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SOLVING SAMPLE
TRANSLATION
PROBLEMS



REVIEWS

Mackie Tracttion 2.0
M-Audio Black Box
Cakewalk Project 5 2.0
Millennia TD-1
and 8 more

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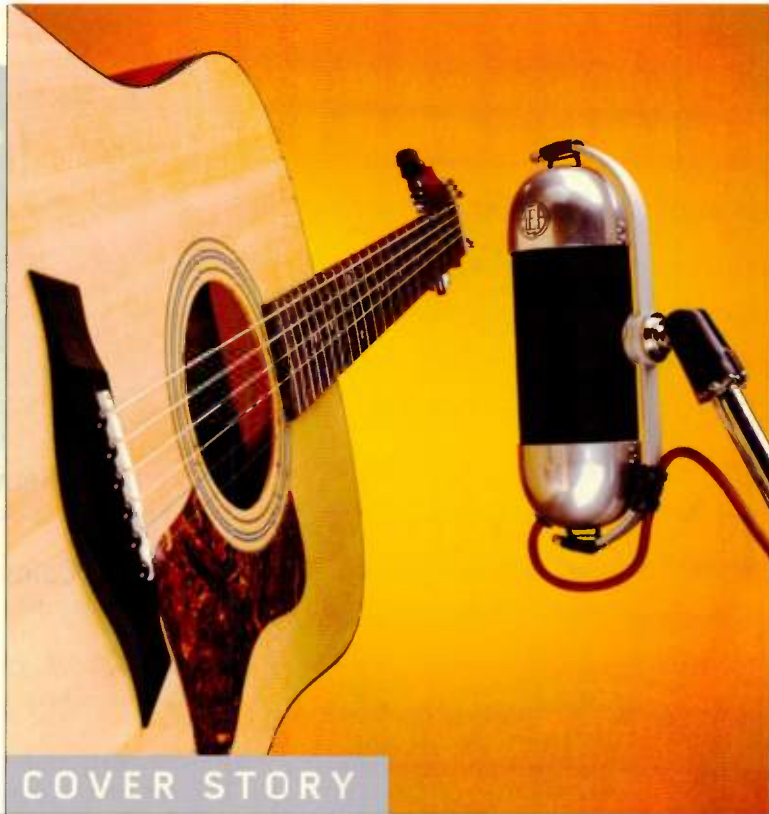
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In days of old, a good ribbon mic used to be a high-ticket item, but today you can find one to fit any budget, including the 13 models we tested from AEA, Apex, beyerdynamic, Coles, Electro-Harmonix, Nady, Royer Labs, and SM Pro Audio. **By Myles Boisen**

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Creating sounds for computer games can be fun and profitable. In this overview, an industry veteran discusses the essential tools and techniques used in designing audio for games. **By Jamie Lendino**

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QUICK PICKS

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- Drums on Demand **Bass On Demand**, vol. 1 bass sample library
- Big Fish Audio **First Call Horns** brass and woodwinds sample library

The Client

When not working in my personal studio, I've spent most of my studio time as a hired gun, working for clients or producers. I had not been a client for many years. But recently, I began producing the first EM Seminar on Demand (SOD) video, or "Webinar," which will be presented on the emusician.com site.

Since video production isn't my area of expertise, I arranged for studio time at a school that specializes in digital media production and hired some graduating students to do the videography and editing. The school administrators were a pleasure to work with and I enjoyed the student team's youthful creativity, but I also observed several classic examples of how to make a client crazy. It was a good reminder of how our clients feel when things go wrong.

I arrived at the studio on time, with the onscreen talent in tow. The production team wasn't ready, however, so we waited for several hours. We were doing a three-camera shoot, but nobody had a mount for the overhead camera (even though I had provided a list of what we would need), so the camera team improvised by duct-taping the camera to a boom. That required a lengthy struggle, but it worked. When we needed to change the videotape, the crew had to cut down the camera, swap tapes, and refasten the camera to the boom. I wasn't impressed with the crew's preparation and efficiency, but I liked their ability to improvise.

After the shoot, the lead engineer was to transfer the videotapes to the computer for editing in Final Cut Pro, sync the Pro Tools sessions, and set up an editing session with me. I arrived at the agreed time, only to find that the engineer had stood me up. I later learned that he had given the master tapes to another student engineer, whom he

had asked to take over the session—but no one else had been told about that. As it turned out, the new engineer had other commitments and couldn't do the job, so I had waited in vain.

Worse, the master tapes were taken off site without any safety backups or security measures—a stunning violation of standard studio procedures. The talent could not have returned for another shoot, so had those tapes been lost or damaged, I wouldn't have been able to complete the project. I stayed cool, knowing I was dealing with students. But if I ever needed a reminder about how a client feels when he hires a production team that doesn't have its act together, I sure got it. I thought it was obvious that having technical skills doesn't overcome a lack of pre-production, planning, reliability, and professionalism; but apparently, that isn't obvious to everyone.

The good news is that we captured some great material, and the SOD should be available for free at emusician.com by the time you read this. The lesson features Korg USA sound-design guru Jack Hotop demonstrating how you can customize several types of synth sounds to make them more expressive and better suited to your individual style. Hotop is gracious and entertaining, and a fine instructor, and his tips work with most hardware and software synths. While you're viewing the SOD, remember the lessons that lurk behind the scenes: be prepared for each session, and remember how it feels to be the client.



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Letters

Surround the Band

I'm a longtime reader of EM. I'd like to share a piece of advice that could be useful to readers who have a surround-sound setup in their personal studio, or who are considering one.

An unexpected benefit of having three extra speakers (not including a subwoofer) is that they can facilitate monitoring while tracking or even just jamming. Depending on where each musician is in the room, you can give each player their own monitor mix (most DAWs have this capability).

For example, I inadvertently set up the rear-right surround speaker directly behind the drum kit in our studio, and it's turned out to be a great monitor for the drummer, who sometimes has trouble hearing the rest of the band. Likewise, I can add a little extra guitar in the rear-left speaker, since the guitarist stands on that side of the room. And the overall level doesn't need to be as loud for everyone to hear a balanced mix.

Obviously, this technique is more useful if you're recording direct, but even for live jamming, the surround setup has is a very practical addition to our studio.

Joe Fry
via email

Meter Reading

I've been a loyal EM reader for several years. In fact, with your magazine's assistance, I made the jump into the digital realm. Since going digital, I've purchased most products only after reading its review in your magazine.

