

➤➤ **MORE THREE-DIMENSIONAL CONCEPTS FOR IMPROVING YOUR MIXES**

JANUARY 2009

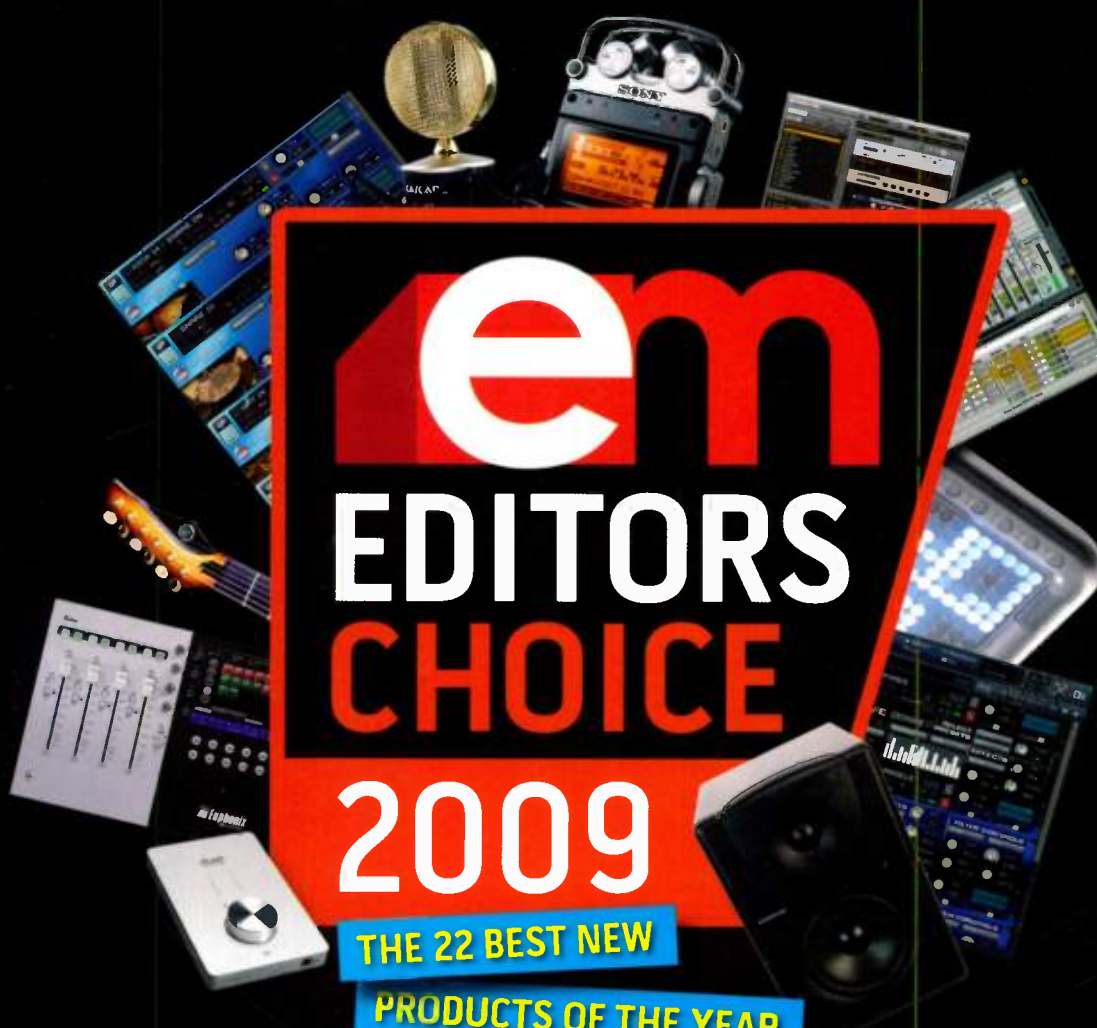


ELECTRONIC MUSICIAN

CARE AND FEEDING OF
YOUR HARD DRIVE

SURROUND MIXING
IN PRO TOOLS LE

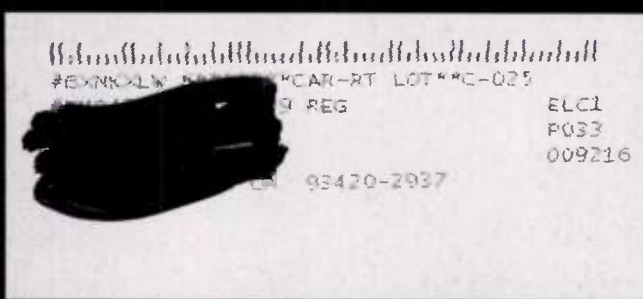
MULTIBAND
FREQUENCY SHIFTING
WITH VIRSYN PRISM



em
EDITORS
CHOICE
2009

**THE 22 BEST NEW
PRODUCTS OF THE YEAR**

A PENTON MEDIA
PUBLICATION



REVIEWS
AKAI MPD32 | PEAVEY REVALVER MKIII
MOOG MUSIC MOOG GUITAR | YAMAHA
POCKETRAK 2G | AND 5 MORE

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World Radio History



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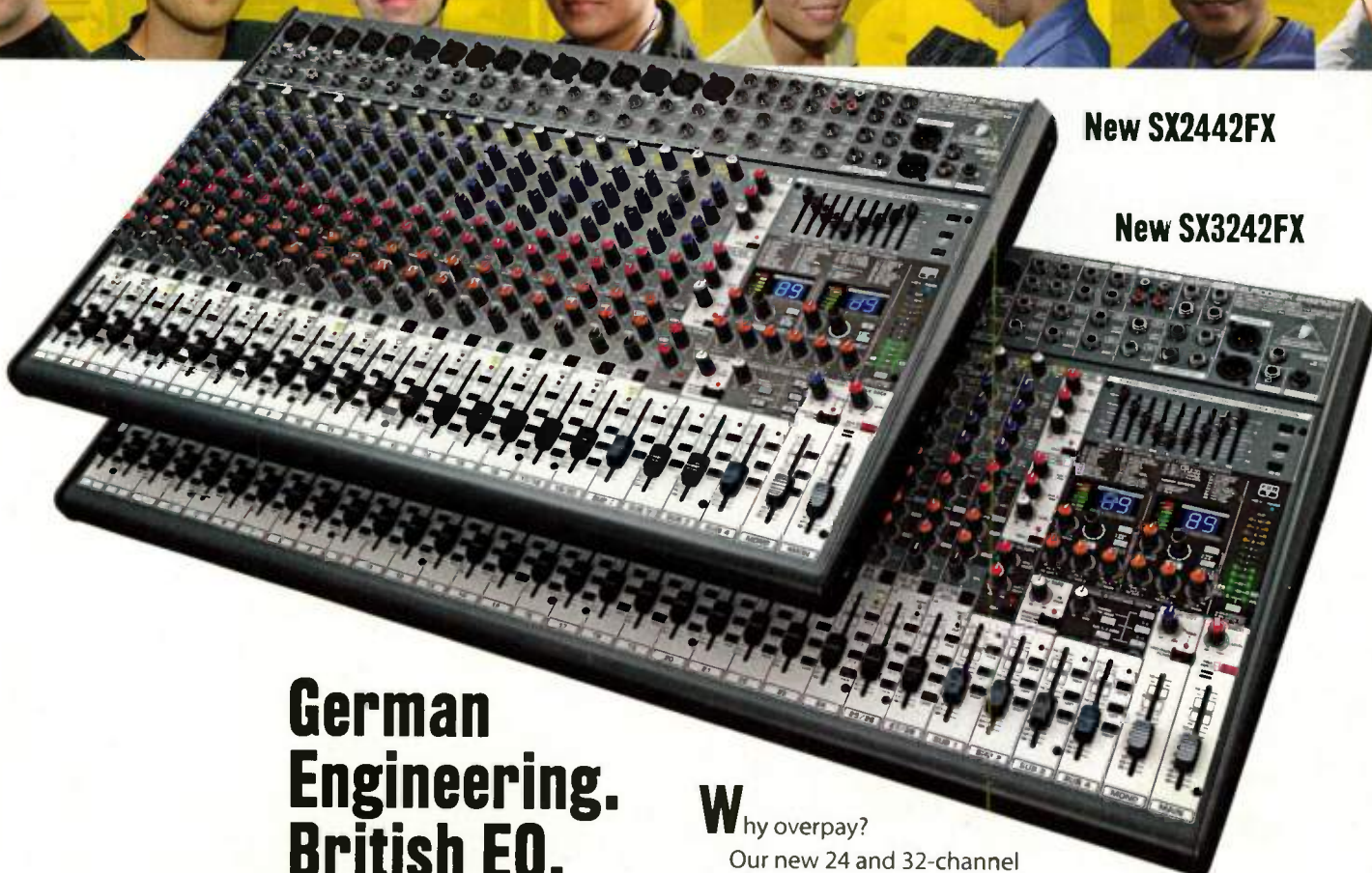
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Boarded & Assembled Them.

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20
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Back in the '80s,
everything was
bigger.



The big record sound of the 4000 E console - now available as X-Rack modules.

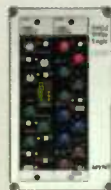
25 years ago, 'big' was in. Big hair, big cars, mobile phones were the size of suitcases, even music came on 12" vinyl discs. Back then, every major studio in the world was equipped with a colossal '4000 E' SSL console - the hit making desk behind hundreds of big records.

Now, the sonic signature of the 4000 E returns in a more affordable (and practical) form. Based on the topology of the original console channel strip, the SL 611E, SSL engineers have crafted EQ and Dynamics modules for our X-Rack and Mynx modular systems that truly capture the sound of this classic desk.

Visit www.solid-state-logic.com to find out more about SSL's big-sounding 4000 E X-Rack modules.

Mynx

The Mynx chassis holds up to two X-Rack modules, offering the most affordable way to bring genuine SSL analogue processing to your studio.



X-Rack

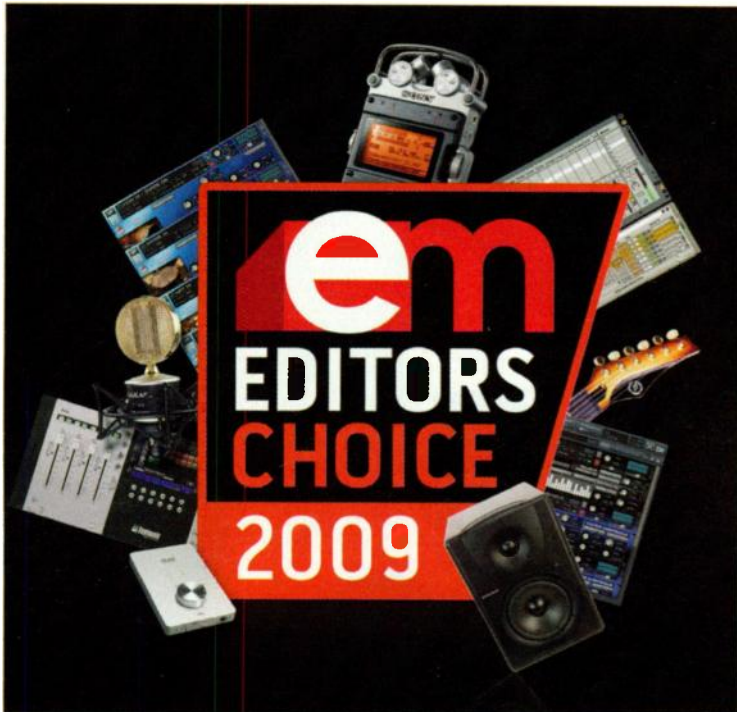
With space for up to eight X-Rack modules and including Total Recall, X-Rack allows you to build your perfect SSL system for tracking, mixing or summing.



4000 E X-Rack modules. This is SSL.

Solid State Logic
SOUND | | VISION

FEATURES



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CHOICE AWARDS

Hats off to the finest new products and upgrades we tested in the past year.

By the EM Staff



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By Myles Boisen



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Hard drives will fail. It's a fact of computing life. But don't be depressed—be prepared. We provide you with preventive maintenance tips and discuss how drives work, why they fail, how to anticipate problems, and what to do when disaster strikes.

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- »» **Soniccouture Balinese Gamelan (Mac/Win)** sound library
- »» **Abbey Road Plug-ins Brilliance Pack 1.05 (Mac/Win)** signal-processing software

PRO TOOLS 8

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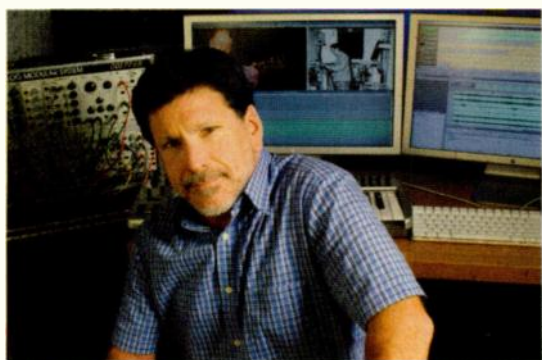


And the Winner Is . . .

It's that time of year again, when EM's editors and authors sift through 12 months of reviews,

roundups, and "What's New" items to find the products that we think stand out from the crowd. Some, like this year's winner in the Microphone category (the Cascade Microphones Gomez Michael Joly Edition), give you maximum bang for the buck, while others, like the winner for Most Innovative Product (the Moog Music Moog Guitar Paul Vo Collector Edition), are chosen because they offer something unique and price isn't a consideration.

The Editors' Choice Awards are not meant to imply that these are the only products released in the past year that are worthy of your attention. In fact, in some categories we had a difficult time choosing a winner because there were so many strong contenders. For example, the competition in the Field Recorder category was fierce, with the Olympus LS-10 coming in as the runner-up. (Check out Senior Editor Geary Yelton's roundup "Studio in Your Pocket" in the June 2008 issue at emusician.com to read about the major players.) In the Monitor Speaker category, the ADAM A5 and KRK RokIt 5 came in a close second and third, respectively.



JANE RICHEY

As usual, the toughest battle was in the Digital Audio Sequencer category, which saw Ableton Live 7 narrowly edge out the other top dogs—Cakewalk Sonar 8, Digidesign Pro Tools 7.4 LE, and MOTU Digital Performer 6.

But beyond the myriad products we did examine are the hundreds that we didn't because we lacked the space in print. To cover more products in 2009, we are launching video reviews on our Web site, beginning with two reviews this month.

This new format will allow you to see *and* hear what products sound like—both the pros and the cons—so you can make better-informed buying decisions. Executive Editor/Senior Media Producer Mike Levine starts the series off by covering this year's winner of the Signal-Processing Software (Individual) award, iZotope RX.

Overall, 2008 was a great year for both software and hardware products, and despite economic woes, all indications point to a stronger year in 2009. In the former class, there continues to be an embarrassment of riches in the world of freeware, shareware, and low-cost apps and plug-ins. Associate Editor Len Sasso keeps a close eye on this field for his "Download of the Month" column, and he constantly surprises us with the intriguing items he finds.

For hardware, the action remains in the world of analog gear, where so many boutique companies keep the focus on sound and build-quality rather than low price points and mass-market appeal. The categories showing the most exciting development trends are synthesizer modules (check out Plan B, Livewire, and the Harvestman); dynamics processors, preamps, and EQ (particularly the companies supporting the 500-series modular format); and stompboxes and effects (such as Diamond, Metasonix, and Devi Ever USA, among dozens of other interesting companies). And with analog hardware products, you don't have to futz with dongles or worry about obsolescence due to system upgrades. Your purchase may very well last you a lifetime.

But EM is not here to sell you gear. Our reviews are only one part of our overall education strategy. Our main objective is to help you grow as an artist or producer by offering practical, how-to articles on every aspect of music production. And with major changes in the way recordings are marketed and sold, we will continue to keep you abreast of the trends on the business side of music with our "Industry Insider" column, as well as with feature articles such as Michael Cooper's "Self-Control" (available in the April 2008 issue at emusician.com), which explains how to set up and manage your own music-publishing company. There will be many surprises coming in the new year, so stay tuned.

May you have a fun and creative 2009!



Gino Robair
Editor



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Download of the Month

Music Engineering Tools' Straightliner (Win) By Len Sasso

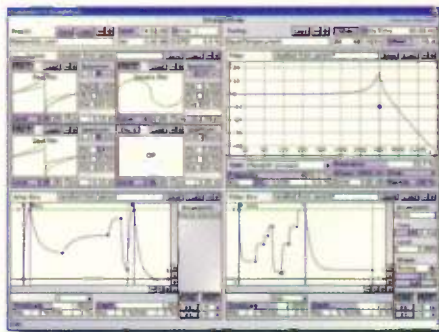
Straightliner (approximately \$120) from Robin Schmidt's Music Engineering Tools (rs-met.com) is a pure subtractive, virtual analog synthesizer that, refreshingly, makes no attempt to emulate a hardware synth's control panel. All of its settings are graphical or numerical and are logically organized on a single screen. A few minutes with the 6-page manual, and you're on your way. Beyond ease of use and a great sound, several things set this synth apart.

Straightliner's signal path starts with four oscillators into which you can load any single-cycle mono or stereo waveform in FLAC or WAV format (the usual waveforms are provided to get you started). The whole signal path is stereo, so stereo waveforms do add breadth. The oscillators also support microtuning and import scales in the Scala format. The oscillators are mixed and fed into a multimode resonant filter that offers the typical configurations along with allpass and shelving filters, a morphing lowpass-to-bandpass-to-highpass filter, and a carefully modeled emulation of the 4-pole Moog ladder filter. A handy TwoStages but-

ton instantly stacks two of the chosen filter types in series.

For control, you get two breakpoint envelope generators (EGs) that loop and sync to tempo. One EG is dedicated to the output amp and the other to filter cutoff.

Both offer variable Velocity and keyboard tracking. All modules have their own preset load-and-save capability and come with a smattering of useful presets. You also get a categorized library of full-synth presets. Straightliner is easy on the CPU and excels at analog-modeled sounds (see [Web Clip 1](#)). Grab the free, time-limited demo and give it a listen.



OPTION-CLICK By David Battino

Touch That Dial

Discover cool features on your keyboard or controller.

Two weeks after helping a musician buy her first synthesizer, I checked back and was shocked to hear that she still hadn't touched the pitch-bend wheel. Are you getting all the expression you can from the joystick, knobs, and wheels on your gear? Even tiny movements can make a big difference, because our brains quickly tune out sounds that don't change. Try varying the panning of a percussive part

slightly—either directly with a knob, or with a mod wheel mapped to an LFO. (Set the LFO to a triangle or random shape, and then use the wheel to move its level up and down.)

Sometimes the most ear-catching results come from pitch-bending sounds you wouldn't normally think of as pitched. I like to loop MIDI drum patterns and then overdub both subtle and drastic



Pitch-bend joysticks facilitate expressive trills, and pan knobs add spice. Just ask this MIDI-monitor monster.

pitch-bends to create alien grooves (see [Web Clip 2](#)). (For more about David Battino's work, visit [batmosphere.com](#).)



Classic Ribbon Mics, Part 2



1939

Tannoy

Small and sturdy, this English ribbon transducer was designed for stage and P.A. use.



1940s

Electro-Voice
Model V-2

A simple but rugged design that could be purchased in one of five standard impedance levels.



Ca. 1942

RCA Varacoustic Microphone
MI-6203-D

This mic offered three main polar patterns ("pressure," "unidirectional," and "velocity") that were selected with a continuously variable slider.

THIS MONTH'S SOUNDTRACK

These albums encompass a diverse range of styles and composition methods, from classic and avant-garde electronics to rock and blues.



VARIOUS: IN CELEBRATION OF THE 50TH ANNIVERSARY OF THE UNIVERSITY OF ILLINOIS EXPERIMENTAL MUSIC STUDIO (1958–2008) (UNIVERSITY OF ILLINOIS)

This 4-disc set includes historic works by Hiller, Martirano, and Gaburo as well as recent works by Payne, Polansky, and Scaletti, among many others.



JEAN-JACQUES PERREY AND DANA COUNTRYMAN:

DESTINATION SPACE (OGLIO) Take a step back in time with the retro-modern synth stylings of French Moog-pop innovator Perrey and analog-synth aficionado Countryman.



ESCAPE MECHANISM: (EMPHASIS ADDED) (RECOMBINATIONS)

Sound and visual artist Jonathan Nelson recycles postconsumer audio into a set of fascinating social and political statements.

EM Readers!

Next month we compare real guitar amps to virtual amp emulations. Can you tell the difference between the two in a mix? Email us at emeditorial@emusician.com, and your responses will be posted online with the article.



VARIOUS: RESONANCE: STEEL PAN IN THE 21ST CENTURY (QUIET DESIGN)

Twelve composers take turns remixing and processing a single steel pan recording to create a very satisfying CD.



VARIOUS: THE MUSIC THAT INFLUENCED LED ZEPPELIN (EAGLE MEDIA) A documentary DVD focusing on the various forms of roots music that stirred a generation of British rockers.



1948

Steanes Ellipsoid
Touted as the world's smallest ribbon mic, this Australian-made uni-directional transducer was designed to be inexpensive and to keep feedback to a minimum.



1956

Shure Model 330
This familiar mic designed for radio and TV use, had a supercardioid pattern and a 3-position impedance switch.



1962

Bang & Olufsen BeoMic BM4
Outfitted with switchable impedance, this Danish mic's industrial design inspired the look of the modern transducers by Royer Labs.

DIGIDESIGN PRO TOOLS 8

EIGHT IS ENOUGH

Digidesign (digidesign.com) has released Pro Tools 8|HD (Mac/Win, \$249.95), LE (\$149.95), and M-Powered (\$149.95), which boast a redesigned user interface, new effects and virtual instrument plugins, scoring, improved MIDI editing, and enhanced mixing capabilities. The new Elastic Pitch complements Elastic Time, letting you repair and manipulate the pitch of audio directly in the Edit window. An improved comping work flow lets you quickly piece together composite takes. Track lanes provide instant access to multiple automation parameters. According to the manufacturer, the program is easier to install, offers deeper controller integration, supports larger track counts for LE and M-Powered users, and lets HD users link up to five Pro Tools|HD systems with the Satellite Link option.



PHONE IT IN

ULTRASONIC PRO 900 HEADPHONES

The PRO 900 (\$549) is the first headphone in Ultrasonic's (ultrasonic.com) PRO series. The series incorporates S-Logic Plus, the newest advance in the company's S-Logic Natural Surround System technology. Ultrasonic claims that S-Logic Plus reduces sound pressure by as much as 40 percent and achieves true spatial realism by directing the sound to the outer ear for reflection to the auditory canal—it does not simulate spatial characteristics with DSP or delay. The headphones feature 40 mm titanium-plated drivers and Mu-Metal shielding for ultralow radiation. They come with a carrying case and two detachable cables (straight and coiled) with gold-plated Neutrik connectors and adapters.





KORG MR-2000S

A BIT IN TIME

Korg (korg.com) expands its MR series of digital recorders with the rackmountable MR-2000S (\$2,499 [MSRP]). This follow-up to the MR-1000 retains its 5.6 and 2.8 MHz, 1-bit DSD and 16- and 24-bit PCM recording options in a configuration aimed at studio recording, mastering, archiving, and live-sound recording. The I/O is enhanced with balanced XLR jacks and unbalanced RCA jacks, and there is 24-stage LED metering with a switchable reference level. You also get S/PDIF jacks for PCM sources and word-clock jacks for synchronization. A new version of Korg's AudioGate audio file conversion software improves all of the previous conversion algorithms.

THE ACID TEST



SONY CREATIVE SOFTWARE ACID PRO 7

Sony Creative Software (sonycreativesoftware.com) ups the ante in loop-based music production with this upgrade of its flagship DAW. Noteworthy enhancements in Acid Pro 7 (Win, \$399 [MSRP]) include a new audio and MIDI mixing console, input buses and real-time rendering, improved time-stretching and pitch-shifting with Zplane élastique Pro, tempo curves, and enhanced Beatmapping for tracks with tempo changes. You can freeze MIDI tracks for improved CPU efficiency, and you can import and export in the FLAC, AAC, AC-3 Studio, and MPEG-2 audio formats. Acid Pro 7 comes bundled with more than \$500 worth of software from outside developers.

GET SMART

Common Ground Publishing's The Music of CSIRAC

The Music of CSIRAC (\$25) from Common Ground Publishing (thehumanities.cgpublisher.com/product/pub.61/prod.10) explores Australian computer-music research in the early 1950s, well before the better-known pioneering work of Max Mathews and his colleagues at Bell Labs in the United States. The book is as much mystery as history because the music, made on the CSIR Mk1 (aka CSIRAC) computer, was never recorded and only anecdotally documented. Author Paul Doornbusch manages to unearth the story, recover many of the original music programs, and painstakingly reproduce the sounds. An accompanying CD includes a slide show, a video interview with CSIRAC designer



Treaver Percey, and 16 reconstructed audio examples.

MacAudioLab's Ultimate DP6 Learning Series

Ultimate DP6 Learning Series (Mac, \$79.95) from MacAudioLab (macaudiolab.com) is a new instructional DVD covering all aspects of MOTU Digital Performer 6. This follow-up to its series of DP5 training videos offers 15 hours of new video, real-world projects to follow along with, spotlighted features, and an exploration of the MOTU sampler MachFive 2.0. Topics include optimization and integration, tracking and arranging, mixing and mastering, film scoring, and plug-ins. The videos offer 1,280 by 960 resolution and require Apple QuickTime 7.



Focal Press's From Demo to Delivery



From Demo to Delivery: The Process of Production (\$31.95) is the first in the new Mastering Music series of books from Focal Press (focalpress.com). This title includes contributions from industry professionals Bob Katz, Robert E. Runstein, Roey Izhaki, and Jenny Bartlett, among others. Aimed at up-and-coming musicians, the book's essays cover every stage of music production: development of the composition, recording, mixing and mastering, marketing, and distribution. Each chapter includes links to further information. Editor Russ Hepworth-Sawyer has 12 years of experience as a sound engineer and producer and is currently senior lecturer of music production at Leeds College of Music.

