinyl/Romeo Leslie/Romeo Leslie A in Layer A with a Noise layer like Noises/Percussive Noises/Secondary Strike/Secondary Solar Noise. For this particular combination, play the middle of your keyboard to hear how the raw layers are working together; also listen to the file Where_For_Art.mp3 at the EM site.

To radically change the timbre of the patch, flip each layer's filter (assign Layer A to HPF and Layer B to LP2). You will hear vinyl crackle come to life that was previously suppressed by the filter. Too busy-sounding? If so, maximize Layer A's Amp Mod depth and set the control to Alternate, and every other note in the layer will be cut out. Check out Romeo_Splash.mp3 to hear the effect.

WHERE DO I BEGIN?

As some EM readers will know, the attack portion of a sound is critical in determining its character. Many of the layers Persing has sampled and created

STYLUS QUICK TIPS

When playing loops from Stylus's Groove Menus, you will have 61 different loops mapped to individual keys at the same tempo. By using Zone Edit, you can radically filter certain loops, which allows you to create a more interesting and cohesive palette of loops to mix together. To do this, play a key corresponding to a loop with a predominantly low frequency range. Then use one of Stylus's two LFOs to accentuate these lows even more. Next, use one of Stylus's highpass filters to eliminate the lows from a busy snare and hi-hat loop.

With Zone Edit on, increase the attack time of alternate loops in order to clean up the downbeat of the bar. Doing so will eliminate flamming or overemphasizing the first beat. Or you can lower the Envelope's sustain to force a secondary loop to get out of the way of a main loop. This "ducking and weaving" makes loop performances more musical and more fun to play.

To add more rhythmic possibilities to your Groove Menus, try pitching some loops up or down 12 semitones. A 12-semitone boost will force the loop to play at twice the Groove Menu's tempo (handy for fills), while 12 half steps below Groove Menu tempo will provide a cool half-time element.

Mac OS X users will find it helpful to place their Groove Control MIDI files folder on their Dock. To do that, drag the folder with both Perc and Breakbeat MIDI files to the right-hand side of the Dock (next to the Trash). You can then access the folder to drag-and-drop MIDI files into your host sequencer. A little-known OS X tip is that if you click and hold this folder in the Dock, a pop-up menu will open just the way it does in OS 9 and the Apple Menu!

Experiment with mixing and matching loops with Groove Control files. For a couple of cool combinations, try the MIDI file 114-Housebreak c.mid (found in Breakbeat MIDI Files/110–114/114-Housebreak C). Set the tempo to about 110 and load the Groove Control groove 100-Big J GC (found in Breakbeats Groove Control/100–104 BPM/100-Big J GC). To explore more grooves and different feels, press the patch Down Scroll Arrow. I found that 100_Bing Bang A GC sounds great, and after scrolling through another ten loops, I stumbled on 100-OBliged [sic] for another great groove. Be sure to try others until you find something that suits your taste. In general, using a straight and simple Groove Control MIDI beat is best for driving the more complex loops.

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are long, slowly evolving sounds. If you increase a sample's Start offset point, you can add urgency, attack, and other leadlike qualities to your sound (see **Fig. 3**). This is a great trick for rock and lead playing. Let's try a specific example by playing with the AMP ENV (Amplitude Envelope) section of your Atmosphere instrument. We will look at an extreme example for better understanding.

Load the patch called Mysterious Movement, found in the patch group Evolving Moods. Notice the gradual attack and bubbling synths. Now reduce the attack times to zero for both layers (The Motion of Sea Tides and Vorgan Swell). Next, increase the start time for both layers. The new sound has a more definitive attack and immediacy than the original.

MORPHEUS

Another tip for synth or bass blending that also works with Trilogy is to crossfade or morph one patch into another by using the Amplitude Modulation parameter. To do this, load two dissimilar layers—for example, a pad and a lead (found in the Solo layers). Next, activate the Link button (located between the A and B buttons). Go to the Modulation setting and crank the Amp knob all the way up. Then set Wheel as your Amp Mod source by opening the Source Selector pop-up menu. Now deactivate the Link button (to edit the layers independently) and click on the small Polarity LED light below the Amp knob. It should turn from blue (meaning positive) to yellow (negative). Check the other layer to make sure its light is blue.

As you play your patch and slowly move your mod wheel back and forth, you will hear Atmosphere gradually morph between the two layers. You may need to adjust each layer's filter and amplitude settings for optimal blend and check that no other modulation control is mapped to Wheel. Once you do this a couple of times, you will begin to see the possibilities that open up when you swap the polarity of other modulation values.

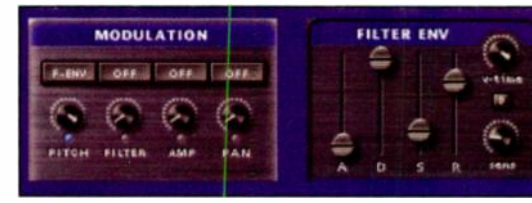

FIG. 4: In this figure, the F-ENV (Filter Envelope) is set to control the layer's Pitch Modulation control (left). The Attack time of the envelope (right) will control the pitch's slide rate, and the Sustain will control the actual sustaining pitch.

PITCH AND PATCH

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pitch fall-offs and glissandos by mapping the Filter Envelope to the Pitch Modulation control. For the moment, mute Layer B. Now turn the Pitch Modulation knob to its full position and set the modulation source to Filter Envelope (see **Fig. 4**). Turn the Pitch Modulation to +48 (full position), and then set the modulation source to Filter Envelope.

Make sure that the other three modulation settings are in the Off position in order to clearly hear the results. The Filter Envelope now controls how your layer's pitch change will be affected. Sustain will control the pitch itself, while Attack and Decay will control the length of time it takes to get to that pitch initially. Release determines how long the layer takes to descend back to the original pitch, and Velocity will change the slope of the Attack to Decay. Try reversing the Pitch Modulation's polarity LED to reverse the direction of the pitch.

ON YOUR OWN

Though I have touched on some creative ideas for working with each of the three Spectrasonics plug-ins, this article can serve only as the beginning. Most of the examples and ideas covered here can be expanded in many ways. Set aside some creative time to focus on getting to know each section of your plug-in(s) intimately and thoroughly; new ideas and inspiration will be yours when you do so. Spectrasonics has given you the raw (and the cooked) sample data and starter patches. Now make these instruments your own.

Former Seattle multitasker **Dave Hill Jr.** *is composing, drumming, and writing in New York City. Listen to his music at www.jettatura.com. His book is titled* Ableton Live Power! *(Muska & Lipman, 2003).*
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Plugging into EQ

By Nick Peck

We test seven EQ plug-ins to find their best uses and discover whether you really get what you pay for.

Whether it's used for cleaning up a problem track, enhancing an instrument sound, or smoothing out a master recording, a flexible and versatile equalizer is an indispensable part of any musician's toolbox. Although hardware EQs are still the preferred tool for a lot of engineers, producers, and musicians, a rapidly increasing number of them rely on EQ plug-ins. Given the power of today's computers, sometimes enhanced with DSP cards, that makes a lot of sense both technologically and financially.

For starters, you can make as many simultaneous instantiations of the same plug-in as your computer will allow. In a complex mix, that could be the equivalent of having a roomful of expensive analog devices. Automation is another huge advantage the digital realm provides; we take for granted the ability to automate virtually any parameter of any plug-in processor in a mix and to save complex setups for later recall, but only the very top-end digitally controlled analog systems can come close to that level of control.

As with hardware EQs, prices for EQ plug-ins vary widely. In this article, I'll take a look at whether you get what you pay for and try to ascertain whether some of the less expensive programs provide superior value. But whichever EQ plug-ins you buy—and you may want several of them—be sure you choose them for the right reasons.

THE RIGHT TOOL FOR THE JOB

As is so often the case with gear, the key with hardware or software equalizers is to find products that not only are affordable and sound good but are appropriate to your application. EQ can be used for corrective processing, such as rolling off low-frequency rumble; for tuning a control room; for mastering; or for creative processing, like making a drum sound unnaturally bright. This means that you probably should have more than one type of EQ in your bag of tricks, and you should not be afraid to use the various types in creative ways.

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Plugging into EQ

Equalizers that are used for tracking and mixing are generally referred to as *program* EQs, but it's a mistake to think that slapping that label on the EQ defines its sole purpose. For instance, let's say you are processing a track and want to slightly enhance its overall sound, as well as boosting or attenuating particular frequency bands. In that case, you might want an EQ that is designed to color the sound in a desirable way. But if you are trying to control a problem frequency without otherwise altering the timbre, you probably want a more transparent EQ that does not impose a sonic signature.

The same applies to *mastering* EQs. Most of the time, given a good mix to start with, you want to make very precise adjustments, and you don't want to color the overall mix. In that case, a clinical, precise, transparent EQ is probably the right choice. It will not sweeten the sound, but it can solve your problem. However, sometimes you are mastering a mix that could use some more "wow" factor—that extra sonic sweetening that makes it sound just right—and adding a bit of color is one way to accomplish that. In that case, you don't want a transparent EQ, and you might decide to master with an EQ that was designed for program use. There may be guidelines, but there are no hard-and-fast rules.

THE INSIDE STORY

Digital EQs work by applying complex mathematical processes (algorithms) to the incoming stream of numbers that represents a digital audio signal. One popular type of filtering algorithm is called *finite impulse response* (FIR). Some FIR filters are designed such that they do not smear the phase within the signal, which means that material with sharp transients, such as snare drums, can pass through the filters and still maintain the relative time positions of their complex series of frequencies. These filters are said to have a *linear phase response;* in other words, they eliminate phase distortion. In addition, they require a good deal of computer horsepower and RAM, and that means you'll get fewer instantiations on a given system. Note that not all FIR filters offer linear phase response, but the two FIR-based plug-ins we tested do.

FIG. 2: Bomb Factory's replica of the Pultec EQP-1A has the look and feel of the original down cold.

As I worked with both FIR-based plug-ins, I discovered a few drawbacks for use in multitrack applications: in addition to being CPU-intensive, FIR EQs generate significant latency as an inherent part of their design. The latency is enough to throw an equalized bass part completely out of time relative to the unequalized drum tracks. You can certainly compensate for that by using plug-ins like Digidesign's Time Adjuster to delay the unequalized tracks so that everything is late together, and some programs, such as Steinberg's Nuendo, can automatically make this adjustment. That helps tremendously at mixdown, but for overdubs, latency remains a problem. However, this style of plug-in is usually chosen for applications such as mastering, where the latency becomes irrelevant. Again, it's just a matter of choosing the right tool for each job.

Another primary digital filtering algorithm is known as *infinite impulse response* (IIR). IIR filters require less computation and exhibit less latency than FIR filters but have their own drawbacks. These filters feed some of the filter's output back into the input in a process known as *recursion.* Recycling some output data is a good substitute for using more of the incoming data, and many digital EQs use this approach. Unfortunately, the tradeoff is that IIR filters cause phase distortion, which can smear transients and cause problems with the stereo image. Until recently, most EQ plug-ins used IIR algorithms for efficiency's sake, but advances in computing horsepower are causing more FIR-based plug-ins to enter the market.

Instead of FIR- or IIR-based algorithms, one of the plug-ins in this group uses Fast Fourier Transform (FFT) algorithms, which analyze the signal and then use that information to set the filters. It exhibited the same kind of latency characteristics as the FIR plug-ins.

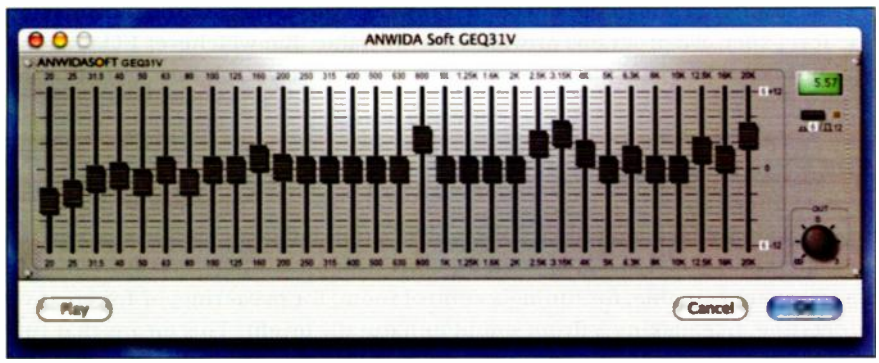

FIG. 1: Anwida Soft's GEQ31V emulates a ⅓-octave, 31-band analog graphic equalizer.

THINNING THE RANKS

One of the biggest challenges in creating this article was determining which products to test. My goal was to be as fair and impartial as possible while representing a good cross section of manufacturers and design approaches. I decided on a strict set of guidelines. First, to appeal to the greatest number of readers, all of the plug-ins had to run under Mac OS X and Windows or be offered in multiple

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Plugging into EQ

formats, such as TDM, VST, and AU. That eliminated McDSP's FilterBank, which has received high praise in the Pro Tools community but is only available for Pro Tools on the Mac.

Each plug-in had to be a commercially available product (not shareware or freeware), and it had to be shipping or in late beta as of this writing. That eliminated a few more programs such as the new plug-in line from Universal Audio. I further narrowed the field by allowing only one product per manufacturer. If more than one was available, I chose the newest product. That's why, for instance, we evaluated Waves' Linear Phase EQ rather than its well-established Renaissance EQ or classic Q10.

When the dust finally settled, I ended up with an interesting and varied collection of seven EQ plug-ins from famous and not-so-famous developers, offering products ranging from less than $70 up to $850. The list came down to Anwida Soft's GEQ31V, Bomb Factory's Pultec EQP-1A, Elemental Audio Systems' Firium, Focusrite's d2, INA-GRM's GRM Tools Equalize ST, Sony's Oxford OXF-R3, and Waves' Linear Phase EQ.

THE LISTENING TESTS

All of the listening tests were done at my studio, Perceptive Sound Design, in Mill Valley, California, by a panel of pro recording engineers and musicians (see the sidebar "The Panel"). The professionally designed space is acoustically treated and big enough to minimize volumetric frequency aberrations. The signal chain began with a Pro Tools HD system running Pro Tools 6.0.1 on a dual-processor 867 MHz Mac G4 under OS X 10.2.5 and through a Digidesign 192 I/O. The signal then went to the monitoring section of a Digidesign Control|24 and directly to a pair of Genelec 1031A monitors. VST-based plug-ins were auditioned from BIAS Peak via the Digi Core Audio driver and through the same signal chain.

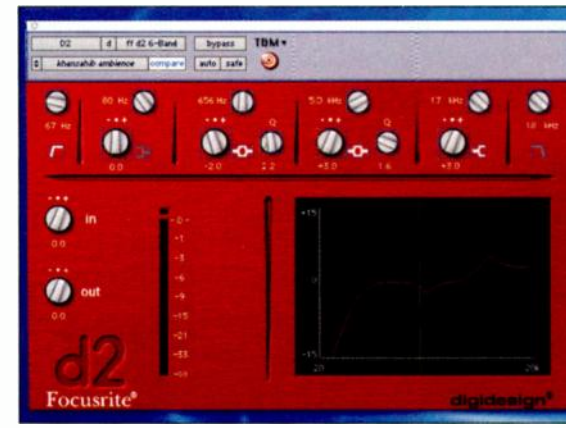

FIG. 4: IIR-based digital equalizers like Focusrite's d2 are efficient and widely used.

We listened to a wide range of source tracks—acoustic guitar, kick drum, snare drum, saxophone, female vocals, and full mixes—through each EQ, making notes and discussing the results as we went. To eliminate phase complications and to widen the listening area, all recordings were mono. Each panelist had hands-on experience, adjusting the knobs and sliders as the rest listened.

As with all aspects of music, taste in EQ is highly subjective. Some panelists clearly liked certain things more than others did. Overall, however, the panelists were in general agreement and expressed similar impressions. Here's what we found.

ANWIDA SOFT GEQ31V

Anwida Soft is an Italian company that has been working in digital audio for eight years. Its inexpensive ($69) GEQ31V graphic EQ is available in VST 2.0 format for the Mac and PC. The plug-in emulates a standard ⅓-octave, 31-band analog graphic equalizer, down to the realistic look and feel of its front panel (see Fig. 1). It supports up to 24-bit, 96 kHz mono or stereo audio and has a simple set of controls consisting of 31 boost-cut sliders, a button to select 6 or 12 dB operation, and an output-gain knob.

Unfortunately, this plug-in received low marks for its sound quality. The listening panel described it as "harsh, edgy, woofy, digital-sounding," and generally "not that musical." On the other hand, GEQ31V was designed to provide transparent, colorless, accurate processing, not to add character to the sound. Its 64-bit internal processing path is designed to create as distortion-free an output signal as possible. The panel noted that it sounded better in cut mode than in boost mode.

In addition, the interface was rather cumbersome to work with: you can grab and move only one band at a time, and there's no easy way to reset the bands to zero. We concluded that this plug-in would be strongest in the realm of corrective processing and room tuning. Keep in mind that fixed-bandwidth EQs typically sound different than parametric EQs, in part because of their different design philosophies. Despite its shortcomings, however, GEQ31V's simple interface and low price make it a viable choice as a back-to-basics plug-in for musicians on a budget who want a different flavor than their audio-editing software's stock EQ provides.

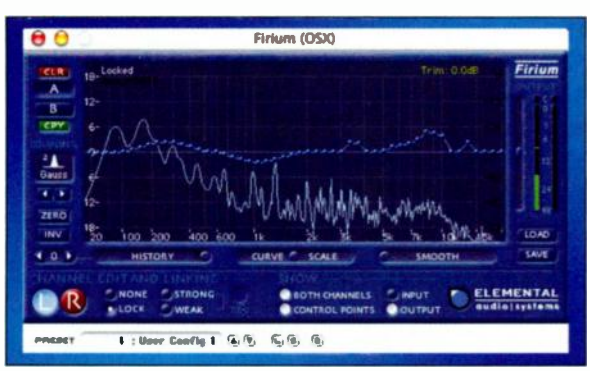

FIG. 3: Elemental Audio Systems' Firium has a user interface well suited to mastering applications.

BOMB FACTORY PULTEC EQP-1A

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Plugging into EQ

long out of production that now fetches thousands of dollars on the Internet. The EQP-1A is not meant to be clean or clinical; it has a sweet, thick, colored sound, capable of hyping the lows or the highs.

Bomb Factory's plug-in emulation of the EQP-1A (high-definition version $399; 48 kHz or lower $249) attempts to capture the sound, look, and quirks of the venerated hardware machine. The front-panel interface has been beautifully rendered, right down to the faceplate color and type fonts (see Fig. 2). As with the real unit, there has been no attempt here to make a clean, flexible, jack-of-all-trades processor. Instead, EQP-1A has a particular sound that is highly useful for vintage emulation.

EQP-1A has a rather unconventional system of controls. The low-frequency selection knob identifies a target frequency that the separate low-frequency boost and cut knobs work from. That's right, you can boost and cut the same low frequency at the same time. For the high end, a high-frequency selection and boost knob is provided along with a high-frequency bandwidth (Q) knob. A separate high-frequency attenuation knob has its own separate high-frequency selection knob. Confused? Once you start working with the various knobs, it makes some sense, but initially it's far from intuitive.

EQP-1A was fun and colorful in some applications, not as useful in others. Some panelists liked the sound more than others, but everyone agreed that it was warm with a huge low end. Some listeners liked the warmth that the high band applied to the signals, others found it dulling. Everyone was surprised that it sounded pretty good on full mixes of music, although it would not normally be anyone's first choice for that application. (According to Bomb Factory, the original Pultec EQ was actually designed for equalizing full program material for mastering and broadcast, and it's still used that way in some circles.) The opinion was unanimous that this EQ was highly musical and well suited to creating colorful tone shaping for a variety of instruments in rock and pop styles.

FIG. 5: GRM Tools Equalize ST from INA-GRM, part of the GRM Tools ST bundle, uses FFT-based algorithms.

ELEMENTAL AUDIO SYSTEMS FIRIUM

As you might have guessed from the name, the bargain-priced Firium ($99) is an FIR-based plug-in from newcomer Elemental Audio Systems. Firium is a linear-phase EQ with some novel features (see Fig. 3). Like GRM Tools Equalize ST, Firium displays a spectral analysis of the audio output. Superimposed over the depiction of the output is a line of 50 connected balls that represents Firium's EQ curve. You change the EQ by drawing a line on the screen. The spectral analysis of the audio updates to reflect the effect of the EQ on the signal.

Firium's FIR algorithms have a clean character that is suited to the subtleties of mastering. It is also able to significantly change the character of a snare drum, although it wouldn't necessarily be my first choice for that application.

Firium's user interface is clearly oriented toward stereo processing, and it

EQ Comparisons

Manufacturer	Name	Type	Formats	Price
Anwida Soft	GEQ31V	31-band ⅓-octave graphic	VST	$69
Bomb Factory	Pultec EQP-1A	4-band parametric hybrid	AudioSuite, MAS, RTAS, TDM	$399 (high definition); $249 (48 kHz or lower)
Elemental Audio Systems	Firium	linear phase stereo mastering	AU, VST	$99
Focusrite	d2	6-band parametric	AudioSuite, RTAS, TDM	$595 (bundled with d3)
INA-GRM	GRM Tools Equalize ST	31-band ⅓-octave graphic	AudioSuite, HTDM, RTAS, VST	$549 (bundled with 3 other plug-ins)
Sony	Oxford OXF-R3	7-band parametric	AudioSuite, RTAS, TC PowerCore, TDM	$850
Waves	Linear Phase EQ	linear phase 6-band parametric	AudioSuite, DX, MAS, RTAS, TDM, VST	part of Master's Bundle: $900 (native); $1,800 (TDM)

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The QUAKE sub-harmonic generator analyzes the source material's bass frequencies, then generates additional low frequencies an octave lower without muddying the sound. THUD provides an additional bass boost an octave higher than the original bass track to fill in and fatten the low end, while XPANSE intensifies the left-right stereo image to add improved separation, atmosphere and clarity.

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offers a variety of linking modes connecting left and right channel adjustments. The left and right spectral analysis and EQ curves are displayed in different colors, and you can switch rapidly between sides for precise adjustments. Handy sliders for scaling and smoothing the EQ curve are also a great touch.

Firium's purpose is mainly to produce colorless, phase-accurate mastering, and it exhibited some of the same sonic characteristics found in the other FIR-based mastering plug-in we tested. However, one panelist characterized it as having "muddy lows," while another described it as having a "cloudy low end and thin high end." The impression of a "thin" high end apparently reflects the fact that Firium did not enhance the highs, and that's fine, because it isn't supposed to do that. We were more concerned about the lows, because if this truly is a transparent EQ for mastering, the lows should not be muddy or cloudy.

The panelists found Firium to be more useful for subtle applications than for making extreme changes. Most of the listeners considered it to be a viable and useful product, and everyone loved the user interface. It's also the only plug-in in the roundup that currently supports Apple's Audio Units (AU) standard.

FIG. 6: Sony's Oxford OXF-R3 EQ has enough controls to allow for sophisticated sonic sculpting.

FOCUSRITE D2

Focusrite d2 ($595, bundled with the d3 compressor-limiter) is an EQ plug-in that has been around for several years and has seen wide distribution. The result of a collaboration between Focusrite and Digidesign, d2 is modeled visually and sonically on Focusrite's Red 2 hardware equalizer (see Fig. 4). The d2 plug-in is available for all flavors of Pro Tools: TDM, RTAS, and AudioSuite for Mac and PC.

This 6-band equalizer consists of highpass and lowpass, high-shelf and low-shelf, and high-mid and low-mid peaking filters. The EQ does not allow the filter types to be changed (for example, allowing the low band to be selectable as shelving or peaking), which means it's not quite as flexible as it could be. However, the Q setting is adjustable for the peaking filters, allowing curves from gentle slopes to sharp mountains. D2 also features individual or linked stereo input- and output-level adjustments as well as a nice diagram of the EQ curve.

To conserve precious CPU bandwidth, d2 offers three modes: 2-band, 4-band, and 6-band. Each mode takes progressively more DSP power. Stereo instantiations of d2 offer either separate left and right adjustments or a linked option that lets you adjust both channels from one set of controls. If you're a speed demon who prefers keyboard control to mousing around with virtual knobs, you can type all frequency values from the keyboard. For example, clicking on a filter and typing "4k" would set the filter to 4 kHz.

Focusrite d2 has been around long enough that no one really expected it to measure up to the new, hip, high-profile EQs with which we were comparing it. You can imagine our surprise when we consistently rated d2 near the top as a program EQ. Everyone agreed that it had a very clean, solid-state kind of sound. It had a good presence and was quite musical and full. It's a good sculpting tool for sounds and appropriate for a wide variety of applications. We also liked the user interface, which the panelists described as "uncluttered" and "fairly direct" (that is, intuitive). Perhaps this shows that newer is not always better, even in the digital realm.

INA-GRM GRM TOOLS EQUALIZE ST

The FFT-based Equalize ST plug-in is part of the GRM Tools ST (Spectral Transform) bundle ($549). It's a 31-band graphic equalizer with an interesting twist: it analyzes the frequency content of the source audio and shows the results in real time on the display behind the graphic faders (see Fig. 5). That lets you adjust the EQ visually, correcting

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Elemental Audio Systems
tel. (919) 462-3351; e-mail press@elementalaudio.com;
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problem areas in the frequency spectrum that you might not have noticed otherwise.

The user interfaces for GRM Tools plug-ins have always been oriented toward changing the timbre over time; a slider at the bottom of the screen lets you morph smoothly between different settings during audio playback. This approach is terrific for special effects and sound design but somewhat less useful for musical applications unless you are pasting takes together. I found Equalize ST to be great for generating wild, unexpected changes in the audio material. However, I noticed some strange warbling and a cold, metallic character in the upper frequencies.

The plug-in's user interface rated high among the panelists; everyone loved the flexibility and ability to easily automate cool EQ changes over time. The spectral-analysis display of the audio superimposed over the graphic EQ area was similarly impressive. Unfortunately, Equalize ST was not a favorite in terms of sound quality. The consensus was that the sound was a bit cold. In particular, Equalize ST's high end had a ringy metallic edge; in general, the sound did not flatter any of the source material we used. That said, the plug-in is popular with many people involved in techno and experimental electronic-music production, where this sort of sound could be just what you need.

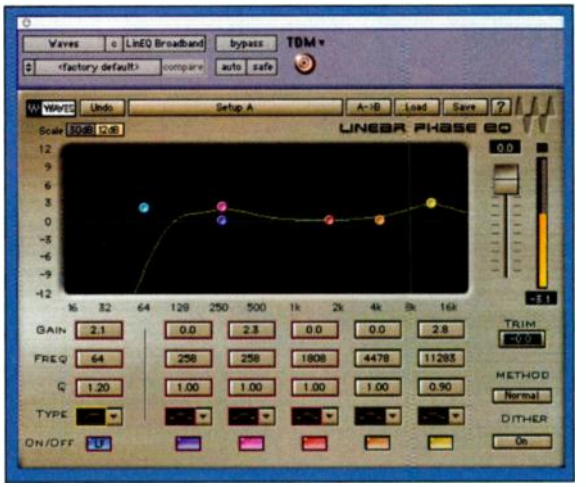

FIG. 7: If you've used Waves' Q10 or Renaissance EQ, you'll feel right at home with Linear Phase EQ.

The flexible interface lets you morph and animate EQ settings smoothly, and the plug-in provides power that I haven't seen in any other EQ. If your focus is on techno or experimental music, Equalize ST definitely offers a unique choice.

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SONY
OXFORD OXF-R3

The algorithms for Sony's OXF-R3 EQ plug-in ($850) are derived from the company's highly acclaimed Oxford digital mixing console. It has seven bands: highpass and lowpass filters and five parametric bands with variable Q, gain, and frequency. The low and high parametric bands can be peaking or shelving EQs. The plug-in can handle sample rates of up to 192 kHz.

Oxford OXF-R3 is clearly designed for serious professional use (see **Fig. 6**). The carefully chosen frequency bands and relatively fine-resolution Q and gain structure allow for subtle EQ adjustments. The plug-in offers four different EQ types, modeled after various industry-standard analog equalizers. Selecting among the different types alters the relationship of Q to gain, essentially changing the steepness of the Q factor depending on how much gain has been applied. A fifth EQ type, the GML option, is based on George Massenburg's GML 8200 EQ; it's available for an additional $350.

As soon as the panelists started working with Oxford OXF-R3, we knew that the engineers at Sony had indeed built a better digital mousetrap, proving that sonically superior results are achievable with a well designed plug-in on a Mac or PC system. One panelist called it "a good Swiss-army-knife mastering tool" and "probably the best tool of the bunch." Another called it "very pleasing" and "near our analog benchmark in character." Another liked the fact that "you could push the EQ to extreme gain changes and have it still be useful." Everyone agreed that setting up an EQ curve and then switching between EQ types to explore different sounds was immensely cool.

Oxford OXF-R3's user interface received mixed reviews. As in most mouse-based systems, the virtual knobs are difficult to manipulate. If a control surface is thrown in, however, OXF-R3 becomes quite easy to work with. Like Focusrite d2, the Oxford EQ has a number of configurations with different numbers of EQ bands to allow you to maximize DSP efficiency.

I recently mixed an album of classical Indian music by sarod maestro Ali Akbar Khan, using Oxford OXF-R3 as my sole

THE PANEL

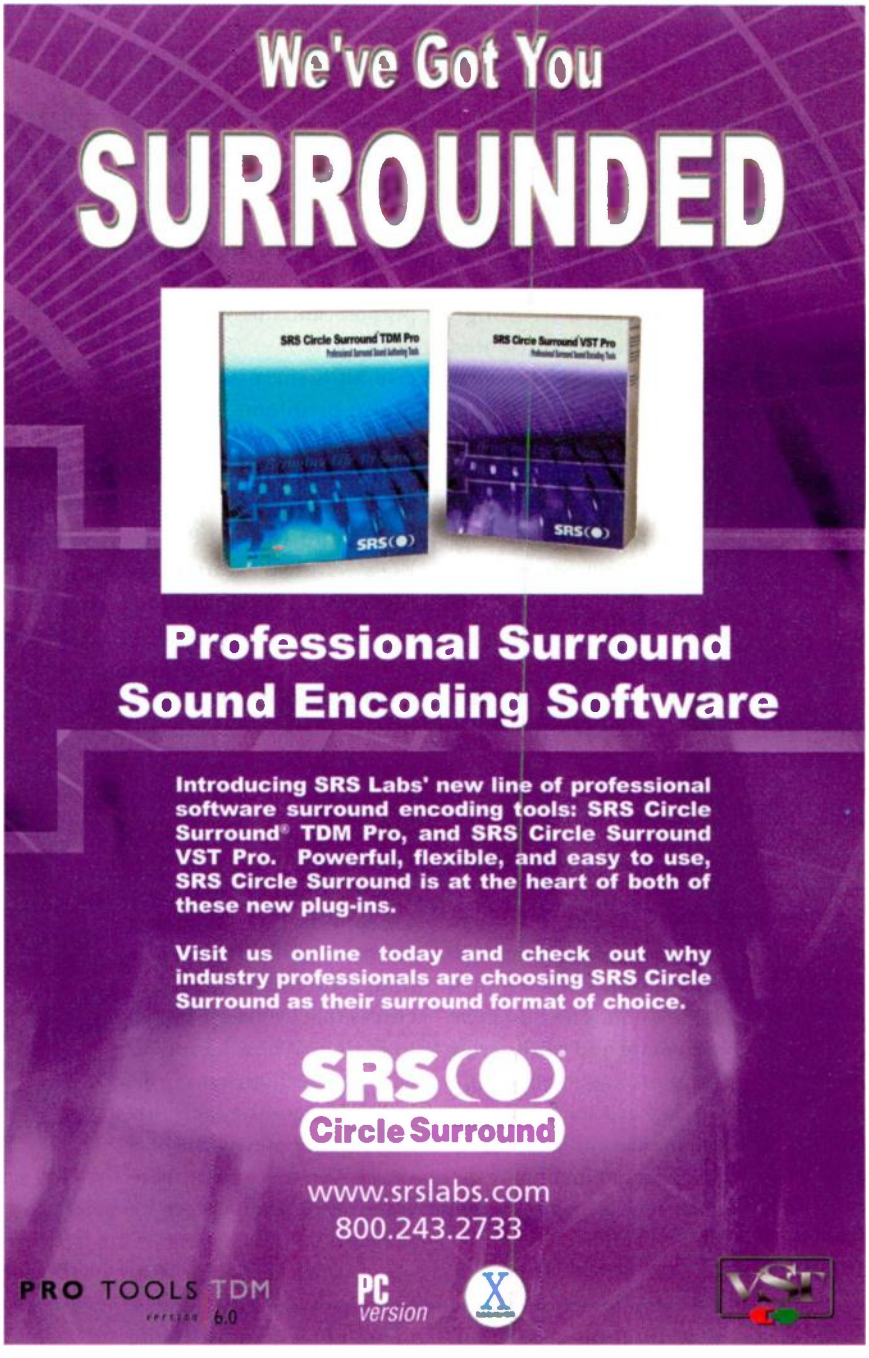
Mike Bemesderfer is a freelance recording and mastering engineer in Berkeley, California. He is also a singer and flutist.