This brings me to my point: if the Tascam US-428 [reviewed in the September 2001 issue] receives an EM Meter rating of 4 for Audio Quality and the Apogee Rosetta 800 [reviewed in the April 2005 issue] receives an overall rating of 4, does that mean they are nearly equivalent in sound quality even though their prices differ by several thousand dollars? Is a product rated within its own price class or is a meter rating of "4" a "4" regardless? Or how about the Focusrite TwinTrak Pro stereo voice processor [reviewed in the August 2004 issue], which received a 3.5 for Quality of Sounds, and the Universal Audio LA-610 tube channel strip [reviewed in the May 2005 issue], which received an overall 3.5 rating and costs a lot more money?

I understand the subjective nature of reviews and that all products have inherent strengths and weaknesses, but readers trust your publication's integrity and professionalism. Many of us lack the time or resources to try every potential product out there before making a purchase. Publishing meter guidelines or giving a better explanation of the spirit of reviews would be very helpful to your readership.

As a parting shot, how about doing a few Ebert & Roeper style reviews for products? Maybe the LA-610 would get a thumbs-up or thumbs-down.

John D'Urso
via email

John—We changed from four EM meters to one overall meter when we redesigned the magazine, starting with the February 2005 issue. We now

feel that was a mistake, and we will go back to offering four meters, starting with the February 2006 issue. When we go back to four meters, as in the past, you will see meters for Features; Ease of Use; Audio Quality, Quality of Sounds (for synths, where programming is important as well as pure audio quality); and Value. Along with the increased number of meters, we'll provide a key to what they mean. That should resolve some of your questions. The current single meter indicates "overall value," so it is price-sensitive. If a low-cost product gets a "4" and an expensive product gets a "4," they offer comparable "bang for the buck," but they are not equivalent products because we expect more bang for more bucks. If you want a direct comparison between the single-meter reviews and the older four-meter reviews, compare the single meter with the old Value meter, which is also price-sensitive.

I'll explain the four-meter system in more detail when we relaunch it next February, including a new explanation of the numbers as applied to that system. Meanwhile, here's what they mean with the single-meter system:

5 = awesome, as good as it gets with current technology, and a great value; no significant "cons."

4 = well above average and quite impressive, and a very good value; however, there is room for improvement given the current state of the art.

3 = a good product that does what it is supposed to do; a reasonable value and may be worth buying, but it doesn't stand out.

2 = barely adequate; useful, but don't expect too much; very overpriced.

1 = a loser—forget it.

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The HS10W powered subwoofer complements the HS speakers and easily handles today's bass-enhanced music or the most dramatic surround effects. The HS10W subwoofer uses a bass reflex design cabinet that maintains high efficiency and low distortion. You can combine HS50Ms or HS80Ms with the HS10W subwoofer to create different 2:1 (stereo) and 5:1 surround sound systems. So check out the new standard in near-field reference monitors at a Yamaha dealer near you.

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Next Month in EM

The Art of Podcasting

Anyone can tell you how to record and podcast a program; EM shows you how to do it well. This how-to feature introduces the concepts, details the process, and puts podcasting in practical and artistic contexts.

Production Values: Jesper Kyd

We interview composer Jesper Kyd about scoring for video games, TV, and films.

Groovy Tips for Pro Tools' Beat Detective

Advanced tips and tricks for Digidesign Pro Tools' Beat Detective feature.

Making Tracks:

LAN Rover

A look at MIDIoverLAN CP, a cross-platform software utility that can eliminate the need for MIDI hardware and cables on multiple computers by sending MIDI data over your Local Area Network (LAN).

Sound Design Workshop: Creative Uses of Noise

This column will demonstrate how you can use noise to create and enhance pitched sounds on synthesizers.

Working Musician:

Taking Your Studio Pro

How to develop your personal studio into a professional project studio capable of serving outside clients.

...and much more!

Letters

We allow half points to indicate shades of meaning, but we're debating whether to continue that.

The meters should be considered along with the author's comments in the text, so don't look only at the meters and skip the rest of the story or you'll miss important points. —Steve O

Doing Windows for Less

I would be surprised if I'm the only EM reader whose budget is even lower than the \$5,000 "Lower-Price Windows Studio" suggested in your July 2005 cover story, "Build a Desktop Studio on Any Budget." It's possible today to record professional quality CDs with a \$2,000 system.

Two years ago, a 2 GHz PC with 512 MB of RAM was considered a high-end system, and it still offers plenty of power for most bedroom musicians. You can buy one for less than \$1,000. You can also buy a digital audio sequencer for \$150, a large-diaphragm condenser mic for \$100,

rig if you're skillful enough. That said, the rig you suggest is not adequate for most professional situations. It's fine for doing your own stuff if you mostly rely on synths and record a few acoustic instruments in mono. But one \$100 mic doesn't allow recording in stereo, and no one mic is good for all applications. True, 2 GHz is still a reasonably fast computer, but 512 MB of RAM will seriously limit your ability to work with multiple tracks and plug-ins. If you have enough experience, you might be able to do professional work with \$200 monitors. But most people can't do that because few monitors in that price range are sufficiently accurate, so you have to know where the holes are and compensate accordingly. It can be done, but it's difficult.

So I agree that it's possible to come up with a workable rig for less than \$5,000. But unless your scope is limited, you will find it difficult to achieve truly professional-level results with your \$2,000 system. —Steve O

We Welcome Your Feedback

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Published letters may be edited for space and clarity.

Error Log

August 2005, "Studio in a Box," pp. 64–67. The specifications tables contained errors regarding the Korg and Boss portable digital studios. The Korg D32XD has eight balanced 1/4-inch inputs, two unbalanced 1/4-inch Stereo Master outputs, two unbalanced 1/4-inch Stereo Monitor outputs, a built-in 80 GB hard drive, and 16 levels of undo. The Korg D1200mkII has four balanced 1/4-inch inputs, two RCA Stereo Master outputs, and two RCA Stereo Monitor outputs. The XLR inputs on both Korg units are individually phantom powered. Lastly, the Boss BR-1600CD transfers data via CD-RW and USB.

August 2005, "The World Wide Studio," p. 76. When discussing commercial services that facilitate remote sessions, we inadvertently omitted eSession (www.esession.com), a Web-based service that gives artists and producers access to top studio players and engineers for remote sessions.

a 2-channel phantom-powered mic preamp for \$80, an audio interface for \$90, powered monitors for \$200, a MIDI keyboard controller for \$100 to \$200, and headphones for \$100.