Sound Advice

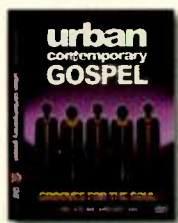
Bitword's WaveFront ReFill

Bitword's (bitword.com) *WaveFront* ReFill (\$149) for Propellerhead Reason 4 is a 4.5 GB collection of waveforms from sound designer Marc Van Bork. It includes multisampled instruments for Reason's NN-19 and NN-X samplers, ReDrum kits, and Combinators mixing multiple instruments and effects. Content ranges from analog and digital waveforms to pads, textures, and ambiences to field recordings. The over 2,000 included patches are just to get you started; the library is set up to facilitate customization and experimentation.



Big Fish Audio's Urban Contemporary Gospel

Urban Contemporary Gospel (Mac/Win, \$99.95) from Big Fish Audio (bigfishaudio.com) fills a neglected niche influential in many popular genres. Its 34 gospel construction kits offer instrumental loops, percussion, and vocal phrases in a variety of keys with tempos ranging from 55 to 140 bpm. Producer Elvert Waltower Jr. has worked with gospel greats such as Kirk Franklin, Fred Hammond, and Ce Ce Winans. The 1.3 GB collection of 746 24-bit, 44.1 kHz loops is provided on DVD in WAV (Acid), REX (Stylus RMX), and Apple Loops formats.



Soniccouture's Tremors

When you want to take your drums and percussion to the dark side, Soniccouture (soniccouture.com) has just the thing: *Tremors: Dubstep Drums & Atmospheric Breaks* (Mac/Win, \$79 download, \$84 DVD). This collection of 300 24-bit, 44.1 kHz drum loops comes in WAV, REX, and Apple Loops formats. Its 63 grooves range in tempo from 65 to 150 bpm and include kicks, snares, percussion, hi-hats, and effects. Each groove contains mixes with and without effects as well as a breakout of each part, and the parts are designed to mix and match well between grooves.



STEAM POWERED

SPECTRASONICS OMNISPHERE



Spectrasonics (spectrasonics.net) has launched its new flagship virtual instrument, Omnisphere (Mac/Win, \$499 [MSRP]). The hybrid-synthesis engine Steam is at the core of this AU, VST, and RTAS plug-in. It features variable-waveshaping DSP, granular synthesis, timbre shifting, FM, polyphonic ring modulation, and high-resolution streaming sample playback. Omnisphere's core library showcases years of sampling and patching


experiments, and the best of Spectrasonics' classic line of sample libraries is also provided. Extensive modulation options include Chaos Envelopes, the Flex-Mod modulation-routing system, and advanced MIDI Learn and automation. Progressive zooming lets you access essential features quickly or burrow deep under the hood.

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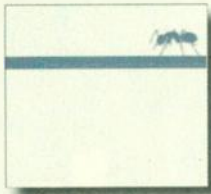
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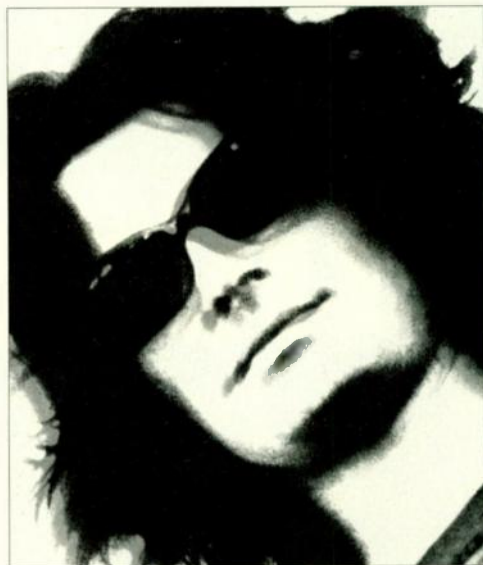


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 Web site: antneely.com



BRIAN DEUTSCH

Crunching Code

Ant Neely's new CD features Morse code, public-domain samples, and more.

A film score, even when there's no film attached to it, usually provides insight into the working style of the composer who made it. Technically speaking, Ant Neely's *Not Fit for Human Consumption* (Creative Commons, 2008) doesn't flow in its entirety like a score, but there's plenty in its overall sound and unifying concept to suggest a wealth of imagery, much of it from a time of innocence in American culture.

By Bill Murphy

That might seem a bit inauthentic considering Neely's British roots, but rest assured he knows the terrain. For a number of years, he called Los Angeles home, writing music with his group subthunk, which made waves on the KCRW radio show *Morning Becomes Eclectic* and attracted film and TV producers from shows like *Six Feet Under* and *Las Vegas*. After three albums, a tour, and several more TV track placements, Neely moved to London to begin work on his first solo effort. All he needed was a direction.

"Very early on, I had a groove that I was messing about with," he recalls, "and I thought what would be perfect for it was a 1950s educational song. I

had a look around the Web and lo and behold, I found the Prelinger Archives [archive.org/details/prelinger], which hosts all these film and audio clips that are in the public domain. I found a whole coloring book full of ideas."


He began his work on the album (which can be downloaded for free from antneely.com) by remixing the 2005 subthunk hit "Scratch," which he gave new life with a more beat-heavy arrangement and low-end synth bass line. Retitled "Scratch Redux" (see Web Clip 1), the song was beefed up in Propellerhead Reason using ReDrum and the program's Scream Sound Destruction

Unit (the Damage section's Tape function in particular) to subtly compress the rhythm tracks. The same effect is applied to the bass line on "Lucky"—the first of a suite of tracks on *Not Fit*, including the 1941 swing-era throwback "What This Country Needs" and the hilarious Post Office send-up "Springfield," that feature voice-overs and samples from the Prelinger Archives (see Web Clip 2).

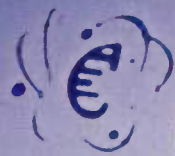
The collage approach smacks of late '80s Coldcut, but what sets Neely apart is that he also imports hefty amounts of strings, brass, timpani, and other orchestral elements from libraries he has loaded in Tascam GigaSampler. Using an M-Audio Axiom 61 keyboard to trigger whatever he needs, he has access to vir-

tual concert halls full of musicians—as well as the quick MIDI-editing capabilities of his GigaStudio and Digidesign Pro Tools setup—that only a few years ago would have been unthinkable without blowing a hole in his bank account.

The payoff by far is the album's title track: a riot of John Barry-like orchestral atmospherics that gradually morphs, with the help of a Korg Kaoss Pad-bent glockenspiel and the Morse code-based rhythm that spells out *not fit for human consumption*, into a slick drum 'n' bass theme reminiscent of a classic James Bond film (see Web Clip 3). Neely embraces the nostalgic reference and hopes to explore the old school even further from a gear perspective.

"I love the digital world," he says, "but I also love gear with knobs you can twiddle. I guess a lot of people just coming up now are purely digital, so they wouldn't have ever played with tape, for instance. I wouldn't go back completely, but my ideal studio would have those elements. It's the forerunner to what we're doing now, and across the board there's a lot to learn from what people have done before us." 





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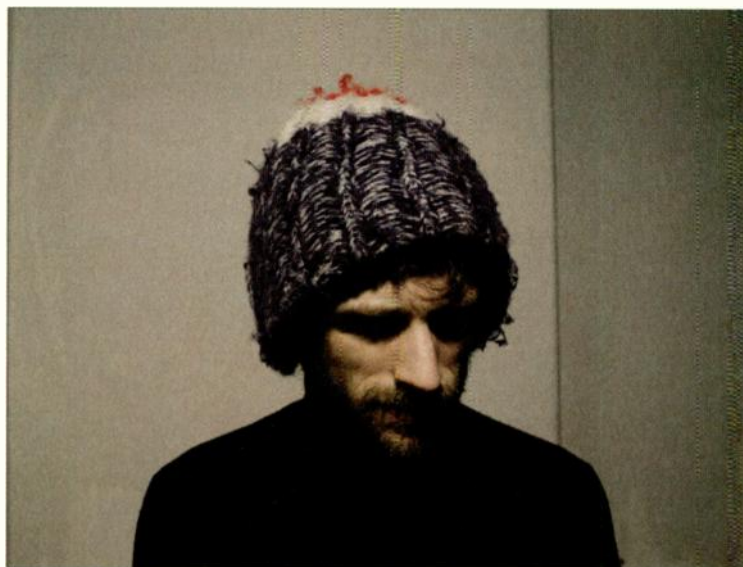
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KIM HORTHOY

Solitary Sound Maker

Lindstrøm works alone to produce his latest CD.

Lindstrøm, the Norwegian multi-instrumentalist, producer, DJ, and mix master, has remixed for the likes of Franz Ferdinand, Roxy Music, and LCD Soundsystem. Now he's reaching for a wider audience for his own music. His latest release, *Where You Go I Go Too* (Smalltown Supersound, 2008), is an electronica-based instrumental CD that's the very definition of a solo project—carefully constructed by himself in his chosen atmosphere of creative solitude.

By Kristi Kates

The multifaceted musician, whose full name is Hans-Peter Lindstrøm, writes, records, and often mixes in his own Feedelity Studio, a 2-room setup that doubles as a record-label office in downtown Oslo, Norway. "There's no control room," he notes. "Everything's in the same brickwalled room with no sound treatment, except that all four walls are covered with 4,000 vinyl records."

Lindstrøm's studio includes both a computer running Steinberg Cubase 4 and a Tascam 58 8-track analog recorder. "I usually record drums onto tape, and sometimes bass, guitars, and some keyboards," he says. "When using the Tascam, I play along with

the metronome in Cubase. Then after I've recorded onto tape, I rewind the machine and play it into Cubase. I don't use timecode or anything to sync the tape. If the timing gets off, which might happen when I record very long takes, I just use cut and paste in Cubase."

His studio is set up for easy access. "I've placed all my equipment around where I sit, so I can easily grab any instrument. Everything is connected to the mixer, so I don't have to think about cables," Lindstrøm says.

That "everything" includes a bunch of favored keyboards, which he used to shape the evocative soundscapes of *Where You Go I Go Too*, on which he broke the traditional album mold by

including only three extralong but stunning tracks (see Web Clip 1). "I was bored of making shorter tracks and needed to do something completely different. I've worked on long tracks before, but never 30 minutes!"


The Memorymoog, Sequential Circuits Prophet-5, Roland Juno-60, and ARP Solina String Ensemble are all part of his vintage-keyboard collection. "Recently, after getting a lot of hardware, I stopped using plug-ins and virtual instruments," he reports. "Grand Ideas" (see Web Clip 2) on the new CD features an especially striking glassy patch from a Yamaha FS1R.



Other elements in his musical arsenal range from Telecasters to congas to bits of gear he's picked up while on tour, including a Korg Kaoss Pad. "I use it on the Solina to get some movement and hands-on control on the static string sound; it sounds great," he enthuses.

During his travels, Lindstrøm likes to record found sounds, which he processes at a later date. "I recorded trains in Kyoto, a beach in Rio, and my vacuum cleaner, which sounds like an old broken analog synth going crazy," he laughs.

His studio tracking process is equally idiosyncratic. "I always write and record at the same time. It might take more time, because I have to rerecord parts since I often come up with new ideas, but I prefer working this way."

Having his own studio is essential to Lindstrøm's way of working. "I've never, ever worked in a professional studio," he muses, "so I don't have to think about high studio prices, which I don't believe would benefit the creative process. Being able to work here is the number one reason that I'm able to express myself musically." 

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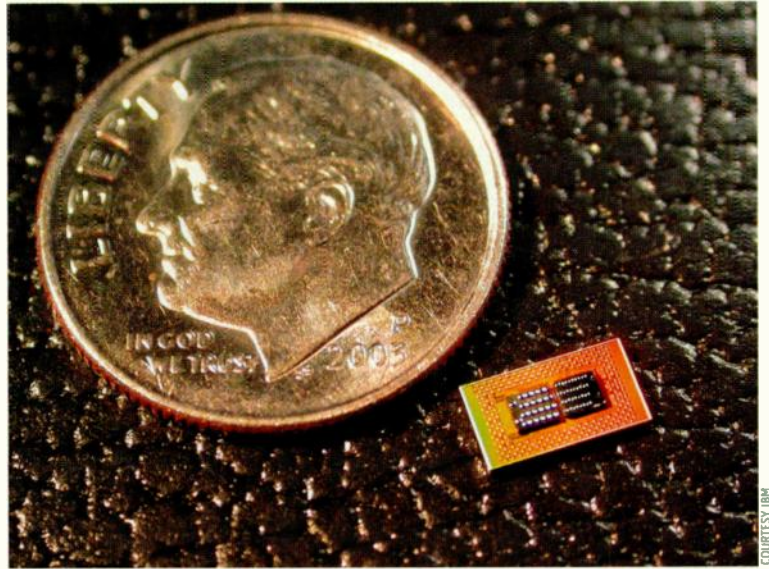
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World Radio History

FIG. 1: IBM researchers have developed the world's fastest optical transceiver, which can handle up to 160 Gbps of data in a very small package.



Let There Be Light

The future of computing may be optical | By Scott Wilkinson

Most people mark the birth of modern electronics with the invention of the transistor in 1947. This device single-handedly overcame the limitations of vacuum tubes, especially in terms of size, heat dissipation, and reliability, leading the way to supercomputers, personal computers, and a vast assortment of electronic musical tools in the last 60 years.

Today, electronic technology is starting to reach the limits of its capabilities, and many labs are working on a new technology called *photonics* with the potential to far exceed these limits. Whereas electronics is concerned with manipulating streams of electrons, photonics deals with light, which consists of a stream of photons.

Photonic computing offers many advantages over its electronic counterpart. For one thing, light can be switched on and off much faster than electricity, allowing far higher digital data rates. In addition, light is much more energy efficient and less prone to pulse degradation, especially over long distances. Finally, crosstalk is eliminated because there are no electromagnetic fields arising from different current paths to interact with each other.

However, these advantages do not come cheap. Ironically, the lack of interaction between photons

means that the technology to manipulate them is more sophisticated than its electronic equivalent. And photonics is in its infancy, with critical breakthroughs appearing only in the last few years.


One vital field of research is the development of nonlinear optical materials, which change their optical properties depending on the light that enters them. One of the most important nonlinear effects is *photorefraction*, in which the intensity of the incoming light changes the refractive index of the material. This changes the angle at which the light is bent as it passes through the material, suggesting the possibility of superfast, multistate optical switches.

Another critical area of development is holographic memory, which stores data as interference patterns in a block of photosensitive material. A laser beam is split into two identical beams, one of which is modulated in a way that corresponds to the data to be stored. When the two beams meet within the storage material, the resulting interference pattern is recorded. This process can be repeated at different angles, yielding a data density up to tens of terabits per cubic centimeter.

Then there's the interface that sends and receives data between digital devices via optical networking. IBM recently demonstrated the world's fastest optical

transceiver, which can send and receive data at 160 gigabits per second, eight times faster than currently available optical components. According to the company, this is fast enough to download a typical high-definition, feature-length movie in 1 second instead of the hours it takes today.

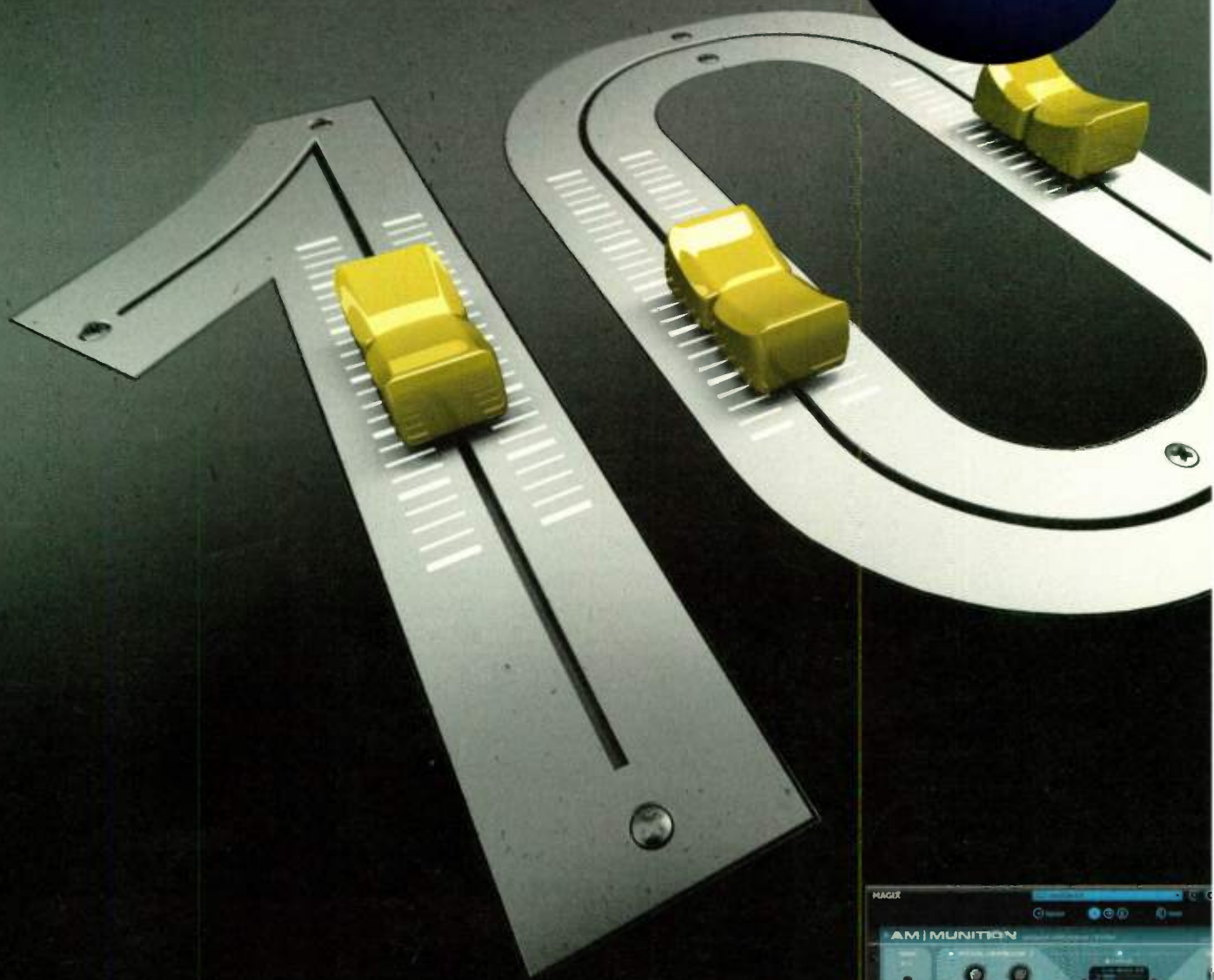
"The explosion in the amount of data being transferred when downloading movies, TV shows, music, and photos is creating demand for greater bandwidth and higher speeds in connectivity," says Dr. T. C. Chen, vice president of science and technology for IBM Research. "Greater use of optical communications is needed to address this issue. We believe our optical transceiver technology may provide the answer."

Even better, the new transceiver measures only 3.25 mm by 5.25 mm (see Fig. 1), allowing it to be incorporated into small devices. The IBM researchers combined current CMOS technology with optical components made of more-exotic materials, such as indium phosphide and gallium arsenide. This approach makes it easier to integrate optical communication into existing electronic circuits. Such an integrated approach may well lead to the first applications of photonics in the music industry, where terabytes of storage and gigahertz of bandwidth would not be wasted. 

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mix, complex interactions can occur that may smother and overwhelm what were once well-recorded tracks.

Squeeze with Care

When used judiciously, compression is a powerful tool for holding expressive tracks like vocals and instrumental solos in one dynamic place rather than letting their focus slide between the foreground and background. But as with reverb, too much of a good thing can be harmful, and you can end up with an over-compressed production that doesn't breathe dynamically.

Compression becomes a space eater particularly when it is overused on percussive and low-end elements, especially electric and acoustic bass. During consultations for remixing (in the old-fashioned sense of the word) and mastering, one of the things I most often recommend is to remove or reduce compression on percussive and bass instruments.

In the depth dimension, percussive sounds generally exhibit sharp transients that are heard initially in the foreground or midground and then fade rapidly into the background. Functionally this kind of movement is very important because it punctuates sustained sounds and reinforces a feeling of space and propulsion in the depth dimension. Overcompression dilutes attack and punch, and obscures rhythmic relationships by inverting the natural dynamics of a percussive event (see the sidebar "Compression: Don't Overdo It").

For instance, when low drums have a noticeable decay or a dominant note (or both), compression can intensify tonal components, eating up space and adding muddiness in all three dimensions. Increasing sustain in the low range can create dissonance, beating, or competition with bass instruments, especially when combined with reverb.

Likewise, remember that bass—whether acoustic or electric—fulfills a percussive and timekeeping function in many musical styles. Moderate compression helps keep the bass present and consistent. But overcompressing it sabotages its rhythmic role, boosts muddiness and tonal competition, and can create a variety of problems during mastering.

As with reverb, the origin of space-sucking

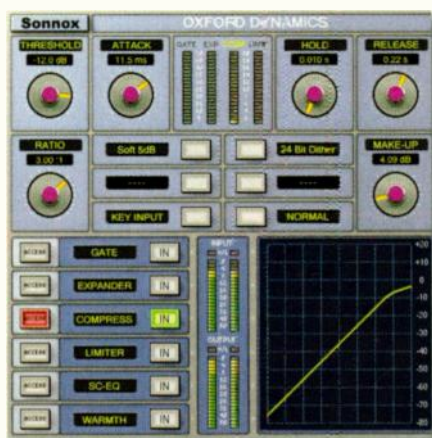


FIG. 1: This screen shot from the Sonnox Oxford Dynamics plug-in shows a good starting-point setting for a mix-bus compressor. To avoid squashing transients, the slow attack is key.

compression abuse is often a lack of familiarity with parameter adjustments, or a blind reliance on default settings. In particular, failing to alter a compressor's attack time from a default zero setting will make almost any kind of track sound overcompressed and lacking in transients.

Mixes that sound flat can often be revitalized by examining and increasing attack times of compressed tracks to 10 ms or more. This adjustment not only passes initial transients—which are vital to vocal intelligibility and percussive attack—but also lessens gain reduction generally to restore depth and dynamics (see [Web Clips 1a and 1b](#)).

Another way to breathe dynamic life and space back into your productions is to utilize stereo-mix-bus compression as an alternative to compressing many individual tracks. To preserve spaciousness and dynamics, my mixes use light compression on individual tracks only where necessary (usually kick drum and vocals, sometimes bass, guitar, or instrumental solos), combined with moderate stereo-bus compression. A third compression level of digital peak limiting is added during mastering. The cumulative effect of three small compression stages—rather than piling on the compression all at once in mixing—works well to preserve the liveliness and dynamic depth of background and midground tracks.

To avoid adding coloration or extra noise, I recommend using a sonically transparent, high-quality hardware compressor or plug-in for the demanding task of mix-bus compression. As a starting point, recommended parameter settings include a low ratio (2.5:1 to 4:1), a slow attack (10 ms or more), a fast release (200 ms or less, depending on tempo and musical style), and a soft knee. Set the threshold so that maximum gain reduction is only 2 to 4 dB, then adjust to taste from there. Adjust makeup gain so that the highest peak gain levels reach -2 dBfs or lower, to allow some headroom in mastering (see [Fig. 1](#)).

The main point is that compression causes problems when it limits or eliminates the depth dimension, crowds out space in the horizontal (imaging) dimension, inverts the natural dynamics of percussion and bass, and increases low-end competition and mud. Too much compression also puts all frequencies in your face, forcing the ear to prematurely tune out the subtleties of space and dimensionality as listening fatigue takes over. Overreliance on compression also increases the general noise floor of your mix. Even at low levels, noise obscures the ear's perception of background details that contribute so much to the unique spatial qualities of a mix.

Quality, Not Quantity

A recording often sounds dense and lacking in space simply because it is cluttered with too many tracks. One of the big drawbacks of the high track counts available in DAW recording is that it's easy to keep adding instruments. And seemingly, come mix time, it becomes even more difficult to take anything away to make space.

One of the most extreme cases of over-tracking I encountered was a song brought to me with four similar bass tracks running simultaneously! "Beefing up the chorus" is another practice that, when taken to the extreme of adding four or five keyboards and guitars at once, can suddenly double the apparent volume of a song, overwhelm any subtlety, and diminish the potency of subsequent verses.

Whenever possible, I get clients to consider the old adage "Less is more" in relation to their arrangements. In 3-D mix-speak, this

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translates to stripping away unnecessary tracks and then emphasizing depth and imaging relationships to open up space and dynamics within a wall of sound. Which tracks are going to be most crucial for your music is really case dependent and defies easy generalization. But here are a few things to watch out for if you feel your mixes have become an overstuffed closet in need of a sonic spring-cleaning.

Easy on the Icing

It's one thing to have a lush, lavishly orchestrated track as the centerpiece of your next CD project, but it's another thing entirely if every song you've recorded has multiple keyboard and guitar parts, strings, horns, five or six background vocals, and enough percussion instruments to start a school music program. I call this condition "all icing, no cake." When this happens to you, it's time to take a step back and admit that you've become a track addict.

One useful exercise for regaining perspective on track addiction is to strip things down and keep your arrangements real. Think for a moment what your ideal real-world band would be: perhaps a folkly 2-guitar-and-percussion unit, a conventional modern-rock band, or a larger R&B combo with keyboards, horns, and a couple of background singers.

With this real-world band in mind, go back to your mixes and mute any tracks that couldn't be performed by the players you envision. This may be a big shock at first, but give yourself a chance to get used to this part of the game. Next, devise an arbitrary rule that will govern the number of tracks you allow yourself to unmute and add back to your production. This could be as basic as using only one new instrument per song, and one doubling track.

Revisit your levels and panning and then give the song a listen to see if you can live with this new austerity. (You'll probably add a few tracks back in that you just couldn't live without.) Hopefully this track trimming will clean up your arrangements, improve vocal clarity, and restore a sense of space simply by clearing out the clutter.

Another part of a mix that's often ripe for trimming is doubled tracks. Doubling has its place for vocals and chordal instruments, but too much can easily backfire and turn a mix

from lush to impenetrable. As with the previous exercise, start by muting all tracks that double other tracks. Doubling can mean a duplicate performance, a similar instrument, or an identical rhythmic feel on a different instrument. Add doubles back into the mix one by one, starting with the tracks that are most essential.