Tom Corwin is a Mill Valley, California–based producer, engineer, and bassist.

Ben Emmerich works in Novato, California, as a freelance recording engineer, studio designer, and bassist.

Jeff Kliment is director of the sound department at LucasArts Entertainment. He was a staff engineer at Russian Hill Recording in San Francisco for many years.

J. White is sound supervisor at LucasArts Entertainment. He is also a composer and recording artist.



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equalizer. The results were excellent; I was able to enhance the high-quality original acoustic tracks with nuance and subtlety. The Oxford OXF-R3 plug-in is the most expensive of the bunch by a decent stretch, but if you can afford it, you should check it out.

WAVES
LINEAR PHASE EQ

Like Elemental Audio's Firium, Waves' Linear Phase EQ is an FIR-based equalizer that is designed to eliminate phase smear and thus create more accurate, transparent signal processing. The plug-in is part of Waves' Master's Bundle (native, $900; TDM, $1,800). Although Linear Phase EQ is primarily oriented toward mastering, it can certainly be used to process individual tracks as well; its colorless nature would make this EQ a good choice for serious track-related corrective surgery, such as removing DC offset or low-frequency rumble.

The Linear Phase EQ plug-in uses the same "Paragraphic EQ" interface approach that Waves uses in its Renaissance EQ and Q10 plug-ins (see **Fig. 7**). The front-panel colors are different, and there are now nine EQ curve types instead of three and six bands instead of five, but Waves recognized a good thing and stuck with it. If you've ever used Renaissance EQ, you'll feel right at home with Linear Phase EQ.

Linear Phase EQ's first band is dedicated specifically to low-frequency manipulation and offers very fine control resolution in the low end. The other five bands are more general and work across most of the frequency spectrum. The nine EQ-curve types are selectable per band and feature precision digital curves as well as curves modeled on analog designs that feature a bit of a resonance bump at the filter cutoff frequency.

The plug-in offers three EQ modes: normal, accurate, and low-ripple. Each mode is aimed at different tasks; a different version of the plug-in is included specifically for low-frequency tasks. That version has three low-frequency and no broadband filters, allowing precise manipulation of the low end alone. Needless to say, it is an extraordinarily flexible tool for mastering engineers and other high-end audio professionals.

This is a truly clinical mastering EQ; in spite of its power and flexibility, none of the listeners chose this plug-in as their favorite for program enhancement. One panelist described it as having a "lack of character," which is exactly right; Linear Phase EQ is supposed to be transparent. Several members of the panel had a problem with this because we are accustomed to using EQs that flatter the material; this was a mistake that you shouldn't make. Remember that each EQ design has its purpose, and this one is supposed to deliver clean, precise adjustments without phase problems, neither more nor less.

Apparently Waves has heard engineers remark about the Linear Phase EQ's "clinical" sound before, because the plug-in also includes filters that were modeled on resonant analog designs. After the initial tests, I examined these filters, and I liked what they did to the midrange and low end. They still would not be my first-choice filters for big, analog sounds, but I liked the sound a good deal more than I did the digital filter curves that we had listened to earlier. When I applied gain to the high end during this second exam, the EQ still seemed a bit too sharp for my taste, even when using the analog-filter model.

I conclude from this that fundamentally, Linear Phase EQ is, as advertised, a superclean, colorless, precision tool that causes no phase distortion. It can be used for some types of enhancement but it doesn't shine in that application. It's also noteworthy for its very low levels of quantization noise (which is especially important for DVD mastering).

ROUND 'EM UP

It's a challenge to compare products with different purposes in a way that makes sense overall. In the end, we found that in some cases, we couldn't

EQ GLOSSARY

bandpass filter: A circuit or algorithm that allows signals at frequencies within a specified range (band) to pass through unaffected, while the level of signals at other frequencies is reduced.

equalization: A circuit or algorithm that allows frequency-selective manipulation of a signal's amplitude.

filter: A device that attenuates or removes certain elements or data from an audio waveform or data stream.

graphic EQ: A frequency-shaping device having multiple filter bands, each operating at a fixed frequency and bandwidth.

highpass filter: A circuit or algorithm designed to attenuate, or cut, frequencies that fall below some designated point, while allowing higher frequencies to pass through unaffected.

lowpass filter: A circuit or algorithm designed to attenuate frequencies that occur above some designated point, while allowing lower frequencies to pass through unaffected.

parametric EQ: A circuit or algorithm designed for frequency-selective attenuation or boosting of a signal's amplitude, with independent controls for gain, center frequency, and bandwidth (including continuously adjustable Q).

Q: In filters, the ratio of a bandpass or band-reject filter's center frequency to its bandwidth. (Higher Q values indicate a narrower bandwidth.)

shelving EQ: A circuit (or algorithm) that offers the ability to cut or boost gain above or below a given frequency. Examples include the treble and bass controls found in home stereo systems or guitar amps.

This glossary is based on definitions from Tech Terms: A Practical Dictionary for Audio and Music Production *(Hal Leonard, 1993) by Steve Oppenheimer and George Petersen. The material is used with permission of the copyright holders.*

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compare these EQ plug-ins directly so much as contrast them.

Waves Linear Phase EQ and Elemental Audio Firium are both aimed mainly at mastering and precision editing, and as such, attempt a more neutral approach to altering sound. Both products are in widespread use among pro and amateur mastering engineers. When comparing Linear Phase EQ and Firium directly with other types of general-purpose or program EQs that are specifically designed to hype or flatter the source material in a musical way, they can seem more clinical. And that is exactly the point: they are not intended to flatter program material; they serve primarily as precision scalpels for balancing and correcting.

Of the program EQs, the panelists especially liked Sony Oxford OXF-R3 and Focusrite d2. That Oxford OXF-R3 was a favorite was no surprise, and it's good to see that it lives up to the hype and justifies its higher price. Focusrite d2, on the other hand, was a pleasant surprise. It has been around for years and is often included by Digidesign in free plug-in packs that accompany Pro Tools. If you have to purchase it, d2 (bundled with the d3 compressor-limiter) is not exactly cheap, but it's a good value and certainly easier to afford than the Oxford.

When it comes to bang for the buck, it's hard to beat Elemental Audio's Firium. A professional plug-in with a terrific interface for $99 is a great deal that gets even better when it's bundled with IIR-based companion plug-in Eqium for $129. Firium's drawing-based approach combined with its real-time spectral analysis, smoothing and scaling tools, and flexible left-right connectivity makes it an undeniable bargain.

No one picked Bomb Factory's Pultec EQP-1A plug-in as an everyday, slather-it-on-like-ketchup type of program EQ, but we agreed that it's a good flavor to have in your arsenal. Opinions were mixed on the high frequencies, but everyone agreed the low end was wicked cool.

So there you have it. I set out to discover whether the differences between assorted digital equalizer plug-ins with widely varying quality levels somehow justified their widely varying price tags. What I learned is that digital EQs do indeed have widely varying sonic qualities, but you have to look more closely at what each EQ is designed to do and what the trade-offs are.

True, the highest-priced program EQ (the Oxford) also sounded the best for enhancing program material. After that, however, all bets were off: the panelists disliked the sound of some relatively expensive products and liked the sound of some inexpensive ones. The lesson is simple: downloading a demo before you buy is a very good idea. Let your own taste be your guide.

Nick Peck *plays the piano, makes sounds, and is a lifelong resident of Marin County, California. He does not own a hot tub.*

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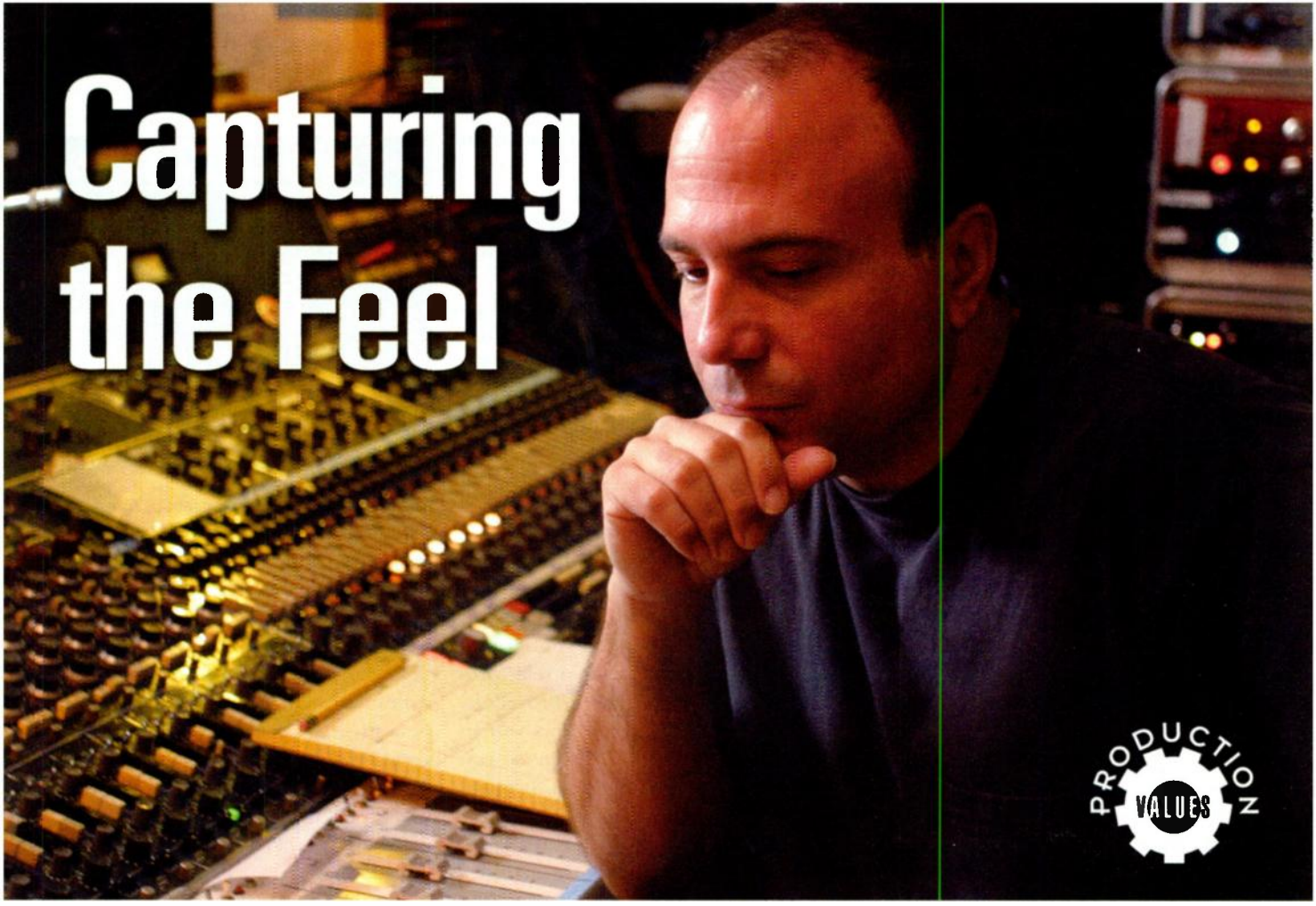

Producer and engineer Joe Barresi combines old and new to record music that grooves.

By Maureen Droney

When you first meet him, Joe Barresi seems like a laid back kind of guy. He doesn't say much—at least until you get to know him—and when he does talk he's usually joking. It takes a while to discover how serious he is about his work. An avid gear collector who's especially known for getting great guitar sounds, Barresi sleeps, eats, and breathes recording. He's almost always in the studio working. When he's not, he's either visiting friends who are in the studio working, or he's home messing with guitars and gear. He has a passion for vintage gear, and he peppers his conversation with references to classic albums and the people who made them. But he's also a Pro Tools maven and a loyal supporter of numerous new-equipment manufacturers.

Barresi is a guitar player with a hard-rock background, yet he also studied classical guitar and music theory at the University of South Florida and piano and music at the University of Miami. Even during his school years, he was constantly developing and recording bands on the side. After graduation he headed to Los Angeles, where he became a freelance assistant engineer and worked on a variety of musical genres at several major studios.

A demo he did with producer Garth Richardson was his first big break; he went on to engineer for such well-respected producers as David Kahne, Michael Beinhorn, and Sylvia Massey Shivy. He's mixed for Hole, Monster Magnet, Anthrax, and Skunk Anansie, among many others, and has branched out into production for bands including Loudermilk, L7, Tomahawk, and the Melvins. One notable project he worked on started off as demos but later turned into the self-titled debut album by Queens of the Stone Age.

MARCELO COELHO

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Capturing the Feel

I caught up with Barresi at Hollywood's venerable Grandmaster Studios, a favorite of such luminaries as the Foo Fighters, Tool, and Ben Harper. He was there to engineer for new Arista artists The High Speed Scene. I arrived at 11 a.m. on a Sunday morning, an hour before the band was due, and squeezed my way around the vintage Neve 8028 desk into the tiny, jam-packed control room where I spoke with Barresi.

How would you describe your style as a producer?

I like to augment what the band does. I don't like to say, "You're going to come in and do it my way," or "You've got to use my '58 Les Paul." It's true that I own a stupid amount of outboard gear and guitars, but I like to at least start with the band's gear. I just finished working with a group from the East Coast who didn't want to bring anything out here with them. I told them it was a must that they bring at least their guitars and amp heads. That's your sound, so start there. We might not end up using it, but I have to know what you sound like as a band.

What happens when you're producing and the band wants to go down a path that you know from experience won't work? Do you let them try it?

No. That's time and money that could be spent in other ways, like getting a better vocal performance. Don't get me wrong. I'm here to make the band's record. I'm all for experimentation and creativity. But there are occasions when you have to steer the boat away from the rocks.

On this project, you're engineering but not producing. Is that difficult after you've been a producer?

Actually, it's good to sit back and look out every once in a while, just absorb and see how somebody else would approach something. It—music and sound—is all subjective anyway.

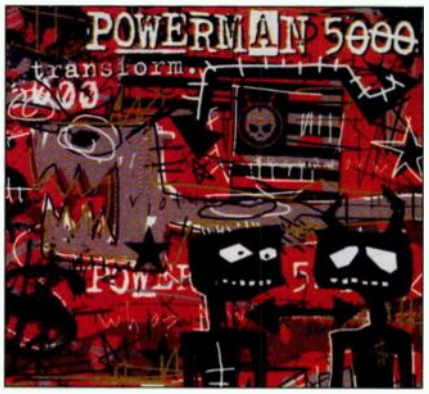
You're using a combination of analog and digital?

After recording to analog 24-track we physically dumped all the drum tracks into [Digidesign] Pro Tools and I spent a day editing a few songs. The band also has a friend with Pro Tools, so we farmed a few songs out to a real "professional Tooler." He used Pro Tools' Beat Detective, which allows you to chop bigger sections of drums so you still retain some naturalness. It quantizes like a drum machine, but you can retain some feel.

As a producer or engineer, do you find that you have to put things "on the grid" because record companies—and the public—expect to hear that kind of perfection?

Personally, I believe that music is about feeling, and that you get no feeling from music that's completely rhythmically accurate, unless, of course, it's straight, [programmed] "dance" music. When you put on AC/DC it makes you want to rock, to get up and dance. But it's not metrically cut, it's just solidly played. I think it's your job as a producer to get that kind of performance out of people.

[Laughs.] Back in the '80s, if you weren't able to perform like that, you'd be replaced. As—supposedly—[engineer-producer] Andy Johns said to the drummer in some band, "This would be a great record for you, just not a great record with you." It's become politically incorrect to do that now. So you "Tool" it. And a lot of people rely on what they see on the screen instead of listening.



On Powerman 5000's most recent CD, *Transform*, Barresi had drummer Adrian Ost play multiple takes along with preprogrammed scratch tracks. Barresi then assembled the best performances in Pro Tools, keeping the drum feel as live as possible.

[Engineer] Mark Dearnley, who's done four albums with AC/DC, once demonstrated something to me [on a piece of tape]. He said, "When you have a kick drum that's this wide, and the bass player plays a little behind and the guitar player plays a little ahead, you get this huge downbeat." Lately music is so lined up that it actually seems smaller. You get these little ticks for downbeats, instead of a big fat 30 ips hit. If something is blatantly out of time, that's different. But unless it's a dance-type song, music that's metrically accurate top to bottom doesn't really excite me.

That said, some bands need to be done that way. Powerman 5000 is a band that uses a lot of programming. That's their sound. But with them, I found it worked best to put the programmed scratch tracks down on three sections of tape and have the drummer play to it three separate times. We picked the best overall performance, then maybe did some chopping and assembling in Pro Tools to tighten a few things up. We could have done just one drum take and fixed everything to a grid. But I

FIG. 1: Barresi likes to use Focusrite's Red 3 compressor when tracking kick and snare.

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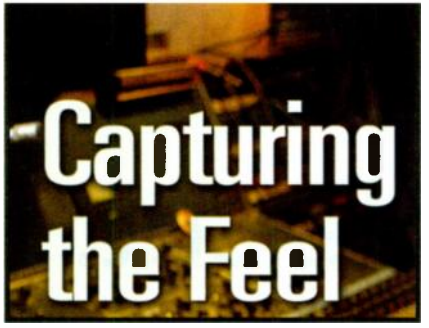

find you get more fills, more good stuff, and a little craziness this way. You can chop the takes together and still retain some live-performance feel.

I can't tell you how many control rooms I walk by and see the engineer's head in a screen all day long. When you start looking at the screen, it's very easy to just use your eyes and forget about your ears. That's one thing good about a tape machine! The only thing you look at on it is meter level. You aren't looking at kicks and snares and timing. Nowadays, you can physically look at the waveform and say, "Okay, it's perfectly in time; it must be good." And that justifies your job. Whereas if you actually made a decision to go with a certain take or style or feel and people said it sucked . . .

Then your taste would be in question.

Or your production skill, or your judgment. Phil Spector is still known for his wall of sound. He made the call: "This is what I like, this is what I'm going for." You don't get much of that anymore. There wasn't much exciting going on in mainstream radio until the White Stripes came out.

A lot of people have said that to me.

I'm not a huge fan because I hate bands without bass players. And I think a lot of it is hype: Are they married? Nice video, whatever. But if you put that aside and listen, these guys are making records on eight tracks. There's a feel and a sound that you can't buy. And if they were produced by almost any of the producers out there right now, I guarantee the feel would have been Tooled right out of it: "You can't make a record on eight tracks, you need 96K and a huge computer rig." I think it's a safety net for producers these days. That said, Pro Tools has definitely saved my ass in a few instances!

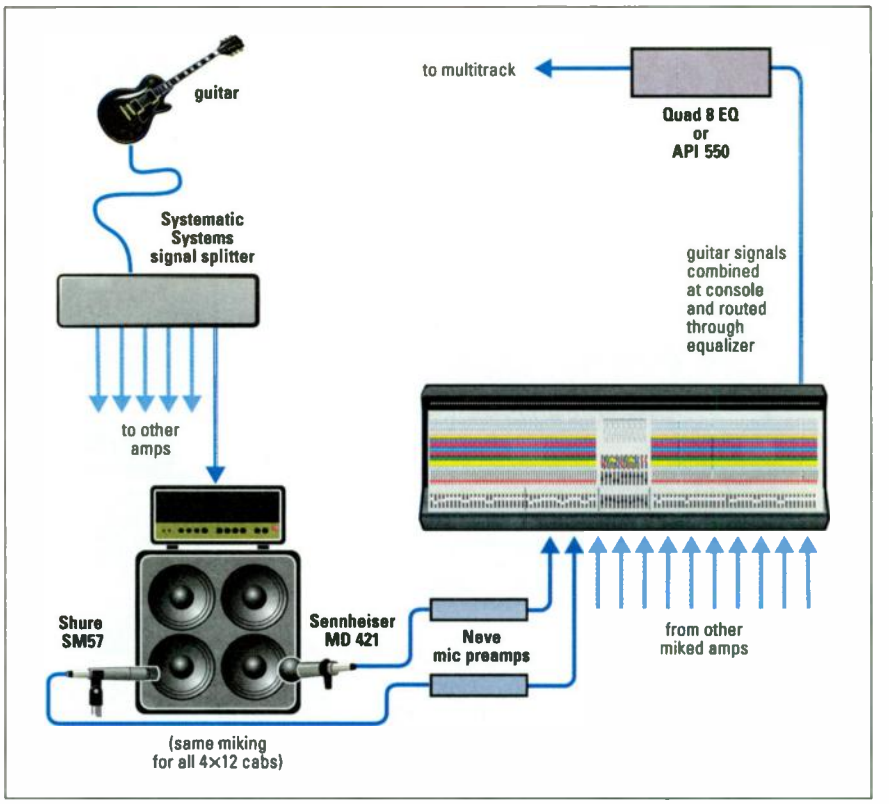

FIG. 2: Barresi often sends a guitar signal through a splitter and routes it through up to six amps. He typically mics 4×12 cabinets using Shure SM57s and Sennheiser MD 421s, and routes the signals through vintage outboard processors before going to the multitrack.

So it's a love-hate thing.

No, I love it. I just don't love what some people do with it. I was up until 3 a.m. last night with an Mbox—the little two-channel Digidesign interface. That and my laptop and a FireWire drive—it's a portable studio. You've got to love being able to make music or capture a moment anywhere, anytime, like that.

Who's a producer you've worked with lately, and what did you learn doing it?

Last year I worked with David Kahne. The beauty of David is commitment from day one. He makes the players commit, makes them play it again [instead of saving a take]. He'll use one overhead: You want to hear toms? Hit the cymbals less and the toms harder. He brings that dynamic back with players as opposed to separating out every freaking cymbal and tom. He also listens to music in an interesting way: by its frequency spectrum. He'll say, "It needs more high-end information," and he'll add cymbals, or a guitar part that comes in high.

You're talking about having a point of view. Where did yours came from?

A combination of everything. There's no one really musical in my family, but both of my parents are good at singing melodies. They sing to the radio or *[laughs]* Italian records. I started playing guitar when I was seven. I also studied as much theory as could. I'm not a drummer, but I can play bass and I took piano lessons for a while. When I moved out here [to Los Angeles] and got a job in a studio, I realized I didn't want to get pigeonholed into one sound or style. So I started freelancing at different rooms as an assistant. The engineering aspect of my musical development came from working on so many different kinds of consoles with so many different kinds of clients.

I also got exposed to gear by reading liner notes and listening to records. "This record sounds insane, how did they do it?" Then finding out it was cut on a Helios console and buying some of that stuff. And figuring out how to work

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Capturing the Feel

guitars and amps and pedals and creating sounds in my bedroom. You know: "Wow, this is what happens when you turn the feedback knob up all the way on a delay!"

You prefer amps to plug-ins for guitar sounds.

I love some plug-ins, especially Echo Farm; so many different delays in one plug-in is great. And Amp Farm, to me, is cool for stuff like drums and distorting a vocal, but not as a substitute for a guitar amp. It's like Pod, which I like on vocals and loops. [Pod, Amp Farm, and Echo Farm are all Line 6 products.] All of those things are very convenient, but my job is not about convenience. Just because a piece of gear is designed for one thing doesn't mean you're limited to using it for that. Sometimes you can get distortion through a mic pre on the console, or an LA2A turned on the "full Canadian" setting—everything to the right.

MARCELO COELHO

Barresi sitting behind a custom Neve 8028 console at a recent session at Sound City Studios in Van Nuys, California.

Full Canadian?

[Laughs.] That's something I started adopting with Garth Richardson, who's Canadian. Extreme stuff got referred to as full Canadian. An 1176 [Urei] with all the buttons in, or an LA2A with all the knobs to the right; put them on an aux send and ship some vocals or drums or bass to it, and then bring it back on a fader to add some fuzz.

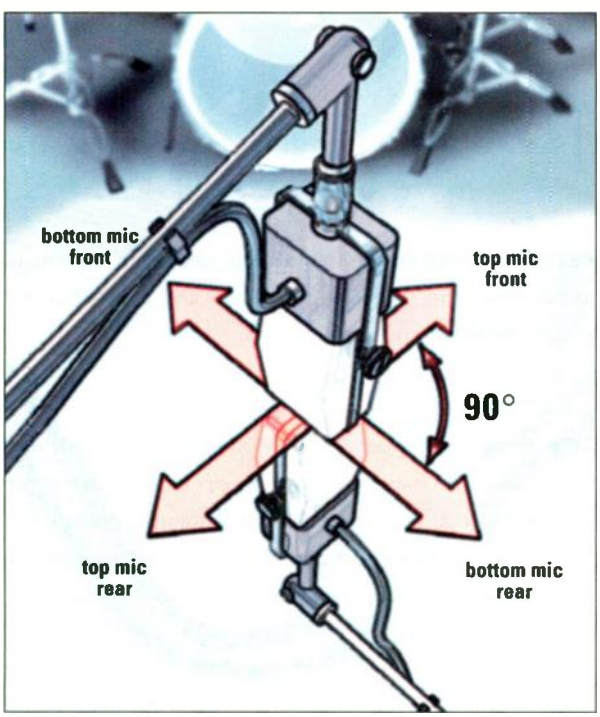

FIG. 3: When recording drums, Barresi sometimes uses a pair of figure-8 mics in a Blumlein configuration (angled 90 degrees apart) to get stereo room sounds that emphasize the sides and rear.

What are some pieces of gear that you always have with you?

If I'm tracking, the Focusrite Red 3 compressor just for kick and snare [see Fig. 1]. I like the way it compresses on the way to tape. If I need to, for guitars I'll use a bus to a Quad 8 EQ module on the way to tape. Sometimes an API is good for that too. I've also got a pair of SSL talkback compressors that Danny Buchanan at Henson Studios built for me.

For real, the compressor from a talkback circuit?

It's just a megalimiter. He bought the cards and put it in a box. I used it on one room sound on this record. I also used a Shure Level Loc on another room sound, and [an Empirical Labs] Distressor on a couple of others. I consciously try to use different things. I might not bring any of this out for another two records. I might use something like an ADR [Compex limiter].

There are definitely pieces of gear that have given certain character to records. On the first Queens of the Stone Age project we had a crazy old ADA digital delay. I used that for all the modulation effects and delays because it crapped out really well and made all these fuzzy sounds. I remember that piece of gear as being part of the sound of that record. The next time I worked at that studio, I didn't use it because I didn't want the same sound. I used a tape delay, or an Echoplex, or a flanger, and that became the theme. That's what I do with amps, too. For the Matchbox Romance record I just finished, I brought out a Fender Tonemaster, which I haven't used in a year, and a Soldano. I brought down 20 different heads; we went through them and picked the 4 or 5 that sounded best for the particular project. And that became part of the sound of the record.

I also work with a lot of smaller companies, like Rivera Amplifiers, which I

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love. Rivera's really into listening to what you have to say about their products. I got an extended 4×12 there, and a subwoofer system. They custom-tweak heads, and they solicit feedback from people.

Are you still obsessed with stompboxes?

[Laughs.] Yes, Andrew Alekel, who works here, just turned me on to one made by Analog Man in New York. It's two compressors—an old Orange Squeezer and a Ross compressor built into one box. It's really amazing and it looks cool.

What's in the rack you brought for these sessions?

Coming here I knew there was enough Neve stuff, so I brought my Telefunken V76 preamps. If I want something to sound a little fatter, I'll go there. The Helios of course, just in case. Some Flickinger and Quad 8 EQ; I can use the Flickinger on anything. It sounds good on drums, guitars, and vocals. It's based on an API but is completely sweepable. That's nice if you want to get into some surgery.

The Chandler EMI limiter I used on the drum room. The room here sounds great and I knew I wanted to compress it pretty heavily, which the Chandler is good for. I'm also using a box made by Geoff Tanner, who has a workshop here. It's a pair of Neve-like preamps with 3-band EQ. The mid is selectable between 400 Hz and 3.5 kHz. And it has a ¼-inch input on the front and a ¼-inch out in the back, which is very cool. You can run it in front of a guitar amp if you want to beef up the input to your amp.

Is the Pro Tools you're using an HD system?

Yes. But I did my last record on a Mix Plus system using 888s, and it sounded fine. It's more important to know how to get the best sound out of what you're

JOE BARRESI SELECTED DISCOGRAPHY

Matchbook Romance, *Stories and Alibis* (Epitaph, 2003); producer, engineer, mixer

Pennywise, *Land of the Free?* (Epitaph, 2001); producer, engineer, mixer

Powerman 5000, *Transform* (DreamWorks, 2003); producer, engineer

Queens of the Stone Age, *Queens of the Stone Age* (Loose Groove, 1998); coproducer, engineer, mixer

Rancid, "Fall Back Down" and "Start Now" from *Indestructible* (Warner Bros., 2003); mixer

Skunk Anansie, *Stoosh* (Epic, 1997); mixerTomahawk, *Mit Gas* (Ipecac, 2003); producer, engineer, mixer

Turbonegro, *Scandinavian Leather* (Burning Heart, 2003); mixer

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working with. I mixed the first Queens of the Stone Age record on a Soundtracks console that I monitored through the whole time I was tracking. If something sounded weird, I adjusted the mic or source placement to compensate for what I was hearing through the console VCAs. It wasn't a purist signal path by any means, but then, I wasn't making a Streisand record.

What mics do you use on guitars?

I keep going with Shure SM57s and Sennheiser MD 421s. Those are my main two on 4×12s [see Fig. 2]. I love the way up-front guitars sound with them. On a 4×12, I'll have two or three mics up on separate speakers and listen. If one sounds bad, I'll move to another speaker or move the mic. I don't EQ the individual mics or compress guitars; they're already compressed. You can just move the mic a little and get the EQ that you need. Because there are phase issues, I generally stick with close mics, but sometimes I use just a Royer R-122 set back a little bit.

On smaller, combo amps, I like to use a mic that has a little more personality, like the Royer R-122. Ribbons are so beautiful; their detail is amazing. I can get the Royer eight inches away, and it's still fat and natural sounding. Also, it's figure-8, so it picks up some room; that helps give it perspective.

You use ribbon mics even on distorted guitars?

Yeah. [Producer] George Drakoulious and I worked with the British band Reef. The guitar player was very '70s sounding, very "Free-ish." The whole sound was a Watkins amp with a V76 preamp and a Royer ribbon mic. That was it. Of course, he was a great player to start with.

How many amps do you usually have set up, and what do you use to split them?

I use a Systematic Systems guitar splitter; I'll use up to six amps. I mic them all up. I don't necessarily run all six at the same time. Sometimes I only use the mics on two or three, but I can blow six amps into the room if needed.

Ideally, I like to stick with three 4×12 half stacks, or two heads and three cabinets, and run two cabs off one of the heads. I want options, because you don't always know what you're getting. When a band brings in their gear off the road, the speakers can be shot. I bring in mine, but they're all different. For instance, tighter speakers work better for certain types of music.

Tighter?

A higher-watt speaker. A 75W or 100W Celestion will be a lot more focused and tight on the low end than a 25W Celestion, which will sound more loose, but is great for certain things, like solos, where you want the speaker to react more.

The lower-wattage speaker, which is getting pushed harder, vibrates more, whereas a higher wattage speaker will barely move. So if your client's playing super, drop-tune, nu-metal chug riffs through a high-gain amp, you want the speaker to be tight and powerful and able to handle the low frequency. That kind of material through a 25W speaker will sound floppy. Then there's the Celestion Vintage 30, a hybrid designed to distort like a 25W speaker that is more a high-wattage speaker.

Seems complicated.

You've got to understand where to start. I go back and listen to records. Why does Jimmy Page or Pete Townshend sound like that? Certain eras had certain speakers: Fanes came in Hiwatts, Celestions in Marshalls, and Vox had their Bulldogs. They all had their sound.

And you mix and match.

I have a Sound City cabinet with Fane speakers, a Hiwatt cab with a 75W Celestion—which is great for tight sounds—and some Marshall cabs with different speakers. I have them customized so I know which character cab

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will do what with which amp—usually! On this last record I ended up using a Soldano and a 25W Celestion cabinet, which I thought would never sound great for tight rhythm, but it was amazing. Whatever works, right? On that particular project we ended up using a combo of Marshall, Soldano, and Rivera.

Sounds like painting a picture.
I'm a guitar player. It keeps me going to work every day, I'll tell you that.

Do you use room mics on guitars much?
Occasionally I'll blend in the room, compressed through the different things I mentioned before.

Are your room mics in omni?
Sometimes, and sometimes in a figure-8 because you can notch out areas. Omni is good if the room is great. If there's a problematic area, say near glass, I'd go cardioid to get rid of reflections from the rear, or figure-8 and turn it the other way [dead side toward the glass.] That's also good on drums. Or, you can use a pair of figure-8s in front of the drums in a Blumlein setup. That can sound amazing. You can pretty much notch out the drum kit and just get the sides and rear for a very natural room sound and a great stereo spread [see **Fig. 3**].