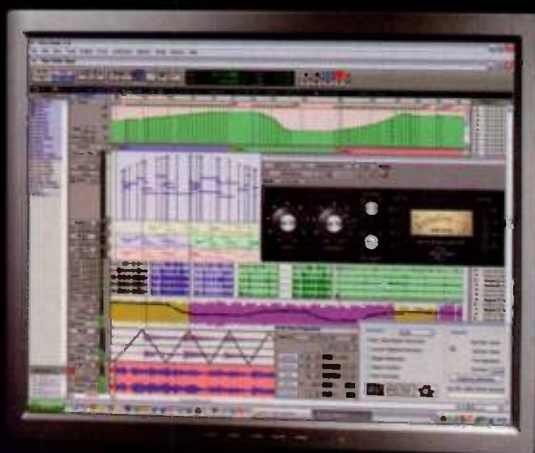
Lastly, the SynthEdit Modular Synthesizer (available for a \$50 registration fee) lets you create VST instruments and effects that are limited only by your imagination.

Ralph Gonzalez
via email

Ralph—It partly depends on what you consider professional, but yes, it's possible to record some types of professional projects with a stripped-down



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EMspotlight

Tuning Talk with Wendy Carlos

Although Wendy Carlos is best known for *Switched-On Bach* (1968), which showed the world that the synthesizer is a serious musical instrument, the record was only a prelude to the interesting work she would later create. In this interview from the EM archives, Carlos discusses her tuning explorations and electronic orchestration for the 1986 recording *Beauty in the Beast*. By Freff.

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*.



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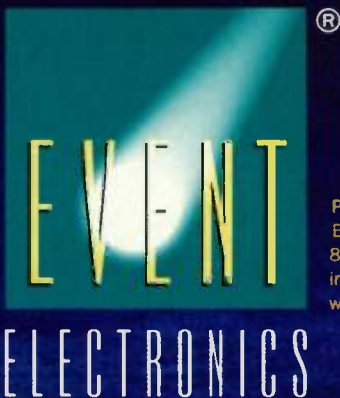
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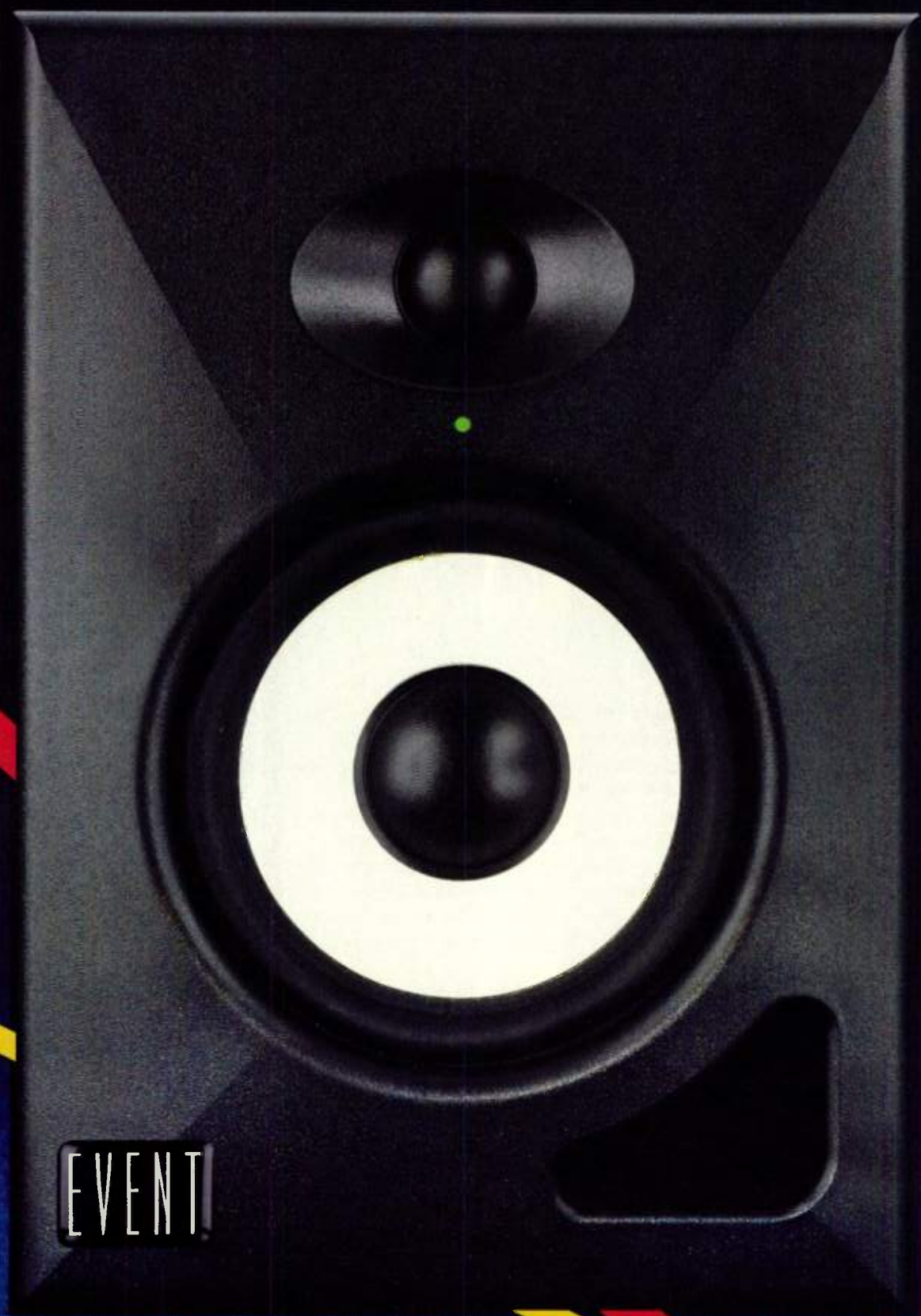


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Rev Up



WUSIKSTATION 2.1

Wusik (www.wusik.com) is shipping Wusikstation 2.1 (Win), a new version of its wave-sequencing soft synth. Wusikstation is a sample-playback plug-in that supplies samples of dozens of hardware synths.

The new version's file browser has been greatly improved, and you can categorize presets as desired. It now supports microtuning, and you can copy and paste between layers. Wusikstation 2.1 requires an SSE-compatible computer and is available in two versions: the 220 MB Small Package (\$49), with 880 presets and 450 sounds, and the 524 MB Big Package (\$99), with 1,520 presets and 2,390 sounds. Version 1 users can upgrade to the Big Package for \$29.