As you do this, consider the content that you are adding and how it fits into the three-dimensional mixing space. Experiment with foreground-to-background relationships and depth by reducing the level of any doubling tracks at least 3 dB below the existing track. Explore the horizontal dimension by panning the double away from the existing track, or change the frequency of the double to differentiate it within the vertical dimension (or do both). Ideally you will end up using less

produce a dull or predominantly bottom-heavy production that needs tambourine or hi-hat to establish a feeling of air and help fill the vertical dimension.

Reverb needs to be considered as an interactive arrangement element as well. Once you have lightened your track load and banished space invaders from the arrangement, double-check to make sure that the amounts, lengths, and character of your reverb choices are still appropriate to the production. Bear in mind that changes in doubling, panning, and compression will also impact reverb perception. And whenever possible, resist the urge to fill up that newfound space with reverb.

All Things Being Equalized

Just as blazing sunlight can make it hard to see visual details, and strong scents can overpower

Too much doubling can easily backfire and turn a mix from lush to impenetrable.

doubling and reapplying these tracks in interesting and subtle ways to enhance the mixing space (see Web Clips 2a and 2b).

Another way to approach dense recordings is to build them up and break them down by way of the arrangement. Varying the dynamics can really help a song breathe. For instance, after a dramatic bridge or chorus, stripping a verse's support down to one or two rhythm instruments is a tried-and-true way to reengage the listener. Beginning a song with simplified orchestration is another conventional way to build up to an impressive chorus, while establishing a sense of space right from the start.

From an EQ perspective, don't underestimate the spatial importance of treble in your arrangement, especially when using sparse instrumentation. Most instruments—even bass and low brass—have some high-frequency content. But, for example, arranging cello and acoustic guitar behind a male voice may pro-

duce subtle aromas, excessive EQ can mask perception of audio nuance. When frequency buildup becomes extreme—particularly in the upper midrange, where the ear is most sensitive—subtle space-enhancing details in a mix are the first to fall victim to frequency masking and hearing fatigue.

On numerous occasions, I have encountered mixes, especially rock recordings, where it is obvious that the guitar is too bright in the upper midrange around 1 to 3 kHz. This timbre can make it hard to hear the "crack" of the snare drum, which then ends up having to get boosted as well. As a further consequence, you might then feel you need to add a brighter edge to the vocals.

As more additive EQ (boosts as opposed to cuts) gets piled on, the final result is often grating, tinny, or downright unlistenable at moderate volume. Such an excessive buildup—in addition to hastening listening fatigue—may smear or obscure subtler

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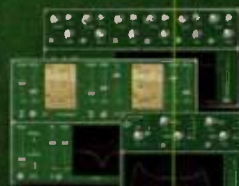
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Overcompression dilutes attack and punch, and obscures rhythmic relationships.

aspects of a production. The interaction of compression or reverb in this range further compounds the problem.

Sometimes it is possible in mastering to solve or at least soften this type of masking effect with a judicious frequency cut, or de-essing tuned to the 2 kHz area. In the cases where this approach actually works, the difference in space and openness in the mix is immediately obvious. Occasionally the trans-

formation borders on the miraculous, causing band members to wonder what kind of sophisticated mastering black magic has been used on their tracks.

Of course, a frequency cut to the most active part of the midrange affects all instruments to some degree and could cause presence problems for some tracks. Similar issues can plague mixes where the low end or treble has been pushed out of balance. In cases where

the mastering fix previously described doesn't do the trick, it's time to go back and remix the track, focusing more on subtractive rather than additive EQ.

I'll start with the low end. Once the mix level of a basic track has been established, bass boosting can be done with compression, as we have already discussed, or with EQ. A common practice that quickly eats up both space and headroom is boosting with a low-shelving EQ, which increases everything below the specified corner frequency. When applied indiscriminately, this practice typically raises the gain of a track without significantly increasing usable tone, and also boosts 60 Hz hum, ambient rumble, and other muddying artifacts.

To enhance your mix's spaciousness and clarity, keep any low-end EQ boosting moderate and targeted between 150 and 400 Hz (see Fig. 2). This range is most effective to add power and warmth to tonal and chordal

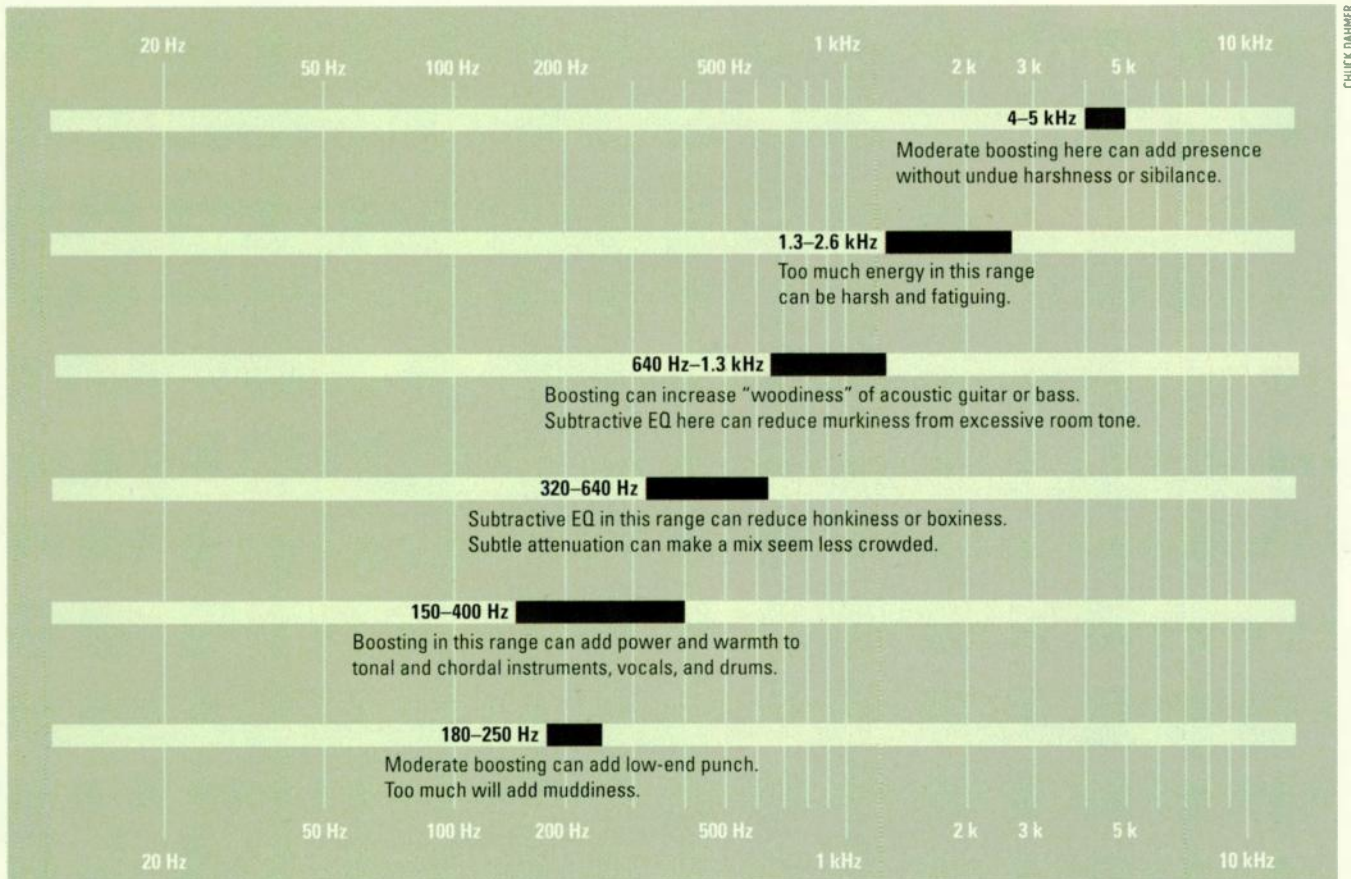


FIG. 2: This chart shows key frequency ranges for additive and subtractive EQ that affect various elements in your mix.

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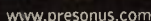
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Compression: Don't Overdo It

Loud is good, and most of us have to use some compression to keep our final mixes competitive in this increasingly noisy world. But louder is not always better. Level-headed mixing and mastering professionals, joined by other voices of sanity in the music business, have been warning for years that the loudness war is simply a losing battle. To illustrate that point, this year even hard-rock fans are blogging that the new Metallica CD has suffered sonically from mixes that were brickwall limited before they reached the mastering lab.

So what are the implications for compression in terms of space and 3-D mixing? When a digital mix becomes squashed with compression, the foreground tracks can't get any louder once a high proportion of peaks have reached digital zero (0 dBfs). The background elements—vocal nuances, chordal decays, room sound, and so on—come to the foreground, hence the phrase "in your face." And this sounds exciting, for a little while. But without some quiet dynamics, there is no longer any meaningful reference for what loud is.

In 3-D terms, if there is no background, your mix becomes a flat plane with no depth and no empty space in the horizontal (imaging) dimension. Similarly, spaciousness is squeezed out and listening fatigue takes over as a result of overcompression crowding the vertical (frequency) dimension.

instruments, including vocals. The tone and punch of drums can be improved in the same manner. Combining this kind of EQ boost with a careful, low-shelving cut is an excellent way to clear up mud in a mix, enhance bass tone in real-world playback environments, and achieve hotter levels in mastering. In order to make effective judgments about the low end when mixing or tracking, it is also very important to use a subwoofer.

In mastering I find that 320 to 450 Hz is a region where I often use subtractive EQ to attenuate the buildup of room tone and leakage on multiple-miked recordings, effectively reducing murkiness. Improved clarity and space usually results from decreasing the boxy-sounding effects of standing waves in small or acoustically flawed rooms (see *Web Clips 3a* and *3b*).

Subtle attenuation throughout the mid-range is another easy way to alleviate a feeling of crowding in a mix, and can make a track seem lighter or airier. Of course, when taken to extremes, subtractive EQ between 320 and 1,000 Hz risks the empty, hollow tone of the smile curve.

As a rule, whenever you add gain to a track

with equalization, it is good practice to try to use subtractive EQ to cut the gain of some other frequencies. Make it your goal to keep the level of a track roughly the same, while increasing its desired tone as well as carving out more room in the mixing space. In addition, don't be single-minded about highlighting one frequency area to the detriment of overall timbral balance.

Into the Pan

In part 1, I addressed stationary panning of basic tracks. Now, here are a few advanced tricks to bring attention to the 3-D mixing space with creative panning and movement of sounds within the horizontal panning dimension.

Panning reverb to the side opposite from a dry track is a hip way to create vivid, dimensional space and draw a listener into the mix. This trick is one of my favorites to use on guitar solos, percussion, effects, and vocal accents. It is also possible to employ long, splashy reverbs this way, because the reverb return will be mono or narrow stereo and therefore will not dominate the entire stereo spectrum.

Manual or automated panning is a good way to energize the horizontal dimension in a

Excessive EQ can mask perception of audio nuance.

mix. A Leslie cabinet or stereo Leslie simulation can help introduce some lateral motion into your recordings.

Another way to add space horizontally is to employ asymmetrical effects. Start by duplicating the desired track(s), then pan the original track to one side. Pan the copied track to the

opposite side and try out some effects (modulated effects like flange, chorus, and tremolo work great), distortion, or radical EQ or compression on it.

Stereo keyboards, Leslie effects, stereo acoustic guitars, and the like sound full and can be relied on to add a lush sense of space to sparse productions. But as great as most stereo sources sound, adding too many can choke the horizontal spectrum of a mix. For this reason, I usually observe a limit of two stereo instruments (not including drums) in a mix, and pan these sources opposite each other with minimal overlap. Generally, with the occasional exception of synth pads and organ parts that are mixed low, any additional stereo tracks in the arrangement are panned in mono or very narrow stereo.

Tips to Avoid "Space Invaders"

- Avoid muddying your mix with too much compression. Make sure that all compressor attack times are at least 10 ms. Combine judicious use of track compression with mild mix-bus compression.

- Keep arrangements relatively sparse. Decide what a real-world band would be for each song, and try not to add extra parts beyond that.

- Avoid excessive doubling of parts.

- Consider varying dynamics through the song by breaking down and building up the mix (through muting and unmuting) as the song progresses.

- Try panning a reverb return to the opposite side of the track it's affecting.


- Consider adding motion to your mix by automating pans and/or using rotating-speaker effects on selected elements.

- Avoid clutter by limiting the amount of wide stereo tracks in your mix to two. Pan other stereo sources more tightly or make them mono.


- Don't overdo additive EQ. Try to make an equal EQ cut to compensate for level added by boosting.

Spaced Out

Conceptualizing the space between the speakers as a three-dimensional realm—rather than as a line between two points—opens up limitless possibilities for the mixer's craft. And hopefully, thinking of mixes in terms of balance, symmetry, and space will help you get over some typical production hurdles.

The tips and methods described here are certainly not intended to be hard-and-fast rules. Nor does this information need to be embraced totally or exclusively. Consider these 3-D mixing concepts as a jumping-off point for your own creativity—a way to make audio dimensional, and to transform the mixing space into a sonic sculpture or an artist's canvas. 

Myles Boisen (mylesboisen.com) consumes significant quantities of space and time at Guerrilla Recording and the Headless Buddha Mastering Lab in Oakland, California. Thanks to Jonathan Segel, David Blatty, Kevin Cunningham and the Goat Family, Freddi Price, Wink Paine, and Rube Waddell.



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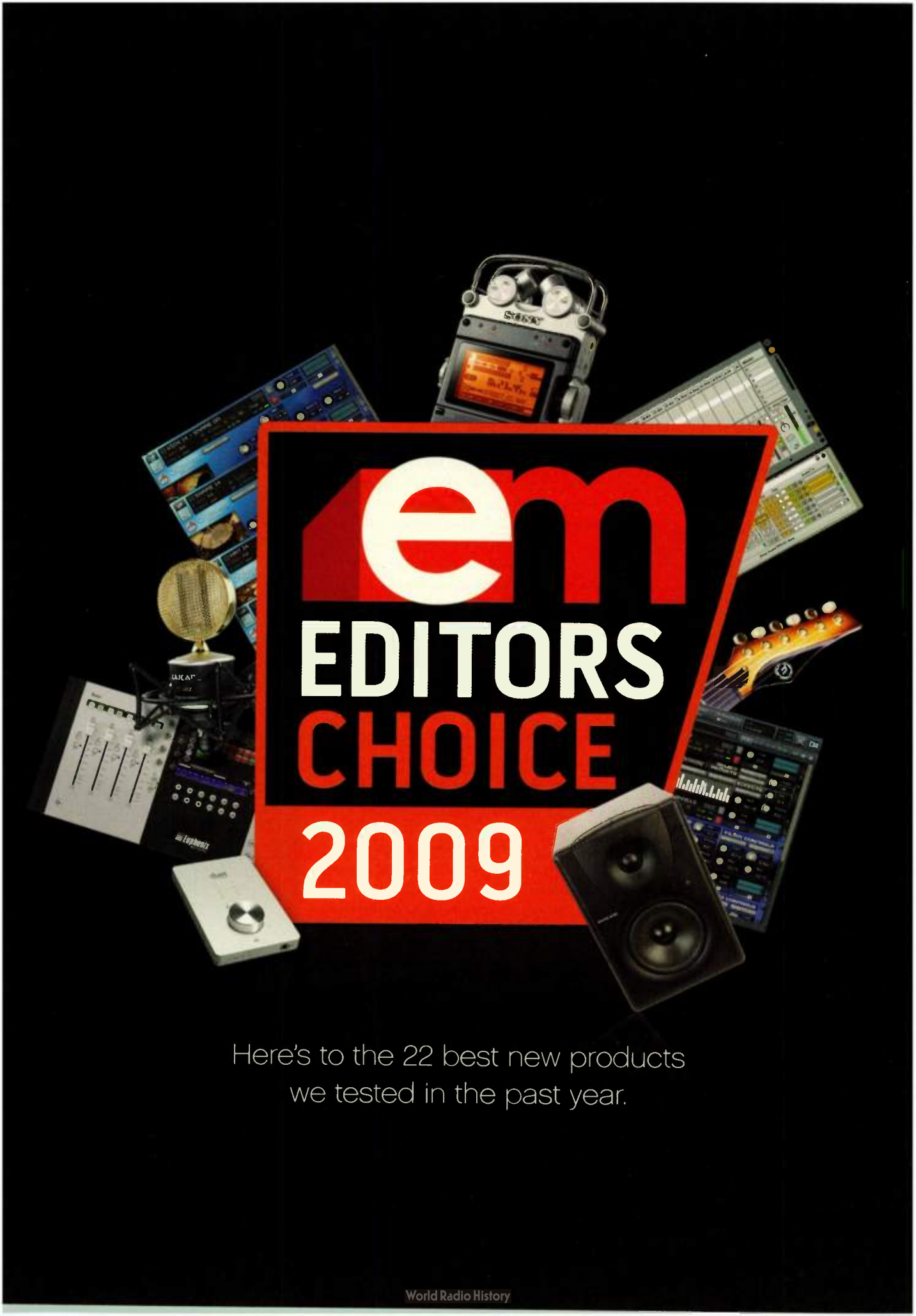
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Here's to the 22 best new products
we tested in the past year.

2008

EDITORS' CHOICE

Awards

By the EM Staff

Got gear? We do—a ton of it! For the past year, EM's editors and authors have worked hard to test and evaluate a large assortment of the new hardware and software we believe to be most important to EM readers. Along the way, we found lots of good stuff and a few disappointing items. We also discovered a relatively small group of amazing products that deserve special recognition, and to these superb devices and applications, we are delighted to present our prized EM Editors' Choice Awards.

To be eligible for an Editors' Choice Award, products must have shipped between September 15, 2007, and October 15, 2008, when we began editing our January issue. We also considered several products that shipped so close to the 2008 Editors' Choice Awards deadline that it was not possible for us to test them in time for that year's awards. If a product shipped too close to this year's deadline for us to properly evaluate it, we'll make it eligible for next year's awards. We give awards to software upgrades only if they were major improvements over the previous version.

All of the winning products have been field-tested by EM's editors and a select group of authors. We also solicited opinions from the editors of our sister publications *Mix* and *Remix*. The final selections were made by EM editors Gino Robair, Mike Levine, Len Sasso, and Geary Yelton, and former EM editor in chief Steve Oppenheimer edited the resulting article. All award-winning products have been covered in EM reviews, or the review is in progress and our tests are far enough along that we feel confident about our conclusions (see the online bonus material "The Award Winners in Review" and "The Winning Manufacturers" at musician.com). Please join us as we applaud the winners of the 17th annual EM Editors' Choice Awards!

Audio-Editing Software

Adobe Audition 3.0 (Win, \$349)

Adobe Audition gets more powerful and full featured with each upgrade, and version 3's new features make it a no-brainer for this year's award.

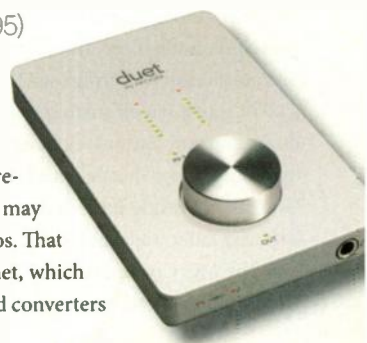
Perhaps the biggest surprise is MIDI sequencing and support for VST instrument plug-ins, which takes Audition one step further into the world of digital audio workstations. Just click on a MIDI track to reveal a Sequencer window where you can enter, edit, and route MIDI by channel to up to 16 virtual instruments. Surround support with the new surround encoder is another major addition.

Audition's complement of signal processors has been expanded, adding a convolution reverb, a mastering tool, tube-modeled compression, analog-modeled delay, and guitar effects. IZotope's Radius is included, enabling time-stretching, and the new Top/Tail views make loop editing a snap. The software's already excellent spectral-editing capabilities have been further improved. You also get new noise-reduction and phase-correction tools. For audio editing and basic MIDI sequencing, Audition is an excellent choice for Windows users.

Audio Interface

Apogee Duet (Mac, \$495)

Only a few years ago, Apogee released the Mini-Me, which combined the company's sought-after A/D converters with a pair of high-quality mic preamps. However, its \$1,500 price point may have kept it out of many personal studios. That certainly won't be the case with the Duet, which puts a pair of Apogee's mic preamps and converters

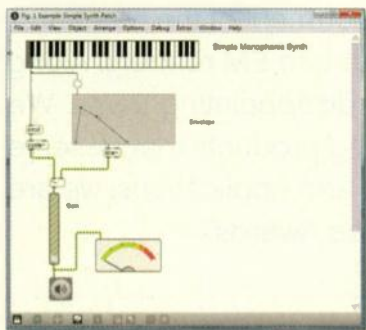


into a FireWire bus-powered audio interface for under \$500.

A Mac-only product, the Duet's clean look fits the Apple design aesthetic, with one rotary encoder that covers everything thanks to the included Maestro configuration software. The product does more than look great next to a Mac: Maestro is built into the current versions of Logic Pro, Soundtrack Pro, and GarageBand for easy access. (Apps that support Core Audio are also compatible.) With two XLR mic/line inputs, a pair of unbalanced instrument-level inputs, and two unbalanced 1/4-inch outputs, the Duet is a cost-effective way to get the excellent Apogee sound, especially for musicians on the go. That's certainly something worth celebrating.

Auxiliary Software

Cycling '74 Max 5 (Mac/Win, \$250 [MSRP])



The Auxiliary Software category includes a diverse range of apps, so it's fitting that the latest update of Max was the winner. Max gives you the tools to do just about anything you can think of with digital signals. With the latest version, Cycling '74 didn't add a ton of new features, but it refined the user interface

and documentation. As a result, this powerful programming environment is less intimidating to newbies, while work flow is improved and the inner workings are more transparent to experienced users.

For example, the new Patcher palette gives you a one-stop shop for adding UI Objects to a project. Ticks and traditional musical-note values have been added as timing increments. And the new Presentation mode lets you easily design an interface to hide the internal workings of your patch. Overall, the upgrade is a winner because it makes Max not only more convenient for power users, but also so easy to use that mainstream musicians should finally be convinced to look deeper into an application that they have considered (incorrectly) to be only for artists on the fringe. "Well, if it's good enough for Radiohead . . ."

Control Surface

Euphonix MC Control (\$1,499)

Known for high-end digital consoles and control surfaces, Euphonix made the intriguing decision to release two controllers priced for the personal studio. One, the MC Control, easily took this year's Control Surface category, offering four 100 mm touch-sensitive motorized faders; a color touch screen surrounded by eight Velocity-sensitive knobs and a dozen soft-key buttons; eight navigation buttons; and transport controls, including a Jog/Shuttle wheel. Despite this wealth of controls, the MC Control fits neatly on a desktop, even when mated with the Euphonix MC Mix fader-and-knob bank.

The MC Control uses Ethernet and the Euphonix EuCon protocol to communicate with a Mac, resulting in higher resolution and greater



throughput than MIDI- or USB-based controllers. It offers HUI emulation and supports the Mackie Control protocol for non-EuCon-aware applications. Whether it's used to control tracks on a DAW, tweak virtual instruments, or edit video, the MC Control's elegant user interface is powerful and flexible, outshining all contenders this year.

Digital Audio Sequencer

Ableton Live 7 (Mac/Win, \$499)

It's been three years since Live won an Editors' Choice Award, and the folks at Ableton have not been sitting idly by. While retaining its signature live-performance-and-tracking duality, Live 7 brings major improvements. Tracking takes a big step forward with multiple time signatures, video export, and automation lanes for simultaneously editing several automation envelopes. On the performance side, the new External Instrument and External Effects plug-ins let you integrate hardware and ReWire devices, with all MIDI and audio routing managed from a single track. Drum Racks let you quickly create complex, 128-pad drum machines with their own foldout mixer and effects buses. And Live now directly supports REX files by automatically building you a Drum Rack and matching MIDI trigger sequence from their slices.

Under-the-hood improvements include a 64-bit audio engine, POW-r dithering, and sidechaining for the Gate, Auto Filter, and new Compressor plug-ins. Premium content includes the Session Drums multisampled drum library, a beefed-up Essential Instruments Collection, and physical-modeled electric piano, analog synth, and string instruments by Applied Acoustics Systems. With its extensive library of instruments, effects, and audio clips, Live is a standout solution for stage and studio.

Download of the Year

u-he MFM2 (Mac/Win, \$79)

The winner of the Download of the Year award is chosen from the software featured in our "Download of the Month" column. This year we had a tough time choosing a winner, given such notable runners-up as AlgoMusic's (algomusic.net) Atomic, a creative step-sequencer plug-in with built-in synth, and Glitch, a clever sequenced-effects processor from Illformed (illformæd.org). But when the dust settled, we chose MFM2 (More Feedback Machine 2) from Urs Heckmann.

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matrix that lets you route any output to any input. Each delay line has its own multimode filter, and each pair of delays also has a multi-effects processor. You can place the filter at various points in the signal path, whereas the effects always come at the end. A 4-band modulation matrix lets you route MFM2's four LFOs, two multisegment envelope generators, and MIDI continuous controller messages to most MFM2 parameters. Delay times as short as 1 ms make this plug-in ideal for resonator effects. Tempo sync with longer delay times lets you create long multitap sequences. Hundreds of presets get you started, but tweaking is the fun part.

DSP Host

Universal Audio UAD-2 (Mac/Win, From \$499)

Universal Audio has raised the ante for DSP host hardware with the UAD-2. The PCIe-2-compatible card features the Analog Devices SHARC 21369 chip and comes in single-, dual-, and quad-processor models, respectively offering 2.5, 5, and 10 times the speed of the original UAD-1 card. UAD-1 sessions can be used with the UAD-2, and you can mix the cards in your system, using up to four of each with a single software license. Current plug-in partners Neve, Roland, SPL, Valley People, and Empirical Labs are actively porting their plug-ins to the new card, with attractive cross-grade pricing, and new partners, including Harrison, Moog, and Little Labs, will be joining forces with UA in the future.

The UAD-2 supports AU and VST software hosts, and RTAS support is in the works. It is Mac OS X Tiger/Leopard and Windows XP/Vista compatible and features a new plug-in GUI with improved preset browsing and card organization. Latency and DSP load are optimized and more easily managed. New features, greater speed, and the convenience of backward compatibility make the UAD-2 an obvious Editors' Choice.