Blumlein?
It's like XY recording using a pair of figure-8 microphones to reject the center and pick up the sides.

Where'd you learn that?
Reading books. I'm a big fan of the library and used bookstores for old audio books. My current favorite is *Modern Recording Techniques,* published in 1970 when a modern compressor was a Pye limiter. Also, when I worked with Mark Dearnley, he always got great room sounds using mic configurations like M-S and figure-8 pairs. M-S is great because you can mess with it later. You set your figure-8 and cardioid level when recording, then when you're mixing you can mult the figure-8 at the console, put one side of it out of phase, and add it back in for as much stereo as you want. It's cool, but not as natural sounding as a Blumlein.

You don't see people doing those kinds of things much, they just throw up any room mic. But there's a lot of information out there about how to do different things. You just have to look for it.

Parting thought?
Yeah. I ran Beat Detective on "Back in Black" the other day, and I'm happy to tell you it speeds up in the choruses!

Maureen Droney, *whose engineering credits include projects for Carlos Santana, George Benson, John Hiatt, Whitney Houston, and Aretha Franklin, is the Los Angeles editor for* Mix.

World Radio History

RECORDING MUSICIAN

Recording on a Dime

Strategies for making band albums fast, cheap, and on the money.

By Sean D. Carberry

Back in the days of analog tape and acetate masters, artists typically made records in hours, not in months or years as is often the case in today's world of plug-ins and tube-mic simulators. John Coltrane recorded *A Love Supreme* (Impulse, 1964), one of the greatest jazz albums of all time, in a mere four-hour session. Up until that time, most recordings were cut live, often with no opportunity to overdub. With that approach, how long could it possibly take to record an album?

LAURA WILLIAMS

Then came bands like the Beatles, Led Zeppelin, and Steely Dan, who found a creative haven in the studio and spent increasingly more time there perfecting their recordings. Thanks in part to their example, it can take a ridiculous amount of time to churn out an album today. Of course, those bands likely also had the financial wherewithal to spend as much time in the studio as they wanted.

The luxury of "financial wherewithal" is rare, of course. As a recording engineer in the Boston area, I typically work with musicians endowed with great talent but little cash. That means most of my projects are recorded under the unforgiving glare of the ticking clock. Hence, I've become rather adept at engineering on a dime—sometimes even on a nickel.

Making a good record in short order is a challenge, but there are ways to help ensure success. First and foremost, keep in mind that this is a joint venture—the best engineer in the world can't make a great record in a hurry if the musicians aren't up to the task. I'll start by discussing pre-production tips for getting everyone organized. Then I'll explore the art of recording at warp speed, and finish up with some tips on mixing in the fast lane.

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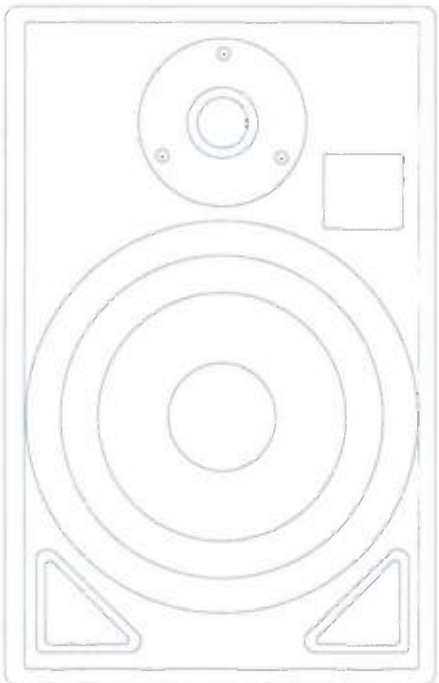

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WORK CUT OUT

Most projects I record begin with a conversation that goes something like this:

"We have $1,500 and we'd like to record and mix and master an entire album. Can we do that?"

"Well, after tape and mastering expenses, that leaves about eight hours in the studio. I can handle that. Can you?"

Silence.

After getting through that fun bit of business, I instruct the musicians on how to make the most of their studio time: practice like crazy every waking moment until the session. After all, great records are all about great performances of great songs (pretty simple, huh?). Of course, great recordings and mixes are important, too. Then again, I've gotten some great sounds in my career, and they haven't all translated into great albums.

It is not unreasonable—or unprecedented—to cut an album in a day, but there's no way it can happen if the musicians can't lay down the tracks. I've worked on projects in which the band planned to record live and cut everything in a day, and then proceeded to spend the entire time unable to play anything worth keeping.

On the other hand, I once had a band come into the studio with a fistful of dollars that the musicians had scraped together with the intent of recording and mixing three songs. Once we got rolling, the group ended up cutting ten songs, which we recorded and mixed in eight hours. Granted, it was a power trio (guitar, bass, and drums) and we didn't do any overdubs. But the point is that the musicians were so well rehearsed that they nailed keepers in one or two takes. That allowed me to keep rolling tape, and when it came time to mix the songs, there wasn't much to do—we had captured everything live.

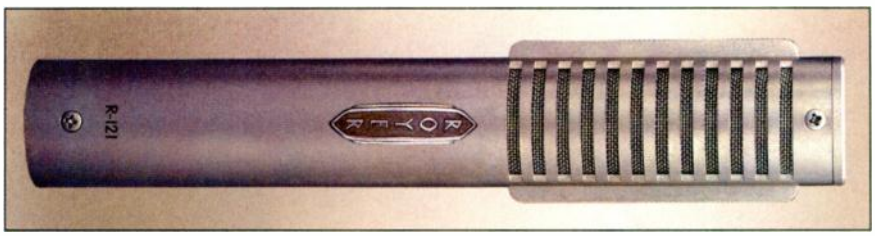

FIG. 2: The Royer R-121 ribbon mic has become a mainstay for many studio engineers. It's great for miking guitar cabinets, bass cabs, drum kits, percussion, horns, and strings.

Another point I counsel bands on is not to rehearse in the studio. If you can't afford a lot of studio time, it doesn't make sense to spend hours figuring out song forms and arrangements while the clock is ticking. Bands need to get those issues worked out before setting foot in the studio.

One other important pre-production task is finding out exactly what the instrumentation is—you must know what you're going to be miking. Draft an input list before going into the studio so you can stay one step ahead of the musicians. In addition, always have a backup plan in case your first picks sound lousy. Anticipation is key.

NOT MEMOREX

When instructing bands about cheapo recording tactics, I always push for recording as live as possible. This has a variety of time-saving benefits. One, everyone plays at once, so you don't need to waste time overdubbing. Two, recording live often requires having several instruments in the same room; thanks to mic bleed, it becomes all but impossible to replace parts (if you do, you will hear "ghost notes" from the original track bleeding into other instrument mics, which tends to sound like someone playing wrong notes in the background), so the musicians are married to the take. Three, mic bleed also means that the group is pretty much locked in to the sound, which also simplifies the mixing stage (although setup tends to take a little longer). For example, if the drums bleed into the guitar mic and you EQ the guitar sound during mixdown, you will likely alter the drum sound as well. In addition, bringing up the guitar will raise the drum levels—sometimes a good thing, sometimes not. You therefore need to commit to as many decisions as possible when setting up and tracking. That way you limit mix decisions, making mixing go much faster.

It's vital to explain these things to the musicians ahead of time so that they understand the limitations this approach imposes. Let them know that they can't replace solos and vocals, and that they will have fewer options in the mix process. In short, they must play their parts "perfectly" or else be willing to accept an imperfection here or there—something people did all the time before digital editing became commonplace.

Naturally, you must be prepared for plans going south. I recently completed a record that we had planned to cut 95 percent live in a couple of days. However, once we got going, it turned out the singer was under the weather and couldn't nail his takes. Furthermore, the guitarist, whose amp was in the live room with the drums, wasn't up on the arrangements, so we had to regroup and overdub much more than planned.

Musicians are human, and they can't always accomplish what they hope to. That often puts more pressure on the engineer to get things done quickly. Be

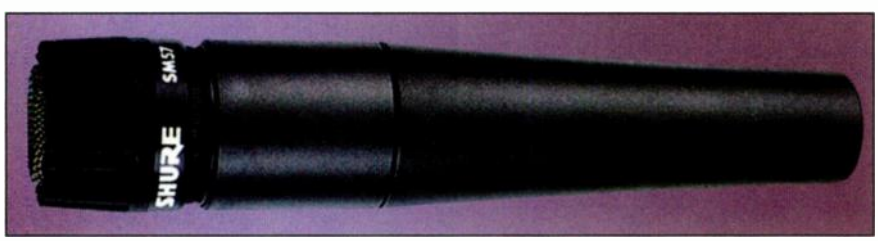

FIG. 1: The workhorse Shure SM57 remains a reliable studio pick, especially for miking snare drums. The author typically uses two—one for the top head and another for the bottom—and then reverses the polarity on the bottom mic.

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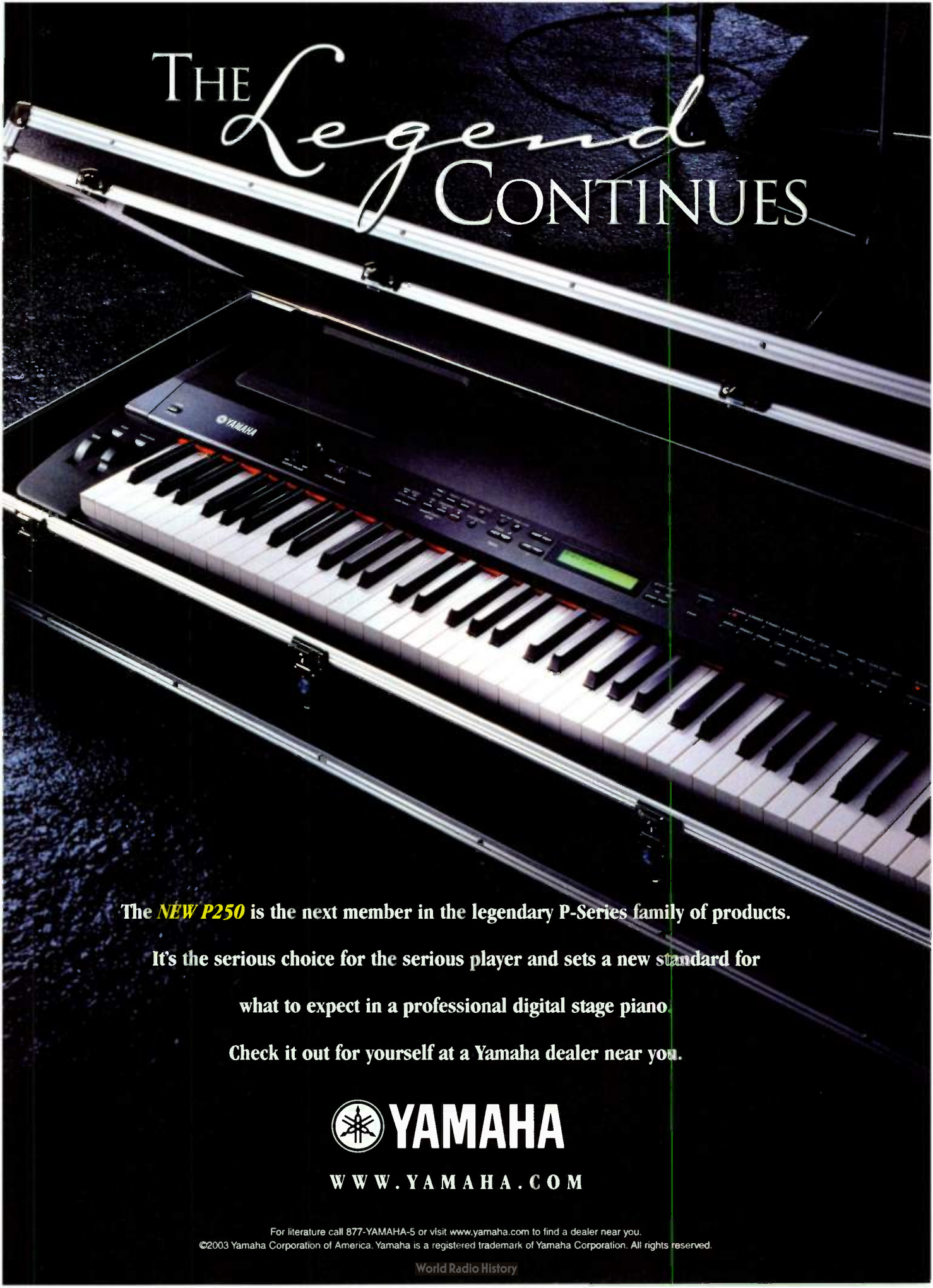
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prepared to skip meals and not go to the bathroom for long periods of time.

STICK TO YOUR GUNS

When you need to record in a hurry, use familiar mics and preamps. That will not only ensure that you get a good sound, but will also eliminate the risk of wasting time on something that might not work—this is not the time to try out that new kick mic you've been dying to hear.

For my part, if I have to get a solid drum sound for a pop-rock recording in 15 minutes, I know what to do. I put a Sennheiser E602 on the kick (just inside the hole, if possible), a Shure SM57 on the snare top and bottom (remember to reverse the polarity of the bottom mic; see **Fig. 1**), Sennheiser MD 421s on the toms, and a pair of Neumann KM 84s as overheads (I start with an XY-coincident setup and move them out to a spaced pair if that's not working). That gets me a solid, close-miked sound, and as long as the drums and drummer sound good, I know I'm in business. (Equally important is the fact that every studio I work at has those mics available.)

I also add a pair of room mics. I have a half-dozen different combos and placements that I like to use, but I go with what I know will get me a good sound in a hurry. I arrange a pair of Earthworks omnis (TC30Ks, QTC1s, or the inexpensive SROs—they all work great) in a spaced pair and give them a moderate squashing with a stereo compressor such as the Joemeek SC2 or Tube-Tech LCA 2B. I will also add a Royer R-121 (see **Fig. 2**) or R-122 about knee-high, two to four feet in front of the kit. Again, it's not that those particular mics will always yield the best sound possible, but that I know what I'm going to get, and it's going to be solid and flexible (by varying the levels of the front and room mics, I can drastically alter the sound as needed).

If I'm really in a hurry and dealing with a great-sounding drum kit, I might keep it simple with a Glyn Johns–type setup (see **Fig. 3**): one mic two to four feet in front of the kit and two to four feet above ground level, aimed directly at the drums (listen to be sure this mic picks up enough kick drum), and two overheads—one roughly over the hi-hat and aimed at the snare drum, and the other to the right of the drummer's right shoulder (assuming a right-handed drummer), also aimed at the snare. This is a time-tested formula that delivers a great natural sound (though do make sure to check for phase problems). I often use the Royer R-121 as the front mic, and usually large-diaphragm condensers such as the Audio-Technica AT4047 (see **Fig. 4**), Neumann U 47, or AKG C 12A for the overheads. Or I might use ribbon mics for the overheads—two Coles 4038s or Royer R-122s do nicely. If I'm recording a jazz session, I'll use the Royer R-121 in front and a stereo Royer SF12 as the overhead and call it a day.

FIG. 3: The minimalist drum-miking setup made popular by engineer Glyn Johns (of Led Zeppelin fame) requires only three mics: one directly in front of the kit, and a spaced pair of matching overheads behind, each aimed at the snare drum.

FIG. 4: The Audio-Technica AT4047 is supremely flexible—it's great for vocals, drum overheads, kick drum, upright bass, bass cabinets, horns, and many other instruments.

For bass, nothing is quicker than using a DI. However, I rarely find the resulting sound very appealing. That said, a nice-sounding bass through one of the high-end DIs such as the Avalon Design U5, or the line input of a Peavey VMP2 mic preamp, can be just the ticket. Otherwise, I have another simple solution: put a mic in front of the bass cabinet. Pretty radical, huh? Specifically, I put a Royer R-121 a couple of inches from the cabinet, and bingo—a great sound (contingent, of course, upon a great sound coming out of the speaker). Other mics I routinely use on bass amps are the Audio-Technica AT4047, Shure KSM44, and Lawson L47MP.

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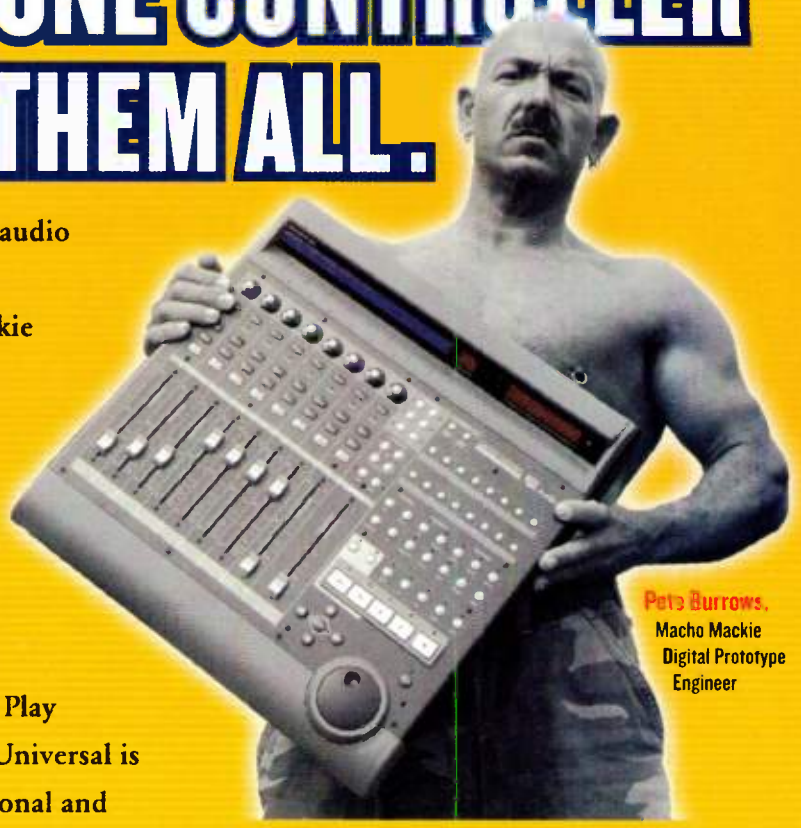

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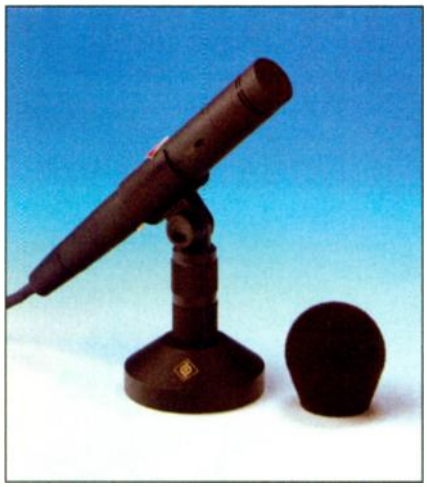

FIG. 5: Neumann's KM 140, which comprises the KM 100 output stage fitted with an AK 40 (cardioid) capsule, is smooth, quiet, and detailed. It's great on acoustic instruments for which a natural sound is desired.

On electric guitars, I generally use a Royer R-121, again a few inches in front of a good-sounding amp. (Royer makes some of my favorite all-purpose mics. I always know what I'm going to get out of them. Again, they might not get me the best of all possible sounds for a given instrument, but I find without fail that they yield a damn good sound.) For mono acoustic guitar, I typically use a Neumann KM 140 (my favorite all-purpose small-diaphragm condenser; see **Fig. 5**) aimed at the neck-body joint anywhere from 6 to 18 inches from the guitar. For stereo acoustic, I usually add a second KM 140 aimed either at the bridge or positioned above the guitarist's right shoulder (assuming a right-handed guitarist) and aimed down at the guitar body.

As an engineer, you need to have a solid vocabulary of mics and outboard gear and be able to set up quickly without having to audition a bunch of equipment. If someone shows up with an instrument I've never recorded, the first thing I do is ask how other people have miked the instrument. Assuming the musician was happy with the previous recording, he or she hopefully will know how the previous engineer got the sound. Heed the musician's advice, but also use your ears—what worked in a previous situation might not work the next time around.

IN THE MOOD

Recording on a tight timeline means that you, the engineer, might not always get to take a break between setup and tracking. But that doesn't mean you should expect the same sacrifice from the musicians—going straight from setting up to playing can be a difficult transition, and you definitely want the musicians in top form.

Whenever possible, I schedule the session so that, once setup is done and everyone is happy with the sound, the band can take a break before starting to record. That gives the musicians time to clear their heads and get in the mood to play (while I'm busy documenting setups, double-checking connections, and calling home to say, "Don't wait up").

CAN WE TRY THAT AGAIN?

I know from unpleasant experience that once a band starts overdubbing, the whole project can soon grind to a halt. Some musicians can overdub quickly and efficiently, but they are the exception, not the rule. I've had projects in which I thought that everything was done, and then the singer decided he needed to fix a verse. Nine songs and six hours later, I was left with half the mix time we had originally scheduled. That is one reason I try to structure the recording so that everything, or as much as possible, is cut live. Still, it's nearly impossible to capture everything live, so the next step is to overdub as efficiently as possible.

When overdubbing in a hurry, stick with one instrument and go through all the songs. That might seem like common sense, but sometimes bands want to finish each song one at a time, and that's tremendously inefficient. Rather, set up for, say, the guitar overdubs and roll each song, and then do all the vocals, and so on.

When it comes to overdubbing electric guitars, I have a few tricks to help keep things rolling. Guitar sounds tend to vary from song to song, so I try to cover the sonic spectrum by setting up three or four different amps at once (see **Fig. 6**). I then set up two or three mics—typically the Royer R-121 in front, a Shure SM57 or Electro-Voice RE20 for the back of the amp (if it's an open-backed cabinet), and usually a room mic such as a Neumann KM 84. I assign the front and rear mics to one bus (again, check the polarity of the rear mic) and record the close signal on one track and the room mic on another. If I'm short on tracks, I'll blend

SEAN CARBERRY

FIG. 6: Streamline electric-guitar overdubs by having an array of amps standing by. Shown are (left to right) a 1961 brownface Fender Super Reverb, a blackface Fender Deluxe Reverb with a Royer R-121 in front and an Electro-Voice RE20 behind, a 50W Marshall JMP Mark II head on a Marshall 4×12 slant cab, and a Cage 18/00 head on a Sonicord 1×15 cab. The room mic is a Neumann KM 84.

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the room mic in with the close mics; however, I prefer to pan the room mic away from the close mics to get a wider sound without having to use artificial reverb. In addition, having the room on its own track gives me control over the amount of room reverb in the mix.

With that much gear set up, changing guitar sounds is as easy as moving the close mics to a different amp and readjusting levels. Often I can go from one sound to another in the same amount of time it takes for the guitarist to change guitars and tune.

Overdubbing vocals is the real hornet's nest. Some singers are great and you can run down one or two passes and get everything you need. Others will nitpick each syllable and make life beyond painful. I try to get singers to take complete passes and to avoid excessive punching, simply because punching is time-consuming and often loses the feel of the track. Unlike guitar overdubs, vocal sounds generally don't vary much over the course of an album, so you can usually get the sound and then roll through everything.

Few other instruments require different sounds from track to track. Pianos, Hammond B-3s, and horns, for example, will almost always stay the same from the engineer's standpoint. Get the sounds quickly, based on your past successes (I suggest dynamic and ribbon mics on brass, beyerdynamic M 201s on B-3 and horns, and Neumann KM 140s on piano) and roll tape.

HIGH-SPEED BLENDER

As we've seen, being able to do good mixes fast depends largely on the tracks—the more you get things right during the recording, the less you have to fuss over in the mix. That's true whether you're doing an album in a day or a month.

I have mixed a half-dozen or so full-length CDs in a single session each. Of those, I would say all but one sounded really good, and the one that didn't suffered because the drummer had a terrible-sounding kit and there simply wasn't time to make it sound better. In other words, the house was built on a lousy foundation (and some of the performances weren't so stellar, either). In addition, the band had a strict budget and self-imposed deadline, so there was no opportunity to polish the performances before mixing. As you surely know, not everything can be fixed in the mix.

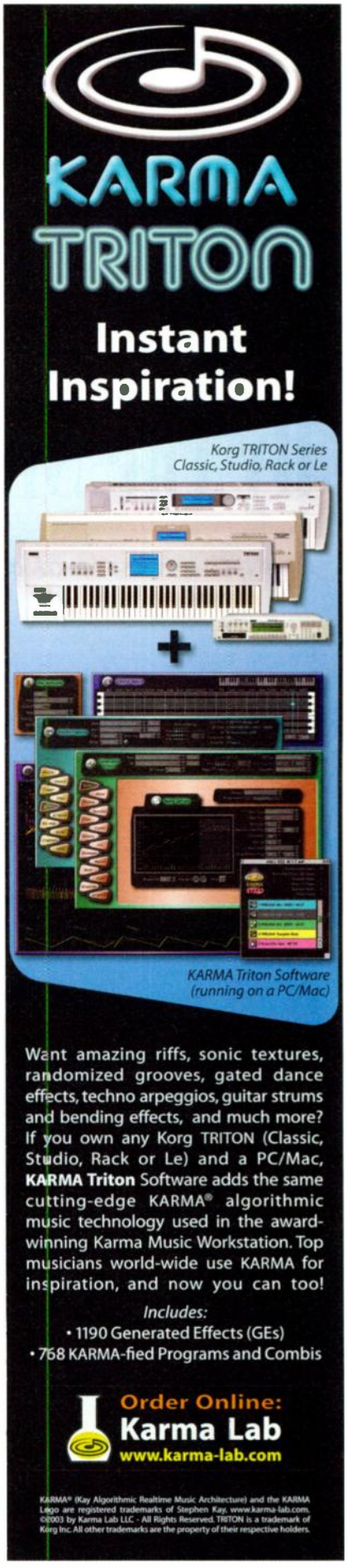
The other albums I mixed in short order were cut almost completely live, so again, many of the decisions had been made already during the tracking phase. In addition, the performances were solid, and each project demanded a fairly consistent sound from start to finish, which further simplified the mix. Even so, when mixing under the gun, my approach is to keep it simple and try to capture the feel without adding anything flashy. You're shooting for as good as possible, not perfection, so be realistic.

ANALOG ADVANTAGE

One last thing I'd like to point out is that every high-speed project I've engineered has been done in the analog domain—a very intentional choice. Yes, 2-inch tape eats up a big chunk of the budget, but that very fact helps keep Pandora's box closed. I have yet to engineer a project in Pro Tools without the artist(s) wanting to exploit the possibilities of digital editing—very few musicians can resist the temptation to tweak a vocal here and alter a guitar line there. For that reason, I feel it's in everyone's best interest to keep the recording process analog and to get everything on tape pretty much the way you want it to sound in the final mix.

Of course, I don't mind doing whatever it takes to make a recording perfect. But when a band has a tight budget, I have a responsibility to reign them in, just as they have a responsibility to keep me moving forward. As long as you anticipate setups and problems, stay one step ahead of the musicians, and stick to your tried-and-true techniques, you'll deliver your end of the bargain. Assuming the band does its part, everyone will walk away happy.

Sean D. Carberry *still sneaks into Boston-area studios to record albums (quickly and cheaply) when he isn't too busy as technical director of* The Connection *on NPR.*



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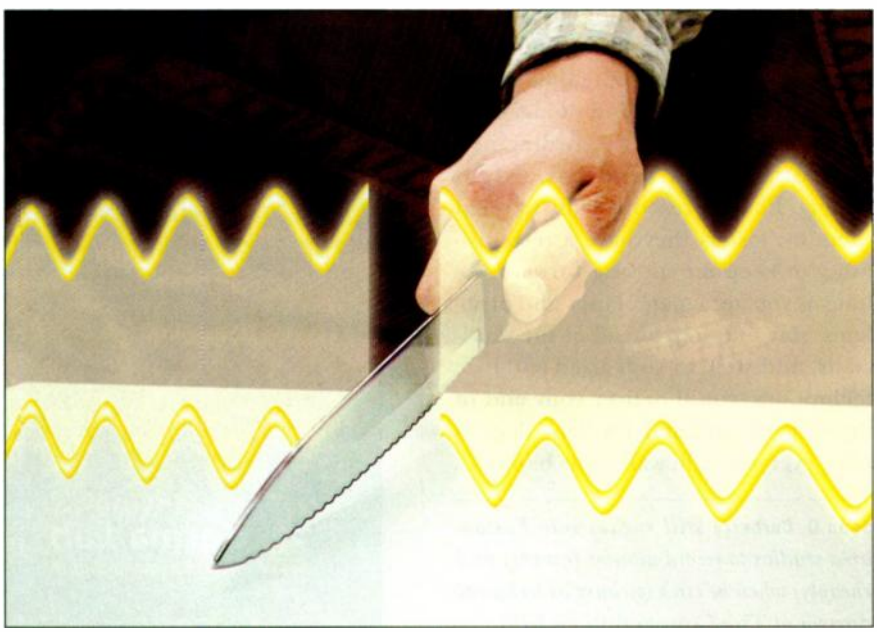
By the Slice

Beat the hassle of changing the tempo.

By Len Sasso

You rummage around in your sample library and find a fantastic drum loop to go with that tasty bass groove your buddy laid down just before he moved to Australia. Trouble is, the drum loop is at 112 bpm and the bass is at 96. You've got a problem.

You could try speeding up the bass recording or slowing down the drum loop, but neither is going to do the job, because the pitch and tonal characteristics of the sound change as you change the playback speed. You can hear this effect demonstrated in the first two audio examples accompanying this article (see the sidebar "Hearing Is Believing").



MIKE CRUZ

A number of methods are available to desktop musicians for matching the tempo of two files, all made possible by the increased processing power of modern personal computers. The options include a variety of time-stretching, pitch-shifting, and formant-shifting algorithms that use granular resynthesis and FFT-analysis and -resynthesis techniques. In this article, however, I'll concentrate on one of the most popular and easily understood solutions, beat slicing.

WHAT'S THE TRICK?

Beat slicing can be accomplished in several ways, but they all amount to breaking an audio file into a number of small segments (often called *slices*). You can do that manually using the scissors tool in your digital audio sequencing software (see **Fig. 1**), or you can rely on software such as Sonic Foundry's Acid, Ableton's Live, Propellerhead's ReCycle, or Bitshift Audio's Phatmatik Pro to automate the process. Once you have the audio file cut into slices, the trick is to change the time between slices rather

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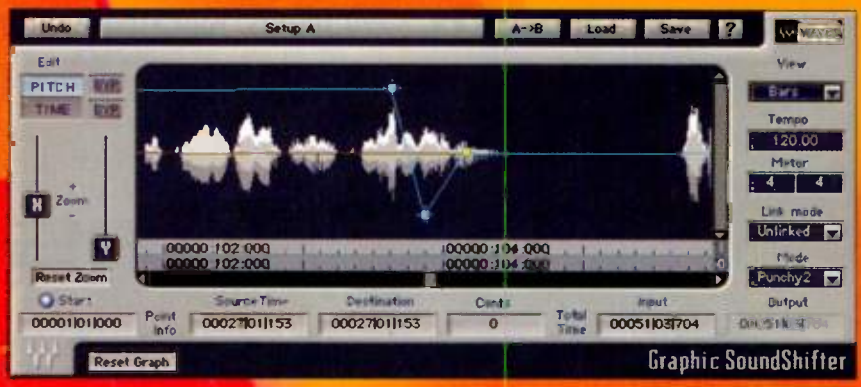
WAVES



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than alter the speed at which each slice is played. That preserves each slice's pitch and timbre while changing the tempo.

If the slicing is done accurately—for example, corresponding to individual hits of a drum loop—you can also make timing modifications such as removing or adding shuffle. You can go even farther afield by changing the order of the slices or by replacing some slices; for instance, you can replace one kick-drum sample with another. Finally, you can apply different DSP effects—pitch shifting, EQ, compression, and so forth—to individual slices.

One obvious shortcoming of beat slicing is that if the slices are played too close together they will overlap, and if they are played farther apart, there will be gaps (see **Fig. 1**). That may or may not create a musical problem, depending on the material you are using. If you're slicing a basic kick-drum part, for example, the individual kicks die out fast, and the latter part of each slice will be silence. With more complex material, however, it's likely that some adjustment will be necessary. If the slices overlap, the obvious choice is to quickly fade each slice at the crossover point.

