Mastering GarageBand 3 ▪ Understanding FM Synthesis

AUGUST 2006

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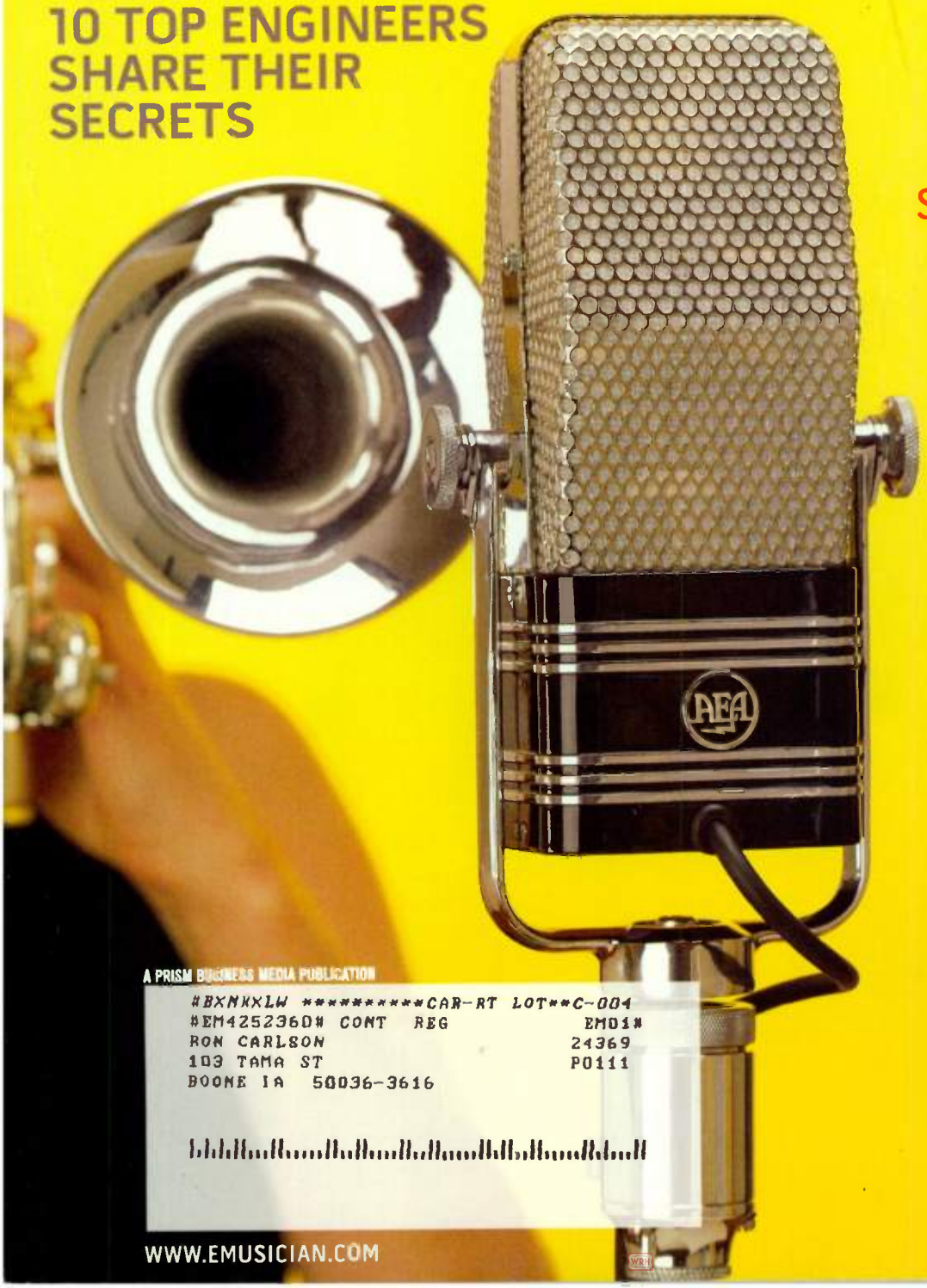
Recording with Ribbon Mics

10 TOP ENGINEERS SHARE THEIR SECRETS



Transform Bland Synth Patches into Wailing Monsters

Creating More-Realistic String Parts

REVIEWS

Adobe Audition 2.0, Akai MPC2500, Garritan Stradivari Solo Violin 1.07, and 8 more

Zappa on Zappa

A PRISM BUSINESS MEDIA PUBLICATION

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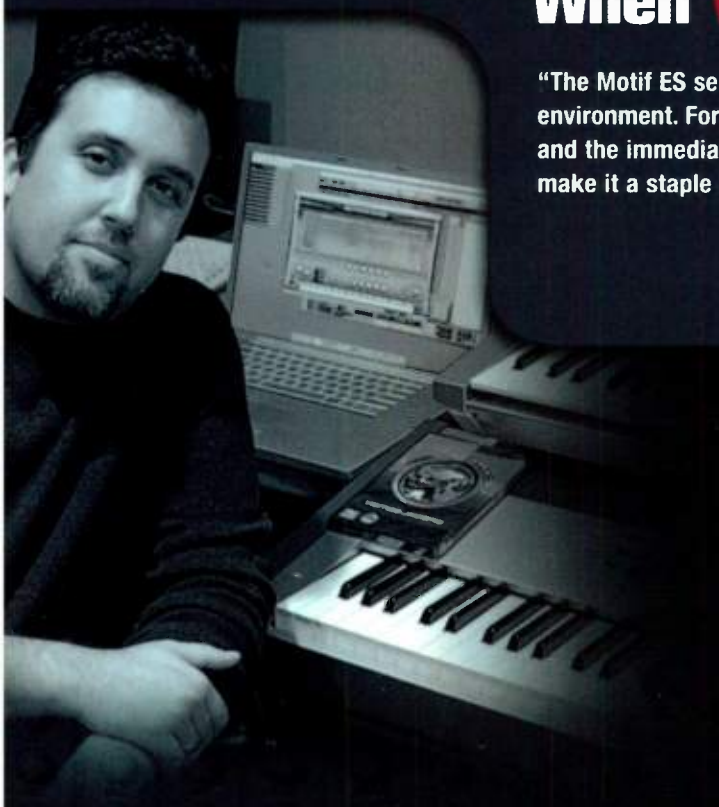
When Virtual Gets Real



"The Motif ES series is the perfect companion in a virtual studio environment. For me, the smooth dynamic feel of Yamaha keyboards and the immediate availability of quality sounds and great features make it a staple in my studio."

Dave Kerzner
CEO and main sound designer for Sonic Reality, Inc.

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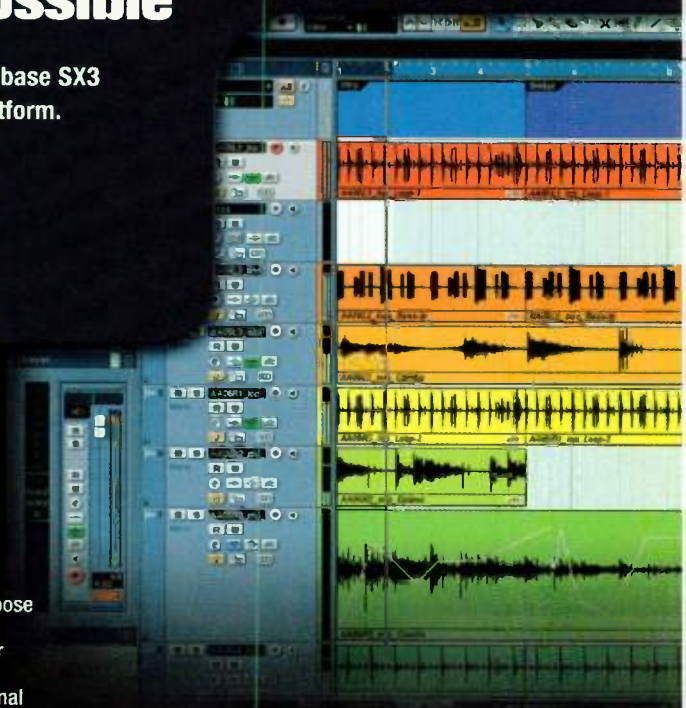

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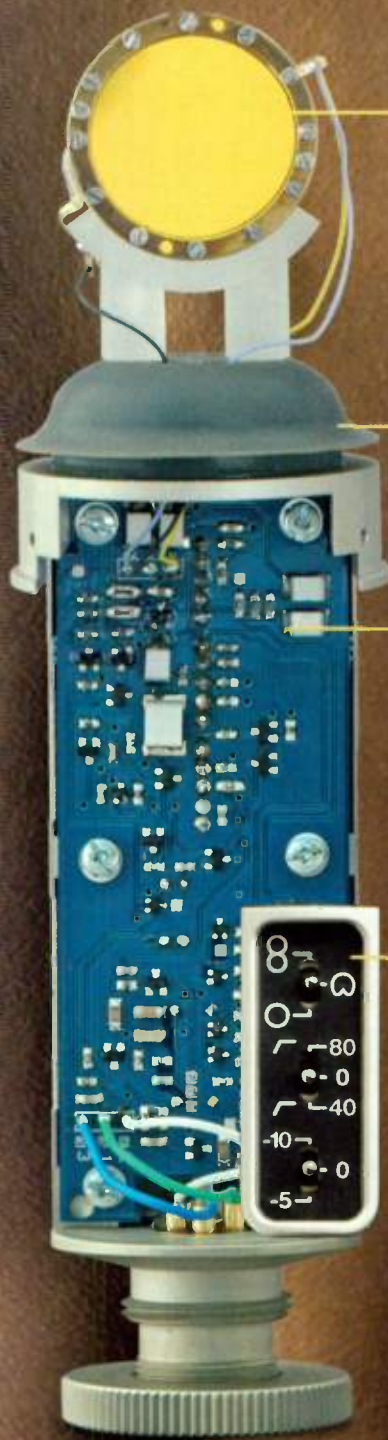

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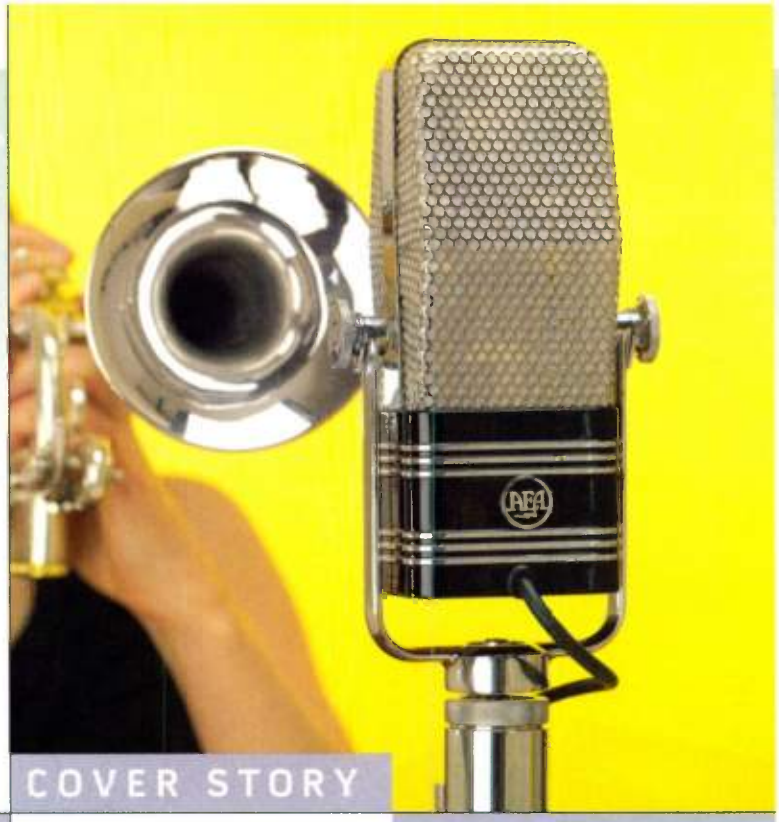

GEOFFREY MOORE

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FEATURES

35 MASTER CLASS: A WORKSHOP IN THE GARAGE

Noted authority "Dr. Mac" takes you deep into GarageBand 3 and shares his shortcuts, work-arounds, and other tips and tricks. Here's how to get more out of Apple's entry-level sequencer. By Bob LeVitus

44 RIBBON MIC SUMMIT

Ribbon mics are making a big comeback and sound great on a variety of instruments, from guitars and drums to brass and woodwinds. We asked ten top engineers to share their favorite techniques for using these amazing microphones. By Gino Robair

65 PRODUCTION VALUES: FRANKLY, IT'S DWEEZIL

EM caught up with Dweezil Zappa as he was preparing for this summer's "Zappa Plays Zappa" tour, which features his father's music played by a band that includes several Frank Zappa alumni. Dweezil talks about the tour, his new CD, his recording chain for guitar, and updating his father's studio. By Mr. Bonzai

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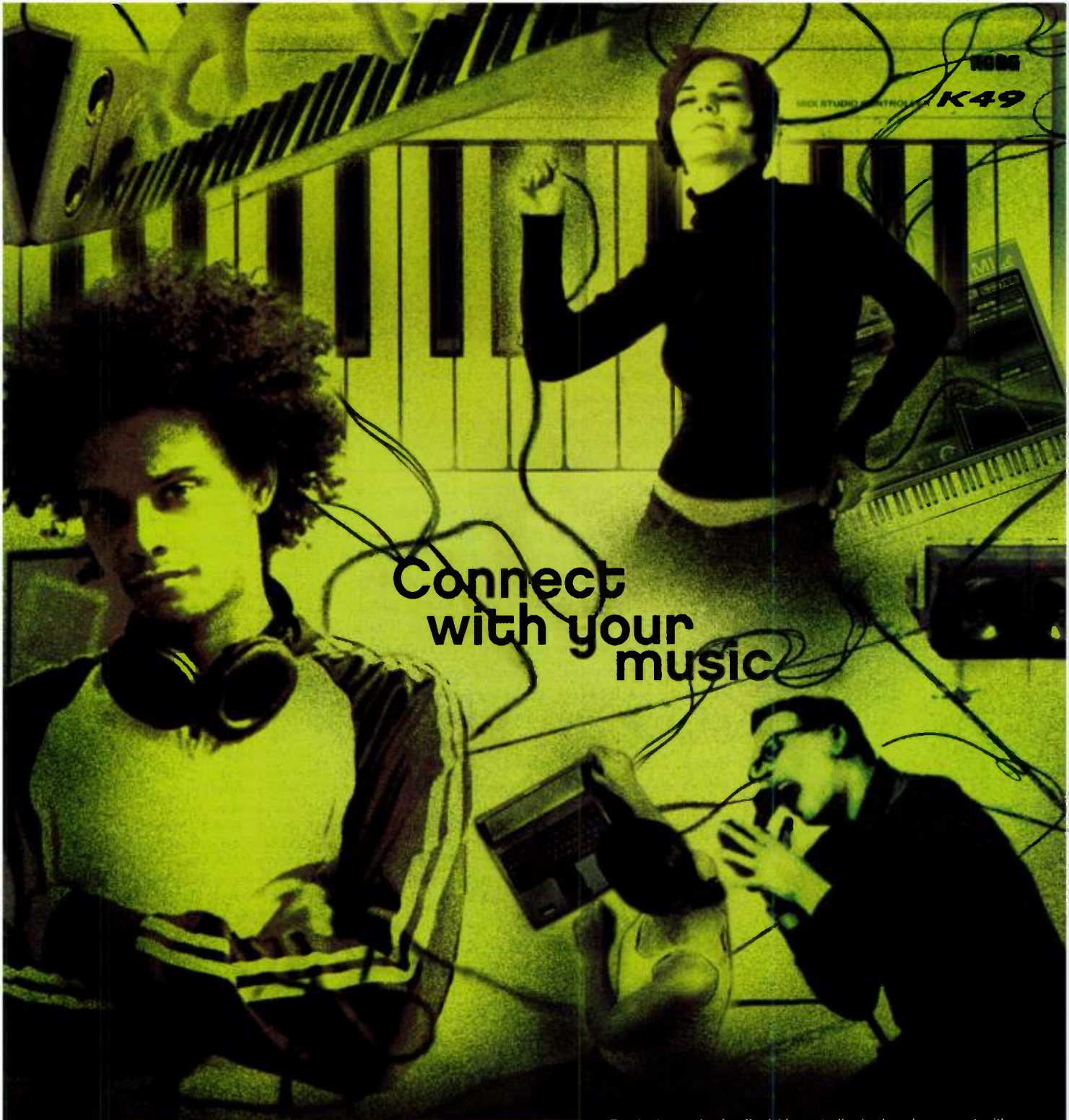
LinPlug Virtual Instruments Octopus 1.1.1 (Mac/Win) software synthesizer plug-in

PreSonus Inspire 1394 (Mac/Win) compact FireWire interface

MusicLab RealGuitar 2L (Mac/Win) acoustic-guitar virtual instrument

Big Fish Audio *Raging Guitars* 1.1.8 (Mac/Win) sample library



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Lessons Dogs Have Taught Me

As longtime readers of this column know, when not involved with music and publishing, I am usually working with dogs. Although dogs lack the self-awareness of humans, they are nonetheless intelligent, emotional creatures, and many of the lessons I have learned from them apply to working with humans. Here are a few examples of lessons dogs have taught me that I have found useful when dealing with musicians in a studio environment.

Keep your eyes on the prize. When working with dogs, your goals are to teach them what you want, to motivate them to perform well, and to maintain safety. You must remain focused on these goals and not allow emotion to distract you or cause you to make handling mistakes.

Translation: You may have to put your ego aside at times in order to obtain and capture a peak performance from your artist. Focus on doing what it takes to make the session successful.

Size up the individual animal and adapt your leadership style. Breed differences notwithstanding, each dog is an individual. Some respond wonderfully to a soft voice and are frightened by a sharp one; others of the same breed simply ignore a soft voice and respond only to a dominant handler.

LAURA WILLIAMS

Translation: Some people need pats on the back, others perform better with the occasional kick in the tail, and many respond differently according to their mood. You need to size up each individual and adjust your approach.

Never lose your temper during training, unless by design. Sometimes a calculated show of pique can get a dog's attention, but losing control is always destructive. It won't increase the animal's desire to perform and could destroy its trust in you.

Translation: Blowing your cool is unlikely to improve anyone's performance, so address problems calmly. This comes back to keeping your eyes on the prize. Occasionally an artist might benefit from a kick in the tail, but that is a high-risk tactic and requires that you know how to deliver a coolly calculated message. Never do it out of anger.

Strong leadership is important; harsh leadership is destructive. Pack leadership is a matter of mental strength, confident handling, and sending the right signals via body language, rather than physical domination. The goal is to command respect, not elicit fear.

Translation: In the studio, strong leadership means knowing what you need to accomplish and being confident, prepared, and organized. It does not mean being bossy or overbearing. Being pushy just makes people want to push back.

Respect what a well-trained animal tells you. If a trained dog is clearly uneasy or is barking at something you can't detect, it probably has good reason. Don't automatically ignore or correct the dog; instead, respect its abilities and observe the situation more closely.

Translation: When working with experienced, talented artists, respect their opinions. In "Production Values: Diva's Choice" in the September 1999 issue of EM, legendary producer and engineer Arif Mardin advises producers: "Don't look down. Respect who you're working with."

And that's the inside poop.

Steve Oppenheimer
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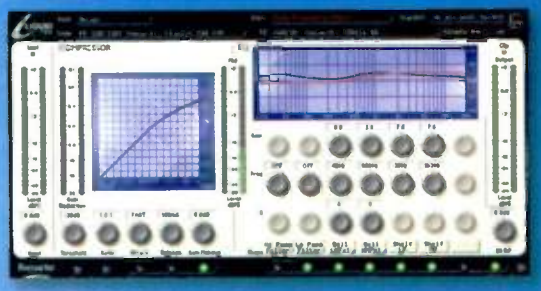

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Electronic Musician

LAURA WILLIAMS

Letters

Jingles All the Way to Trouble

I was excited to get the May 2006 issue of EM, but my heart sank when I saw "How to Make Money Composing Jingles" on the cover. The author of the article, Steve Skinner, made important points, and I agreed with some of them, but the first paragraph was a direct shot at the false dream that has ruined so many lives in this business. You do not have to move to New York or Los Angeles to get work in music for commercials and TV. Please do not break up with your girlfriends and trot off to L.A. and New York looking for those streets paved with gold. Open your eyes, and you'll see that music for picture and advertising is happening in most cities across the country (and internationally). *Local* and *nonunion* are not dirty words that carry shame; they pay as well as, if not better than, some national spots.

Second, I don't think you can make money in music by focusing solely on your music skills. One of the best ways to crack into video or ad music is to get your engineering skills as hot as your music skills, if not hotter. Almost every major city has a video-production house or postproduction facility. This is where video work is getting done, where the agencies go to get the nuts put on the bolts, and where great opportunities are found. By building your career on postproduction, you are doing two things: working and making money whether a program needs music or not, and getting a strong sense of how video and film are put together. And before you know it, a video, ad, documentary, or corporate video pops up, and while everyone is searching through the music library for a good track, you say, "Hey, I can write something that might work," and bam, you've done it.

Opportunities are right under your nose. Just point your honker in the right direction and you will find them.

Bob Pascarella
Boston, Massachusetts

Author Steve Skinner replies: Mr. Pascarella, thank you very much for your suggestions, but I think you misunderstood my point about New York and Los Angeles. In my article, I said that most jingle work for freelance writers who are hired by large music houses happens in big cities. Only in big cities is there enough of this freelance work. I did say that plenty of nonunion, regional work is out there, but it goes to independent writers and producers and small music houses. As a union member, I cannot advocate nonunion work, but I don't think it's shameful. However, union work does pay better on average.

You can make money in music by focusing solely on your music skills, if you are good enough. I have many friends who do just that. However, I am always interested in hearing of new ways to break into the music industry, and postproduction is one that had not occurred to me. Thank you for that suggestion. I would just like to warn readers that they should make sure they enjoy postproduction if they are planning to use that as a stepping-stone to a music career.

New-Tape Smell

I have been reading EM since day one, and I have to tell you that the interview with Geoff Emerick in the May 2006 issue of EM was my favorite article of all time! I could almost sense that new-tape smell and see the tape spinning on those IEC hubs that used to drive me crazy.

I think that computer stuff takes away from the creative process of making music. Move the drumbeats? Autotune the vocal? How about practice and get it right? Write, rehearse, record. It's still the only way to go.

Thanks for a great article. Emerick was and always will be right on the money.

Michael Zavoski
via email

Your interview with Geoff Emerick provided some good insight from a Beatles insider; however, I was struck by Emerick's reluctance to switch from analog to digital.

Emerick pushed the boundaries of music in the 1960s. He was truly a forward thinker—condom on a submerged mic, five tape loops spinning, five EQs in line—and his creativity brought him great success.

Imagine how much more he could do if he was still in that mindset along with things like Pro Tools and SX3. I find it frustrating that he has not embraced decades of innovation. Computers can record a great performance, too.

Scotty Webb
Washington, D.C.

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Next Month in EM

COVER

Ethnic Soft Instruments

This roundup features sample-playback software titles that focus on ethnic instruments. We examine and compare a variety of products, including MOTU Ethno, Quantum Leap RA, and Wizoo Latino.

FEATURES

Making the Move to Intel-based Macs

Bob "Dr. Mac" LeVitus discusses whether and when musicians should switch to Apple's new generation of Macintosh computers.

Production Values: John Paterno

John Paterno is an L.A.-based engineer whose credits include Sheryl Crow and Elvis Costello. We asked Paterno about his latest project, Roger Manning's *Solid State Warrior* solo album, which used an unorthodox two-studio approach requiring a lot of Internet file transfers.

COLUMNS

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Letters

Working with Studio Musicians

I just read Michael Cooper's article "Hired Guns," which appeared in the April 2006 issue of EM, and I was pleased to see your magazine discuss recording in Nashville. However, I was a bit surprised by the author's opinion on the best strategy for working with studio musicians here. A bit of clarification would be useful to others planning to travel to Nashville to record their song demos.

As a rule, demo sessions are 3 hours long. I have been booked on 2-hour demo sessions before, but that rarely happens. Out-of-towners should be aware that studio players will cancel a 2-hour call in favor of the first 3-hour call that comes in.

In each 3-hour period, we record five songs, sometimes six, if the producer or songwriter is on a tight budget and doesn't mind flying through the tunes in favor of more quantity. Five songs in a 3-hour session means that in 36 minutes, one must listen to the work tape, discuss direction or feel, run the tune a couple of times, record the track, and fix any mistakes. Having said that, there isn't much time to overdub as you go.

Here is the problem that I see with taking unrepaired tracks home and mixing and matching: as a track is being recorded, we don't wait for the producer to tell us to fix parts; we fix our own parts as we go. So, if a producer were to take several unfixed tracks back home and start mixing and matching, he might overlook the subtle clams that a player would have fixed if given the chance. I think it is much better to get a good track in the studio than to take home several tracks that have clams in them. When working with rhythm tracks, seasoned demo producers here always record a track until a good take is played, and then we all fix that take.

Bob Patin
Nashville, Tennessee

Author Michael Cooper replies: Bob, your point about the potential for musicians canceling a 2-hour session is well taken, although I've never had a player cancel back-to-back 2-hour sessions so they could play on a 3-hour demo session.

I never presented my approach to production as the "best strategy" for everyone but simply as the way that works best for me. I have never been able to cut more than three or four songs in three hours and still get the quality I need, and I use A-list players who regularly command double master scale. A typical master session in Nashville dedicates roughly three hours to tracking one song, and I feel that one can cut only so many corners before a demo suffers. And your 36-minutes-per-song calculation does not allow time for sound check, which usually takes about 20 minutes away from actual tracking, in my experience.

As for clams, I have never been stuck with a bad note or section in one take that couldn't be fixed by copying and pasting from a different take or somewhere else in the same take. To preclude such problems, I record anywhere from four to seven takes per song and maintain a preprinted checklist on the fly during the session, noting for each take which song sections have problems or great performances. Many of the players I work with express how much they enjoy being allowed enough takes to build up a head of steam, not to mention avoiding the tedium of punches.

In the end, it all comes down to how you prefer to work. For a small sample of my productions, go to www.myspace.com/michaelcooperrecording. EM

We Welcome Your Feedback

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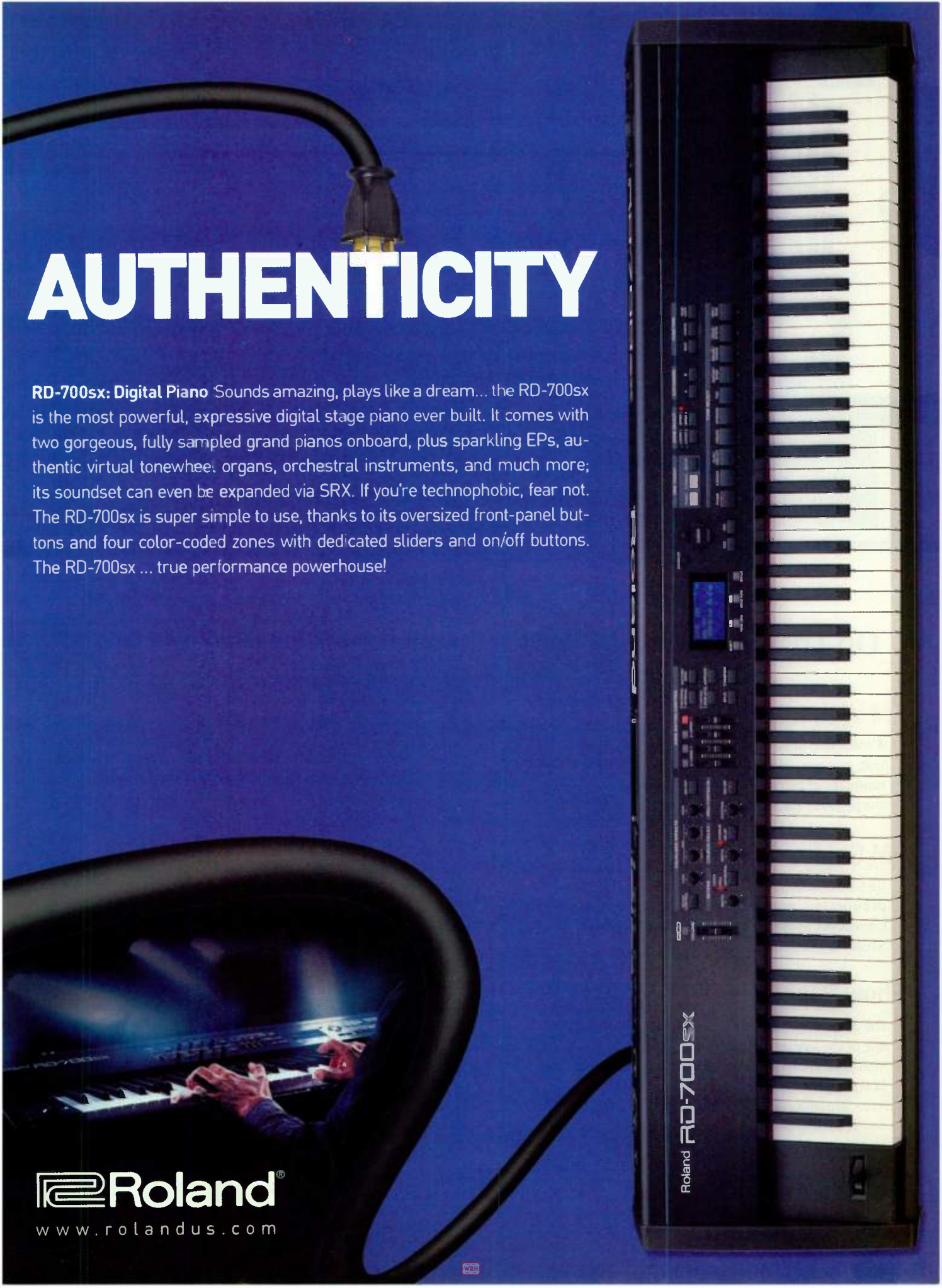

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EMspotlight

Love and Rockets: From Bauhaus to Acid House

Twenty years after founding Bauhaus, Love and Rockets furthered its cutting-edge sound by releasing *Lift* (Red Ant/BMG) in 1998. Learn how the band and producer Doug DeAngelis prepared for their dance-floor opus, tracked in odd spaces, and collaborated with the likes of DJ Keoki and Luscious Jackson. By Rick Weldon. emusician.com/em_spotlight

On the Home Page

EM Web Clips

A collection of supplemental audio, video, text, graphics, and MIDI files that provides examples of techniques and products discussed in the pages of *Electronic Musician*.

EM Guides Online

Get detailed specs on thousands of music-production products with our free online Computer Music Product Guide and Personal Studio Buyer's Guide.

Show Report

The 2006 Summer NAMM show is one of the largest annual musical-instrument expos in the United States. Visit emusician.com for Associate Editor Geary Yelton's report on the exciting new recording gear, music software, and electronic musical instruments unveiled at this year's show.

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By Geary Yelton

Edirol R-09

One of the biggest hits of the 2006 NAMM Show was a versatile little recorder from Edirol (www.rolandus.com/edirol), the R-09 ($450). It records and plays 16- and 24-bit WAV files at 44.1 or 48 kHz and MP3 files at rates from 64 to 320 kbps. The R-09 is suitable for a variety of audio applications, from capturing interviews and ambient sound effects to recording your band and mastering your next CD. Building on the popularity of Edirol's portable R-1 recorder and only half the size of its predecessor, the R-09 features a built-in stereo condenser microphone, ⅛-inch stereo mic and line inputs, and an output that accommodates optical S/PDIF or ⅛-inch headphones. A USB 2.0 connection lets you transfer audio files to and from your computer.

In addition to transport and level controls and a 120 × 64–pixel organic LED display, the menu-driven R-09 has onboard reverb and a button dedicated to looping between two user-defined markers, as well as automatic gain control and a low-cut filter. The 6-ounce device offers one-handed operation and relies on cost-effective Secure Digital cards as its storage medium. Two alkaline AA batteries yield up to 5.5 hours of playback and 4 hours of recording time. An AC adapter is included.

M-Audio EX66

M-Audio (www.m-audio.com) has unveiled its top-of-the-line studio monitor speaker, the EX66 ($699.95). With two 6-inch linear-piston low-frequency drivers and a 1-inch titanium dome high-frequency driver, the EX66's midwoofer-tweeter-midwoofer (MTM) vertical array was designed to exhibit a wider sweet spot while avoiding reflection problems inherent in more traditional woofer-tweeter configurations. The system is biamped, with two 100W PWM power amplifiers separately driving the 4Ω woofer combination and the 4Ω tweeter.

M-Audio calls the EX66 a digital high-definition reference monitor and recommends it for 2-channel and multichannel applications in which audio accuracy is paramount. Onboard digital signal processing tunes the cabinet to eliminate self-resonance, and a fourth-order Linkwitz-Riley crossover ensures a smooth, flat response. The EX66's Optimage II waveguide helps to minimize diffraction and improve imaging. A dual-flanged rear-cabinet port diminishes friction noise and port turbulence. An acoustic space control lets you optimize response based on room placement. Other controls include a volume knob, a high-frequency boost/attenuation switch, a midrange low-Q peak switch, and a 3-position low-frequency cutoff switch. S/PDIF and AES/EBU inputs handle 24-bit, 192 kHz signals and supplement the EX66's balanced ¼-inch TRS and XLR inputs.

Joemeek MC2

Joemeek (www.joemeek.com) continues to update its line of pro audio products, introducing an affordable stereo compressor that replaces a discontinued model with the same name. The MC2 ($299.99) houses two channels of photo-optical compression in a half-rack chassis that has electronically balanced inputs and outputs and a sidechain insert. The ins and outs also accept unbalanced signals.