CAKEWALK SONAR 5

Cakewalk (www.cakewalk.com) has announced a major upgrade to its flagship sequencing software for Windows. Sonar 5 Studio Edition (\$479) and Sonar 5 Producer Edition (\$799)



boast numerous new features, topped off by a 64-bit, double-precision, floating-point audio engine that increases speed and dynamic range, even when running on 32-bit computers. Both versions of Sonar 5 integrate audio and MIDI editing, arranging, and mixing into a single window, with track icons and tabbed edit views for quicker workflow. If you're scoring to picture, you can send video output from Sonar 5 to a FireWire device for high-quality display and reduced demand on your computer resources. Additional new features include updated MIDI effects, automation drawing enhancements, and native VST support.

The Producer Edition gives you capabilities missing from the Studio Edition. Key among those are Roland V-Vocal VariPhrase processing and the new Pure Space convolution reverb. You also get several new instrument plug-ins, including the subtractive synth PSYN II, the virtual analog Pentagon I, the flexible REX player RXP, and Roland Groove Synth.



STEINBERG CUBASE SX/SL 3.1

Steinberg (www.steinberg.de) is shipping updated versions of Cubase SX (Mac/Win, \$799) and Cubase SL (Mac/Win, \$499), free downloadable updates for version 3 users. Cubase 3.1 has expanded editing and mixing functions and new support for Steinberg's Dolby Digital and DTS Encoders (previously available only to Nuendo users) and for Studio Connections II, which allows easy integration between software and hardware, enabling Cubase to control a variety of MIDI devices.

Cubase 3.1's expanded CPU support takes full advantage of dual-processor computers, as well as the latest AMD and Intel dual-core processors. MIDI output delay compensation helps to maintain proper timing when mixing external MIDI instruments through Cubase's VST mixer. Additional enhancements include a new equal-power panner, extended copy functions for mixer channels, and the ability to freeze MIDI playback parameters.

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IK Multimedia Miroslav Philharmonik

IK Multimedia (www.ikmultimedia.com) has begun shipping the much-anticipated Miroslav Philharmonik (Mac/Win, \$599). Using an enhanced version of SampleTank 2, Miroslav Philharmonik is a virtual symphonic plug-in paired with an orchestral and choir sample library developed by Miroslav Vitous. Many included sounds were once part of one of the most expensive orchestral libraries available. Now they've been reformatted and combined with previously unreleased material that supplies additional instruments, ensembles, and performance articulations. All instruments were played by members of the Czech Philharmonic Orchestra and recorded in Prague's Dvorák Symphony Hall.

Miroslav Philharmonik features more than 1,300 sounds totaling more than 7 GB. The 16-part multitimbral instrument gives you full MIDI control of all performance parameters. You can customize sample maps, part presets, and combination presets to suit your needs. Like SampleTank 2, it gives you a choice of three sample-playback engines and a large assortment of



DSP effects, with a reverb derived from IK's soon-to-be-released Classik Studio Reverb. The plug-in supports Audio Units, DirectX, RTAS, and VST formats. Registered SampleTank 2 users can crossgrade to Miroslav Philharmonik for \$399.

Download of the Month

KRAKLI SOFTWARE YAVA2 (WIN)

Yava2 (\$24.95), from Krakli Software (www.krakli.co.uk) is an analog-modeled subtractive-synthesis VST plug-in with an array of features that belies its modest price. Purchase includes the effects plug-ins Charlton and Gate-XOR, for phasing and gating, and the additional synths YFG and BEL, which are devoted respectively to noise and to clangorous, bell-like sounds.

A glance at Yava2's control panel and a spin through its bank of factory presets will convince you that there's a lot going on in this little synth. The story starts with a pair of oscillators labeled Orch and Morph. Orch generates a stack of waveforms that can be offset by octaves and slightly detuned. Morph is a variable-waveshape oscillator with five preset waveforms (including noise). Morph can be hard-synced to Orch, and a separate sine-wave oscillator can ring- or frequency-modulate a mix of their outputs.

Alongside the oscillators is a pair of 12 dB-per-octave state-variable (lowpass, bandpass, or highpass) filters, which you can arrange in parallel or in series. You can position the ring and frequency modulation either before or after the filters. The signal path ends in a dual-delay effect that can sync to tempo.

Yava2's modulators include two assignable ADSR envelope generators, a dedicated ADSR amp envelope, a flexible module that combines LFO and sample-and-hold functions, two gate sequencers, and two sequencers that you can configure as control or as note sequencers. An 8-destination-



by-9-source modulation matrix controls modulation routings. Needless to say, things can get quite animated (see [Web Clip 1](#)).

Although Yava2 is the main attraction, don't overlook the other plug-ins in the package. BEL is especially charming. You can download a demo of Yava2, as well as a variety of free synth and effects plug-ins, from the Krakli Web site.

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Peterson StroboSoft

Peterson Tuners (www.petersontuners.com), a company long associated with making strobe tuners for stage and studio, has gone soft. StroboSoft (Mac/Win) is a virtual tuner that comes in two versions with



features designed specifically for stringed instruments. StroboSoft Standard (\$49) is a basic chromatic tuner that displays pitch, MIDI Note Number, Hertz, and cents. It has a selectable sampling rate, switchable temperaments, and global cents offset. It also supports capo and drop tunings.

In addition to chromatic tuning, StroboSoft Deluxe (\$79) offers Instrument Mode tuning, which lets you store presets for a particular instrument and set intonation visually. It supplies an oscilloscope and a spectrum analyzer, and it supports Peterson Sweetened Tunings and the Buzz Feiten Tuning System. Both editions are available only as downloads.

Moog Moogerfooger MF-104Z

Moog Music (www.moogmusic.com) has a new and improved version of the MF-104 analog delay processor first introduced five years ago. One of the final products designed by Bob Moog, the MF-104Z (\$729) contains true bucket-brigade circuitry and offers delay times from less than 50 milliseconds to just over one second—longer than any other standalone analog module, according to Moog Music.

Drive and output controls let you match impedances to suit signals of all levels. You can route the output directly to the input, or you can send the output to an external processor before it returns to the input. Because most front-panel functions are voltage controllable, you can control them using an optional Moog Expression Pedal. Like all Moogerfoogers, the MF-104Z can be rack-mounted or placed on the floor or a tabletop.