Effects Processor (Hardware)

Eventide ModFactor (\$399)



Classic stompboxes like the Cry Baby, Fuzz Face, Bi-Phase, and Uni-Vibe are practically guaranteed to inspire creativity. Now you can add the Eventide ModFactor to your list of must-have effects devices.

Borrowing presets from Eventide's rack-mount studio processors, the ModFactor combines ten modulation effects ranging from chorus, flanger, and phaser to vibrato, ring mod, and rotary-speaker simulation. This rugged black box accommodates anything from guitar and bass to line-level sources like keyboards and mixers through its 1/4-inch stereo inputs and outputs.

With three footswitches and ten knobs, the ModFactor is not your average stompbox. A single auxiliary input handles the three foot-

switches, and you can plug in an expression pedal for classic wah effects and hands-off parameter control. MIDI and USB 2.0 ports let you use any MIDI source to switch presets, change parameter values, adjust the tempo, enable bypass, and more. The ModFactor has two independent LFOs, and it syncs to MIDI Clock. The USB connection lets you update firmware and back up settings to your computer. The ModFactor is a versatile studio processor that offers clean sound and a wealth of modulation effects. Try it out, and we bet you'll be hooked.

Field Recorder

Sony PCM-D50 (\$499)



Two years ago, we gave an Editors' Choice Award to Sony's PCM-D1, a digital stereo recorder remarkable for its portability and outstanding quality. Late that year, we got our hands on the PCM-D50, an even smaller machine possessing nearly all the D1's charms at a fraction of the cost. It was love at first sight. The PCM-D50 is a thing of beauty. Its specs and feature set make it an ideal choice for audio professionals. Though compact, it offers an ample display, lots of buttons, and four AA batteries and can record 24-bit, 96 kHz BWF files for 12 hours without running out of juice.

The PCM-D50 comes loaded with 4 GB of onboard memory, and you can expand it further with a Memory Stick. Like the D1, the D50 has top-mounted mics that swivel to accommodate XY and wide-angle recording. It sets up quickly and offers both analog and digital audio I/O. You can speed up or slow down playback without changing pitch. Dedicated buttons and an easy-to-navigate menu system let you define loop points, split files, and automatically engage an unusually flexible limiter. It can even begin recording 5 seconds before you press Record. In a year when several pocket-size recorders hit the street, the Sony PCM-D50 is at the top of the heap.

Guitar Amp/Effects-Modeling Software

Native Instruments Guitar Rig 3

(Mac/Win; Kontrol edition \$499, software only \$299)

Native Instruments Guitar Rig is a perennial leader in this very competitive and ever-growing software category. Guitar Rig 3, which is both a standalone program and a multiformat plug-in, offers a wide range of new features. Our reviewer, Babz, described the new version as "an all-around guitarist's toolbox."

Version 3 adds four new amp models (emulating Orange, Bogner, Hiwatt, and Fender Tweed amplifiers) to its previous total of eight, giving you a wider range of tones. Six new effects include a ring modulator and a tape echo that models the Roland Space Echo. The user interface has been redesigned, offering improvements such as large views for live work, reorganized preset menus, and automatic cabinet matching. The

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Rig Kontrol pedal—the hardware controller/audio interface that comes with the Kontrol edition—has also been revamped. It sports a new look, additional switches, and new audio converters. So whether you're into simple, straight-ahead rigs or complicated multiamp-and-effects setups with complex custom routing, Guitar Rig 3—even more so than previous versions—provides an all-in-one software solution.

Microphone

Cascade Microphones Gomez Michael Joly Edition (\$499)



Once again the mic category proved to be quite a horse race, with a variety of mics competing at a wide range of prices. This year's winner is a modestly priced ribbon transducer that offers greater versatility than others in its price class. The Cascade Gomez Michael Joly Edition received kudos from reviewer Rudy Trubitt for its well-rounded sound, relatively open top end, and clarity in the lower

midrange. With a frequency response that is relatively flat up to about 5 kHz, recordings made with the Gomez respond well to high EQ boosts without getting harsh.

With its asymmetrical grille basket, this distinctive-looking mic features a symmetrical bidirectional pattern and includes a Lundahl LL2912 output transformer. It also comes with a shockmount and a foam-lined metal case. However, it's how good the mic sounded that got our attention. As ribbon mics continue to grow in popularity for recording electric and acoustic guitar, brass, woodwinds, and percussion, it's fitting that this year's winner is an affordable ribbon with a sound that belies its price.

MIDI/Instrument Controller

Yamaha Tenori-on (\$1,199)



When Tenori-ons began to trickle into the United States, we were lucky enough to get our hands on one for a little while. That was all it took to convince us that Yamaha was onto something big—much bigger than the Tenori-on's 8-inch-square magnesium frame filled with 256 pulsating white LED buttons. Weighing about 1.5 pounds, the Tenori-on is multifaceted and one of a kind: a performance instrument with a recognizable sound, combining sample playback with step sequencing; an eye-catching source of kinetic light; and a unique MIDI controller for

hardware or software instruments.

hardware or software instruments.

Developed by Japanese media artist Toshio Iwai in collaboration with Yamaha, the multitimbral Tenori-on lets you compose in as many as 16 Layers, each containing 16 steps. You can instantly switch among 16 sequences and record your live performances as songs. In addition to the familiar Score Mode, in which you manually specify pitches for every step, you get several modes you've never seen before. You can drag your finger across the buttons to create shimmering, repeating note patterns in Draw Mode, or select a note in Bounce Mode to make it drop to the bottom of the grid and then bounce up and down until you stop it. Whether you rely on the built-in speakers and battery power or integrate the device into your stage or studio rig, the Tenori-on can fire up your imagination and enable you to create music you'd never make without it.

Monitor Speaker

Mackie MR5 (\$149.95 each)



There are plenty of powered close-field monitors, but few offer studio-level sound quality at an entry-level price. Fortunately, Mackie created the MR5 for musicians who are upgrading from home-stereo or multimedia speakers. With a 5.25-inch woofer and 1-inch tweeter (powered at 55W and 30W, respectively), the MR5 provides the kind of unhyped balance you need when mixing. Our reviewer, Mark Nelson, enjoyed the monitor's smooth, clear sound, as

well as its ample bass. Yet a pair of the monitors fit in a desktop studio.

The MR5 also presents a nice mix of pro features, like balanced inputs (XLR, ¼-inch), along with the entry-level unbalanced inputs (RCA, ¼-inch), not to mention switches for bass boost and high-frequency cut/boost. Mackie added the pro-level features because it sees the MR5 as a companion to its larger MR8 monitor in a surround setup. Either way, a pair of MR5s should help you hear what you've been missing in your mixes.

Most Innovative Product

Moog Music Moog Guitar Paul Vo Collector Edition (\$5,895)

It's rare that an instrument gets reinvented, but that's what Moog Music has done with its Moog Guitar. Although it's from Moog, it's not a synth or a MIDI guitar. Rather, it's a super-high-quality electric guitar with extended expressive and sound-altering capabilities. Its most dramatic feature is its



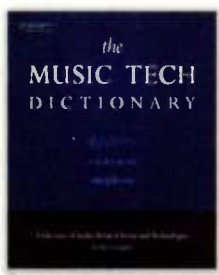
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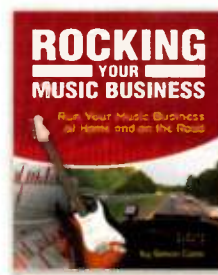
Going Pro with Logic Pro 8
 Jay Asher ■ \$29.99

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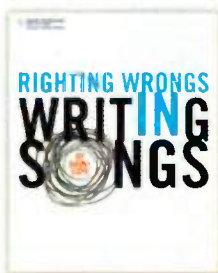
The Music Tech Dictionary
 Mitch Gallagher ■ \$24.99

This is a perfect resource to keep handy near your music gear so you can consult it when you're hit with an unfamiliar term. Provides nearly 2500 succinct yet complete definitions.



Rocking Your Music Business
 Simon Cann ■ \$34.99

Teaches musicians how to make money from music sales, live performances, licensing for film and television, and merchandising. Also explains how to protect songwriting rights and how to have professional relationships with fellow musicians, booking agents, managers, and studio owners.



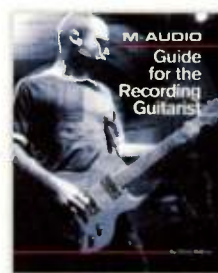
Righting Wrongs in Writing Songs
 Danny Cope ■ \$29.99

This book gives both aspiring and seasoned songwriters a powerful new approach to writing songs, focusing on common obstacles in the songwriting process and providing techniques to help you overcome them.



Music Theory for Computer Musicians
 Michael Hewitt ■ \$34.99

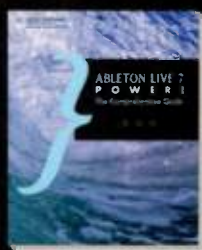
Teaches DJs, gigging musicians, and electronic music producers the music theory concepts they need to become better musicians.



M-Audio Guide for the Recording Guitarist
 Chris Buono ■ \$34.99

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infinite sustain capability, which expands the guitar into new performance territory. The Controlled Sustain setting allows up to two notes to sustain, while the Full setting sustains all notes. The Mute mode reduces sustain for staccato articulations. Once you understand the guitar's controls, you'll find yourself playing in ways you've never played before. The guitar also offers built-in filter effects (controlled, along with other parameters, with the included Control Pedal) and Graph Tech piezo bridge saddles to supplement Moog's proprietary pair of single-coil electric pickups. When you want a conventional electric guitar, just turn off the added goodies.

The instrument is first-class all the way, with a gorgeous flame- or quilted-maple top (you can choose from a range of colors), a swamp ash or mahogany body, an ebony fingerboard, a Wilkinson tremolo system, locking Sperzel tuners, a tweed hard-shell case, and more. Yes, it's pricey, but it's a revolutionary new instrument and clearly a deserving winner.

Sample Player (Software)

Heavyocity Evolve (Mac/Win, \$399)

Sonic Reality Ocean Way Drums Gold (Mac/Win, \$895)

These two groundbreaking products were so good that we decided to declare a tie and award an Editors' Choice to both. Though different in many ways, they have some interesting similarities: both are built on Native Instruments' Kontakt Player 2 platform, and both were the brainchild of a pair of working pros who sensed a need in their respective markets.

Ocean Way Drums (OWD) was developed by producer-engineers Steven Miller and Allen Sides, who frequently use high-quality drum samples in their record-production work. The product, which was brought to market in collaboration with sound developer Sonic Reality, is an incredibly realistic-sounding 40 GB collection of multisampled drum kits recorded by Miller and Sides at the renowned Ocean Way Studios in Hollywood. (A Platinum version is also available, offering 120 GB of samples and its own hard drive, for \$1,795.) OWD provides superb sounds and unparalleled sonic control over the samples, allowing you to choose from or mix the signal of a number of mics (including close, overhead, and room) on each element. For those not into tweaking, a selection of Sides's mix presets can be accessed for each of the 19 kits.

Heavyocity Evolve was the creation of New York-based TV and video-game producers Dave Fraser and Neil Goldberg. It's designed for composers and sound designers and is intended to streamline work flow by offering the kinds of textures that are most in demand for game and TV production. You get a range of sounds, including drums and percussion, rhythmic and tonal loops, strings, stings, basses, and sound effects. You can call up individual sounds or work from one of 25 8-channel Multi setups that cover a variety of specific project types.

Signal-Processing Software (Bundle)

McDSP Emerald Pack 3.0 (Mac/Win; \$2,599 TDM, \$1,399 native)

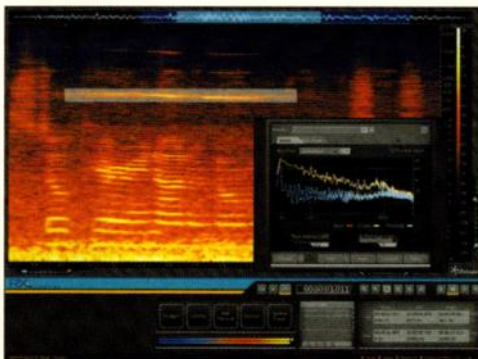
McDSP has a well-earned reputation for producing quality signal-processing plug-ins for the Digidesign Pro Tools platform. A 10-year

veteran of the DSP market, the company has built a legion of loyal users, including many high-profile engineers and producers. Starting with its classic FilterBank and CompressorBank products, and subsequently adding a multiband compressor, a limiter, a convolution reverb, an analog-tape emulator, a channel strip, and even a software synth, McDSP has developed a 12-deep roster of plug-ins, all of which are more than competitive in their respective categories.

Emerald Pack 3.0 gives you McDSP's entire collection of plug-ins (including its newest products, like the lo-fi-effects processor FutzBox) and is available in either TDM or native configurations. If you're looking for a complete signal-processing solution, Emerald Pack 3.0 is a stellar choice. For that, we bestow upon it an Editors' Choice Award.

Signal-Processing Software (Individual)

iZotope RX (Mac/Win, \$279)



Audio-restoration software is not generally thought of as sexy in the way that sequencing software or a synth plug-in is. It's considered more of a utilitarian tool that's necessary for

ridding recordings of hiss, hum, clicks, crackle, and broadband noise. But with the introduction of RX, which is both a standalone application and a suite of plug-ins for all major formats, iZotope has put the gee-whiz factor into audio restoration.

RX is slickly designed, intuitive, and extremely effective. Its Denoiser, Declipper, and Hum Removal modules are all above average. Its Declipper tool can fix clipped waveforms, and its Spectral Repair module is like nothing else in its price range. If you've got a finger squeak on a guitar track, a stray noise that's intruding on a spoken or sung word, or almost any sonic anomaly, Spectral Repair—which, like the Declipper, uses interpolation technology—seems to always find a way to get rid of the offending noise or reduce it to an acceptable level. In addition, RX offers both waveform and spectral editing. This product is much more than just a tool for fixing recordings transferred from vinyl. From music production to video to Podcasting—any area where audio recording is involved—it's a must-have piece of software and was a hands-down winner in this category.

Software Drums

FXpansion BFD2 2.0.5 (Mac/Win, \$399)

FXpansion, winner of the 2005 Editors' Choice Award for BFD, is back on top this year with the long-anticipated and completely redesigned BFD2.

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The new version starts with a fresh graphical user interface, adds a full-featured mixer, and tops it off with a comprehensive drum-sequencing, editing, and composition environment. You get 50 GB of sample content consisting of ten drum kits that represent a range of vintage and modern styles and manufacturers, along with a broad selection of extra snares and cymbals. And FXpansion has managed to keep all this backward compatible with older BFD content.

BFD2's Kit page offers 10-, 18-, and 32-piece drum kits. You can fill the kit from scratch or customize one of the preset kits. You can have as many as 96 Velocity layers per articulation, and each articulation includes up to 3 stereo and 6 mono mic setups. Each mixer channel strip holds four insert effects and has four effects sends. Aux busing, sidechaining, and submixing are all supported. The Groove window is a sophisticated drum sequencer in which you can create, import, and edit MIDI grooves, and more than 5,000 patterns are provided. When you've created a drum sequence, you can render a multichannel mix of discrete WAV files directly from BFD2. All of this is available standalone or as a plug-in in your favorite host.

Sound Library

SoniVox Anatomy (Mac/Win, \$219 [MSRP])

Just when you thought everything under the sun had been sampled—orchestral instruments, vintage keyboards, ethnic ensembles, and burning pianos—SoniVox did something different and sampled human sounds. If you're wondering what's unusual about that, then you've obviously never heard Anatomy, a unique sample library for Kontakt 2 and 3. Have you ever considered the groove potential of burps, farts, coughs, and ululation? SoniVox sampled every one of those sounds, truncated them, looped them, and mapped them to MIDI. Anatomy covers the gamut from icky to ethereal, from comic to downright danceable.

Anatomy's instruments are divided into two categories: Man and Machine. Sounds categorized as Man are unprocessed, without any obvious effects. Machine sounds, though human in origin, are heavily processed and barely recognizable as humanoid. Alongside all the vocal percussion and sampled vowels, you'll find snoring, screaming, moaning, and all manner of breathy mischief. If it's a sound the human body makes, you'll find it in Anatomy. For examples, visit SoniVox's Web site. For sound design, soundtrack enhancement, or simply something completely different, we give it eight thumbs up.

Synthesizer (Hardware)

Dave Smith Instruments Prophet '08 (\$1,999)

Dave Smith has been around the block a few times, and he keeps on contributing. He conceived and helped give birth to MIDI, invented wave-table synthesis, and developed the first commercial soft synth. Beginning in 1978, his company Sequential Circuits produced one of the most desirable synths of all time, the Prophet-5. For years musicians were clamoring for a new Prophet, and in 2008 Smith delivered. The Prophet '08 has all the features you'd hope for in a polyphonic synthesizer—eight



voices with two independent layers, a versatile lowpass filter, three envelopes, four LFOs, complex modulation routing, an arpeggiator, and even a 4-channel sequencer—at a price that can scarcely be believed. And if you don't need the 61-note keyboard, a tabletop/rackmount module (\$1,499) is also available.

You want to talk about fat? The Prophet '08 is a true analog poly synth, with a voltage-controlled filter (VCF), a voltage-controlled amplifier (VCA), and digitally controlled analog oscillators (DCOs). Even with an entirely analog signal path, the Prophet '08 takes full advantage of digital technology. It stores 256 top-notch factory programs, and you can rewrite any of them. Here's an example of its many useful touches: you can apply its sequencer to control any parameter that's available for modulation. Powerful and fun, the Prophet '08 gives us everything we wanted a modern-day Prophet to be.


Synthesizer (Software)

Spectrasonics Omnisphere (Mac/Win, \$499 [MSRP])



How would you describe your dream synth? Lots of everything and then some? The core of any synthesizer is its pool of raw sounds, whether simple waveforms or complex multi-samples, and bigger is usually better. If

you're like us, you also want the sound-shaping potential of multimode filters and multistage envelope generators. Sophisticated onboard effects and a nice arpeggiator wouldn't hurt, either. Throw in a large assortment of well-designed patches and then organize them for quick recall, and you have Omnisphere, the flagship soft-synth plug-in from Spectrasonics.

A mountain of advance publicity preceded Omnisphere's September release, and for once, the software completely lives up to the hype. Beyond its remarkable assortment of dynamite patches and 42 GB of sample content, Omnisphere's depth and ease of programming are unprecedented. Each part in a multitimbral setup has two layers, and each layer offers real-time control paths and an impressive variety of synthesis techniques, from sample playback and FM to granular and variable wave-shaping. Omnisphere wraps all this power in a transparent user interface that feels natural. Giving it an award was easy; leaving it long enough to write about it was hard. 

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True disk optimization is different from defragmentation.

touch on a few aspects of contemporary drive architecture that will help you understand why they sometimes fail and how to avert or deal with the problem. (For more information, read the Wikipedia article at en.wikipedia.org/wiki/Hard_drive.)

A hard drive records data on from one to five flat disks called *platters*. The platters, held in place by a spindle, rotate at high speed and are driven by a motor. Most platters are made of glass or an aluminum alloy and are coated with two parallel layers of a magnetic cobalt-based alloy that are separated by a 3-atom-thick layer of nonmagnetic ruthenium. The two main layers are magnetized in opposite orientation, reinforcing each other.

The drive's microscopic *read/write heads*—floating nanometers above (but not touching) the rotating platter's surface—detect and alter the magnetic pattern that stores the data. One head, containing both the read and write elements, serves each platter surface. The read/write head is mounted on a light, rigid *actuator arm* that moves the head to the correct position above the platter. The arm is moved by a voice-coil actuator that, like a loudspeaker, utilizes a coil and a magnetic field. The air close to the platter moves at or close to the platter speed and acts like a bearing, preventing the head from touching the platter. Each platter's magnetic surface is logically divided into many small regions, each of which stores a binary unit of information.

A drive also contains a circuit board and firmware to operate all these parts and to encode and manage the data. Modern drives have an onboard RAM cache that buffers between the speedy computer and the slower hard disk. A sealed case with a filtered vent hole (to equalize air pressure) encloses the entire mechanism.

There's much more to the internal workings of a drive, but these parts most directly affect our discussion.

Physical Failure

Hard drives can fail due to either physical problems or logic problems. Although you can't prevent most failures, if you discover a problem in time, you might be able to power down and have a chance to salvage your data (see the **online bonus material** "When Disaster Strikes" at emusician.com). Here are a few of the physical reasons why drives fail:

Head crash. Head crashes are a common cause of drive failure. They usually occur when

the actuator arm swings too close to the surface of the platter and touches it, potentially damaging the platter and the read/write heads. In some cases, the arm just falls out of position and the heads and platter remain intact; in other cases, the platters collide or stick together. Either way, you almost certainly can't fix this yourself.

Heat damage. Heat is another leading cause of drive failure. Heat can burn out a circuit board and cause a platter to expand and damage the magnetic surface, thus altering the distance from the read/write heads to the platters. And that's just for starters!

Motor failure. If the drive motor fails, your drive either will spin at a degraded and unpredictable speed or won't spin at all. You can't prevent this, but you might hear the motor speed waver in time to be able to power down and try to minimize damage.

Other damaged components. A broken read/write arm, scratched platters, and bad drive bearings are deadly. All sorts of things can cause them to occur: impact damage, a head crash, heat, dust inside the case, a defective part, and so on. Baby your drives—don't bounce them around,

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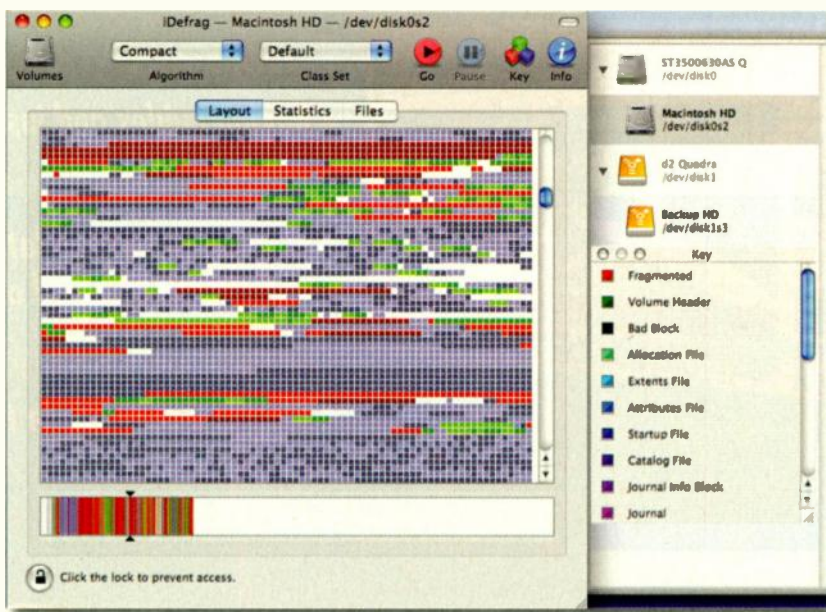


FIG. 2: This screen shot from Coriolis Systems iDefrag 1.6.4 for Macintosh shows parts of files scattered about. This is called fragmentation.

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pad them well if you transport them, and don't drop them.

Water or fire damage. These are obvious drive killers. Enough said.

Logic Failure

Hard drives can also fail because of logic problems, including the following:

Bad drive sectors. Bad sectors are less of a problem with modern drives than with older ones, but when they appear, you should be concerned. If the number of bad sectors has increased even slightly since the previous time you checked, it's time to replace the drive.

Disk fragmentation. When you save or modify a file, the operating system looks for sufficient free disk space to store the data. The same thing happens when the OS and applications overwrite old files and write new ones

stresses fragile, precision parts. Eventually it can cause the drive to fail. Therefore, defragmenting is an important aspect of drive maintenance.

True disk optimization is different from defragmentation. Optimization organizes related files and files that are commonly accessed together into logical groups for faster access. For instance, applications will launch faster if the files they require are located together, so the drive doesn't have to work hard to find them. Here I'm talking about organizing the files on the platters, not within folders or directories on your desktop. All of this takes place behind the scenes. (For information on defragmenting and optimizing software, see the [online bonus material](#) "Shattered!")

Computer viruses. Viruses can wreak havoc on a drive.

Disk utility software might be able to fix the bad sectors, but as noted earlier, if the problem reappears and increases, your drive is dying.

The drive is hot to the touch. All drives get warm, but if a drive is noticeably hot, it is working way too hard and is about to die.

The "click of death." Any odd sound made by your drive—such as clicking, knocking, whistling, or grinding—is a bad sign. A clicking sound (the so-called click of death) often indicates a read/write error during a seek. The sound is usually due to a mechanical failure that causes the head actuator to click as the drive attempts to recalibrate. If the drive hasn't crashed, it's about to.

Cyclic redundancy errors. Computers have an error-checking procedure to validate that a file has been copied correctly. A cyclic redundancy error indicates that the computer cannot make an accurate copy. This could indicate a bad disk sector or something worse: damaged read/write heads, a bad RAM cache, or dust that is damaging the platter.

If you see any of these signs, stop using the drive immediately.

(this includes temporary files and updaters). If the OS can't find enough contiguous space, it has to break the file into pieces—fragments—that can fit in the available free blocks of space. Over time, pieces of files and applications are increasingly scattered across the disk; this is called *fragmentation* (see Fig. 2).

When you delete a file, it isn't erased; it is deleted from the directory, allowing the computer to gradually overwrite those blocks. This can create fragments. And because large audio and video files require big blocks of free space, they become fragmented far more quickly than smaller files.

The directory, stored on the disk, keeps track of the fragments. When the computer opens a file, the directory tells the drive to find and reassemble the parts into a coherent file. This happens on the fly, constantly, at very high speed. The more fragmented a hard disk becomes, the harder the drive has to work to find the scattered pieces. This creates heat and

Corrupt firmware or bad RAM. Even firmware can get screwed up over time. The RAM cache is usually SDRAM, and like any memory, it can be damaged. You can't do much to prevent this problem from happening.

Warning Signs

If you see any of the following signs of imminent drive failure, stop using the drive immediately:

Your computer takes a long time to boot or hangs completely. Slow boots can be caused by factors other than drive problems, such as a corrupt operating system or having your OS launch a lot of programs at startup. A somewhat sluggish boot disk might just need to be defragmented. But a very long boot time or a failure to boot generally indicates that a drive is encountering read/write failures. Minimizing the number of programs that automatically launch at startup will enable you to more easily notice slow boot times.