The front panel has controls for Input Gain (with a peak LED), Compress (which determines the threshold), Slope (which determines the ratio), Attack, Release, and Make Up Gain. The MC2 can automatically adjust its ratio in response to the input signal's transient content. Gain reduction is indicated by a row of eight LEDs, and the overall level is indicated by nine LEDs.

By freezing gain-reduction levels when the input falls below threshold, the MC2's Gain Reduction Hold function can suppress noise or hiss during quiet passages, as indicated by a 2-color LED. The MC2 also lets you control stereo width by using a mid-side technique to vary the image from mono to normal stereo to extrawide, without losing the center or affecting bass response.

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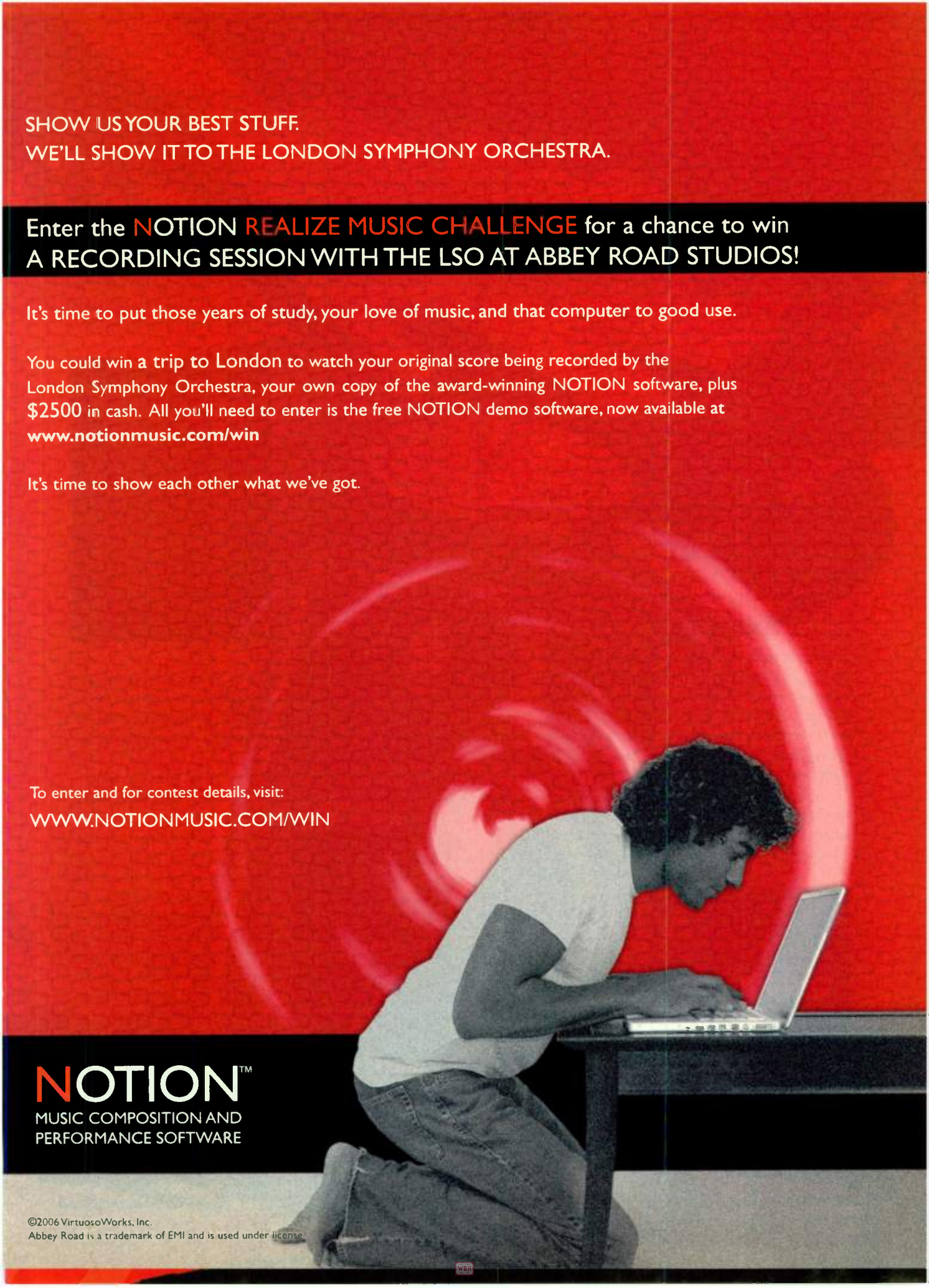

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Serato Pitch 'n Time LE

Pitch 'n Time LE (Mac/Win, $399), a host-specific plug-in from Serato Audio Research (www.serato.com), produces pitch-shifting and time-stretching effects ranging from subtle to dramatic. Previously available only as Pitch 'n Time Pro for Digidesign Pro Tools TDM, the LE edition works with Pro Tools TDM, Pro Tools M-Powered, Pro Tools LE 6 and 7, and Apple Logic Pro 7.2. Because Pitch 'n Time LE relies on the same algorithm as the Pro edition, it produces the same high-quality output by acting on one set of parameters at a time. Use it to process any 16- or 24-bit audio, from a single sample to an entire stereo mix. You can shift pitch as much as an octave up or down and scale time from half to twice its original length.

Pitch 'n Time LE appears different in Logic Pro than it does in Pro Tools. Either version allows you to set the output tempo by a percentage or in beats per minute, specify the output length, transpose by pitch or by key, and create classic varispeed effects. The Pro Tools plug-in can also attenuate the output to avoid clipping, preview time changes, and help you calculate an audio selection's input tempo. In either version, you can preview pitch changes before rendering an audio file to disk.

Download of the Month

ANDREAS ERSSON VIRTUAL INSTRUMENTS (WIN)

Virtual-instrument designer Andreas Ersson offers a collection of innovative VSTi plug-ins for Windows. Prices range from inexpensive for drum synths Drumular 1.1 ($39) and Vendetta 1.0 ($29) to free for synths Iblit and PolyIblit, electric piano LazySnake, and drum synth ErsDrums. Drumular and Vendetta are joint efforts of Ersson and Roy Queenan and can be purchased from Redshift Audio (www.redshiftaudio.com). You can download the others from Ersson's personal Web site (www.bostreammail.net/ers/vstplugins.html).

LazySnake and ErsDrums are very nice for the price. LazySnake's synthesis engine has separate controls that detune the harmonics and change the level and contour of its synthesized tine sound. The Amp section's Overdrive and Hardness controls mimic the pickup adjustments on a real electric piano. Separate Wah and Tremolo sections with dedicated LFOs provide mod-wheel-controlled modulation. You don't get the realism of sample-based or physical-modeled electric-piano virtual instruments, but you do get lots of playable keyboard sounds.

ErsDrums has ten pads, each with a fixed sound source: single pads for clap, clave, hi-hat, and crash, and two pads for kick, snare, and blip. Each pad has controls custom-tailored for its sound that can be triggered by any MIDI note number on any channel. The hi-hat pad has trigger notes for open and closed hi-hat sounds. Most pads also have a KeyMode button, which makes the pad play like a standard keyboard instrument. You can use that on a separate MIDI channel, for example, to create an interesting bass from one of the kick drum pads.

Drum synths Drumular and Vendetta each have 24 pads and allow drum programming that can be more detailed than ErsDrums'. Drumular furnishes 17 sound-generating algorithms, ranging from additive synthesis and drum-specific subtractive synthesis to sample and multisample playback. Any pad can use any algorithm, and in a nice touch, any pad can trigger or choke any combination of other pads. You can assign pads to a MIDI note number range and, host permitting, to separate audio outputs.

Each Vendetta pad has three sound layers—Attack, Body, and Synth—and each sound layer offers 3-zone Velocity switching (see **Web Clip 1**). You can use Vendetta's factory content or load your own samples into any zone. Each layer has its own synthesis engine consisting of a multimode filter with LFOs and ADSR generators. The pads have fixed MIDI note number assignments, but like Drumular, Vendetta supports multiple outputs.

Iblit and PolyIblit are mono and poly synths based on an identical synthesis engine, which uses low-aliasing band-limited impulse-train (BLIT) waveform generators. Both are 3-oscillator synths featuring pulse-width modulation and multimode filters. PolyIblit has two filters fed by separate oscillator mixers and four freely assignable LFOs and envelopes. These synths can produce all the analog-style clichés in the book, and they're CPU efficient.

EM WEB CLIPS

—Len Sasso

The Pro in your Tools

The best stereo tools, now for TDM

It's the announcement Pro Tools HD users have been waiting for: Stereo reverbs and mastering tools from TC Electronic's flagship System 6000 available for TDM!

Throughout the years TC has developed superior technology that requires seriously dedicated and sophisticated hardware. Today, Digidesign's HD DSP hardware provides a processing infrastructure powerful enough to host a choice selection of stereo reverbs and mastering tools from TC's flagship, the System 6000. Go to *www.tcelectronic.com* for more details on how to get the Pro in your Tools.

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sE Electronics Reflexion Filter

Many personal-studio owners don't have the resources to build an isolation booth for recording vocals and amplified and acoustic instruments. sE Electronics (www.seelectronics.com) seeks to address their needs with the Reflexion Filter ($399), a portable device you mount behind a microphone to reduce room ambience. It consists of a curved, approximately 12 × 18–inch wall attached to a mic stand using a variable-position clamp. Functioning as a lightweight, mobile vocal booth, the Reflexion Filter helps to achieve dry, nonreflective sound in rooms that lack proper acoustic treatment.

To diffuse acoustic energy, the Reflexion Filter's composite wall has six layers that are made of punched aluminum on the outside, absorptive wool and aluminum foil on the inside, and an air gap in the middle. Attached to the main absorber are pieces of formed polyester fiberboard, which help absorb and diffuse sound waves striking the filter. The Reflexion Filter prevents reflected waves from reaching the microphone's back and sides while minimizing unnatural coloration.

The Sound Guy SFX Machine Pro

The latest audio plug-in from the Sound Guy (www.sfxmachine.com) is SFX Machine Pro (Mac/Win, $199), a versatile real-time multi-effects processor. Featuring all the effects of SFX Machine RT, the Pro version also has new algorithms such as granular synthesis and pitch sweep. More than 300 presets include such unique effects as 16mm Projector, Subliminablizer, and Full-Wave Rectifier, as well as studio standards like distortion, filter vibrato, and slapback echo.

You can also create your own effects with the modular Preset Editor, which lets you specify the DSP type and modulation routings for as many as eight stereo sound sources. All parameters can be automated, and you can assign remote hardware controllers using the MIDI Learn function. SFX Machine Pro can sync its LFOs and delay times to your sequencer's tempo, too. The plug-in supports the VST format in Windows and Mac OS X and AU on the Mac. The Sound Guy promises that future versions will add new features and even more presets.

Nomad Factory Analog Signature Pack

Nomad Factory (www.nomadfactory.com) has introduced a suite of three plug-ins that simulate tube-based studio processors. Analog Signature Pack (Mac/Win, $287) consists of a limiter, an equalizer, and a combination EQ and compressor. Limiting Amplifier LM-662 is a software emulation of the Fairchild 670, a dual-mono limiter with individual A/B controls. Two identical halves each provide knobs for Threshold, Attack/Release Time, DC Adjust, and Gain, as well as a 12AX7 tube-emulation slider.

Program Equalizer EQP-4 is a stereo processor that features low and high bands with a choice of shelving or peaking, boost or cut, and 13 cutoff frequencies. Parametric EQ is available for overlapping low-mid and high-mid bands with variable bandwidth, boost or cut, and 13 center frequencies.

Studio Channel SC226 gives you a 4-band equalizer, modeled optical compression, and brickwall limiting for tracking, mixing, or mastering. Each of the three plug-ins supplies analog-style VU meters and 21 presets for specific instruments or situations. Analog Signature Pack is compatible with AU, RTAS, and VST hosts. EM

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Rey Hernandez aka DJ Spinn

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Nu Metal City

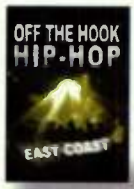
$69.95
WAV/REX/Apple Loops

A head-banging collection of construction kits covering a variety of styles, including Nu Metal, Metalcore, Death Metal, and Industrial Rock. Inspired by the music of such artists as Slipknot, Korn, Anthrax, and Nine Inch Nails, *NU METAL CITY* features live and programmed drums,screamin' guitars, electric bass, synths, turntable FX, and atmospheres. If you're looking for butt-kicking loops with a hardcore attitude, welcome to *NU METAL CITY*.

Chill: Downtempo Loops and Beats

$99.95
WAV/REX/Apple Loops

This loungin' set of construction kits draw from jazz, hip hop, dub, funk, soul, ambient, and pop to create a whole new downtempo experience. Drums, guitars, keys, electric and acoustic bass, flutes and more gel somewhere between 60 and 110 bpm. Sometimes a little jazzy, sometimes a little old school, but always the perfect combination of reclined head bobbin' lazy pleasure.



Off The Hook Hip Hop: East Coast

$99.95
WAV/REX/Apple Loops

Anthony Myers and company are back with that East coast flava, it doesn't get any better than Off the Hook. Check out the new hot construction kits, guitar licks and loops, drum hits and sounds, and many extras. Straight from the underground hip hop clubs...this is another one you must have! No doubt about it.

Off The Hook Hip Hop: Dirty South

$99.95
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Apple Loops

From the legendary "Off the Hook" series, these construction kits flow with some serious southern Hip Hop flavor. 2116 loops and sounds including drums, synths, electric bass, organs, guitars, Rhodes, strings, percussion and more. Plus a ton of bonus material! Packed with the beats and sounds that make hits!

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NNXT/AIFF/EXS24
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Experience the definitive collection of country instruments, performed by country guru Larry Campbell. Fiddle, mandolin, pedal steel, banjo, dobro, hi-string guitar, Telecaster, 6-string bass, and gut bucket are programmed for Kontakt, HALion 3, EXS24, MachFive, and NNXT. You'll also find an outstanding collection of country/acoustic loops, phrases, and riffs, including endings and fills in WAV, REX, and Apple Loops formats.

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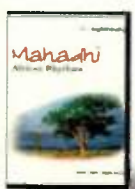

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Feel the tradition as you dance to the rhythms of Africa with this collection of live percussion loops. Traditional instruments include the agogo, bembe, conga, djembe, ekwe, shekere, kalimba, talking drum, saworo, shaweru and more. Experience this culture in it's purest form, Mahadhi puts the authentic rhythms of Africa at your fingertips.

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Platinum Essentials 2

$69.95
WAV/REX/Apple Loops

Well...well...well, guess who's back with another bag full of Platinum hits. The west coast phenomenon Keith a.k.a Clizark can't be stopped. We snatched him outta Snoop's studio to finish this sequel. Loaded with more Hip Hop and R&B construction kits, *Platinum Essentials 2* contains all the sounds you've been askin' for, completely broken down. From bangin' beats and nasty bass samples to wicked synth and vicious sounds, nobody's puttin' it down west coast style like Clizark.

Soul City

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A groovin' collection of construction kits covering a variety of Nu and Old School Soul styles, from early 1970s retro-soul to modern-day R&B and Neo Soul. Inspired by the music of such artists as Isaac Hayes, Marvin Gaye, Macy Gray, and Erykah Badu, SOUL CITY features live and programmed drums, bass, funk guitar, keyboards, horns, sax licks, congas, bongos, and hand percussion. If you're looking for loops with a groove, take a trip to *SOUL CITY*.

Neo Soul 2

$99.95
WAV/REX/Apple Loops

Sultry producers/songwriters Josquin des Pres and Michael Wiesman deliver a sequel that rivals the original. You can't help but feel G'd up and Classy with these sensual grooves. With drumloops, guitar, bass, synth, piano, percussion, organ, strings, horns and more, these construction kits give you the perfect blend of 70's soul, New millennium Hip Hop, Jazz and R&B.

Nu Jazz City

$69.95
WAV/REX/Apple Loops

A killer collection of construction kits covering such diverse styles as European Nu Jazz, Acid Jazz, 1960s Soul Jazz, 1970s Jazz Rock & Fusion, Latin Jazz and lots more. Featuring musicians who have recorded with such luminaries as Miles Davis, Ron Carter, Wynton Marsalis, and Roy Hargrove. Includes acoustic bass, drums, keys, jazz guitar, trumpet, sax, flute, horns, congas, bongos, and hand percussion. Whether you like your jazz cool or hot, *NU JAZZ CITY* is the place to be.

Greg Adam's Big Band Brass

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AIFF/Apple Loops /WAV/Acid

The Performance Loops® producers have teamed up with legendary trumpeter, composer, and arranger Greg Adams (Rod Stewart, Elton John, Linda Ronstadt, Lyle Lovett) to bring you over 4600 Brass loops and samples, providing a new level of realism. Thousands of loops and samples from Greg's Jazz Orchestra featuring a 14 piece horn section.

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A gigantic collection of the most contemporary drum and percussion tones available. Dig into the raw, unadulterated single hit samples that have made Bunker 8 Digital Labs so world renowned. Over 6,500 samples of drum, percussion, special fx, hits and one shots makes this one of the most extensive drum and percussion libraries ever done.

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$99.95
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Britney, Christina, Justin, Janet...any of those names sound familiar? Of course they do, because they're on top of the charts and in heavy rotation on the radio. The whole world knows who they are! And if you're looking to produce tracks that the whole world is hearing, this is your secret goldmine of loops. These aiff/wav/rex loops are in Construction Kit format so you can use as much or as little of the track as you want, and mix and match with other material to create something that's ready for radio.

Loungin' House

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By Scott Wilkinson

Data compression that mimics the auditory nerve.

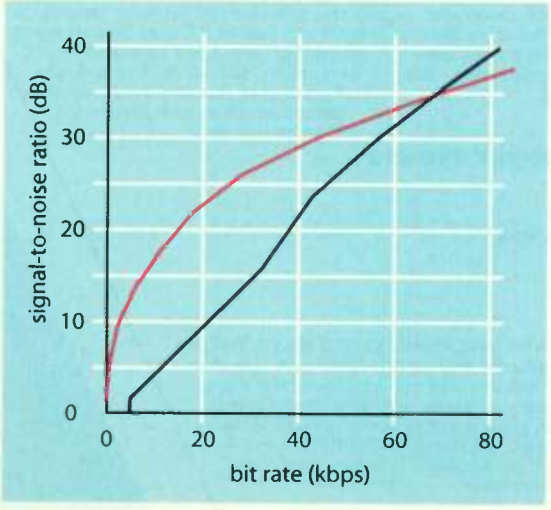
Data compression is a huge boon to the audio industry. MP3, for example, revolutionized music distribution, and Dolby Digital and DTS allowed 5.1-channel soundtracks to be included on DVDs. The point of these lossy compression schemes (also called perceptual coders) is to discard elements of the audio signal that humans would not perceive anyway. For instance, MP3 throws away a whopping 90 percent of the audio data, resulting in a compression ratio of 10:1.

Still, who wouldn't want to fit more audio in a given amount of storage space or hear the same sound quality at lower bit rates? Researchers at Carnegie Mellon University (www.cmu.edu) are developing new audio coding algorithms that promise much greater efficiency than is possible today.

Instead of removing frequencies deemed imperceptible due to masking and other psychoacoustic effects, as with MP3 and other perceptual coding methods, the CMU algorithms take a different approach. Audio signals are encoded as a series of very short wave packets called spikes, which closely mimic the impulses sent along the auditory nerve from the inner ear to the brain.

Like the inner ear, the CMU algorithms divide incoming sound waves into narrow frequency bands and send short bursts of energy of varying amplitudes at different times. In fact, the spike waveforms closely match the way auditory nerve fibers encode sound, integrating specific frequencies for specific durations, weighted in time by a sharp attack and a slower decay. Interestingly, the spike waveforms were derived independently, after which it was discovered that they closely resemble the filtering properties of the auditory nerve.

FIG. 1: Spike coding (red) exhibits much better fidelity than Fourier transform coding (black) at bit rates below 60 kbps.



CHUCK DAHMER

One way to evaluate the efficiency of a coding method is to look at its fidelity—that is, how closely the decoded signal matches the original signal—at a given bit rate. Using signal-to-noise ratio as an indicator of fidelity, spike coding performs much better than Fourier transforms at low bit rates (see **Fig. 1**); perceptual coders such as MP3 perform about the same as Fourier in this regard.

The CMU researchers expect that spike coding will excel at lossless or near-lossless coding, while exhibiting greater efficiency than current perceptual coders at low bit rates. They predict that their approach could also be used for lossy compression, greatly increasing the efficiency of encoding only perceptually relevant information.

Most of the CMU work has been done with two types of sounds: vocalizations, including speech, and natural environmental sounds, including steady-state sounds (such as rain) and transient sounds (such as leaves and branches crunching underfoot). Preliminary research into musical sounds indicates that they can be encoded using algorithms like those optimized for vocalizations, with similar benefits at low bit rates.

The potential applications for spike coding are myriad. For example, it could lead to much better cochlear implants, giving the deaf a far more accurate aural experience of the world thanks to the code's striking similarity to auditory nerve impulses. According to Michael Lewicki, associate professor of computer science at CMU and a member of the Center for the Neural Basis of Cognition, "If we could use a cochlear implant to 'talk' to the auditory nerve in a more natural way via our coding, we could quite possibly design implants that would convey sounds to the brain that are much more intelligible."

In the musical domain, tunes could sound just as good as current encoders allow but at lower bit rates. "We're very excited about this work," says Lewicki, "because we can give a simple theoretical account of the auditory code that predicts how we could optimize signal processing to one day allow for much more efficient data storage on everything from DVDs to iPods." This is a laudable goal, and I look forward to hearing it realized. EM

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Tape Head

By Rich Maloof

Kelley Stoltz moves forward by way of the past.

It's always tempting to get scientific about reproducing the sound of old records you love. Replicate the instruments, mic placement, and signal path from a timeless recording, and maybe you have a shot at rebirthing a classic sound.

Or so the thinking goes. Yet time and time again, the producers and artists who made those records reveal how very unscientific their own methods were. They set up their noisy mics in poorly insulated rooms with imperfect analog gear and made some of the greatest recordings ever.

In his San Francisco apartment one floor above a Laundromat, Kelley Stoltz is successfully tying into the vibe of some classic rock 'n' roll records. His modest personal studio contains a handful of stock instruments, bad carpeting, and a Tascam 388, the ¼-inch reel-to-reel introduced back in 1985. "The 388 works great, it's pretty reliable, and it's easy to use," says Stoltz. "It's not so lo-fi that it sounds like I recorded on a boombox, and not so hi-fi that it sounds slick. It's a mid-fi sound—right in the middle."

A songwriter and multi-instrumentalist, Stoltz values the 388 for its middle-ground fidelity and because it's so well suited to the way he works. He explains, "I just enjoy the ritual of the tape machine: cleaning the heads, waiting for the tape to rewind. A lot of the music I love—the Beatles, Pink Floyd—they were using 2-inch rather than ¼-inch, but they still had to wait for tape to rewind. It just feels more like it used to be. I feel as though I'm partaking in the same process."

NIKKI PRATCHIOS

Below the Branches/Kelley Stoltz

RIFFS

Kelley Stoltz

Home base: San Francisco, California
Multitrack of choice: Tascam 388 reel-to-reel
Oddest instruments: Stylophone and Optigan
Web site: www.electriccity.org

Stoltz is no technophobe; his choice is a conscious and informed one. "I've tried several other setups," he says, "but when I record into a computer, I generally end up making kind of down-tempo shoe store music. I don't know why." And who wants "sole" music if you can have *Below the Branches* (2006), Stoltz's first full-length release for the Sub Pop label? Kaleidoscopic arrangements, ageless hooks, and wry turns of phrase are the songwriter's own even when his influences are in stark relief, and he makes no argument that he's taken cues as a musician and as a producer from heroes such as the Beach Boys, Ray Davies, and Nick Drake.

Like the songs, the instruments on the album aren't overly precious. Stoltz says that the CD is heavy on piano because there happened to be one in his new apartment. The guitars he used include a Fender Telecaster, a hollowbody Gretsch, and a Vox knockoff of a Gibson ES-335, which Stoltz describes as a "plinkophonic tone sucker."

He runs his guitars and basses through a Fender Princeton Reverb amp, which he also uses to cut vocals with reverb. Two of his favorite oddball instruments are a Stylophone similar to the one David Bowie used on "Space Oddity" and an Optigan (see www.optigan.com). Everything—*everything*—gets miked up with Shure SM57s plugged directly into the 388's built-in mixer.

Getting the songs out of his head and onto tape quickly is key to Stoltz's process, and it's another reason he likes working with the analog 8-track. Anyone who has written with sophisticated music software knows how easy it is to get distracted by a program's features. "You start out saying, 'Maybe this would sound good with a little vibrato,'" Stoltz says, "and then you end up spending hours figuring out the right oscillation on a vibrato plug-in."

Stoltz concludes, "For me, when I'm chasing a song idea that's in my mind, it's best to get it done as quickly as possible because it doesn't stay there forever." EM

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LAURA WILLIAMS

A Workshop in the Garage

By Bob "Dr. Mac" LeVitus

How to get great results with GarageBand 3.

Apple Computer's GarageBand is revolutionary. Never has it been easier or less expensive to record, mix, and master studio-quality audio. Though GarageBand is an entry-level application, it has features that compare favorably with those of programs five times as expensive and ten times as complicated. GarageBand is almost certainly the easiest way to create multitrack recordings on a Mac, but it offers much more than meets the eye. For this article I will assume that you already know the basics, so let's jump right into some of the less intuitively obvious tips, tricks, and techniques.

Get More from Presets

GarageBand ships with hundreds of presets for Software Instruments, Real Instruments, and audio effects. Apple went to great lengths to make the presets sound great, and most of them do. A novice might be satisfied with so many presets, but experienced musicians want to tweak every parameter of every instrument and effect. Thank heaven for the Track Info pane!

GarageBand provides three ways to open the Track Info pane, and you should memorize at least one of them. First, click on a track to select it. Then, either double-click on its icon in the

Tracks list, use its keyboard shortcut (Command + I), or click on the Track Info button (the little encircled *i* to the right of the time display).

Notice that the Track Info pane has a small Details triangle that expands and contracts the pane's Details section. If you don't see a bunch of effects checkboxes, sliders, and pop-up menus in the Track Info pane's lower half, click on the Details triangle to reveal them.

Five effects for Real Instruments are always available: Gate, Compressor, Equalizer, Echo, and Reverb. For Software Instruments, the always-included effects are the same except for an instrument generator, which takes the place of the Gate effect.

Software Instruments and Real Instruments furnish two pop-up menus that let you choose from GarageBand's 16 included effects and another 16 AU effects that come with Mac OS X 10.4 (see **Fig. 1**). Most effects have presets of their own in the pop-up menu to the right of the menu for selecting the effects type. If none of the included effects presets is just what you need, or if a preset is close to what you're looking for, you can modify the effect by clicking on the pencil icon just to the right of its presets menu (see **Fig. 2**).

FIG. 1: GarageBand supplies 32 effects that you can apply to Software Instrument or Real Instrument tracks; they range from Amp Simulation to Vocal Transformer.

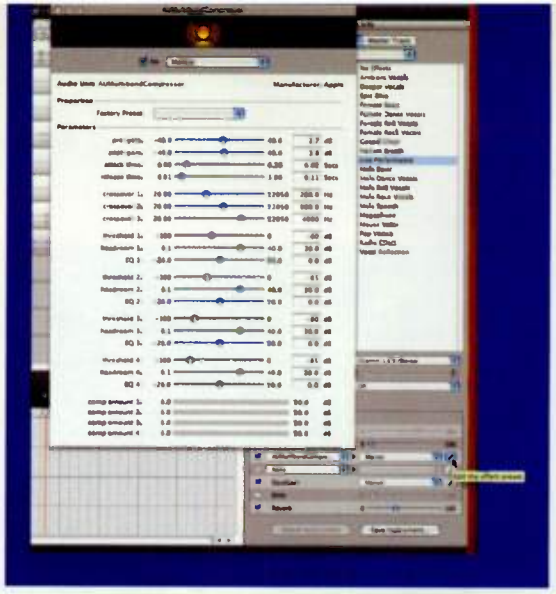

FIG. 2: Clicking on the pencil icon opens a window for setting an effect's parameters.

If you've created settings for an effect and think you'll want to reuse them in the future, save them as a new preset by choosing Make Preset from the presets menu. GarageBand will ask you to name your new preset; do so, click on Save, and voilà—you have a custom preset.

Now let's say you've tweaked a track's settings for several effects and want to save them *all* for reuse. You could save a preset for each individual effect, but there's an easier way: click on the Save Instrument button at the bottom of the Track Info pane, name your new instrument, and click on Save, and you have a custom instrument with all its effects presets just the way you like them.

One last thing about presets: if you modify a preset or an instrument, GarageBand will ask if you want to save your changes if you select a different preset or instrument. If you find this behavior as annoying as I do, you can turn it off in the General pane of GarageBand's Preferences. But be careful—after you do, any modifications you make to presets or instruments are blown away unless you expressly choose Make Preset or click on Save Instrument before you switch to a different preset or instrument.

Mobile Recording Tips

GarageBand paired with a PowerBook, iBook, MacBook, or MacBook Pro makes a pretty darn good mobile recording studio. Still, even if your laptop has Intel inside, at some point you may push your song project beyond GarageBand's ability to play all your instruments and effects in real time.

First and foremost, GarageBand needs lots of RAM. If you don't have enough, it will almost certainly pelt you with arcane error messages. Although 512 MB is the very least you should have, more is better. If you are seeing error messages, you could do a couple of things to improve performance. In GarageBand 3, the easiest way to conserve resources is to lock any track you're not working on by clicking on its lock button (see **Fig. 3**). The track will be rendered to disk the next time you click on the Play button.

In a similar vein, Software Instrument loops (which appear green) use more RAM and processor power than Real Instrument loops (which appear blue). Fortunately, GarageBand 3 makes it easy to turn a Software Instrument loop into a Real Instrument loop. Just press the Option key before you click-and-drag a Software Instrument loop to the Timeline, and it will be converted to a Real Instrument loop.

Locking tracks and turning Software Instrument loops into Real Instrument loops has a downside. Although both techniques free up CPU and RAM, they

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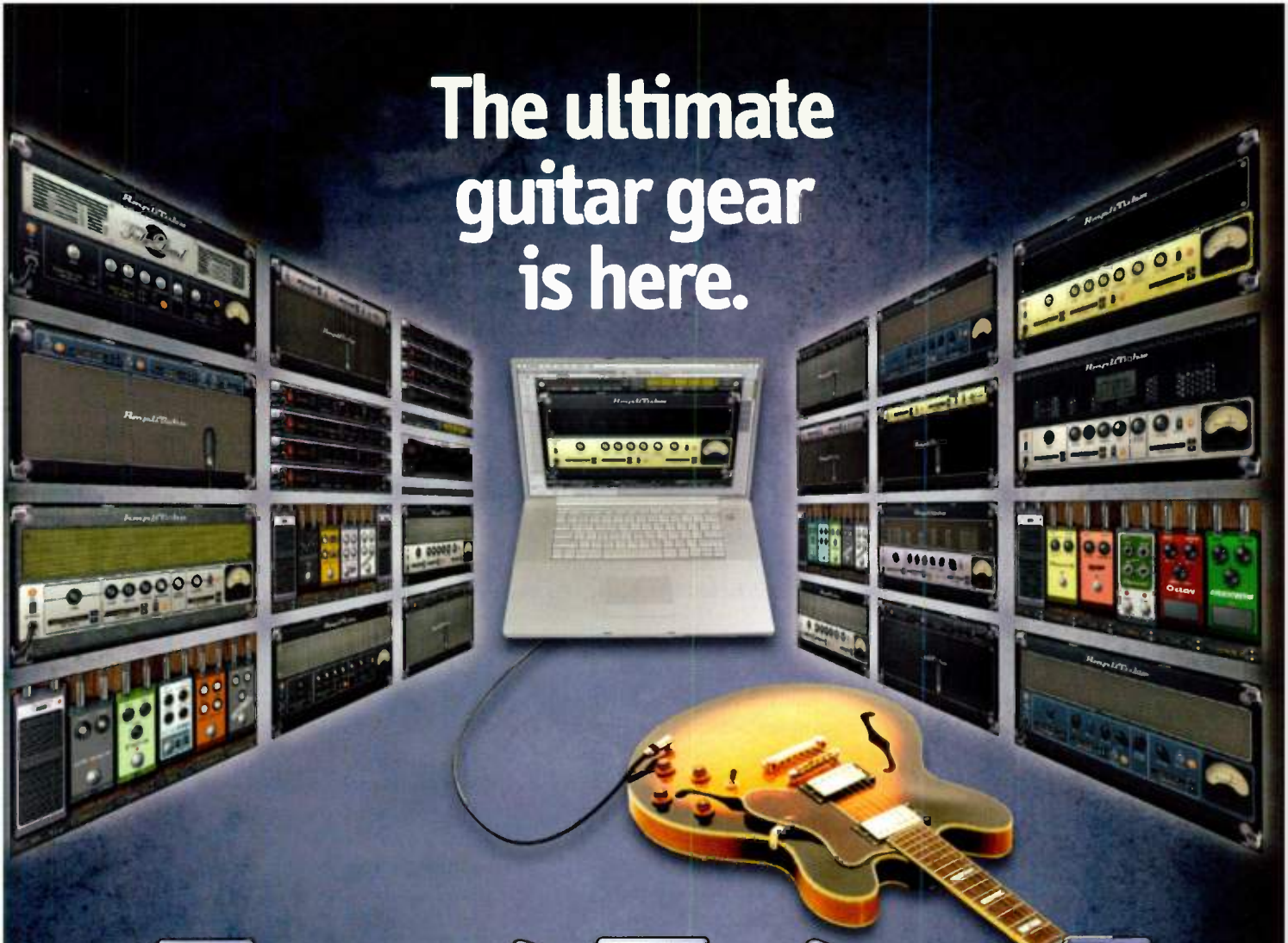

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make your hard disk work harder. If you have a slow hard disk, those techniques may not help much. If you see error messages during playback or recording, give one or both techniques a try—it couldn't hurt and will probably help.