Get Smart

Top-flight sequencers have grown so complex that they might take years to master. Fortunately, first-rate help is available that can turn you from a novice into an expert. In the *Cubase SX Ed Series* (\$45

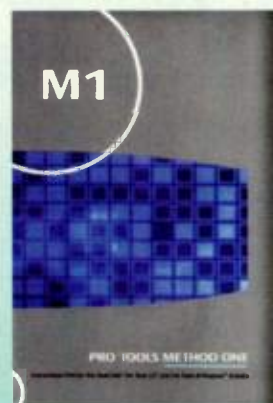


each, \$80 for two, \$120 for all), three tutorial DVD-ROMs from ASKVideo Interactive Media (www.askvideo.com), product specialist Steve Kostrey teaches you how to use all versions of Steinberg's audio sequencer. Tutorial Level 1 quickly gets you up and running with 28 video lessons that explain MIDI and audio setup, the Project page, the Pool, VST connections, Workspaces, and other basics. In Level 2, you learn about fades and crossfades, the Key Editor, the Drum Editor,

and more. Tutorial Level 3 explores time and audio warp, ReWire, VST System Link, and other advanced topics. Together, they give you

almost eight hours of interactive instruction covering 80 topics.

Anyone who's trying to master Pro Tools appreciates helpful instruction, and many resources are available. The latest from Digidesign (www.digidesign.com) is *Pro Tools Method One* (\$49.95), a video DVD hosted by certified Pro Tools expert Eddie Heidenreich. He explains core concepts and techniques for using Pro Tools | HD, LE, and M-Powered, covering topics from session basics and navigation techniques to automating mixes and backup strategies. Over the course of one hour and 53 minutes, he also discusses editing MIDI, working with loops and plug-ins, and many other essential issues. Although it's no substitute for certified Pro Tools training, Method One will give you a firm foundation for further education.



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Elemental Audio InspectorXL

Elemental Audio (www.elementalaudio.com) has introduced a suite of six audio-analysis plug-ins. InspectorXL (Mac/Win, \$219) integrates pro studio tools such as spectrum analyzers, a multimode phase scope, and a variety of metering devices. All plug-ins are optimized for each supported operating system, and all make the most efficient use of screen space and computer resources for the task at hand, according to Elemental Audio. InspectorXL supports Audio Units, RTAS, and VST plug-in formats and sampling rates as high as 192 kHz.

The colorful, customizable Spectral Analysis plug-in lets you choose FFT, spectrogram, or 1/3-octave analysis. Level meters are available in horizontal or vertical formats, and the Statistics plug-in keeps track of clip and over incidents. You can tailor the Stereo Analyzer plug-in to display Vector, Polar, or Lissajous/XY plots. Use it to monitor phase correlation



and balance, and stereo image with independent mid and side meters. The customizable Multimeter combines many of InspectorXL's functions to display levels, spectral analysis, stereo analysis, and clip statistics in a single plug-in.

Rob Papen Blue

Sound designer Rob Papen has teamed up with Jon Ayres to develop Blue (Mac/Win, \$199), a soft-synth plug-in that combines subtractive, FM, phase-distortion, and waveshaping synthesis. Six oscillators generate virtual analog, additive, and spectral-type waveforms, and you can combine them using 32 modulation routings. Create complex timbres with ten LFOs, three modulation sequencers, and a modulation matrix with 20 slots, 35 sources, and 103 destinations.

Blue is 16-note polyphonic with a 32-step monophonic sequencer. Two stereo filters arranged in series or in parallel give you lowpass, bandpass, highpass, notch, ring, comb, and formant responses. Four multi-envelopes (with as many as 32 sections) supplement nine AHDSFR envelopes. Two effects blocks produce nine stereo effects such as delay, flanger, and distortion. Time-based effects, LFOs, and other parameters can sync to MIDI tempo. Blue is compatible with VST and Audio Units formats and is distributed by EastWest (www.soundsonline.com).



MusicXPC Professional C3 and C4

MusicXPC (www.musicxpc.com), a manufacturer specializing in building computers for media production, has introduced two small-form-factor models for audio professionals. Both are configured from the BIOS up with music applications in mind. External ports support FireWire, USB 2.0, analog audio, and S/PDIF, and internal slots support 8x AGP graphics and a PCI card. Both models feature heat-pipe technology for cool, quiet operation. To minimize studio downtime, a comprehensive backup and restore utility is included.

The Professional C3 (\$1,399) is built around the Shuttle XPC G2 and houses a Pentium 4/3 GHz with a 1 MB cache and an 800 MHz frontside bus. It comes with 512 MB of RAM, a 16x DVD burner, and two 7,200-rpm Serial ATA hard drives totaling 280 GB. The Professional



C4 (\$1,899), based on the Shuttle XPC G5, contains a Pentium 4/3.2 GHz, 1 GB of RAM, a 16x DVD burner, and 320 GB of disk space. It also has Gigabit Ethernet and dual VGA outputs.

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Sound Advice



One of the newest sound libraries from Native Instruments (www.native-instruments.com) is *Kontakt Experience* (\$119), a collection of sampler instruments and scripts exclusively for Kontakt 2. More than 1.3 GB of content gives you 128 ready-made instruments. A wide range of styles falls into ten categories such as Exotic, Vocalized, Guitarized, Motions & Pads, and Drumkits & Drumloops. Documentation furnishes complete details on

each instrument, including Quick Edit parameters and scripts. Ten Kontakt Script Processor (KSP) modules are integrated into the collection, and you can apply them to any Kontakt 2 instruments. They include useful functions such as Chord Splitter, Delay Sequencer, and Drum Computer.

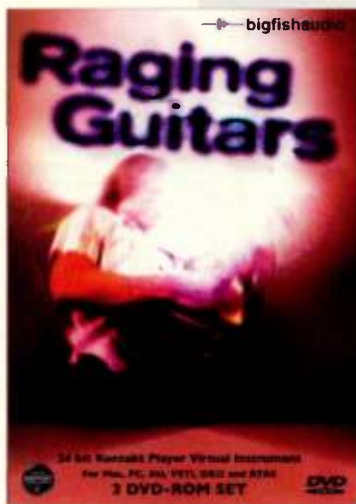
If you've been paying attention, you've probably noticed a number of large, detailed sample libraries for realistically emulating an electric guitarist. *Raging Guitars* (\$299), a Kontakt-compatible collection from Big Fish Audio (www.bigfishaudio.com), is a three-DVD set loaded with more than 11 GB of notes and

chords for building your own riffs and progressions. Three levels of distortion are available: mild, medium, and rip-your-face-off. Use the mod wheel and key-switching to select layers and articulations on the fly. To avoid repetition, round robin mode ensures that every note plays from a different layer. You can dial in brightness, chorusing, reverb, and other effects as needed. Also on hand is an assortment of loops in construction-kit format. *Raging Guitars* includes

Kontakt Player (Mac/Win), which runs standalone or as a plug-in in numerous formats.