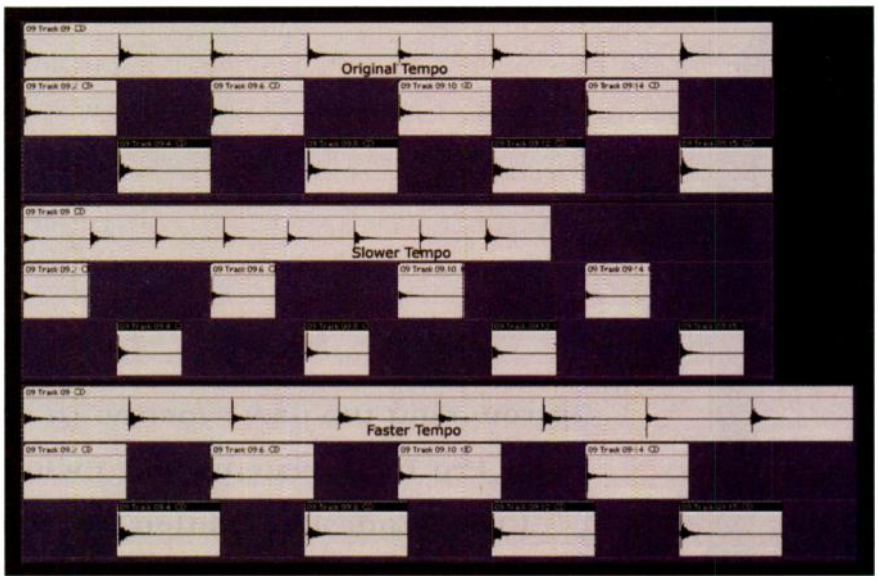

FIG. 1: A one-measure drum loop (top) is manually cut into eighth-note slices. At a slower tempo (middle), the loop occupies less than a measure and gaps appear between the slices. At a faster tempo (bottom), the loop occupies more than a measure and the slices overlap. In all cases, the individual slices are always at eighth-note positions.

When the slices are farther apart, some sort of padding is needed at the end of each slice. High-quality beat-slicing software will do both for you automatically, but when you make radical changes to the tempo, you always run into some limitations on how much fix-up the software can do.

TO BEAT OR NOT TO BEAT

There are two ways to approach slicing up an audio file. The simplest is to base

HEARING IS BELIEVING

You might be wondering how different the various beat-slicing techniques really are. On the **EM** Web site (www.emusician.com) you'll find five audio examples illustrating the techniques described in this article. Here's a quick rundown of how they were produced.

As source material I started with five four-measure audio tracks that had been recorded at different tempos: a 16th-note polysynth track at 120 bpm, a four-on-the-floor kick-drum at 130 bpm, a 16th-note hi-hat shuffle at 126 bpm, electric piano chords at 135 bpm, and a bass line at 114 bpm. All of these tracks were clearly not meant to go together, as is illustrated by the first audio example, called Original.mp3. The tracks are played together at their original tempos, and as you might imagine, the end result is a horrible mess.

The second audio example, Stretch.mp3, applies classic time stretching to each track to bring them all to 126 bpm. Classic time stretching amounts to just changing the pitch (like slowing down or speeding up a tape) to reach the desired tempo. You probably thought things couldn't get worse, but they just did.

The third example, called TimeSlice16.mp3, uses automatic time slicing to bring all the tracks to 126 bpm. In this case, all the tracks were imported into Live, and its default 16th-note time slicing was used to sync the tracks. Two things are apparent here: the hi-hat shuffle still conflicts with the straight 16ths of the polysynth, and 16th-note time slicing is hard on the sustained chords of the electric piano.

TimeSliceVar.mp3, the fourth example, again uses Live, but the time slicing for the electric piano, kick drum, and bass was changed to quarter-note slices. The time slicing of the chords is no longer as obvious. Notice that there is still no improvement in the shuffle conflict.

The last example, BeatSlice.mp3, uses event slicing on all tracks. Phatmatik Pro was used for all but the electric-piano part, which was sliced in ReCycle to take advantage of its excellent padding algorithm. The MIDI file used to play the hi-hat shuffle was then quantized to straight 16th notes. It should be obvious that event slicing produces superior results. Of course, it also takes considerably longer—you get what you pay for.

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US-224	2-in / 2-out	2 XLR mic, 2 ¼" TRS (bal./unbal.)	YUP	2 RCA (unbal.) + headphone	N/A	two S/PDIF	24 bit	1 x 16	GigaStudio & Cubasis VST	4 faders[2] + stereo master, Phones, Line, Jog and Transport	N/A
US-122	2-in / 2-out	2 XLR mic, ¼" TRS (bal./unbal.)	YEAH	2 RCA (unbal.) + headphone	two inserts	N/A	24 bit	1 x 16	GigaStudio & Cubasis VST	2 rotary input level controls, Line, Phones, Direct Monitor	

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BEYOND TIME

Tempo matching is only the tip of the iceberg. Once you have sliced up an audio file into individual events, you can replace any or all events with other audio clips. You can use that technique to swap one snare sample for another, fix a few bad notes in a solo or bass line, rearrange the words in a dialog track, or process one or more clips with a DSP effect such as compression. In fact, slice players often incorporate DSP effects for individual slice processing.

Now that you have slices triggered by individual MIDI notes, you are no longer locked in to the original timing. In the extreme, you could quantize the MIDI file to get rid of shuffle or timing errors (and with them, any human feel). Conversely, you can add shuffle or introduce slight random changes in the timing. Of course, the maxim "Garbage in, garbage out" still applies—the changes you choose to make need to be appropriate to the material you started with.

You can also change the order of slice playback by moving the MIDI notes in two ways: vertically or horizontally. Moving the MIDI notes vertically changes the slice being played. That's fine if all the slices are of equal length (as they would be with time slicing), but it's not a good idea otherwise, because the MIDI note length will probably not match the length of the new slice. Moving MIDI notes horizontally changes the playback position of a slice. That is a little more time-consuming because you need to move the other slices around in order to avoid overlaps, but it is the best method with event-sliced material. Of course, either method will allow you to play any slice at any time position.

Keep in mind that you can use the same MIDI file to play other MIDI instruments, such as hardware or soft synths. This would allow you to apply the timing or "groove" of your slices to another instrument. Typically all notes in the automatically generated MIDI file are at maximum Velocity. That's usually adequate because the slices contain their own amplitude information. However, some beat slicers (notably Phatmatik Pro) will convert the slice amplitudes to Velocity values in the MIDI file, which allows you to retain even more of the feel (including accents) of the original audio file. Note that when you're using the MIDI file to trigger another device, the original pitches have no intrinsic meaning, and you will probably need to change them to match the device being triggered.

As we've seen, beat slicing is a conceptually simple process with applications ranging from tempo matching to complete reorganization of an audio file. Loop-oriented audio software often takes care of the details without the need for your intervention, but a basic knowledge of what's going on can open up a broad range of creative possibilities.

Len Sasso *can be contacted through his Web site at www.swiftkick.com.*

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STEINBERG

CUBASE SX 1.0.6 (MAC/WIN)

A major upgrade to Steinberg's flagship sequencer.

By Len Sasso

Steinberg has taken advantage of two significant system upgrades—Windows XP and Mac OS X—to revitalize its Cubase line of sequencers. The result is a must-have upgrade for Cubase users and a worthy contender in the field of full-featured digital audio sequencing software. Cubase SX is more than just a face-lift; it combines the best features of Cubase VST/32 and Nuendo. Some familiar Cubase features have been left in the dust, but all in all, the new program is more streamlined, easier to use, and more powerful.

Among Cubase SX's most notable new features are its unlimited undo/redo capability for all processes and its permanent Offline Process History for audio files. The former lets you reverse any changes that you've made since the last save; the latter lets you reverse any destructive audio processing at any time. That essentially makes all audio processing nondestructive.

FIG. 1: The arrangement of a Cubase SX song is managed in the Project window. Individual tracks hold MIDI, audio, markers, and automation. The Track Inspector in the upper left shows editable details for the selected track; the Key Editor window appears in the lower left.

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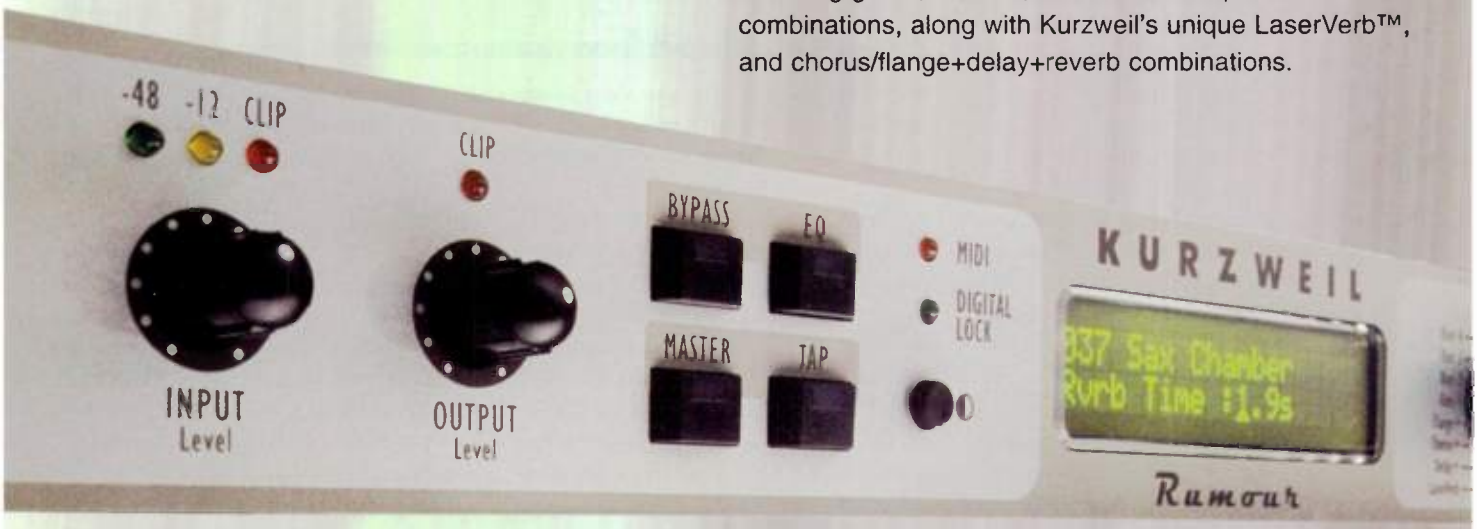

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Steinberg's VST System Link is fully supported, allowing, for example, sample-accurate linking between one computer running the company's V-Stack VST-instrument-hosting software (currently for PC only; a Mac version is in the works) and another running Cubase SX. (VST System Link is not platform specific, so a Mac with SX could link to a PC with SX.)

Surround-sound mixing is supported for up to six channels, which is enough for 5.1, but not 7.1 as in Nuendo. MP3 encoding and an improved Apogee UV22 dithering plug-in are provided, and you'll find several new VST plug-ins including DeEsser, QuadraFuzz, and the Waldorf A1 analog-modeled synth. A new MIDI-effects plug-in scheme comes with a number of useful plug-ins, and on the PC, a wrapper lets you use Cakewalk MFX-format MIDI plug-ins as well.

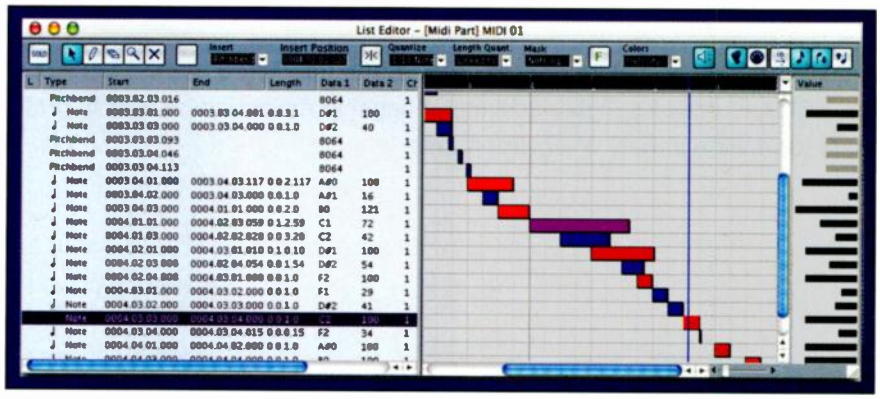

FIG. 3: The List Editor's three panes give alternate views of the same data. The left pane displays all MIDI Events in numerical form. The middle pane displays Events as bars along a timeline, and the right pane shows data values and note Velocities.

GETTING ORGANIZED

The top level of organization in Cubase SX is called a Project. The Project window (see **Fig. 1**) replaces Cubase's Arrange window, and unlike previous versions of Cubase, SX allows you to have only one arrangement in a Project. You can, however, have several Projects open at a time and freely drag audio and MIDI between them. The Project window must always be open (though it can be minimized); closing it is the same as closing the Project. That can be a bit confusing because VST windows such as the Mixer remain open even though the Project is closed.

When you create a new Project, Cubase SX asks you to select a Project folder on your hard drive. The program creates folders named Audio and Images for use by the Project Pool unless folders with those names already exist, in which case Cubase SX will use them. (That facilitates setting up separate Projects for different versions of the same song, all of which share one audio and video Pool.) Cubase SX then opens an untitled Project. That probably avoids a proliferation of false-start Project files, but I'd prefer automatically naming and saving the Project in the chosen folder.

Cubase SX distinguishes two kinds of objects for data tracks: Events and Parts. Parts are collections of Events, and in the case of MIDI, only Parts can be arranged on Project tracks. Audio Events, which are references to individual audio clips in the Pool, can be arranged individually or can be collected into Parts when you want to treat several Events as a single object for purposes of moving or copying. (Creating an Audio Part doesn't affect the audio clips involved, and the Part can be dissolved into its constituent Events at any time.)

The program offers a handy alternate view of the Project in its Project Browser—a two-pane window in which a Windows-Explorer tree-style view of all the tracks appears on the left and all Events in the Parts selected in the left pane are listed on the right. The nice thing about the Project Browser is that you can numerically edit all Event parameters. You can also sort the list of Events by any of the Events' parameters.

Cubase SX has carried over the window-management scheme from previous versions of the program, allowing you to save any screen configuration as a Window Layout. Window Layouts are stored in the program's global preferences and are available to all of your Projects. You can assign key commands to call up specific Layouts, and an Organize Layouts window lets you add, delete, and rename Layouts and recall them by double-clicking. Oddly, the one thing you can't do is reorder the Layouts; they always appear in the order in which they were created.

Window-specific settings such as zoom and scroll-position are not Part of a Window set—only the window's location and size are saved. One disadvantage of that

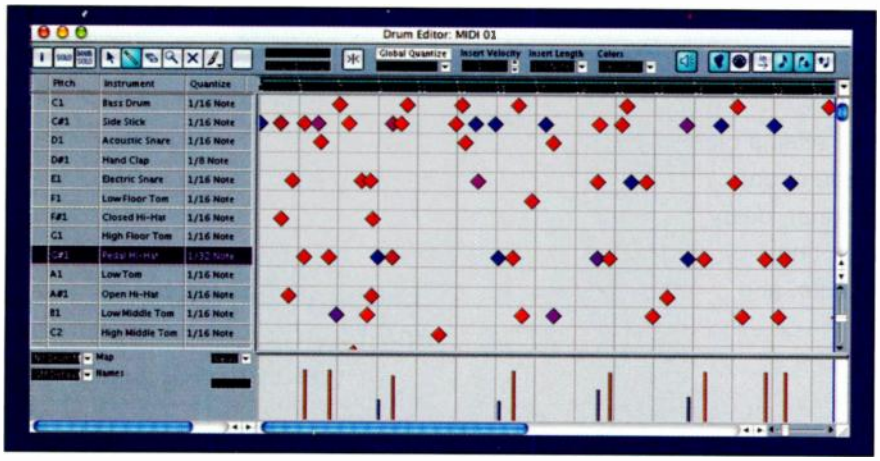

FIG. 2: The Drum Editor window displays individual notes as diamonds (rather than bars as in the Key Editor window). Each row represents an individual drum sound, and the rows can be rearranged for convenient grouping of related sounds.

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scheme is that you can't have a zoomed-out version of the Project window with optional features suppressed in one Window Layout and a zoomed-in version with all options displayed in another. In fact, the Mixer is the only Cubase SX window that allows you two views of the same information. Even with the help of key commands and the View Presets menu, I found myself wasting a lot of time adjusting window parameters.

KEEPING TRACK

Cubase SX's various track types fall into three categories: reference (Marker and Video), data (MIDI, Audio, and Folder), and automation (Channel, Group, Plug-in, and Master).

The Marker track allows you to mark individual time positions and cycle boundaries. You can create either type of Marker graphically, and individual Markers can also be created on the fly as the song plays. Pop-up menus let you jump to any Marker position, set the Right and Left Locators to match any cycle Marker, and set the horizontal zoom to match any cycle Marker. The Video track displays thumbnail frames along the Project's timeline; it's a wonderful feature for spotting hit points in a video.

Folder tracks are a housekeeping device that lets you group multiple tracks for display purposes. Once you've created a Folder track, you can drag other tracks into it, and once you have tracks in a Folder track, you can drag individual Parts to them. Folders can be expanded to show their member tracks or collapsed to appear as a single track.

Objects called Folder Parts are created automatically on a Folder track based on the time positions of the Parts within the Folder. Folder Parts can be edited like individual Parts, but the actions apply to all the Parts within the track. Although you can easily use the Glue and Scissors tools to edit the various Parts, I found the automatic creation of Parts within Folders to be more of a nuisance than an advantage.

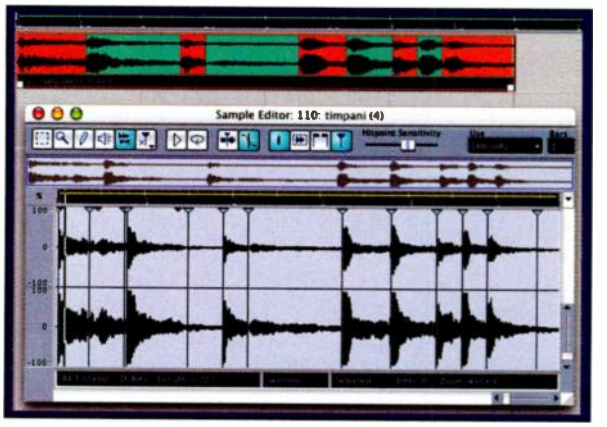

FIG. 5: The Sample Editor's Hitpoint mode can function as a beat slicer similar to Propellerhead's ReCycle. Once you've arranged the hit points to your liking, the program converts the Audio Event into a Part made up of the individual slices.

AUTO CONTROL

Automation tracks are created in several ways in Cubase SX. MIDI and Audio tracks have attached Automation subtracks for all mixing parameters. The subtracks can be revealed to create, edit, and view automation, or they can be hidden to save space. Group and Master Automation tracks are created manually in the Project window. (Channel strips for Groups, which are primarily used for submixes and stereo-effects bus returns, are automatically created in the Mixer when Group tracks are created.) Plug-in automation tracks are created automatically when automation writing is enabled on the plug-in's control panel.

Regardless of how they get there, all Automation tracks work in the same way, allowing you to enter and edit breakpoint-style automation for a single parameter. Breakpoints can be recorded with the onscreen faders or created graphically with the Pencil tool. The Pencil tool has modes for creating individual breakpoints, for drawing straight and parabolic line segments, and for drawing square, sawtooth, and sine waveforms with the current grid setting. (Check out the MP3 file AudMix for an example.)

The various drawing tools, while a good start, are sometimes a bit limited. For example, the parabolic-curve tool doesn't allow you to vary the shape, and it automatically controls which way the curve bends. Being able to control the bend direction and the degree of bending (often called the slope) as well as being able draw S-shaped curves would be welcome additions.

Cubase SX provides a flexible and user-friendly method of setting up MIDI

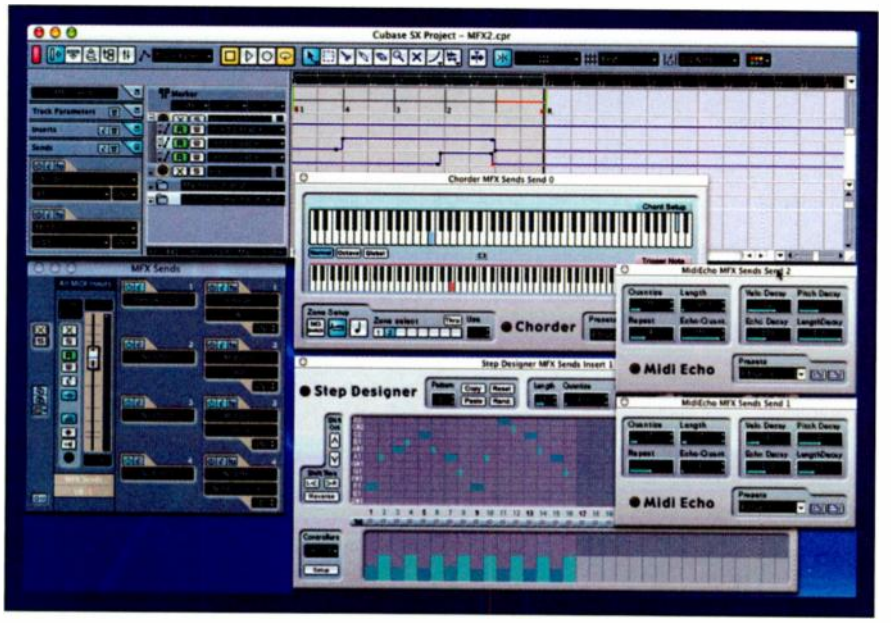

FIG. 4: Cubase SX's MIDI plug-in scheme provides a variety of MIDI processes that can be applied either as insert or send effects. Up to four inserts are possible, and they apply in series.

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WHO REALLY CARES HOW THE MUSIC SOUNDS?

❊ Today's pop stars succeed or fail on the strength of their videos. It's all about sex appeal and mass marketing. It's eye candy, with a music track. ❊ Unless, of course, you happen to be smarter than the average monkey. Early on, you discovered music through your ears, and not your eyes. Which is why you should know about Ex'pression Center. When it comes to sound recording and production, this is the place of higher learning. ❊ We take a more evolved approach. You get your Bachelor's Degree in Sound Arts in just 2 years. And you graduate with skills that will enable you to work in virtually any studio in the world. ❊ To find out more, just click on our web address. Discover why education at E.C. sounds a whole lot better than the rest.

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remote control for automation. Templates are provided for a number of popular hardware control surfaces, and a generic template lets you customize the MIDI remote setup to match any MIDI device. Once set up, remote automation works the same as using the onscreen controls except that in replace-recording existing automation data is overwritten. Unless you have a control surface with touch-sensitive faders, Cubase SX has no way of knowing when you take your fingers off the hardware control, so it continues to replace data until playback is stopped. A time-out mode would make a nice enhancement, but the existing system works fine.

Cubase SX's automation is time based; you can't connect it to individual Parts for moving and copying. You can, however, lasso-select automation data along with Parts and move or copy them simultaneously. That's a little less convenient than locking them together, but it gets the job done. For MIDI you can partially get around the limitation by recording MIDI controller data directly into MIDI Parts. You have to be careful, however, because MIDI controller data contained in a Part could conflict with Automation data for the same Part.

THE MIDI PART

As mentioned, MIDI Events on Project tracks must be contained in MIDI Parts. MIDI Parts can be recorded in real time or step time using a MIDI keyboard, and MIDI Events can be entered graphically using various tools in the MIDI editors. The four MIDI editors—Key, Score, Drum, and List—are each designed for a specific form of data editing. The Key Editor window provides the familiar piano-roll-style view with optional lanes along the bottom for other types of MIDI data. By default, a single lane shows note Velocity, but that can be changed to show any kind of MIDI data, and as a bonus, additional lanes can be added. The Score Editor window displays notes in standard music notation and offers all the scoring features previously found in Cubase VST/32.

The Drum Editor window (see **Fig. 2**) provides a number of nice features for editing drum parts. It is similar to the Key Editor except that its rows are labeled as drum sounds rather than as pitches, and the rows can be rearranged. That's a terrific feature because it lets you group similar drum sounds together and move empty rows out of the way. Notes are indicated by diamonds rather than bars, and click-dragging with the Drumstick tool (which replaces the Pencil tool) creates multiple hits spaced according to the row's quantize setting. Each row can be individually mapped to any output pitch, channel, or port. Drum sounds can be individually soloed or muted, and the Velocity lane at the bottom shows only the Velocities for the selected row.

The List Editor window (see **Fig. 3**) is a three-pane display showing MIDI data in list form, in a time-position bar chart, and in a data-value bar chart. All three panes are interactive; you can adjust any parameter numerically in the list and make changes graphically in the other panes. You can also filter any combination of MIDI data types, making it easy, for example, to edit only notes and Pitch Bend.

Cubase SX implements a MIDI plug-in scheme similar to Cakewalk's MIDI FX (MFX), and on the PC, Steinberg has a wrapper that lets you use MFX plug-ins. MIDI plug-ins manipulate MIDI data in real time during live input or track playback. The factory plug-ins range from common effects such as arpeggiation, chord construction, and step sequencing to more arcane offerings such as Transformer, a real-time version of Cubase SX's Logical Editor.

Each MIDI track has four insert slots and four send slots. Using the sends, you can route the same track through different effects to different MIDI devices. In other words, you can have a single MIDI data stream play several instruments simultaneously and in different ways. **Fig. 4** shows a Project using only MIDI insert and send effects to play four Cubase SX plug-in instruments. The processing starts with the Step Designer plug-in, so the MIDI is completely self-generated. You can hear the results in the MP3 example MFX.

FIG. 6: Cubase SX offers two very flexible Mixer views. Each channel strip can be narrow or wide, and individual channel strips can be hidden as can all channel strips of any type. An optional second pane above the channel strips shows EQ, insert effects, or send effects routings for each channel. The insert at the upper left shows the Reverb-A plug-in control panel.

THE AUDIO PART

As you'd expect, Cubase SX offers an ample selection of audio-editing tools. Audio Events are easily arranged and grouped in Project-window audio tracks. An Audio Part Editor window provides nondestructive editing of Audio Events

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Minimum System Requirements

Cubase SX

MAC: G3/733 MHz; 512 MB RAM; Mac OS X 10.2; USB port for copy-protection key (dongle)

PC: Pentium III/1 GHz; 512 MB RAM; Windows 2000/XP; USB port for copy-protection key (dongle)

within an Audio Part. (As mentioned earlier, Audio Parts serve as containers for multiple Audio Events.) A full-featured Sample Editor window lets you manually edit waveforms on a sample-accurate basis (as does the Project window). The Sample Editor and Project windows also let you apply various DSP processes. You can zoom in to the sample level for accurate positioning in any of the Editors, but the Sample Editor window offers the most detailed editing capabilities.

A number of convenient editing features are available from Cubase SX's Audio menu, and they can be applied in the Project and Audio Part Editor windows. You can bounce any selection of Audio Events to create a new audio file. A Detect Silence command lets you automatically cut up an Audio Event into slices based on a threshold and time settings. That's ideal for breaking a drum clip into individual hits. Three high-quality time-stretching algorithms are provided to accommodate a variety of material. You can time-stretch graphically by changing the length of an Audio Part in the Project window, or you can open a dialog box that lets you set the parameters numerically.

Other DSP processes available in the Audio menu include enveloping, fading (in, out, and cross) with editable shapes, normalizing, pitch shifting, reversing, flipping stereo channels, and merging with audio data that has been copied to the clipboard. Enveloping is a particularly useful feature, allowing you to create a breakpoint-style gain curve and apply it to the selected Audio Event. Finally, you can apply any available VST (or DirectX in Windows) plug-in effect to create a new Audio Event. Cubase SX even asks if you want to apply the process to only the selected Event or to all copies of the Event used in the Project—nice.

Cubase SX's full-function Sample Editor window offers most of the main features found in standalone sample editors. You can edit audio data graphically, and you can apply any of the processing from the Audio menu to the selected part of an audio clip. The Sample Editor window's Hitpoint mode (see **Fig. 5**) functions as a transient-detecting beat slicer in the style of Propellerhead's ReCycle. Once you've set up hit points, Cubase SX automatically replaces the Audio Event in the Project window with an Audio Part containing the individual slices. You can slice the Event into separate beats or create a MIDI groove template corresponding to the hit points. Although

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it doesn't offer all the bells and whistles of ReCycle, having an integrated beat-slicer is a big plus.

FIX IT IN THE MIX

The Cubase SX Mixer (see **Fig. 6**) includes a channel strip for each track in the Project window, and the channel strips appear in the same order as the tracks. That's the approach used by most software sequencers, but I'd like the option of rearranging the mixer channel strips.

You can open two Mixer windows at a time with entirely different configurations. (A track's channel strip can also be viewed in the Track Inspector at the left of the Project window.) Space-saving configuration options include suppressing all channel strips of any track type, designating individual channel strips as hideable, toggling the display of hideable channels, and toggling individual channel strips between narrow and wide display. (Narrow channel strips have smaller controls and no VU meter.) You can also toggle the display of the Master Output channel strip.

The Mixer has an optional upper pane for viewing send-bus routings and effects inserts. Each audio channel has a 4-channel parametric equalizer whose settings can also be viewed in the upper pane. Only one of the options can be viewed at a time, but which one can be set individually for each channel. Alternatively, you can open a separate Edit VST panel for any channel to show all views simultaneously. The Edit VST view also provides enhanced graphics for the EQ settings.

For a complex Project, setting up the Mixer (in both appearance and content) can take quite a bit of time, but a number of aids have been included to simplify the process and limit its repetitive aspects. You can save and recall View settings using a drop-down menu at the bottom-left corner of the Mixer window; you can copy and paste settings between channels; and you can

PRODUCT SUMMARY

Steinberg
Cubase SX 1.0.6
digital audio sequencer
$799.99
upgrade from Cubase VST/32 5.0
$149.99

FEATURES	4.5
EASE OF USE	4.0
DOCUMENTATION	2.5
VALUE	4.0

RATING PRODUCTS FROM 1 TO 5

PROS: Very flexible, full-featured Mixer. Extensive MIDI plug-in collection. Powerful and easy MIDI remote setup for Mixer and plug-in control.

CONS: No printed manual. Window layout management is a bit limited. Graphic automation editing has some limitations.

Manufacturer
Steinberg North America
tel. (818) 678-5100
e-mail info@steinberg.net
Web www.steinbergusa.net

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save selected channel setups or entire Mixer setups to disk. As I mentioned, you can also set up MIDI remote control of all Mixer parameters, and you can link channel level, mute, solo, monitor, and record-enable settings. Relative levels are preserved for linked channels, and you can use the Alt (Option on the Mac) key to alter an individual setting on a linked channel. The mixer-setup tools—especially the presets feature—are invaluable time-savers.

Cubase SX has two send-effects busing schemes. You can apply up to eight effects plug-ins in the VST Send effects window and use a channel's send controls to bus a mono mix of its output to any effect. The effects are automatically returned to the Master Output, and you need to use the effects' settings to control the wet/dry mix and return level. However, Group channels provide a more robust scheme. When a channel send is routed to a Group, the send is stereo. You can also route the output of a channel to a Group, allowing you to use Groups as submixes, and you can route the output of lower numbered Groups to higher numbered ones. In short, you can set up just about any effects and submixing scheme you can think of.

Cubase SX includes a sizable collection of effects plug-ins in all the major categories as well as a few "trick" effects such as my favorite, the Step Filter. It's a resonant multimode filter with a built-in 16-step pattern-sequencer for controlling filter cutoff and resonance. It's especially good for mangling straight-ahead percussion loops by filtering alternate eighth-note or 16th-note hits. You're also given the option to install all the original Cubase 5 effects and synths.

THE MISSING MANUAL

Cubase SX comes with a small 182-page printed Getting Started manual; unfortunately, most of the documentation is provided only as PDF files, which you can read onscreen or print out yourself. If you prefer to do neither, you can buy Mark Wherry's excellent (but poorly indexed) 808-page *Cubase SX/SL Reference*, which includes tutorials and a good intro to Cubase SX. If you've never used digital audio sequencing software before and you're working on a PC, Wherry's *Quick Start Cubase SX* is also worth a look. Both are published jointly by Wizoo and the Music Sales Publishing Group (2002).

Another excellent reference, which covers all aspects of Cubase SX and contains many useful tips, tricks, and step-by-step explanations, is Simon Millward's *Fast Guide to Cubase SX*, published by PC Publishing. Keith Gemmell's *Get Creative with Cubase SX/SL* (Musca and Lipman, 2003) and *Cubase SX/SL Tips and Tricks* (PC Publishing, 2003) are also useful guides.

MORE IS MORE

Cubase SX is an enormous program; I have highlighted only some of its more salient features here. If you're currently a Cubase user, there's no question that the upgrade is worth it, and in a nice gesture, Steinberg lets you keep using your old Cubase VST dongle, so you can have the best of both applications. (You can also use the earlier version of the program as part of a VST System Link setup.)