My next tip won't improve GarageBand's performance, but it might get you out of a jam if you're on the road without a MIDI keyboard. GarageBand 3 has a feature called Musical Typing. It's not that dorky little click-the-notes piano keyboard that appears when you create a new project; rather, it's a way to use your Mac keyboard as a MIDI controller. Choose Musical Typing from the Windows menu or use the keyboard shortcut Command + Shift + K, and your QWERTY keyboard will turn into a MIDI keyboard of sorts (see Fig. 4).

FIG. 4: Musical Typing lets your QWERTY keyboard function as a polyphonic MIDI keyboard.

Because Musical Typing is polyphonic, you can play several notes simultaneously. And though it's not Velocity sensitive, you can edit individual note Velocities by double-clicking in the green Software Instrument region containing the notes whose Velocity you want to change. That feature could be a lifesaver when you're in a hotel room or on a plane and a brilliant musical idea pops into your head.

While I'm on the subject of typing, if you haven't reviewed the list of GarageBand keyboard shortcuts, you should; just choose Keyboard Shortcuts from the Help menu. There are a lot of 'em—you'll do more with less effort if you memorize the ones you'll use most.

Working Around Limitations

Every so often, you'll decide a track needs three or more of GarageBand's user-selectable effects. Unfortunately, each track has only two user-selectable effects. Fortunately, GarageBand provides a work-around. When you're happy with your performance on the track, add the first two effects. When you're satisfied with the way it sounds with the effects, click on the lock button and then click on the Play button to render the track to disk.

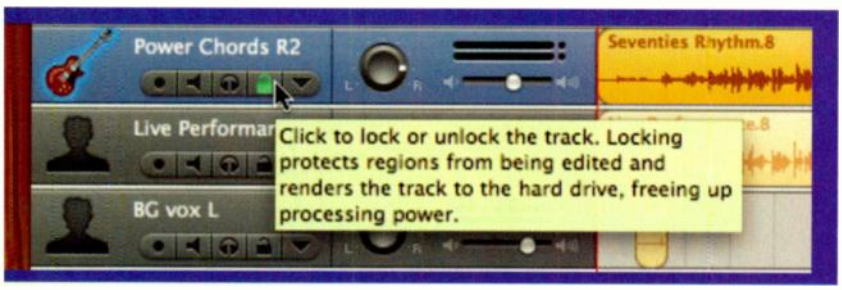


FIG. 3: Locking a track renders it to disk, which may improve GarageBand's performance.

Now switch to the Finder and locate the GarageBand project file you're working on. Control-click on its icon and choose Show Package Contents from the contextual menu. Open the Freeze Files folder and drag the track you just froze onto GarageBand's Timeline. GarageBand will import it as a Real Instrument track, and you can add two more effects.

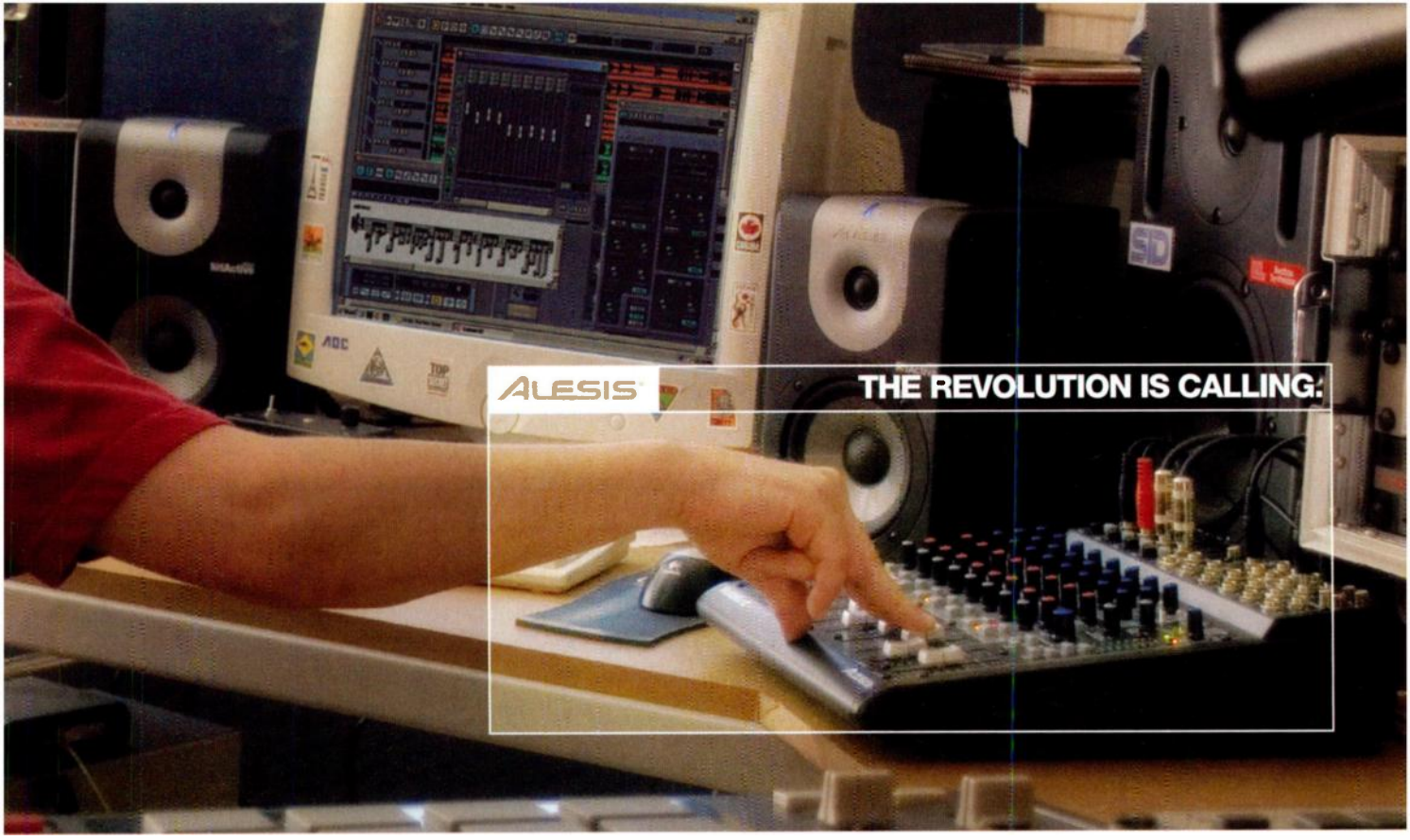
If you've locked other tracks, you'll find more than one file in your Freeze Files folder. If you do, switch to List View (shortcut: Command + 2) and then click on the Date Modified or Date Created column. The file with the most recent creation or modification date is the one you want.

Another limitation of GarageBand is that a song can have only one time signature. The work-around isn't perfect, but it does allow you to record songs with more than one time signature. Start by creating two (or more) GarageBand projects, each with the appropriate time signature. Record the first portion of your song up to the point where the time signature change occurs. When you're satisfied with your performance and mix on that part of the song, choose Send Song To iTunes from the Share menu. Now close the first project and open the second (which should have a different time signature). Drag the song you just sent to iTunes from iTunes onto GarageBand's Timeline. Now you can record the second part of the song by punching in at the appropriate place on the Timeline. Repeat as necessary for songs that change meter more than once.

Real Instrument Magic

You can, of course, record guitar or bass with a microphone if you want. But for many projects, you can get the sound you want by leaving the amp and microphone out of the equation and recording direct using GarageBand's built-in Amp Simulation models. Just plug your instrument into your Mac (or into an audio interface that's plugged into your Mac), create a Real Instrument track, open its Track Info pane, and choose the appropriate guitar or bass preset.

Now for the really cool part: Real Instrument effects are nondestructive. Let's say you record a guitar track using the Metal preset. The next day you decide that track should have less distortion. Merely choose a new



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preset, say, Clean Jazz, and the track loses its distortion and instead sounds like the cool, sweet tones of a jazz guitar.

Nondestructive effects are not just for guitars; they work with any Real Instrument track and allow you to focus on your performance when you're recording. After you've recorded a perfect take, you can experiment with different presets as much as you want without altering your perfect performance.

Watch out, though: because tone generators and effects used on Real or Software Instrument tracks are nondestructive, they are applied to the tracks on the fly. The result is that the more tracks you record, the more you demand of your hardware. At some point, you'll probably need to lock some or all of your existing tracks before you can record any additional tracks.

FIG. 6: GarageBand comes with a nice variety of Foley and other sound effects. Here I've added a short string riff that fades into some crowd noise.

I'm sure you already know it's a good idea to tune your instrument before you record a single note. What you might not know is that GarageBand 2 and 3 have a simulated stroboscopic tuner that works with guitars, basses, and other instruments that require tuning. To tune up, connect the instrument to your Mac and create a Real Instrument track for it. Access the tuner either by choosing Show Instrument Tuner from the Control menu, by using the keyboard shortcut Command + F, or by clicking on the tuning fork icon in the time display's left side (see Fig. 5).

When you pluck a string on your guitar or bass, the tuner (usually) guesses what note you're trying to play. If you see red lights on the left of center, you're flat. If you see red lights on the right of center, you're sharp. When you see a green light in the center, the string is perfectly in tune. Note that the instrument tuner works only with Real Instruments; Software Instruments are always in tune.

Whenever I'm trying to learn how to play a new song, I put the audio file on its own track in GarageBand and play along with it. If it's in my iTunes Library, I just drag it from iTunes onto GarageBand's Timeline. If it's an MP3 or M4A file in the Finder, I drag its icon onto GarageBand's Timeline. As soon as I drop it on the Timeline, GarageBand creates a new Real Instrument track for it. Then I can play along with the new track to my heart's content.

FIG. 5: Clicking on the tuning fork icon reveals a handy instrument tuner. This screen shot was taken as I tuned my guitar's E string.

When I'm trying to learn a particularly tricky passage, I turn on the Cycle Region function (by clicking on the circular-arrow button in the transport controls) so that part of the song plays over and over again. The only downside to this trick is that it won't work with songs you've purchased from the iTunes Music Store. If you want to play along with one you've purchased from Apple, you'll first need to burn it onto an audio CD and then rip it from the disc to create an unprotected (but slightly degraded) copy.

Not Just for Audio

GarageBand 3 does more than ever before, including digital video scoring. That's right—GarageBand 3 lets you create a multitrack soundtrack for video. Start by creating a New Movie Score (as opposed to a New Music Project or a New Podcast Episode). Your project will appear with a special track for video at the top of the Timeline. Click on the Media Browser button—the one that looks like a musical note, a piece of film, and a picture frame and is immediately to the right of the Track Info button—and then click on the Movies tab at the top of the Media Browser. Now you can drag any movie in your Home directory's Movies folder or any picture in your Home directory's Pictures folder onto the video track. Or you can drag digital movie or picture files onto the video track from the Finder. Your video will appear in the topmost track, and its audio (if it already has audio and it's in a compatible format) will appear on a Real Instrument track just below it. In addition, the video preview will appear at the top of the Track Info pane.

Now I'll offer a couple of tips that will help you make your videos sound as good as they look. First, don't forget you can use GarageBand's Apple Loops to create your film score; you don't have to play a note. Or you can use one or more synthesizer instruments to create a moody bed of

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The other really cool sounds for video are the included Foley effects. Open the Loop Browser and click on the FX button to choose from more than 200 sound effects that add realism to your video. You'll find at least a dozen kinds of crowd noise, a variety of doors and windows opening and closing, phones, footsteps, vehicles, and many other first-rate sound effects that will sweeten your video like never before (see Fig. 6). You'll be amazed at how much more professional a soundtrack and some Foley effects will make your video productions.

Throw Money at It

GarageBand does more than any other entry-level digital audio sequencer for the Mac, but it can do even more if you're willing to throw a little money at it. Last but not least, then, here are a few add-ons to make using GarageBand even better.

That feature could be a lifesaver when a musical idea pops into your head.

M-Audio's iControl ($179.95) is a plug-and-play desktop control surface and MIDI interface that gives you complete tactile control over GarageBand. It has knobs, buttons, a jog/shuttle wheel, and more. It lets you control volume, pan, effects, mute, solo, and record functions for up to eight tracks at a time. iControl is USB powered, so there's no power brick, and GarageBand automatically recognizes it without requiring you to install any pesky drivers. If you use GarageBand a lot, iControl is an elegant way to save hundreds of mouse-clicks and drags each day.

If you don't already have good microphones and a FireWire or USB audio interface for your Mac, consider the Snowball ($189) from Blue Microphones. The Snowball is a cool-looking dual-capsule USB mic that's switchable between three patterns (cardioid, cardioid with –10 dB pad, and omni). Use it to record just about anything, from a whisper to a screaming Marshall double stack.

To assist in pitch correction, GarageBand provides an Enhance Tuning slider for Real Instrument tracks that's

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Finally, if you simply need more horsepower or flexibility than GarageBand provides, Apple offers an excellent upgrade path. Check out Logic Express 7 ($299) or Logic Pro 7 ($999), Apple's intermediate and advanced recording-studios-in-a-box. The transition will be relatively painless, because your GarageBand projects, Software Instruments, Apple Loops, Jam Packs, and AU plug-ins are all completely compatible with both versions of Logic. EM

Bob "Dr. Mac" LeVitus is a leading authority on Macs and the author of 49 computer books, including GarageBand for Dummies *(Wiley, 2004). You can listen to some of his GarageBand cover tune recordings at http://homepage.mac.com/boblevitus/FileSharing17.html.*

JOHN JENNINGS

FIG. 1: Like many engineers, Ross Hogarth combines several different mics on an electric guitar speaker to create a tone to match a particular song. His typical setup includes (left to right) a Sennheiser 421, a Royer R-121, and a Shure SM57.

Second, with the exception of the Royer R-122 or SF-24, don't use phantom power on a ribbon mic. "If you have a bad cable where one side shorts out, or you have a bad power supply, you know it immediately with ribbon mics because they go dead," mic designer and forensic audio specialist Wes Dooley (www.wesdooley.com) explains. "If you send 48V DC to it, it launches the ribbon out and snaps it." He also suggests storing long ribbon mics vertically to keep the ribbon from sagging, and covering them when they're not in use to protect them from wind and "tramp iron" (the fuzz that covers a magnet after it has been dragged through sand).

Abbey Road veteran John Kurlander (www.studioexpresso.com/profiles/johnkurlander.htm) suggests keeping the cable between a ribbon mic and the preamp as short as possible. "With a mic like the AEA R44 that comes with 5 or 6 feet of cable attached to it, I try to take the mic pre to the mic, placing it on the floor next to the stand. If it's a mic like a Coles 4038, which doesn't have a permanently attached cable, then I use the shortest cable possible."

Although there are a number of exceptions—including the multipattern RCA 77 and BK5, and the hypercardioid beyerdynamic M 160 and M 260—the majority of ribbon microphones have figure-8 patterns. Joe Chiccarelli (www.studioexpresso.com/profiles/joechiccarelli.htm) notes that the figure-8 pattern is often used to pick up the ambience of the recording space. "In a sense it's kind of like having two mics in one. And it comes down to working with the mic's position."

"Try to find the best placement in the room for the instrument," says Ross Hogarth (www.hoaxproductions.com). "You should use the room as your friend, not foe."

Vocal Tracking

Since the days when crooners ruled the airwaves, ribbon mics have been used to round out singers' voices. "For vocals sometimes I'll use an RCA 44, but it depends on the song," Steve Churchyard (www.stevechurchyard.com) says. "They've got a very smooth top end, so with just a little bit of EQ they really come to life. But it has to be the right song and the right singer. It doesn't always work, so usually I'll have a condenser running simultaneously, and I note as we're doing sound check if it's working for the song. Typically I'll set up two mics: a tube Neumann U 47 and a ribbon mic alongside it. The singer stands 8 or 9 inches from the mic. You don't want to get too close, and you want a really good pop shield as well."

Nashville-based engineer Chuck Ainlay (http://chuckainlay.com) also uses a 2-mic approach on vocals. "Sometimes I'll use a condenser mic with a ribbon mic right beside it or underneath it, and blend the two. I probably wouldn't use a ribbon as the only microphone on a vocal, because it usually doesn't have the air that I'm looking for. But sometimes it helps to fill out the sound, because a condenser can sometimes be too harsh on things, such as a female vocal." (For an in-depth view of Ainlay at work, see the article "Mix Magic on Music Row" at www.emusician.com.)

Bruce Swedien (Quincy Jones/Duke Ellington/Paul McCartney) notes that he used ribbon mics to record Michael Jackson's backing vocals. "Michael sings all his own background parts, and they're really well sung: pitch and articulation and everything. After I do one pass with Michael singing the first harmony, I'll move him back 4 feet for the second pass, so there are more early reflections in the sound. And then I raise the level of the second pass so that it matches the first. It enriches the content of the early reflections and makes a gorgeous sound."

Eddie Kramer (www.kramerarchives.com) gained his signature sound with Jimi Hendrix by taking

"You should use the room as your friend, not foe." —*Ross Hogarth*

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advantage of the hypercardioid pattern of the beyerdynamic M 160. "When I started recording Hendrix, I used the dual-ribbon M 160, and it saved my ass because I could record him singing live in the studio while he was playing, without much leakage.

"Not only did it work well for the vocal, I started using it on his amp," Kramer continues. "And I discovered this beautiful silky sound. What it did was it took some of the harshness of the Marshall away."

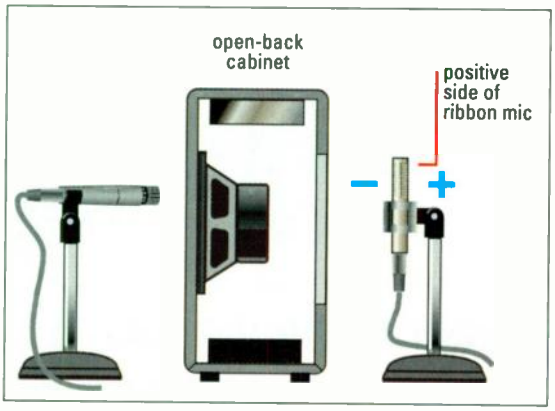
Totally Amped

Using a ribbon mic on a guitar amp is extremely popular. The most common application is to put the mic close to the speaker grille, pointing directly at the cone. But everyone I interviewed agrees that finding the exact position is key to getting a sound that works for the song.

Like many of the others, Kramer takes it further by augmenting the ribbon sound with other mics. "My normal miking will be right up close on the grille. I like that presence and the crunch—right in your face. But I will experiment depending on what the guitar player's doing. If he likes a lot of crunch and a lot of air, and there's a lot of woof from the amp, I might back the mic up a foot away. But I like to go dead center on the middle of that cone. I want to get that edge.

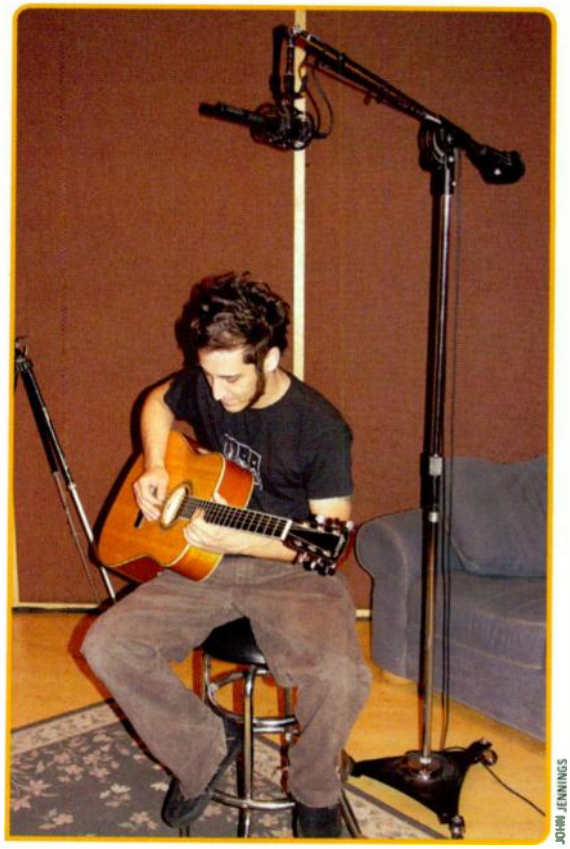
"I use four microphones quite often on a Marshall amplifier. I use the beyerdynamic M 160 when I can, but it's rarer now. Ninety percent of the time I use a Royer R-121, a Shure SM57, a Sennheiser 421, and a Neumann U 67. Each one has its own unique characteristic. Think about it: 57, dynamic cardioid; 421, dynamic, but with a totally different tone attached to it; the Royer ribbon at the complete opposite end of the spectrum; and a U 67, totally the other end. And when you combine those in a specific manner, you get all the variety and impact that's available to you."

But Kramer notes that inevitably you get into a situation where multiple miking techniques do not work. "So you just pull each mic down until you find the one that does work. I often find that the killer combination is usually either a single Royer, a single 57, or a 57 and a Royer. And that's the sort of de facto guitar tone."



CHUCK DAHMER

FIG. 2: To get a big guitar sound from an open-backed amp, Chuck Ainlay points an SM57 at the front of the speaker, while simultaneously miking the back of the amp with the back of a Royer R-121. By pointing the back of the R-121 at the rear of the speaker, you keep both mics in phase.



JOHN JENNINGS

FIG. 3: Hogarth captures the player's perspective when he records an acoustic guitar by placing a stereo ribbon mic over the player's head.

Churchyard is also a fan of that combination. "The R-121 makes the guitar sound like it does to the guitarist in the room. It doesn't have the exaggerated midrange that the 57 has. If I combine the two, I might put the 57 right on the cone, and offset the ribbon to one side, on the same speaker, slightly apart, so the phase is coherent. If I use the Royer by itself, I'd probably put it dead center."

"I've been using ribbons through my whole career, starting with RCAs, beyers, and Coles," Hogarth says. "With Motley Crüe, we were using RCA 77s and 44s on the *Girls, Girls, Girls* record. But now, with the advent of the Royers, which you can shove right up on a speaker and not blow them up, I haven't done a guitar in about ten years without a ribbon mic right up on the speaker."

Hogarth combines three mics on guitar amps: generally an SM57, a 421, and an R-121 (see **Fig. 1**). "It's always a balance. If I'm doing metal or really heavy guitar, I will use less of the Royer because it's going to get

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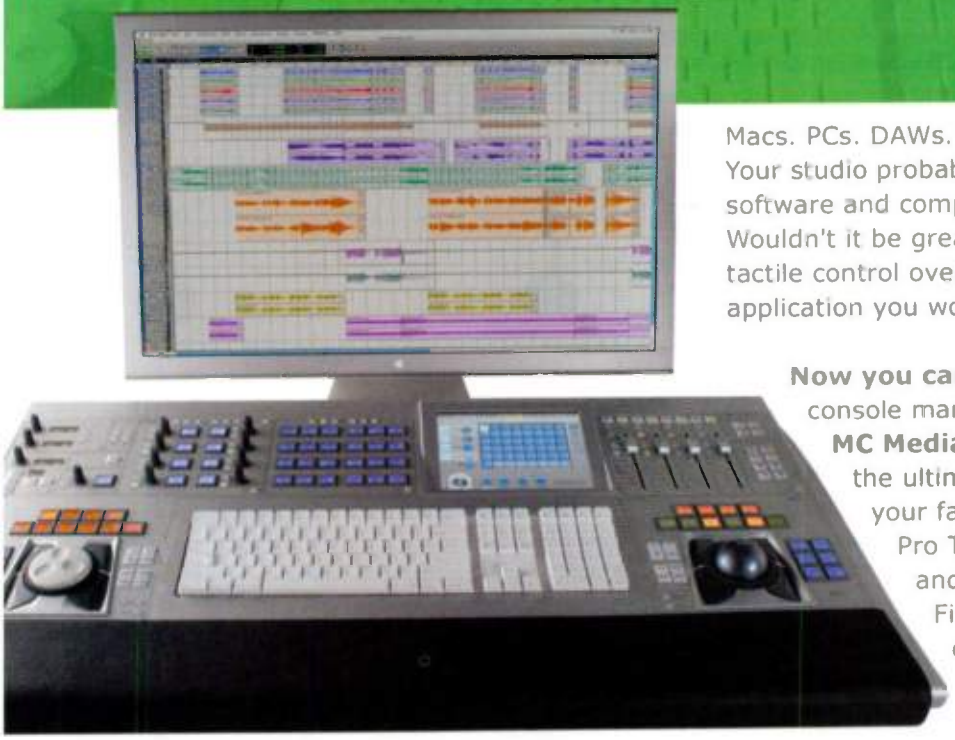

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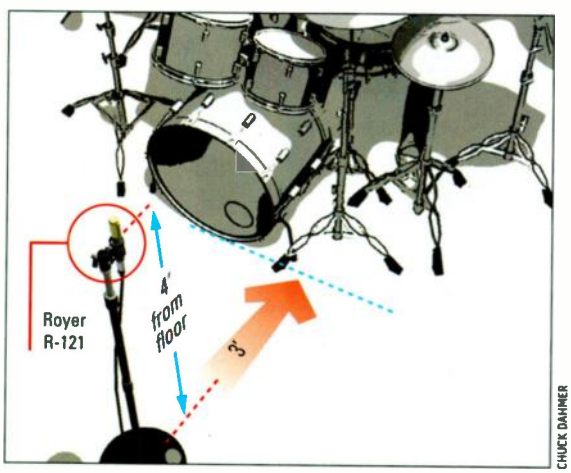
too big on the bottom: what ribbons give you is the fatness. Also, there's a midrange push to ribbon mics that you don't get out of either condenser or dynamic mics. But depending on where the guitar needs to be placed in the mix, you're going to have to balance between the microphones. That's why I like to use extra microphones instead of adding EQ or taking frequencies away. I use the microphones like EQ."

The style of music largely dictates how an amp is miked, and Dusty Wakeman (www.maddogstudio.com/dusty.html) offers an alternative to the previous suggestions. "I love the sound of a ribbon mic about 2 feet back from the amp. I do a lot of roots music: I'm not going for a huge, modern-rock guitar sound. When you're back about 2 feet, point the mic toward the center of the cone, because you're getting plenty of room sound at that distance. Moving the mic forward or backward will really change the balance of the direct to the ambient signal. You have to be in a good-sounding room to do that, though. You can't do it in your closet because it'll sound like a closet."

The Turnaround

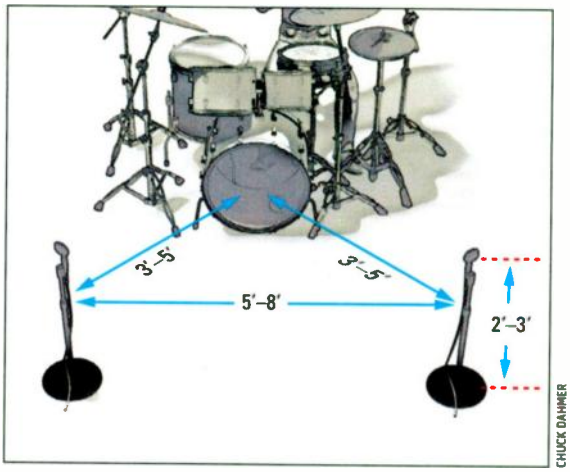
Ainlay also suggests combining a ribbon mic with an SM57, but he adds a twist. "Sometimes I'll place the ribbon mic in back of an open-back cabinet and turn the microphone around backwards, and then mix that in with a 57 in the front [see Fig. 2]. Obviously, the back of the speaker is the opposite phase of the front of the speaker: if you turn the ribbon microphone backwards, so that the back of the microphone is facing the speaker, you're putting the microphones in phase with each other. It makes a huge guitar sound.

"I place the ribbon mic about 3 or 4 inches from the back of the cabinet," Ainlay continues. "You have to put the front mic up close to the speaker. You don't want it too distant, or you're going to have time smear."



CHUCK DAHMER

FIG. 4: Ainlay's midroom mic blends together the most important elements of the drum kit—snare, kick, and hi-hat.



CHUCK DAHMER

FIG. 5: Joe Chiccarelli uses a spaced pair of ribbon mics, aimed toward the bass drum, to get a rocking drum sound.

Rather than reach for the EQ, some engineers suggest using the back of a ribbon mic to brighten up the sound of an instrument. "Sometimes a ribbon close on an electric guitar amp gives you a nice, chunky, lower-midrangy kind of tone," Chiccarelli explains. "But if I feel like the sound I want is close but a bit dark sounding so I want to brighten it up just a bit without using any EQ, I will flip the mic around. The back side of some ribbon mics is a bit brighter."

"You can turn the mic around and use the back side if you want an acoustic guitar to sound a little brighter," says Wakeman. "You can also do vocals on the back of the mic and they sound great." But he notes that it depends on the sound of the singer's voice "and how much brightness you need for the track."

Acoustic Guitar

Al Schmitt (www.studioexpresso.com/profiles/alschmitt.htm) prefers using ribbons on acoustic instruments, and guitar was one instrument he singled out in our interview. "If it's got an f hole, I might place the mic about 8 or 10 inches from the bottom one. You have to listen and see where the sound is, because every guitar is a little different. Moving the mic an inch or two makes all the difference in the world: you really have to listen."

Chiccarelli used ribbon mics to track jazz guitarist Peter White, whose nylon-string guitar presents its own recording challenges. "I've used the Royer R-121 on his nylon-string guitar and gotten great results. The ribbon is a lot slower on the transients, and a nylon guitar played with fingers can be a little spiky, attackwise. The ribbon definitely softens that." In terms of placement, Chiccarelli will start by aiming the mic above the sound hole, where the neck meets the body, anywhere from 6 inches to 2 feet from the guitar.

Hogarth, on the other hand, has a distinctive—and personal—way of miking an acoustic guitar. "We all mic

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guitars at the 12th fret or the sound hole, but that's not where I hear the guitar, unless I'm in front of the guy. Because I'm a guitar player, I've always wanted to capture what it sounds like to me when I'm playing the guitar. To do that, I place a Royer stereo ribbon mic right over the head of the guitar player [see Fig. 3]." Hogarth adds that you should turn down the player's headphones to avoid bleed-through.

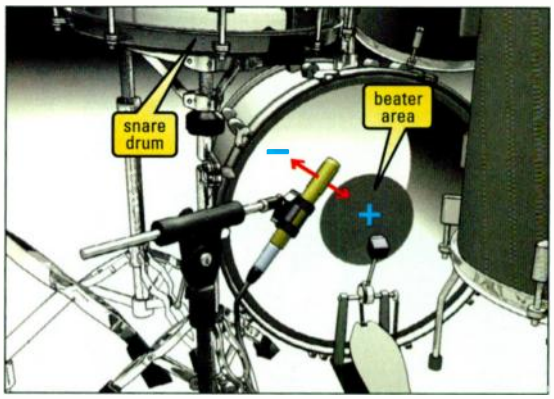
Ainlay says a ribbon mic is the ultimate mic on two other acoustic string instruments: the banjo and the Dobro. "They're kind of noisy instruments, and ribbons sound really great on them. I mic the Dobro about 6 inches away, on the portion of the resonator away from where the right hand is picking."

He also mics the banjo head from the same distance. "I just try to mic an instrument where I'm out of the way of the musician. And I'll move the mic around a little bit if it's too bitey because it's close to the bridge."

Call of the Drums

Using ribbon mics on drums is a classic sound, whether it's out front or overhead. "I use either a Coles 4038 or an RCA 44 in front of the kit—3 or 4 feet back—to get a big, mono drum sound," explains Hogarth. "To me there's nothing that does that like a ribbon mic. U 47s do a pretty good job of getting the top end and the smack, but nothing grabs the low end, and the fat, and the punch like a mono ribbon mic in front of a kit.

"It's generally placed waist high: I don't go down to the floor with it," Hogarth continues. "I move around the studio and feel where the low end goes away, and I don't go any farther away from the kick drum than that. There's a point where you really feel the punch, and then you go farther back and it's more like a room mic."



CHUCK DAHMER

FIG. 6: Dusty Wakeman uses the bidirectionality of the Royer R-121 to capture both the front of the bass drum head (aiming the positive side of the mic at the beater) and the bottom head of the snare drum. He then flips the polarity of the mic by 180 degrees to make it phase coherent with the mic pointing at the front head of the bass drum and the mic on the top of the snare drum.

Ainlay's approach involves putting an R-121 about 3 feet in front of the kit (see Fig. 4). "I call it my 'midroom mic,'" he says. "It offers a nice overall drum representation that I can mix in with the other drum mics. I place the mic off center from the kick, out from the snare drum, about 4 feet up from the floor. Then I listen to the mic and move it around until I get mostly snare, but a nice blend between kick, snare, and hat. And then I just totally smash it with a UREI 1176.

"I almost always record three room mics: a pair of spreads further away to get the ambience of the room, and the midroom mic, which, on its own, sounds great all smashed out like that. I can just mix that in with the close mics, and it fills out the drum kit and makes it sound more real."

Chiccarelli says his favorite thing is to put a pair of ribbons in front of the kit (see Fig. 5). "I place them 3 to 5 feet in front of the kit, with about 5 to 8 feet of separation between them, and maybe 2 to 3 feet above the floor. They're about the height of the kick drum or the floor toms, and angled in a little toward the kick drum, almost like a triangle between the kick drum and the two microphones. And sometimes that's my only pair of room mics for the drums.