A disk utility reveals bad disk sectors.

Preventive Medicine

Because there is usually no cure for a crashed drive, keeping your data safe is all about prevention to the greatest extent possible and preparation for the inevitable. Here are some tips:

Save often and do backups faithfully. You never know when your drive will fail, so take no chances. Save open files whenever you have a moment. Back up at least daily or be prepared to lose your work. (For more about backup, see the [online bonus material](#) "Get Back" and the feature "Better Safe Than Sorry" in the May 2006 issue, available at [emusician.com](#).)

Leave free space. As your drive fills up, the OS will have a harder time finding large contiguous blocks, so fragmentation is increased. In addition, defragmentation software needs free space to move file fragments, and optimization requires more free space.

Complete defragmentation with the Windows XP Disk Defragmenter requires that at least 15 percent of the drive be available, and that's a good, if generous, guideline. Some utility programs can defragment drives with less free space, but it's wiser not to push your drive to the limit. You can check available space in Windows by right-clicking on

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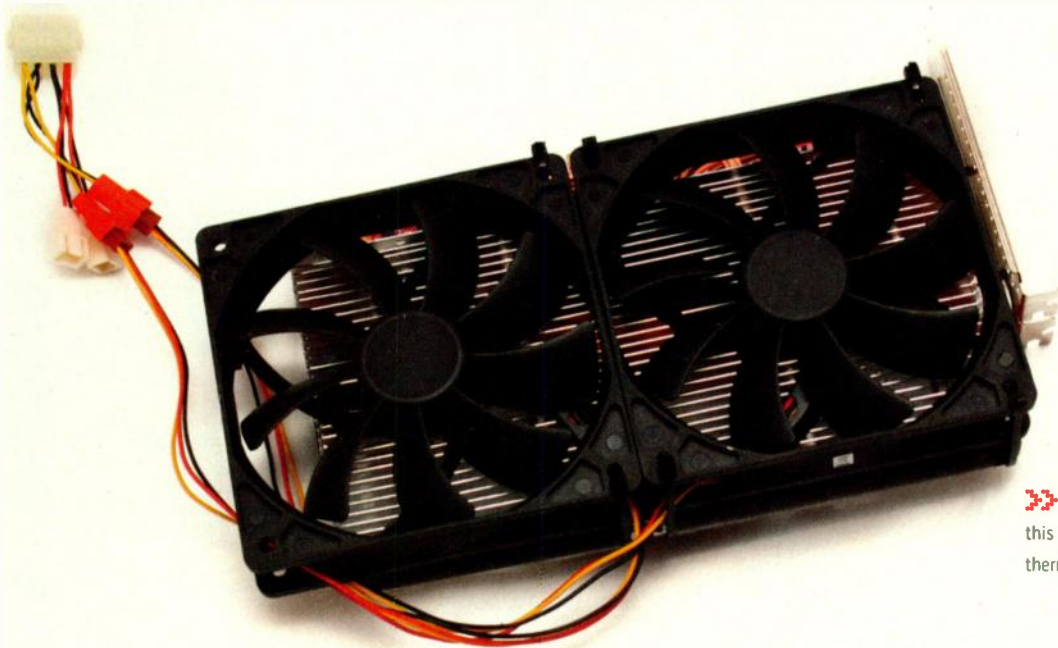
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➤ FIG. 3: A cooling fan such as this twin-fan model can help prevent thermal damage to your hard drive.

When you delete a file, it isn't erased.

a drive and choosing Properties. For Mac OS X, use the Activity Monitor application (in the Applications folder) and choose Disk Usage.

Keep cool. You know those pictures of happy people using laptop computers in full sun on a hot beach? They won't be so happy when their internal drives fry. Keep drives away from heat sources and make sure that they're well ventilated. If needed, you can buy additional cooling fans (see Fig. 3). You can also monitor the temperature of your hard drive with SMART-savvy software (more on this in a moment).

Feed clean power. Power surges, spikes, and sags endanger your drive's health, so use a quality power conditioner that includes filtering and surge/spike protection. I recommend getting an uninterruptible power supply (UPS) like those in the APC (apcc.com) Back-UPS LS or RS series (see Fig. 4). A UPS gives you temporary power in the event of a power failure, and the Back-UPS LS and RS models feature automatic voltage regulation (AVR), which

delivers 120 VAC regardless of the incoming voltage. (For more, see the article "Power



➤ FIG. 4: The APC Back-UPS LS 700 is a quality uninterruptible power supply with surge, spike, and sag protection; automatic voltage regulation; and an assortment of bells and whistles.

Hitters" at home.comcast.net/~soppenheimer/sound/articles/features/power_hitters.html.)

Give it a rest. Some pros recommend keeping a hard drive running all the time because powering up and down is more stressful than continuous operation. Others say that if you're not using the drive, you should turn it off to avoid wear and tear. I generally prefer to leave my computer running when I'm home, but I power down when I'm leaving for several hours.

If you are going out for a few hours and want to leave your computer running, you can give your drives a chance to cool by letting them sleep. Windows users can enable Hard Disk Power Off under Power Management, or they can just hibernate the computer, which will power down the boot disk. Mac users can select System Preferences→Energy Saver, click on Show Details, and then check Put The Hard Disk(s) To Sleep When Possible. If, having returned from a short break, you try to access your drive and get a spinning beach ball, make sure that you unchecked the sleep option.

Let it be. Moving or tilting a hard drive while powering up is dangerous to its health.

Perform regular maintenance. Make preventive maintenance a part of your weekly routine. Use disk utility software to detect and fix a variety of disk problems, such as corrupt

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Crash and Burn

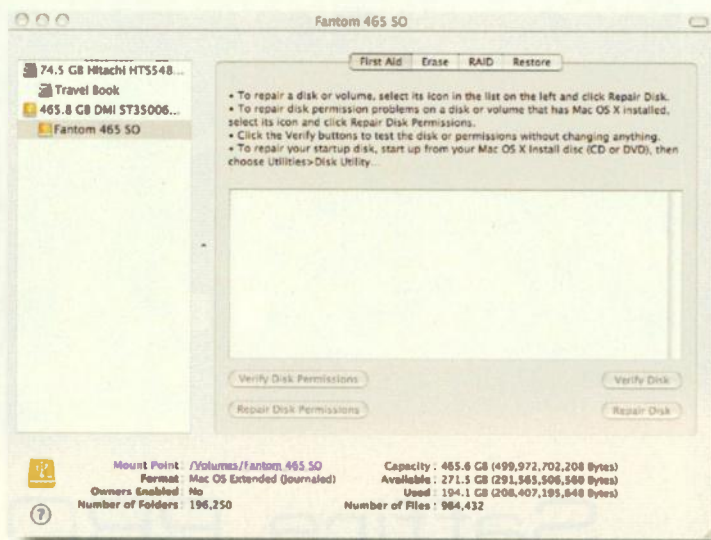


FIG. 5: Apple's Disk Utility comes free with Mac OS X and offers a number of important features, including verification and repair of the disk and the disk permissions.

file directories and bad sectors. Don't wait until your computer slows down and you suspect a problem.

Mac OS X comes with Disk Utility (found in the Applications folder), which enables you to verify and repair the disk and the disk permissions (see Fig. 5). Windows XP includes Chkdsk; to use it, choose Start→Run and then type chkdsk.exe. You can also use third-party Mac and Windows disk utilities, which often

have more features (see the online bonus material "Your Utility Belt").

Get SMART. SMART (Self-Monitoring Analysis and Reporting Technology) is built into many modern hard drives. It monitors more than 35 attributes of drive performance, including temperature, calibration, bad sectors, spin-up time, and the distance between the heads and the platter(s). You need SMART-savvy disk utility software (see

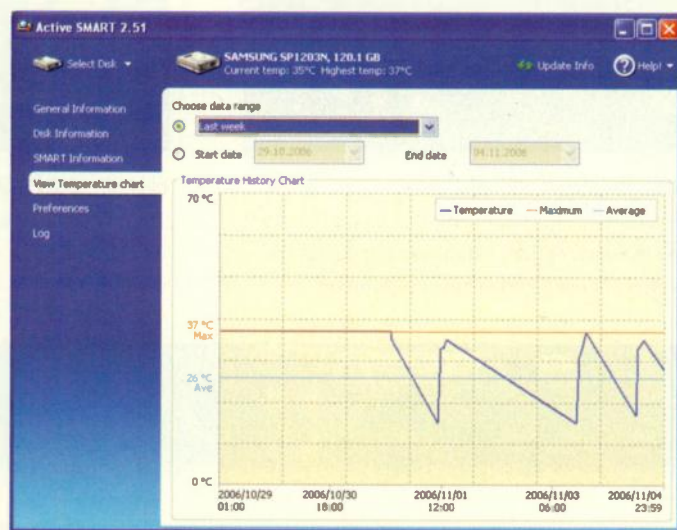


FIG. 6: Utilities such as Ariolic Software ActiveSMART 2.51 can use SMART technology to report on the condition of a hard drive. Here is a graph representing a drive's temperature history.

Fig. 6) to access this information.

Defragment. I discussed defragmentation and optimization earlier, in the “Logic Failure” section.


Mac OS X: ensure that the OS does its maintenance routines. OS X automatically performs certain background maintenance tasks that can affect your boot drive. By default, these tasks are scheduled to run between 3:15 and 5:30 a.m., and if your computer is shut down or asleep, the maintenance can't be done. In that case, reschedule these tasks or run them manually using a third-party program such as Atomic Bird Macaroni 2.1.1 (\$9.99; atomicbird.com/macaroni) or Brian R. Hill's MacJanitor 1.3 (free; personalpages.tds.net/~brian_hill/macjanitor.html). You can also run the maintenance tasks using the Terminal application.

Don't record audio projects to your boot disk. Because audio files are large and we edit them extensively, the drive where you store them can become fragmented relatively quickly. In addition, audio drives in studios work long and hard. If you record to a drive other than your boot drive, it will be easier to mind your audio drive's health, and your boot drive will last longer.

Go on a RAID. If you have a professional project studio and can afford the investment, consider using a RAID 1 disk array for critical audio file storage. (For more on RAID, see the online bonus material “Mirror, Mirror.”)

Tighten it up. If you have an internal drive that's acting a bit strange—say, it's constantly spinning—check to make sure that the drive is fully seated, all contacts are clean, and all connections are tight.

The Rest of the Story

There is much more to learn about hard-drive failure and data safety, so be sure to read the five useful sidebars in the online bonus material. This should give you enough information to begin a drive-maintenance program and to prepare for the evil day that you know is coming. I suggest you start now. Remember, back up first—because nothing in life is certain except death and hard-drive failure. 

Former EM editor in chief Steve Oppenheimer bought another backup drive while writing this story.

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WAVEMACHINE LABS

Surround in Pro Tools LE and M-Powered

5.1 and beyond with Neyrinck Mix 51. | By Brian Smithers

For those mixing in surround, the biggest shortcoming of Digidesign Pro Tools LE and M-Powered is the lack of surround support. Luckily, Neyrinck Mix 51 (neyrinck.com), an RTAS plug-in reviewed in the June 2008 issue (available at emusician.com), brings surround panning and mixing to both. (Digidesign's recently announced Complete Production Toolkit adds surround support to Pro Tools LE.) If you're familiar with Pro Tools|HD's surround panner, you'll feel right at home with the plug-in. If you aren't, I'll have you up and running in no time.

Setting up Mix 51 is a bit convoluted, but everything works as expected (see "Step-by-Step Instructions"). The setup gives you one 5.1 main output and two quad effects returns.

That lets you have separate returns for delay and reverb. To create multiple surround sub-groups or to mix to separate music, dialog, and effects stems, use the plug-in's three 5.1 main outputs and three quad send outputs.

Spin Me Right Round

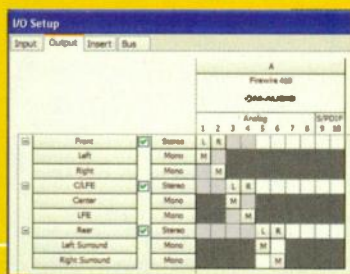
Insert an instance of Mix 51 Surround Panner on each audio, aux, and instrument track you want to pan in surround (see Fig. 1). For most applications, you'll simply grab the little orange widget and drag it within the x-y grid. Drag it all the way to any corner to hard-pan to a specific channel, and Alt-click (Option-click on a Mac) to hard-pan to the center channel.

The Surround Panner plug-in directs the signal to the surround outputs; no signal

passes through the assigned track outputs, and their controls are irrelevant. However, if you click on the Bypass button, the signal does pass through the track outputs, allowing you to create an independent stereo mix. Actually, the name Bypass is inapt because the surround panner also continues to operate normally.

Divergence is an often-misunderstood parameter with varying definitions. In Pro Tools, it controls the amount to which a signal bleeds into adjacent channels. With all three Diverge knobs set to 100, when you pan a signal to the center channel, none of the signal comes out of any other speakers. (The surround panner's meters will confirm this.) That makes the sound a point source at the center speaker, giving it maximum isolation at that position.

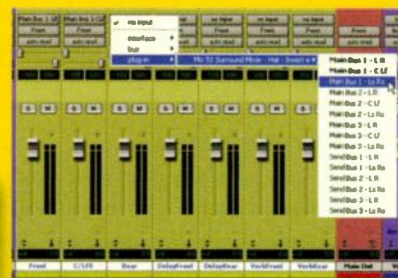
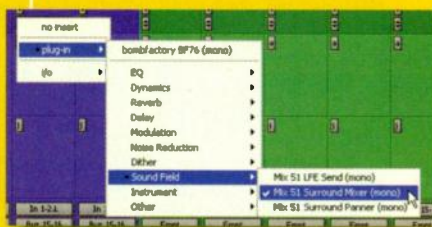
STEP-BY-STEP INSTRUCTIONS



Step 1: Prepare your session by creating three main stereo paths with SMPTE path order: L/R, C/LFE, and Ls/Rs.



Step 2: Insert the Mix 51 Surround Mixer plug-in on any track.



Step 3: Create seven stereo aux inputs, and assign their inputs from the surround mixer. Name the aux tracks.

Lowering the front divergence lets the signal bleed into the left and right channels, spreading the sound wider across the front. At zero, the signal comes equally from all three front speakers. Lower the front-to-rear (F/R) and rear divergences, and the signal comes equally from all five main speakers. At this point, the signal will be centered in the room and will not drift relative to the listening position.


Notice how the outline of the surround panner (blue square) narrows as you lower each divergence control—divergence effectively makes the room smaller. Imagine that you are panning a sound from left to right to follow onscreen movement. If your left and right speakers are placed exactly at the left and right edges of the screen, the motion will track perfectly. If, however, your speakers are placed beyond the edges, the sound will travel farther left and right than the onscreen action. By lowering front divergence, you can narrow the reach of the front speakers to fit the screen. As another example, try panning a sound in a circle as you progressively lower divergence, and you will hear the circle growing smaller.

Journey to the Center

Center percentage (set with the Center % slider) is a bit simpler. It controls the amount of signal coming from the center channel, regardless of pan and divergence. Think of onscreen dialog with street noise behind the actors. The center-panned dialog is isolated in the center channel by setting center percentage on those tracks to 100. The street noise (passing cars, jackhammers, and so forth) is panned between the left and right channels, with center percentage set to 0, so that even when it passes through the center of the soundstage, it remains acoustically separate from the dialog. Use the same technique to obtain some separation between your lead vocal and center-panned instruments.


The one thing still missing is true multichannel effects. Inserting two identical plug-ins (with the same settings) on the front and rear effects returns will get you close. To get true multichannel compression, bus the tracks you want to compress together and use that bus as the key input on stereo compressors on the three axes that make up the


5.1 subgroup. You'll need to bypass the surround panner for audio to get to the bus. (See Web Clip 1 for an example session that demonstrates this technique.)

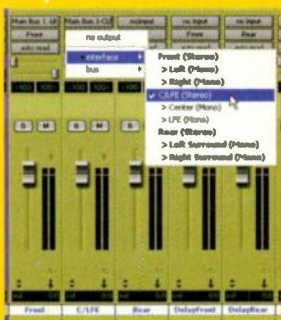
All of Mix 51's parameters are compatible with corresponding parameters in Pro Tools|HD's surround mixer. (The online bonus material at emusician.com describes how to migrate your LE/M-Powered surround mix to Pro Tools|HD.) Getting the most out of Mix 51 is a bit laborious, but it's worth it to finally be able to mix in surround in LE. 

Brian Smithers is department chair of workstations at Full Sail University and the author of Mixing in Pro Tools: Skill Pack (Cengage Learning, 2006).



 FIG. 1: The Mix 51 Surround Panner plug-in's controls emulate those in the Pro Tools|HD surround panner.

 **Step 4:** Assign the outputs of the aux tracks to the main output paths you created, and assign them to main L/R and main Ls/Rs.



 **Step 5:** Insert a Mix 51 Surround Panner plug-in on all audio, aux, and instrument tracks you want to pan in surround.



 **Step 6:** Insert matching delay plug-ins on the two Delay axes and matching reverb plug-ins on the two Reverb axes.



FIG. 1: This acoustic bass setup shifts bands 750 through 1,100 Hz down by varying amounts within a 7-semitone range.

Klangumwandler Redux

Multiband frequency shifting with VirSyn Prism. | By Len Sasso

Frequency shifting, which linearly shifts the entire frequency spectrum of a sound, has long been used for turning pitched sounds into inharmonic, bell-like timbres. These sounds, often produced by the Bode Frequency Shifter (designed by Harold Bode and marketed by Moog Music), feature prominently in early electronic music.

Pitch-shifting, which is more common and usually involves granular or FFT processing, preserves timbre by exponentially shifting the spectrum—in effect, stretching the spectrum as it is shifted so that the ratios between the spectral elements are preserved. For instance, if you start with two sine waves an octave apart (say, 220 and 440 Hz) and frequency shift them by 110 Hz, their ratio (330 to 550 Hz) is no longer 1:2 (an octave). On the other hand, if you pitch-shift them by 50 percent, they remain an octave apart (330 and 660 Hz).

Color Separation

VirSyn Prism (Mac/Win, virsyn.com) takes a novel, multiband approach to frequency shifting, first breaking the signal into 27 frequency bands and then letting you frequency shift each band independently. The results don't measure up to high-quality pitch-shifting, but that's not the point—you can create effects with Prism that you can't create with anything else. I'll give three examples, using Prism to add color to electric piano, drum, and bass clips without mangling their timbre beyond recognition.

The frequency spectrum area at the top right of

Prism's control panel has three tabs: Level, Shift, and LFO. The Level tab works like a graphic equalizer, and that's a good place to start with an electric piano sound. To add some bite, raise the bands between 1 and 5 kHz by around 9 dB and lower the bands below 350 kHz by about 3 dB. That may be a little extreme with a full-wet mix, but it's fine at about 50 percent, which works better for the frequency shifting and LFO in this case.

On the Shift tab, set all bands to maximum. That produces a phased pitch-shifting effect when you manipulate the F-Shift knob with a 50 percent mix and the Range knob set to 1 Semi (a ± 1 -semitone range). On the LFO tab, set the lowest band around 4 Hz and click on the Flat button, and all bands will be set to the same frequency. LFO knob settings of around 25 percent with a slight F-Shift produce a nice phasing-vibrato effect (see [Web Clip 1](#)).


Although Prism doesn't have a built-in MIDI Learn capability, many hosts let you map MIDI continuous controllers to the parameters that the plug-in presents to the host for automation. With Prism you can access all the front-panel knobs, and for the electric piano settings just described, I map the MIDI Mod Wheel to the LFO knob and the MIDI Pitch Bend controller to F-Shift.

Drum and Bass

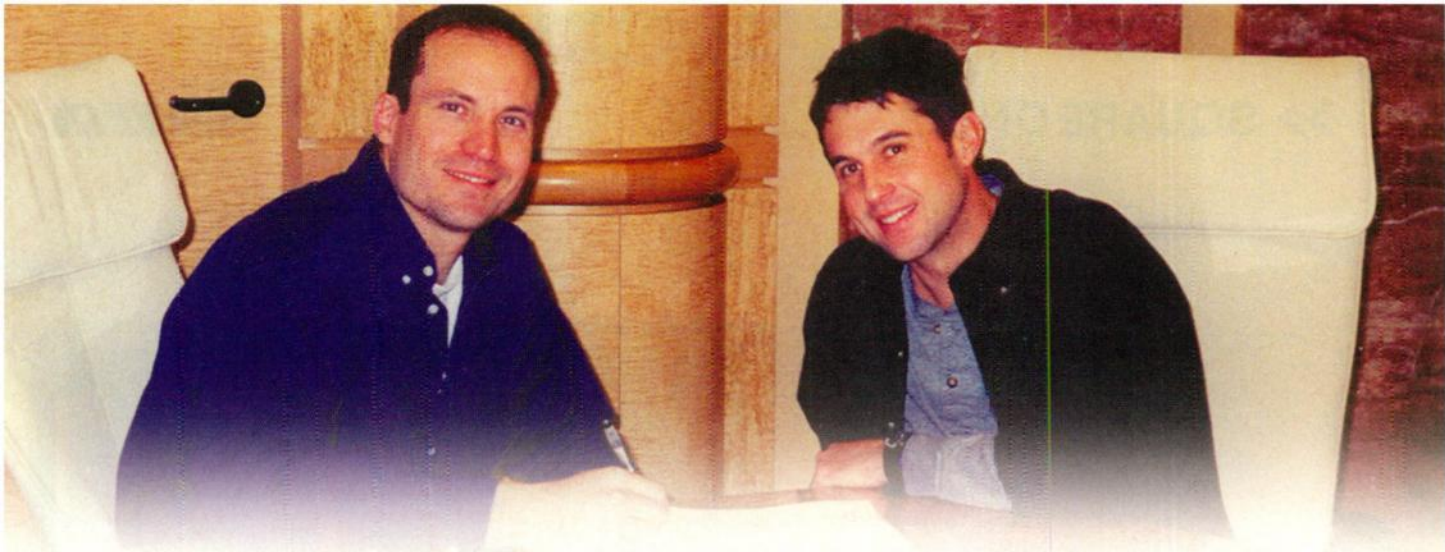
Prism is a great tool for retuning one drum in a mixed drum track. For instance, when the kick drum doesn't

sit well with the bass or another track, use Prism to shift the bottom two or three bands. At the same time, you can use the Level tab to EQ the drums. For kick drum pitch-shifting, set the affected bands to maximum shift and use a full-wet mix, then use the F-Shift knob to dial in the desired kick drum pitch (see [Web Clip 2](#)). For tom tracks, try using the Envelope and Release knobs to add a level-tracking pitch-bend.

With acoustic bass, I like to boost the bands between 750 and 1,100 Hz and then shift them down by varying amounts within a 7-semitone range (see [Fig. 1](#)). That affects the bass harmonics without altering the fundamental pitch. I map the MIDI Mod Wheel to the Dry/Wet knob and map the Pitch Bend controller to the Envelope knob. Mixes that are between 25 and 50 percent, together with small, positive envelope settings, produce a subtle scat-singing effect over the bass line (see [Web Clips 3 and 4](#)).

Although these examples have emphasized coloration rather than mutilation, Prism can easily mangle your sounds beyond recognition. It's a great tool for creating sound effects, adding texture and motion to pads and ambient tracks, and processing speech. For instance, try processing a speech clip with the lower and upper bands shifted in opposite directions (see [Web Clip 5](#)). 

Len Sasso is an associate editor of EM. For an earful, visit his Web site at swiftkick.com.



“My #1 Country Hit Started With a Phone Call to TAXI”

Elliott Park – TAXI Member

Photo: Elliott (left) with publisher, Michael Martin

I used to think that living in Clyde, Texas (Population 3,345) really limited my chances of ever having success in the music business. But all my friends and family members live here, so I’ve never wanted to move to Nashville.

Although I love to write songs, I felt isolated when it came to getting them heard by anybody in the music business. Then a friend told me that TAXI would bring real opportunities for my music right to my front door.

I Used a 4-Track

I signed up and sent in songs that I demoed with my digital piano in my little home studio. The A&R people at TAXI liked my songs and began sending them off to some pretty high-level people in Nashville.

All the sudden, doors started opening. With the connections I made through TAXI, I began to have meetings with some of Country Music’s top executives, and signed a staff writer deal with a great publisher in Nashville.

Tim McGraw, Rascal Flatts and Faith Hill Put My Songs on Hold

Over the next three years, my songs were considered by a Who’s Who of Country Music, but the “big cut” eluded me. I learned to be patient and worked even harder on my songwriting.

Then, my publisher hooked me up with veteran songwriter, Walt Aldridge. Together, we wrote a song called, ‘I Loved Her First,’ and finally, I hit pay dirt!

#1 Hit on Two Charts!

The group ‘Heartland’ cut our song and released it as a single. It started out slowly, then gained

momentum, and eventually made it all the way to the Number One spot on the Billboard *and* R&R Country charts.

Could that have happened without TAXI? Probably not.

Although there were many people that helped me once I signed my publishing deal, it was TAXI that made that all important first connection for me. And I didn’t have to leave my hometown to do it.

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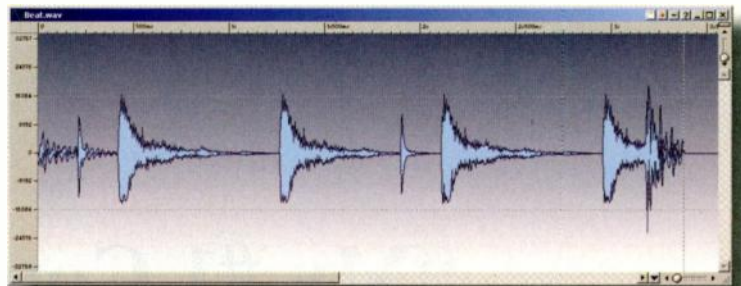
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FIG. 1: This screen shot shows a waveform display in Steinberg WaveLab. The blue shapes are the audio data. From the sharp peaks and rapid decays, experienced computer musicians can tell that this is a drum loop.



Catch a Wave

How to interpret the display in an audio editor. | By Jim Aikin

When you look at a graphic waveform display, you're seeing a frozen snapshot of a sound. Those squiggly shapes aren't just eye candy: if you understand them, they will help you spot problems and make mixing decisions.