If you're new to digital audio sequencing, don't need a lot of advanced features, or are working on a tight budget, you might want to check out Cubase SL ($499.99). It has the same architecture and philosophy as Cubase SX, but is less expensive and omits some features. It doesn't support surround sound, allows fewer VST plug-in instruments, is missing some of the Cubase SX effects plug-ins, and doesn't include all of the scoring capabilities. If you start with SL, you can upgrade to Cubase SX for $299.99, and the total cost will be the same as buying Cubase SX in the first place.

For high-end music production, Cubase SX certainly packs a lot of powerful features into a well-designed user interface. With its impressive family tree that includes Nuendo and with its professional-level processing, notating, film-scoring, mastering, and editing tools, Cubase deserves some serious consideration.

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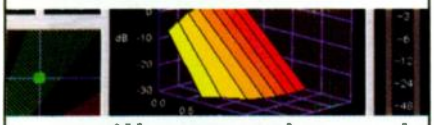
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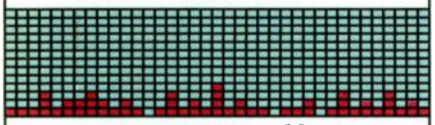
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MOOG MUSIC

MINIMOOG VOYAGER

A classic analog synthesizer is updated for the modern age.

By Geary Yelton

In the beginning, Moog Music made modular synthesizers, and they were very good. But it wasn't until 1971, after Bob Moog and company designed and built the portable Minimoog Model D, that synths were sold in music stores. Between 1971 and 1984, the Minimoog sold approximately 13,000 units and permanently altered the modern soundscape, etching its influence on late-20th-century music.

Fast-forward to the year 2001: Bob Moog's North Carolina–based company Big Briar, maker of theremins and sophisticated effects pedals called Moogerfoogers, announced a Minimoog for the 21st century by staging a contest to name the new instrument. After several prototypes and dozens of design changes, the Minimoog Voyager began shipping in August 2002. By then, Big Briar had successfully regained the rights to use the name Moog Music.

The monophonic Voyager is everything the Minimoog was and more. In addition to voltage-controlled oscillators, filters, amplifier, and envelope generators (EGs), the Voyager offers two distinct advantages of digital technology: Preset memory and MIDI communication. Other technical refinements, along with true analog sound, have made the Voyager a serious contender for pride of place onstage and in studios everywhere.

VOYAGE OF DISCOVERY

Like the original Minimoog, the Voyager is housed in a beautiful wood case with a 44-note keyboard and a control panel that tilts upward at an adjustable angle (see **Fig. 1**). The entirely hand-built 40-pound instrument's construction is as solid as ever. Although the front-panel layout has been changed a bit, the new Minimoog bears a remarkable resemblance to its namesake except for the center section, which provides access to the analog synth's digital features. Even the knobs and rocker switches are the same types as on the original, giving the Voyager quite a retro look and feel. Immediately above the wheels are Glide and Release switches, just as on the original. My review unit had transparent pitch-bend and mod wheels that glow a backlit blue, a $119 option that looks really cool onstage.

Considering Moog's experience with synthesizer ergonomics, it is no surprise that the Voyager's arrangement of front-panel controls has an intuitive flow that makes it easy to navigate. In the upper left is the LFO section, with Fine Tune and Glide Rate knobs just below. The Modulation Bus section is to its right, and next to that is the Oscillator section, which contains all the controls for the Voyager's three audio oscillators. The main display above and the touch pad below dominate the center section, with a row of seven buttons between them. Next come the Mixer, Filters, and Envelopes sections, and finally the Output section, containing only the Master Volume, Headphone Volume, and a ¼-inch stereo headphone jack.

The Voyager's controls are plentiful and most are conveniently placed, but they aren't perfect. Even though placing the Volume control on the far right is pretty standard, I'd prefer a knob that's easier to reach with my left hand when my right hand is on the keyboard. I like to be able to shape loudness manually, like an electric guitarist can. Luckily, a control input for volume lets you dedicate a control-voltage (CV) pedal to that function. The Voyager's 1.25-by-2.25-inch backlit LCD is just a bit small by today's standards, especially considering the quantity of information that's crammed into such a tiny space. On the other hand, I do appreciate just how much data is available at a glance, even if I have to squint to see what looks like 12-point type. Happily, Preset names are twice as big. But the best thing about the LCD is that it simultaneously displays original and edited parameter values whenever you turn a knob.

Other than headphones, most of the Voyager's connections to the outside world are atop its tilt-up panel (see **Fig. 2**). Of special note is the multipin accessory port that connects the

FIG. 1: Consumer demand fueled the creation of the Minimoog Voyager. Like the original Minimoog, it was a classic from the moment it hit the streets.

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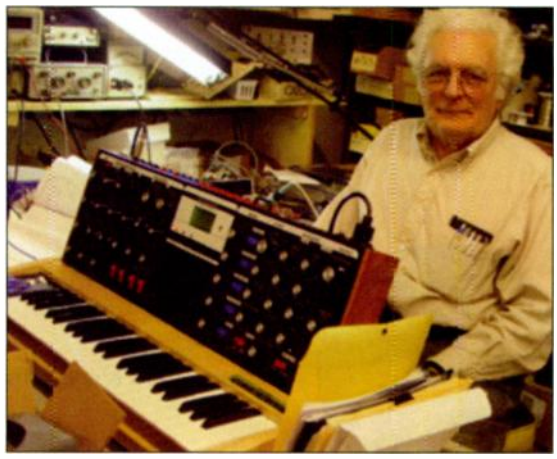
Voyager to the optional VX-351 CV Expander. Except for three MIDI ports, a BNC connection for the optional 12V gooseneck lamp ($38.50), and an IEC power socket, all the remaining connectors are ¼-inch jacks. Those include two audio outputs, an external audio input, a mixer-out/filter-in jack, ten red control inputs, and four blue gate inputs. Those color-coded control and gate inputs open up a world of external modulation capabilities, which I'll later discuss in more detail.

The Voyager is available in Performer and Signature models. At $2,995, the Performer model costs twice as much as the Minimoog did when it was introduced; when you take inflation into account, though, it's certainly less expensive. The Signature model is a limited edition; all 600 have left the factory and are available from authorized dealers. For $500 more than the Performer model, the Signature model offers such niceties as a choice of solid cherry, maple, or walnut for the cabinet; the aforementioned illuminated wheels; a four-year warranty with two free tunings; and Bob Moog's signature certifying that he personally inspected it prior to shipping (see Fig. 3). For this review, I had the Performer model.

SURFACE WITH A SMILE

At first glance, the touch pad, which Moog calls a Touch Surface Controller, might appear to be a 5.00-by-3.25-inch video monitor that's switched off. When you touch it, however, you'll discover a subtly ribbed surface that Moog calls a three-dimensional XYA controller. It responds to movements of your finger from side to side (the *x*-axis) and up and down (the *y*-axis), and to changes in the amount of area covered by your fingers (the *A*-axis).

By default, the touch pad controls three filter parameters: cutoff, spacing, and resonance. You can reassign it to control other modulation destinations in the Edit menu, with different assignments for each Preset. Possible destinations include LFO rate, glide rate, waveform, noise level, envelope values, and modulation bus depth. If you enable latching, then the touch pad holds its value at the last location of your fingers on the *x*- and *y*-axes. You can set the touch pad to generate either positive or negative control signals, and you can set its modulation depth to off, halfway, or full.



GEARY YELTON

FIG. 3: Scientist at work: Bob Moog personally inspected each Voyager Signature model before he signed his name to it.

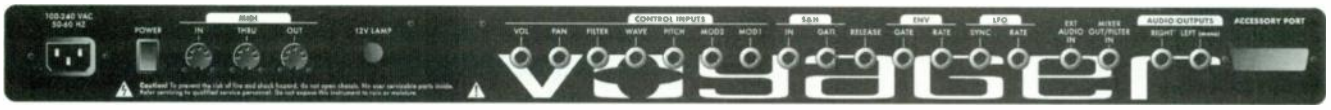
I found it rather odd that the touch pad is in the center rather than on the left side, as it is on instruments such as the Roland V-Synth and Korg Triton. I suppose that arrangement is meant to accommodate either right- or left-handed playing, but it's just a bit awkward when you're forced to cross hands for the sake of musical expression. In practice, though, the Voyager's touch pad is a very effective real-time controller; in particular, controlling modulation by applying additional fingers feels quite natural as a means of musical expression.

ANGELS IN THE ARCHITECTURE

The Minimoog Model D helped establish the synthesizer voice's most typical configuration, but the exact selection of components has always varied somewhat from one synth to another. The Voyager begins with its forebear's basic structure and adds features such as multimode filters instead of merely lowpass, four rather than three controllable envelope stages, and considerably more modulation possibilities. You won't find an onboard effects processor, though, so you'll probably want to process the Voyager's sounds with reverb at the very least.

In an initial moment of confusion, I searched in vain for an autotune function; I quickly discovered that you must tune the Voyager by hand. The Fine Tune knob allows you to change the overall tuning by a minor third up or down. In the Mixer section, you can switch on and control the level of each oscillator, as well as white noise and the external audio input, independently. In my test unit, tuning stability was excellent and required only minimal warm-up time.

The Voyager's three audio oscillators add a terrific twist: continuously variable knobs let you select triangle, sawtooth, square, narrow pulse, or any waveshape in between. As you turn the Wave knob clockwise from triangle to sawtooth, harmonic complexity increases. Turn it a bit further, and the even-numbered harmonics drop out. Continue to turn, and the pulse width varies from square to narrow. That capability gives you as many different waveforms as you can get from a traditional voltage-controlled oscillator. Waveshape is a voltage-controllable parameter, which means that you can



MOOG MUSIC

FIG. 2: The Voyager's patch panel provides unprecedented voltage control capabilities, analog audio I/O, and MIDI, too.

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Photos shown with optional AIB-8 analog input board.

D16XD

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• MINIMOOG VOYAGER

As useful as all the external inputs are, I certainly wish Moog had included a few control outputs, too, particularly LFO and EG. The ability to reroute control signals would have extended the Voyager's modulation capabilities to overcome a few minor shortcomings in that department.

If you add the optional VX-351 CV Expander ($265), however, your Voyager will gain many of a modular synth's control-routing capabilities. Using the VX requires that you open up your Voyager and install an output adapter mounted on a small circuit board. The VX-351 houses 2 attenuator knobs, 21 ¼-inch jacks, and a 25-pin D connector on its 5-by-9-inch surface. It supplies control outputs for the touch pad, keyboard, wheels, noise, pedals, EGs, LFO, and sample and hold. Adding the VX to your Voyager setup gives you a wealth of new choices for modulation routings. If you want to program your own signature sounds, I definitely recommend springing for the VX-351.

SOUND AND FURY

The Voyager has enough memory to store 128 user-programmable Presets—that's not a lot, especially when you consider the thousands of user patches that might appear online as a result of the instrument's easy programmability. The shortage of memory reserved for storing Presets is perplexing, particularly because there's no need for multitimbral programs in a monotimbral instrument such as the Voyager.

But what wonderful sounds they are! What the Voyager lacks in quantity, it certainly makes up for in quality. Punchy basses, searing leads, striking effects—the Voyager puts them all at your disposal. It can perfectly reproduce all the timbres that made the Minimoog famous, and it extends its ancestor's patch programming possibilities tremendously, so you can craft sounds the original couldn't touch. Virtually every Preset exhibits a luxurious warmth that you just can't achieve without analog electronics. In exploring the factory Presets, though, I was surprised at how few took advantage of the keyboard's velocity- and pressure-sensitivity. You can also enable Real Panel Control, which ignores what's in memory and plays the settings on the front panel, just like a synthesizer that doesn't have Presets.

I spent some time exploring the Performer model's standard Presets. Not surprisingly, the emphasis is decidedly on the sounds of yesteryear. Of all the bass Presets, In the Pocket and Bass for E. Vonallen are my favorites; both are definite blasts from the past, and certainly the most authentic Moog basses I've ever heard (because that's exactly what they are!). If you want to sound just like Rick Wakeman or Tony Banks in the mid-'70s, Chiffy Lead is an excellent solo Preset. Familiar Growl is straight from Wakeman's *The Six Wives of Henry VIII*. He Was Lucky, of course, is the perfect ELP simulation.

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The Minimoog Voyager begins with everything that the Minimoog had to offer in the '70s and adds MIDI, 128 memory Presets, a touch-sensitive keyboard, continuously variable waveforms, a stereo multimode filter, and expressive real-time modulation capabilities. With the addition of some affordable hardware to harness its potential for external voltage control, the Voyager can perform many tricks that used to require a modular synth. If you've ever wanted a real Minimoog, there's no contest: buying a Voyager beats owning an original hands down. If an analog monosynth fills your needs, look no further.

Granted, for the same money, you could buy a used polyphonic analog synthesizer or a less expensive monosynth. But then you'd probably be giving up the cachet of owning a real Moog, the retro styling, and the decades of experience that went into its design. Most of all, you'd sacrifice something that's hard to attain without a Moog: the Moog sound. You'd also miss out on the expressive nuance that the Voyager can achieve by means of its continuous controllers. If you want to plug in eight CV pedals and three footswitches for real-time performance gestures, you can.

Sure, the Minimoog Voyager is a little expensive; the finer things in life often are. It's your money, but if you're at all tempted to buy one, I say try it, and then buy it. Bon voyage!

EM *associate editor* **Geary Yelton** *has been messing around with electronic music since 1971 and writing about it since 1976. He lives in Charlotte, North Carolina.*

PRODUCT SUMMARY

Moog Music
Minimoog Voyager
analog synthesizer
Performer model $2,995
Signature model $3,495

FEATURES	4.0
EASE OF USE	3.5
QUALITY OF SOUNDS	4.5
VALUE	4.0

RATING PRODUCTS FROM 1 TO 5

PROS: Sounds great. Hands-on control with plenty of performance expression. Programmable modulation routings. Lots of CV inputs. Upgradeable functionality through system updates. Solid construction. Looks cool.

CONS: Small LCD. No effects processor. Only two programmable modulation routings. No CV outputs without optional VX-351.

Manufacturer
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D16XD

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create a lot of interesting sonic motion by modulating it with an envelope, LFO, mod wheel, or CV pedal.

Although each oscillator has a six-position Octave knob, it's assumed that it will produce the fundamental frequency, so oscillator 1 has no Frequency control. Instead, you change its tuning with the master Fine Tune knob, and you can't deviate more than a minor third from concert pitch. Dedicated Frequency knobs let you tune the other two oscillators up or down a perfect fifth relative to the first. Two red rocker switches hard-sync oscillators 1 and 2 and enable frequency modulation of oscillator 1 with oscillator 3. Oscillator sync wasn't available on the Model D, but now it's considered a modern necessity for analog synthesis. Two other switches toggle the third oscillator from audio range to low-frequency and from keyboard control to a fixed frequency, allowing it to serve as a second LFO when you need one or to drone independently of what you play on the keys.

The old Minimoog is still famous for the sound of its 4-pole filter, and rightfully so. The Voyager offers a pair of filters with the very same 24 dB-per-octave response, but you also have a menu choice of selecting one, two, or three poles for more flexible filtering.

In Dual Lowpass mode, the two filters operate in parallel so that one is applied to the right stereo output and the other to the left. A single knob controls the cutoff frequency of both sides, and a Spacing control shifts the cutoff frequency of the right filter. The result is a much more dramatic stereo separation, especially when you apply a modulation source to the cutoff frequency. Using the touch pad to continuously change the resonance of two different cutoffs at the same time is a really cool effect that you have to experience for yourself.

GEARY YELTON

FIG. 4: You access the Voyager's software-based functions using seven buttons and the LCD, which here displays the modulation source menu for the mod wheel.

In addition to Dual Lowpass, there's a Highpass/Lowpass mode that splits the two filters in series for bandpass response. The Spacing knob shifts the Highpass filter's cutoff frequency, and therefore the width of the passband. In Highpass/Lowpass mode, only the

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VTB1 Variable Tube Mic-Pre

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lowpass filter is resonant, and identical signals are routed to both stereo outputs.

The Minimoog Model D had EGs that applied the Decay setting to the release stage as well. You could defeat the prescribed final decay by flipping the Release switch, which was conveniently located above the left-hand wheels. The Voyager has the same switch, and although its EGs are true ADSR generators, the Release switch is an excellent performance feature. One EG is devoted to the filter and the other to amplitude, and a Rate input lets you skew the envelope times with an external CV source.

MOD OR ROCKER?

The Modulation Busses section provides a lot of functionality that synthesists have come to expect but that wasn't available on the Model D. The Voyager provides two programmable modulation routings: one controlled by the mod wheel and the other controlled by either an external CV source (most likely a footpedal) or a fixed maximum value. Compared to a synth with matrix modulation, two programmable routings aren't especially generous, but that's two more than the first Minimoog offered. Although the mod buses account for vibrato and most other typical mod functions, a few expected routings—such as LFO to amplifier for tremolo—are missing.

Your selection of modulation sources includes three LFO waveforms (triangle, square, and sample and hold), oscillator 3, the noise generator, an external CV input, and a fixed voltage. Mod destinations include the pitch of all three oscillators, oscillator 2 or 3 only, filter cutoff, and waveshape. In a software menu, you can also select from a list of eight additional modulation sources and eight additional destinations; such sources include filter envelope and the touch pad's *x*- and *y*-axes, and destinations include LFO rate and filter spacing. A dedicated Amount knob provides control over mod depth for each of the two buses. It would have been useful to be able to invert the modulation signals—most mod sources apply only positive modulation—but you can reverse the touch pad's polarity when you need negative modulation.

In addition to specifying the source and destination, you can moderate the modulation signal by means of the Shape control, which varies the source's depth using the filter envelope, Velocity, Aftertouch, or a programmable source. Those choices open up lots of classic modulation tricks, such as modulating a synced oscillator with an EG. The ability to select a Shape source in software hasn't been implemented in the most recent software revision, but it's expected.

MOOG Á LA MODE

The Voyager's software-based functions are tucked away in what Moog Music calls its user interface. Physically, the interface consists of the main display and the seven square buttons located below (see Fig. 4). The Voyager has

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three main modes, each with a dedicated button: Panel, Edit, and Master. Three other buttons scroll the display's contents up and down and move the cursor laterally, and the Enter button confirms your selections.

The Voyager powers up in Panel mode, and that's where you'll keep it most of the time. Panel mode simply displays the name of the current Preset. Edit mode is where you make any edits to the current Preset that can't be done using the front-panel controls, such as making modulation assignments, changing the keyboard triggering mode, and saving Presets. Master mode is where you assign MIDI channels, enable data dumps, and perform various other global tasks.

When you press the up and down buttons, a cursor vertically scrolls in the display. Only four items appear at a time, so every fifth press completely changes the LCD's contents, and that's just a little disorienting. I'd rather see items scroll one at a time, so that the previous item always appears either just above or below the current choice. For navigation, I usually prefer turning a knob to pressing up and down buttons, but at least the buttons don't operate in reverse as they did with the previous operating system. The current software really threw me for a loop after I performed an update and the cursor moved in the opposite direction from what I'd grown accustomed to in the prior version. One quibble I hope to see addressed in a future revision is that when you exit a menu, the display always goes back to the first item in the previous menu rather than to your last selected item, and that slows down programming needlessly.

After I downloaded the operating system update, the Voyager's faculties were greatly enhanced and much of the disappointment I felt with the original was ameliorated. The Voyager's software is written by Rudi Linhard (www.lintronics.biz), a German programmer who's obviously a longtime Moog synth aficionado. Installing it was a simple as opening two SysEx sequences on my computer and enabling reception on the Voyager. Because the Voyager's MIDI functions depend on its current software revision, its capabilities will continue to grow.

GO OUTSIDE AND PLAY

One aspect of the Voyager that sets it apart from almost any other synth is its external interfacing. Its ten continuous controller inputs (color-coded with red nuts) accept signals from a variety of sources, including CV pedals, envelope followers, and analog sequencers. Three of the four gate inputs (color-coded with blue nuts) accept standard footswitches. (The gate input for sample and hold requires a fixed +5V gate signal.) All have sturdy jacks that accept regular instrument cables—a vast improvement over modular designs that provide ⅛-inch minijacks. The control and gate inputs extend the instrument's real-time modulation options immensely.

The Voyager uses external control signals to modulate volume, panning, pitch, waveform, and the like. Except for the Mod1 and Mod2 inputs, however, the inputs don't provide any attenuation. Gate inputs are provided for sample and hold, LFO sync, EG release stage, and EG gate, which initiates the envelope's attack and release.

Most of the external inputs are for control signals only. On a true modular synth, you can reroute audio signals, too. The Voyager supplies two audio inputs: one that sends audio through the synthesizer's signal path and another that serves as an insertion point for external effects. Because there's no provision for triggering the envelopes by exceeding an audio threshold, though, you'll need to either flip the Env. Gate switch to its On position (disabling keyboard control) or manually press a key to trigger each envelope for processing external sounds.

You can also address dozens of parameters with MIDI. Each front-panel knob and switch responds to a fixed MIDI Control Change (CC) number. The controls don't send MIDI data, but CC transmission is planned for a future software update.

Minimoog Voyager Specifications

Sound Engine	analog subtractive synthesis
Keyboard	44-note, Velocity and Channel Aftertouch
Controls	(40) knobs, (13) switches, (7) buttons, mod wheel, pitch-bend wheel, Touch Surface Controller
Polyphony	monophonic
RAM Programs	128
Audio I/O	(1) unbalanced ¼" TS input; (1) unbalanced ¼" TRS insert; (2) unbalanced ¼" TS outputs; (1) ¼" stereo headphones
Control I/O	(10) CV inputs; (4) gate inputs; (1) accessory port (for optional VX-351 CV Expander)
MIDI I/O	In, Out, Thru
Oscillators	(3) audio VCOs with continuously variable waveshape (1 with LF range); (1) LFO
Filters	(2) VCFs, switchable from dual resonant lowpass to lowpass/highpass; selectable 1, 2, 3, or 4 poles
Amplifier	stereo
Envelope Generators	(1) filter ADSR; (1) amplitude ADSR
Display	1.25" × 2.25" backlit LCD
Power Supply	internal 100–250 VAC; IEC connector
Dimensions	30.5" (W) × 3.0" (H) × 18.0" (D); 12.0" (H) when fully upright
Weight	40 lb.

World Radio History

"I Landed a Record Deal in a Week Because I Joined TAXI"

Brian Allan – TAXI Member

I know it sounds almost too good to be true, but I really did land a record deal about a week after arriving in America on my first visit. That's me signing my contract with 2K Sounds/EMI President Michael Blakey on the left, and V.P. of A&R, Laura Becker on the right.

My name is Brian Allan, and I'm from Scotland. I thought landing a deal with a U.S. label was just a pipe dream, but I was really determined. I figured all I needed was a "vehicle" to get my music heard by American labels.

The vehicle I chose was TAXI. And let me tell you why I'm so incredibly happy I did.

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Before I'd even taken advantage of TAXI's phenomenal industry connections, I heard about their annual convention, The Road Rally. I decided to fly out to Los Angeles and give it a try.

I was amazed by what I saw. Nearly two thousand songwriters and artists were there. Plus more high-level music industry executives than I had ever seen in one place. The panels were brilliant, but what happened next was a dream come true.

A fellow TAXI member heard my music, and introduced me to an A&R person who was a panelist at the convention. She liked my music so much that she asked me to extend my stay in the States. Needless to say, I was more than happy to oblige.

The next thing you know, I was auditioning for the president of the label right in his office. I guess I passed the audition, because I got signed a few days later.

The ironic part is that I got my record deal so quickly, I never got to pitch my music to the hundreds of companies that use TAXI to find songs, bands, artists, and tracks for film and TV projects.

Will your TAXI membership get you a record, publishing, or Film & TV deal? That all depends on your music. As my friends in Scotland always say, "You can't win the lottery if you don't buy a ticket."

But TAXI offers a lot more than a great way to get your music heard by key people in the music industry. Their monthly newsletter, personal feedback, and private convention are worth much more than the price of investing in a TAXI membership.

If you are a songwriter, artist, composer or band, then I highly recommend that you make the call to TAXI right now. I did, and it changed my life!

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As useful as all the external inputs are, I certainly wish Moog had included a few control outputs, too, particularly LFO and EG. The ability to reroute control signals would have extended the Voyager's modulation capabilities to overcome a few minor shortcomings in that department.

If you add the optional VX-351 CV Expander ($265), however, your Voyager will gain many of a modular synth's control-routing capabilities. Using the VX requires that you open up your Voyager and install an output adapter mounted on a small circuit board. The VX-351 houses 2 attenuator knobs, 21 ¼-inch jacks, and a 25-pin D connector on its 5-by-9-inch surface. It supplies control outputs for the touch pad, keyboard, wheels, noise, pedals, EGs, LFO, and sample and hold. Adding the VX to your Voyager setup gives you a wealth of new choices for modulation routings. If you want to program your own signature sounds, I definitely recommend springing for the VX-351.

SOUND AND FURY

The Voyager has enough memory to store 128 user-programmable Presets—that's not a lot, especially when you consider the thousands of user patches that might appear online as a result of the instrument's easy programmability. The shortage of memory reserved for storing Presets is perplexing, particularly because there's no need for multitimbral programs in a monotimbral instrument such as the Voyager.

But what wonderful sounds they are! What the Voyager lacks in quantity, it certainly makes up for in quality. Punchy basses, searing leads, striking effects—the Voyager puts them all at your disposal. It can perfectly reproduce all the timbres that made the Minimoog famous, and it extends its ancestor's patch programming possibilities tremendously, so you can craft sounds the original couldn't touch. Virtually every Preset exhibits a luxurious warmth that you just can't achieve without analog electronics. In exploring the factory Presets, though, I was surprised at how few took advantage of the keyboard's velocity- and pressure-sensitivity. You can also enable Real Panel Control, which ignores what's in memory and plays the settings on the front panel, just like a synthesizer that doesn't have Presets.

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PROS: Sounds great. Hands-on control with plenty of performance expression. Programmable modulation routings. Lots of CV inputs. Upgradeable functionality through system updates. Solid construction. Looks cool.

CONS: Small LCD. No effects processor. Only two programmable modulation routings. No CV outputs without optional VX-351.

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BURTON AND PICH

CECILIA 2.04 (MAC/WIN/LINUX)

A powerful tool for processing and generating sound.

By Dennis Miller

Many desktop musicians are familiar with MIT's sound-programming language, Csound. What they might not know is that it's no longer necessary to type code to work with the software. A number of new helper applications have appeared that provide graphical interfaces for Csound, making the language much easier to work with (see "Csound Comes of Age" in the July 2002 **EM**). One application, Alexandre Burton and Jean Piché's Cecilia, has been available for Mac and Linux for some time but was only recently ported to Windows by UC Davis faculty member Bill Beck. Like all things Csound, Cecilia is in the public domain and is free of charge.

Cecilia offers access to all of Csound's features but extends the language in unique and exciting ways. It runs "on top" of Csound—you can use Cecilia without any knowledge of what's happening under the hood, though the more you know about Csound and sound synthesis, the more you'll get from the program.

I'll review Cecilia 2.04 running under Windows, but the feature set is nearly identical on the other platforms. First, just a few words of introduction about Csound itself.

FROM C TO SHINING C

Csound is a programming language for generating and processing sound that has its roots at Bell Labs, where, in the late 1950s, many of the most significant developments in computer-generated sound first occurred. Like any programming language, Csound supplies a library of functions with which the user builds the types of sound-generating and -processing algorithms desired. Most functions have one or more parameters that the user must supply, and a complex design (which Csound calls an Instrument) can require dozens of parameters. Though it was originally developed as a non-real-time application, several new versions of Csound allow you to hear your sounds as they compile (see the Csound home page at http://csounds.com for further details).

Minimum System Requirements

Cecilia 2.04

MAC: G3/600 MHz; 64 MB RAM; Mac OS 9

PC: Pentium II/800 MHz; 64 MB RAM; Windows 98, 2000, ME, XP

Cecilia's main job is to help you avoid the extensive typing that is typically required to work with Csound. Using its large and colorful main screen, called the Grapher (see **Fig. 1**), you enter values for the various parameters of the included Csound Instruments by drawing large sweeping arcs with your mouse or using the various data-input tools Cecilia provides.

Before you start making sound, you'll need to set up various preferences to optimize Cecilia for use on your computer. There are numerous adjustable settings: you designate the version of Csound you want Cecilia to call upon (a real-time version is included), choose folders for the various types of files you'll use and create, and identify external audio and MIDI programs to play those types of data.

Inside Cecilia, you can also tweak all of Csound's own settings; you can, for example, adjust the buffer size for real-time playback, pick the default sampling rate and output file type (WAV, AIFF, or RAW), and choose how much memory to allocate to the program. With just a little effort, you can tweak Cecilia for optimal performance within nearly any computing environment.

JOB ONE

If you're inclined to run through the presets when first checking out a new piece of gear, you can start right in by testing Cecilia's existing Modules to see how they sound. Modules are text files that contain complete Csound Instrument designs along with additional information that determines how the Modules look when first loaded (see the sidebar "Module Building" for more details).

Included with Cecilia for Windows are several dozen Modules that are grouped by category. Among these are

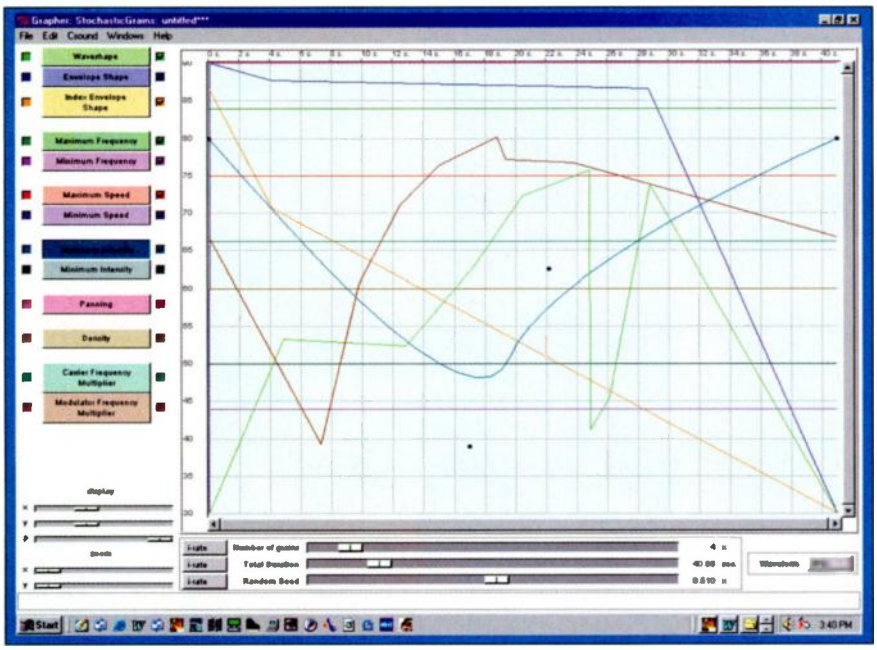

FIG. 1: Cecilia's highly graphical interface uses envelopes and sliders to control the parameters of a Csound Instrument. The Grapher window is the program's main work area.

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spectral effects (equalizers and filters), dynamics processors (distortion and compression/expansion), additive- and granular-synthesis processes, time-based routines (delays and time compression/expansion), and a number of processing functions that defy categorization (including my favorite, Singin-in the-Fog). There are also Modules for per-

MODULE BUILDING

Building your own modules in Cecilia is fairly trivial, though some experience with Csound is highly recommended. The Module in this example requires Csound version 4.02 or greater, which is included with Cecilia for Windows. For the completed Phaser2 Module, which has a few extra bells and whistles, go to http://music.ucdavis.edu/re4m/cecilia.

This example uses the Csound opcode phaser2, a classic phaser effect with time-varying feedback and separation of the filter bands that produce the characteristic sweeping overtones. The Csound manual shows this phaser2 syntax:

```
ar phaser2 asig, kfreq, iqual, iord, imode, ksep,
kfeedback
```

Csound k-rate data is represented in Cecilia with graphs, i-rate data with sliders. Looking at phaser2, you can see that it will have three sliders and three graphs.

From Cecilia's File menu, choose New/Module, which brings up Cecilia's Module editor (see **Fig. A**). The buttons along the top give you access to text-editing windows for the code involved in Module making; the blue boxes along the right are labels for each section. This example is in mono, so you'll need to remove code from the stereo orchestra that appears by default. Click on the Stereo button to reveal the code that begins "stereo template," then Select All and Cut. Move your cursor to the tk_interface area and add the following, which tells Cecilia to accommodate an input sound file:

```
cfilein source
```

Our first graph will be for the "kfreq" variable. Enter the following on the next line in the tk_interface screen:

```
cgraph freq -label "Phase Freq" -unit cps -min 25
-max 15000 -rel log -func "0 600 .5 3000 1 300"
```

Note that the arguments all begin with dashes. In order, they set these parameters: -label "Phase Freq" gives the graph a label; -unit cps labels the units; -min 25 and -max 15000 set the minimum and maximum values (in units of cps); -rel log specifies that the graph value be treated logarithmically rather than linearly; and -func "0 600 .5 3000 1 300" specifies that the initial graph be a function defined by three breakpoints.