"I find that it gives a lot of weight to the kit," Chiccarelli explains. "There's that chunky, almost Bonham-esque kind of low end that you can get from a pair of Royer R-121s or R-122s. Occasionally I'll use Coles 4038s. The older ribbons don't work as well for me in this situation. They're kind of soft and dark, and not punchy. That's the one thing about the new ribbon

THINKING AHEAD WITH RIBBON MICS

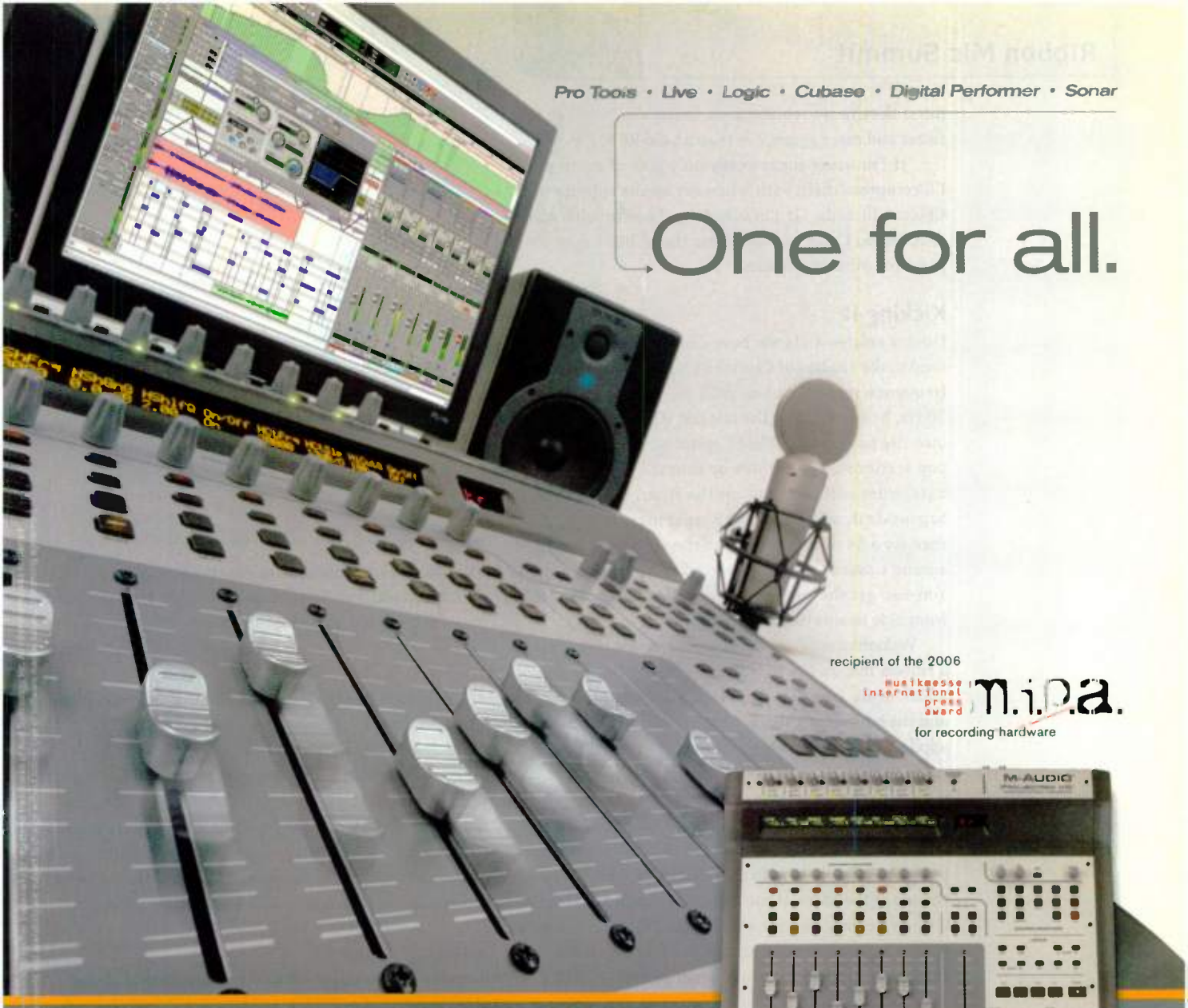
Using ribbon mics in the initial recording of percussion tracks can definitely make life easier when it comes to mastering a recording. Here's how it works: if you have the Michael Jackson album *Off the Wall*, listen to "Don't Stop 'Til You Get Enough." Listen carefully to the percussion: it is Michael and his brothers playing glass bottles. I wanted the glass-bottle percussion in this piece of music to have a unique sonic character and a great deal of impact in the final mix.

The year was 1979. I used a mic technique that came from my experience during the days when it was difficult to put much transient response on a disc. I used all ribbon, or velocity, microphones to record the glass-bottle percussion section. The mics I chose were my RCA 77DXs and RCA 44BXs.

If I had used condenser microphones, with the condenser mics' ability to translate the entire transient peak of the bottles, the bottles would have sounded great played back from tape in the control room, but when it came time to master, such an incredible transient peak would have minimized the overall level—on disc, cassette, or CD—of the entire piece of music. In other words, condenser mics would have compromised the dynamic impact of the sonic image of the entire piece of music.

—Bruce Swedien

(Reprinted with permission from *Mix* magazine.)



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mics: they're not condensers, certainly, but they feel faster and more aggressive than an old RCA.

"If I'm using them as my only pair of room mics, I'll compress them with whatever seems appropriate," Chiccarelli adds. "If I'm blending those in with other room mics, I may not compress them. But I may compress the other room mics."

Kicking It

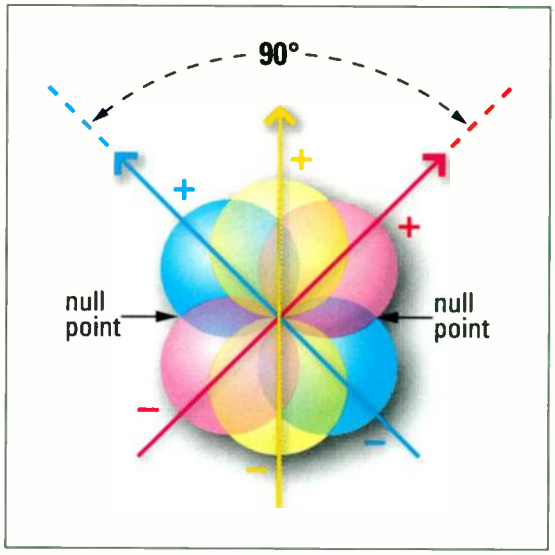
Dooley relates a classic bass-drum miking technique used in the studios of Capitol Records for decades. "The frequency response of an RCA 44 goes down solid to 20 Hz, but you'd blow the mic out if you aimed it right into the bass drum. What Capitol would do on all the pop sessions from the '40s up into the '70s is take the bass drum with no head on the front, throw a sandbag inside it, which tends to keep it in place nicely, and then lay a 44 on top of that, so the 44 is laying flat and aiming towards the inside top of the bass drum shell. You also get the sound of whatever resonance there is from side to side inside the kick."

Wakeman suggests another interesting way of using a ribbon mic on the bass drum—on the beater side of a kick drum (see **Fig. 6**). "Place it between the beater and the bottom of a snare, pointing at the beater. In this application, you're taking advantage of the bidirectional nature of the mic. If you point it on an angle, you can use it for both the beater side of the kick drum and to get the bottom of the snare coming in the back side of the mic. Then you reverse the phase on the ribbon mic, so that it puts it both in phase with the front of the kick drum and the top of the snare. If you compress that, and you bring it up in the mix, you get a lot of size. You want the mics to be electrically in phase, and you'll know instantly if they are in or out once you hit your phase button."

Listening from Above

Hogarth also uses ribbon mics to "detoxify" the hi-hat. "The thing I like about ribbon mics is the warm, muted top end instead of the bright, splashy top end you would get out of a condenser mic. So if you want to make the drums a little more jazzy or punchy, use them as overheads. But the problem is that because of the figure-8 pattern, you're going to get the ceiling. So you have to be careful that you have a decent-sounding ceiling or else you'll end up having a boxier sound than you really want."

Many of the engineers—Ainlay, Hogarth, Schmitt, and Wakeman—use the Royer SF-24 stereo ribbon mic, with its Blumlein pattern, as a drum overhead. "I raise and lower it in height depending on how much spread I want to get, and how much focus I get at the center of the snare drum," says Wakeman. "The lower you get it, the wider the stereo spread is going to be. But you want to get it high enough that the cymbals sound good."



CHUCK DAHMER

FIG. 7: To get a strong center image with the Blumlein configuration that results from using a stereo pair of figure-8 mics, Hogarth suggests adding an additional figure-8 mic to fill in the area between the two front stereo lobes.

Although Churchyard uses ribbons only as overheads on drums, he prefers to use a spaced pair. "I like the Coles 4038 as an overhead mic. It makes the kit sound really musical. I put one over the area of the snare and hi-hat, and one over the area of the floor tom, usually about 2 to 3 feet apart, and about 6 or 7 feet above the kit—far enough away so the drummer doesn't hit them." On occasion, he'll add a touch of compression to the overheads, with a ratio of 2:1 or 4:1.

Shaking All Over

Ribbon mics are also great for taming the rough sounds of hand percussion. "When recording shakers," Hogarth says, "I want them fatter: I don't want them spittier. So I usually add some midrange EQ. When you listen to the Rolling Stones, those shakers are all in the 500 Hz to 2 kHz range of the mix. They're crunching away in a good way; they're not spitting away. They're not 10 kHz shakers. They're not 5 kHz shakers. They're lower. I find that ribbon mics bring out those frequencies by muting the top end in a nice way."

"I just did a Brazilian album and used two Royers as a Blumlein pair on maracas," notes Swedien. "You may think this would give you a big pickup pattern, but it doesn't. I purposefully kept it very small, and the resulting sound is fantastic. And it's not mono: it's not a single-point source, but it's not moving around the stereo space.

"When you use a Blumlein pair on a single-point source," he continues, "you preserve the polar response of the sound source, so you don't lose the width. The sound moves, but it doesn't move in an apparent fashion.

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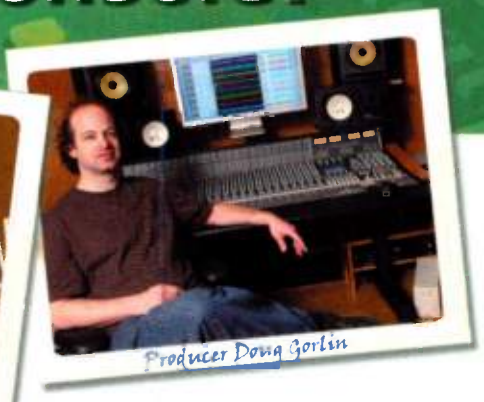

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piano approach. The older ribbons seem to fill in the blanks with the condensers."

Hogarth agrees that ribbon mics warm up a piano sound. "For really gorgeous, open sections of music, a lot of times I'll place the stereo mic just outside the edge of the lid, taking a picture of the whole piano. That's a mic I can bring in and blend. I've been doing that on a lot of instruments: using it as an ambience mic, but close enough that there's detail. Then I blend that microphone in with the close mics for three-dimensionality, because it's a Blumlein pair, looking side to side, back to back.

"With a Blumlein pair, the one place the mics aren't looking at is the actual center," explains Hogarth. "So a lot of times, I'll place another microphone right underneath the stereo ribbon mic, in another figure-8 pattern. Then you get, if you draw it as a diagram, two Xs—front and back—and a figure-8 in front. Although you're not getting the true sides, you're covering every other angle [see Fig. 7]."

But he warns that you have to be careful about using a ribbon mic on a piano in a rock 'n' roll context, because to cut through a busy mix, the piano needs to be brighter than you would prefer it on its own. "You might listen to the piano soloed up and think, 'Man, that's too bright.' Then you put it in the track and go, 'Wow, that needs to be a little brighter,' because a piano sounds so huge. So I find that ribbon mics tend to be a little too big on piano for rock 'n' roll."

Strike Up the Band

When it comes to recording brass, the engineers agree that there's nothing better than a ribbon. Kramer was enthusiastic about using ribbon mics to record trumpet. "The RCA 44 is one of the greatest trumpet mics of all time. It's an undeniable sound.

"If I'm miking a trumpet section, I like to put an RCA 77 maybe a foot away, sometimes 2 feet away so you get all that air. If it's a nice studio, with good acoustics, a wood floor, and a nice high ceiling, that makes a big difference. The 44 is the darkest-sounding one. The 77 is brighter, and you can switch the patterns—figure-8, omni, and cardioid. What we used to do was put two trumpet players, one on each side, and set the mic to figure-8. If there is a nice quiet passage, maybe I'll get the players to lean in. But if they're screaming, they need to get back—you don't want to overload it. There's a famous saying: distance makes depth."

"Moving the mic an inch or two makes all the difference in the world." —*Al Schmitt*

Ainlay, Churchyard, Kramer, and Wakeman all noted that they have the trumpeter play directly into the mic, suggesting a range of distances—1 to 3 feet—between the mic and player, depending on the room, the music, and the trumpeter (see Fig. 8).

Chiccarelli, on the other hand, doesn't have brass players play directly into his mics. "The guys that are well trained tend to feel more comfortable playing off-axis a little bit, 3 to 5 feet in front of the mic, depending on the room and everything else. If they feel comfortable with the horn sound and the mic position, and things aren't in their way, they're going to perform better. Certainly, the more you can back them off the mic and it sounds good, the happier they are. I think they feel like there are too many little anomalies and little bumps in the sound when they are too close to the mic—all the little squeaks and honks are magnified. But when the player is backed off the mic, you get the room and it tends to be a wider sound, and not so scratchy."

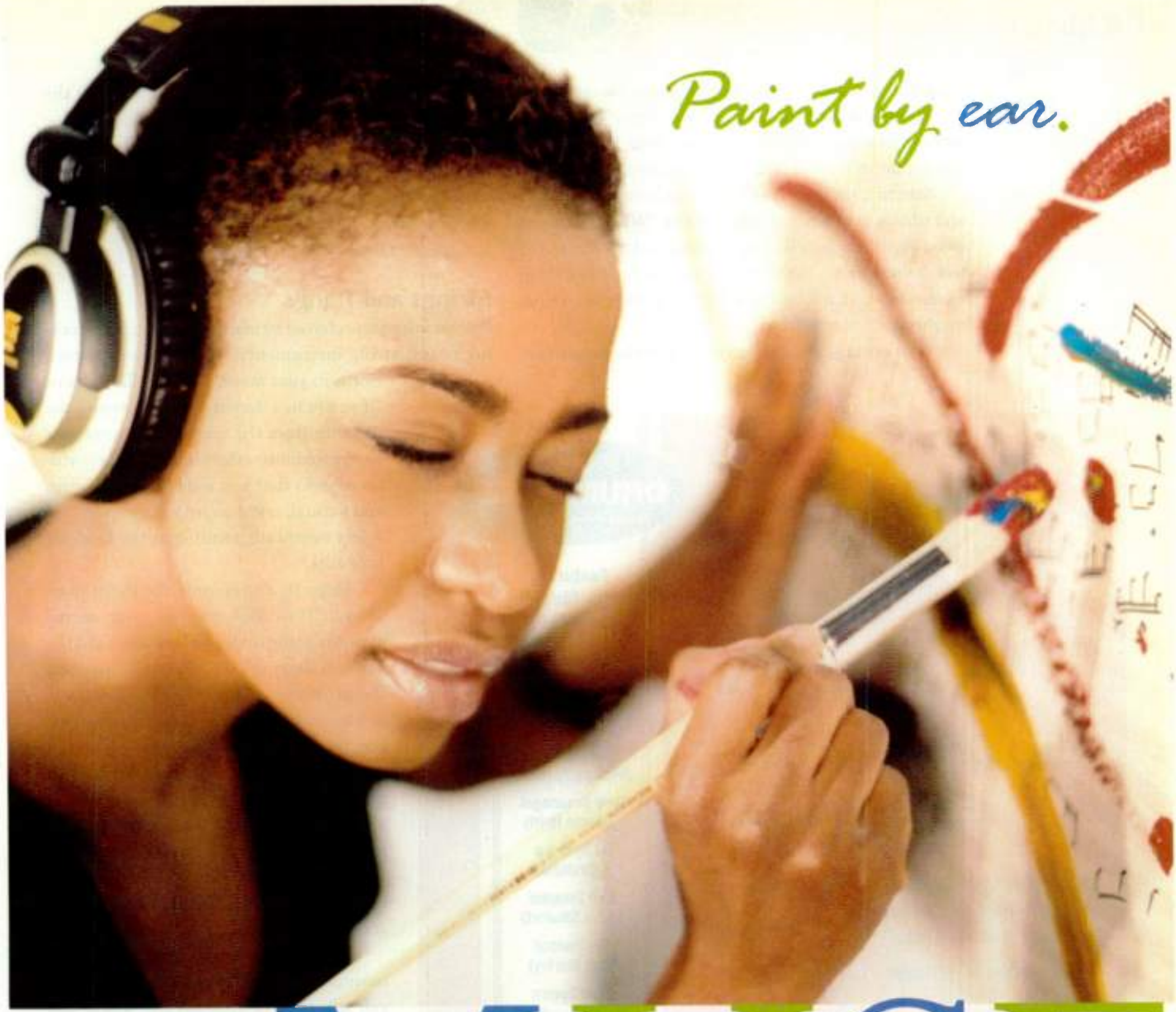
Schmitt noted his preference for ribbon mics on trombones. "If I'm doing a section," he explains, "I'll have it about two or two and a half feet in front of the trombonists. Although lately we've been putting a mic on every trombone."

Chiccarelli says ribbons are great on the lower brass: "Like that Salvation Army brass band sound, where you don't necessarily want punch and percussion out of the tuba or euphonium. They have a rich lower midrange. For me, getting enough lower midrange out of an instrument, and getting quality lower midrange that doesn't murk up a track, is always tricky. You always want to clean up that area because you want to make room for vocals or whatever the lead instrument is. At the same time, if you can leave a lot of that information in a track, it makes the track sound huge, realistic, and warm. It's always a trick of how much you can get away with.

"I found that if you put a mic too close to a tuba or euphonium, they can be really brassy," Chiccarelli adds, "and it can sound like you're getting only half of the instrument. Usually with a tuba, I'll put the mic over the bell, and on a euphonium, I'll mic it out front. A lot of brass instruments don't radiate sound in one direction, so instead of putting a lot of microphones up, I've found that a ribbon mic with a figure-8 pattern, depending on where you place it, can give you enough of the real sound in the room as well as the presence of the instrument. The distance of the mic from the instrument is based on the room and how hard the player's playing."

Woodwinds

As with brass instruments, the engineers in this story often reach for a ribbon mic when tracking woodwind instruments, such as saxophones and clarinets. To Ainlay, condensers sound shrill on a saxophone. "But if you put a ribbon on there, it's just the ultimate sax sound. I mic it about 3 feet away, aiming at the keys. If



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you get too close to the mouthpiece, it gets too reedy, and if you're too close to the bell, it's too brassy." Wakeman agrees about pointing the mic at the keys, but suggests placing the mic 1 to 2 feet away from the instrument.

Schmitt, on the other hand, combines condensers and ribbon mics when doing sections. "When I'm doing woodwinds, maybe I'll have a Neumann U 67 up on the woodwinds and a Royer stereo mic up for the overall room sound. That'll be about 10 feet above the section, maybe 4 or 5 feet in front."

"I love using either Royers or RCAs on keyboard reed instruments that can be a little harsh sounding in the midrange," notes Chiccarelli. "I love them on accordion—usually right in front, depending on the instrument. You have to listen a little bit for the sweet spot, but it tends to be somewhere between the keyboard and the bellows. On pump organs, I usually place the mic in the back. I find there's a little bit more sound there."

Strings and Things

Ribbon mics are preferred by many engineers for recording bowed string instruments. "The figure-8 pattern works in your favor," Chiccarelli explains. "If you're in a decent-sounding room, the distance from the mic to the source sets your proximity-effect balance. For a violin or viola that you want to sound warm and natural, mic it anywhere between 2 to 4 feet overhead, pointing at the bridge/f hole area."

Hogarth also records the violin from above. "How high you set your microphone is going to depend on how hard the player is digging in. Ribbon mics give you the proximity effect: the closer you get to a source, the fatter it's going to sound. But the violin isn't a very fat-sounding instrument. So generally, a violin doesn't get that much fatter as you get closer; it gets screechier. So there's that balance between being too far away and losing articulation, and being too close and getting the harshness of the bow scraping across the strings.

"Generally there's a certain amount of movement to a violin player," he adds. "So you will have to approximate where the sway is in their playing."

Kurlander relates his personal experience with a well-known classical violinist. "I recorded Itzhak Perlman for about ten years, and we came to an understanding about the sound that he liked: it was an RCA 44. The way I miked him had to be compatible with the rest of the orchestral setup. Sometimes it would just be one mic, and that would be a solo spot, because a lot of the violin was being caught on the main mics. In other situations, I went at the violin from two positions. One was aimed down the line of the strings at his face, with the mic out a couple of feet from the end of the instrument. The other would be aimed straight at the body of the violin [see Fig. 9]. When you looked

at them, the two mics were at a 90-degree angle relative to each other."

In contrast, Dooley relates a hybrid miking technique for capturing solo string instruments. "A good way to record an acoustic instrument and still have good room sound is to put one ribbon up close and a pair of good, small-diaphragm pressure omnis back a couple of feet and spaced apart slightly. Itzhak Perlman and Yo-Yo Ma were soloists in the recent movie *Memoirs of a Geisha*, and those sessions were done at Royce Hall [on the campus of the University of California, Los Angeles]. On Perlman they used a pair of AEA R44s in a Blumlein configuration up close, and a pair of Schoeps omnis back a couple of feet and spaced. They miked Yo-Yo Ma the same way using Coles 4028s. Because these ribbons are fast and smooth, you do get the close-up sound of fingers on the strings, and the plucks, and everything without any harshness."

"Sometimes I'll use ribbons exclusively, but I usually use them in combination with other microphones," notes Churchyard. "On a string section, I'll set up some close mics, usually condensers, like U 67s, and room mics, like M 50s. But I'll also set up ribbon room mics—Royer R-122s or the RCA 44s—and I'll mix that back into the sound. I think that adds thickness and depth to the sound. So I'll mix some close ribbon mics in with the room sound and the close mics.

"The ribbon mics are not real distant room mics: they're kind of close. Usually on either side of the conductor. I'll do that for brass as well as strings."

Kurlander says that he generally uses ribbons in combination with other mics when tracking. "I don't think you can really get away with using ribbons exclusively. The public is accustomed to a brighter orchestral sound than it was 50, 60 years ago. You need a little bit of the modern high end in there as well, just to make the soundtrack competitive."

But Kurlander notes that on certain projects he uses ribbon mics as a coloring device for the whole orchestra. "I did that particularly on the *Lord of the Rings* trilogy, where we wanted to get a very distinct 'aged' sound on the whole score. We put a pair of AEA R44s 4 feet apart, behind the conductor, 6 feet from the floor. And they were positioned in a very wide left-and-right pattern over the whole orchestra.

"What that did was provide a tonal color that is missing from the rest of the condenser pickup, in the fundamental areas between, say, 200 and 800 cycles [Hz]. It provided an old-fashioned warmth that is missing in a lot of the modern mics, which have so much extended frequency on them. I could use the ribbons pretty much as you would use a graphic equalizer. Instead of putting a bump in the lower middle with an EQ, I would be able to warm it up by using more or less of the ribbon pair in the mix. And it also provided another perspective to the audio picture of the orchestra that the other mics didn't have, because they're up high in the air."

The Bassics

Ainlay will often use two mics to track an acoustic bass. "I'll put a ribbon mic out in front of the f hole, and point a condenser between the two hands of the player, a foot or foot and a half from the bass: both mics are about the same distance away. The upper mic gets more of the percussive sound of the bass, while the mic at the f hole gets the fundamental."

Hogarth has a similar concept when recording the bass: "I have it just about where the f hole is, back just a few inches. Sometimes optimum mic placement is not optimum for the player. Particularly when it comes to upright bass, you have to position it based on where the player is standing, as well as where the focus is of the performance. Is it on the high strings going up the neck? Or is the player laying down the low end?"

Hogarth will also augment the ribbon mic with a condenser or a contact pickup through a DI, which he will blend in as necessary. "The second mic will be some kind of large-diaphragm condenser, placed alongside the ribbon mic and blended for phase."

The Big Picture

Wakeman notes that ribbon mics can be used to put other instruments in their place, mixwise. "I really try to paint a picture in the track. If you use a bright vocal mic, you shouldn't need to add a ton of presence or top end to get it to cut through in the track. The more ribbon mics I use, the more of a natural bed I've created in the backing tracks. And that way, the vocal just sits right in there, without having to work too hard."

Near the end of his interview, Hogarth offered a reality check on being too specific about which mic to use and where you put it. "If you try to take what I'm saying and lay a template over your recording, it's going to suck. Understand that I'm using ribbon mics like EQ. Take the direction, but use your ears.

"I try not to engineer with the lab coat on," Hogarth continued. "If it sounds good, I use it. A lot of times I'll just put a mic somewhere and see what it sounds like. If it sounds cool, that's good. If it doesn't sound good, I'll blow it off. The key is keeping your mind open." **EM**

Gino Robair is a senior editor at Electronic Musician.

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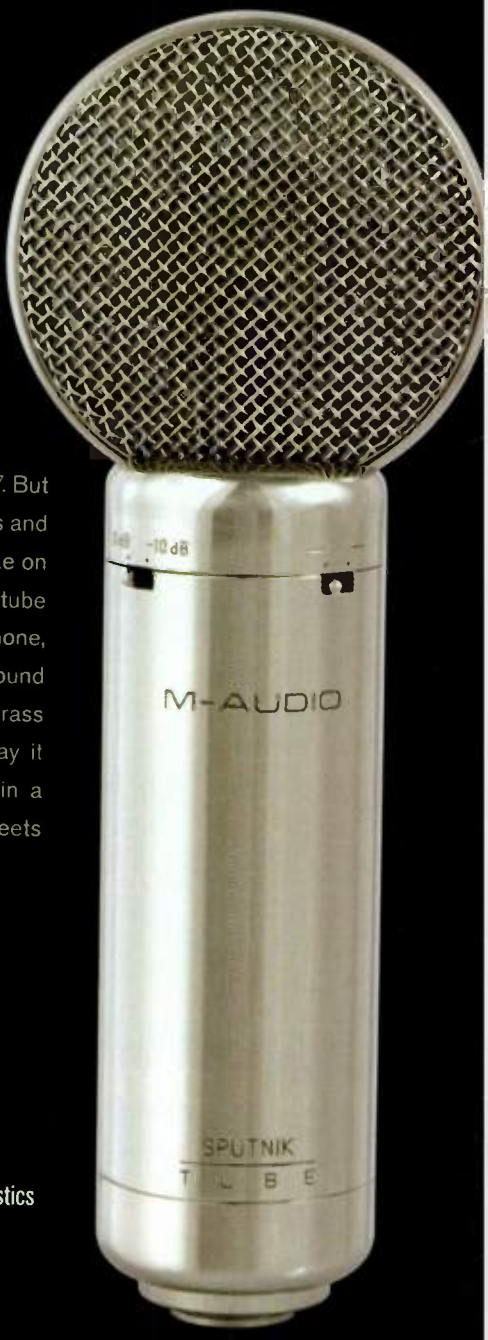

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MR. BONZAI

Frankly, It's Dweezil

By Mr. Bonzai

Zappa the younger on engineering his new CD, revamping his dad's studio, and the "Tour de Frank."

The year 2006 has shaped up to be a big one for Dweezil Zappa. He's releasing his first solo album since 2000's *Automatic* (Favored Nations), he completely remodeled the control room of the renowned Zappa studio—the Utility Muffin Research Kitchen—and he launched a full-scale tour of entirely Frank Zappa compositions, called "Zappa Plays Zappa" (aka the "Tour de Frank"). Joining the touring band are Frank Zappa alumni Steve Vai, Terry Bozzio, and Napoleon Murphy Brock (see Fig. 1).

Dweezil and I met in the studio as he was finishing two months of rehearsals and putting the final touches on the album, *Go with What You Know* (Zappa Records, 2006; see Fig. 2), which comprises Dweezil's compositions as well as Frank Zappa's "Peaches en Regalia," a tune originally recorded in 1969 and altered in 2006 with the Dweezil touch. The album will be released during the final leg of the tour, which stretches throughout Europe and America.

I was listening to you playing a part that Frank wrote. Is that in preparation for your tour?

Yes, we are preparing for the "Zappa Plays Zappa" tour. It's the first official event that we've been able to put together where we're actually going to go out and play Frank's music. We'll have other elements as well. The 25-minute opening of the concert will include excerpts from a documentary film about Frank's work as a composer as well as some rare FZ concert footage.

He had all these ideas about how to make the music sound unique and special, and he was able to use technology to make that happen. What I did with the version for my album—I wanted it to sound like it did in 1969, add elements that are modern, but to take a similar approach to Frank's. I thought, Well, what can I do in the studio now that's technologically equivalent to that? What kind of instrument can I modify using technology and make it sound like something other than what it is? I took acoustic guitar and I recorded multiple parts, and then I cut them all up on the beat, on each transient, and then I reversed them so I was able to alter the sound. Acoustic guitar has a lot of transient information, so when you turn it around backwards, it sounds like a bowed instrument. But it also has an eerie backwards quality. The result is a mysterious orchestral sound.

So you didn't use backwards tape?

No. When you run something backwards, you can do it in several ways. With a tape machine, you flip the tape over and play it backwards, and then you record it again on a different track and flip the tape back over. With a computer, you have a couple of options. You can take something and flip it backwards, but if you want to play a specific part that has to work with the music playing forwards and be in time—it's hard to learn to play something backwards that you can then turn forwards. The way you get around that in a computer is you can prep all the transients and it will reverse all of those notes in place. It's not taking the whole phrase and reversing it; it's taking each note and reversing it. When you play it forwards, it's playing in time with what you want, each note, but it's swelling up into it. It's a confusing thing that will bend a lot of people's minds when they try to figure it out.

Do your new elements appear throughout the piece?

They make several appearances, but I'm also playing all of the main melody lines on guitar. I was trying to use the guitar to mimic the instruments that were originally played. I took out the original instruments and replaced them with my guitar parts. Another interesting thing: Frank's guitar solo is doubled by a flute on the record. It is still doubled by a flute, but I also learned the guitar solo and played that. So you hear Frank on the left side and me on the right side playing in unison, which is slightly equivalent to Natalie Cole singing with her father, Nat King Cole. That is also a good example of what might be happening on this tour.

FIG. 2: Dweezil's new CD, *Go with What You Know*, comprises mainly original material but also includes a revamped version of Frank Zappa's "Peaches en Regalia."

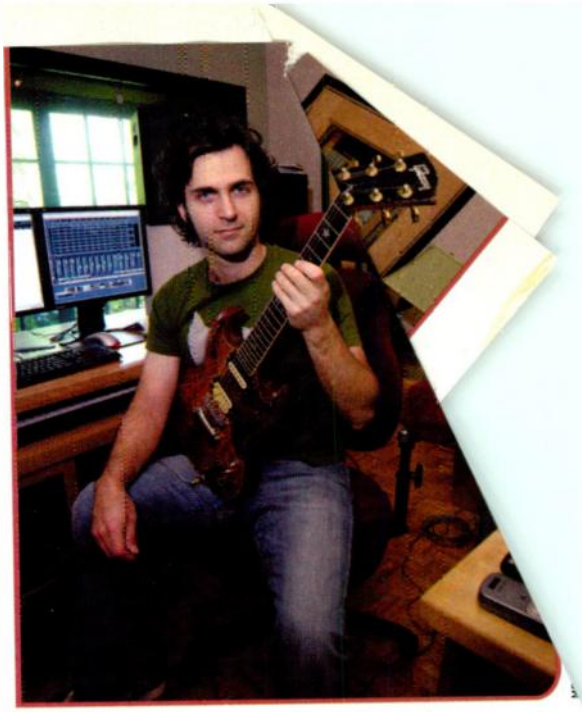

FIG. 3: Dweezil with a guitar of his dad's, which he thinks is not actually a Gibson SG but a high-quality copy. It features extremely low action and a preamp with an 18 dB boost.

You open the album with your only vocal track, "Love Ride." It's a very "summer fun" pop song. Have you been taking vocal lessons?

I haven't, and I would never say I'm a singer, but I can sing well enough to harmonize with myself and make something interesting on occasion.

Who recorded the jet engines that open the album?

That's a sample from a NASA rocket plane. I found it on a sound library I own, but I altered it and beefed it up with some subinformation.

Do you have to pay royalties to NASA?

I don't think so, but I heard they're getting into the record business. I think they're negotiating with Michael Jackson.

How many tracks did you have in that song?

That song has a lot of tracks, over 50, but that's because in my working process in [Steinberg] Nuendo I like to separate things out. Even if a track only comes in for 2 seconds in the song, it has its own track. In an analog world, you would be track sharing a lot of stuff, but I could fit it on 24 tracks.

The second track is virtually a 1-minute-and-30-second guitar solo called "Noitpure."

People are going to have to think about what that me[illegible]an"

The third track reminded me of "Frank[illegible]Asian by Edgar Winter, juxtaposed with a kig[illegible] vibe—from heavy guitar to playful s[illegible]titled "Fighty

There's a weird little sitar moment. That c[illegible]

MR. BONZAI

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By Mr. Bonzai

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The goal is to have a new audience enjoy Frank's music but hear it from an unfiltered perspective. When you see the movie and hear him talk about the music and hear other people talk about his serious music, the classical music—some of which was played by the rock bands through the years—I think it does so much more than we could ever say. We are very excited about presenting the music to younger generations.