When you look at a waveform display, it's like seeing the sound waves themselves. A display like the one shown in Fig. 1 is a two-dimensional graph that shows increments of time along the horizontal axis, or *x*-axis, and the sound's amplitude on the vertical axis, or *y*-axis. In general, the greater the waveform's amplitude, the more space it will occupy on the vertical axis. If you zoom in, a few milliseconds of audio data will fill the display and you might not see the full height (amplitude) of the waveform. If you zoom out, you'll see less detail but will get an overview of the entire waveform over many minutes. By viewing a whole song, for instance, you might be able to see a level dip in one section that you might not have noticed while listening. On the other hand, you might barely see the waveform of a hi-hat sound—even though the sound is plainly audible—but by zooming in, you can clearly view it.

When the waveform is zoomed out, the software doesn't display all of the detail in the data. Instead, it finds and displays the largest peaks. For faster operation, the peak profile of a wave file may be saved automatically in a much smaller file on your hard drive. The small file can be loaded quickly each time the file needs to be displayed.

Waveform Displays Rule

Waveform displays usually have a vertical ruler at the left edge and a horizontal ruler across the top. If you look closely at the vertical ruler, you'll see that zero is in the middle, not at the bottom. This *zero-crossing* is where the air pressure goes from negative (below normal) to positive (above normal). The waveform should be vertically centered on the zero-crossing; if the waveform is mostly above or below the zero line, either your audio system has introduced a direct-current (DC) offset or your audio software is producing one. This is a problem that you need to track down and fix.


Most waveform editors let you display the rulers in a variety of formats. You may be able to view the number of seconds (absolute time), the number of individual samples, or the metrical values (bars and beats) on the horizontal ruler. Setting the horizontal ruler to bars and beats can be very useful when you need to edit the audio so that it will match the tempo and phrasing of a song. The vertical ruler may show the amplitude in decibels (dB), as raw data (the actual content of the sample words), or as a percentage of the greatest amplitude the software can handle.

Hitting the High Spots

Here are some simple problems you can identify by looking at a waveform display:

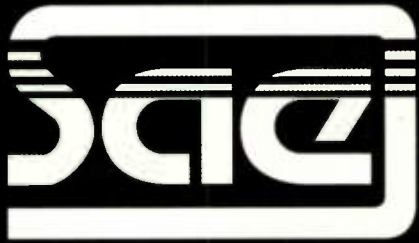
Clipping. A waveform's shape reflects the sound's frequency content. If a signal's level is too "hot" for any stage of the signal path to handle, then the peaks (the parts of the signal where the amplitude is highest) are cut off—a form of distortion called *clipping*. In a waveform display, you can easily recognize clipped waveforms because they have flat tops. To eliminate clipping, figure out which stage of the signal path is overloaded and reduce the level at that stage, then rerecord the sound.

Inadequate level. If the loudest peaks in the signal use only a fraction of the display's vertical space, the overall level is probably too low and you're more likely to hear noise that would be masked by a hotter signal. Instead of rerecording the track, you might be able to *normalize* the signal. Normalizing raises the level of the highest peak to the maximum it can be before clipping, and then raises the rest of the signal by an equal amount.

A good audio-editor program will have many other tools for editing the wave data. After using some of the available commands, inspect the waveform display to see the results as you listen to the edited sound. You'll quickly gain an understanding of what you're seeing in the display. 

Jim Aikin plays music and writes about music technology. You can visit him online at musicwords.net.

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FIG. 1: Chertkow (left) and Feehan (right), who've spent the past 11 years in the band Beatnik Turtle, have lots of advice on promoting your act on the Web.

Q&A: Randy Chertkow and Jason Feehan

Web promotion for independent musicians.

Empowered by the Internet, independent musicians have more opportunities to build their careers than ever before. But with so many tools, sites, services, and other Web-based music entities beckoning, it's not easy to decide which are best for your career. To get an in-the-trenches look at Web-based musical self-promotion, I turned to Randy Chertkow and Jason Feehan (see Fig. 1), authors of the new book *The Indie Band Survival Guide* (St. Martin's Press, 2008).

By Mike Levine

Over the course of their now 11-year career as members of the Chicago rock band Beatnik Turtle, Chertkow and Feehan have picked up countless tips and tricks for using the Net to promote themselves. They've put out 18 albums, written music for TV shows and films, licensed a song to Disney, produced one song a day for a year, and gigged extensively—all without the backing of a label. Although their book and Web site cover a range of tips for the DIY musician, in this interview I focused on how to use the Web to promote your music.

Do you have your own MySpace site?

Feehan: Absolutely. And we have our own Web site as well.

Chertkow: We've never really loved MySpace, so you're never going to see our page looking really

fancy compared to some others.

What don't you like about MySpace?

Chertkow: Competing with ads. But there are also many reasons to be on MySpace that we actually talk about in the book. Chief among them is that it's really easy for your fans to find music, because the songs are always in the same place, over in the upper right corner. You know exactly where to hit the play button. But, of course, you only get a handful of songs.

So what is the most important online vehicle for promoting a band or musical act?

Feehan: In our book we talk about the importance of having your own Web site. There's no such thing as a local musician. If you're on the Web, you're global.

And that means that the most important thing you have is your brand: your image and your music. So you want to have a home base for that—and that is your domain, that is your Web site. You can print up T-shirts with "myspace.com/beatnikturtle" on them, but it's a heck of a lot better, and more effective, to have it be "beatnikturtle.com." A domain name says so much in such a short way. It's branding, constantly reinforcing the name.

What about Facebook? Do you think a Facebook page is also important for a musician to have, even though it doesn't have a music player?

Chertkow: It goes beyond Facebook. We have an entire chapter on something we call "Web Presences." Facebook is just one place you should be. MySpace is certainly one, but ReverbNation [reverbnation.com] is

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an excellent one, as is Eventful [eventful.com]—both offer many free tools. Twitter [twitter.com] is highly recommended as well to stay in touch with your fans. You really should have a blog. You might want to think about being on Virb [virb.com] and other online music-hosting sites [all listed at indiebandsurvivalguide.com]. They're all free, and beyond the services they provide, the other reason why you do it is that it helps the SEO [search engine optimization] rankings of your Web site.

As long as it's free, all it takes is time.

Chertkow: Right. Again, what do musicians want? It comes down to having fans. Any way you can get fans that's free, do it.

Feehan: The key is definitely to build your presence on the Web and refer everybody back to your home base, where you can give them whatever you want to give them and send them the message you want to send them.

Talk about other Web-based ways to develop your fan base.

Feehan: Last.fm is a great example.

How does it work?

Chertkow: Last.fm is what's called a social playlist. They let you install a program that's almost like an automatic blog of everything that you listen to. But it goes a step beyond that, because it's looking at my collection and it knows that I listen to, say, They Might Be Giants, and then I listen to Beatnik Turtle, my band. Eventually, [the program] gets to know that people who listen to They Might Be Giants might also like Beatnik Turtle. So you can go to Last.fm and search on any band that you like, and it will play other bands that are related based on the listening habits of millions of people. In this way, your own music can get "found" by users of Last.fm.

You guys advocate giving away your songs online, right?

Feehan: It depends on your goals, but yes. If anybody is going to discover who your band is, what you're all about, the best way to actually get that picture is

through your music. And, therefore, it comes down to both selling your recorded music and making it available at the same time.

So you have stuff for free, but people are buying your stuff as well. Why do they pay if they don't have to?

Feehan: I think it's the emotional connection to the band that generates the support. It's the relationship that they end up having with the band.

Chertkow: It's also the fact that our music has actually made it out there because it's not locked up, so we get more fans. We wouldn't have nearly as many if we didn't give the songs away.

Feehan: They wouldn't know about us. In the past, first you had to impress a record label and you had to impress certain businesspeople. Then they let you into the club. And then you had to get onto the radio—and they had that locked up. And now, thanks to the Web, you can get directly to your fans, wherever they may be, through so many new-media channels. It's unbelievable.

Chertkow: And once you get fans—and remember, they can be all over the world now—you have more of a chance to sell CDs, more music, T-shirts, or get them to come out to gigs.

One of those new-media channels that you recommend reaching out to is Podcasting.

Chertkow: It's the new radio of the Internet.

How do you let Podcasters know that your music is available for them to use?

Chertkow: There are two primary ways to do it. The easiest way is to use what's called a Podsafe collective. You can upload your music onto those [sites] to make it easy for Podcasters to find—they often troll the collectives looking for new music. And because Podcasters are rather twitchy about copyright—everybody is nowadays—they know that if they go to the collectives, they won't have any trouble. PodShow [music.podshow.com] and PodsafeAudio [podsafeaudio.com] are two examples of Podsafe collectives.

But Podcasters must get inundated by tons of bands, right?

Chertkow: Not necessarily, and here's why: in the book we have a chapter that talks about lessons we've learned as a band. And one of the things that has worked for us is a lesson that we call standing out, which means that you try and put your music in a place that doesn't have music. So while music Podcasters are sometimes inundated, we've worked with people who have Podcasts about all kinds of other topics.

And they need music?

Chertkow: They do. It's not like radio, where they could just pick up any CD from their collection. They need permission and are looking for music. For example, one that has featured a lot of our music is the Gigcast [gigcast.nightgig.com], a Podcast that covers Web comics.


What keeps a Podcaster from using your music without crediting you?

Feehan: Usually you offer your music under a license that limits the Podcaster. By registering your music at a Podsafe collective, you automatically give them a license. You could also issue your music this way on your own, under a Creative Commons license [creativecommons.org]. When the Podcasters use this music, they agree to attribute it to you and provide a link to a band's Web site or a link to iTunes. So there is a legal mechanism to make sure that people play the game correctly.

But do you think that people would want to do that anyway?

Feehan: Absolutely. Attribution is the currency of the Web.

Chertkow: The entire Web is based on what they sometimes call link love.

Feehan: Yeah, it's cross-promotion. So if they use somebody's music and don't link back to them, it's a big faux pas. They know that the entire reason musicians are letting them use the music free is to get new fans, so they nearly always link back to the band. But we also suggest that you blog about it after and link back to them, so your fans can find their Podcast. After a while, we found that the Podcasters will start asking you for music to play. Just think—when was the last time a radio station *asked* you for your music? 

Mike Levine is EM's executive editor, senior media producer, and the host of the monthly Podcast "EM Cast" (emusician.com/podcasts).

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World Radio History

Moog Music

Moog Guitar Paul Vo Collector Edition

A legendary synth company's take on the guitar.

By Mike Levine

PRODUCT SUMMARY

guitar with built-in sustain, mute, and filter effects **\$5,895**

PROS: Inspirational to play. Innovative sustain, mute, and filter effects. Excellent build quality. Superior tremolo system and tuning machines.

CONS: Very pricey. Conventional guitar tone unexceptional. Requires Moog's proprietary strings for optimal functionality.

FEATURES	1	2	3	4	5
EASE OF USE	1	2	3	4	5
AUDIO QUALITY	1	2	3	4	5
VALUE	1	2	3	4	5

Moog Music
moogmusic.com

»» In our reviews, prices are MAP or street unless otherwise noted.



GUIDE TO EM METERS

- 5 Amazing: as good as it gets with current technology
- 4 Clearly above average; very desirable
- 3 Good: meets expectations
- 2 Somewhat disappointing but usable
- 1 Unacceptably flawed

Considering the company's pedigree, you shouldn't be surprised to learn that the Moog Guitar expands the expressive palette of the electric guitar into new territory. What's most impressive about this instrument is that it engenders creativity. You sit down to play it, and you find yourself playing things and getting sounds in totally new ways.

The instrument, designed by Paul Vo, is imbued with many unique features, and its processing is all analog. Its user-adjustable infinite sustain is one of the highlights. Yes, infinite sustain is not new (the Fernandes Sustainer, for one, has offered it for years), but the Moog Guitar implements it with a great degree of user control over both the nature of the sustain and its harmonic content. The guitar also features a mute mode that reduces sustain to create a staccato attack. To enhance the tonal palette, you get a built-in 4-pole Moog lowpass ladder filter, which can be triggered by right-hand attack or with the included Control Pedal. Also onboard are Graph Tech piezo bridge saddles for acoustic-guitar-like tones. The piezo output can be blended with or taken separate from

the magnetic pickups' signal. The Moog Guitar is not a synth guitar, but rather a guitar with extended sonic and expressive capabilities.

According to Moog, in the short time since the guitar's release in September, it has already been purchased by a number of high-profile musicians, including Trent Reznor, Joe Walsh, Lionel Loueke of Herbie Hancock's band, James Valentine of Maroon 5, Joe Don Rooney of Rascal Flatts, and Lou Reed. So what makes the Moog Guitar so special? I'll start with a closer look at its features.

Maple Candy

The construction is first-class all the way (see Fig. 1). It's a solidbody instrument made of either mahogany or swamp ash (depending on availability). It has a gorgeous top, either flame or quilted maple, which is available in a range of colors. The guitar I reviewed had a golden yellow quilted-maple top (Moog calls that finish Honey). The 22-fret set neck features an ebony fingerboard.

In conjunction with locking Sperzel tuners, the Wilkinson bridge/tremolo system



FIG. 1: The Moog Guitar is a boutique electric guitar with built-in sustain, mute, and filter features.

stays in tune remarkably well. A pair of proprietary, single-coil Moog pickups provide the electric guitar sound. Moog is very hush-hush about the pickup design, saying on its Web site that “we cannot divulge too much detail” about them.

The Moog Guitar comes set up with heavier-than-normal strings (.011, .018, .024, .030, .044, .052). I normally play 10s, and the guitar felt a bit stiff at first. However, bending was comfortable enough, and I soon adjusted to the guitar’s feel. According to Moog’s Jason Daniello, the heavy strings produce a stronger electromagnetic field, which makes the guitar’s sustain and mute features (which Moog terms Vo Power in honor of the guitar’s designer) function better. Daniello says that the guitar will work with a .010 or even a .009 on top (the recommended lower-string gauges are heavier than in conventional sets), but that the 11s are optimal. Moog is selling its own strings for the guitar, which contain a metallic composition designed to optimize electromagnetic response. The company recommends using conventional strings only in a pinch; the response, it says, will be “weaker and less stable.”

The guitar electronics require power,

which comes through the 5-pin XLR cable that also carries the audio from the guitar and connects to the Control Pedal, which has a metal bottom and a plastic body and treadle. The pedal then plugs into the wall with a line-lump transformer and has a high-impedance output to go to an amp or DI. The pedal is also a key part of the extensive user control of the guitar’s sustain and filter features. A 9V battery, which powers the piezo pickups, is located in a compartment in the back of the guitar’s body. The guitar comes in a snazzy-looking tweed hard-shell case, which has a substantial handle, gold hardware, and a pocket for the Control Pedal.

Of Knobs and Switches

It took me several playing sessions until I felt like I had a good grasp on the Moog Guitar’s controls. I found the 6-page printed *User’s Guide* to be well written and thorough. It was invaluable to have at hand when I was learning how to “work” the guitar.

The leftmost (from the player’s perspective) of the control hardware is a Master Volume knob. Next to that is the Vo Power knob (see Fig. 2), which governs the strength of the sus-

tain and mute features. The Harmonic Balance knob adjusts how much Vo Power goes to each pickup, making it kind of like a tone knob for the sustain and mute features. Turning this knob changes the harmonic content of the signal, resulting in higher or lower overtones being produced. You can turn it while the note sustains, changing its character as it goes along. You can also control this same parameter with the Control Pedal when the 3-way Filter Toggle switch is set to Tone.

The Filter Toggle is one of the key controls on the guitar. When it’s set to Tone (position 1), the guitar responds to its own tone control knob (called the Tone/Filter knob), like a conventional instrument. Position 2 turns on the Articulated Filter, which gives you a more intense filter effect the harder you hit the note. When it’s used with the Mute mode, you can get some really cool, sitarlike tones (see Web Clip 1). When the guitar is in either of the two filter modes, the Tone/Filter knob controls the filter’s resonance.

Position 3 of the Filter Toggle is called the Moog Filter. When it’s on, the filter responds to the pedal, creating wahlike effects when the pedal is moved around (see Web Clip 2),

❧ The Filter Toggle switches between filter effect modes.

❧ The Piezo Blend knob allows you to dial in as much piezo sound as you want.



❧ The Vo Power knob governs the intensity of the sustain and mute effects.

❧ The 3-position Mode Selector switches between mute and sustain effects.

❧ FIG. 2: The guitar's knobs and switches allow most functions to be controlled from onboard.

or exaggerated tonal effects when it's held stationary near one of its extremes.

The Mode Selector is a 3-way switch that toggles between the Mute mode and the two sustain modes: Controlled Sustain and Full Sustain. In Controlled Sustain, only one or two notes can sustain at a time; the sustain gets muted for the rest. As its name implies, this

Mode Selector into position 1. It essentially chokes the string output, giving you a staccato sound. As with the sustain, the degree of this effect is controlled by the Vo Power knob.

The other switch on the guitar is a 5-way pickup selector. You can set it to piezo only, bridge pickup, bridge and neck out of phase, bridge and neck in phase, and neck. With the

amp) or to a separate DAW track or P.A. input. The piezo signal is fully affected by the sustain and mute effects, but not the filter effects.

Getting Mooged

The variety of tones you can get from the Moog Guitar is impressive. Even more so is the range of playing techniques you can apply that would be impossible on a conventional guitar. For instance, when you're in one of the sustain modes, you can easily play melodies with your left hand only, by sliding your fingers around on the fretboard. Meanwhile, you can use your right hand to tap counter melodies, or, you can hit a chord and, as it sustains, play melodies with your right hand on top of it (see Web Clip 4). I was also able to get some really unusual, singsongy sounds using a slide and dialing in some distortion on my amp modeler. Once you start bringing the filter into it, the sonic variety is pretty extensive. (The filter can also be controlled by external CV control, by plugging a Moogerfooger or other CV-equipped device into the CV input on the Moog Guitar's Control Pedal.)

The only aspect of the Moog Guitar's sonic palette that I didn't find to be exceptional was

gives you more control, making it easier to play single lines more cleanly, without too many notes ringing over. Full Sustain, on the other hand, could be described as more of a "pedal-to-the-metal" effect. Every note sustains, which makes for a more intense result. Together with some distortion from your amp or modeler, the sustain modes make it easy to get cool feedback effects, too (see Web Clip 3).

The Mute mode is engaged by putting the

pickup selector in any of the electric guitar positions, the Piezo Blend knob lets you dial in as much or as little of the piezo signal as you'd like. With the pickup in the piezo position, the Piezo Blend knob is inactive because the guitar is outputting only piezo signal.

The guitar also has a ¼-inch auxiliary output that carries only the piezo signal. It can be used either to feed a tuner or to send the piezo signal to a separate amp (like an acoustic guitar

You can easily play melodies with your left hand only.

how it sounded as a conventional guitar, with the effects bypassed. Both through an amp and direct into an amp modeler in my DAW, I found the pickup sound to be kind of mid-rangy. In addition, the notes tended to sound and feel a little plunky, without the normal sustain I would expect. (According to Daniello, the plunkiness was likely due to incorrect setup, not the nature of the guitar.) My issues with the conventional guitar tone are why I gave the instrument a 4 instead of a 5 for Audio Quality in the EM ratings. In defense of the guitar's tone, I recently heard Jake Cinninger of the band Umphrey's McGee playing the Moog Guitar at Moogfest 2008, and it sounded awesome through his rig, both as a conventional guitar and with the effects turned on.

On several occasions, I picked up RF interference when using the Moog Guitar. When I mentioned this to Daniello, he told me that Moog was aware of the issue and had solved it with an updated version of the Control Pedal that included a grounding switch. The company subsequently sent me the new pedal, which remedied the problem.

Six-String Mooger

Overall, I found the Moog Guitar to be an inspirational instrument. It opened up exciting new worlds of playing technique for me like no guitar I've ever played. Especially when I used external effects, like distortion, delay, and modulation, I found myself getting lost in the guitar and playing and improvising for long stretches without even realizing that time had passed. It was kind of like discovering a whole new side to my guitar skills.

That said, the Moog Guitar is quite expensive and at this point in its development is a luxury item that will be affordable only to some. I hope that in the not-too-distant future, Moog will release a lower-priced line, bringing the Moog Guitar's exciting combination of sustain, mute, and filter effects to a wider range of potential buyers. I can already tell that I'm going to miss having this guitar around when I have to return it after this review is over. There's simply nothing else out there like it.

Mike Levine is EM's executive editor and senior media producer. He's been playing guitar since age ten.

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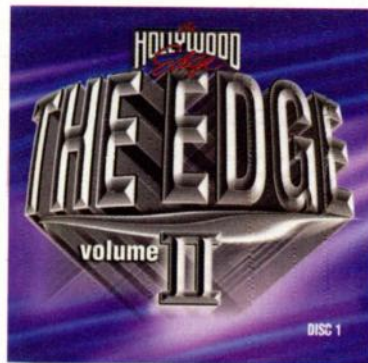
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FIG. 1: ReValver MkIII delivers models of popular Peavey amplifiers, such as the high-gain 6505, as well as other hardware amps, speakers, and effects.



Peavey Electronics

ReValver MkIII (Mac/Win)

An amp and effects simulator you can tweak from the inside out.

By Orren Merton

PRODUCT SUMMARY

guitar amp modeler **\$249.99**

PROS: Amazingly flexible. Excellent high-gain amps. Ability to load your own impulse responses. Hosts VST plug-ins. Thorough documentation.

CONS: Many dull presets. Non-Peavey models a mixed bag. Tweaking amp components is complicated. The 64-bit mode doesn't work in real time. Too many nested dialog boxes.

FEATURES	1	2	3	4	5
EASE OF USE	1	2	3	4	5
QUALITY OF SOUNDS	1	2	3	4	5
VALUE	1	2	3	4	5

Peavey Electronics
peavey.com



In 2007 Peavey acquired Alien Connections, the company that developed the guitar-amp-and-effects-modeling software ReValver, and released an updated version soon after. ReValver MkIII runs standalone or as a VST or AU plug-in. The standalone edition gives you a running tally of the current rig's CPU use—a feature that isn't available in the plug-in version.

Rack Stacking

Upon first launch, ReValver greets you with a rack containing only the Title module, a virtual device that lets you load and save presets, adjust the input and output levels, access the Options window and user guide, and perform various utility functions (see Fig. 1). Below that, a rectangle in the vacant rackspace invites you to add modules by clicking on it.

The command to add modules opens the Module window, in which you can select from dozens of virtual amps, speakers, effects, and so on. The window provides separate tabs for dif-

ferent module types and describes each module with a paragraph taken from the manual (which is extremely informative and well written—a plus considering ReValver's flexibility). When at least one module is present, you can summon additional modules from a contextual menu. New modules will appear in the rack with the signal flowing from the Title module down to the one in the lowest position.

You can add as few or as many modules as you want, in any order, and rearrange them by dragging-and-dropping or right-clicking on them. There are no restrictions other than your computer's available processing power. Indeed, ReValver takes flexibility and tweakability to new extremes.

You can run ReValver in either of two quality modes. Real-time mode uses 32-bit processing and is recommended for live performance. Mixdown mode uses 64-bit processing and 4x oversampling. Peavey says that mixdown mode consumes about five times as many CPU cycles, and my tests bore this out. On my 2.66 GHz

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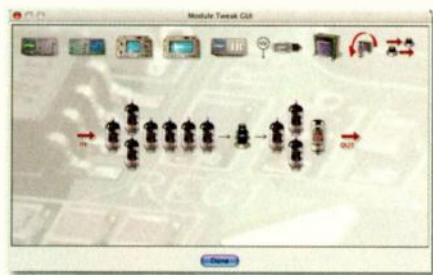


FIG. 2: You can open the Module Tweak GUI window for any amp and then revoice and reconfigure each tube and tone stack.

quad-core Mac Pro with 5 GB of RAM and Mac OS X 10.4, ReValver registered a 20 percent hit on one bar of Apple Logic Pro 8.0.2's CPU meter in real-time mode, but pegged one of the bars completely in mixdown mode. Clearly, mixdown mode is just for freezing or bouncing, but to my ear, it does sound slightly smoother and more articulate than real-time mode. To change modes, you first select the desired one in the Options window and then quit and reload all instances of ReValver. If you're using multiple instances of the plug-in, all of them operate in the same mode.

Tweaker's Paradise

The ability to customize ReValver MkIII's simulations from the ground up is amazing. You are presented with a preamp, power amp, and complete amp-head module for each of the 15 amplifier simulations. You can mix and match different preamp sections with different power-amp sections at any point in the signal chain. And that's not all—you can tweak every aspect of an amp's design (see Fig. 2), and I do mean every aspect. You can change tube characteristics, EQ stacks, you name it (for details, see the [online bonus material](#) at [emusician.com](#)).

The speaker simulations are equally versatile. ReValver comes with convolution samples of dozens of classic speaker cabinets, and you can load impulse responses for your favorite cabinet. I have long enjoyed using my own custom Egnater oversize speaker cabinet in convolution processors, so this was an especially welcome feature. ReValver's Speaker Construction Set module lets you specify individual cabinet sizes; select the number, size, and type of speakers; choose the microphone type and configuration; and equalize the result.

Effects and More

ReValver MkIII provides the usual selection of distortion boxes, compressors, delays, reverbs, and modulation effects. It also supplies tool modules such as frequency analyzers, tuners, signal splitters, and tone-shaping devices such as the Leveler volume-adjusting module.

ReValver has two tuners: the Tuner module offers both VU and strobe views, and the Simul-Tune module gives you six separate strobe tuners (one per string) and tunes against a user-selectable preset tone. I love good tuners, and ReValver's Tuner module ranks up there with the best. Personally, I found looking at Simul-Tune's six mini tuners too confusing, but that's not to say everyone would.

Although ReValver's onboard effects didn't blow me away, there are a few standouts. The Greener tube screamer is quite good, and Wow-Wah is one of the most versatile wah simulations I've seen, with lots of parameters you can tweak to find exactly the sound you want. I also liked the fact that the C-Verb convolution reverb lets you load in your own impulse responses in WAV format.