Megatrax Production Music (www.megatrax.com) has released *Megasonics* (\$395), a 5-disc set of production elements covering a wide range of effects and timbres. The 1,200 tracks are available as 16-bit, 44.1 kHz audio files on four CDs, and as 24-bit, 48 kHz WAV files on one DVD. The sounds on disc 1 relate to hits and motion, including the categories Risers, Flybys, and Transitions. Disc 2 is divided between Drones, Atmospheres, and Textures, while disc 3 contains the categories Noise, Pulses, and Loops. If you're looking for Magical, Sci-Fi, and Spooky effects, disc 4 has it all. *Megasonics* gets extra kudos for its documentation, which includes a colorful booklet that clearly lists the CD audio files by disc and track, and a complete catalog of the WAV files in Excel and PDF formats.

Propellerhead Software (www.propellerheads.se) is distributing *Flatpack 2* (Mac/Win, \$90), a Refill for Reason 3. Built around Reason's Combinator environment, *Flatpack 2* contains four new instrument concepts: Kilburn, Scope, Boxmoor, and Rex Dex. Kilburn is a modular framework that uses multi-sampled content to re-create classic synths. Scope supplies 100 customizable Combinators for generating and blending soundscapes, pads, textures, and evolving sound beds. Boxmoor is a Combinator-based drum machine that begins with sampled beatboxes and gives you enhanced real-time control. Rex Dex, a collection of REX-based players, furnishes innovative techniques for controlling and transforming REX loops. *Flatpack 2* also includes Outboard, a collection of virtual effects processors. Demo downloads are available from www.lapjockey.com. EM



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Something Old, Something New

By Scott Wilkinson

Infinity adds new member to transducer family.

Loudspeaker systems have used cone and dome transducers almost since their inception in the late 19th century. We've seen advances in speaker technology, of course, such as the development of compression drivers, electrostatic-planar designs, and Kevlar. But in many respects, speaker transducers have remained unchanged since General Electric researchers Chester Rice and Edward Kellogg patented the moving-coil, direct-radiator speaker in 1924.

Now, a new driver design from Infinity (www.infinityspeakers.com) adds an interesting alternative to the mix. As part of the Harman group of companies (which also includes JBL, Lexicon, dbx, and other names familiar to electronic musicians), Infinity is a well-regarded manufacturer of speakers for the consumer market. The company's engineers were given a mandate to develop a new driver that would accommodate low-profile cabinets to accompany flat-panel video displays without sacrificing sound quality. Almost two years and 8,000 man-hours later, the resulting driver is called the MRS (Maximum Radiating Surface) flat-panel transducer.

MRS is said to combine the best attributes of traditional cone and planar drivers, using a flat, rectan-

gular diaphragm measuring 7 x 3.5 inches that provides the same radiating surface area as a 6-inch cone. The diaphragm is made of Infinity's proprietary CMMD (Ceramic Metal Matrix Diaphragm) material, which consists of a stiff aluminum core anodized with layers

of alumina ceramic on both sides to provide a good balance between stiffness and mass. The diaphragm is formed with beveled edges, raised ribs, and notches (called gussets) around the perimeter (see Fig. 1a). The beveled edges add rigidity, and the ribs and gussets are spaced to minimize breakup modes; in fact, in the company's first commercial MRS products, the first major breakup mode is around 10 kHz, far above the 2 kHz crossover frequency. The motor structure uses three high-energy neodymium magnets and two 5-inch-long cigar-shaped voice coils (see Fig. 1b) that apply force uniformly over the entire surface. As a result, all parts of the surface move in phase, with very little breakup.

The diaphragm is mounted in a low-profile, self-contained module that is vented in the rear to dissipate heat and reduce standing waves. The rectangular surround is attached to the module in the same plane as the voice coils to minimize so-called "rocking modes," and the corners of the surround are rounded with a carefully calculated radius to allow for maximum movement without collapsing. According to Infinity, a larger model would need a second suspension, which can be added without increasing the overall depth.

All of those factors result in a shallow mounting depth, as with planar drivers; good mid- and low-frequency response, like that of cone drivers; and a peak excursion that is more than 25 percent of the overall driver depth (compared with 10 percent for planar and 12 percent for cone). In addition, the modules are designed for mounting horizontally or vertically and very close together to form a line array.

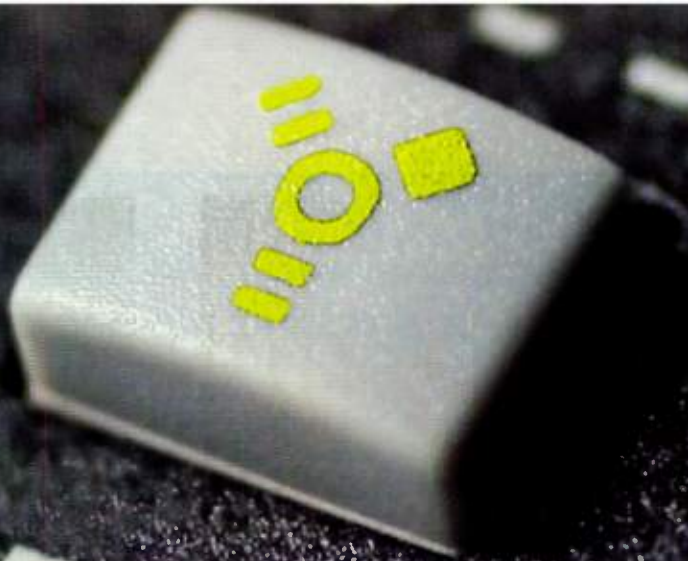
In the initial line of speakers, MRS transducers are mated with a 1-inch CMMD dome tweeter mounted in a constant-acoustic impedance (CAI) wave guide that imparts the same directionality characteristics as the MRS diaphragm and provides some gain, improved dynamic range, and lower compression and distortion. Those speakers are intended for use with a subwoofer crossed over at about 80 Hz, but a larger MRS driver might not need a subwoofer to hold up the bottom end.

During the press introduction to the new line, I got to hear these speakers in several different listening environments, and I was impressed. The MRS transducer is aimed at the consumer market for now, but it has the potential to affect all segments of the speaker industry, and studio monitors may not be far behind. **EM**

FIG. 1: The MRS diaphragm includes ribs and notches (gussets) to minimize breakup modes (a). Two elongated voice coils apply uniform force to the entire surface (b).



gular diaphragm measuring 7 x 3.5 inches that provides the same radiating surface area as a 6-inch cone. The diaphragm is made of Infinity's proprietary CMMD (Ceramic Metal Matrix Diaphragm) material, which consists of a stiff aluminum core anodized with layers



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Colossal Production

By Matt Gallagher

Colossus produces hip-hop using jazz sensibilities.