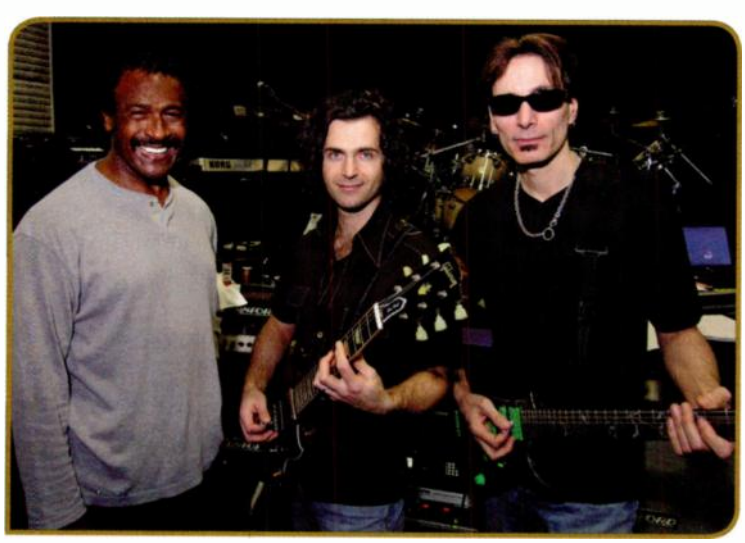
Will you be entirely faithful to the original compositions?

Frank wrote all of his music. It sounds the way it does because that was his intent. He had the ability to hear music in his head and write it down on paper, then teach it to other musicians. The sound is not the result of the players; it's the result of the composer. He certainly had exceptional musicians articulating his music, but that's merely execution. He hired people who were at the top of their skill level and trained them to do extraordinary things under his baton.

He would always allow them to have some space in the show to present what he called "body commercials." That was his terminology for solos. If someone was capable of something unique, he would always find a way to expose and exploit it. He wrote a lot of incredible compositions that are extremely challenging but with beautiful melodies and really interesting rhythms.

When you referred to what I was just playing, I was learning a part from "Inca Roads" that was a keyboard line and was also doubled on marimba. It was never intended to be played on guitar, because the interval stretches are not set up for guitar. But it's great to learn stuff like that because it makes you a better player, and it gives you an entirely different look at the instrument. It's been a great challenge for me to learn hard interludes of songs like that.

FIG. 1: On this summer's "Zappa Plays Zappa" tour, Dweezil's band includes Frank Zappa alumni such as Steve Vai (right) and Napoleon Murphy Brock (left).



MR. BONZAI

"You hear Frank on the left side and me on the right side."

You mentioned that when you asked Frank back in 1985 if he had ever witnessed a miracle, he replied that one time one of his bands played several bars correctly from his composition "The Black Page." That is a song that we're going to learn as well, and it is definitely not easy on guitar. Steve Vai did a great job with that when he was in Frank's band, but it's very hard to articulate Frank's complex rhythms and the melodies that go with them.

Let's talk about your new album, *Go with What You Know*. Did you do all the engineering?

Yes, I did, except for "Peaches en Regalia," which was a unique situation. I went to the master tapes from Frank's *Hot Rats* album [Rykodisc, 1969]. We were getting ready to do a project with that album and listened to the master tapes for the first time. They've been sitting in boxes for a long time—the last time Frank used them was for some remixing on CD in the mid-'80s.

I heard the tape when you were soloing material and listening, and it was amazing how Frank got those sounds, with tape speed changes and such, all done in the predigital world.

What was so impressive was that the piece of music itself is a great composition and the arrangement is unique. What he was able to accomplish using that studio technology was to take instruments and embellish their personalities in very subtle ways. You wouldn't necessarily know what was being done unless you soloed the individual tracks.

One example was the bass guitar. The initial melody in the first verse has multiple bass parts that were recorded at a slower speed so that it could be pitched up when you heard it at normal speed. It enabled Frank to have this sound in the right pitch register, but the tone had this rubbery, lower, smooth character. But it doesn't really exist in the real world. It's a unique sound. Now we are used to synthesizers, and you might think it must have been a synthesizer, but it was 1969 and there wasn't anything invented that sounded like that. He's making up a sound that doesn't exist.

Another example: there's one melody line that's clearly played on a saxophone. It's in an upper register, and you know it's there because of the way it sits in the mix, but you can't be sure what it is. He's altered the range of that instrument by recording at a slower speed and making it able to play this part an octave higher, which is well out of the range of the instrument. It had a unique sound. Very different from merely substituting an instrument that can play in that range. If you took that out of the arrangement, that melody wouldn't sound nearly as interesting.

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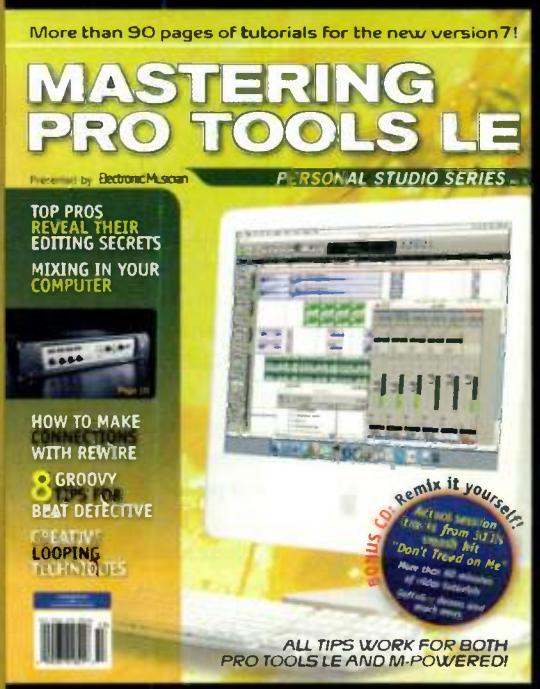

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He had all these ideas about how to make the music sound unique and special, and he was able to use technology to make that happen. What I did with the version for my album—I wanted it to sound like it did in 1969, add elements that are modern, but to take a similar approach to Frank's. I thought, Well, what can I do in the studio now that's technologically equivalent to that? What kind of instrument can I modify using technology and make it sound like something other than what it is? I took acoustic guitar and I recorded multiple parts, and then I cut them all up on the beat, on each transient, and then I reversed them so I was able to alter the sound. Acoustic guitar has a lot of transient information, so when you turn it around backwards, it sounds like a bowed instrument. But it also has an eerie backwards quality. The result is a mysterious orchestral sound.

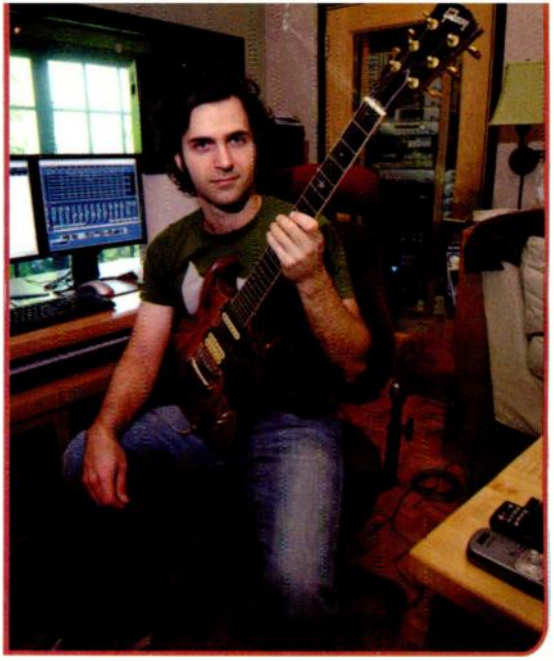
So you didn't use backwards tape?

No. When you run something backwards, you can do it in several ways. With a tape machine, you flip the tape over and play it backwards, and then you record it again on a different track and flip the tape back over. With a computer, you have a couple of options. You can take something and flip it backwards, but if you want to play a specific part that has to work with the music playing forwards and be in time—it's hard to learn to play something backwards that you can then turn forwards. The way you get around that in a computer is you can prep all the transients and it will reverse all of those notes in place. It's not taking the whole phrase and reversing it; it's taking each note and reversing it. When you play it forwards, it's playing in time with what you want, each note, but it's swelling up into it. It's a confusing thing that will bend a lot of people's minds when they try to figure it out.

Do your new elements appear throughout the piece?

They make several appearances, but I'm also playing all of the main melody lines on guitar. I was trying to use the guitar to mimic the instruments that were originally played. I took out the original instruments and replaced them with my guitar parts. Another interesting thing: Frank's guitar solo is doubled by a flute on the record. It is still doubled by a flute, but I also learned the guitar solo and played that. So you hear Frank on the left side and me on the right side playing in unison, which is slightly equivalent to Natalie Cole singing with her father, Nat King Cole. That is also a good example of what might be happening on this tour.

FIG. 2: Dweezil's new CD, *Go with What You Know*, comprises mainly original material but also includes a revamped version of Frank Zappa's "Peaches en Regalia."



MR. BONZAI

FIG. 3: Dweezil with a guitar of his dad's, which he thinks is not actually a Gibson SG but a high-quality copy. It features extremely low action and a preamp with an 18 dB boost.

You open the album with your only vocal track, "Love Ride." It's a very "summer fun" pop song. Have you been taking vocal lessons?

I haven't, and I would never say I'm a singer, but I can sing well enough to harmonize with myself and make something interesting on occasion.

Who recorded the jet engines that open the album?

That's a sample from a NASA rocket plane. I found it on a sound library I own, but I altered it and beefed it up with some subinformation.

Do you have to pay royalties to NASA?

I don't think so, but I heard they're getting into the record business. I think they're negotiating with Michael Jackson.

How many tracks did you have in that song?

That song has a lot of tracks, over 50, but that's because in my working process in [Steinberg] Nuendo I like to separate things out. Even if a track only comes in for 2 seconds in the song, it has its own track. In an analog world, you would be track sharing a lot of stuff, but I could fit it on 24 tracks.

The second track is virtually a 1-minute-and-30-second guitar solo called "Noitpure."

People are going to have to think about what that means.

The third track reminded me of "Frankenstein" by Edgar Winter, juxtaposed with a kind of Asian vibe—from heavy guitar to playful sounds.

There's a weird little sitar moment. That one is titled "Fighty

Bitey," which was the name of a cat with a feisty personality we had for 21 years and who recently passed away.

And then we have "CC $," with a *whoop-whoop* sound I thought was a synthesizer.
Well, that sound comes from a TC Electronic effects unit, FireworX—basically a noise generator, like a feedback loop. Just that one sound inspired the whole song. I had recorded that little *whoop-whoop* sound and asked Joe Travers to play drums to it. Then I had my friend Blues Saraceno play acoustic guitar on it. After that, I created all the other stuff on top.

So there are real drums on the album, played by Joe Travers, who also happens to be your "Vault Meister" and is archiving all of Frank's tapes.
Yes, and he will also be playing drums on our tour.

Is anyone else playing on the album?
I had two guitar solo spots open, so I invited my friend T.J. Helmerich to play a crazy solo on "The Grind," and I have a guitar duel with Blues Saraceno on the song "Thunder Pimp." Pete Griffin plays bass on "All Roads Lead to Inca." He's playing bass on tour with us, and Aaron Arntz, our touring keyboardist, also plays on that track. Mark Meadows plays bass on the final track, "Audio Movie," but I did everything else.

The final track reminded me of science-fiction sounds and Hawaiian music. Is that a slack-key guitar in it?
No, the weirdo guitar melody that starts and ends the song is a fretless guitar. There's a little bit of a jungle rhythm background sound going on that might remind you of Hawaii. That song itself sort of inspired the rest of the record to have this continuity with sound effects. The record evolved like one long audio movie, starting with the feeling that you're being taken away on a spaceship, and it ends with the ship landing, with a number of departure points along the way—being kidnapped in a van, going underwater—with lots of things happening at the beginnings and endings of songs that set a certain tone.

On *Go with What You Know*, the elements jump here and there, unlike many albums that are put together to create one mood only.
Record companies try so hard to market popular-music records as one specific thing, so most aren't allowed to have songs that deviate from what the hit single is supposed to be. I like Beatles records or Led Zeppelin

records that show and embrace different influences. The media today would call that "unfocused." I find that [characterization] extremely irritating.

For me, I just wanted my record to be a listening experience, a ride—you go somewhere from the first song to the last song. It's definitely rock-guitar oriented, but there are acoustic elements and electronic elements that I haven't touched on in my music before. Mainly, it's because when we redid the studio, I had to force myself to become computer literate. I tried to use technology as an instrument on this record, and it really did help form the project. Once you know how to use the technology, you can hear something in your head and then make it happen. It would be very difficult for me to explain to someone how to make these sounds. It gave me the opportunity to use a lot of sounds that I could adapt and mutilate, and twist and turn into whatever I wanted. Why not have fun and play around with it? And that's what I did.

Talk about the renovation of the Zappa studio, the Utility Muffin Research Kitchen.

In the control room, we have JBL speakers, which we discovered were the right monitors for this space. The big recording room has always been a great-sounding room, with two live chambers. One chamber is big enough to record in, and the other one is narrow but longer and taller, giving you natural ambient reverb. But the control room is quite a bit different now—it's got a higher ceiling and the colors are good for long working hours. Before, it was sort of a burlap look with a dark ceiling. The main console is a Euphonix System 5.

Was it sad to see Frank's old console leave?

Well, the studio has evolved quite a bit since its original design. The original console was a Harrison that was heavily modified—sort of an API style—and that was in here from 1980 until about 1990. Then we got the Neve V series console, and Frank liked it because at the time it gave him opportunities to use his Synclavier and have multiple tracks with automation. It was before the digital console era; he would have loved all the possibilities that exist now. The studio was dormant for 11 years before we rebuilt it.

FIG. 4: This shot from inside the Utility Muffin Research Kitchen shows a rack full of signal processing gear, much of which (such as the Neve 1073 modules and the Avalon AD2022 mic pre) Dweezil uses when recording his guitar. The studio's new Euphonix System 5 console is in back.

MR. BONZAI

But you had a small room for your own work, didn't you?

Yes, I had my own room for my projects. I was studying engineering, and experimenting. This room was in disrepair, and when gear isn't used, the gremlins usually like to come in and modify it for you.

What is your recording medium these days?

It depends: Most of the time for a brand-new session, my preference is to use the Euphonix R-1 hard-disk recording system and then bump that over to Nuendo. But we have also refurbished some of the analog machines, and I'm looking forward to using them as well and then transferring over to the R-1 or Nuendo. The R-1 is a great-sounding digital recorder, but it doesn't have fantastic editing capabilities as of yet. Nuendo is also a great-sounding digital recorder and has fantastic editing.

What analog machines do you have?

We have a 24-track Studer A80, a 2-track A80, and two Ampex machines, one 4-track and another 2-track. We have various headstacks for the machines. We even have an unusual 5-track headstack that was a special invention from the '50s, created by Paul Buff.

You also recently refurbished Frank's microphone collection.

Yes, we have a nice vintage mic selection, but for years we haven't had the opportunity to use them, because we didn't have the right power supplies and I didn't want to ruin them in any way by experimenting. It was fortuitous to have Toni Fishman and Joe Sanborn here, from Telefunken North America, to solve our problems. Among others, we have three Telefunken U47s, four Neumann M 49s, a matched pair of Neumann M 50s, circa 1950, four AKG C 24s, circa 1960, and a new U47 built by Toni's company. Now we have a lot of options. It all comes down to the microphones as to what gives you the sound of your record. The better the microphones, the better the sound. I'm really looking forward to using those mics on all the new projects.

At the rehearsal for the tour, you were playing a Gibson that you referred to as a "Frank's guitar." Is it a special model?

It's funny because it says Gibson, but I believe from the stories that Frank told that someone had copied a Gibson

SG (see **Fig. 3**). Frank liked the feel of it and bought it. It's got some special detail work that was never offered in a Gibson. But Frank's guitars were all unique in that they had extremely low action, and they had specialized electronics. That guitar has a preamp that has 18 dB more output than a normal guitar. Frank would use the guitar to overdrive his amplifiers as opposed to using a preamp gain stage in an amplifier.

He used effects as well, but he would rely more on the power section from the amp and use the guitar for the gain and tonal changes. He didn't play particularly hard, so he liked having the dynamic range. With the extra output coming from the guitar, you can really articulate dynamics.

He was very astute when it came to EQ in the signal path. He had the electronics built into his guitars so that he would be able to equalize his sound over the band. He didn't necessarily have one signature tone. He adjusted it to fit the moment. He was essentially mixing from the stage, creating guitar tones that were unique but would cut through the arrangement that he created.

He knew the range of the instruments in the accompaniment and the tones that they were creating, and he balanced his guitar tone to smoothly sit above everything. That's why his live recordings always sounded so good. They are consistently good from tape to tape, which is very difficult to achieve.

What is your typical guitar signal chain for recording?

What I like the most is to use these Neve 1073 modules. I use two microphones on the cabinets. I have a stereo guitar rig now, so I've been using a Shure SM57 and a Sennheiser 421, making sure that they are in phase on each cabinet. The 57s usually go through the 1073s, and I also have this Neve 1272 stereo microphone preamp that we put the 421s through. Sometimes I'll use the console mic pres, and sometimes I'll use these Avalon mic pres (see **Fig. 4**). The console and the Avalon mic pres are clean, so for a distorted guitar, I'll sometimes want it to have a little bit more of an edge, and the Neve can give me the edge. I also have some API mic pres that I'm fixing up because they tend to overload right now. I'm still looking for the ideal chain, but things are sounding good. **EM**

Mr. Bonzai is an award-winning photographer and writer. His new book, Faces of Music: 25 Years of Lunching with Legends *(Thomson CoursePTR/ArtistPro, 2006), includes over 400 photographs and 160 interviews. Visit www.mrbonzai.com to learn more.*

Create More Realistic Strings

By Steve Skinner

Improve your arrangements with these techniques.

There are two ways to work with string samples. One is to use them to try to simulate the sound of a live string section. The other is to approach them as you would any other keyboard instrument and just use them as sounds. Both approaches are valid and useful, but they require different skills. Here I'll discuss simulating a live string section with a sampled-strings library.

The more you know about how real strings are arranged, and the more sample choices you have, the better your sampled-string arrangements will sound. I currently use MOTU Symphonic Instrument, the Vienna Symphonic Library *Vienna Strings* samples converted for a MOTU Mach Five sampler, and IK Multimedia Miroslav Philharmonik, all in Digidesign Pro Tools 7.

> It helps to have a choice of sample sets, as each set has a different sound and feel.

Ensemble-Strings Arranging

Most modern keyboards have an ensemble-strings patch, which is usually one consistent sound up and down the keyboard. If you are playing live or don't have samples of the individual string sections, then you must do your best to make this type of string patch sound realistic.

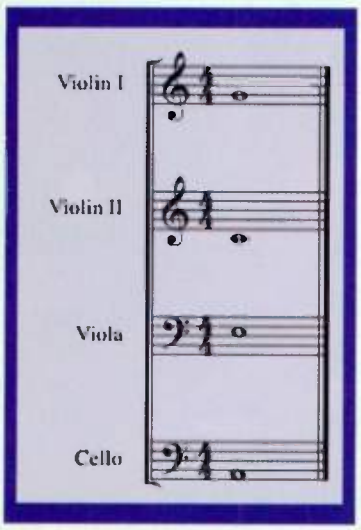


FIG. 1: A string ensemble playing an Am7 chord in open inversion. Viola is written in bass clef instead of the usual C clef.

In most string arranging, each section plays the same note. For example, the cellos play the root of the chord, the violas the fifth, the second violins the third, and the first violins the root again, or a sixth, seventh, or ninth. The violas are tuned a fifth below the violins, the cellos are an octave below the violas, and the contrabass is a sixth below the cellos. Therefore, when the ensemble plays a chord, the notes will tend to be spread out across the range of the orchestra in what is called open inversions (see **Fig. 1**).

Keyboard players tend to play chords in close inversions. Real strings are sometimes written in close inversions, but when keyboard players play string samples in this way, it sounds like a keyboard. If you play the string parts in open inversions, it sounds more like real strings and less like a keyboard player (see **Fig. 2** and **Web Clip 1**).

Multivoice Arranging

If you are using MIDI to do your string arrangement, and you have a string sampler that has samples of each of the string sections (violins, violas, cellos, and contrabasses), I highly recommend that you write each part separately. It's a lot more work than just playing chords or lines with a string patch, but it's worth it. Your arrangement will consist of four or five interesting melodies instead of one chord following another.

Sometimes I'll start with the cello part, and other times I'll start with the first violin. If interesting countermelodies occur to me as I'm playing, I'll put them in. I then go on to record the next part. I try not to duplicate notes that were in the previous part unless I want to emphasize a particular line. Because I don't have the gift of perfect musical memory, I will invariably play some notes that result in either unisons, octaves, or bad dissonances, which I go back and fix in the MIDI editor. It gets progressively harder to play the best notes with each successive part, but I can always go back and fix things. When I'm done, I listen to the strings soloed as well as in the arrangement to make sure everything works.

Next I go through each part and carefully draw in MIDI volume commands using a graphical editor. I try to bring out parts that play interesting melodies and to create crescendos and decrescendos that are effective and emotional. Sometimes doing the volume rides can take as long as arranging the notes.

Finally, I'll record the string parts as audio tracks. If you have the tracks available, I recommend recording

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each string section on a separate stereo track. That way, you can keep control of the balance and dynamics of the string section.

Dissonance

You can get away with a lot more dissonance with strings than with other instruments. While the guitars are playing simple triads, the strings can lay on some minor seconds, raised fourths, and clusters. But it's important to prepare the dissonance (see **Fig. 3** and **Web Clips 2 through 4**). Don't just jump to an exposed minor second; it's more effective to move one voice into a dissonance with a sustained voice. (This is a rule that was made to be broken. If you want a jarring effect, jump right to a dissonance.)

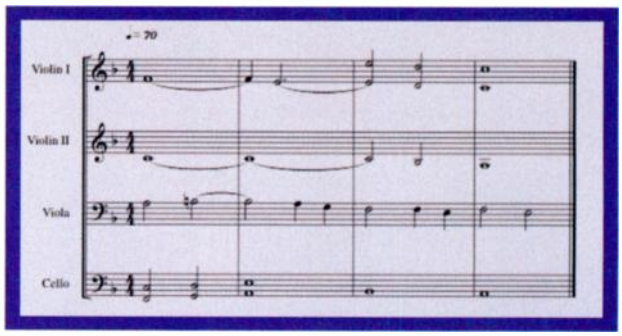

FIG. 3: A multivoice string arrangement with prepared dissonances.

I recommend studying traditional harmony and counterpoint. It also helps to study some of the great pop-music string arrangements. The Goo Goo Dolls' "Iris," with its excellent use of dissonance, the Beatles' "Eleanor Rigby," and Simon and Garfunkel's "The Boxer" are a few of my favorites.

Panning for Gold

Many string-section sample libraries, such as the *Vienna Strings* and MOTU Symphonic Instrument, are already panned to the position they would occupy in an orchestra. If your samples are not prepanned, then pan the first violins to eight o'clock, the second violins to ten o'clock, the violas to one o'clock, the cellos to three o'clock, and the basses to five o'clock.

If the basses are the only bass instruments in the mix, I'll often pan them back toward the center so the mix won't be unbalanced. I bus all the string tracks to an aux track, to which I apply EQ, reverb, and often some stereo spreading.

Smooth Lines

String samples sound exactly like live strings during the sustain portion of a note, but they tend to be less realistic for the transitions between notes. String players will connect the notes in legato passages, sometimes sliding from one note to the next. Each player in the section will do this slightly differently, creating a very complex sound.

FIG. 2: A 4-bar chord progression scored twice—first using close inversions, then using open inversions.

With a sampler, each note gets a new attack. Some samplers allow you to choose between slow and fast attacks, enabling you to move smoothly between notes. Another way to connect notes is to modulate the sample-start position using the MIDI Mod Wheel. Use the full attack for the beginning of a phrase, and then move the Mod Wheel up to remove the attack part of the sample while playing the rest of the phrase. You won't get sliding effects with this technique, but the note connections will be more authentic.

I have not encountered any string samples that have a strong marcato attack followed by a sustain. Usually the marcato samples will be short, and the sustained samples will have slow attacks. So when I need a sustained note with a strong attack, which is often, I mix a small amount of the marcato sample in with the sustained sample. I'm careful not to use too much marcato, because that sounds quite artificial.

Sound Choices

It helps to have a choice of sample sets, because each sample set has a different sound and feel (see Web Clips 2 through 4). I sometimes combine sample sets for a larger, fuller sound.

When a full sound is not what you want, you can use solo violin, viola, and cello sounds to create a string quartet. Similarly, use solo strings from two different sample sets to get a double quartet. Mixing a quartet or double quartet with an ensemble sample set gives you a very nice midsize ensemble sound; you can hear the individual instruments, but it sounds rich.

String libraries, no matter how realistic sounding, are just not the same as a live string section. The same samples are used repeatedly, and the number and variety of gestures are limited. But if you work within those limitations and strive to push beyond them, you can create some beautiful arrangements. EM

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Steve Skinner has worked as an arranger-programmer for Bette Midler, Jewel, Celine Dion, R. Kelly, Diana Ross, the Bee Gees, and Chaka Khan. He arranged the musical Rent *and coproduced the cast album.*

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Extreme Resonance

By rachMiel

Turn bland synth patches into wailing monsters.

Increasing filter resonance to its conventional limit sharpens audio, giving it presence and bite. Pushing resonance beyond that limit can generate wild and delightfully unstable wails, groans, and ululations.

Resonance is the tendency of a physical body to vibrate at one or more specific frequencies. Resonant filters simulate physical resonance by introducing feedback, which boosts a frequency band around the filter's cutoff frequency. The resonance-amount setting usually affects the width of the boosted frequency band: low settings boost a wider band, and high settings boost a narrower band.

Some resonant filters will begin to oscillate once the resonance reaches a certain level. This self-oscillation can be useful, but it can also generate hideous ear-scrunching screams. Turn the output level way down when experimenting with high-resonance patches. Once you're convinced the sound is stable, adjust the volume to taste.

From Scratch

For my examples, I've used Applied Acoustics Systems Ultra Analog VA-1 (www.applied-acoustics.com), but most synths with analog-style resonant filters will do the trick. Ultra Analog's filters have five modes, but high-resonance effects work best in lowpass, bandpass, and highpass modes. Resonance is audible but less effective for the notch filter, and the resonance control (labeled Q) for the formant filter actually changes vowel formants rather than affecting resonance.

A resonant filter needs a stimulus, and harmonically rich stimuli offer more frequencies with which the filter can resonate. Starting with Ultra Analog's Mono preset from the Lead bank, turn off both oscillators, turn on the Noise module, set the Filter 1 Drive to Off, and set the Cutoff Env1 and LFO1 knobs fully counterclockwise. You'll now have white noise feeding Filter 1, which is in lowpass 4-pole mode. Set Filter 1's cutoff to 42, crank its Q knob to maximum, and center the Cutoff Kbd knob. The resulting timbre will be a typical breathy sort of sine wave.

FIG. 1: On the left are the Filter 1 and Output settings for the original Arp Epiano preset; on the right are the settings for the high-resonance variant.

Next, turn the level way down, turn off the Noise module, turn on the Oscillator 1 module, and play with the filter's Cutoff knob. You'll notice that resonance peaks occur at the harmonics of the sawtooth. You now have two good starting points for creating your own high-resonance patches. Don't forget to try the other filter types and to bring Filter 2 into the action in series or parallel with Filter 1.

From a Preset

You can easily modify Ultra Analog presets to get interesting high-resonance sounds. I created three quick patches this way by lowering the cutoff frequency, raising the resonance, and lowering the output level (see **Fig. 1**).

Load the Arp Epiano preset from the Guided Tour bank and lower Filter 1's cutoff frequency from 44 to 5, raise its resonance from 36 to 112, and lower the main output level from 43 to 20. Arp Epiano uses the arpeggiator, so simply hold a chord and play with the filter cutoff frequency to vary the color. For performance, you might want to assign a MIDI continuous controller to modulate filter cutoff. This high-resonance patch sounds like the original e-piano preset played underwater (see **Web Clip 1**).

My second high-resonance patch is a variant of the Arpeg Aggressive preset, another arpeggiated sound from the Guided Tour bank. This time I lowered Filter 1's cutoff from 59 to 41, raised its resonance from 22 to 127, and lowered the main output from 75 to 38. Using maximum resonance produces a wild glistening sound, particularly on note attacks (see **Web Clip 2**).

Broken Glass

The Glass preset from the Ambient bank provides an opportunity to get both filters into play. It starts with two sine waves an octave apart, and the output of Filter 1 is mixed with Oscillator 2 in Filter 2. Lower the main output, and set the cutoff and resonance respectively to 37 and 108 for each filter. That places the resonance roughly between the low and high oscillator pitches.

You can use LFO 2 to add some motion to this patch. Center the Cutoff LFO2 knob, change LFO 2's shape to Random 1, and increase its rate to 96. That will cause the resonant peak of Filter 2 to jump around, occasionally hitting each of the oscillator pitches to create a percussive *thwop* (see **Web Clip 3**). EM

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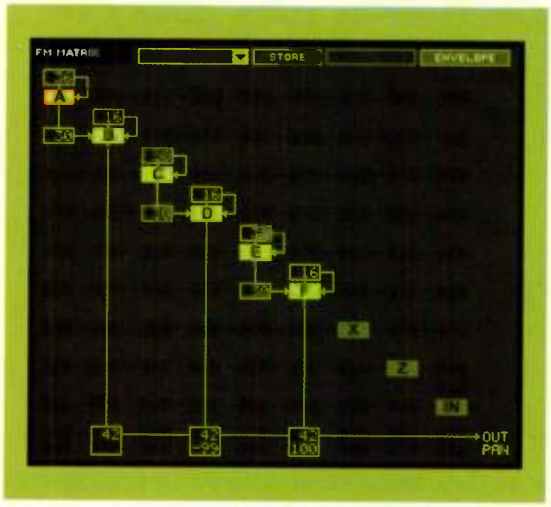
Operators Are Standing By

By Jim Aikin

FM synthesis offers powerful sonic potential.

Despite its age, FM (frequency modulation) synthesis remains a popular technique for desktop musicians. In fact, composers and sound designers have more choices than ever when it comes to FM. Native Instruments FM7, which has been around for several years, has recently been joined by Image-Line Sytrus and the Operator add-on for Ableton Live. In addition, numerous analog-style and modular synths offer basic FM as part of their sound palette.



This figure shows an algorithm in Native Instruments FM7 with three carrier/modulator pairs. The audio outputs are in the bottom row, so any operator connected to that row by a vertical line is a carrier. The signals from modulators travel down and to the right to enter the modulation inputs of the carriers.

Though FM is capable of producing a wide variety of sounds, programming your own FM presets is not always easy. In this column, I'll cover the basics of FM programming, with an eye toward making useful sounds. If you're curious about the theory behind FM synthesis, see "Square One: FM Basic Training" in the April 1999 issue of EM and "Master Class: Smooth Operators" in the June 2003 issue; both are available at www.emusician.com.

It Takes Two

Most FM synths have either four or six *operators*. (An operator is a software construct that combines an oscillator and its amplitude envelope.) These are combined in various ways to produce complex sounds. An excellent way to start learning FM is to take a preset you like, and mute and unmute the operators one at a time to hear the contribution that each makes to the sound (see **Web Clip 1**). It's easier to hear what's going on if you also switch off any filters or effects in the preset.

The three most important characteristics of an operator are its frequency, its amplitude, and the shape of its amplitude envelope. Let's look at each in turn.

Changing the frequency of an operator affects the tone color in an immediately obvious way. To experiment with this, mute all but two of the operators, and make sure they're patched as a carrier/modulator pair. Give them both full-on organ-type envelopes (instantaneous attack and release), and set the amplitude of the modulator to a moderate value. (If the modulator also has a direct audio output, turn it down to zero.) Then experiment with the relative tunings of the two (see **Web Clip 2**).

Next, try slowly increasing and decreasing the amount of signal coming from the modulator (see **Web Clip 3**). As the modulation amount increases, the number of *sidebands* (sine wave components above and below the carrier frequency) in the signal increases, as does their loudness. At first, this may sound rather like raising and lowering the cutoff frequency of a lowpass filter. If you listen closely, however, you'll hear that some sidebands increase and then decrease in loudness while the amount of modulation increases steadily. The mathematical reasons for this are complex and have to do with phase cancellation. In general, though, increasing the amplitude of the modulator creates a brighter sound. At extremely high modulator amplitudes, frequency modulation produces so many sidebands that the composite waveform turns to noise.

Experiment with various envelope shapes for the modulator. An instant attack and quick decay back to zero produces a plucked sound. A modulator with a long attack time can add a subtle bit of color to the sustain portion of a tone (see **Web Clip 4**). By applying three modulators with different envelopes to a single carrier, you can change the carrier's harmonic spectrum in complex ways over the course of each note.

Slow Pitch

One feature found on some FM synths is the ability to change the pitch of individual operators under envelope

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or LFO control. Changing the pitch of one operator rather than changing them all together would cause the frequencies of the sidebands to become inharmonic, which produces a sound usually lacking in a clear pitch. Detuning one operator slightly from another, however, produces a pleasing chorused quality, much as it does in analog synthesis.

If your FM synth has only one general-purpose LFO, you can create a separate vibrato LFO by setting an operator to a low, fixed frequency and using it to modulate other operators. This works because FM synthesis is based on the same concept as vibrato. The main difference is that most FM patches have modulating waves that are in the audio frequency range (above 20 Hz).

Advanced FM Techniques

Controlling the amplitude of a modulator from MIDI Velocity is extremely useful. Because each modulator can add different partials to the tone, playing harder and softer can change the timbre in ways that would be extremely difficult to duplicate using an analog-style filter.