ReValver's VST Host module can host any VST plug-ins you have installed. You can use this module to add your favorite effects from other packages, and open their user interfaces by clicking on the GUI button. Peavey's Read Me file warns that some VST effects may crash ReValver, but I loaded all sorts of VST plug-ins and didn't experience a crash (although loading a VST instrument does kill the audio). The VST Host module vastly expands the sonic palette available to ReValver—kudos to its developers for including it.

X-Rated

As you might guess, ReValver's simulations of Peavey's own amps are top-notch. The heavy channels on the Triple X, 6505, and JSX models sound open, alive, powerful, and huge (see [Web Clip 1](#)). In fact, they're some of the best high-gain amps of any simulator I've heard. The clean and less distorted channels of these amps are also modeled, of course, but the distortion channels are the real draw.

The Classic 30 model sounds very open and warm, and it responds well to playing dynamics. To my ear, the ValveKing models have a slightly notch-filtered digital sound at

higher gain settings. Ultimately, however, I was most impressed with the models of Peavey's heavy amps.

Some of the non-Peavey amps don't quite capture the signature character of the amps they model. The Fox ACS-45 didn't sound as Vox-like to me as the Vox simulations of some other modelers. The '62 BluesMaker sounded appropriately midgain and dynamic, but not much like the Marshall Bluesbreaker. The Flathill model didn't sound much like the Mesa Boogie Dual Rectifier, either. And the Basic 100 didn't have the dynamic response of the Peavey models.

Le Petite, however, is a dynamic 3-channel amp with a very cool feature that lets you blend each of the three channels to taste. That blend feature gives the amp a unique character, and it was very playable. The MatchBox is a dynamic amp that was quite responsive to picking and had a smooth, liquid feel even when overdriven.

If you can live without the non-Peavey amps, you should check out ReValver HP (Mac/Win, \$69.99). It includes all 6 Peavey tube-amp models and more than 75 speaker simulations, but it lacks the Module Tweak functions.

Hot Valves

ReValver MkIII delivers an unmatched level of flexibility and some of the best-modeled high-gain amps I've ever heard. Its VST Host module is unique among amp-simulation programs. ReValver is so tweakable, in fact, that with enough knowledge and patience, I'd bet even the simulations I wasn't as fond of could be adjusted to sound fantastic.

However, the way that ReValver continually opens dialog boxes in new windows can get messy if you have a lot of windows already open. What's more, the presets don't offer enough variety, instead sticking too close to traditional, blues, rock, and jazz staples. But if you're looking for a versatile amp simulator with excellent high-gain Peavey amp models, ReValver MkIII will not disappoint.

When Orren Merton isn't writing and editing music-technology books for Course Technology, he simulates being a guitarist for Ember After ([emberafter.com](#)).



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Yamaha Pocketrak 2G

The pocket recorder goes nano.



FIG. 1: The Pocketrak 2G offers advanced features such as an adjustable mic, a built-in speaker, and a slide-out USB connector—all within an ultraslim, lightweight profile.

By Bobz

If you're in the market for a pocket-size digital recorder, then you have more choices than ever. Even in such a crowded playing field, the Yamaha Pocketrak 2G offers numerous innovations that make it stand out. For starters, it's the tiniest pro audio recorder yet (see Fig. 1). Although its small size does necessitate a few compromises, Yamaha has done an excellent job of packing maximum features into minimal space.

Little Wonder

The Pocketrak is roughly the size of the original iPod nano, only half an inch thick and weighing just 1.7 ounces (including battery). I could fit at least six Pocketraks in the space of my old Edirol R-1, and several within the footprint of any current recorder. Despite being significantly slimmer and lighter than the competition, however, it boasts several firsts and some advanced features. It's one of only a handful of recorders to offer a built-in speaker, in addition to a headphone out, for quick playback monitoring in the field. A slide-out, full-size USB connector enables direct connection to a

computer, without the need for a cable. And the built-in stereo microphone can be tilted up for a better angle on a tabletop.

The unit is powered by a single AAA battery and comes with a Sanyo Eneloop NiMH rechargeable battery in the box. According to Sanyo, the Eneloop does not suffer from the self-discharge typical of rechargeables. Yamaha claims it can power the Pocketrak for up to 19 hours of continuous MP3 recording. The recorder will also run with any standard AAA alkaline, making backup power readily available should the rechargeable ever die on you in the field.

Also included in the box are a leather carrying case, a USB extension cable, earphones, a stand adapter, a printed manual, and an installer disc for Steinberg Cubase AI 4 (Mac/Win; see Fig. 2). The case has a way to attach the unit to a tripod (or mic stand, with the included adapter) through a threaded socket in the bottom. The USB cable provides a more secure connection to certain USB ports than the slide-out connector. The bundled Cubase software adds outstanding value if you don't already have a DAW, offering a cross-platform, professional-quality solution

>> PRODUCT SUMMARY

portable digital recorder **\$299**

PROS: Ultracompact size. Tilting mic, built-in speaker, and direct computer connection. Excellent audio quality with built-in mic.

CONS: Maximum recording quality is 16-bit, 44.1 kHz WAV. Line input can record only 128 Kbps MP3s. No real-time level monitoring. No memory expansion.

FEATURES	1	2	3	4	5
EASE OF USE	1	2	3	4	5
AUDIO QUALITY	1	2	3	4	5
VALUE	1	2	3	4	5

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FIG. 2: Included with the Pocketrak 2G are a leather carrying case, a USB extension cable, a rechargeable AAA battery, earbuds, a stand adapter, a manual, and Cubase AI 4 software.

for editing and mastering your recordings (see the online bonus material at emusician.com).

Pocket-Size Interface

The Pocketrak's user interface packs a lot of functionality into minimal space, with most controls doing double or triple duty. Nonetheless, one-handed operation is easy if you press the buttons with your thumb. The menu interface feels much like a cell phone's, and essential items are easy to access with minimal scrolling. The menus furnish access to many useful functions, such as selectable recording format (16 to 160 Kbps MP3 and 16-bit WAV), Automatic Level Control, a Stereo Wide effect, timer- and voice-activated recording, playback EQ, and more.

However, I discovered a few limitations and bothersome aspects of the Pocketrak's operation and interface. Some seem like reasonable compromises due to its compact size, but others I found harder to understand. A single stereo minijack is your only port for both mic and line input. There is no AC power option, but the Eneloop battery is robust and can be recharged when you connect the recorder to your computer. The Pocketrak does not use memory cards, but the 2 GB of built-in flash memory provides up to 3 hours of recording at highest resolution. Unfortunately, 16-bit, 44.1 kHz audio is the maximum resolution available. That's sufficient for professional quality, but 24-bit and higher sampling rates are more or less standard fare nowadays.

from the display and you can't adjust the levels.

The operating system has a file and folder structure that's somewhat complex. Mic recordings, line recordings, data files, and music files from your computer's MP3 library each have to go in their own designated folder (A, B, C, D, L, M, S, and so on), and files must observe the folder's naming conventions. I assume part of this system stems from the fact that Yamaha has designed the unit to do double duty as a consumer music

player, and thus wanted to keep music files separate from your recordings (in the M folder). And given its nano profile, it could make a perfect one-stop pro recorder and MP3 player. Features such as bass boost, preset EQs, a shuffle mode, and the ability to play DRM-protected WMA files make it a formidable iPod surrogate. And ultimately, once you get used to it, the folder scheme is logical and painless to live with.

Field Tests

I tested the Pocketrak in the studio and in a number of live recording environments, with the internal mic and with an Audio-Technica AT825 (a high-end, industry-standard stereo

Harder to understand is that you can make line-level recordings only as MP3s, making the unit inadequate for 2-track studio mixdowns. Yamaha says this limitation is a result of digital rights management (DRM) concerns. Another thing that bothered me: although you can set microphone levels in standby mode, once you actually begin recording, the meters disappear

field-recording microphone). I must admit that I didn't expect such impressive quality with the built-in stereo mic, but the results were nothing short of spectacular. For live recordings, they sounded as good as what I obtained with the AT825 (see Web Clips 1 and 2). This was great news, as it meant I could expect excellent results in the field, without the need to lug around an extra mic that is several times the size and weight of the Pocketrak unit itself.

I was less impressed with the unit's capabilities with an external mic in the studio. On my tests with acoustic guitars, the quiet of the studio revealed an elevated noise floor with the AT825. The same mic on my Edirol R-1 was much quieter.

Pick Your Pocket

The Pocketrak 2G excels at professional-quality recordings with pocket-size convenience. Additional features allow it to double as an MP3 player, flash drive, and more, which could be perfect for an on-the-go student or reporter who also wants to be able to record lectures, music lessons, or interviews. What's more, it includes slow- and fast-speed playback to aid in transcription (although that feature works only with MP3 recordings, not WAV).

Given the Pocketrak's price point, however, I would prefer to see more focus on higher reso-

[The Pocketrak does not use memory cards.]

lution and professional needs than Swiss-Army-knife, prosumer-gadget features. Still, the unit's ultracompact size, tilting mic, direct computer connection, long-lasting battery, and bundled DAW software make it a unique and compelling alternative for the professional market. It's an ideal choice for high-quality stealth recordings, and it's a super quick-idea scratch pad: you can power on and begin recording your flashes of inspiration in about 3 seconds. Overall, the Pocketrak 2G is an excellent, nano-size, all-in-one pro recorder and portable music player.

Babz is a composer, multi-instrumentalist, and music-technology writer in New York City.

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AKAI

MPD32

By Marty Cutler



Armed with multiple banks of pads, faders, knobs, and switches tied to comprehensive MIDI implementation, the Akai MPD32 is the rhythm programmer's Swiss Army knife.

It would be a stretch for my capabilities and my available studio space to use a MIDI drum kit to sequence drum parts. For that job, I like the fat, can't-miss, drum machine-style pads and solid feel of Akai's MPC-series instruments. However, I also prefer the editing capabilities of my sequencer software and the luxury of using software instruments with streaming, high-capacity sound libraries. For those who share my rhythm-programming preferences, Akai's MPD32 (\$499 [MSRP]) could be the perfect fit. It's a full-fledged controller with capabilities way beyond simple drum-pad triggers.

BRICK-HOUSE BATTERY

The MPD32 is built like a brick house and occupies a modest footprint (12 inches deep by 15 inches wide) on your desktop. The unit draws power from a USB port or an optional 6V power supply. USB 1.0 provides 32 channels of MIDI communication, and you can use the controller's MIDI In and Out ports to address an additional 16 MIDI channels on external hardware.

At the heart of the MPD32 are its four

columns and rows of pressure-sensitive trigger pads, which are large enough to accommodate a couple of fingers on a single pad for flams and rolls. The pads supply sufficient resistance to wring dynamic beats from even the most ham-fisted programmers; if you need more give, just scale the pad's Velocity response to your own needs. You can edit the MIDI Note Number each pad outputs and select a port and channel for each. This was great for playing composite kits built from software instruments and my mothballed Roland TD-7 sound module.

When used with the Time Division button engaged, the Note Repeat switch delivers anything from simple quarter-note hits to 32nd-triplet buzz rolls. Varying pressure dynamically alters Velocities, avoiding static-sounding rolls. With Time Division disengaged, the buttons can send discrete MIDI controller values or serve as track solos or mutes. The row of eight faders and the eight knobs at the lower right default to conventional volume and panning tasks, respectively, but each is also assignable to the MIDI message of your choice. This means you can use them to control software-synth voice parameters, among other tasks. Best of all, the array of faders, buttons, and knobs has three banks, easily accessed from the A, B, and C buttons to the right of the trigger pads. Four separate banks govern trigger pad assignments.



Familiar transport buttons offer MIDI Machine Control or System Real-Time commands, but these can also send discrete MIDI continuous controller messages. A solid rotary-control knob lets you page through parameters and commands or choose presets; you can confirm a selection by pressing down on the knob. Just below the rotary control are cursor buttons to navigate through any of three

Mode menus (Preset, Edit, and Global). You also get buttons to quantize all Velocities to 127 or spread a single hit across the pads, each with a different Velocity. The latter makes nailing Velocity-crossfade instruments a breeze. All knobs, faders, and buttons are solidly ensconced and smooth in their response.

Finally, among other functions, the bright blue LCD will clearly display every editing parameter and every MIDI controller and value you can send, including Channel Pressure from the pads. I love the little data indicator in the corner of the display that updates values numerically and graphically.

CAVALCADE OF HITS

There were too many templates to test fully, but one standout was a setup for Spectrasonics Stylus RMX. RMX Multis generally require dragging each part's MIDI files end to end into multiple host tracks. With the MPD32 template, track building was a real-time musical joy. Each switch in the first bank started and stopped a part, allowing me to build layers of percussion on a single track in a quick, musical, and less abstract manner. I've always regarded FXpansion Guru as a sort of software MPC; pairing it with the MPD32 was a thing of synergistic beauty. The MPD32 is not limited to drums and percussion; I found useful templates for Ableton Live and Steinberg Cubase, soft-synth plug-ins from Spectrasonics, and several sequencer and instrument-specific Propellerhead Reason setups.

Akai packed more MIDI implementation and programming features into the MPD32 than I can cover here. It even bundles an editor-librarian and lite versions of FXpansion BFD and Ableton Live to start you off. Documentation is clear and thorough and includes a printed quick-start manual, a PDF operator's guide, and a

comprehensive list of presets with details on installing and playing them (you can download them from Akai's site to learn more). Solidly constructed, with versatility and plenty of physical and musical heft, Akai's MPD32 should be a runaway hit.

Value (1 through 5): 5

Akai
akaipro.com

FUTURE AUDIO WORKSHOP

Circle 1.0.2 (Mac/Win)

By Len Sasso



Sound sources along the left are mixed (top center) and sent through three multi-effects for filtering and distortion. Modulators on the right are assigned by dragging color coded dots to inputs near the affected controls.

Circle (\$199) is the first product from the Irish collective of developers Future Audio Workshop (FAW). It is an analog-modeled synth that comes in standalone and plug-in formats (VST, AU, and RTAS) and boasts a variety of unusual features. Two things make this synth special: it sounds great, and it's easy to program. Audition it by listening to the Web clips on the FAW Web site or downloading the full-featured demo.

Circle ships with more than 500 factory presets and a detailed PDF manual. It's easy to figure out what's going on by examining a few presets and playing around, using the manual as backup for the more enigmatic settings. The preset browser and various ancillary panels are accessed with tabs along the bottom of the user interface. Presets are categorized in the browser by 21 characteristics (Bass, Pad, Moving, Static, 1970, FX Sounds, and

so on), and you can characterize your own presets as you create them.

EYES LEFT

The left side of Circle's control panel is devoted to sound sources: four oscillators, a noise generator, and a feedback circuit. The feedback is taken from the end of the signal path and passed through a short delay line that you tune in semitones. It produces resonator-style effects when applied to simple waveforms and gravitates toward distortion when applied to more-complex sounds.

The oscillators toggle between analog and wavetable modes. In analog mode, you get sine, sawtooth, and variable-width pulse and triangle waveforms. In wavetable mode, you choose two single-cycle waveforms from a selection of 110 shapes, and then use a slider to morph between the two chosen shapes. All of Circle's modulation options can apply to that slider, giving you a lot of sonic flexibility and motion.

A mixer at the top of the center column of modules mixes the active sources (you can turn any Circle module off to save CPU) and feeds the mix to three sound modifiers in series. The top and bottom modifiers are multi-effects emphasizing filtering and distortion. The Mouth Filter is an interesting example; an automatable slider morphs through three vowel formants. Those modifiers surround a resonant multimode filter module that you configure as one filter or as two filters in series or parallel.

The signal path ends in a series of three global multi-effects that can host the usual suspects: phaser, reverb, echo (single, double, ping-pong), chorus, and panner. They're nothing special, but they get the job done.

MOVING RIGHT ALONG

Circle's modulation scheme is another standout feature. Five control-rate modulators line the right side of the interface. You can configure each modulator as an ADSR envelope generator, an LFO, or a step sequencer. The modulators are color coded, and you apply them by dragging a colored ball to an input circle located below or next to

the knob or slider you want to modulate. Once modulation is applied, clicking on the input circle reveals a bipolar slider for setting the modulation amount.

The sound source modules also have modulation outputs that you can use for audio-rate modulation (think FM). The oscillators have a subaudio mode, and that lets you use the unusual wavelike waveforms as LFO shapes. User-configurable curves tracking the MIDI keyboard (2) and MIDI Velocity (1) round out the modulation scheme.

You get a simple but robust MIDI controller setup. Clicking on the MIDI Learn button outlines each target. Click on a target, and then tweak a control on your MIDI control surface to assign it to the target. The subpanel revealed by the Control tab lets you set a range for each assignment. You can assign the same MIDI controller to multiple targets with different ranges. In a nice touch, even the individual steps of the step sequencers are available as targets, letting you automate step sequencing in real time. In addition to MIDI modulation, Mac versions of Circle support Open Sound Control (OSC).

RANDOMLY YOURS

Like most virtual instruments, Circle lets you randomize its settings and tame the results with separate amount settings for sources, modifiers, modulators, and master effects. You can also specify that tuning (sources) and levels (others) not be randomized.

Circle's clearly designed user interface, easy-to-use modulation scheme, and full-featured MIDI implementation make it a pleasure to work with. This is one synth that begs to be tweaked, and there's not much head-scratching involved. You're bound to find useful sounds among the

many presets for your synth leads, basses, pads, and ambient effects, but you won't feel limited to the presets (see **Web Clip 1**).

Value (1 through 5): 4

Future Audio Workshop
futureaudioworkshop.com



NOVATION

Nocturn

By Rusty Cutchin



Point your mouse at a plug-in knob or slider, and the Nocturn Speed Dial (top center) assumes control.

Novation Nocturn (\$199.99 [MSRP]) is a plug-in controller that lets you conveniently access most any effects or instrument plug-in parameter with the turn of a knob or push of a button. A compact slimline control surface, the Nocturn promises tactile control of parameters that usually require a multitude of mouse moves to tweak, and, for the most part, the device delivers.

THE HARD AND SOFT

The Nocturn hardware is a 9.4 x 5.4 x 1.1-inch bus-powered USB device whose only connector is the USB port. It has a staggered array of eight knobs across the top panel, and each knob has an associated push button. There's a Speed Dial (more on this in a bit) and a master slider in the middle of the panel. Eight more push buttons along the bottom have fixed assignments, such as selecting page-up or -down or toggling between effects, instrument, and mixer, depending on which functions you want to control.

The View button hides or shows the onscreen window for Novation's Automap Universal software, which displays a likeness of the Nocturn's top panel, along with the data values you adjust with the knobs. When you launch Automap, it finds your plug-ins and maps their controls to the Nocturn's. Automap works with VST, AU, and Digidesign's TDM and RTAS plug-ins by converting them to Automap-wrapped ver-

sions. An onscreen window lets you choose which plug-ins you want to convert.

I used the 2.0 version of Automap for this review (check novationmusic.com for the latest release). The software works with Windows XP (SP2) or Vista 32/64 and Mac OS X 10.4 or later. Automap requires at least a 1 GHz Pentium III or Mac G4 with 256 MB of RAM.

NOCTURNAL TRANSMISSIONS

Both the Nocturn controller and the Automap software have some nifty elements. The controller knobs are touch sensitive and are ringed with LEDs, and the associated buttons are illuminated. That's a big help to those who tweak plug-ins in dim light. The unit's central Speed Dial knob is perhaps its strongest feature; point your mouse to a control in your onscreen plug-in, and the touch-sensitive Speed Dial assumes control of that parameter.

Once you make your plug-ins Automap ready, the software provides the real magic. When you boot up your DAW and launch an Automap-wrapped plug-in, its window appears normal except for a slim new control bar at the bottom. At the same time, the Nocturn's LEDs illuminate and the plug-in's controls appear in the Automap window. The unit also has a Learn button, which lets you reassign the controls or create your own controller map. Hitting the page button accesses the next group of controls.

A simple browser lets you review all open plug-ins and then quickly switch to controlling one of them. Automap Universal 2.0 supports standard MIDI protocol, and you can teach the Nocturn to control a hardware MIDI device, nonautomatable plug-ins, or your sequencer's mixer. Once a MIDI map is created, you can save and recall it using the browser.

The Nocturn can control multiple functions of some DAWs, like Cubase, right out of the box. It handled the AU plug-ins in Digital Performer 5.0 (DP) just as easily. VST plug-ins converted with FXpansion's VST to AU Adapter program also worked fine.

To use the Nocturn's knobs with DP's mixer, however, required a quick programming session. Once the system was set up for MIDI control, I could select an individual DP fader onscreen and touch a knob on the Nocturn to assign it to the fader. Novation promises that custom maps for applications like DP will be available for download free from Novation's Web site.

GOOD COMBINATION

The Nocturn became a very handy tool once I learned how to use it to navigate among effects, instruments, and mixer channels and figured out how to work with Automap and the hardware simultaneously. At first, the knobs didn't appear to allow precise control of parameters, making values jump by several increments. But this was in an inaudible range (hundredths of a decibel), and I could achieve finer control by turning off Encoder Acceleration in the Settings menu.

On the whole, the Nocturn is a good system for those who get tired of adjusting multiple plug-in parameters with a mouse. It was fast, sturdy, and bug-free in my testing, and Novation offers excellent support. The Nocturn system is a great way to take some control from the computer and put it back in your hands.

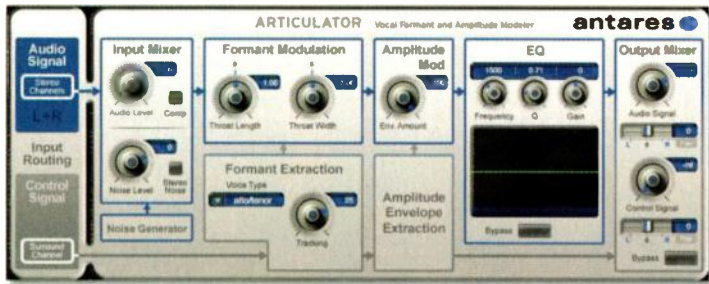
Value (1 through 5): 4
Novation
novationmusic.com

ANTARES AUDIO TECHNOLOGIES

Avox 2 (Mac/Win)

By Len Sasso

With the release of Avox 2 (\$499), Antares delivers the full force of its voice-modeling technology for the same price as the original Avox bundle. The package combines the five Avox plug-ins (Throat, Duo, Choir, Punch, and Sybil) with four new voice manglers (Articulator, Mutator, Warm, and Aspire) and throws



Articulator lets you apply Antares voice-mode ing technology with vocoder-like results.

in the vocal-modeling harmony generator Harmony Engine for good measure. This product is a bargain.

EM reviewed Avox and Harmony Engine in the May 2006 and April 2008 issues, respectively. Both reviews are available online at emusician.com. I'll begin with a brief description of the original plug-ins, then concentrate on the new ones.

BY THE THROAT

The physical-modeled Throat is at the heart of Avox 2, and it is what most distinguishes these applications from others that do a similar job. Throat lets you change the character of a solo singing or speaking voice by modeling changes to the shape of the vocal tract at five different locations, from the vocal cords to the lips. It also lets you modify the waveform produced by the vocal cords and the breathiness of the sound. Some part of this physical-modeled process makes its way into most of the other Avox 2 plug-ins. Throat modeling is intended for clean, solo vocal parts, which you might interpret as a challenge to see what it will do to pads, sound effects, and solo instruments (see [Web Clip 1](#)).

Of the other Avox plug-ins, Duo is a vocal-doubling plug-in with throat-grabbing options; Choir multiplies vocal parts with random pitch, time, and vibrato manipulations; Punch combines fattening, distortion, compression, and limiting; and Sybil is a de-esser. Harmony Engine creates up to four harmony parts from a clean, solo vocal and gives you some control over throat modeling for each voice. It is the most complex of the Avox 2 plug-ins and is best suited to solo vocals.

a great deal of influence over the vocal characteristics of the output; you're not restricted to the characteristics of the control signal (typically speech or singing).

Like a vocoder, Articulator requires two audio inputs—one for a mono control signal and one for a stereo carrier signal, which should be harmonically rich and fairly continuous (gaps in the carrier translate to gaps in the output). A built-in noise generator can substitute for the carrier, and it also serves to accentuate sibilants. Because it requires two audio inputs, the routing differs by both host and plug-in format. But the manual details most of the problems you might encounter, and the process is fairly straightforward in most DAWs.

Because you're not dealing with band mapping or the separation of voiced and unvoiced parts of the control signal, Articulator's setup is simpler than a vocoder's. You tweak level, throat, formant-analysis, envelope-follower, and output-mix settings to taste, and you're done. A 1-band parametric EQ at the output is very helpful for enhancing intelligibility. The results are not quite as intelligible as a high-quality vocoder's, but the creative potential is much greater (see [Web Clip 2](#)).

WARM AND ASPIRING MUTATIONS

Mutator is the other new creative tool in Avox 2. It offers four processes: pitch-shifting, throat modeling, ring modulation (called Mutation), and chop and reverse (called Alienize). The ring modulator is unusual in that the pitch of the modulating signal tracks the pitch of the incoming audio, which keeps the effect

ARTICULATION

uniform for clean, monophonic sources. You can use Mutator's effects separately or together, and you can change the wet/dry mix of all effects except Alienize with the Mutant Mix knob. Automating changes in the various controls lets you mangle and mutate speech, singing, and instrumental material in real time (see [Web Clip 3](#)).

Articulator is a vocal-formant and amplitude modeler. It sounds a lot like a vocoder, but it uses formant analysis and throat modeling rather than the classic band-mapped filtering technique. That gives you

The other new effects, Warm and Aspire, add tube saturation and control aspiration (breathiness). As their names imply, Warm's Velvet tube model produces a smooth and subtle effect, whereas the Crunch model emulates an overdriven tube amp (which is either subtle or in your face, depending on the input level and amount of drive). Aspire is surprisingly effective at adding or removing breathiness from a vocal.

The four new effects are a welcome addition to the Avox bundle. With Throat, Articulator, and Mutator you can manage or mismanage your vocals to taste. Duo, Choir, and Harmony Engine all have a place in creating background vocals. Sybil and Aspire are handy when you need them, and Punch and Warm do an excellent job of beefing up any kind of material.