Charlie Tate cut his teeth by playing bass and touring with the Big Cheese All Stars and Neneh Cherry. He later formed a record label in London and became involved with urban-music production. "I learned the hard way by using samplers and a Mac Classic," Tate says. In October 2002, Tate moved to Oakland, California, adopting the name Colossus as a production moniker and forming a collective of hip-hop musicians.

Tate wrote, recorded, and produced Colossus's debut, *West Oaktown* (Om Records, 2005), a jazz-inflected hip-hop work featuring musicians from the Bay Area and London. "When I got the idea for this record I didn't have a band," Tate says. "I programmed all the drums, the Rhodes [piano sounds], the upright bass, and some rudimentary guitar. I did all the pre-production here [in West Oakland]."

For pre-production, Tate relied upon his mobile studio setup, which consists of a Mac G4 PowerBook running Emagic Logic Pro 6; an Emagic emi 2/6 USB audio interface; an HHB Radius FatMan mono mic preamp and compressor; and a Shure SM58 mic. "A lot of sounds are set up on my laptop, and I don't need to mess with them much," Tate says. "I generally use

the virtual instruments in Logic and draw everything in with the mouse.

"I start with a drum pattern and edit it as the song evolves," Tate says. "The keys come next. I usually start with the [Emagic] evp88 [soft-synth plug-in] and mess around with chord variations. I use the Humanize function within [Logic's] Transform [window] to put a little bit of movement on things. Next, I muck around with bass samples. Normally, that takes me about five minutes."

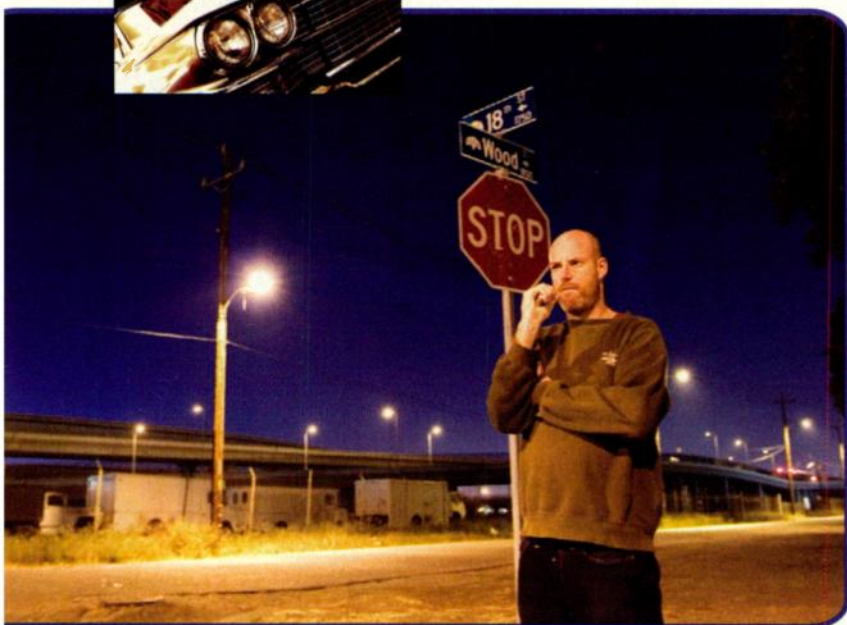
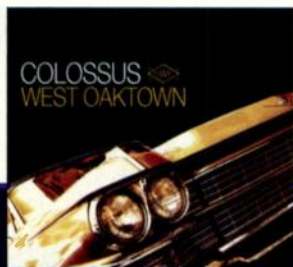
Tate captured vocal performances from Bay Area MCs Azeem, Capitol A, Delphi, and Regi B during pre-production. He found that the SM58, which emphasizes high- and midrange frequencies, was well suited for the task. "The big Rhodes chords occupy such a large frequency range that you have to cut the vocal at the bottom end to keep the richness and the warmth of the rest of the track," he says. Tate also believes in capturing complete vocal takes. "I don't like comping vocal performances," he says. "I don't think it sounds right."

Although Tate builds tracks quickly, he carefully sculpts his sequences to impart them with as organic a feel as possible. "The background of each song is sequenced," he says. "I used the same set of drum samples throughout. Once I have the basic arrangement, I'll get back into the drums and spend hours moving fills and adjusting velocities," he says.

In London, Tate recorded vocals from Hilton Smythe (aka Roots Manuva), guitar, bass, and percussion at the now-defunct Blueprint Studios, which included a Mac G5 running Logic Pro 7, a MOTU 2408 mkII audio interface, an Avalon VT-737SP instrument preamp, a Focusrite ISA428 Pre Pack mic preamp, an Empirical Labs EL7 Fatso Jr. compressor/limiter, two TC Electronic PowerCore DSP devices, and a Neumann TLM 103 condenser mic. "The Fatso is crucial," Tate says. "It gives [the evp88] extra warmth and it compresses the drums so that they sound cutting but still warm and smooth." He recorded horn parts at Easy Access Studios and mixed the album in Logic at Blueprint.

Tate fashions his arrangements using small jazz combos as a model. "I've seen some amazing three-piece bands that create an enormous sound," he says. "I go by the adage 'less is more.' After years of sequencing and programming, your filtration skills get better. I think it's a matter of doing what sounds right." **EM**