The FM4 Ensemble in Native Instruments Reaktor 5.1 uses four operators, each of which has its own envelope. The modulation matrix (which functions like the matrix in Fig. 1) is on the left.

Instead of tracking the keyboard, an FM operator can be tuned to a fixed frequency. Tuning a modulator to a fixed high frequency can add *formants* to the tone (see **Web Clip 5**). A formant is a frequency or a group of frequencies that doesn't change as the fundamental changes. Another option is to tune the carrier to a fixed sub-audio frequency (around 1 Hz). That will give the tone of its modulators a rolling chorused quality (see **Web Clip 6**).

Classic FM uses sine waves for both the carriers and modulators. But as early as the Yamaha TX81Z (a 4-operator module that was released soon after the original DX7), operators with a choice of waveforms were provided. Choosing anything but a sine wave as a carrier or modulator multiplies the number and intensity of the sidebands, because each overtone in a more complex wave serves as a separate carrier or modulator, generating new sidebands that are added to the mix.

If the carrier is tuned to a high frequency and the modulator to a lower one (though still above 20 Hz), the modulator will provide the fundamental for the composite waveform. If you place an envelope on the modulator's amplitude, the carrier's high tone will be left exposed as the modulator decays toward zero (see **Web Clip 7**). This technique can be used to emulate the sound of an electric guitar feeding back.

Algorithms

The operators in an FM synth can be configured in a number of ways. For instance, with only four operators you can have either two carrier/modulator pairs, one modulator affecting three carriers, or three modulators all affecting one carrier. These configurations are called *algorithms*. Some FM synths have a fixed set of algorithms that the user selects from, while others allow users to design their own algorithms.

Choosing the right algorithm is an essential part of FM sound design. For a rich pad sound, you'll want three carriers that are slightly detuned from one another. Many bass sounds, on the other hand, use only a single carrier, because the phase cancellation caused by detuning can cause a bass to lose punch.

On Track

Another feature of FM synthesizers that dates back to the early days is *keyboard tracking*. When a keyboard-tracking curve is applied to an operator, its output has a greater amplitude in one region of the keyboard than in another.

Keyboard tracking can tame the output of an operator in a region where it would create too many prominent sidebands. Reducing a modulator's amplitude at the low end of the keyboard, for example, produces bass notes with fewer overtones, which is helpful because it prevents the bass from overpowering instruments that are playing in the midrange. Many acoustic instruments sound quite different in different pitch ranges, so keyboard tracking is useful in emulating acoustic instruments using FM.

Reducing the modulator's level at the high end of the keyboard helps prevent *aliasing* (see **Web Clip 8**). Aliasing is a form of digital distortion in which the tone acquires new partials that are not harmonically related to the fundamental. The clangorous (bell-like) tones produced by aliasing can occasionally be useful for a special effect, but aliasing is generally undesirable. Aliasing is produced in FM synthesis when the modulation produces sidebands that are higher than the *Nyquist frequency*. (The Nyquist frequency is equal to one-half of the sampling rate. If the synth is operating at 44.1 kHz, the Nyquist frequency is 22.05 kHz.)

If you're curious about FM, there's no need to remain in the dark. Both FM7 and Sytrus are available in demo downloads. Freeware synths that do FM include Green Oak's Crystal (www.greenoak.com/crystal/download.html), which is cross-platform, and the Windows-only Oxe from Daniel Moura (www.oxesoft.com/products.php). FM is well suited to experimentation, so why not give it a try? EM

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Jim Aikin has played and written about hundreds of synthesizers, but he still remembers the first day his ears were opened by a Yamaha DX7.

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By Strother Bullins

Four Web sites that can boost your music career.

Most serious musicians will agree that composing, recording, and performing great music is a full-time occupation. Yet there is no promise of seeing a single dime for the time and effort involved in creating such art, nor any guaranteed rewards for its artistic merit. That may come later, after more work in the realms of self-promotion, networking, and other, far less enjoyable endeavors.

Fortunately, help is available, much of it through Internet-based musicians' resource companies. In this column, I will focus on four such outfits—ArtistShare, Broadjam, Pump Audio, and Sonicbids—all of which are designed to assist artists who have the goods but aren't sure how to turn them into revenue streams. Each of these unique businesses goes to impressive lengths to help musicians generate music-based profits without having to know all the right people, hang out in all the right places, or spend a lot more money than they can really afford.

These four musicians' resource sites offer a range of services that can help you gain recognition and income. Clockwise from upper left: ArtistShare, Broadjam, Pump Audio, and Sonicbids.

ArtistShare

Founded by musician and computer programmer Brian Camelio, ArtistShare (www.artistshare.com) was born after three years of what he jovially recalls as "writing software, creating business plans, and eating a lot of Chinese takeout, all in the name of the creative process." ArtistShare, he insists, "is a business model *and* a philosophy. The business model enables artists to fund their work through their fans and own the copyrights to their work, which eliminates the need for outside companies. The philosophy part is about empowering artists and developing strong, loyal relationships with fans by allowing them to be a part of the process."

Being a part of the process at ArtistShare includes selling more than just CDs or music downloads. Some artists have sold complete scores, seats at rehearsals, autographed merchandise, and—in the case of trumpeter and composer Brian Lynch—a chance to participate in the recordings of new releases. "Brian called me a few weeks ago and invited me to the studio for the mix of his record," recalls Camelio. "He blew me away when he told me that his Executive Producer Participant was there—he had flown in from Houston to attend the mixing session. Roger, an amazing fan who loves Brian's music, signed up for his ArtistShare project through the Executive Producer Participant offer. And he came to the recording session!"

One of ArtistShare's success stories is that of jazz composer Maria Schneider, whose release *Concert in the Garden* (ArtistShare, 2004) won a Grammy and is the first recording to receive the award without being distributed in record stores. "That was real validation that the method and philosophy worked," Camelio beams. "Maria was an artist who had been largely ignored by the industry. Winning the Grammy through ArtistShare offered assurance that great music and art will continue to be created even if it's not 'industry approved.'"

Broadjam

According to Roy Elkins, founder and CEO of Broadjam (www.broadjam.com), finding success through his firm is all about utilizing its

"We Had a Hit Single with Jesse McCartney, and it all Began with TAXI"

Andy Dodd and Adam Watts – TAXI members
www.reddecibelproductions.com www.adamwatts.com

Adam and Andy's success through TAXI is a little bit different from all the other stories you've probably heard. They got their *biggest* deal after their membership ran out!

Here's how it happened: "We joined TAXI in 2001 and found that it was a great motivator for us. We were members for two years. We learned a lot, wrote a ton of songs, and got a few film and TV placements -- some through TAXI, and some on our own.

We submitted a song we wrote with Jenn Shepard called "You Make Me Feel" to one of TAXI's Industry Listings. We didn't hear anything back for a while and eventually our TAXI membership ran out. Thankfully, we began to get so busy with production and writing gigs that we decided to wait and renew our membership at a later date.

Little did we know that TAXI had sent our song to a production/management company that was looking for material for a young, male Pop artist they were developing.

Later that year, Jesse McCartney's managers called us saying they had just heard "You Make Me Feel" on a CD they got from TAXI and wanted to have him cut the song. Although Jesse decided not to record "You Make Me Feel", his managers asked us to write more songs for him. We wrote a handful and they ended up putting his vocal on two of the tracks we produced, "Take Your Sweet Time" and "Beautiful Soul".

"Beautiful Soul" got played on Radio Disney, and Jesse's management got the song to a label executive at Disney. Soon after, Jesse was signed to Hollywood Records. "Beautiful Soul" became his first single, and we both signed publishing deals with Disney Music Publishing.

Jesse McCartney's album (entitled "Beautiful Soul") has gone Platinum in the U.S. and Australia.

"Beautiful Soul" went to #3 on Radio and Records CHR Pop Chart, #5 on Billboard's Top 40 Chart, #19 on Billboard's Adult Top 40 chart, it's a Platinum Digital Single Download, it's on the Gold-selling 'Cinderella Story' Motion Picture Soundtrack, the Gold-selling 'That's So Raven' TV Soundtrack, and the video was nominated for Best Pop Video at a 2005 MTV Video Music Awards."

All of this came about because Adam and Andy sent a song to TAXI. Call for our free information kit!

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synergistic benefits. "Broadjam serves three distinct market sectors: musicians, underground and indie music fans, and the music industry," he explains. A litany of services exists for musicians, including comprehensively maintained and appropriately designed Web sites for $199 a year or $19.95 a month, over 175 review-based song charts, song-transmitting services, and what Elkins believes to be the highest net download payout on the Internet: over 80 percent of sales.

"Our music downloads are priced at 99 cents, and artists receive 80 cents for each sale," he explains. "Almost the whole team here at Broadjam is made up of musicians, myself included. So we have worked hard to develop a fair and ethical business model to deliver really useful services for serious musicians."

Of course, making money from sales requires more than just great payouts for downloads; the audience must be there, too. That's why true music fans and the music industry itself require the remainder of Broadjam's attention. Using a comprehensive search mechanism and a database of 200,000 songs and 50,000 artist members, Broadjam is able to give music fans exactly what they want. "Broadjam captures a lot of metadata about songs, so searches can be really focused," explains Elkins. "Fields include genre, subject matter, mood, tempo, lyrics, and geography. In fact, we know that industry pros use our database to search for just the right song for specific projects."

And if anyone is aware of the attributes of Broadjam, it's the industry. "We provide professional consulting and project-based services for industry clients such as the Academy of Country Music," Elkins says. "We build and run the ACM voting system for the awards show broadcast on CBS every May, and we also built their Web site. Other clients include Peavey, Yamaha, Warner/Chappell, several publishers, and more."

Pump Audio

At Pump Audio (www.pumpaudio.com), the goal is to connect indie artists directly with mainstream media clients ready to write checks for the use of truly great music. Artists are able to license their music to productions while retaining all ownership rights, and television and advertising producers gain access to new music and often untapped talent.

"Pump Audio is a new kind of agent for independent musicians, digitally connecting them with buyers in the mainstream media," says Steve Ellis, founder and CEO of Pump Audio. "With a growing catalog of tens of thousands of songs—all by independent artists from around the world—customers access music through Pump Audio's innovative search software and delivery device, the PumpBox." According to the company, Pump Audio licenses hundreds of independently produced songs per week to major and international clients such as MTV, VH1, NBC, CBS, ABC, Nickelodeon, and the BBC, among others.

So who is the ideal Pump Audio client? "Literally anyone," explains Ellis. "The whole concept behind Pump is that anyone, literally anyone, may make music that our clients find useful."

According to Ellis, the Pump network includes 65,000 tracks under license with over 50,000 licensing placements to date. "Rock, electronic, and hip-hop are the genres we see the most and the ones that are used the most. All music submissions are prescreened, and Pump's staff listens first for recording quality. Obviously, we can't accept music that is poorly recorded, though perfect sound isn't needed either. After that, it's about the performance and the sounds and style."

One of Pump Audio's more interesting success stories is that of a California recording artist and a Pump client from an ad agency in Portugal. "The agency started using the PumpBox and immediately picked a track for a Portuguese bank," Ellis explains. "Most interesting was that the track was from L.A. alt-country artist Brady Harris. He got paid and started getting emails from Portuguese women."

Sonicbids

Sonicbids (www.sonicbids.com), a company founded by current CEO Panos Panay, set out to do something about the music industry's problem with the elusive "press kit." In the past, musicians' press kits either were missing something or included too much; they never seemed to be right for every potential client's needs. But at Sonicbids' online headquarters, affordably priced and easily emailable electronic press kits (EPKs) are a reality, perfect for musicians seeking to rustle up publicity and to apply to various events, festivals, and other jobs. In a word, to be a user of Sonicbids means to be "connected."

Panay insists that if you aren't already a member of Sonicbids, you're missing out—membership clearly has its benefits. "We have 60,000 artists and some 5,200 promoters from 107 countries using the service, and we are growing daily."

However, Panay is clear to explain who would not be the ideal Sonicbids member: "The *American Idol* and *Star Search* crowd," he deadpans. "Sonicbids is a cool, professional community. We like to preach the gospel of DIY, the artist-as-entrepreneur ethos. The perfect member—and the one who gets the most benefits from Sonicbids—is the artist who is looking to be proactive about their career, who understands that if used correctly, the Internet is a powerful tool to connect you with audiences and opportunities. But it's up to you to make it work for you and your needs. We are a site for musicians for whom music is a passion and career, not a ticket to fame." EM

Strother Bullins is a North Carolina–based musician and freelance entertainment writer.

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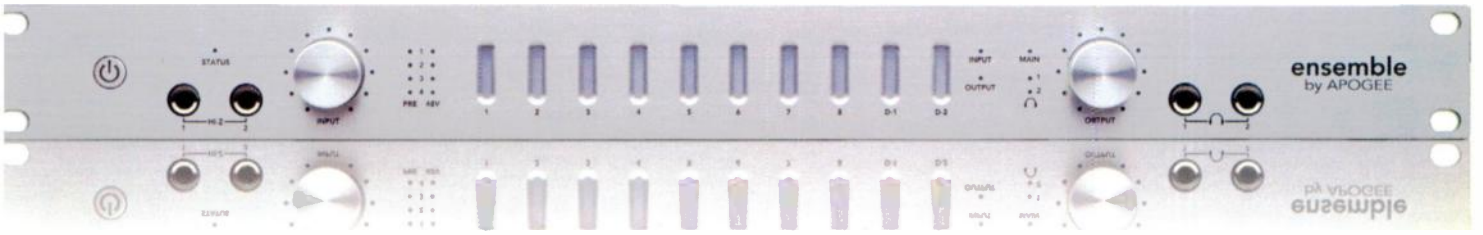

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ABOBE SYSTEMS Audition 2.0 (Win)

Real-time mixing and more enhance this audio editor.

By Allan Metts

From its humble beginnings as Cool Edit Pro, a midline stereo audio editor, Adobe Audition has evolved into a powerful platform for multitrack recording, mixing, and mastering. Version 2.0 continues this evolution by adding real-time mixing and monitoring, new ways to analyze and edit audio, and a host of other new features. I reviewed Audition 1.5 in the January 2005 issue of EM (available online at www.emusician.com), so I'll cover only the new and improved features in this review.

FIG. 1: Audition sports an intuitive, modern user interface that is consistent with those of other Adobe products. Panels can be rearranged and undocked.

Audition is available both standalone and as part of Adobe's Production Studio bundle. Its new look and feel put it more in line with other Adobe products (see **Fig. 1**), and like those, Audition now requires product activation within 30 days of installation.

Several of the editing tools in Adobe's programs have consistent names and behavior. So whether you're editing a photo in Photoshop, a drawing in Illustrator, or an audio clip in Audition, you'll find yourself in familiar territory. You can also link to Audition from other Adobe programs. For example, if you choose Edit In Audition while working with video in Premiere Pro or After Effects, your audio will open in Audition. Audition also links to Adobe Bridge, which provides content management and metadata-based searching and organization for audio, video, photos, and text documents.

Life in Real Time

Audition now supports ASIO and offers low-latency mixing and monitoring. All of the inputs and outputs on

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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

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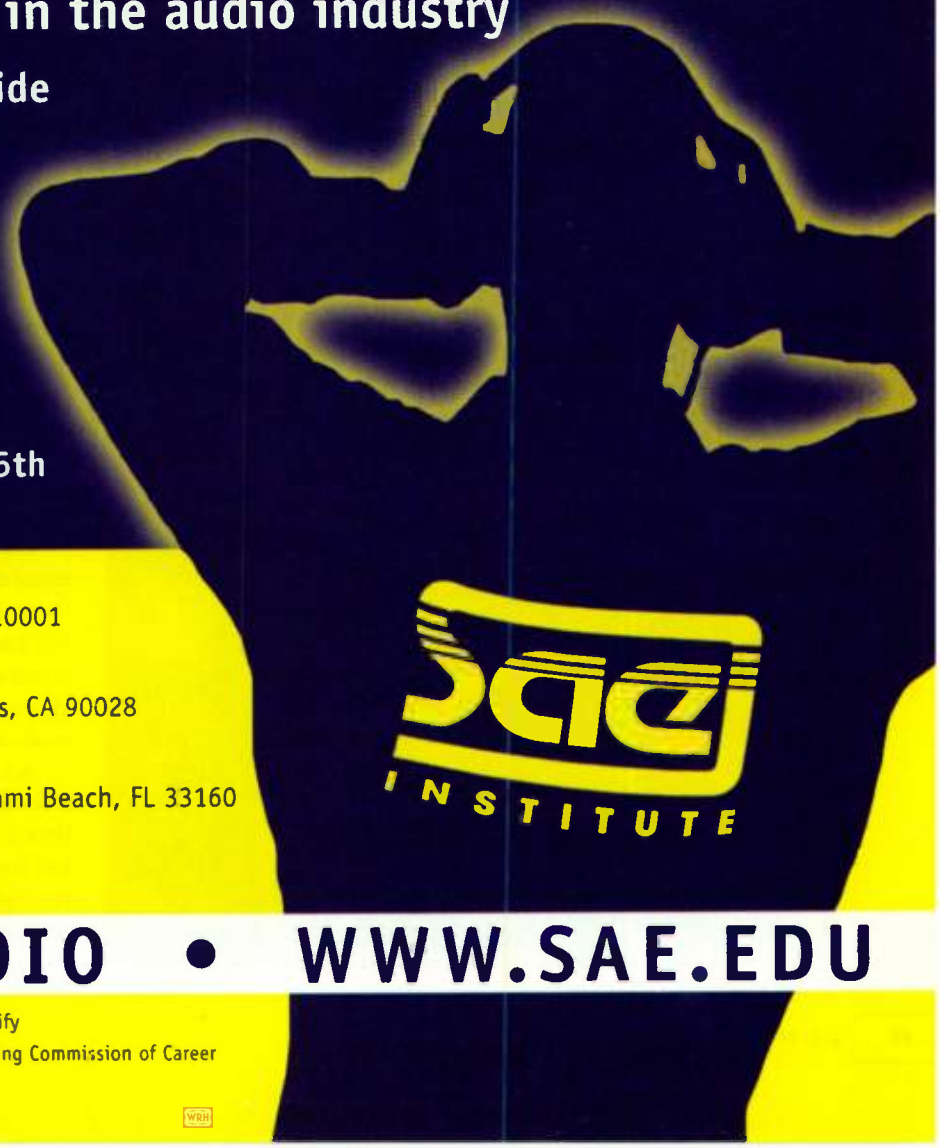

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my MOTU 828 were recognized immediately, and with monitoring set to Audition Mix in the Session properties, I could monitor the inputs on any track as soon as it was armed for recording. Latency on my 2.4 GHz Pentium 4 system was only 2 ms, which is undetectable to my ears.

When monitoring, you can choose Smart Input, which monitors the input only when you're actually recording in a track (useful for punch recording). Or you can choose Always Input, which always monitors live audio, regardless of whether you're playing back or recording. In either case, you hear exactly what you'll get in the final mix, including the impact of any effects that you might have configured.

Audition 1.5 had support for multiple buses, but the audio-routing capabilities in version 2 have improved dramatically. The only limit on the number of tracks and buses is your system's resources. Buses appear alongside tracks in the Multitrack view, and configuring effects racks in each track and bus is much more intuitive than before. With live monitoring, you can hear what changes to effects parameters will sound like as you make them.

Each track and bus can have 16 stereo sends to other buses (complete with pan controls), and each send can be configured as pre- or postfader. The bottom line: Audition's audio routing is flexible enough to set up any configuration you can imagine.

All of this capability is of no use if you can't make sense of it during a mixdown. To help in this regard, Audition now has a Mixer view that shows each track and bus side by side (see Fig. 2). There's nothing here that isn't also available on the main track view, but the Mixer view gives you the ability to see everything on one screen. If you need more screen real estate, you can hide the output, effects, sends, or EQ sections of the channel strips. You can also drag, dock, or hide all windows and window panels, and then save your layouts as a work space.

FIG. 2: Audition's new Mixer view lets you see all the settings for each track and bus at the same time. Several controls can be hidden if you need more screen space.

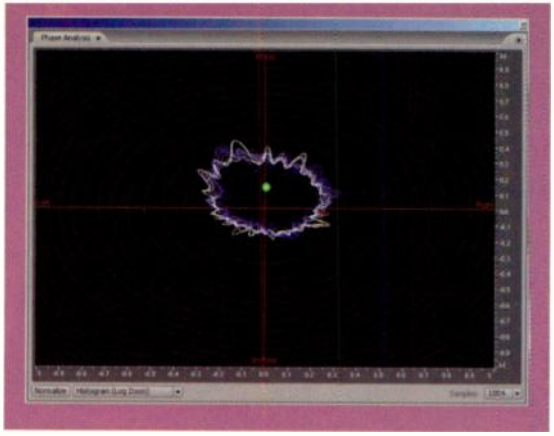

FIG. 3: Audition's Phase Analysis window gives you a graphical representation of your audio's stereo spread and phase relationships. Everything above the horizontal line is in phase.

The Automation Lane

Audition 2 allows you to open any number of automation lanes to establish precise control over individual track and send levels, panning, muting, EQ, input gain, and effects parameters. I like the ability to open lanes only for what's needed while leaving everything else hidden.

As in previous versions, there are level and pan envelopes for each clip. But the envelopes in automation lanes operate on the track as a whole and give you access to many more parameters. The envelope editing tools behave in the same manner whether you're adjusting a clip's envelope or an envelope in an automation lane.

There are five modes for recording envelopes in automation lanes, each of which can be set on a per-track (but not per-lane) basis. Off causes the automation lanes to be ignored during recording and playback, and Read lets you hear the envelopes being applied during playback. Write records new envelopes as the transport moves, and Touch overwrites the envelopes only while you're making a change to a particular control.

The fifth mode, Latch, starts recording new values as soon as you make a change and continues recording until the transport is stopped. And even though these modes are set on a per-track basis, there's a Safe During Write button on each envelope to keep you from inadvertently changing envelopes that you don't want to change.

I really like Audition's automation capabilities, and I found them very intuitive to use. I would, however, like the ability to control automatable parameters using any MIDI message. A MIDI Learn mode to help set it all up would also be useful. This capability would make mixing using real faders and knobs on hardware much more practical.

Adobe claims that Audition works only with the Mackie Control Universal (MCU) or a device that emulates it, such as the Behringer BCF2000. My ADS Tech Red Rover—left around from my days using Cool Edit Pro—worked fine, however, though it deals with only one track at a time. It would be great to see more manufacturers adopt the MC standard. (Adobe offers an

SDK that would allow developers of control surfaces to add Audition 2.0 support, and new programs such as WiseMix's approximately $49 MCmu Mackie Control emulator, available at www.wisemix.com, could alleviate this problem.)

Audible Editing

Given Audition's roots as a 2-track editor, it makes sense that the program's offline editing capabilities should see some enhancements. Audition's Spectral view has a new Lasso tool that lets you select precise regions across time and frequency for editing. You can display frequencies using either a linear or a log scale. Using the linear scale, the same number of hertz always covers the same number of pixels, regardless of frequency. In Log mode, the scale slides so that low frequencies are displayed using more pixels than higher ones.

A Spectral Pan display gives you a visual representation of stereo spread. This view shows time across the horizontal axis and pan position across the vertical (measured from 100 percent left to 100 percent right). Intensity is shown with brighter colors. A single-point source of audio, for example, moving from left to right in time would show up as a downward-sloping line. If you want a uniform stereo field, you should target a view that shows colors of equal intensity spread evenly from left to right.

Similarly, a Spectral Phase display shows you the phase relationships in your audio plotted over time. This lets you determine where any problems might be if stereo audio were to be summed to mono. Frequencies that are in phase are plotted at vertical center (0 degrees), and frequencies that are out of phase are plotted at their difference in phases (from +180 to –180 degrees). In my experience, using this display required me to isolate the exact audio that might have the phase problem. Audio of any complexity (for example, a final mix with a full-frequency spectrum, reverb, and so on) tended to show phase differences all over the place, which limited the tool's usefulness.

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FEATURES	3
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CONS: Minimal MIDI controller support.

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I found the Phase Analysis window more useful for detecting phase problems (see **Fig. 3**). The Spectral Phase display shows you phase over time, but the Phase Analysis window shows you the stereo spread and the phase relationship of your entire selection at once. Left versus right appears on the horizontal axis. In-phase audio is plotted above the horizontal axis, and out-of-phase audio is plotted below it. The program offers several alternate views of this data.

There are other improvements in the Edit view. The Scrub tool lets you find precise editing points by audibly scrubbing the audio with your mouse, and the Mastering Rack lets you set up a bank of effects that work in real time from the editing window. This allows you to hear exactly what will be printed to disk when the time comes to export a final master. In Audition 1.5 you could preview only one effect at a time, then you'd have to apply it and move on to the next one. Now you can preview your effects all together before applying them.

Other Goodies

Adobe added a number of other enhancements to Audition 2.0. An intuitive multiband compressor displays audio in four separate frequency bands and lets you adjust compression settings in each band during playback. There's support for additional video formats as well, including QuickTime, Windows Media, and MPEG, although you can export video only in the same format that you used to import it. Ogg Vorbis support, embedded BWF time stamps for broadcast applications, and support for XMP metadata (which is used in content-management applications) have also been added.

Audition includes gigabytes of royalty-free loops and music beds (the latter in 15- and 30-second lengths), a printed manual, and extensive online help. Its price has gone up a little since the last version, but it's still quite reasonable given the features you're getting.

Audition probably isn't the application to buy if you're looking for extensive MIDI support or a bundle full of soft synths. But if you need a solid program for multitrack recording and editing, with loads of built-in effects and lots of royalty-free content, then Audition is hard to beat. And if you're already using other Adobe applications, you'll certainly appreciate its familiar look and feel, as well as its integration with products such as Premiere Pro, After Effects, and Bridge.

Allan Metts is an Atlanta-based musician, software/systems designer, and consultant. Check him out at www.sonicbids.com/AllanMetts.

FIG. 1: The MPC2500 sports a set of 16 solid-feeling pads. Four Pad Bank buttons at the instrument's upper right let you trigger as many as 64 different sounds.

AKAI MPC2500

A venerable sampling series pulls out some new tricks.

By Marty Cutler

Of all the self-contained groove machines, Akai's Music Production Center (MPC) series has endured longer than most. The MPC retains a place at the top of almost every hip-hop musician's list, in spite of their general migration toward using software instruments. The MPC's survival is due in part to the convenience of its solid, all-in-one, drum-machine-style interface. Each successive model has managed to reinvent itself through expanded connectivity, storage, RAM capacities, and additional new features, all while retaining most of its predecessors' familiar design. Other factors contributing to the instrument's success include the MPC's much-vaunted feel, which has inspired numerous groove-quantizing algorithms in software sequencers.

Akai's latest addition to the series is the MPC2500, which has assimilated recent developments in groove-oriented software instruments—most notably, the ability to alter the tempo and feel of loops by slicing them into smaller components. The MPC2500's outward appearance has changed only slightly since the MPC60, which was introduced in 1988, enabling users of older units and devotees of drum-machine-style, pattern-based sequencing to adapt to new features comfortably.

Hit and Run

The MPC2500 has a solid heft and feels like a small tank. My review unit came with standard fixtures, including a CompactFlash card slot with a capacity of up to 2 GB, and a 16 MB CompactFlash card, which you need to have to be able to store projects. You can expand the unit's stock 16 MB of RAM to 128 MB. A USB jack on the rear panel lets you save and load data (including samples) to and from your computer and update the MPC's operating system.

Central to the MPC's operation and its controls are 16 heavy-duty, 1.25-inch-square foam-rubber trigger pads and a tilt-angle 240 × 64–pixel LCD (see Fig. 1). The size of the pads makes it easy for the most ham-fisted of programmers to build a groove, and yet the pads are very responsive. If you aren't satisfied with the response, you

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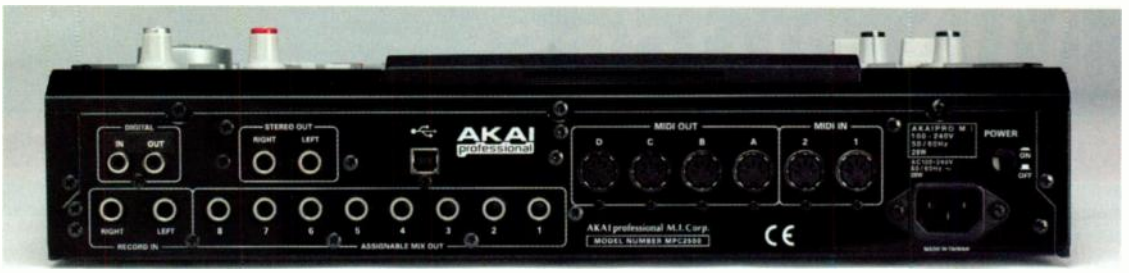

FIG. 2: The MPC2500's rear panel sports a generous complement of inputs and outputs. In addition to stereo analog ins and outs, you get eight assignable analog outs, coaxial S/PDIF I/O, two merged MIDI Ins, and four independent MIDI Outs.

can edit each pad's Velocity curve (try doing that with a keyboard). Each pad plays samples in as many as four Velocity layers. Although you can modulate between samples with Velocity, you can also use the instrument's Q-Link feature for that purpose. Furthermore, you can assign each pad's sounds to one of eight analog outputs in addition to the main stereo-output pair.

The Q-Link controls, comprising a pair of knobs and two faders, occupy a strip directly to the left of the pads. You can assign each Q-Link control to sound-shaping features such as filter frequency and resonance, so you can record data to animate sounds on playback. Each Q-Link control features a mysteriously named After button, which overrides previously recorded data for manipulating sound during playback—a handy feature for DJs.

Below the Q-Link section is an Erase button that deletes any notes triggered by a given pad when you hold the button down along with that pad. The Note Repeat button lets you program rolls based on the resolution you choose. Although the pads do not send Aftertouch, they are pressure sensitive and, along with the Note Repeat button, can continuously alter the dynamics of rolls with variations in pressure. Although pad pressure does not modulate between sample layers, altering the pressure helps achieve a small measure of realism and imparts interesting dynamics to buzz rolls.

You set the roll's note resolution using six function buttons that sit below the menu in the LCD; the menu and associated function buttons are context sensitive. For example, in the Note Repeat menu, you can select values ranging from 8th notes to 32nd-note triplets, and in the Main window, selections include setup for time correction (quantization value), click, track selection, muting, and soloing. Knobs at the top panel's upper right adjust recording-input gain and monitor level. The Input Thru button allows you to process external audio through the MPC2500's filters and effects.

The MPC2500 furnishes coaxial S/PDIF input and output on the rear panel, but you can apply the filters and effects only to the analog signal path. Also on the rear are two MIDI In and four MIDI Out ports, the analog inputs and outputs, and the USB port (see Fig. 2). The CompactFlash slot, two footswitch jacks, and a stereo headphone output are on the unit's front.

If you plan to make the MPC2500 the center of your music-production hub or use it as a standalone instrument, you should consider adding the optional CD-RW drive and an internal hard disk. Because my review unit arrived without the CD-RW option, I was unable to test the added feature set. Although the MPC2500 can render individual WAV files to audio CD, it does not render songs or sequences as audio data; you must upgrade the unit's operating system to version 1.1 to write to CD. If your computer can burn CDs, however, the MPC's built-in USB connectivity makes purchasing a CD drive a bit redundant. Likewise, the USB link obviates a built-in hard disk if you have a computer to store files.

The MPC2500 offers the expressiveness of linear sequencing and the convenience of pattern-based song construction.

Bank Shot

A set of eight buttons sits below the Rec Gain and Main Volume knobs; the top row of four buttons engages pad banks A through D, bringing the total number of pads in a program to 64. Two buttons fix Velocities at maximum value or quantize Velocities to 16 levels, which is useful if you are a beginner with an unsure hand at dynamics. The Next Seq button calls up a menu of available sequences, and the Track Mute button summons a page that shows the tracks and the data contained therein; you can mute any track by tapping on its associated pad. One function button lets you toggle between track soloing and muting. Selected tracks are highlighted in the menu display. Visual confirmation is especially handy, given the difficulty of memorizing which pad in which

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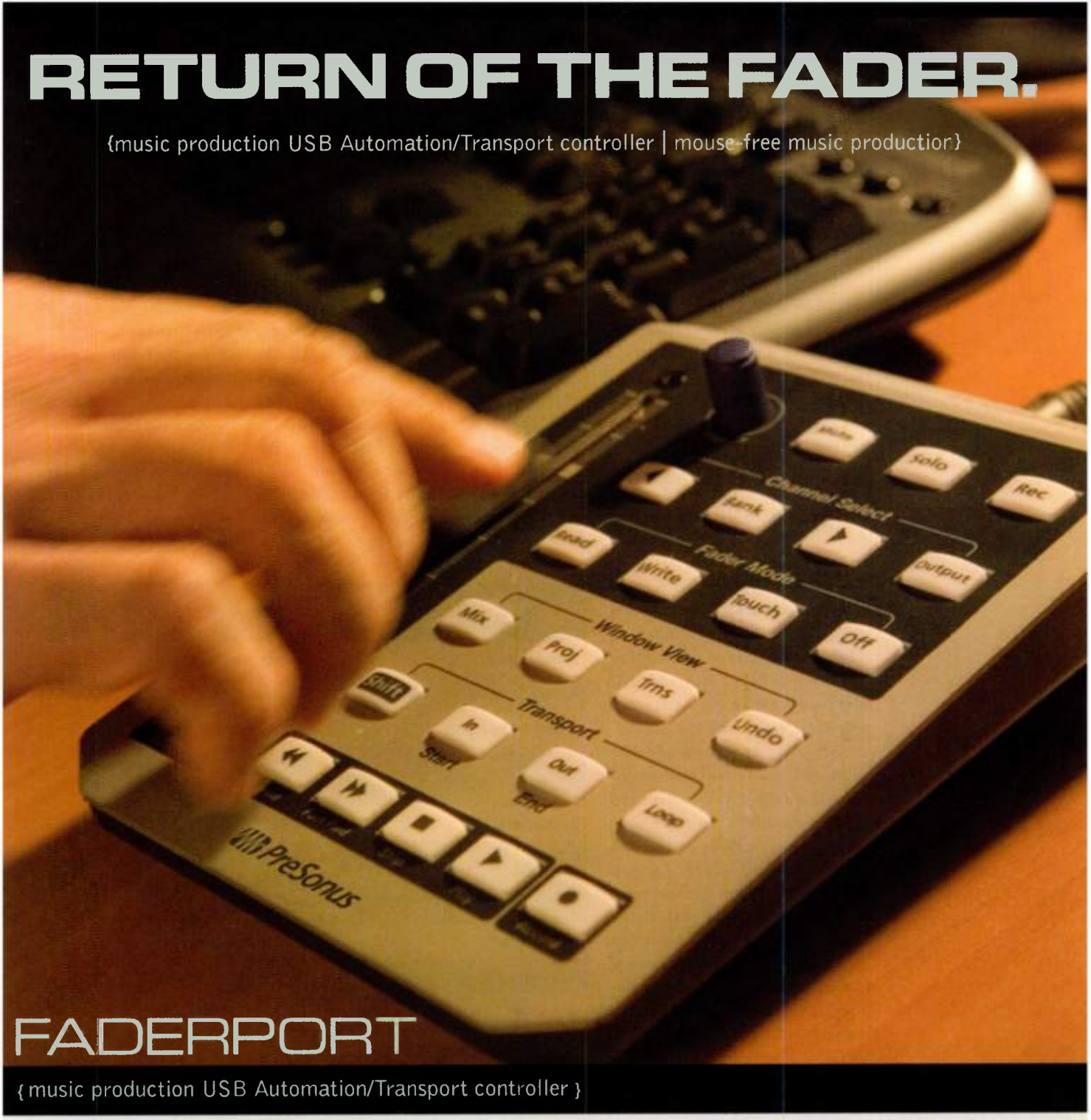

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bank triggers which one of the 64 possible tracks.