Value (1 through 5): 4
Antares Audio Technologies
antarestech.com



SONICCOUTURE

Balinese Gamelan (Mac/Win)

By Peter Hamlin

A gamelan is a unique type of musical ensemble native to Indonesia. The instruments it contains include a variety of tuned gongs in many different sizes, metallophones (instruments with struck metal bars, somewhat like a vibraphone although much different in sound), and drums. The gamelan has long fascinated Westerners (Claude Debussy famously admired one at the Paris Exposition of 1889), and many Western composers,

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My true story of Perfect Pitch by David-Lucas Burge

IT ALL STARTED when I was in ninth grade as a sort of teenage rivalry...

I'd slave at the piano for five hours daily. Linda practiced far less. Yet somehow she always shined as the star performer at our school. It was frustrating.

What does she have that I don't? I'd wonder.

Linda's best friend, Sheryl, bragged on and on to me, adding more fuel to my fire.

"You could never be as good as Linda," she would taunt. "Linda's got Perfect Pitch."

"What's Perfect Pitch?" I asked.

Sheryl gloated about Linda's uncanny abilities: how she could name exact notes and chords—all BY EAR; how she could sing any tone—from memory alone; how she could play songs—after just hearing them; the list went on and on...

My heart sank. Her EAR is the secret to her success I thought. How could I ever hope to compete with her?

But it bothered me. Did she really have Perfect Pitch? How could she know notes and chords just by hearing them? It seemed impossible.

Finally I couldn't stand it anymore. So one day I marched right up to Linda and asked her point-blank if she had Perfect Pitch.

"Yes," she nodded aloofly.

But Perfect Pitch was too good to believe. I rudely pressed, "Can I test you sometime?"

"OK," she replied.

Now she would eat her words...

My plot was ingeniously simple...

When Linda least suspected, I walked right up and

challenged her to name tones for me—by ear.

I made her stand so she could not see the piano keyboard. I made sure other classmates could not help her. I set up everything perfectly so I could expose her Perfect Pitch claims as a ridiculous joke.

With silent apprehension, I selected a tone to play. (She'll never guess F#, I thought.)

I had barely touched the key.

"F#," she said. I was astonished.

I played another tone.

"C," she announced, not stopping to think.

Frantically, I played more tones, skipping here and there all over the keyboard. But somehow she knew the pitch each time. She was AMAZING.

"Sing an E!," I demanded, determined to mess her up. She sang a tone. I checked her on the keyboard—and she was right on!

Now I started to boil.

I called out more tones, trying hard to make them increasingly difficult. But each note she sang perfectly on pitch.

I was totally boggled. "How in the world do you do it?" I blurted.

"I don't know," she sighed. And that was all I could get out of her!

The dazzle of Perfect Pitch hit me like a ton of bricks. I was dizzy with disbelief. Yet from then on, I knew that Perfect Pitch was real.



"How in the world do you do it?" I blurted. I was totally boggled. (age 14, 9th grade)

I couldn't figure it out...

"How does she DO it?" I kept asking myself. On the other hand, why can't everyone recognize and sing tones by ear?

Then it dawned on me. People call themselves musicians, yet they can't tell a C from a C#? Or A major from F major?! That's as strange as a portrait painter who can't name the colors of paint on his palette. It all seemed so odd and contradictory.

Humiliated and puzzled, I went home to work on this problem. At age 14, this was a hard nut to crack.

You can be sure I tried it out for myself. With a little sweet-talking, I got my three brothers and two sisters to play piano tones for me—so I could try to name them by ear. But it always turned into a messy guessing game I just couldn't win.

Day after day I tried to learn those freaking tones. I would hammer a note over and over to make it stick in my head. But hours later I would remember it a half step flat. No matter how hard I tried, I couldn't recognize or remember any of the tones by ear. They all sounded the same after awhile; how were you supposed to know which was which—just by listening?

I would have done anything to have an ear like Linda. But now I realized it was way beyond my reach. So after weeks of work, I finally gave up.

Then it happened...

It was like a miracle... a twist of fate... like finding the lost Holy Grail...

Once I stopped training my ear, I started to listen NATURALLY. Then the simple secret to Perfect Pitch jumped right into my lap.

Curiously, I began to notice faint "colors" within the tones. Not visual colors, but colors of pitch, colors of

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sound. They had always been there. But this was the first time I had ever really "let go"—and listened—to discover these subtle differences.

Soon—to my own disbelief—I too could name the tones by ear! It was simple. I could hear how F# sounds one way, while Bb has a totally different sound—sort of like "hearing" red and blue!

The realization struck me: THIS IS PERFECT PITCH! This is how Bach, Beethoven, and Mozart

could mentally hear their masterpieces—and know tones, chords, and keys—all by ear!

It was almost childish—I felt sure that anyone could unlock their own Perfect Pitch with this simple secret of "Color Hearing."

Bursting with excitement, I told my best friend, Ann (a flutist).

She laughed at me. "You have to be born with Perfect Pitch," she asserted. "You can't develop it."

"You don't understand how Perfect Pitch works," I countered. I sat her down and showed her how to listen. Timidly, she confessed that she too could hear the pitch colors. With this jump start, Ann soon realized she also had gained Perfect Pitch.

We became instant celebrities. Classmates loved to call out tones for us to magically sing from thin air. They played chords for us to name by ear. They quizzed us on what key a song was in.

Everyone was fascinated with our "supernatural" powers, yet to Ann and me, it was just normal.

Way back then, I never dreamed I would later cause such a stir in the academic world. But when I entered college and started to explain my discoveries, professors laughed at me.

"You must be born with Perfect Pitch," they'd say. "You can't develop it!"

I would listen politely. Then I'd reveal the simple secret—so they could hear it for themselves.

You'd be surprised how fast they changed their tune!

In college, my so-called "perfect ear" allowed me to skip over two required music theory courses. Perfect Pitch made everything easier—my ability to perform, compose, arrange, transpose, improvise, and even sight-read (because—without looking at the keyboard—you know you're playing the correct tones).

And because my ears were open, music sounded richer. I learned that music is truly a HEARING art.

Oh, you must be wondering: whatever happened with Linda? I'll have to backtrack...

Flashback to my senior year of high school. I was nearly 18. In these three-and-a-half years with Perfect Pitch, my piano teacher insisted I had made ten years of progress. And I had. But my youthful ambition wasn't satisfied. I needed one more thing: to beat Linda. Now was my final chance.

The University of Delaware hosts a performing

music festival each spring, complete with judges and awards. To my horror, they scheduled me that year as the grand finale.

The fated day arrived. Linda gave her usual sterling performance. She would be tough to match, let alone surpass. But my turn finally came, and I went for it.

Slinking to the stage, I sat down and played my heart out with selections from Beethoven, Chopin, and Ravel. The applause was overwhelming.

Afterwards, I scoured the bulletin board for our grades. Linda received an A. This was no surprise.

Then I saw that I had scored an A+.

Sweet victory was mine to my ears, mine at last! —D.L.B.



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- "Someone played a D major chord and I recognized it straight away. S.C., bass
- "Thanks...I developed a full Perfect Pitch in just two weeks! It just happened like a miracle." B.B., guitar/piano
- "It is wonderful. I can truly hear the differences in the color of the tones." D.P., student
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- "It's so simple it's ridiculous. M.P., guitar
- "I'm able to play things I hear in my head. Before, I could barely do it." J.W., keyboards
- "I hear a song on the radio and I know what they're doing. My improvisations have improved. I feel more in control." L.B., bass guitar
- "It feels like I'm singing and playing MY notes instead of somebody else's—like music is more 'my own'." L.H., voice/guitar
- "What a boost for children's musical education! R.P., music teacher
- "I can identify tones and keys just by hearing them and sing tones at will. When I hear music now it has much more definition, form and substance. I don't just passively listen anymore, but actively listen to detail." M.U., bass
- "Although I was skeptical at first, I am now awed." R.H., sax
- "It's like hearing in a whole new dimension." L.S., guitar
- "I started crying and laughing all at the same time. J.S., music educator
- "I wish I could have had this 30 years ago!" R.B., voice
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- "Mr. Burge—you've changed my life!" T.B., student
- "Learn it or be left behind." P.S., student...

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This screen shows *Balinese Gamelan* with several instruments loaded as it appears within Kontakt. The keyboard at the bottom displays the keyboard mapping for the Kantilan Pair: red indicates the keyswitches (to switch between normal and damped articulation), and blue indicates the available notes of the instrument.

performers, scholars, and listeners have fallen in love with this great musical tradition. There are now gamelan ensembles around the world—probably more than 100 in the United States alone.

Most of us will never own or even have access to a gamelan, but Soniccouture has created a sample library called *Balinese Gamelan* (\$499) that brings a virtual gamelan into the home studio. The 24 GB collection arrives on 3 DVDs and features superb recordings of some 25 different gamelan instruments sampled in 96 kHz, 24-bit stereo. The collection requires the Native Instruments Kontakt 2 or 3 software sampler (there is no standalone playback engine). The recordings were made on a type of gamelan called Gamelan Samara Dana, and the particular instruments sampled reside at LSO St. Luke's in London (the home of the London Symphony Orchestra's community and music-education program).

After you install *Balinese Gamelan* and launch Kontakt, the instruments will be visible in Kontakt's main file viewer. Double-click on an instrument to load its associated samples, and you'll see a control panel that lets you adjust the level, panning, envelope, and tuning. Additional controls allow randomizing Velocity and timing. The Timing control offsets the attack of each note by varying degrees

of randomness. This option, which is especially effective when applied to pairs of instruments playing the same passage together, replicates the slight imperfections of a live performance. There's a script to apply the tuning gamelan to any other Kontakt instrument, or, if you want the gamelan to conform to Western tuning (for example, if you're using it as just

A CLOSER LISTEN

one track on an orchestral score), you can use the Concert Pitch feature to retune the instruments. The excellent documentation includes helpful descriptions and beautiful pictures of each instrument. The gong samples are gorgeous and are appropriately sensitive to touch—a louder strike stimulates more harmonics, which bloom beautifully after the attack (see Web Clips 1 through 8 and the examples posted on the developer's Web site; the realism is quite remarkable). The two Kendang drums include samples of left and right hands with different kinds of strikes, as well as hits with a wooden striker called a pangul. (The keyboard mapping makes it easy to play in a left- and right-hand fashion on the keyboard.) There are multisamples at different Velocities, so tone changes realistically as you play with different pressure on the keyboard. If you play repetitively at the same Velocity, the program automatically cycles through different samples to avoid an artificial machine-gun effect. The Kempli, Bebende, and Kajar (small gongs used as timekeepers) have been sampled for both open and damped sounds: playing the closed sample automatically stops the corresponding open sample, as would occur in actually playing the

instrument. Ceng Ceng and Gentorak are, respectively, a set of small cymbals and something like a bell tree. The Ceng Ceng has open and damped options as well as a short 2-stroke rhythm.

There are six different metallophones, and all of them have a keyswitch (C1 and C#1) to change between normal articulation and damped. These instruments are typically played in slightly detuned pairs, which creates a characteristic shimmering effect. The sample library includes that option, although of course you can also play each instrument alone. The metallophone samples are beautifully recorded and very realistic in their response to different Velocities. The test for me of a good multisample is that you can almost literally see and feel the instrument being struck in different locations, and that is definitely the case here.

The Pitched Kettle Gongs (called Reyong and Trompong) contain an especially effective release. In performance, these instruments are damped by lightly placing the mallet on the nipple of the gong, and that sound is sampled and played on release for added realism.

In addition to all this, there are two multi-instrument options. The Gamelan Multi Original loads all the instruments in the ensemble mapped to different MIDI channels. The Gamelan Multi Shifted is the same as the Multi Original, only transposed down 35 cents (35 percent of a semitone) so that it is closer to a Western concert D, an option that might work for users who are mixing the gamelan with "tempered" instruments.

This collection isn't cheap, but it seems to be priced in line with what you'd expect for a high-quality sample library. If you've always wished you could have an actual gamelan in your home, owning this beautifully recorded sample library is the next best thing.

Value (1 through 5): 4
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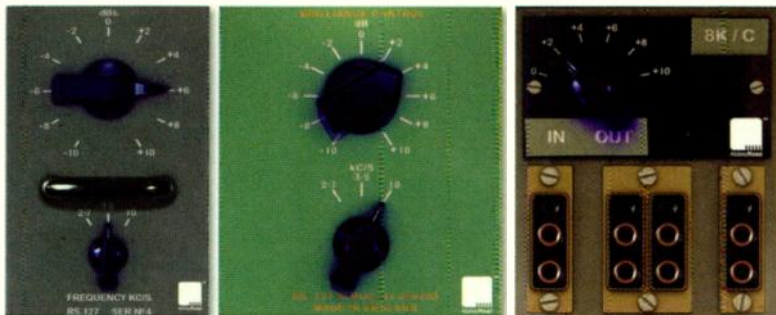
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ABBEEY ROAD PLUG-INS

Brilliance Pack 1.05 (Mac/Win)

By Eli Crews



The Abbey Road Plug-ins Brilliance Pack plug-ins are modeled on actual hardware devices used by numerous artists, including the Beatles. The suite contains the RS127 Rack (left), the RS127 Box (center), and the RS135 (right).

When it comes to recording studios, one monolithic name towers over the past 40 years of record production: Abbey Road. For decades, engineers near and far have been searching for the holy grail of the Abbey Road sound, as epitomized in the records of the Beatles. The new Brilliance Pack plug-in suite (\$499 TDM, \$249 RTAS/AU/VST) from the studio's tech department brings us mere mortals one step closer.

PRESENT AND ACCOUNTED FOR

The Brilliance Pack consists of three plug-ins, all of which replicate in software the hardware boxes designed at Abbey Road in the early '60s. The RS127 Brilliance Control (or Presence Box) was a remarkably basic, passive treble control with two knobs, one for up to 10 dB of boost or cut in 2 dB steps, and one for selecting one of three center frequencies (2.7 kHz, 3.5 kHz, or 10 kHz, chosen to complement the EQ on the REDD mixing consoles at Abbey Road). The Presence Box came in two flavors: the gray Rack model or the green Box version. The actual Rack and Box RS127s have identical circuitry, but when the plug-in engineers were analyzing the units, they discovered that a certain transformer (utilized to interface the RS127s with modern equipment) colored the sound in a desirable way, so the virtual RS127 Box has that transformer coloration as part of its sound.

The third plug-in in the Brilliance Pack is the RS135, which is known to many simply as the "8 kHz box." It's even more basic than the RS127, with only one control for boosting 8 kHz up to 10 dB in 2 dB steps. All three plug-ins are exact visual replicas of the originals and are reported to be aural replicas as well. Having never used the original boxes, I'll have to take the manufacturer's word on that one.

LOAD 'ER UP

After loading the authorization into my iLok Smart Key (required to run the suite), the first thing I noticed using the Brilliance Pack in Digidesign Pro Tools LE was that there are no AudioSuite versions of the plug-ins, so non-real-time bounces are out of the question. This is a minor drag for people with older or slower computers who rely on AudioSuite processing in order to be able to use a lot of effects. With the plug-ins loaded up as inserts, though, I immediately forgot such trifles. I was instantly hooked on these plug-ins, which all sound amazing and quite different from one another.

RS127. The RS127 Rack sounds the cleanest of the three. It was extraordinarily easy to achieve gentle presence boosts on vocals, snare drums, or guitars, and the results were pleasing to the ears. I heard none of the undesirable phase-shifting or harshness/honkiness that can arise with lesser EQs boosting high-mid or high-end frequencies. The Box version of the RS127 is quite a bit more aggressive; when set to the same frequency and boost amount as the RS127 Rack, the signal gets a significant volume boost comparatively and sounds a lot more forward in the mix.

This has become one of my favorite vocal-presence boosts, especially when set between 2 and 6 dB at 10 kHz. This

boost can often cause clipping, and because there is no gain control in these plug-ins (an oversight, in my opinion, despite the lack of a gain control on the original units), I usually had to insert a Trim plug-in before the RS plug-ins to bring my signal down a few decibels. Because these boxes have the ability to cut as well, I successfully tamed some harshly recorded guitars with the Box plug-in by knocking 2 dB off at 3.5 kHz.

RS135. As stated earlier, the RS135 has a single control that boosts 8 kHz in 2 dB steps. In actuality, because the original box was passive, it attenuated all frequencies *except* 8 kHz, which is somewhat apparent in the plug-in version, because your signal doesn't get a whole lot louder even when boosted to the extreme. However, because of the resonant peak created, you still need a trim control to prevent clipping when boosting signals anywhere close to 0 dBfs.

The sound of this plug-in is phenomenal. It can really make instruments poke their head through, so to speak, without seeming much louder. I've been using it like crazy lately to get guitars, bass, and backing vocals to assert themselves without taking over the mix.

SHINING STARS

You might be wondering how plug-ins that seemingly do so little can compete with the myriad of plug-ins out there that do so much. For my money, I'd much rather have a simple EQ with one knob that sounds fantastic than a mediocre EQ with ten bands and oodles of parameters. It's refreshing to get back to the basics of tonal control, and it doesn't get much more basic than the Brilliance Pack. It certainly won't serve as your utilitarian, catch-all EQ tool, but it can augment your existing EQs in a simple, elegant, and extremely exciting way. And if one band of EQ isn't enough for you, stacking them sounds great, too. **EM**

Value (1 through 5): 4
Abbey Road Plug-ins
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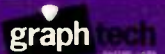


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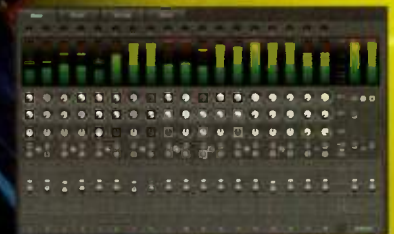
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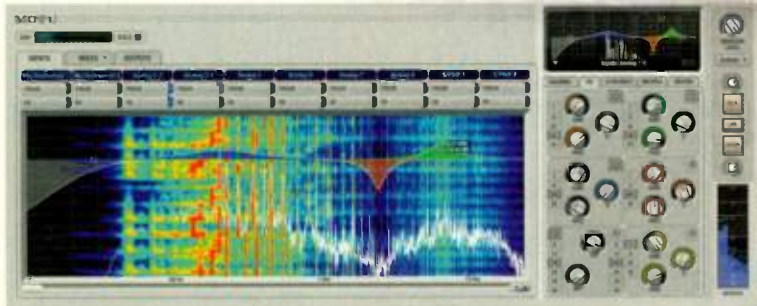
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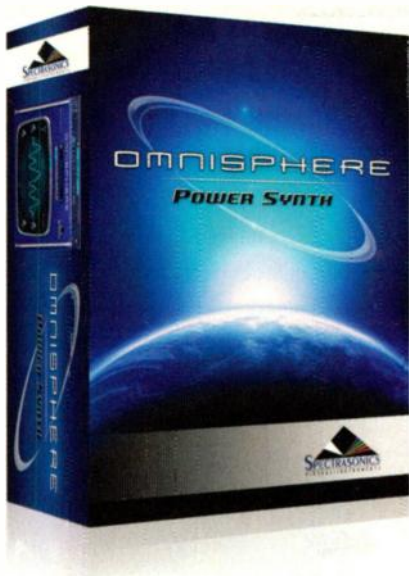


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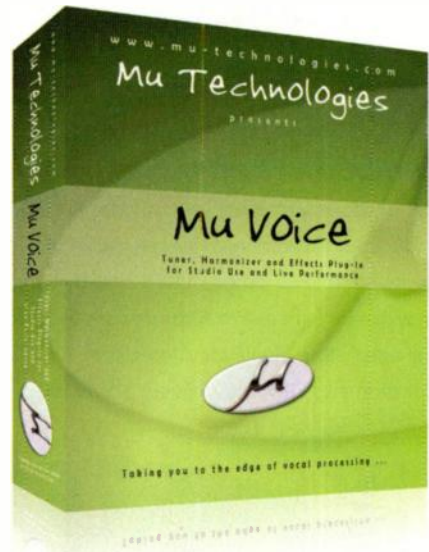


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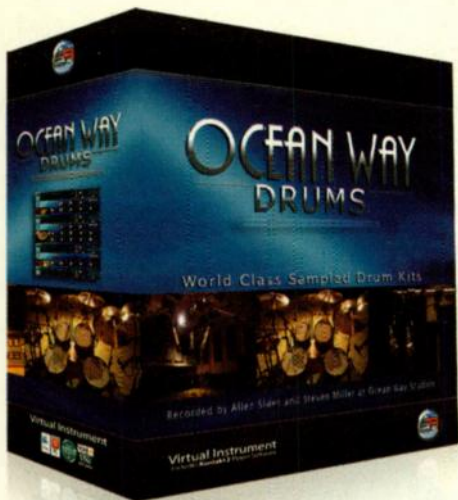
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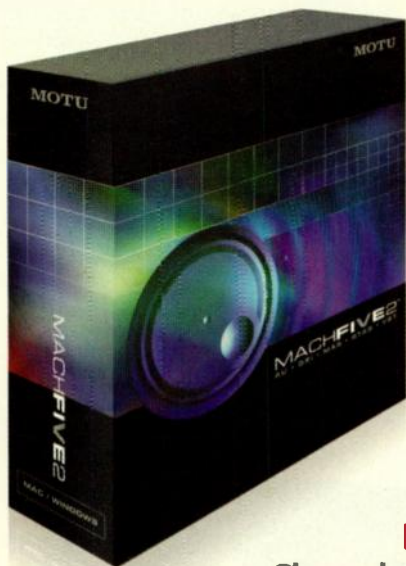
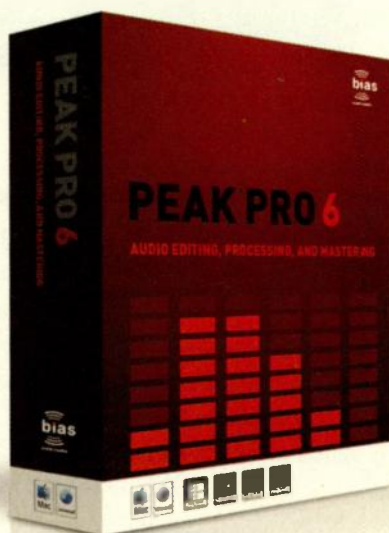
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Compression Is Like Salt

By Nathaniel Kunkel



The holiday season is in full swing, which means it's time to start cooking. I love to cook, and I have the same passion for cooking as I have for mixing. I've noticed that the two passions have many correlations. But I'm not alone in this finding.

Doug Sax once said to me that mixers were like chefs. Some use lots of salt, some use none, and many cover the vast ground in between. Each of these practices can result in fabulous food. But what if you are used to eating food with no salt and all of a sudden you eat something really salty? Gross, right? It's similar with audio. When you are used to hearing recordings with plenty of dynamics and you hear one that

is really compressed, it sounds broken. Unless, of course, it's part of the sound you're looking for—and it works.

Then you're a genius.

It's all context. Take blackened fish, for instance. The proper way to blacken a fish is to partially burn it, which is not a normal thing. But in the context of the spice and the meat, it works like a charm. Much like tremendous distortion and/or ridiculous compression—contrasted against other textures, these flavors can be very powerful.

Simple can also be powerful. A slice of fresh tomato, some fresh basil, and a pinch of good sea salt: very different, simple ingredients, and a very good combination. Just like how a Wurlitzer organ, a jazz drum kit, and a thrilling vocal performance can be as compelling as a big band.

Complex is also wonderful. Compare a fruit salad to an orchestra: the ingredients are so much greater than the sum of their parts, offering limitless combinations and massive differences in the compositions as you move each element around. On the other hand, one can clearly see that an 80-piece orchestra consisting only of Wurlitzers might not be that appealing.


(I am still searching my soul for the musical equivalent of suspending fruit salad in Jell-O molds. I am sure it relates to '80s reverbs, but the exact correlation eludes me.)

Perspective—and the loss of it—is much the same in cooking as it is in mixing. I can be cooking a pasta sauce for hours and not be happy with it. My wife will breeze through the room, taste it, and add a pinch of one ingredient, and the whole thing will be perfect. Ugh, that kills me. I do all the work, she is the genius.

Just like when your producer walks in to a mix you have been struggling with for hours and tells you to turn up the vocal 1.5 dB and print it. Then he turns out to be completely right and the mix fixes itself right in front of your eyes.

We can get into a rut just as easily when we mix as when we cook, making the same three breakfasts, the same four lunches, and the same ten dinners that we always make. It is so easy to do. The hungry part of you overpowers the artist, and before you know it, you are a Top Ramen eating machine. It's much like the mixers who never touch their outboard gear, or the arrangers who always load the same keyboard sample and drum-loop library. When you are good at your gig, you can get away with simply doing what you always do and never challenge yourself to go further.

But in my opinion, that makes for boring music and boring eating.

For me, the new frontier is phyllo dough. I have to figure out how to make that stuff rock without using butter. So far it seems an impossible task. I'm going to try some desserts with it tonight—right after I finish this mix. 

Nathaniel Kunkel (studiowithoutwalls.com) is a Grammy and Emmy Award-winning producer, engineer, and mixer who has worked with Sting, James Taylor, B.B. King, Insane Clown Posse, Lyle Lovett, I-9, and comedian Robin Williams.

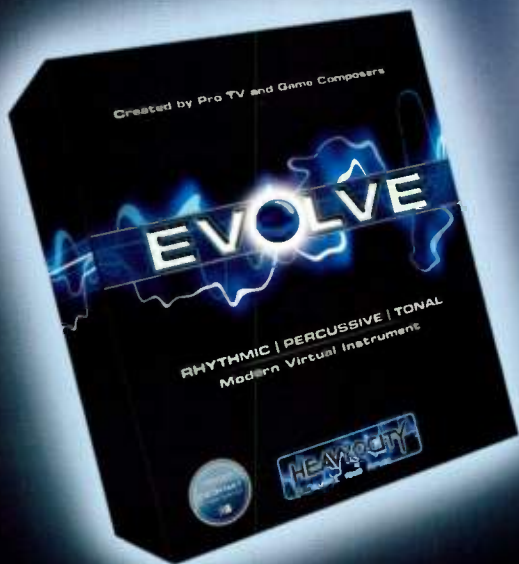


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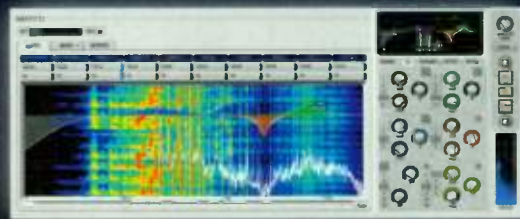
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