Less obvious is that the code "cgraph freq" tells Cecilia to create a global variable "gkfreq" that we will use in instrument 1 to access the graph data. Gkfreq itself will be defined behind the scenes in Cecilia's own instrument.

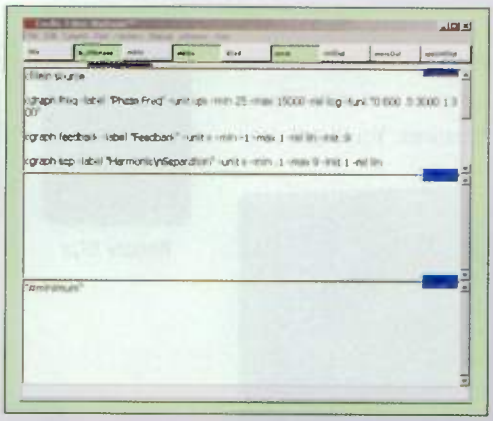

FIG. A: You can build your own Modules using Cecilia's Module editor. In this figure, each of the lines starting with "cgraph" will add a user-adjustable envelope to the Module's Grapher window.

Next, add graphs for the other two k-rate variables, along with a fourth for adjusting the wet/dry mix. These graphs will initialize with the value specified by "-init":

```
cgraph feedback -label "Feedback" -unit x -min -1
-max 1 -rel lin -init .9
cgraph sep -label "Harmonic\nSeparation" -unit
x -min .1 -max 9 -init 1 -rel lin
cgraph wet -label "Wet/Dry Mix" -unit x -min 0
-max 1 -init .7 -rel lin
```

The sliders work in a similar manner. Enter the text below, which will create one slider for each i-rate variable in phaser2:

```
cslider ord -label "Filter Order" -min 1 -max 200
-res 1 -init 4
cslider qual -label "Quality" -min .01 -max 20 -init
.5 -res .25
cslider mode -label "Mode" -min 1 -max 2 -res 1
-init 1
```

Note that this code uses a "-res" argument instead of "-rel"; "-res" controls the step size of the slider. With sliders, Cecilia will create global i-rate variables. Click on Mono to bring up the mono orchestra code. Add the following code between the "instr 1" and "out ar" lines:

```
asig soundin "[source]"
aphs phaser2 asig, gkfreq, giqual, giord, gimode,
gksep, gkfeedback
amix = asig * (1-gkwet) + aphs* gkwet
ar balance amix, asig
```

Here, [source] refers to the interface code variable "source" that we created with the Cecilia "cfilein" command. Note that our i and k variables are now global and ready to receive the data from Cecilia's interface instrument.

Finally, click on the Score button to view the Csound score. Replace the default code with the text "#minimum", and Cecilia will simply call our instrument for a duration equal to the input sound we process. From the File menu, choose "Save Module As" and find your way to Cecilia's Files/Builtin folder. Name your module "Phaser2" or any name without spaces. The module is ready to go!

—Bill Beck

World Radio History

Drum Series I

Get ready for the drums of your dreams. Recorded at famous Blue Jay Studios near Boston, all drums and all cymbals are Stereo and make heavy use of **Multi-Velocity Samples**. Separate snare samples for left hand and right hand included. **Studio kits, Small Ambient kits, Rock Ambient kits, Extra Kicks, Snares and Cymbals,** and a **Brush Drum kit** to die for. The attention to detail is guaranteed to give you the most realistic, most playable drum sounds ever.

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Sonic Implants Silk Road CD captures authentic melodic and percussion instruments native to the Middle Eastern leg of this illustrious trade route. **Instruments were performed by Middle Eastern musicians** and utilizing methods and techniques innate to centuries of musical tradition. Featuring a vast array of multi-sampled instruments, the CD also includes **Percussion Loops** and **Melodic Improvisations**.

"Sonic Implants should be commended for providing a high-quality sample collection of these exotic instruments"
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-JACK CONRAD The Doors / Beach Boys

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-ELECTRONIC MUSICIAN

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Gigasampler, EXS, Kontakt, Soundfont

Amps&Pickups 2

Continuing in the tradition of Sonic Implants' fine line of guitars and basses, a huge new **2 CD collection** of classic instruments with **all the fidelity, playability, and realism** you've come to expect from the Sonic Implants name. Over a gigabyte of Guitar & Bass Classics!

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CD-ROM $229
Gigasampler, EXS, Kontakt, Soundfont

Strings MINI

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CD-ROM $449
Gigasampler, EXS, Kontakt, Soundfont

Strat & Fuzz

Widely regarded as **the best sampled Strat available**. Features Seymour Duncan pickups through a Fender Vibrolux amp, multi-velocity mutes, tones and chords so dynamic they pop right off your fingers and onto your guitar tracks. Creamy Fuzz Guitar features a custom built Strat through a Mesa Boogie, with FullTone SoulBender and FullDrive2 pedals to create a very soulful tone.

"This is the best sampled Strat sound I've ever heard.... it doesn't just sound real, it plays real ...there is a difference!"
-BRAD LYONS Sweetwater Product Specialist

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Gigasampler, EXS, Kontakt, Soundfont

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FIG. 2: Cecilia's Tools window provides a number of tools for entering and editing data.

forming LPC- and additive-based analysis/resynthesis and several that serve a variety of utility purposes.

To run a Module, load it from the New menu and specify the name of an audio file for processing (if needed), then click on the Play button to hear the sound using the Module's default values. To record the sound, choose Disk as the output before pressing Play and supply a name for the new file that will be created. "Playing" the Modules feels very much like working with a soft synth or sampler, but there is one major difference: you can't change parameter settings while a sound is playing back.

DIGGING IN

When you're ready to dig a bit deeper, maximize the Grapher window, and you'll find a very intuitive and efficient interface. The main area of the screen contains envelopes (or "Graphs," as they're termed in Cecilia) and sliders that control the various parameters of the Csound Instrument being used by the current Module. Along the left of the window are buttons that you use to switch among the parameters—click the Density button in the Stochastic-Grains Module shown in Fig. 1, for example, and the envelope for that parameter will be highlighted. Once highlighted, you can edit the envelope by adding or deleting breakpoints or moving existing ones.

The number of breakpoints an envelope can have is unlimited, and you can use both linear and nonlinear curves. Also, when you add a new breakpoint or select an existing one, a small display appears showing you the exact value for that point and its position in time. It's hard to enter specific values—even with the screen zoomed all the way in, the cursor still jumps to nonconsecutive values.

Working with the sliders is a bit easier; clicking on the blank space on either side of a slider increments the value by its smallest amount. You can also change a slider's resolution by editing its Module. Still, it would be useful to have a separate dialog box available in which you could type an exact value for either a slider or an envelope.

Once you've created all the control data for the parameters of a Module, you can change the amount of time over which the sound will evolve by using the Duration slider at the bottom of the screen. That feature, reminiscent of Xenakis's UPIC system and U&I Software's MetaSynth, offers tremendous potential for creating a vast range of sounds from a single Instrument design and cries out for experimentation. You might, for example, create an evolving additive or FM sound, then recompile the sound after having scaled it to 25 times its original length. See the EM Web site for an example of this and other sounds created in Cecilia.

You'll be happiest using a large monitor or high screen resolution, because Cecilia's modular windows—the Grapher in particular—take up a lot of real estate.

ENTER HERE

One of the most extraordinary features of Cecilia is the toolkit it provides for manipulating and generating control data. In the Tools window, you'll find buttons for importing and exporting Grapher data to or from a text file; cutting, copying, or pasting existing data to the Clipboard; resetting the graph to its default value; and scaling existing data (see **Fig. 2**). You can also copy the envelope of one parameter onto another.

The five buttons found in the center column of the Tools window are perhaps the most useful and interesting, however, as they allow you to generate entirely new data in unique ways. For example, the Sine tool lets you quickly create sine curves to control a parameter, and like the others, it provides precise control over the type of curve that will be generated. You can set the number of control points on the curve (from 2 through 150 in increments of 1), as well as its frequency (0.01 to 20 in increments of 0.1 Hz), amplitude (values are normalized between 0.01 and 1 and are adjustable in increments of 0.01), and phase (0 to 360 in 1-degree increments).

Among the other tools are a pulse- and ramp-waveform generator complete with controls for frequency, amplitude, and pulse width; a noise generator, which offers control over the number of points and the noise's overall amplitude; and a scatter tool that will sprinkle breakpoints all over the screen. The final tool is called Drunk, and the name gives a pretty clear indication of the effect this tool has.

MIGHTY MODULES

As mentioned above, Modules are at the heart of the Cecilia universe. The included Modules cover only a fraction of the vast range of functions Csound provides, so many more Modules are likely

PRODUCT SUMMARY

Burton and Piché
Cecilia 2.04 (Mac/Win/Linux)
sound-design software
free

FEATURES	4.5
EASE OF USE	4.0
QUALITY OF SOUNDS	5.0
VALUE	5.0

RATING PRODUCTS FROM 1 TO 5

PROS: Unique parameter control for sounds. Highly graphical and colorful interface. Outstanding presets.

CONS: Building Modules requires knowledge of Csound.

Manufacturer
Burton and Piché
Web http://music.ucdavis.edu/re4m/cecilia

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to appear at the Cecilia Web site (and, of course, you can create your own!).

I can't cover all of the Modules in detail but will focus on a few of my favorites. For starters, the Brassage Module from the Time category produces striking granulated bursts of sound that build into dense, layered textures. The Module uses Csound's FOF2 opcode and requires an audio file for processing. Parameters include Grain Frequency and Placement, Density, a pointer into the sample file being processed, and Grain Attack and Decay times. The MP3 file brassagelaugh uses an increasing density coupled with a descending pitch-range curve.

Cuisi-warp mixes four versions of an audio input and gives you independent control over each version's pitch level and sample position. By setting the Index parameter below zero, you can make any of the four audio streams play backwards. The effect using a Gregorian chant sample as input is found in the MP3 file cuisiwarpchant.

The AdditiveSynth Module from the Synthesis category offers exacting control over 16 harmonic partials. As expected, you can specify the fundamental frequency, then design complex, evolving envelopes for each of the partials. You can also draw a waveform for the partials to use (why stick with a sine wave?)—just be sure to uncheck "sinus" at the bottom of the screen. By using the FreqShift slider to move each partial up or down a small amount, you can easily create beating inharmonic sounds.

Also in the Synthesis category is StochasticGrains, a granular "synthesizer" that uses Csound's Foscil opcode to generate an FM sound source. The FM sound is controlled by a host of parameters, each of which offers varying degrees of randomness.

The Compressor-Expander has a look slightly different from the others—its controls (which include Slew Rate, Compression Ratio, and Gate Threshold, as well as both Input- and Output-Gain Amounts) appear as a bank of sliders. And if you're a big Hendrix fan, try drawing your own nonlinear transfer functions in the Distortion Module and see if you can match The Master's sound.

SEE WHAT YOU CAN C

Cecilia's documentation (HTML format only) is tightly linked with the application and is comprehensive and well organized. You'll also find a number of tutorials online at the Windows Cecilia home page as well as at the sites that support the versions running on other platforms.

Cecilia is a unique and fun program for working with sound. It is well suited to experimentation and is guaranteed to produce results that would be hard or even impossible to get in many of today's software synthesizers and samplers. It could also serve as a great introduction to some esoteric synthesis methods, granular in particular, and if it inspires you to learn more about Csound itself, so much the better. At this price, it's an unbeatable deal.

Dennis Miller *is an associate editor of* **EM.**

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A E A

R84

Superior sound at a surprising price.

By Myles Boisen

Sometimes the audio industry resembles a time machine gone haywire. One technological innovation promises to rocket us toward the future, while another seeks to re-create the overheated allure of a 40-year-old tube compressor right down to the virtual-Bakelite knobs. Nowhere is this time schism more apparent than in the microphone sector, where "back to the future" has been a guiding principle for the past few years.

The AEA R84 ribbon microphone offers punchy lows, detailed mids, and exceptional high-end response.

The resurgence of interest in ribbon microphones has certainly been a surprising development, made possible largely by advances in engineering and recording technology. But a few intrepid souls—such as Wes Dooley of Audio Engineering Associates—have championed ribbon mics all along. Dooley's commitment to the cause drove him to re-create the classic RCA 44 a few years ago. Enthusiastic reviews of that product no doubt inspired another time-traveling trip to the drawing board. But this time, AEA has set the controls for the future of recording with the innovative and affordable AEA R84.

SPEC IT UP

Although it relies heavily on the vintage appointments of a classic RCA ribbon mic—right down to the yokemount, hard-wired cable, and rounded red logo set in a chrome band—the R84 is not a replica mic like the AEA R44C. Cosmetically it does recall the rounded contours of the venerable RCA 77, and the chrome yokemount is similar to the one used on that model.

It should also be noted that the R84 uses the same long low-tension ribbon as the AEA R44C, measuring 0.185 by 2.35 inches, with a thickness of 1.8 microns. However, with the exception of the new old stock RCA ribbon material, this is actually a completely redesigned ribbon microphone. AEA's new transducer is primarily intended for use as a close mic for solo and spot mic duties, and to that end the R84's specs boast virtually flat response up to 20 kHz (see **Fig. 1**).

The first clue that this is not your grandparent's RCA mic is the weight—just 1.75 pounds, compared to over 7 pounds for a 44! Obviously, the development of lighter magnetic materials has a lot to do with this rather spectacular weight loss and contributes to the mic's slim and trim profile. The R84's body is mostly taken up by a sturdy wire-mesh grille, with rounded black caps at both ends. At the top of the mic is a silver graphic that indicates the on-axis and off-axis sides of the mic's figure-8 pattern.

The 6-foot fixed cable (which AEA informed us at press time has been increased to 10 feet), attached with an oh-so-old-school spring strain relief, is anchored to the black plastic socket at the bottom of the yokemount. This socket also contains a rubber shockmount system to shield the microphone from vibrations conducted through the mic stand. The R84 can be rotated from side to side or swiveled up and down over a wide angle around the axis of the set screws at the top of the yokemount.

Instead of a hard case, the R84 comes in a utilitarian padded bag. The drawstring, snaps, pockets, and straps give the impression that this mic is ready to go on a camping trip, and the enclosure does seem rugged and thick enough to deal with any wildlife your studio might offer!

GETTING ON TRACKS

In a variety of session duties around my Guerrilla Recording studio, the R84 impressed me with its ability to convey forceful lows, richly detailed mids, and unusually crisp and open highs. Ribbon mics are always my first choice for electric-guitar recording, and the R84 was definitely a strong competitor in this category.

On a punky "noise-guitar" track, the R84 worked its magic to smooth the brittle high end of a Telecaster guitar being played through a clean, solid-state amp. Rotating the mic about 45-degrees off axis and positioning it midway between the cone and edge of the speaker emphasized a fundamental lower-midrange tone that pleased the band once they heard it on tape, even though this richness was not audible in the room.

The R84 also extracted a gorgeous tone with palpable low-end air movement from a Parker Fly–Vox amp rig in another session. The resolution, low-level detail, and frequency balance on this experimental guitar track was nothing short of amazing. On both of these guitar tracks, the Universal Audio 2-610

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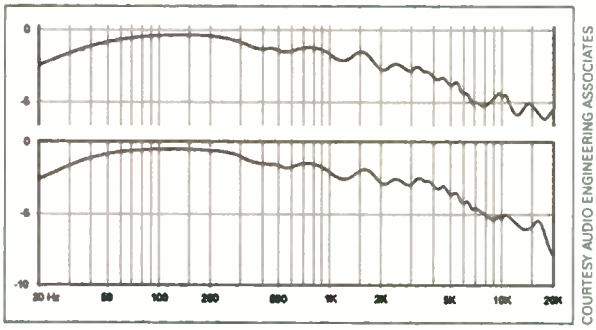
tube mic preamp was an asset as well.

As a room mic, AEA's lightweight creation managed to impart that big, thumpy RCA 44 sound to the diminutive sopranino saxophone. For this instrument, the R84 (paired with a Focusrite Red 6 solid-state preamp) definitely saved the day, rendering a naturalness and tone that I couldn't have captured on the close mic alone (a Lawson L47MP). In keeping with the big-eared signature of vintage RCA ribbons, the R84 delivered a superbly warm low end and a focused, realistic timbre at a distance of four feet.



COURTESY AUDIO ENGINEERING ASSOCIATES

FIG. 1: This shows the frequency response curves for the R84. The upper curve is the front (0 degrees) and the lower curve is the rear (180 degrees).

During the same date, as a room mic on a bass clarinet, the R84's merits were less dramatically apparent, but the microphone was a useful addition to the mix nonetheless. Adding a portion of this distant mic to the mix rounded out the instrument's tone and added a convincing heft to the low end. For a ribbon mic, the R84 sounded very open and clear, and also provided good 90-degree, off-axis rejection when that was needed to cancel out a drum kit in the room.

On a trumpeter who moved around quite a bit and employed a variety of mutes and unusual techniques, the tight pattern of the R84 was sometimes a disadvantage. When the horn—or its shifting, highly directional expressions—approached the side of the R84's figure-8 pickup pattern, the sound quickly became murky in the high end and attenuated dynamically. But when the trumpeter stayed on axis, the sound was accurate and always natural. At times, the ribbon transducer and its smooth high-end contour also served to soften the trumpeter's buzzy high end.

Although I was did not have the opportunity to test it on any singers, my studio partner Bart Thurber reported good results using the R84 on female rock vocals. Unlike most condenser mics, ribbons generally have no presence boost to aid vocal intelligibility and exhibit a fairly flat or attenuated high end response above 10 kHz. However, the R84's extra sizzle made it a contender in the vocal booth. As expected, Thurber still had to use some high-end shelf boosting to get the vocal track to cut through, but he was quite impressed with the mic's ample tone and its superlative treble response.

R84 Specifications

Element	1.8 µm aluminum ribbon
Polar Pattern	figure-8
Frequency Response	20 Hz–20 kHz
Output Impedance	270Ω
Recommended Load Impedance	≥1 kΩ
Sensitivity	–52 dBV/94 dB SPL (2.5 mV/Pa)
Maximum Sound Pressure Level	168 dB SPL >1 kHz
Power	self-powered
Dimensions	12.0" (H) x 4.0" (max. W) x 2.5" (diameter)
Weight	1.75 lb.

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PRODUCT SUMMARY

AEA
R84
ribbon microphone
$1,000

AUDIO QUALITY	5.0
VALUE	5.0

RATING PRODUCTS FROM 1 TO 5

PROS: Big, gorgeous tone. Superior treble response for a ribbon transducer. Comparable output to similar ribbon designs. Lightweight. Affordable. Padded carrying bag.

CONS: Short cable. Easily audible variation in response between two units.

Manufacturer
Audio Engineering Associates
tel. (626) 798-9128
e-mail stereoms@aol.com
Web www.wesdooley.com

TESTING, ONE, TWO

To get additional perspective on the qualities of the R84, I put it side-by-side with a selection of ribbon mics from the Guerrilla Recording vault. I played full-frequency mixes through a small combo P.A. cabinet and auditioned the mic pair, placed about four feet away from the cabinet, on studio monitors in the control room. I used Grace 101 preamps to amplify the test mics, and matched levels carefully by ear and with meters.

Compared with a Royer SF1, the tone of the R84 was definitely brighter and more present in the 4 to 6 kHz range, with more low-end thump on kick drum, and a rounder representation of bass guitar. Up against this Royer, which I think of as a very flat ribbon, the R84 had a more forward and lively sound. Output levels were very closely matched with this pairing.

Next to a Royer R-121, I noted that the R84 had a less aggressive midrange, but again more substantial lows, and it generally had a clearer and more natural-sounding treble response. The R84's output was about 2 or 3 dB hotter in this test.

The R84 had a much bigger sound than a Coles 4038, with easily perceived low- and high-end extension. In particular, the highs on the AEA mic were much more open and crisp; the Coles sounded distant and muffled by comparison. In this case, output from the R84 was about 2 dB lower.

A vintage RCA 77DX was the only ribbon I tested that had a low-end punch equivalent to that offered by the R84. This mic's output was also about 5 dB hotter. But like the SF1 and the Coles, the RCA mic didn't have the high-end clarity that I was now hearing as a trademark of the AEA R84.

I also tested the R84 against a second R84 that I had received from AEA. In a stereo matching test, these mics showed less of a discrepancy than the mics in the aforementioned test pairs. But there were still noticeable differences between the two mics. The first R84—the one used in the previous tests—did prove to be the brighter of the two, with more sizzle around 6 to 7 kHz. The two R84s also exhibited different levels of midrange response around 800 Hz, and a more subtle response difference in the lower octaves (below 80 Hz). Because the delicate ribbon elements in these mics have to be tuned and adjusted by hand, such discrepancies are understandable. Additionally, this mic pair was not offered as a matched stereo set, and based on my tests I wouldn't use it as such.

TIE A RIBBON

With its vintage good looks, light weight, affordable price, and gorgeous tone, what's not to like about the AEA R84? I am particularly enthusiastic about the superior high-end clarity of this new ribbon design, and its incisive detail has been a real ear opener for me. My only quibble is with the relatively short cable. But overall, this redesigned "back to the future" ribbon mic is a winner in every way and gets my highest recommendation.

Guitarist, producer, and composer **Myles Boisen** *is head engineer and instructor at Guerrilla Recording and The Headless Buddha Mastering Lab in Oakland, California. You can reach him by e-mail at mylesaudio@aol.com.*

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SPL

TRANSIENT DESIGNER 4

Shape unique sounds with this groundbreaking dynamics processor.

By Michael Cooper

The Transient Designer 4 is an analog dynamics processor like no other (except its 2-channel sibling, the Transient Designer 2). Unlike conventional dynamics processors that treat only signals that exceed or drop below a specified threshold, the Transient Designer 4 can shape sounds independent of their levels. Imagine increasing the attack transients of quiet instrumental passages, or abbreviating loud sounds that would normally bully a gate to stay open. Such tasks are child's play for the Transient Designer 4. While that might not seem earth-shattering at first blush, trust me, it is. The Transient Designer 4 (or the TD4, as I'll call it from here on) is one of the most revolutionary products I have ever worked with, and the sounds it creates are nothing short of astounding.

LET'S BE UP FRONT

The TD4's spartan front-panel layout points to the 1U rackmount unit's simple and intuitive operation but belies the power of this amazing processor. Four independent channels each feature single Attack and Sustain knobs, an On button, and a solitary signal-present LED (see **Fig. 1**).

To increase the level of an input signal's attack (transient) portion, simply turn the TD4's Attack knob clockwise from the noon position. To soften the attack, turn the Attack knob counterclockwise from the noon position. Similarly, turning the TD4's Sustain knob increases or decreases the sustained portion of the sound with, respectively, a clockwise or counterclockwise adjustment from its noon position.

When a channel's On button is depressed, a red status LED inset in the button lights to indicate that the channel's dynamics processing is active. When the On button is switched out, a hard-bypass relay circuit is engaged. (The bypass circuit also automatically engages when the unit loses power for any reason, preventing embarrassing silences in live-performance applications.) A channel's signal-present LED lights when its input signal's level exceeds –40 dBu. Unfortunately, neither input- and output-level controls nor clip indicators are provided. Those omissions would be more grievous if the unit were a digital device, which it isn't.

In addition to the aforementioned controls, a Link switch (also with an inset red status LED) is provided for each pair of channels. When the Link switch for channels 1 and 2, for example, is depressed, channel 1's controls (including active or bypassed status) govern settings for both channels. Depending on the status of its two link switches, the TD4 can process four mono, two stereo, or one stereo and two mono channels at the same time. The TD4 also provides a rocker-style power switch (with an inset lamp) on the unit's front panel.

BALANCING ACT

The TD4's rear panel provides a locking, balanced XLR connector for each channel's input and output (eight I/O connectors in total; see **Fig. 2**). Disconnecting my I/O cables (fitted with Switchcraft XLRs) from the review unit was difficult because the TD4's locking mechanisms would not readily release them. The TD4's nominal input levels are +6 dBu (a standard widely used in Europe, where SPL's headquarters are located). Pin 2 is hot for all I/O. If you plan to use the TD4 with unbalanced signals, you must shunt pin 1 to pin 3. The balanced, transformerless I/O stages include high-quality, laser-trimmed resistors with a tolerance of 0.01 percent, resulting in excellent common-mode (hum and noise) rejection.

I wish that the TD4 provided XLR/TRS combo jacks (which exist only for female connectors, anyway) and unbalanced ¼-inch jacks, but that undoubtedly would have increased its size and price considerably. SPL says that the unit handles a wide range of input levels, and it performed almost equally well when I fed it –10 dBV unbalanced signals and +4 dBu balanced audio. (You'll want to use balanced lines, however, for the quietest operation.) You can connect the TD4 to your mixer's inserts or in series with line-level (preferably +4 dBu nominal) outboard gear.

PUSHING THE ENVELOPE

As mentioned earlier, the TD4's dynamics processing works independent of signal levels. Consequently, you shouldn't expect to find any threshold or ratio functions, because there are none. The unit uses SPL's Differential Envelope Technology to process both low- and high-level signals without distinction.

The process produces two envelopes for each Attack and Sustain control (hence, four envelopes per channel). The first envelope, which is generated by an envelope follower, tracks the shape of the input signal's curve. The second envelope is a fixed curve that

FIG. 1: The Transient Designer 4 uses VCAs controlled by envelope generators to process dynamics independent of levels.

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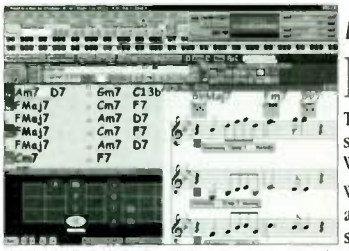

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responds more slowly than the first envelope. The TD4 derives a difference signal from the two envelopes (subtracting the second envelope's amplitude values from those of the first) and uses it to vary the control voltage of a single THAT 2181-VCA (one VCA per channel). The VCA rides the channel's gain up or down during both the attack and sustain portions of the audio signal to the degree that you boost or attenuate their respective controls.

The TD4's attack and sustain circuits work in parallel, giving you independent control over the attack and sustain characteristics of each channel's processed audio. You can boost or attenuate a sound's attack portion as much as 15 dB, whereas you can adjust the sustain component over a range of 24 dB up or down. That's enough rope to hang yourself, so be sure to watch for overloaded mixer-insert returns or downstream gear and adjust your gain staging as needed. Drastic settings can sometimes cause unflattering pumping. Nonetheless, I'd much rather use a box that lets me get wild and crazy than one that constrains me to some engineering department's idea of safe sex.

The Transient Designer won't take the place of a compressor or limiter, as it cannot, for example, selectively reign in peaks; lowering the TD4's attack control lowers *all* peaks regardless of their level. Nor will the Transient Designer take the place of a gate for all applications, as it will not selectively weed out low-level signals below a certain threshold (as noted before, the TD4 has no Threshold control). Think of the TD4 as a 2-stage (attack and sustain) envelope generator for audio signals, with one caveat: because musical phrases have a finite duration, the Transient Designer can't *elongate* the sustain portion of a signal; it can only boost the level of the signal while it is still present. You can shorten the duration of audio signals, however, by dramatically lowering the TD4's sustain control.

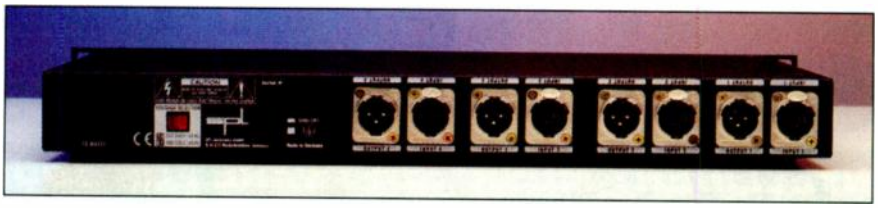

FIG. 2: With four XLR inputs, four XLR outputs, a ground-lift switch, and an IEC connector, the TD4's rear panel reflects its overall simplicity.

BEND ME, SHAPE ME

The TD4 is so easy to use, you'd have to be in a coma to get lost. Simply turn the Attack and Release knobs until you like what you hear—that's it! Throughout the course of several recording and mixdown sessions, the TD4 delivered unique and remarkable sounds that were impossible to achieve by any other means, and it did it in a fraction of the time I would have spent fruitlessly tweaking gates and compressors.

The TD4 consistently worked better than my high-end gates in reshaping drum sounds, with results that were more musical and predictable. Using the TD4 to shorten the decays of individual trap drums, I never heard any threshold-related chatter. I was also able to effectively mute downbeats to create driving rhythmic effects by shaping the envelopes of drum sounds.

What's more, I used less EQ on mixes in which I processed drum tracks with the TD4, as there was far less ringing of drums cluttering up the bass and low-mid spectrums. The beauty of the TD4 is that it corrects temporal problems in a way that often reduces and sometimes precludes the need to use static EQ and multiband compressors on individual tracks. That said, SPL does not recommend using the Transient Designer on entire mixes for mastering applications.

Feel free to use the TD4 in live performance, too. In Digital Performer, I compared the waveforms of processed tracks to their originals and found no latency beyond that caused by a round-trip through my MOTU PCI-324 card and converters.

DESIGNER DRUMS

I love this incredible box. The TD4 has saved my butt on more than one occasion. For example, a client brought me drum tracks he had recorded in his living-room studio, and the completely undamped kick drum rang like a timpani. With the TD4's Sustain control

Transient Designer 4 Specifications

Inputs	(4) balanced, cross-coupled XLR (2 per channel)
Outputs	(4) balanced, cross-coupled XLR (2 per channel)
Nominal Input Level	+6 dBu
Maximum Input Level	+24 dBu
Maximum Output Level	+22.4 dBu
Minimum Load	600Ω
Frequency Response	20 Hz–100 kHz (–3 dB down at 100 kHz)
CCMR (Common Mode Rejection)	–87 dBu @ 100 Hz –80 dBu @ 1 kHz –75 dBu @ 10 kHz –70 dBu @ 20 kHz
THD + Noise	0.004% @ 1 kHz
S/N CCIR 468-3	–89 dBu
S/N A-weighted	–105 dBu
Dimensions	1U × 9.33" (D)
Weight	7.5 lb.

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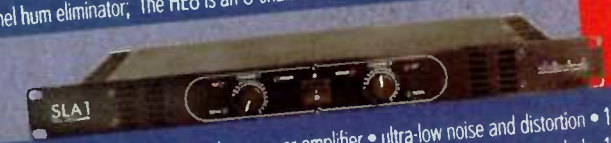

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turned down most of the way and the Attack control up slightly, the kick's sustain and boominess were greatly decreased and the track grooved *so* much better. That benefited the entire mix, creating more punch and clarity.

On another project, increasing the TD4's Attack and lowering its Sustain control on a snare-drum track yielded two simultaneous benefits: it lent a gunshotlike crack to the snare drum, and it lessened hi-hat bleed. I could further whittle the sound down to a short, sharp attack by cranking the TD4's Attack control to the max and turning the Sustain knob to its minimum setting; combining that explosive burst with the original snare-drum sound created a slammin' track that rocked harder than dynamite. Conversely, I got a trashy rock sound by *increasing* the snare-drum track's sustain. The result sounded like I had a room mic set up over the drums—awesome!

On tom tracks, increasing the TD4's attack nicely enhanced the stick hits. Decreasing the sustain tightened up ringing shells without having to muffle the toms' heads with toilet paper and duct tape (which I virtually never do, because it sucks the life out of a kit).

In the course of processing a drum kit with the TD4, I became convinced that the 4-channel version has a practical advantage over the Transient Designer 2. For example, adding attack to the kick and snare sounds resulted in a slight enhancement of the toms' attack, because the Transient Designer also processed the toms' bleed (into the kick and snare mics). Having four channels of processing at my immediate disposal allowed me to counteract the effect by slightly backing off the attack on the tom tracks using the TD4's two remaining channels. Adjusting the degree of processing for four drum tracks at the same time lent greater balance to the sound of the overall kit, and it saved me from having to guess how the drums would otherwise sound with two passes of 2-channel processing.

▼

The TD4 is so easy to use, you'd have to be in a coma to get lost.

Another consideration when comparing the TD4 and the TD2 is that the latter offers only unbalanced I/O that operates at 0 dBu nominal levels. In its favor, the 2-channel version costs approximately half as much as the TD4 and represents a highly cost-effective entry point for access to this groundbreaking technology.