In the data-entry section, you can change values or navigate to the next song using the data wheel, enter values directly using the numeric pad to the left of the wheel, or change values incrementally using the plus and minus buttons. Use the 2-axis cursor buttons to navigate to the parameter you want. A Chiclets-size button to the left of the cursor buttons lets you instantly change tempo by tapping quarter notes.

The red Mode button calls up additional pad functions such as saving and loading data, setting loops, recording and programming samples, and other tasks. Similarly, the Shift button accesses additional context-sensitive functions, such as entering text characters in file-naming procedures. However deep you find yourself in the instrument's page and menu hierarchy, the Main button takes you back to the top. The ever-popular Undo button is to its left. The lowest two rows are devoted to familiar transport controls for locating, recording, and playback.

Simple Sample

The MPC2500 plays and records 16-bit, 44.1 kHz audio in WAV format only. The instrument supports a limited amount of proprietary data, such as PGM, SEQ, and SND files from previous MPC units, but only as far back as the MPC1000.

Sampling is simple and has remained relatively unchanged since the early days of Akai sampling instruments. To start sampling, press the Mode button and the pad labeled Record. You can sample through the left and right analog inputs or the digital inputs, or choose the MPC's main outputs for resampling through effects and filters. Surprisingly, although resampling is done internally, it stays entirely in the analog domain. The MPC2500's effects sound adequate but pedestrian; the most exotic is the distortion and bit-reduction algorithm. The best-sounding effects are the filters.

To assist in setting a threshold and sample time, horizontally arranged level meters give you visual feedback. Press the Record function button, and either the instrument will wait for a sufficient level to initiate the sampling process or you can manually begin sampling by pressing the Start function button.

Attention, Choppers

New to the MPC series is the unit's Chop Shop feature—Akai's take on loop slicing as exemplified by software applications such as Propellerhead ReCycle and Spectrasonics Stylus RMX. After you access the Trim window and press the function button for Chop, you can either divide the sample into 2 to 64 equal segments or let the MPC2500 use amplitude measurements as slice points. If you choose the latter, you can tweak time and amplitude thresholds for peak detection as well as the unit's sensitivity to variations in attack level. Each of those parameters provides settings between 0 and 100. The default settings worked just fine for drum and percussion grooves, but it was flummoxed by samples that had weaker attacks, such as organ pads and the like. To be fair, sounds with weaker envelopes are usually difficult to divide into rhythmic slices.

You can then choose one of two methods for playback: Patched Phrase or Sliced Sample. The first assigns the entire loop to a single pad, and the loop will adapt to the MPC's tempo. The second assigns

MPC2500 SPECIFICATIONS

Sound Engine	32-note polyphonic sampler
Audio Format	16-bit, 44.1 kHz WAV
Analog Audio Inputs	(2) balanced ¼" TRS
Analog Audio Outputs	(8) balanced ¼" TRS, (1) ¼" stereo headphone
Digital Audio I/O	coaxial S/PDIF in and out
Data I/O	(1) USB 1.1, (2) MIDI In, (4) MIDI Out (switchable to MIDI Thru), (1) CompactFlash
Control Inputs	(2) ¼" footswitch jacks
Display	240 × 64–pixel backlit LCD
Pads	(16) 1.25", Velocity- and pressure-sensitive (no Aftertouch)
Sampling RAM	16 MB, expandable to 128 MB
Sequencer	(64) tracks, (99) sequences × (999) measures, (20) songs × (250) steps (each containing a sequence), 96 ppqn
Effects	insert effects (2 simultaneous): chorus, flanger, bit grunger, 4-band EQ, compressor, phase shifter, tremolo, pan, reverb, delay; master effects: 4-band EQ, compressor
Dimensions	16.34" (W) × 3.68" (H) × 13.11" (D)
Weight	13.56 lbs.

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each slice to its own pad, letting you trigger phrase elements in any order you choose, change the feel or omit elements of the phrase, apply effects or alter the tuning of individual elements, and perform other operations.

The tempo-detecting features worked well, and they accurately interpreted several drum loops I had imported. Once you have determined a file's tempo, you can use one of several time-stretching algorithms. Time-stretching worked well for limited deviations of 10 bpm or so, but changing a 100 bpm drum loop to 120 bpm caused the kick drum to lose its punch.

MIDI Monster

As a sequencer, the MPC2500 offers the expressiveness of linear sequencing and the convenience of pattern-based song construction. A single track can hold data from any or all of the pads, and sequences can hold a maximum of 999 measures and 64 tracks. If that's not enough for a full-blown composition, you can link as many as 250 sequences to create a song (if RAM permits). You can even link a total of 20 songs for a magnum opus.

The MPC2500 serves well as a MIDI pad controller for external instruments. You can control up to 64 external MIDI channels thanks to the unit's four independent MIDI Outs. The MIDI Thru setup is as flexible as any I've seen. You can designate one, a pair, or all of the ports to echo incoming data, making the MPC2500 useful as a MIDI hub for live performance without a computer. The two MIDI In ports are merged instead of independent, but more than 16 MIDI input channels would probably provoke the bandwidth gods.

You can assign any pad to a different MIDI note. Along with the Note Number and pitch, the LCD shows the name of the General MIDI drum sound mapped to that note. That's handy for controlling external hardware, because many manufacturers use the GM note map for drums.

MIDI recording resolution is 96 ppqn,

PRODUCT SUMMARY

AKAI MPC2500

sampling workstation
$2,999

FEATURES	3
EASE OF USE	3
AUDIO QUALITY	3
VALUE	2

RATING PRODUCTS FROM 1 TO 5

PROS: Easy sampling. Terrific MIDI controller features. USB connectivity. Versatile loop slicing. Responsive pads with adaptable Velocity curves.

CONS: Overpriced. Poor documentation. Disappointing sequencer resolution. Optional CD-RW drive does not render songs to audio. Stingy sound set.

MANUFACTURER
Akai Professional USA
www.akaipro.com

which is pretty coarse given what the state of the art is. Quantizing options are also relatively stripped down, with choices ranging from 8th notes to 32nd-note triplets and no percentage quantization, except for the amount of swing (limited to from 50 to 75). You can either quantize data on input or fix the timing after recording.

Groove Analyst

On the surface level, recording, sequencing, and playback of the MPC2500 is easy to understand, but a page system selected by pads can lead you down a few blind alleys. For deeper editing, you will need to keep the manual close by. Unfortunately, the manual is among the worst I have seen, rife with typos and confusing directions.

Providing a generous startup library for samples has become a common practice for hardware and software groove instruments costing far less than the MPC2500. I was disappointed in the MPC2500's set, which consisted of a few banks on the 16 MB CompactFlash card. The sounds and loops are quite usable but not exceptional.

The feature set is impressive, but at $2,999 retail, the MPC2500 is overpriced. For that much, I would expect higher sampling rates and bit depth, more RAM, a built-in hard disk, and a CD-RW drive as standard issue. Nonetheless, MPCs have become something of an industry standard in the hip-hop world. Even if you are caught up in the unit's cachet, for the same money you could pick up a fast notebook computer with plenty of RAM, a decent audio interface, some sequencing software, a few sample collections, and a good pad controller (Akai makes a fine one).

Mixed Messages

Constructing songs using the Akai MPC2500's resources can be challenging (particularly when compared with using a computer-based sequencer) but also great fun. Anyone who's accustomed to MPC-style music production can fly on the MPC2500. It excels as a pad-style controller for external instruments, but the omission of Aftertouch transmission is a head-scratcher, especially considering that the pads are pressure sensitive. Likewise, the low MIDI-event resolution is puzzling, especially in light of claims for the instrument's classic feel. I hope that Akai will address some of these shortcomings with a future update (currently in the works, according to Akai) or in a next-generation instrument.

Contributing editor Marty Cutler likes to bang on things even when he isn't frustrated.

FIG. 1: *Stradivari Solo Violin* is an intelligent sample library that can translate keyboard gestures into nuanced performances that, until now, only a real violinist could accomplish.

GARRITAN Stradivari Solo Violin 1.07

Can a sample library bring perfection to life?

By Geary Yelton

For centuries, the gold standard in handcrafted acoustic instruments has been any violin, viola, or cello made by Antonio Stradivari (also known as Stradivarius), who lived in the Italian city of Cremona until his death in 1737. He built more than a thousand instruments in his lifetime. More than 600 of his violins still survive, and some are worth millions of dollars. It's generally accepted that in the hands of a talented performer, no violin sounds sweeter than a Stradivari.

> They said they could overcome sampling's accepted limitations.

One of the greatest challenges of realistic sampling is to capture the nuances inherent in playing an acoustic instrument. Whereas a real violinist can continuously control expressivity in real time, samples are static by nature. Typically, samplers lack an acoustic instrument's ability to subtly and seamlessly change timbre in response to a performer's expressive playing. To do that, a sampler would have to transition from one sample to another without interruption.

Over a year ago, Garritan announced the development of a sample library in association with Dr. Giorgio Tommasini and Stefano Lucato. By recording a Stradivari violin made in 1716, they planned to create a sample collection that captured the various articulations typically employed by violinists. They announced plans to offer a sampled Stradivari with harmonically aligned samples produced using a technique they called *sonic morphing*. They said they could overcome sampling's accepted limitations and smoothly crossfade from one dynamic level to another, with no phase anomalies, as a note sustained. I was naturally skeptical when I first heard their claims. That changed after I received *Stradivari Solo Violin* for review (see Fig. 1).

Coming in Kontakt

The sample library requires Native Instruments Kontakt 2; no other formats are available. Garritan

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FIG. 1: CamelPhat's control panel layout mirrors the signal flow from BP Filter (top left) to the master output (bottom right).

CAMEL AUDIO CamelPhat 3.15 and CamelSpace 1.15 (Mac/Win)

A pair of great-sounding multi-effects.

By rachMiel

CamelPhat 3.15 and CamelSpace 1.15 are multi-effects plug-ins from U.K.-based Camel Audio. CamelPhat is designed to add warmth, edge, growl, and in-your-face presence to bass, guitar, drums, grooves, and vocals. CamelSpace works less with timbre, more with rhythm. It specializes in superimposing rhythm patterns over pads and ambient sounds.

I installed CamelPhat and CamelSpace as VST plug-ins on my 2.3 GHz Pentium 4 computer running Windows XP. VST and AU versions are provided for the Mac. I had no trouble using the plug-ins in Sony Media Software's Sound Forge 8 and Acid 6 and Cakewalk's Sonar 5.

CamelPhat is quite CPU efficient; CamelSpace is more demanding. Being multi-effects, their CPU drain varies with the number of individual effects that are active. For example, with all nine effects turned on, six instances of CamelSpace in Sonar required 70 percent of the CPU, which works out to just over 1 percent per active effect. With all eight effects turned on, six instances of CamelPhat required 20 percent of the CPU, for less than 0.5 percent per effect. That's quite efficient in both cases.

CamelPhat

CamelPhat is a work of streamlined beauty and a joy to program (see **Web Clip 1**). Its six effects modules—BP Filter, Distortion, MM Filter, Flanger, Magic EQ, and Compressor—are graphically arranged to reflect the signal flow (see **Fig. 1**). The control panel also houses a pair of LFOs, a Value Readout display, an *x-y* controller pad, and a master output module.

BP Filter is a powerful bandpass filter. Low and High faders set the frequency boundaries of the pass band, and each has its own resonance control. You can use the BR Mix control to mix some of the rejected portion of the signal back into the output. Modest BP Filter settings soften the low and high ends of your signal, whereas extreme settings permit only the narrowest sliver of a band to pass through. Turning the Low Res control up can induce oscillation. Increasing the High Resonance can sharpen the output to a razor's edge.

The Distortion module offers four different distortion

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types: Tube (analog-style overdrive), Mech (a grittier version of the same and my favorite), Bit Crusher (bit-depth reduction), and Xcita (a high-frequency exciter). You can mix in varying amounts of each to create a rich and complexly distorted output ranging from a purr to a complete breakdown.

More Filters

MM Filter is a multimode resonant filter offering nine filter types—lowpass, bandpass, highpass, lowpass fat (an edgier version of lowpass), bandpass fat, highpass fat, notch, peak (inverted notch), and comb—along with a ring modulator. Attack, release, and envelope-amount controls fine-tune the envelope generated by a built-in envelope follower, which is used to modulate the filter cutoff and ring-modulator frequencies.

Flanger, a bare-bones flanging effect, has just two controls: Amount for the wet/dry mix, and Rate for the speed of the LFO that modulates the delay time. Its purpose is to impart a flange-inflected undercurrent to the mix when used in conjunction with other effects.

Magic EQ is an equalizer for boosting the low end. It works especially well with kicks, low toms, and bass lines. I fed it a groove, turned up the amount, and found that sweeping the frequency from minimum to maximum brought out elements of the low end I'd never heard before. Pressing the P (phat) button thickens the signal, but the effect can be too much when used with signals that are already rich in low frequencies.

The powerful Compressor module is modeled after classic analog studio compressors. As with many CamelPhat and CamelSpace effects, its few controls—compression amount, release time, and fattening—belie its power.

PRODUCT SUMMARY

CAMEL AUDIO CamelPhat 3.15

multi-effects plug-in
$85
$149 bundled with CamelSpace

FEATURES	4
EASE OF USE	4
QUALITY OF SOUNDS	4
VALUE	4

RATING PRODUCTS FROM 1 TO 5

PROS: Excellent sound quality. Handsome and efficient GUI. Generous preset collection. Intelligent random patcher. Reasonable price. CPU efficient.

CONS: Many low-level parameters are inaccessible. Distortion could be more dramatic. No internal tempo control.

MANUFACTURER
Camel Audio
www.camelaudio.com

Camels in Motion

Each of the LFO module's two independent LFOs can be routed to modulate any CamelPhat parameter using one of seven waveforms: sine, triangle, ramp up, ramp down, square, random square, and random triangle. Turning Rate Sync on syncs the LFO rate to tempo, and both triplets and dotted notes are supported.

Clicking on the Randomize button assigns random settings to every control in every active module.

FIG. 2: CamelSpace's step sequencer (bottom center) can control the Trance Gate, the AutoPan position, and the filter cutoff.

Randomization is intelligent, meaning that it generally results in musically interesting settings. It is great for creating new, unexpected sounds.

The Value Readout display shows the current preset name and has buttons for selecting the previous or next preset in the bank. When the Display Value option is active, it also displays the value of the currently selected knob.

The *x-y* controller enables you to modify the values of any two of CamelPhat's parameters. That is useful for both patch building and live performance. You can assign any parameter to the *x* (horizontal) or *y* (vertical) axis.

You can easily assign each CamelPhat control, including the *x-y* controller's cursor, to a MIDI continuous controller. Right-click on the control, choose MIDI Learn from the shortcut menu, and move your MIDI controller.

CamelSpace

Although CamelSpace is as well crafted as CamelPhat, the control panel is more crowded to accommodate more modules and a step sequencer. With a few exceptions, the panel again reflects the signal flow through the modules: Trance Gate, Enhancer, AutoPan, MMFilter, Flanger, StereoDelay, and Reverb (see **Fig. 2**).

Trance Gate works in conjunction with the step sequencer to gate incoming audio. That creates a host of enticing stutter effects, imparting rhythm to continuous passages. It's a great tool for adding inner motion to pads, chords, and legato melodies.

Enhancer combines two effects: Xcita adds presence-enhancing distortion to the upper frequency range. Softsat adds warmth and oomph by emulating analog-style soft saturation.

AutoPan automates left-right panning motion in a stereo track. The LFO and Seq buttons determine whether the automation is driven by an LFO with seven waveshapes or the step sequencer, both of which can be synced to host tempo. The MMFilter is the same as CamelPhat's, but in CamelSpace, its cutoff frequency can be modulated by the LFO or the step sequencer.

Flanger is a classic flange effect with typical controls: Delay, Rate, Depth, Feedback, and Mix. Unlike CamelPhat's, this flanger is capable of generating robust effects suitable for soloing.

StereoDelay has independent left- and right-channel delay times syncable to tempo. Global Feedback, Cutoff for a lowpass filter in the delay feedback line, and Mix controls are also present. The Reverb module is basic but effective, allowing control of room size and wet/dry mix (see **Web Clip 2**).

CamelSpace's powerful little 128-step pattern sequencer can drive the Trance Gate, the AutoPan position, and the filter cutoff. In just a few square inches of screen space, it manages to fit an attack-sustain-decay amplitude envelope for each step, eight 16-step patterns, a pattern selector for creating and arranging the playback of those patterns, a Length control that specifies the duration in bars of the 16-step patterns, and a Shuffle control for inducing swing. MIDI users will be happy to know that MIDI notes can be used to switch on different patterns for different effects parameters.

One Hump or Two?

From their classy looks to their reasonable price, everything about the CamelPhat and CamelSpace duo says "Buy me." The graphical user interfaces are well designed, and the documentation is clear and complete. The sound quality is excellent, and each comes with a generous collection of presets to get you started or to use as fodder for randomization.

If I had the cash for only one of these plug-ins, I'd go with CamelSpace. I found it endlessly fascinating to run groove loops through its presets, tweaking and randomizing as I went. I was slightly less bowled over by CamelPhat, but still sufficiently impressed to fork over the money. At $149 for the pair, you really can't go wrong.

EM Web Clips

rachMiel is a composer of deliriously experimental electronic and acoustic music.

PRODUCT SUMMARY

CAMEL AUDIO — CamelSpace 1.15

multi-effects plug-in
$85
$149 bundled with CamelPhat

FEATURES	4
EASE OF USE	4
QUALITY OF SOUNDS	4
VALUE	4

RATING PRODUCTS FROM 1 TO 5

PROS: Excellent sound quality. Attractive GUI. Generous preset collection. Intelligent random patcher. Reasonable price.

CONS: Some low-level parameters are inaccessible. Programming logic for long patterns is counterintuitive. No internal tempo control. Quite CPU demanding.

MANUFACTURER
Camel Audio
www.camelaudio.com

FIG. 1: The Joemeek sixQ furnishes a single-channel mic and instrument preamp, an optical compressor, three bands of EQ, and an A/D converter in a single-rackspace channel strip.

JOEMEEK sixQ

One-stop shopping for excellent sound.

By Eli Crews

tudio-gear manufacturer Joemeek, named after the innovative record producer and audio pioneer from the '50s and '60s, makes a next-generation line of preamps and signal processors designed in the U.K. and assembled in China. The sixQ, a monophonic channel strip, is in the product line's middle tier and has all you need to get great sounds from your microphone to your recording medium.

Hands On

The sixQ is a handsome forest green, single-rackspace unit with four distinct, clearly labeled sections: Preamp, Optical Compressor, Meequalizer, and Output (see **Fig. 1**). In the Preamp section, round white buttons engage 48V phantom power, a –20 dB pad, polarity reversal, and an 80 Hz highpass filter. In addition, the Iron button places a transformer in the preamplifier's circuit path, and the Line button switches between the mic and line inputs. A domed black knob controls preamp gain, with a range from 10 to 60 dB and with a special marking for the line amplifier's unity position. A red LED lights when the preamp reaches 6 dB below its clipping point.

The compressor has five knobs: Compress, Slope, Attack, Release, and Make Up Gain. As you turn the Compress knob clockwise, the threshold is lowered from +∞ to –20 dBu. Slope is roughly equivalent to a ratio setting, although the manual says that at a given slope setting, the ratio changes depending on the transient nature of the signal. Attack times are from 1 to 100 ms, and release times are from 0.1 second to 3 seconds. Make Up Gain sets the postcompression level, with the ability to boost the signal a maximum of 20 dB. Above the button for engaging the compressor circuit (with an accompanying bright blue LED) is a 4-segment LED meter indicating the amount of gain reduction taking place. This coarse meter shows when you are applying 2, 4, 8, or 16 dB of gain reduction to your signal.

The 3-band equalizer (labeled Meequalizer) has two semiparametric bands and one switchable band. You can sweep the low frequencies from 40 Hz to 650 Hz and the mids from 300 Hz to 5 kHz, and you can switch the high frequencies between 6 kHz and 12 kHz. All three bands are bell shaped and have a fixed Q (bandwidth) of 0.9, equivalent to 1.6 octaves; they also have ±15 dB cut or boost, with detents for the pot at the unity positions. Yet another white button engages the EQ circuit, which always follows the compressor in the signal path.

The Output knob is the final gain control; its range is from –∞ to +10 dB, with unity around the 1:30 position. An 8-segment LED meter displays levels, with VU ballistics and level indications from –24 dB to +12 dB. The top LED doubles as a peak indicator that lights when you are within 6 dB of 0 dBfs, which is helpful if you're using the onboard A/D converter. A button sets the meter to indicate either the output level or the signal at the preamp circuit. The unit has a rocker switch for power and a power-on LED that's positioned at the left of the horizontal bar-graph meter.

I to the O

On the rear panel is a female XLR jack for the mic input, a TRS jack for the balanced or unbalanced line input, a tip-send TRS jack for the unbalanced insert (which is always between the preamp and the compressor in the signal path), a male XLR jack for the +4 dBu balanced output, and a TRS jack for the secondary line output (see **Fig. 2**). This last jack operates at +4 dBu or –10 dBV and works with balanced or unbalanced connections.

The sixQ's internal A/D converter has optical (Toslink) and coaxial (RCA) S/PDIF outputs. Because the

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sixQ is a single-channel unit and the S/PDIF protocol is stereo, Joemeek has cleverly included a line-level TRS input jack for getting a second analog signal (presumably from another mono preamp) into the remaining S/PDIF channel. In addition, there are two buttons for choosing your sampling rate; one toggles between 44.1 kHz and 48 kHz, and the other multiplies the chosen sampling rate by a factor of two, resulting in 88.2 kHz and 96 kHz settings. When I compared the sixQ's converter with the high-quality converters I usually use, I heard no discernible differences. Also on the back panel is an integrated power supply with a fuse housing and standard IEC power cable socket.

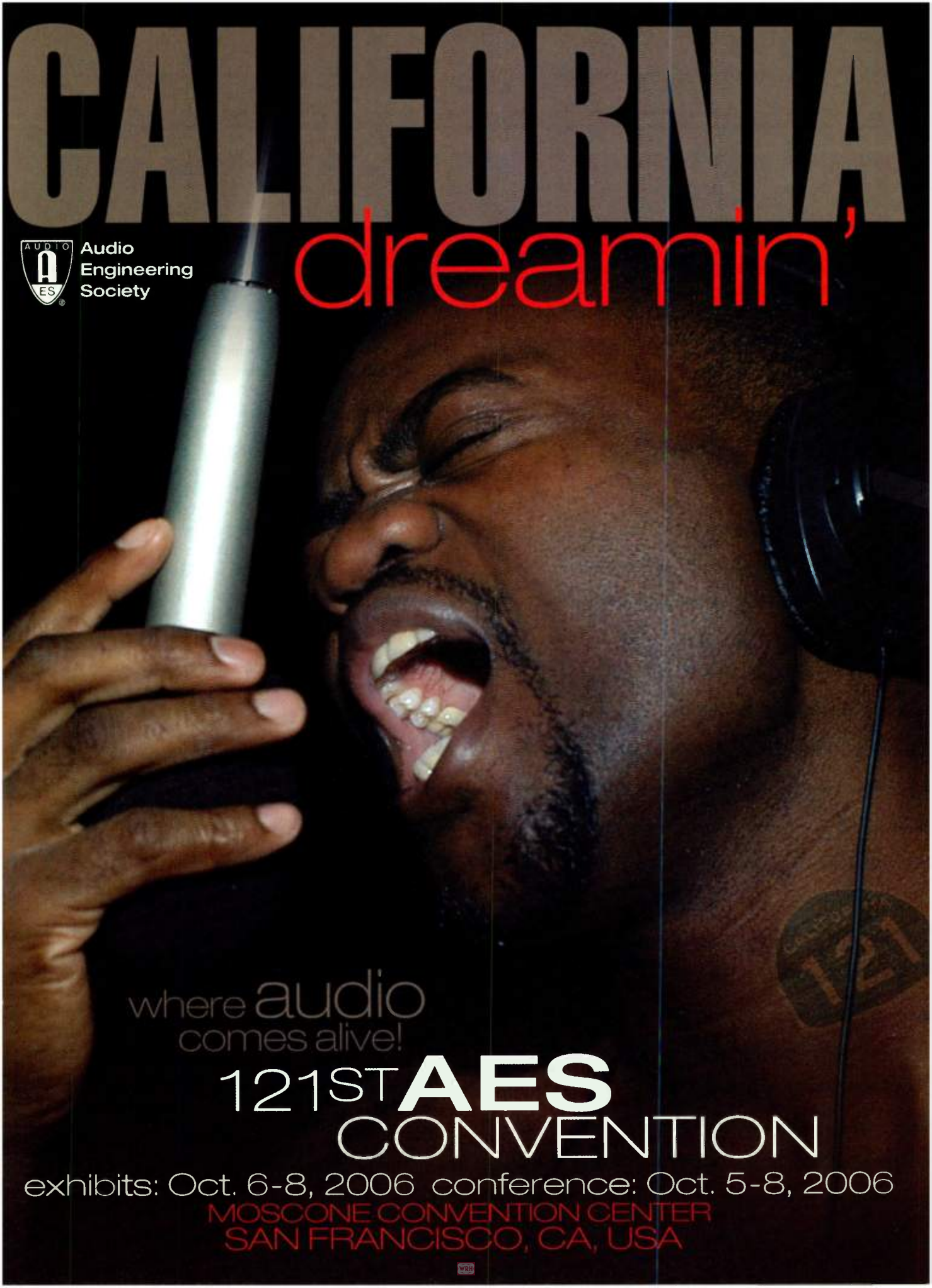
Enriched with Iron

The sixQ manual and the Joemeek Web site boast of the Burr-Brown INA217 op-amp at the heart of the sixQ's preamp circuit, and I was impressed with the preamp's features and functionality. I tried it with numerous mics on various sources (kick drum, snare, bass, guitars, and vocals) and was always pleased by the sound. When directly compared with some of my favorite high-end mic preamps, the sixQ didn't always win out, but it held its own impressively.

Surprisingly, one of the standouts was an acoustic guitar miked with a Royer R-121. Ribbon mics need substantially more gain than other mics, especially on a quiet sound source. The 60 dB of preamp gain was barely enough

SIXQ SPECIFICATIONS

Channels	1
Analog Inputs	(1) balanced XLR (mic) with switchable 48V phantom power; (1) balanced ¼" TRS (line); (1) ¼" high-impedance TS (instrument)
Analog Outputs	(1) balanced XLR (+4 dBu); (1) balanced ¼" TRS (+4 dBu or –10 dBV, switchable)
Digital Outputs	(1) coaxial S/PDIF; (1) optical S/PDIF
Sampling Resolution	24-bit
Sampling Rate	44.1, 48, 88.2, 96 kHz
Highpass Filter	12 dB/octave cut below 80 Hz
EQ Boost or Cut	±15 dB
Low EQ	40 Hz–650 Hz, continuously variable
Mid EQ	300 Hz–5 kHz, continuously variable
High EQ	6 kHz/12 kHz, switchable
EQ Bandwidth	0.9 (1.6 octaves)
Compressor Threshold	+∞ to –20 dBu, continuously variable
Compressor Ratio	1:1–10:1, continuously variable
Compressor Attack Time	1 ms–100 ms, continuously variable
Compressor Release Time	0.1 second–3 seconds, continuously variable
Gain	+10 dB–+60 dB
Frequency Response	15 Hz–70 kHz
Input Impedance	mic 1.2 kΩ; line 20 kΩ
Output Impedance	75Ω
Headroom	+21 dBu
Equivalent Input Noise	–128.5 dBu
Total Harmonic Distortion	0.001%
Power	115 or 230 VAC; internal supply, IEC socket
Dimensions	1U × 8.7" (D)
Weight	6.6 lbs.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Engineering
Society
where audio
comes alive!
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CONVENTION
exhibits: Oct. 6-8, 2006 conference: Oct. 5-8, 2006
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SAN FRANCISCO, CA, USA

to produce a visible waveform in my DAW, but it sounded clean and clear even when pushed to the limit, with no electronic noise introduced. For recording an electric guitar, I really liked the beef the sixQ imparted using the R-121 as well as a Sennheiser MD 421. In fact, my benchmark preamp sounded a little thin in comparison.

Pressing the Iron button puts a transformer in the signal path before the op-amp. Oddly, though, the manual says nothing about why you'd want to use it. On electric guitar and on male vocals through a Blue Baby Bottle, the Iron button changed the sound very slightly and in a positive way, by opening up the top end nicely and cleaning up the low mids a touch. Without the Iron button on, the sixQ sounded dull and boxy on male vocals, but only slightly.

Plugging my Rickenbacker 4001 bass into the instrument jack on the sixQ's front produced similarly satisfying results. The direct sound, both picked and plucked, stood up nicely against those from my favorite DIs. Although the Iron setting came close, I chose another of the direct boxes as my favorite, but that box costs three times as much as the sixQ.

Hitting the Slope

The first time I used the compressor, I tried it on a bass track I was having trouble with. I had gotten a good sound from the bass itself through a DI straight to 2-inch tape, but it just wasn't sitting right in the mix. After trying a few of my trusty compressors to no avail, I ran the track through the sixQ's line input and dialed in just a touch of gain reduction at about 2.5:1, with a slow attack and slow release. It was exactly the compression I had been looking for and hadn't gotten with my other boxes. Reading the documentation, I understood why.

The sixQ's compressor circuit, a photo-optical circuit based on producer Joe Meek's designs from the '50s, is designed not to be transparent the way a lot of modern compressors are. In fact, Joemeek claims to be the first modern manufacturer to make compressors as effects units and not just level-control devices. I hear what the company means; the compressor kicks in hard even at

PRODUCT SUMMARY

JOEMEEK sixQ

mic preamp/signal processor
$599.99

FEATURES	4
EASE OF USE	4
QUALITY OF SOUNDS	4
VALUE	5

RATING PRODUCTS FROM 1 TO 5

PROS: Very clean sound. Loaded with nice features. All buttons are accompanied by LED indicators. Digital interface has both optical and coaxial S/PDIF outputs.

CONS: No word-clock input. Coarse gain-reduction metering. Knobs too sensitive.

MANUFACTURER
Joemeek/PM Audio Group
www.joemeek.com

conservative settings and alters the sound of the material dramatically, whether it's used on bass, vocals, or drums. It may be too squashy for a lot of scenarios, but I really like the character that the compressor imparts on the right signal at the right time. Just be careful: a little goes a long way when you are adjusting the controls. If I had one complaint, it would be that the knobs are too sensitive—it's hard to dial in just a little more.

FIG. 2: Other than the front-panel instrument input, all of the sixQ's connections are located on the rear panel.

Meequalize Me

The odd thing about the EQ section is that the high and low bands are peak filters instead of the shelving curves more commonly used in those ranges. Joemeek states that it uses peak filtering to prevent boosting subsonic and supersonic frequencies. After using the sixQ's EQ, I buy that argument. It was easier to dial in the meat of a bass drum around 80 Hz, for instance, without making the entire low end too thick.

As for the high band, it was easy to dial air into a vocal or bass track at the 12 kHz setting, whereas the snare liked the same band set at 6 kHz for adding just the right crispness without emphasizing tape hiss. The mid band was handy for bringing electric guitars forward, and for adding extra clarity to the acoustic track.

As with the compressor controls, a little goes a long way, and I rarely wanted to push the boost more than 3 dB. The documentation claims zero phase distortion in the EQ circuit, and my ears concurred.

Inherit the Earth

The sixQ is an impressive value with a well-rounded feature set, and at this price, it's hard to ask for more. If you do want more, Joemeek's oneQ is a full-featured variation on the sixQ, and the twinQ is a 2-channel version. Both units have large needle-type VU meters, word-clock inputs, and AES/EBU outputs, and the oneQ has an extra EQ band, an enhancer, and a de-esser. If you need those features, they can be yours for a few more bucks. If not, however, the sixQ is very affordable and highly usable. It should be a welcome addition to studios of all sizes.

Eli Crews tries to emulate Joe Meek's amazing recordings at New, Improved Recording (www.newimprovedrecording.com) in Oakland, California.

FIG. 1: Synthogy Ivory harnesses a 40 GB sample library to realistically reproduce the sound and playability of three concert grand pianos.

SYNTHOGY Ivory 1.5 (Mac/Win)

Put a grand piano on your desktop.

By Geary Yelton

No matter what kind of music you listen to and play, you probably appreciate the sound of a fine acoustic piano. As an electronic musician, you may also appreciate the tedium endured by anyone who attempts to capture that sound by means of sampling. Over the years, I've used quite a few sampled piano libraries and practically every piano plug-in available, and I'm pleased to note their increasing realism. The most recent of these that I've had the pleasure of using is Synthogy Ivory 1.5, a custom virtual instrument plug-in paired with a 40 GB sample library.

Ivory is Synthogy's first and only product to date. Version 1.0 for the Mac shipped in October 2004, and version 1.5 for Windows and the Mac appeared about a year later. Synthogy's founders, Joe Ierardi and George Taylor, are former Kurzweil employees; Ierardi was the sound designer responsible for the piano content of Kurzweil instruments such as the PC88 and K2600. His experience is evident in Ivory, which provides deep and detailed 32-bit samples of three first-rate pianos: a Bösendorfer 290, a German-built Steinway Model D, and a Yamaha C7.

The Grand Scheme

Ivory's minimum system requirements are 1 GB of RAM, 11 GB of space on a 7,200 rpm or faster hard disk, and either a 450 MHz Macintosh G4 running Mac OS X 10.2 or OS 9.2 or a 1.3 GHz Pentium 4 running Windows XP. The plug-in supports VST, RTAS, and AU formats.

Ivory comes on ten DVD-ROMs, and it took a full hour to install all the content on my dual-processor 2.3 GHz Power Mac G5 with 4 GB of RAM and Mac OS X 10.4.6. As each disc finished, the computer ejected it and asked for the next, conveniently counting off the remaining time as it progressed. You must authorize the software within five days of installation—a simple matter of entering your information on Synthogy's registration page, waiting a moment for an email response, and pasting the unlock code into a dialog box. You're allowed three authorizations, and you can request more if you need them.

I tested Ivory 1.5 using Steinberg Cubase SX3, MOTU Digital Performer 4.61, and Digidesign Pro Tools M-Powered 7.1. The only difference I noticed was that in Pro Tools, the knobs had a linear response, and in the others, it was circular. I prefer dragging up and down to change parameter values, and I wish that Ivory's knob response were user definable.

Build Your Own Piano

Most of Ivory's essential parameters are on its Main screen (see **Fig. 1**). When you open the plug-in, by default no samples will be loaded. You can select from 68 Programs: 20 Bösendorfers, 22 Steinways, and 26

Yamahas. Each Program includes a group of samples called a Keyset, along with settings for dynamic range, key noise, effects, and other parameters. The Programs cover a range of musical applications that encompass classical, rock, jazz, gospel, and ambient styles. They all sound excellent, and many sound spectacular (see **Web Clip 1**). You can create and save your own Programs, as well as rename or delete the included Programs.

You can change the Keyset contained in a Program by selecting a new one from a drop-down menu. Each of the 16 Keysets supplies two versions, for a total of 32. The second of each pair ends with *II*, which indicates that it has an alternate set of Velocity switch points that offer better dynamics for certain types of playing.

Because a Bösendorfer 290 has 97 keys—9 more than a standard piano—half of the 16 Bösendorfer Keysets contain 97 notes. All the other Keysets contain 88 notes, each sampled at various Velocities. The Bösendorfer and Steinway Keysets have four to ten Velocity layers, and the Yamaha Keysets have four to eight. How many layers you'll want to use will depend on your computer's resources and your musical style; rock 'n' roll, for example, typically requires fewer Velocity levels than classical music.

Ivory Polish

Ivory furnishes more controls for customizing your piano sound than I've ever seen. The breadth of control serves two purposes: to create a sound that best serves your particular application, and to maximize your computer's resources by minimizing the demands on those resources. Because some Programs are resource intensive, Ivory offers many ways to lessen its RAM and CPU requirements. Happily, I didn't experience any resource-related issues using it on my Power Mac G5.

The Sustain Resonance parameter reproduces timbral changes that occur when a piano's sustain pedal lifts its dampers, contributing to Ivory's realistic sound. A drop-down menu lets you select from six Sustain Resonance models, which affect the perceived mic position, and a knob can boost or cut their level by as much as 6 dB. You can also turn off Sustain Resonance completely.

Turning on the release and soft-pedal samples helps produce a realistic piano sound, but to conserve RAM, you can easily turn those samples off, too. If you do use

FIG. 2: Ambience, Chorus, and 2-band EQ are available on Ivory's Effects screen, which also lets you load and save groups of effects presets.

You can also use the Oscillator Matrix to route the oscillators to two identical 18 dB-per-octave, resonant multimode filters as well as directly to the output mix. The filters can be routed to each other and mixed in any proportion in the output, making possible virtually any combination serial-parallel signal path. Each of the filters can also be routed back as an FM modulator to any of the oscillators. In short, Octopus is a very flexible FM synth.

The oscillators are additive, with individual level and phase settings for 32 harmonics. Furthermore, Octopus can perform a spectral analysis of any WAV or AIFF file and create a 32-harmonic additive oscillator waveform from it.

Octopus's signal path ends with four effects arranged in series: chorus, stereo delay, reverb, and 4-band parametric EQ. Additionally, the amplifier stage houses a distortion effect and has a LoFi Waves option for emulating early FM synths.

The heart of Octopus's control panel is the 10-by-12 Oscillator Matrix, at the top left of the graphical user interface.

Enveloping Strategies

Modulation in Octopus is accomplished almost exclusively with breakpoint envelopes. In particular, it lacks any LFOs and, unfortunately, has no provision for MIDI remote. However, host automation is supported for all knobs and buttons. You can have as many as 32 envelopes, and user configurability of breakpoints, curves, and loop boundaries eliminates the need for LFOs.

Octopus's envelopes can target most synthesis parameters (effects settings are an exception), and although the setup takes a little getting used to, it's fast and flexible. An Envelope Matrix determines the synthesis object (oscillator, filter, or sampler) to which the envelope is routed. The envelope type, set in the Envelope editor, determines which parameter of the target object is affected.

Envelope breakpoints are created and moved onscreen with the mouse, and the curve between adjacent breakpoints is also set by dragging. Each envelope has its own keyboard and Velocity scaling settings along with optional scaling by MIDI. The selection of MIDI messages is limited but includes Modulation Wheel, Pitch Bend change, mono and poly Aftertouch, and seven Control Change messages.

Steppin' Out

In addition to its envelopes, Octopus has two 32-step, eighth-note pattern sequencers. The pattern sequencers are actually more like a cross between an arpeggiator and a pattern sequencer. Each position can be off (no note triggered), set to a value between –24 and 24 (triggering a note transposed from the lowest MIDI note held), or set to sustain the note triggered by the previous step.

The pattern sequencers will grab as many voices as necessary, limited to the preset's polyphony (which is set by the Voices parameter and maxes out at 12). That results in polyphonic patterns for presets with long decay times or when both sequencers are running simultaneously. In the latter case, you can produce intricate, nonrepeating patterns by varying the pattern-length, transpose, shuffle, random-mode, and ping-pong-mode settings (see **Web Clip 1**).

Stayin' In

One of the great things about LinPlug products is that they offer a rich palette of sounds for the tweak averse. If you don't want or don't have time to program your own presets, you'll find plenty of great sounds by Big!Tone (BT), ProSounds (PS), Summa (SUM), Tim Conrardy (TC), and Outsiderz (OZ) in Octopus's 16 factory preset banks.

The Ambient, Fx, and Pad banks contain a variety of slowly evolving textures. The Bass, Digital, Keys, Lead, Plucked, Semireal, Synth, and Voice banks all contain playable sounds in the indicated categories. Percussion is covered in the Drum, Bells, and Percussive banks, and sequencer and envelope patterns are well illustrated in the Moving and Seq banks. You can download a demo of Octopus, which includes a cross section of presets, from the LinPlug Web site. EM WEB CLIPS

Value (1 through 5): 4
LinPlug Virtual Instruments
www.linplug.com

PRESONUS

Inspire 1394 (Mac/Win)

By Rusty Cutchin

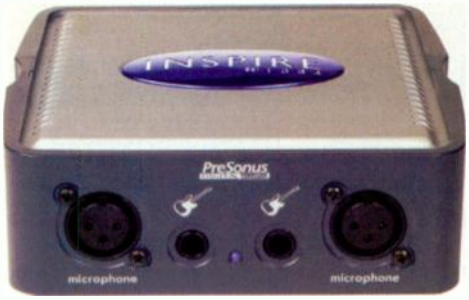
The PreSonus Inspire 1394 ($229.95) is a compact FireWire interface that offers such features as 24-bit, 96 kHz operation; up to four simultaneous inputs; an onscreen control panel; and multiple-unit linking. PreSonus supplements the hardware with a generous software bundle that includes Steinberg Cubase LE, Minnetonka Discwelder Bronze, a Discrete Drums loop sampler, a collection of plug-ins, and more.

Panel Discussion

The Inspire 1394 sports a pair of solid-state preamps, each of which can be accessed by either XLR or ¼-inch (instrument) front-panel inputs. You also get selectable line or phono (with RIAA filter) inputs on the rear panel. Stereo outputs are provided on unbalanced RCA and mini TRS jacks, which can be used simultaneously. There's also a mini stereo headphone jack. Two FireWire ports allow for connection to both your computer and other Inspire 1394s. Up to four units can be linked together, which gives you plenty of potential expandability.

If your computer has a 6-pin FireWire port, the Inspire will draw its power from the FireWire bus. If not, you'll need to get a 4- to 6-pin FireWire cable and power the unit with the included AC adapter.

The software control panel handles all of the Inspire 1394's functions,



The PreSonus Inspire 1394 is an affordable FireWire interface that offers two mic/instrument preamps, up to four simultaneous inputs, and the ability to link with up to three other units.

including engaging 48V phantom power for either or both of the mic preamps. The hardware itself has no knobs or switches. The control panel consists of a virtual mixer. You click on buttons and turn graphical pots to select inputs, set levels and panning, or engage a 12 dB boost or basic limiter. The control panel also lets you mute channels, adjust the headphone level, or bypass the software mixer completely. Snapshots of control panel settings can be saved for recall, and you can minimize the control panel and keep it on top of other applications.

The PC version of the control panel allows you to choose sampling-rate and latency values from drop-down menus. You can choose a sampling rate of 44.1, 48, 88.2, or 96 kHz. Latency values range from 1.5 to 24 ms. On a Mac, these menus are not available in the control panel. Instead, you select sampling rates in the Audio MIDI Setup application and adjust latency from your host application.

Linking Machine

The Inspire CD includes the drivers and control panels for both Windows XP and Mac OS X (10.3.7 or later). Installation on either platform is easy: just follow the onscreen prompts. After the driver is installed, you can use any ASIO, WMD, or Core Audio recording application.

When multiple Inspire 1394s are linked, the Unit Select area at the bottom right of the control panel shows how many are connected. Just click on the unit you want to access. You can give individual names to each one.

To use multiple Inspire 1394s on a PC, you must install a driver for each one. You can then select and assign inputs for any of the linked units from your host application. On a Mac, in most cases, you'll need to have OS X Tiger installed, and you'll assign all the Inspire 1394s you're using to an Aggregate Device in the Audio MIDI Setup utility. If you haven't done this before, PreSonus provides a helpful document at www.presonus.com/pdf/multiFPhowtoOSX.pdf.

Because I was using MOTU Digital Performer 4.52, which directly supports multiple interfaces, I could make two Inspire 1394s active in DP simply by shift-clicking to both units' drivers in DP's Configure Hardware Driver dialog box. Input names like "Line In 1–2" were duplicated, so I had to double-check that I was accessing the correct unit.

I set up a 2-guitar, 2-mic session with a pair of Inspire 1394s. I used two large-diaphragm condensers for vocals, a small condenser on acoustic guitar, and a dynamic mic on a guitar amp. Later I overdubbed an electric guitar solo through one of the Inspire 1394's instrument inputs.

After the initial setup, the two units communicated without problem with both the control panel and my recording app. The mic preamps in my test units were quiet, and the converters sounded fine. The Inspire 1394 provided plenty of headroom for the various mics and plenty of output to my powered speakers.

Bargain Box

The Inspire 1394 is an impressive product. Its combination of good sound quality, small size, and multiple-unit-linking ability makes it a great choice for recording on a laptop or assembling dance mixes. Throw in the sizable software bundle, and you've got a bargain that's inspired, indeed.

Value (1 through 5): 4
PreSonus
www.presonus.com

MUSICLAB

RealGuitar 2L (Mac/Win)

By Marty Cutler

Acoustic rhythm guitar parts aren't easily played from a keyboard. Guitaristic chord voicings can be finger busters when laid out on a keyboard, to say nothing of the nuances of tone and articulation that most sampled guitars lack. MusicLab's RealGuitar 2L ($239) is a sample-based software instrument that does an impressive job of creating guitar parts and adds clever new techniques for triggering performances from your MIDI keyboard.

RealGuitar 2L is the flagship of the RealGuitar product line, which also includes RealGuitar 2.0 ($159). The latter has the same feature set as RealGuitar 2L minus its Pattern Manager and Pattern Library.

RealGuitar 2L runs on Mac OS X and Windows 2000 or XP. On either platform, it runs as a standalone application or as a plug-in (AU or VST on OS X and DX or VST on Windows). I tested it with a dual-processor 1.42 GHz Power Mac with OS X 10.4.6 and 2 GB of RAM. I opened it in Apple Logic Pro 7.1, Granted Software Rax 1.2.3, MOTU Digital Performer 4.6.1, and Ableton Live 5.02.

MusicLab's RealGuitar re-creates realistic guitar parts with authentic voicings. The onscreen fingerboard illustrates the chord positions in real time.

Take Your Pick

RealGuitar 2L comes on a single CD-ROM that includes the software and eight sampled guitars. You can choose to install the various guitars at 44.1, 48, 88.2, 96, 176.4, or 192 kHz sampling rates. Thanks to the included Bank Manager mini app, the settings are easy to change at any time afterward. You also get a Quick Load button that buffers a portion of the samples, significantly reducing the RAM requirements and the size of loaded files. The samples are played back through RealGuitar 2L's custom 32-bit sound engine.

The sampled guitars include two steel-string acoustics, played fingerstyle and with a pick; a doubled steel-string; two nylon-string guitars (one picked and one fingered), and a 12-string. So many sampled 12-string instruments are merely 2-layered 6-string guitars tuned an octave apart, but RealGuitar's 12-string is accurately voiced, with the bottom four string pairs tuned in octaves and the B and E string pairs tuned in unison. The

various guitars are detailed and warm, and contain every playable note of the instruments they're sampled from.

Despite the relatively small file size of the various sampled guitars (290 MB was the largest), they all reacted nicely to dynamics and conveyed subtle, seemingly random variations in tone—even when I looped a bar of step-entered 16th notes with the same pitch and Velocity. Attack transients shifted slightly from note to note, authentically simulating up-and-down pick strokes.

Call My Manager

The Pattern Manager accesses a library of strums and fingerpicking styles in Standard MIDI File format. When played through RealGuitar, they are no longer a static set of MIDI Note Numbers but instead move with the chords you hold down on the keyboard. RealGuitar maps the notes to proper guitar positions on the fingerboard, as the virtual fingerboard illustrates.

The library contains a generous collection of stylistically authentic patterns for such genres as flamenco, R&B, rock, pop, folk, and country. Both strumming and picking patterns are included.

RealGuitar 2L offers many easy ways to perform realistic strumming, guitar fills, solos, and more (see **Web Clips 1 through 3**). Buttons for strumming modes let you modulate from open- to closed-position chords. In most cases, you create authentic strumming parts by holding down a chord with one hand and tapping a single key rhythmically with the other. A separate set of keys lets you perform muting techniques.

To further enhance the realism, you can assign key, pedal, and Velocity switches to create hammer-ons, pull-offs, and slides. You can hear a small amount of stepping in the slides, but that is the natural by-product of slides performed on a fretted instrument. You can control the speed and maximum interval of the slide. Depending on which key you strike first, you can slide up or down, hammer on, or pull off.

You access other sound enhancements from virtual knobs on the guitar display. These include faders for fret noise, release sounds, and pick transients. You also get built-in controls for tremolo and chorus. The thorough, user-friendly documentation includes an HTML-linked set of videos that illustrate basic performance techniques.

Getting Real

As a single-string lead instrument, RealGuitar 2L is considerably better than most other sample-based guitar emulations at evoking picked, monophonic lines. It also effortlessly outdistances its competition for solo fingerpicking and rhythm guitar emulations.

There is a lot more to explore with MusicLab RealGuitar 2L than this short review can cover, so I recommend that you download a demo copy at MusicLab's Web site.

EM WEB CLIPS

Value (1 through 5): 4

MusicLab
www.musiclab.com

BIG FISH AUDIO

Raging Guitars 1.1.8 (MAC/WIN)

By Marty Cutler

Anyone who has attempted to accurately sample, loop, and voice distorted and overdriven electric guitars can attest to the difficulty of the task. Strumming, note bending, and hammering, to name only a few performance gestures, defy MIDI and sampling technology. Undaunted, Big Fish Audio does a creditable job of capturing distorted and overdriven guitar tones, and providing plenty of ways to create realistic performances.

Raging Guitars 1.1.8.3 ($299.95) is an 11 GB sample library driven by Native Instruments' proprietary Kontakt Player. The library contains multilayered electric guitars; sampled articulations; looped, edited, and sliced performances arranged as construction kits; and a variety of sampled artifacts for adding convincing detail to performances. The instruments are sampled with several types and amounts of distortion. Kontakt Player brings additional sound-shaping resources to the table.

Installation, which includes authorization using Native Instruments' Registration Tool, was painless on my dual-processor 1.42 GHz Power Mac G4. In addition to the standalone version, you get plug-in instruments in AU, RTAS, and VST formats on the Mac and DX, RTAS, and VST formats on Windows computers.

Big Fish Audio's *Raging Guitars* holds 11 GB of distorted and processed electric guitar sounds.

This Is Rock 'n' Roll

Raging Guitars won't get you through your next lounge gig; the performances are decidedly not pristine, which is a good thing. There's plenty of grit: accidentally brushed, ghosted notes; notes just a hair trigger away from howling feedback; and in many instances a prominent noise floor. However, there's nothing amateurish about the musicianship; the construction kits go well beyond root-and-fifth clichés to include dissonant and rhythmically assertive arpeggios as well as rhythm-guitar motifs. Some are so distinctive that they could easily limit the user's choices.

The well-thought-out kit setups contain loops on the left side of the keyboard, with individual sliced elements on the right. And with a bit of forethought, you can keep things from sounding canned by adding or subtracting parts to taste. Other patches include AdrenaLinn-style, beat-sliced loops that sync to the host's tempo, a variety of muted guitars with several variations, and chords in a couple of minor and major families. In short, there's a ton of material for building a wall-of-guitars sound (see **Web Clip 1**).

In a sweet touch, many of the solo instrument patches allow different amounts of vibrato on simultaneous notes. You can't do that with the mod wheel or Aftertouch, and instead, Big Fish uses Velocity-switched vibrato samples. On the other hand, I wasn't fond of the patches that use the mod wheel to switch between picked and hammered notes or to switch from normal to whole-step, upward string bends. The sample map is generous enough to use a traditional pitch-bend wheel without noticeable artifacts to create upward and downward bends and dive-bomber effects. The feedback samples are far more realistic than the typical synthesist's ploy of fading in a sine wave, but the folder of shorted-cable-noise samples will probably appeal only to the truly obsessed.

For the most part, the solo guitars are quite convincing, but because each note is a discrete sample, you can't achieve the growling intermodulation effects of a guitar whose output is the sum of all of its strings. You can, however, use an amp model or distortion plug-in to achieve that effect. I got great results using Apple Logic Pro's Guitar Amp Pro plug-in, although that significantly raised the noise floor of some of the samples.

Picky, Picky

Apart from a single-page explanation of *Raging Guitars*' patches and how to use them, the HTML-based documentation is cursory. That is somewhat tempered by the simplicity of Kontakt Player's user interface, but a little more documentation would be welcome. A more serious shortcoming is that there is no way to create Multis other than by saving with the plug-in host.

Raging Guitars' anomalous behavior as a multitimbral plug-in instrument was most frustrating. Apple Logic Audio 7.1 often came down like a house of cards when I loaded a second patch into another slot in the plug-in. Reloading a patch in MOTU Digital Performer 4.6.1 often resulted in greatly reduced amplitude despite unchanged track and instrument settings in the host and the plug-in. Construction-kit loops frequently remained on after the host was stopped. Changes in the host's tempo caused the lead guitar to play with comically wide vibrato unrelated to LFO or other settings. Big Fish is aware of these problems and may have a fix by the time you read this.

Raging Guitars is a well-rounded and nicely played library. The plug-in will be exceedingly useful to keyboardists, or even guitarists, wanting to lay down beefy, distorted electric-guitar tracks when the manufacturer addresses the stability and reliability issues. It is unfortunate that these problems hamper an otherwise fine sound library; were it otherwise, I would certainly give *Raging Guitars* a higher rating. EM

EM WEB CLIPS

Value (1 through 5): 2

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www.bigfishaudio.com

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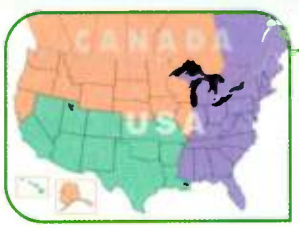

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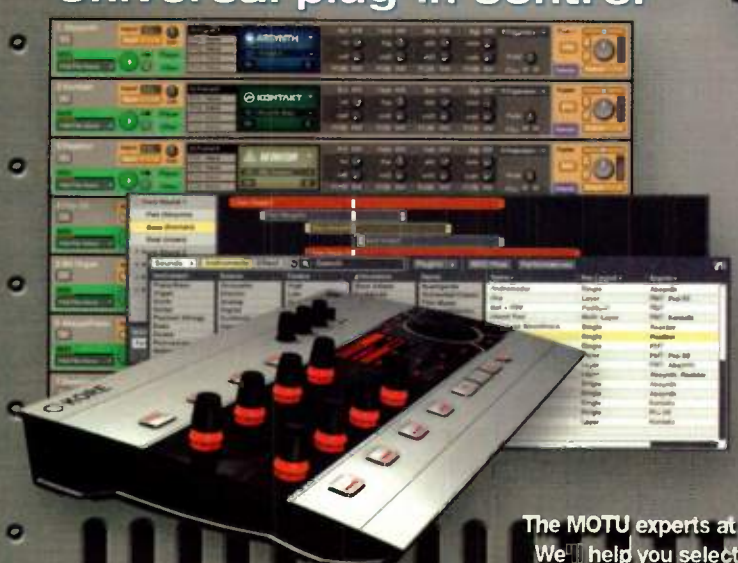
Universal plug-in control



As a Universal Sound Platform, Native Instruments KORE operates not only as a plug-in within Digital Performer but also as an instrument host application. It allows you to integrate all your VST- and Audio Units-based software instruments and effects into a single, unified interface. KORE provides greatly increased control, overview and ease of use in all creative situations. Both Native Instrument's own range of instruments and effects as well as third-party products are supported. The seamless integration with KORE's advanced hardware controller gives hands-on control with unprecedented analog feel, finally turning today's software synthesizers and samplers from applications into true instruments.

The MOTU experts at Sweetwater can put together the perfect DP5 rig for you. We'll help you select the right components to build a system that seamlessly integrates into your workflow, and we can even install, configure and test the entire system for you. Why shop anywhere else?

Synthesis ignited

Combining power, elegance, control, and unbeatable sounds, Cakewalk Rapture is one of the most exciting synthesizers to hit the market in years. Capable of producing rich, hypnotic, and rhythmic basses, leads, and pads, Rapture is perfect for performing and designing the modern synthesized sounds igniting today's pop, dance, and electronic music. What better way to expand the sound possibilities of your Digital Performer studio?

Rapture compliments Digital Performer with pristine wavetable synthesis and a sophisticated palette of hundreds of patches. Its staggering array of modulation features includes brilliant multi-point envelopes, a powerful MIDI control matrix, and 40 step generators to add rhythmic complexity to patches. Discover timbres you've never imagined with this truly unique instrument. Ask Sweetwater today about using Rapture with DP5.

Amazing sounds

Cakewalk Dimension Pro is the critically-acclaimed synthesizer that combines real instruments with advanced synthesis, giving you endless sound possibilities. The immense two DVD sound library that ships with Dimension Pro makes it the ideal go-to instrument for musicians, while its deep editing and sound generation capabilities have a natural appeal to sound designers.

Digital Performer users looking to create rich, ambient film-score beds will love the "Dimensions" bank, which features complex, evolving atmospheres. Dimension Pro also offers an abundance of vital, playable sounds that range from pristine realistic acoustic instruments to thumping basses and cutting leads. This wide tonal range can be attributed to both advanced sample mapping and a powerful sound-sculpting engine with analog sound generation that lets you mutate and recompose any sound you might imagine.

Waves native processing

Waves delivers the classic sound of the SSL 4000 Series to your Digital Performer mixes. Developed under license from Solid State Logic, The Waves SSL 4000 Collection includes three meticulously modeled plug-ins based on the legendary SSL 4000 Series: the SSL E-Channel, the SSL G-Master Buss Compressor, and the SSL G-Equalizer. Now featuring Chris Lord-Alge presets — personal presets from the legendary Grammy® Award-winning, multi-platinum mixer. Now add the Waves Gold Native bundle, packed with all the first rate plug-ins that put Waves at the top of computer-based professional audio processing. If you want a complete, world-class processing and mastering package for DP5, the Gold Native Bundle is it. You get total control of the highest-resolution tools for a broad range of applications.

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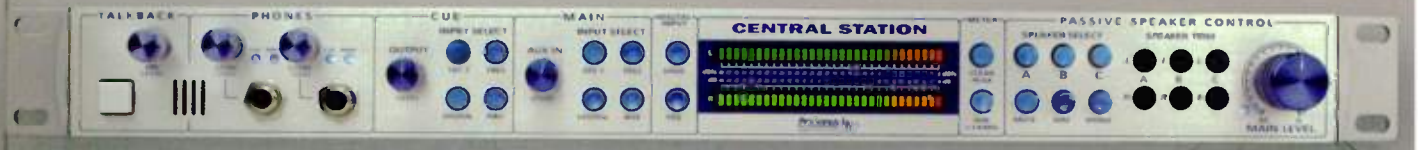

Control room monitoring

The PreSonus Central Station™ is the missing link between your MOTU recording interface, studio monitors, input sources and the artist. Featuring 5 sets of stereo inputs (3 analog and 2 digital with 192kHz D/A conversion), the Central Station allows you to switch between 3 different sets of studio monitor outputs while maintaining a purely passive signal path. The main audio path uses no amplifier stages including op amps, active IC's or chips. This eliminates coloration, noise and distortion, enabling you to hear your mixes more clearly and minimize ear fatigue.

In addition, the Central Station features a complete studio communication solution with built-in condenser talkback microphone, MUTE, DIM, two separate headphone outputs plus a cue output to enhance the creative process. A fast-acting 30 segment LED is also supplied for flawless visual metering of levels both in dBu and dBfs mode. Communicate with the artist via talkback. Send a headphone mix to the artist while listening to the main mix in the control room and more. The Central Station brings all of your inputs and outputs together.

16-pad drum controller

M-Audio Trigger Finger puts the power to record your own expressive percussion and drum parts into Digital Performer. Its 16 velocity-sensitive pads are perfect for playing DP5's included Model 12 drum module, launching loops and samples via DP5's Nanosampler, or even controlling video projections — and applying pressure to the pads can generate any MIDI controller you wish. Trigger Finger also gives you 8 knobs and 4 faders that are freely assignable to MIDI parameters such as volume, pan, pitch, and effects. Full programmability lets you customize the unit to fit your needs. Settings are easy to store via 16 presets and M-Audio's free Enigma librarian software. A simple USB cable is all it takes to connect and power Trigger Finger with your computer.

The MOTU experts at Sweetwater can put together the perfect DP5 rig for you. We'll help you select the right components to build a system that seamlessly integrates into your workflow, and we can even install, configure and test the entire system for you. Why shop anywhere else?

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Accurate monitoring

The Mackie HR-Series Active Studio Monitors are considered some of the most loved and trusted nearfield studio monitors of all time, and with good reason. These award-winning bi-amplified monitors offer a performance that rivals monitors costing two or three times their price. Namely, a stereo field that's wide, deep and incredibly detailed. Low frequencies that are no more or less than what you've recorded. High and mid-range frequencies that are clean and articulated. Plus the sweetest of sweet spots. Whether it's the 6-inch HR-624, 8-inch HR-824 or dual 6-inch 626, there's an HR Series monitor that will tell you the truth, the whole truth, and nothing but the truth.

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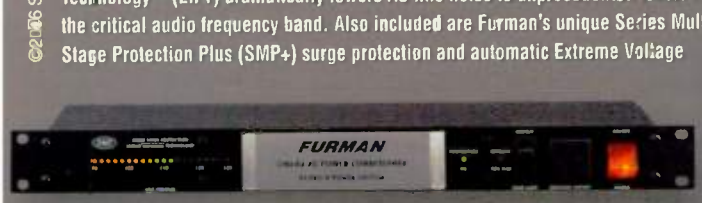

Keep on the Sunny Side

By Larry the O

Forrest Gump's mother was wrong: life is not like a box of chocolates. It's easy to choose a box of chocolates that are all of one type, while life puts a range of flavors on your plate whether you want them or not. Alas, the one flavor guaranteed to show up in everyone's diet is pain, but most people also find some happiness. It is interesting to see how this dichotomy is reflected in songwriting.

Music differs from movies in that movies tell a story that almost always requires a central conflict around which everything forms and moves. Conflict is hardly associated with happiness, so a representation of pain or difficulty is sure to inhabit the overwhelming majority of movies, happy ending or not. But songs don't have to tell a story (though they certainly can). A song can simply be a musical snapshot of a feeling, time, or place. That makes it possible for a song to be exclusively happy or sad or even a sophisticated blend of the two.

The blues, for instance, gain a lot of their expressive power from a frame of reference that is grounded in the difficult realities of life. Yes, there are happy blues, but the very idea of blues comes from sadness and hard times, and their appeal is their worldly-wise perspectives that lie under their lyrical surfaces.

> One way to write positive songs is to entirely ignore the complexities of real life.

We find a full spectrum of moods in pop and rock lyrics, but they seem disproportionately skewed toward unhappiness (I also find that to be true of movies and novels). One reason for this is the aforementioned commonality of pain. As the saying goes, "Misery loves company," and because everyone has problems, songs that express pain resonate more broadly than happy songs.

I also think it is easier to wax poetic about trouble and garment-rending travail than to write a happy song without sounding sappy. I've come to see it as a worthy challenge to write songs with positive feelings or messages that don't sound syrupy or preachy. It isn't easy.

One way to write songs that have a positive message is to entirely ignore the complexities of real life and write very basic lyrics. For example, Motown in its heyday excelled at producing these kinds of songs. The risk occurs when an author is striving for the simple while trying to avoid the simplistic, which can just sound dumb.

Another approach to writing happy songs that are convincing is to acknowledge the difficult reality while focusing on an overall positive viewpoint. Robert Hunter's lyrics for the Grateful Dead's "Ripple" and "Box of Rain"—both from the album *American Beauty* (Warner Bros., 1970), recorded while the band was going through serious life changes—carry the message that life is tough but beautiful nonetheless. The challenge with this type of song is to maintain a balance: too little "bummer factor," and it sounds fluffy; too much, and the song doesn't express a positive outlook.

Another approach that sometimes works is to take an impressionistic tack, in which the lyrics might not be literally coherent but are composed of a series of images that, individually and collectively, convey a feeling that is upbeat. John Lennon used this particular technique to good effect in "Across the Universe."

Then there is inspired silliness. It's difficult to hear Bob Dylan's "Rainy Day Women #12 and 35" or Louis Armstrong's apparently well-lubricated "Lonesome Road" without at least a chuckle. The interesting thing about the Armstrong cut is that the lyrics themselves are sad, but Armstrong casts them into such a wacky performance that the overall effect is giggly.

There is no more a pat answer to the question of how to write a good happy song than there is to the question of how to be happy. But I put it to you that it is harder than writing sad, mad, or gloomy songs. That doesn't make happy songs better than sad ones, but it does make writing them an interesting artistic hill to climb. EM

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- **Stand-alone mixing** — connect the included DC power supply and mix your band live, without a computer. Save up to 16 mix setups and then recall them on the spot with the front-panel LCD.
- **"Mix1" return bus** — record the UltraLite's live mixdown back into your audio software for archiving or further workstation editing.
- **Mac OS Universal Binary and Windows XP x64 drivers** — use the UltraLite with today's latest Intel-based Macs or with a super-fast high-performance 64-bit Windows XP Pro audio workstation.
- **Across-the-board compatibility** — works with all major audio software for Mac OS X and Windows XP. Includes AudioDesk for Mac OS X.

The CueMix Console software gives you direct access to the UltraLite's 10-input, 8-bus digital mixer. Route any combination of inputs to four separate output pairs. Create and save up to 16 mix setups. You can even set up talk-back and listen-back for studio recording sessions.

UltraLite

Compact bus-powered 10 x 14 FireWire audio I/O

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