GROOVING GUITARS

Turning to a mixdown session, the TD4 also rescued an electric bass guitar track playing on a samba tune. The bassist's performance was a bit too relaxed (legato). I turned the TD4's Sustain knob down to the point where bass notes sustained no longer than the duration of a quarter note, which was a tad less than on the untreated track. Now the bassist's performance had clear breaks on downbeats, producing a more staccato performance that really propelled the rhythm section forward. I was dumbfounded by the realization that the TD4 had changed not just the bass track's sound but also the player's performance. Without the TD4, I would have had to track the entire performance over again to get the syncopated feel and tight groove that SPL's box produced with the twist of one friggin' knob! On another song, decreasing the TD4's attack by 7 dB gave the bass a wonderfully pillowy sound.

Next up was an electric guitar solo, playing blazing eighth-note triplets for bars on end. It was a very challenging part, and the guitarist understandably sounded just a tad sticky-fingered (staccato). No problem—simply increasing the TD4's sustain roughly 3 to 6 dB made the solo sound smooth and fluid, and it took less than 30 seconds to dial in the sound.

Finally, I tried the TD4 on a stereo pair of acoustic guitar tracks, in which the guitar played arpeggios. The track was so well performed and recorded that the TD4 could not improve it, yet I was happy to note that the unit's Link function successfully kept the stereo image steady.

I'M SOLD!

The Transient Designer 4 is one of the most exciting products I've had the pleasure to review over the past 15 years. It is clean and quiet, incredibly fast to set up, and intuitive to use. Its unique processing produces sounds that no other signal processor can currently create. At just over $300 per channel, this box is an outright steal.

I only wish that SPL would offer a software plug-in version of the TD4 in multiple formats, but the company informed me that—aside from a plug-in already available for use with Creamware's Scope platform—they do not intend to do so.

Try it for just a few minutes, and you, too, will be hooked. The Transient Designer 4 will rock your world.

EM *contributing editor* **Michael Cooper** *is the owner of Michael Cooper Recording, located in beautiful Sisters, Oregon.*

PRODUCT SUMMARY

SPL
Transient Designer 4
dynamics processor
$1,299

FEATURES	4.0
EASE OF USE	4.5
AUDIO QUALITY	5.0
VALUE	5.0

RATING PRODUCTS FROM 1 TO 5

PROS: Awesome sounds that no other processor can duplicate. Ridiculously easy to learn and operate. Useful on a variety of sources. Saves time in the studio. High-quality signal path. Outstanding value.

CONS: No I/O level controls. Rudimentary metering. No unbalanced I/O connectors. Difficult to disconnect Switchcraft XLRs. No sensitivity switch.

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LINE 6

PODXT

The new generation in amp and effects modeling.

By Jon Chappell

Line 6 was one of the first manufacturers to practically apply the principles of modeling to guitar-amp simulation. Though not the only company to produce modeling devices, Line 6 distinguishes itself by creating only products whose core technology is modeling. Its products continue to improve in design, features, and sound quality, proving that modeling can keep up with the evolving tastes and increasing demands of recordists. Enter the PodXT.

Though similar to its predecessor in look and feel, the PodXT leaves the original Pod in a trail of digital dust in terms of its sound, editing capabilities, and interface. The PodXT is a complete top-to-bottom redesign that takes advantage of 32-bit floating-point processing and offers a host of useful new features.

THIS YEAR'S MODEL

The PodXT may be a drastic improvement on the original Pod (now in version 2.0 and still in production), but the bold-red color and kidney shape are much the same. The PodXT's cutaway is more gradual, and its front panel provides more controls (see Fig. 1). Except for the addition of a USB port, the PodXT's I/O is the same, making it familiar to anyone who has programmed the original device.

The PodXT's top-panel layout also resembles its predecessor's: the "amp" knobs, including the new dedicated Presence control, form a semicircle around the outer edge of the upper two-thirds of the panel. The assignable Effects Tweak now resides in the front panel's interior. This central area has been expanded slightly to accommodate the enhanced display and additional controls. The rear panel has ¼-inch unbalanced jacks for left and right outputs; a jack for the optional FBV foot controller (it's an RJ-45 port that also supplies power to the pedal); a USB port for bidirectional transfer of MIDI data and 16- and 24-bit audio (with drivers for ASIO, Sound Manager, WDM, and DirectSound); MIDI In and Out/Thru ports; an unbalanced ¼-inch instrument input; and a ¼-inch stereo headphone jack.

A NEW FACE

The biggest change in the front panel is the addition of a four-line, 122 × 32-pixel backlit LCD. That's not merely a cosmetic improvement; one of the limitations of the Pod was that it had a numerical display, which was not great for remembering what you had programmed. It also didn't tell you anything about the present state of your preset's parameters as you called them up.

The new display shows the preset's name and a graphic depiction of the position of seven of the eight amp knobs. That lets you quickly assess the saved values and takes the guesswork out of making adjustments. A graphical dot shows the saved position and remains in view even after you start twiddling the knobs, allowing you to keep a bead on your parameter's starting position.

That is handy, but it's not quite as good as a Compare function, which the PodXT lacks. It's quite easy to get lost in the fun of editing, only to have to dial your parameters back to their saved positions one by one for a comparison.

The only amp knob not under microprocessor control and therefore not included as part of the saved preset is Output. That's because this control is meant to adjust the electrical level of the output, not the volume. If you wish to balance the overall sound of your saved preset against others, you must raise or lower the channel volume, which is programmable and savable.

Editing in the PodXT is as simple as pressing the Edit button and using the Select knob to scroll through the pages, which follow a logical source-to-destination progression. This method is best for building sounds from scratch, as the effects are presented in order, from start to finish, in a predictable sequence.

The other way to edit involves simply double-tapping any of the five stompbox-style buttons (Comp/Gate, Stomp, Mod, Delay, Cab/A.I.R.), which pulls up the appropriate page. I preferred that method for editing specific parameters on the fly.

MODEL PERFORMANCE

I own a Pod 2.0 and a Pod Pro, so I'm intimately familiar with the Pod's operation as well as its sounds. After two months with the PodXT, I can say that while the original Pod possesses a raw charm that bests its modeling competitors, the PodXT provides a whole new level of subtlety—and it can still serve up in-your-face sounds with a mean attitude.

The new amp models in the PodXT are derived from Line 6's flagship amp, the Vetta. They boast 32-bit floating-point processing—a significant power boost over the original's 24-bit capabilities. Whereas the Pod's sounds were impressive and uncanny, the PodXT's sounds are strikingly realistic, complex, and musical. I found virtually every one

FIG. 1: The PodXT's front panel includes a four-line backlit graphical display. Tuner, Tap, rotary controllers, and data switches occupy the middle and bottom portion of the front panel.

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"Awesome...

Don 'Turk' Schell, Front of House for Lucinda Williams, Ryan Adams

"Best kick drum mic I've ever used. Replaced my kick drum mic I'd been using for 15 years!"
Paul Rogers, Front of House George Strait

"The D6 was designed with just one goal in mind: to be a no-compromise contemporary kick mic... If you want a painless way to get an absolutely rocking professional sound with a ton of serious beef on the bottom and that Lars type 'click" on the top, then this is the stuff."
Mark Parsons, Modern Drummer

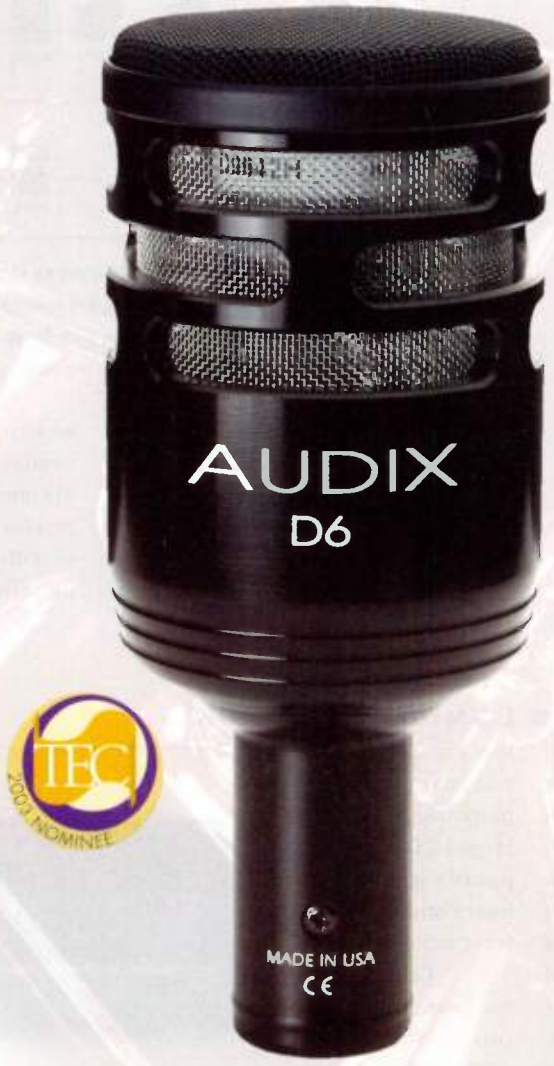
"Every day in sound-check we wrestle with that first channel. We know the ideal mic for any application is one that sounds natural with no EQ. The D6 is the 'swift kick' we've all been waiting for. Thanks Audix."
Mark Frink, Monitor Engineer k.d. lang

"The introduction of the D6 from Audix has made an impressive impact. We've had many requests from high profile drummers to install them in their custom kick drums using our May Miking System..."
Randall May

"Audix continues to impress us with its latest kick drum mic."
2003 PAR Excellence Award Winner, Pro Audio Review

"I am extremely happy with the D6 as I have been looking for a excellent sounding Kick mic. It is great to finally find a dynamic kick mic that has clean clear low end without that "un-natural resonant low boost" that so many so-called 'Kick Mics' have."
Dave Rat, Front of House, Red Hot Chili Peppers

"The D6 was awesome right out of the box. In a recent TV performance with Lucinda Williams, the D6 shook the ground to the point where the high definition camera men asked me if I could please high pass the bass!"
Don "Turk" Schell, Front of House Lucinda Williams, Ryan Adams



"Forget EQ. You don't need it. Outside, six inches from the double-headed jazz drums, the sound was rounded, full, and woolly... Inside a 22-inch rock kick, the result was punchy and tight, with soul-shaking lows. The D6 was consistent nearly anywhere within the kick, with a solid, no-hassle sound....
On stage or in session, the D6 rocks – literally!"

George Petersen, Mix Magazine

"The D6 delivers a crisp, modern sounding kick sound right out of the box and is also a useful mic to have in the locker for bass miking."
Martin Ostrowski Gig Magazine

"With the D6, attaining an authentic kick sound requires no effort so I don't need to spend my time researching crossover points and hacking at EQ's."
Steve Beatty, Mobile Engineer Real Image Recording

"The first time I put the D6 in our drummer's (Rickie Fataar) kick drum was in sound check at one of our gigs. We didn't even get through the first 8 bars when he asked what I did to the kick drum sound. He said it was shaking the whole stage and that he could really feel the improved low end. The D6 is now part of our sound."
Paul Middleton, Front of House, Bonnie Raitt

"Love the D6-sounds so natural and does not color the sound at all. It literally took me 2 minutes on the first day of tour to get Matt Cameron's kick drum sound and I have not messed with it since.
Karrie Keyes, Monitor Engineer Pearl Jam

"In my 18 years of doing this, I have never received more compliments on my kick drum sound than I do now. I only travel with three things; two pieces of fussy English outboard gear and an Audix D6!"
Chris "Sully" Sullivan, Front of House, Jaci Velasquez

"I like the fact that the D6 has all the lows and can handle the SPL of large, low frequency drums, but still allows the drum to sound the same as it does acoustically. At Blue Man Group, we use many drums with frequency ranges that go even lower than average kick drums...the D6 does a great job of reproducing them accurately."
Ross Humphrey, Sound Supervisor, Blue Man Productions

....right out of the box!"

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of the models usable, even when the tones didn't suit my taste. But the heart of the PodXT's sounds—modeled classic amps by Fender, Marshall, Matchless, Mesa/Boogie, Soldano, and Vox, among others—show the true power of this generation of modeling devices.

Over several weeks I ran side-by-side recorded comparisons, with assistants alternately performing and listening, of the PodXT's models against my collection of amps: late-'60s and modern Marshalls and Fenders, a mid-'60s Vox AC30, and a '90s Matchless Chieftain. What I was looking for in the models was not an exact tone-clone (which would be hard to create, even if you matched up the year and model), but the general characteristics and behavior of the amps the PodXT models.

The PodXT did not disappoint. One standout was the Blackface Lux—modeled after a '64 Fender Deluxe Reverb—which exhibited the signature glassy sheen when run at clean levels and became appropriately furry when overdriven. Another outstanding model was the Plexi Lead 100—modeled after the '68 Marshall Plexi Super Lead—which was remarkable for its raw realism in distorted mode and for its tubelike behavior. Much like the original, the Plexi Lead 100 actually sags after you hit a hard power chord and continue to play. Amazing.

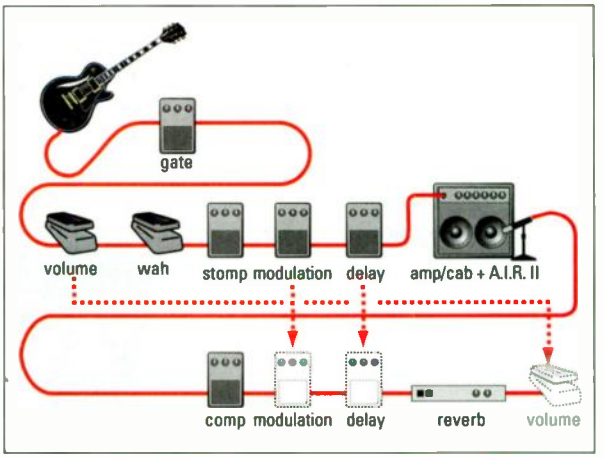

FIG. 2: You can change the order of the PodXT's effects by, for example, putting the volume pedal at the front of the chain or at the end. Modulation and delay can appear either in front of the amp stage or after the preamp.

The preset names are quite specific, often invoking song titles, such as "Won't Get Fooled," "Sultans of Swing," and "Eruption." That is much more helpful than naming, say, an artist or style, like "Clapton Woman-tone," which could sound like many different things. The naming scheme virtually taunts you into playing the lick with the presets bearing their namesake's sound. Assuming you use the pickup setting recommended in the manual, you can produce dead-to-rights versions of classic riffs and get a feel for the PodXT's imitative power.

A SHORTBOARD THAT'S LONG ON FEATURES

The PodXT is a tabletop device that is not designed to be operated with the feet. So for hands-free control, Line 6 offers the FBV ($599.99) and FBV Shortboard ($369.99; see **Fig. A**). My review unit was an FBV Shortboard. It has fewer dedicated switches than the larger FBV and one pedal instead of two. To compensate, the FBV Shortboard has an expression pedal input, and some of the switches perform double duty.

You can assign any function to the pedal—volume, wah, modulation depth—and save that assignment as part of the preset. In addition, a dedicated switch toggles the pedal between wah and volume modes.

The FBV Shortboard is a thing of beauty in terms of design, construction, and ease of use. The high-quality footswitches give a satisfying and unambiguous *ker-chunk* when you step on them. The pedal's action has a nice throw to it—not too shallow and not too long, but just right for a multitude of uses. The large LCD shows the patch name that appears on the PodXT's front panel.

Communication between the tabletop device and the pedalboard is bidirectional and instantaneous, so moves made on the PodXT's front panel are reflected on the FBV Shortboard's display and status lights. The two devices are connected with a single network-style Cat. 5 cable with RJ-45 plugs, which handle data communications and power.

Features include tap tempo, a tuner, Manual and Stompbox modes, an effects-loop toggle switch, and the ability to edit program names from the footswitches. The Shortboard is expensive and works only with the PodXT and Line 6 Vetta- and Duoverb-series amps, and it can't integrate with your other MIDI gear. But with its hot-linked connection to the PodXT and its bulletproof construction, you're not likely to need anything else for a well-appointed live rig.

FIG A: So that you can take advantage of the PodXT's continuous-controller features, Line 6 offers the FBV Shortboard, which includes a single pedal.

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STOMPIN'

The addition of modeled effects, taken from classic stompboxes, also adds new dimensions to the PodXT. So if the amps aren't quite nasty enough by themselves, you can add a virtual distortion box in front of them—something you couldn't do with the original Pod. The PodXT's distortion options model a ProCo Rat, an Arbiter Fuzz Face, a Tycobrake Octavia, an Electro-Harmonix Big Muff Pi, and an Ibanez Tube Screamer (the TS-808 version).

Similarly, the compressor and modulation effects offer not generic parameters to tweak, but a choice of models of classic devices. You can select a Boss CS-1 (my favorite for spanky country Tele licks) or the supersquashed MXR Dynacomp. The modulation models run from stompboxes like the Sine Chorus (modeled on the Boss CE-1) to the Bias Trem (after the old brown Fender amps that produced their tremolo pulse by varying the bias of the power tubes).

I was further impressed when I placed these models in an ambient context. In addition to the improved amp models, Line 6 has enhanced its cabinet-and-mic-modeling technology, called A.I.R. for Acoustically Integrated Recording. This part of the tone-shaping process models the interaction of a speaker moving air in a room and the mic that captures its sound.

Many of my tonal whims were satisfied not by changing amp models but by switching mic modes (for example, from an SM57 off axis to an SM57 on axis) or by changing the cabinet (from a 4×12 Celestion V30 to a 2×12 Blackface). These are all the adjustments you'd attempt with a real amp in a studio before scrapping the amp altogether and trying another (especially if you've just spent 20 minutes lugging the thing into the live room and miking it up). More often than not, you'd find the right settings by varying your miking approach and sticking with your original amp choice.

For subtle changes, I almost never had to resort to external processing (EQ, ambience, or compression) to enhance the core amp sound; the full sonic character came as a package from the amp, cabinet, and mic models. For instance, after listening back and deciding I wanted more highs, all I had to do was change the SM57 model to the U 67 for a fuller frequency response. At least that was my first move, which allowed me to retain some sense of reference. If that wasn't pronounced enough, I'd simply boost the treble or the presence.

PRODUCT SUMMARY

Line 6
PodXT
guitar direct box
$569.99

FEATURES	4.5
EASE OF USE	4.0
AUDIO QUALITY	4.5
VALUE	4.0

RATING PRODUCTS FROM 1 TO 5

PROS: Stellar sound. Realistic models of amps and effects. Solid construction. Flexible I/O and routing options. Powerful and easy-to-use editing interface.

CONS: No compare function. No CV jack. FBV Floorboards are expensive.

Manufacturer
Line 6
tel. (818) 575-3600
e-mail info@line6.com
Web www.line6.com

TWEAK DEEPLY

The original Pod let you tweak only some of its parameters from the front panel, giving you access to more esoteric functions through a MIDI editor-librarian. With the PodXT, you can adjust any parameter using the front-panel controls alone. Entering Edit mode on the PodXT is as simple as double-tapping the effect switches and using the cursor buttons to navigate and the rotary controls to make adjustments. This is especially handy with the modulation effects, where you can, for example, set the speed of the LFO in hundredths of a hertz, from 0.10 Hz to 15.00 Hz. If you're thinking in musical time, you can set the LFO to a multiple of the current tap tempo, such as 16th notes or eighth-note triplets.

The PodXT allows you to vary the placement of certain effects. You can place the volume pedal up front or at the very end, and you can place the modulation and delay effects before the amp (the stompbox way) or after

PodXT Specifications

Inputs	(1) ¼" unbalanced
Outputs	(2) ¼" balanced; (1) ¼" stereo headphone
Maximum Input Level	+5 dBV
Additional I/O	MIDI In, Out/Thru; USB
Maximum Output Level	+20 dBu
Dynamic Range	>90 dB
Guitar In to Analog Out S/N	stereo: –107.5 dB; mono: –110.2 dB
Presets	64
Amp Models	32
Effect Models	49
Mic/Cabinet Models	22
A/D Converters	24-bit; multistage hybrid; 64× oversampling
D/A Converters	24-bit; 128× oversampling
Control	MIDI In; MIDI Out; RJ-45 for self-powering optional Line 6 floor controller; USB MIDI
Digital I/O	USB; 16- and 24-bit, 44.1 kHz, 48 kHz
Display	122 × 32-pixel backlit LCD
Power Supply	9 VAC; 2,000 mA line-lump
Dimensions	11.5" (W) × 3.0" (H) × 7.5" (D)
Weight	3 lb.

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the amp (the effects-loop way). **Fig. 2** shows how the PodXT places its effects in the virtual chain, and the optional positions for the volume pedal, delay, and modulation effects.

For those who prefer to edit and organize patches using a computer, Line 6 offers PodXT Edit (Mac/Win), a downloadable editor-librarian that allows you to view your patches onscreen and edit the parameters using your computer's graphical interface. PodXT Edit also features backup and organizational utilities for grouping your patches according to type and sequence.

X-TRAS

The PodXT produces great sounds and gives you powerful editing options, but its features go beyond tone production. Live musicians will want to check out the FBV and FBV Shortboard, two footpedal devices that attach to the PodXT with an RJ-45 cable (see the sidebar "A Shortboard That's Long on Features"). If you want to take advantage of any of the PodXT's continuous-controller features, you'll need an FBV board or a MIDI footpedal, because there is no back-panel CV jack on the PodXT itself.

Recordists will appreciate the USB I/O, which transports digital audio as well as MIDI and provides the means for installing the firmware and driver updates available from Line 6's Web site. Line 6 will soon offer GuitarPort compatibility, which means PodXT owners can benefit from the company's ambitious online educational efforts.

MODELS AND SUPERMODELS

There's nothing in the world like miking up a vintage guitar amp and spending time tweaking the dials, varying the mic position, and swapping out different effects pedals. And on the best of days, this will yield superior results. But if you want to quickly capture the essence of a vintage setup—in terms of sound production and behavior—the PodXT does an outstanding job, with all the advantages of virtual technology.

If you're a working recordist operating under the real-world strictures of a budget and a schedule, you'll savor the PodXT's ability to deliver predictable, consistent, and excellent results. I'd have no problem using the PodXT as my single-solution guitar device—especially in a situation where direct recording is an option. Your personal tastes might lead you to another multi-effects processor for a particular fuzz sound or modulation patch, but as a single unit delivering realism and versatility with great sound, the PodXT gives you an all-inclusive sound-production environment for start-to-finish guitar processing.

Jon Chappell *is the author of* Rock Guitar for Dummies *(John Wiley & Sons, 2001) and* Build Your Own PC Recording Studio *(McGraw-Hill, 2003).*

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Quick Picks

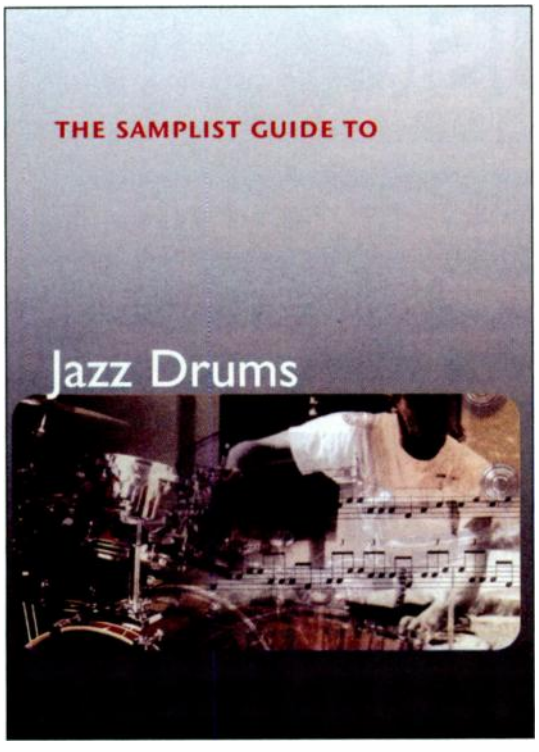
POWERFX

The Samplist Guide to Jazz Drums

By Gene Porfido

The PowerFX *Samplist Guide to Jazz Drums* ($49) is a collection of beats, patterns, and samples played by jazz drummer Ralph Peterson and produced by Bil Bryant. The CD-ROM contains nearly 450 MB of 16-bit, 44.1 kHz WAV files, as well as video interviews (in Windows Media Player format) of Peterson demonstrating his extensive knowledge of jazz drumming.

The collection is organized into five main folders according to style. Each folder contains samples or subfolders of samples and a video of Peterson demonstrating how the jazz greats played the enclosed patterns. Most of the phrases are two measures long for easy editing and looping. A sixth folder, Tools, contains individual samples of drums, fills, solos, cymbals, and cymbal combinations.



More than just a collection of samples, *The Samplist Guide to Jazz Drums* offers a historical look at some of the great drummers and bands in jazz.

All That Jazz

The stylistic categories on the CD-ROM are Afro-Cuban-Latin, Bop, Brushes, Funky, and Old School. In each category, Peterson plays patterns that are based either on specific songs or on the playing of drummers known for a particular style. Conveniently, the names of the samples include the musical style or drummer as well as the bpm.

The Old School category takes you from New Orleans, the birthplace of jazz, to the unmistakable tom-based playing of Gene Krupa on "Sing, Sing, Sing." Peterson includes examples of various Mardi Gras–Indian and second-line beats, and he captures the hi-hat feel of Count Basie's drummer, Papa Jo Jones.

The Afro-Cuban-Latin folder holds five subfolders: Bomba, Bossanova, Calypso, Mambo/Rumba, and Samba. Peterson plays the Latin-based rhythms made famous in the early '50s by Dizzy Gillespie's percussionist, Chano Pozzo, and later by John Coltrane's drummer, Elvin Jones. Jazz legend Billy Higgins, who played the bossa nova with brushes and a stick on his snare rim, is also represented. The styles of Art Blakey, Max Roach, Tony Williams, and Jimmy Cobb help make the Bop folder a Who's Who of jazz drummers.

Funky is the least explored of the five drum styles, but Peterson does capture the syncopated feel of virtuoso drummers Steve Gadd and Harvey Mason. Brushes play a major role in jazz, and in the Brushes folder, Peterson shows his mastery of many feels, from fast bop to swing and ballads.

Making History

The Samplist Guide to Jazz Drums is as much a history lesson as it is a treasure trove of samples. Peterson is well qualified to share his extensive knowledge of jazz drumming; he studied the subject at Rutgers University, played with Art Blakey, and worked with Branford Marsalis, the Count Basie Orchestra, and Stanley Turrentine.

The CD-ROM is well recorded and captures a soft, old-style sound. Although Peterson's kit is close-miked as well as room-miked, the balance creates an appropriately open and live sound. Every nuance of each instrument is present across the stereo spectrum, from the ringing of the toms to the rich sustain of the ride cymbal.

The Samplist Guide to Jazz Drums is worth investigating for its historical value alone. The information presented in the liner notes, videos, and recordings gives a true feeling of what jazz is all about. If you are looking for samples of authentic and well-played jazz drumming, this CD-ROM is an excellent choice.

Overall EM Rating (1 through 5): 4.5

PowerFX Systems AB/EastWest (distributor); e-mail info@powerfx.com; Web www.powerfx.com

GMEDIA MUSIC

Oddity (Mac/Win)

By Brian Smithers

Back in the day, when my older brothers worked to expand my musical horizons beyond Cannonball Adderley and Gerry Mulligan, they introduced me to the world of synthesizers and taught me such revered names as Moog and ARP. Now analog synths—virtual ones, anyway—are hot again. Fittingly, the sound of the classic ARP Odyssey lives again in the Oddity ($129.95), a VST instrument with attitude.

Gmedia Music, in partnership with Ohm Force, designed the Oddity to work in any VST host under Mac OS 8.6 or higher (including OS X) and in Windows 98, 2000, ME, or XP. I tested it in Emagic Logic Platinum under Mac OS 9.2 and Windows XP, and it installed easily and functioned perfectly on both platforms.

All Things Old

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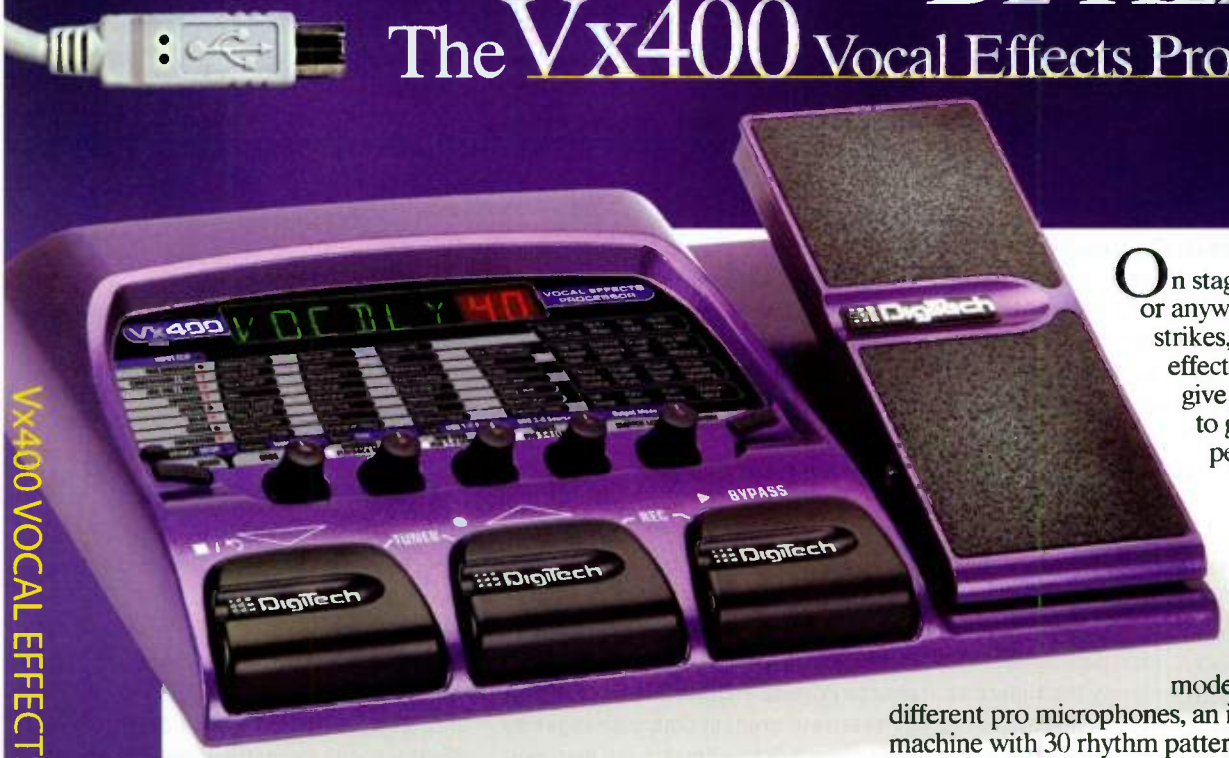

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World Radio History

its namesake, Oddity's two oscillators can be linked in mono mode or used independently in dual mode. Oddity features a 4-pole resonant lowpass filter and a highpass filter. Two envelope generators are available—an AR and an ADSR—as is a dedicated LFO that can sync to tempo. You can also use VCO 1 as a second LFO.

Oddity's layout is intelligent and efficient but initially daunting—as is the layout of the original Odyssey. If you're unaccustomed to the Odyssey's design, you might fiddle with the sliders and switches for several minutes before actually getting a sound out of it. Fortunately, Oddity has the advantage of presets, so your sonic explorations will have plenty of good starting points. Although Oddity's routing capabilities fall far short of a modular synth's, numerous switches allow you to choose modulation sources for most parameters.

Are New Again

Several aspects of Oddity's user interface are noteworthy. The program incorporates some innovative mouse techniques, including the ability to throw the sliders at various speeds. If you click just above or below a slider and then move the mouse away, you initiate a smooth movement of the slider from its current position to its upper or lower extreme. The more slowly you move the mouse, the more slowly the slider moves. It's great for generating smooth controller data, and as a result, the mouse feels like a better performance controller than usual. After a few practice tries, I was able to throw a slider at any speed, taking from half a second to more than 30 seconds to cover its whole range.

Here's another cool mouse trick: dragging sideways provides finer resolution. Drag up and down, and your mouse moves the slider as if you were physically grabbing it. Drag to the left or right, and the control moves down or up, respectively, in much smaller increments. Enhanced Mouse Mode improves control even more by causing the mouse pointer to disappear until the motion stops, at which point it reappears, still pointing to the slider. Using my trackball, I had the sensation of actually grabbing and moving a slider. It is a minor feature, but it makes adjusting parameters remarkably comfortable, easy, and accurate.

Unlike its predecessor, Oddity features a fantastic patch-morphing function that causes all the controls to glide to their new settings over a user-defined period of between 0 and 99 seconds when you change Presets. That feature lets you easily automate gradual timbre changes by saving your edits as Presets and then morphing from one to the next. You can even record parameter changes into a sequencer as MIDI controller data. All of Oddity's parameters are preassigned to controller numbers, making it easier to operate the synth from a control surface. You can change those assignments with Oddity's Auto-bind feature and save them as Presets.

If you're looking for a virtual synth with a sound that can grab your attention, download a demo of Oddity and take it for a spin. It's intelligently designed, it's fun to tweak, and it delivers plenty of bang for the buck.

Overall EM Rating (1 through 5): 4.5

Gmedia Music/eBlitz Audio Labs (distributor); tel. (805) 258-1465; e-mail eblitzaudiolabs@cox.net; Web www.gmediamusic.com.

Like the ARP Odyssey after which it's modeled, Gmedia Music's Oddity offers a user interface that's a bizarre combination of utilitarian block diagram and festive color-coded sliders.

DISCRETE DRUMS

Series Two

By Marty Cutler

Many groove-based sample CD-ROMs use a "construction kit" approach in which different instrument parts from a song or groove are provided as separate elements. Users can then choose to use all or some of these parts, depending on the needs of their song. Discrete Drums *Series Two* ($549) takes the construction-kit concept and applies it to drums and percussion.

The main feature of the *Series Two* collection is its high-quality, song-length drum performances, recorded in a professional studio with the kit elements separated on individual tracks (kick, snare, toms, overheads, and percussion). Having multiple tracks gives you much more flexibility for processing and mixing drum elements than you'd get from ordinary stereo drum loops. The set includes room tracks for each song section, which provide nice-sounding sampled ambience.

Series Two comes with 18 discs. Of those, 11 are CD-ROMs containing multitrack performances, and 1 is a CD-ROM of individual drum hits, all in 24-bit, 44.1 kHz WAV format. There are four CD-ROMs containing 16-bit stereo versions of the multitrack performances in Acidized WAV format. (These four stereo discs are also available separately as the *Series Two 16-Bit Stereo Loop WAV Volumes* for $229.) Finally, you get two audio CDs containing demo versions of the grooves, which are useful for auditioning the samples.

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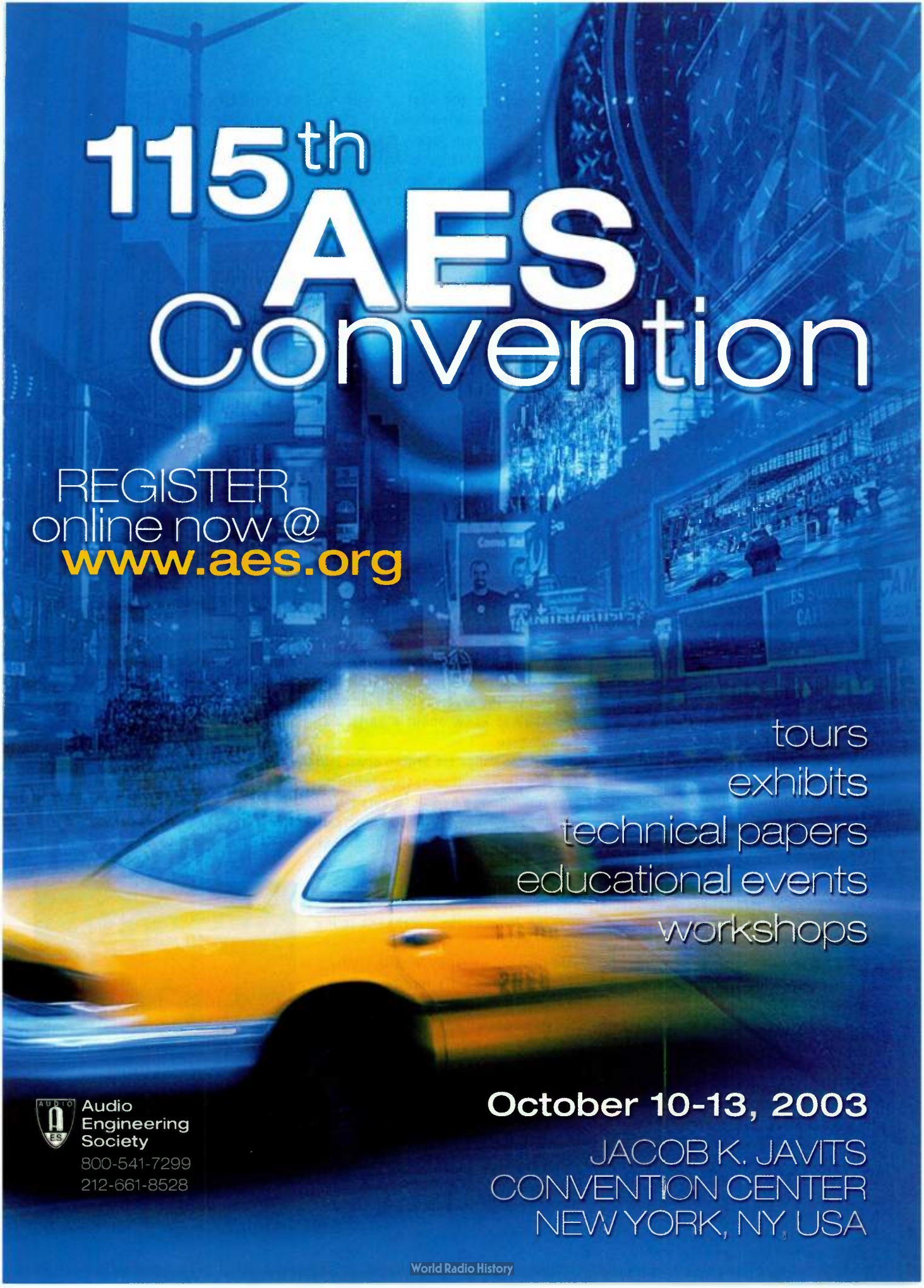

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The Discrete Drums *Series Two* collection gives you a large assortment of song-length, multitrack drum performances covering a range of styles.

Because the CD-ROMs provide files in WAV format, they're easy to import into your digital audio sequencer, sampler, or even a personal digital studio. (Most personal digital studios support 24-bit, 44.1 kHz files). I used MOTU's Digital Performer 4.01 during my testing of *Series Two*.

The Stylistics

Discrete Drum's previous collection, *Series One* (reviewed in the March 2002 issue of EM), focused on rock and alternative rock. *Series Two* offers a wider range of styles, including rock, pop, funk, hip-hop, and modern country. Of course, it's difficult to cover all of the bases to everyone's satisfaction—even with a collection this size—but the additional percussion loops help create more supple and varied grooves. Furthermore, the ability to add or remove individual drum tracks within a performance expands your opportunities for dynamic and textural variation.

The recording quality and instrument sounds are uniformly excellent. There were a few instances in which a particular drum sound wasn't perfectly matched to the style at hand, but overall, I was quite impressed.

The performances range from tight, in-the-pocket, up-tempo funk grooves to lazy, loose, half-time rock offerings. Among my favorites are the laid-back 6/8 of "Brick in the Waltz," with its brushed toms and hand-drum percussion; the swampy, percolating feel of "Bubble;" and the equally swampy half-time grooves of "Lava" and "Slam It." The very tasty "I Love Loosely" captures that quirky Akai MPC60 swing favored in some hip-hop styles, albeit with real drums. Oddly enough, the percussion loop on "Swing Theory" seems to swing harder than some of the snare tracks, and yet they meld beautifully; it's all very human, and I like it.

EM WEB CLIPS

Manual Override

The manual gives you general setup instructions, tips, and file-naming conventions, as well as song descriptions. Although they contain accurate tempo information, these descriptions are often sketchy. For example, the description for "Light It Up" simply says, "The coolest vibe ever. Could be jazz, pop, R&B." Listening to the demo versions on the audio CDs is often the best way to find out what you need to know about a particular performance.

The demo songs are broken down into example tracks with percussion (when it's present) followed by soloed percussion loops and each song's individual drum patterns. The cymbals on the demo tracks are mixed too high, but once I imported the actual tracks from the multitrack discs into my sequence, I was easily able to adjust the level of the overheads to my satisfaction.

Putting songs together with multiple tracks requires more forethought than compiling stereo loops, and *Series Two* requires a bit more work than *Series One* due to the presence of multitrack percussion. Nonetheless, the percussion sounds and feels great.

Overall, the grooves and sounds in Discrete Drums *Series Two* are inspiring and filled with attitude. The combination of the multitrack format and the individual drum samples allows for plenty of creative flexibility. If you're serious about putting together drum tracks that maintain the human element, I highly recommend this collection.

Overall EM Rating (1 through 5): 4

Discrete Drums; tel. (800) 387-5720; e-mail contact@discretedrums.com; Web www.discretedrums.com

FOCAL PRESS

Mastering Audio: The Art and the Science

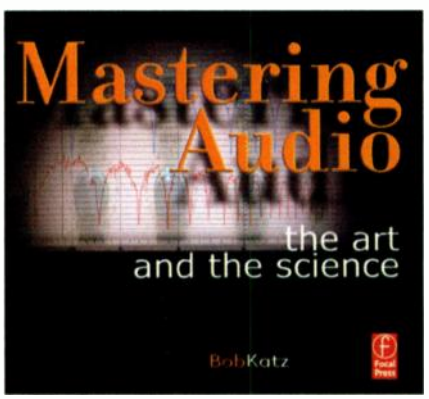
By Myles Boisen

Grammy Award winner Bob Katz is one of the most uncompromising and respected mastering engineers in the business. His book *Mastering Audio: The Art and the Science* ($39.99) is not so much a how-to manual for do-it-yourself mastering engineers as a thorough introduction to the unique procedures and technical issues involved in mastering.

EM ★★★★★ hot pick

This book is poised to become the authoritative text on audio mastering. Because most of the top mastering engineers are unwilling to divulge their secrets to the masses, Katz's book is indispensable for anyone interested in mastering as a profession.

Beyond this admittedly narrow topic, Katz offers his personal perspective on rarely discussed topics such as critical listening, the monitoring environment, depth and clarity in recordings, and digital-audio specifics (such as dithering and jitter). To his credit,



Bob Katz imparts the wisdom of the masters in his highly informative book *Mastering Audio: The Art and the Science*, published by Focal Press.

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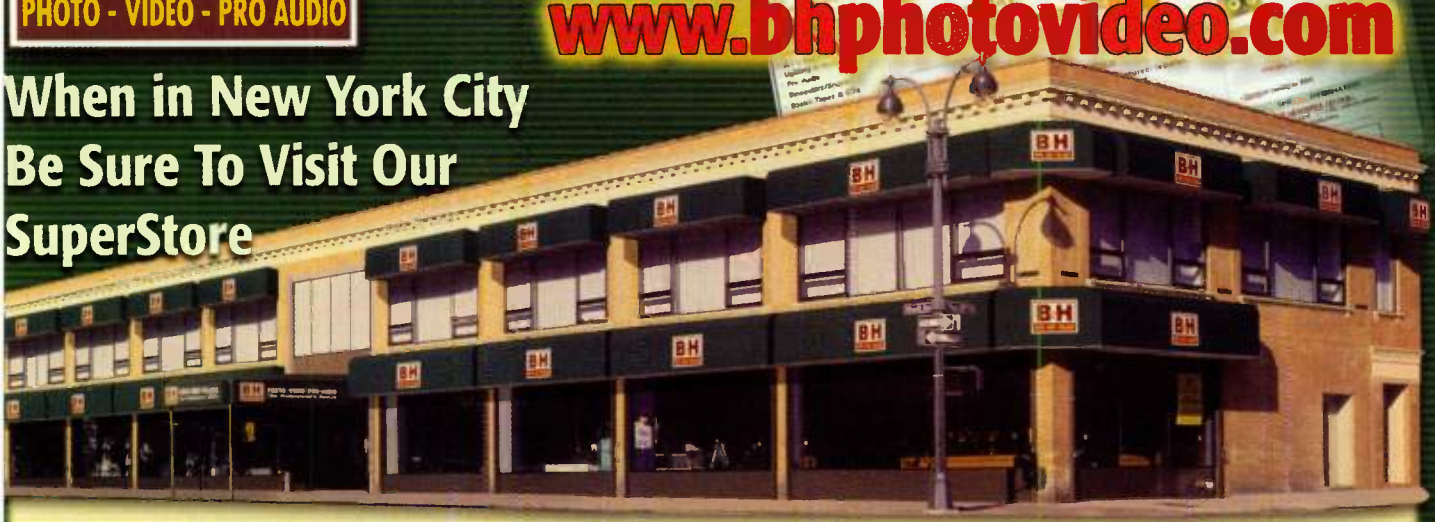

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Katz is also generous with informed opinions on the myths that permeate the often misunderstood world of mastering, including his cause célèbre, the uses (and abuses) of compression.

Mr. Science

Divided into five parts—Preparation, Mastering, Advanced Theory and Practice, Out of the Jungle, and Appendices—*Mastering Audio* begins with the basics. Part one offers an overview of mastering philosophy and gear, along with useful tutorials on listening, monitoring, and the fundamentals of bit rates, dithering, and decibels.

Part two continues to lift the veil of secrecy that often obscures the mastering engineer's practices. In this section, Katz delves further into the art, science, and philosophy of mastering, as well as the practical applications of equalization, dynamics processing, noise reduction, and other types of mastering processes. In addition, he offers opinions on some of his favorite high-end mastering gear and manufacturers.

Don your pocket protectors for part three, as Professor Katz gets technical on the topics of jitter and clocking, high-sampling-rate recording, monitor calibration, multichannel audio, miking techniques, and acoustics. The chapter titled "How to Achieve Depth and Dimension in Recording, Mixing, and Mastering" will appeal to recordists at all levels of expertise, as will a grab bag of insider tips and tricks related to a variety of analog- and digital-recording issues. This section also includes several deluxe color plates and a detailed explanation of the K-System approach to standardized metering and monitoring.

Having convincingly played the role of Mr. Science, Katz shows his philosophical side in part four with a short essay titled "Out of the Jungle." Here, the author addresses quality control, standards and the need for industry-wide education, and the thorny topic of mastering audio in nonprofessional or personal studio facilities. He also includes a poetic meditation on the future of audio as he envisions it.

Part five collects useful information into appendices, including technical specs, short papers, charts, a bibliography, and bios. The book also includes a handy fold-out chart that equates musical pitch to frequency (in hertz), referenced with the notes of the piano keyboard and common instrumental and vocal ranges.

Master of Audio

With the strong academic focus of his writing, Katz succeeds at being the college professor we all wish we could have had. At the same time, he never loses sight of the importance of listening, the value of experience, and the enjoyment of music as the ultimate goal of mastering.

By maintaining this careful balance, Bob Katz is an inspiration to anyone wishing to improve their recording projects and become, in Katz's words, "a master of audio." As a mastering engineer and recording instructor myself, I would recommend this book without reservation to anyone in any sector of the audio industry. ●

Overall EM Rating (1 through 5): 5

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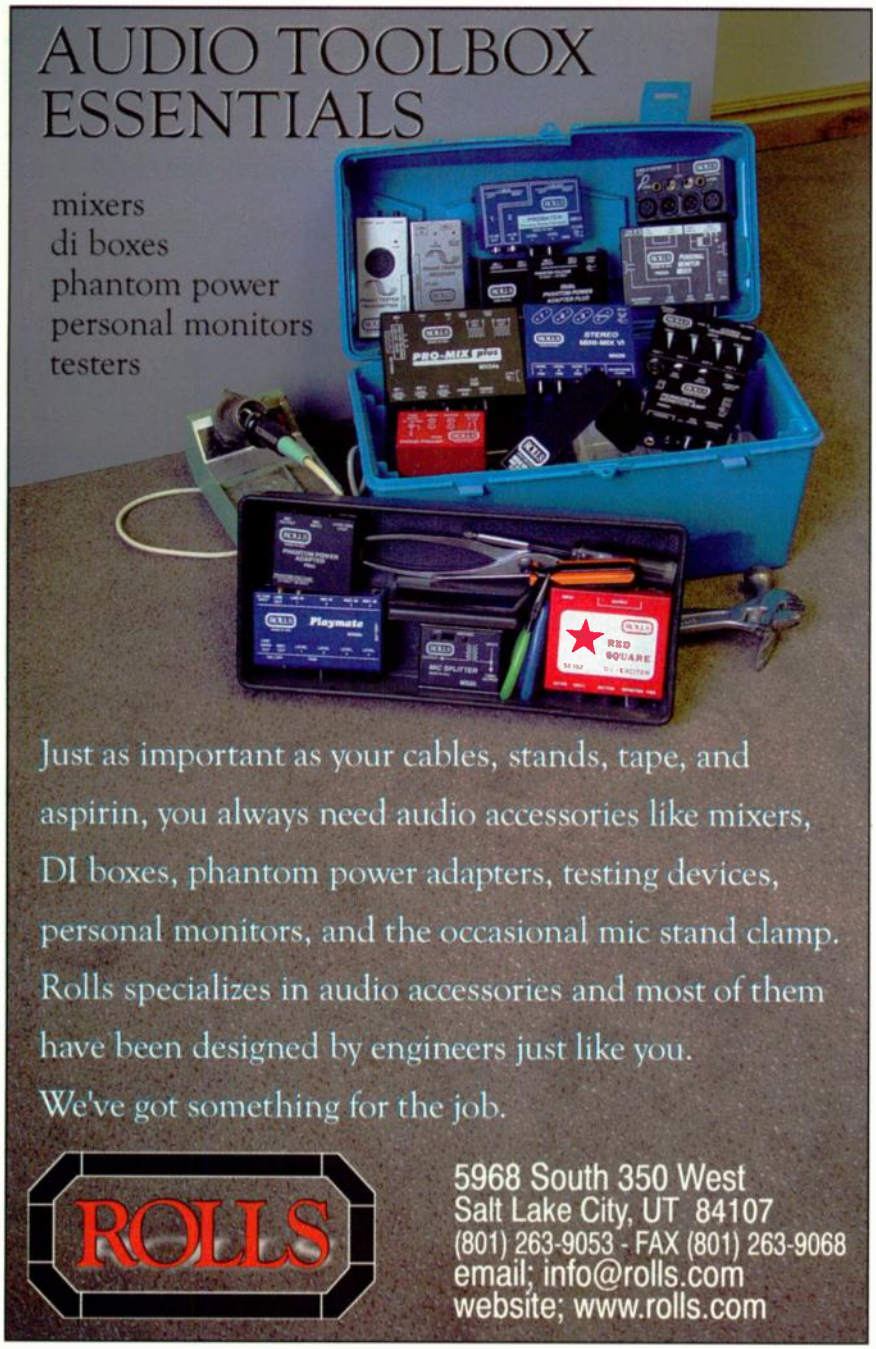

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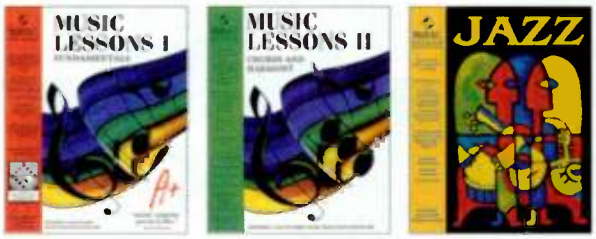

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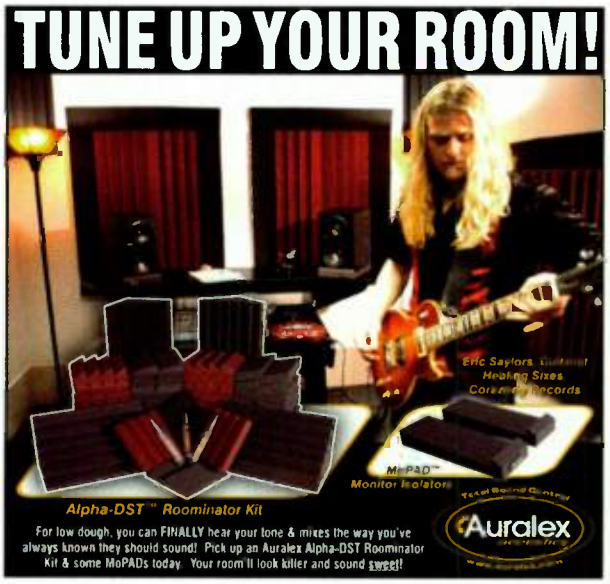

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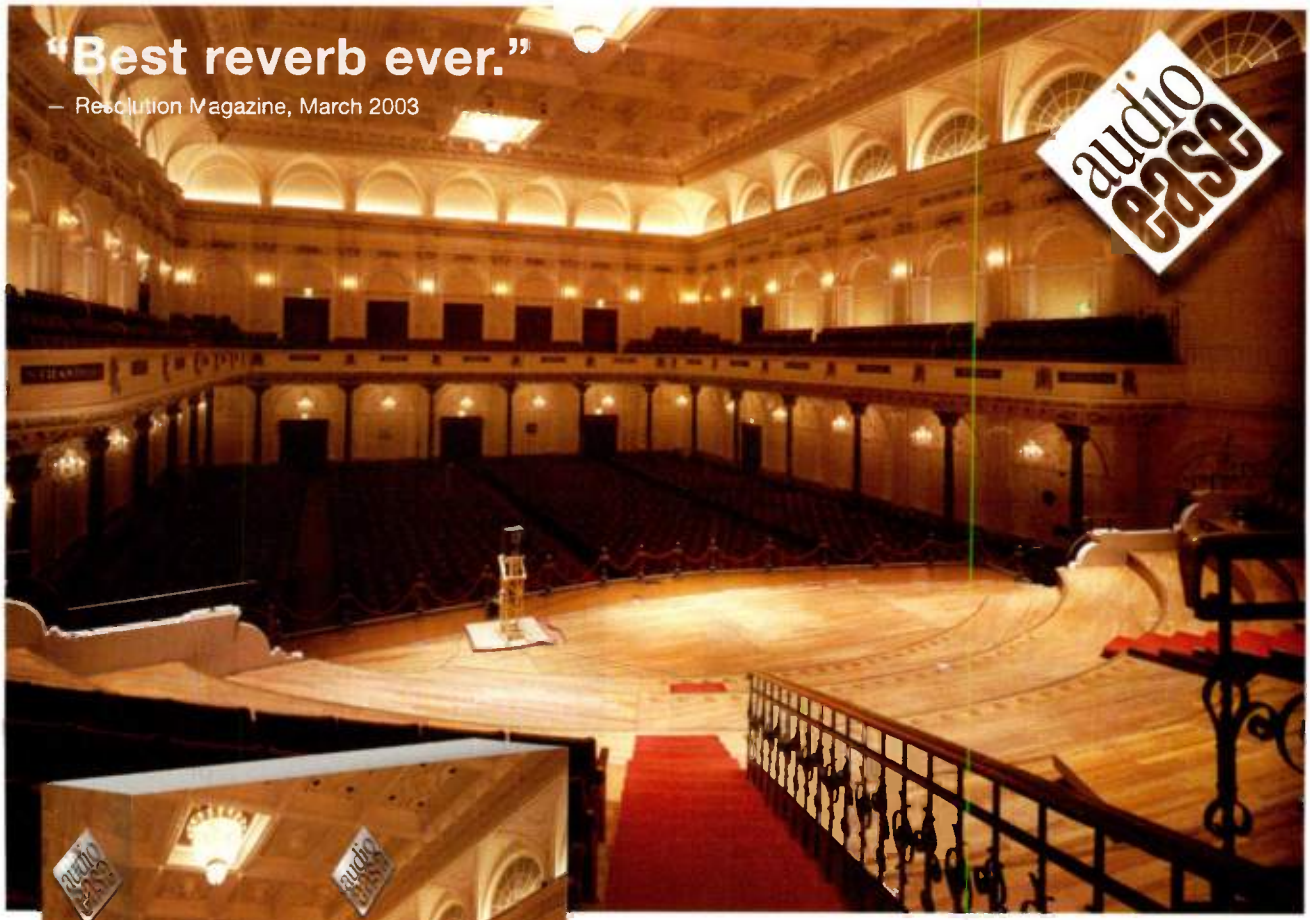

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Digital Performer 4 interactive training

Cool School Vol. 6.1 DP Basics, Vol. 9 DP4, Vol. 10&11 Plug-ins

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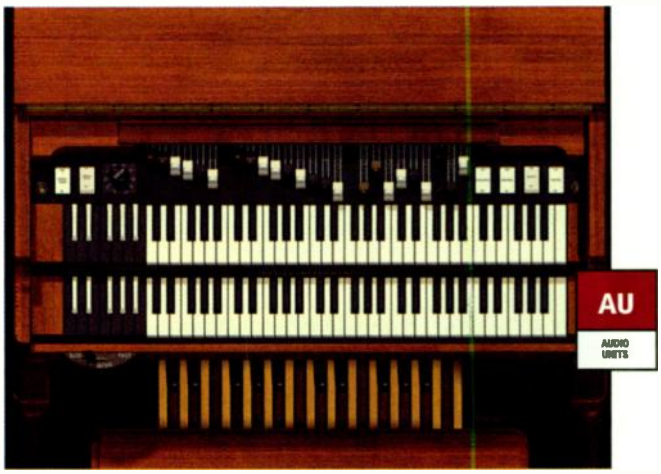

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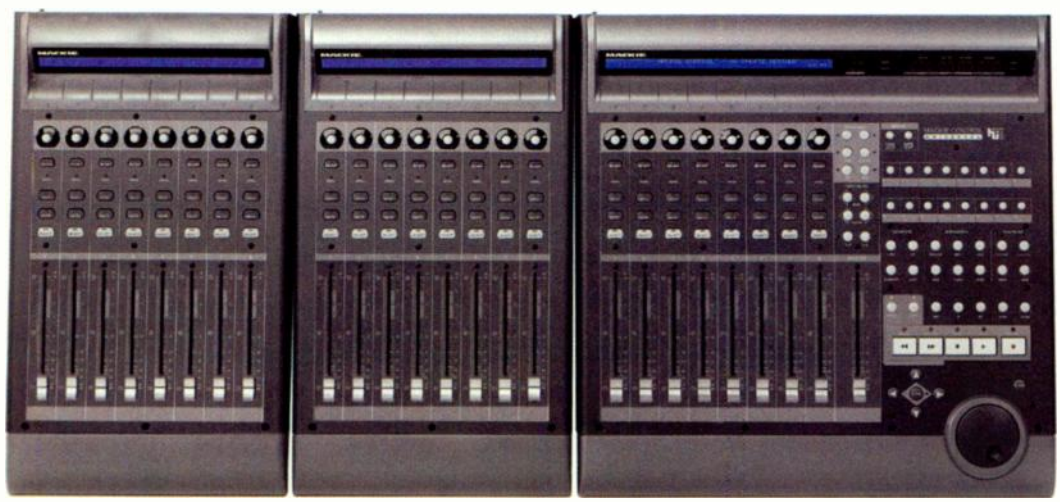

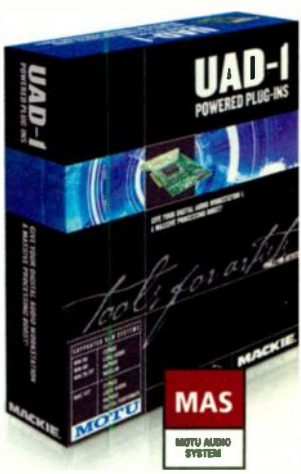

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Ground-breaking audio restoration plug-ins for DP4

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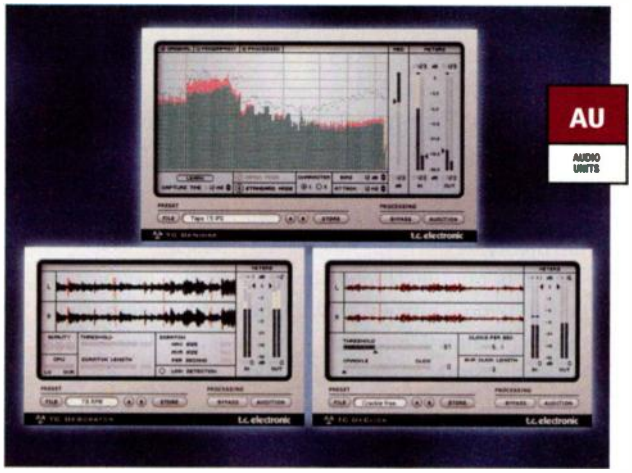

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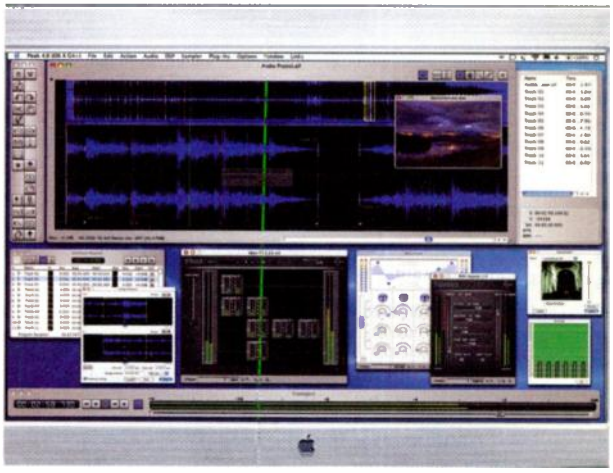

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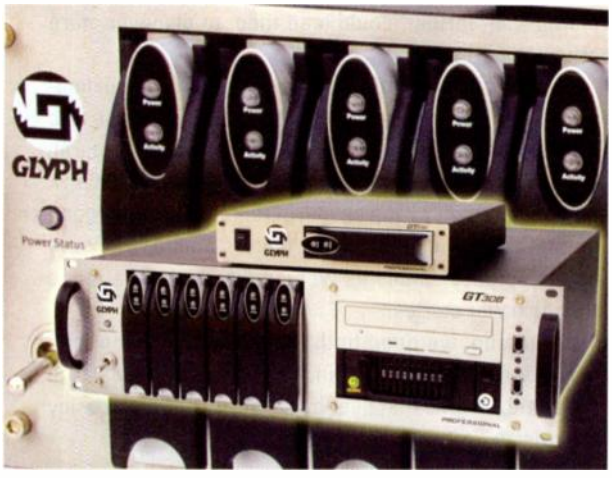

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World Radio History

By Larry the O

Theory and Practice: The Tiger Rag

I have no idea who said it first, but it is a witticism so incisive it nearly draws blood, yet so pithy and droll that it has all the sophistication of a fine wine: "The difference between theory and practice is that, in theory, there is no difference." To me, the stark accuracy and exquisite elegance of this statement convey ever so much more nuance than talking about "where the rubber meets the road."

When I think of the difference between theory and practice (hereafter called "The Diff") in my musical and audio life, I get a flaming vision, shooting incredibly painfully from my third eye, of Practice being the result of Theory having been strapped onto the wild tiger of Reality and left with no alternative other than to ride. But that's just me.

Nonetheless, this points up that point of view determines the perceived point of The Diff. The theoretician and the day-to-day trenchmeister might both view The Diff as a sort of margin of error, but the theoretician's frame of reference casts it as error relative to the mathematical representation, while the trenchmeister understands it as error in the context of an accurate model of the how the world really works.

Even a value judgment on whether The Diff is good or bad depends on frame of reference. If you're producing a live show of any type, performing audio post, or doing most commercial audio-production tasks, deviation from the theoretical model is more often than not a pain in the patootie, though it can be occasionally cleverly leveraged to sidestep a limitation. ("Hey, that's not supposed to work!")

For the most part, professionals who are in these positions are quite well aware of how extremely relentless the battle is just to hang on to that tiger, and they make broad accommodations for it with redundant systems, contingency plans, and overbuilt equipment. In studio work, this same caution manifests itself in things like a well-founded fanaticism for backing up data. But it is in any kind of real-time function, such as broadcast or live performance, that roadies and technicians give wide berth for a panoply of bizarre eventualities. The whole Boy Scout routine and all that.

On the other hand, much of the art of improvised live performance, music composition, and even sound design lies in the realm where real-world practice departs from theory.

There is another, higher-level argument in favor of The Diff, which hinges, as well, on point of view. Theory can provide a long view and move fast, like a rock skipping on the surface of a lake. Practice, on the other hand, accomplishes what Theory only dreams about. Paradoxically, the most fruitful results occur only when the two have some occasion to meet and intermingle.

Without that meeting, one has experiences like those described in the classic comments of many design engineers when they are exposed to the desires and complaints of customers. While working on a post-production studio for a network TV series, one design engineer, dragged into the field by his director of marketing, informed us that professionals didn't do what we asked for. The director of marketing shot him a look, informed him in a low voice that we were professionals, and tried to salvage the situation.

Conversely, I've seen product specialists trying to explain to practitioners (who wanted to do things the way they'd always done them) how examining their practices closely would reveal an underlying theory that, if explored a bit further, could lead them to discover more efficient methods.

In many cases, The Diff comes about because of limitations in the field. Time and money are, of course, the most common, but logistical, acoustical, infrastructural, and resource limitations also can come into play. Then, it all comes down to the resourcefulness that any good field professional has, but an understanding of theory opens up possibilities as well as the hard experience touted in war stories.

In the end, we need both theory and practice, and maybe we even need The Diff. It's just one more duality in the world, so grab that tiger by the scruff and try to enjoy the ride.

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