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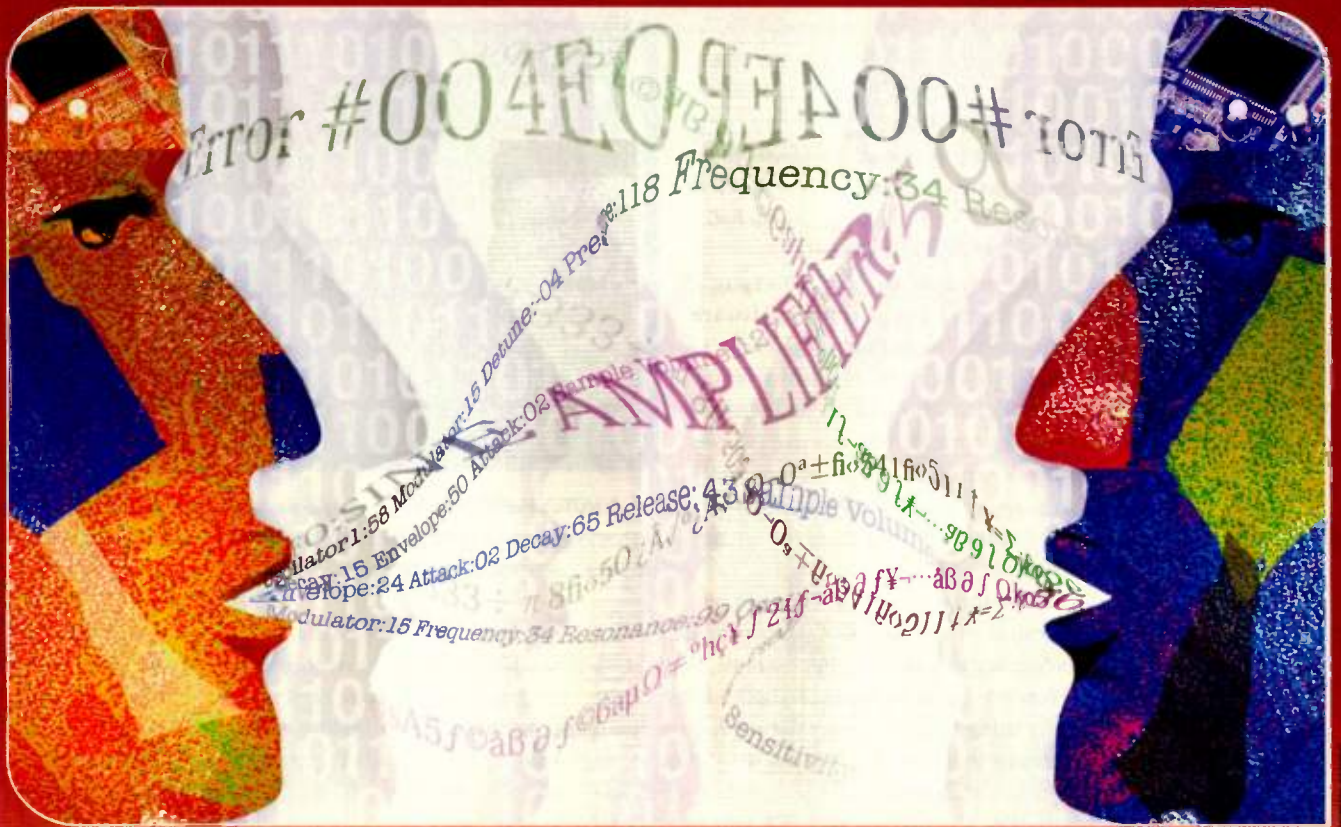
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Lost in Translation

By Garth Hjelte

You can
get there
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Let's say that one day you are leafing through the pages of the latest issue of EM, and you come across an ad for a new sample library of Central Malaysian nose flutes. The trouble is that the CD is for GigaStudio, but you use SampleTank on your Mac. Can you use the sample library, and, if so, how?

The good news is that no matter what sample library and sampler you choose, you'll be able to make some sort of conversion between formats. The solution might be as simple as pointing your sampler to the source library, clicking on the import button, and entering nose-flute nirvana. Or you may experience difficulties, forcing you to leave some of the library's features behind, and you could need separate software to make the conversion (see the sidebar "Conversion Software").

Bear in mind that converting a sample library from one sampler format to another doesn't void the library manufacturer's End User License Agreement; all the rules stated in the EULA apply to the converted library. In other words, you can convert your own library for your own use, including whatever commercial uses are permitted in the EULA.

Who Needs It?

Why should you need to worry about conversion; why not just buy the version of the library that matches your sampler? For one thing, it might not be available in your sampler's format. With the growing number of samplers on the market, it's increasingly difficult for sample-library developers to directly support multiple formats, although they do cover most of the majors.

Kontakt 2's Script Processor and GigaStudio's MIDI Rules allow real-time MIDI automation of some or all parameters.

Furthermore, the signal and modulation paths are not necessarily fixed; some samplers provide full-modulation matrices, whereas others hardwire modulation routings. Kontakt 2 has a semimodular signal path. Beyond that, different signal paths and different parameter settings may apply to different zones or zone groups within the sample map. In short, you shouldn't expect complex design schemes written by different developers to be easily interchangeable.

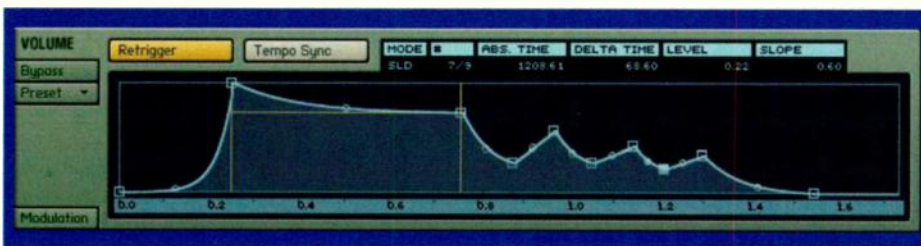
The Upside

Now that I've made the task sound impossible, let me assure you that it is possible. Sample libraries are routinely converted to play successfully in different samplers, although there are different degrees of success (see the table "Sample Library Conversion").

Many sample libraries don't stray far from basic sample mapping and subtractive synthesis. Almost all samplers, from the simplest to the most complex, support Note Number and Note On Velocity zones and a straightforward subtractive-synth signal path with ADSR envelopes and basic LFOs routed to the typical elements. With a library that uses only those features, all you need is a way to decode and translate the settings from one model to the other.

Not all sampler modules are created equal, and tweaking is often necessary to obtain the exact sound intended by the library's developers. Careful programming of the conversion algorithms can minimize the tweaking required, and differences in component characteristics may make a perfect match impossible—but it's not hard to get close. Unless you're going for an exact emulation of a specific instrument or sound, close is probably good enough, because you're unlikely to be using the library in different samplers side-by-side. And who's to say that for your purposes the sound you get is not better than the original? Sampler manufacturers give you all those options for a reason: to encourage you to tweak.

FIG. 3: Native Instruments' Kontakt 2
Flexible envelopes can have as many as 32 breakpoints. The sustain breakpoint is indicated by the vertical orange line.



Common Tweaks

Some issues come up repeatedly when converting sample libraries. Once they have been identified,

CONVERSION SOFTWARE

The following companies manufacture conversion software that supports most formats and samplers.

Awave

FMJ Software
support@fmjsoft.com
www.fmjsoft.com

CDXtract

Bernard Chavonnet
support@cdxtract.com
www.cdxtract.com

Extreme Sample Converter

Wlodzmeirz Grabowski
support@extranlator.com
www.extranlator.com

Translator

Chicken Systems
support@chickensys.com
www.chickensys.com

they are usually easy to fix. Here are some of the more common ones.

The onset of the sound may be too fast or too slow. Piano notes shouldn't fade in, and at the other extreme, you don't want clicks at the onset. The key in both cases is to adjust the amplifier envelope's attack time—slight lengthening will eliminate onset-transient clicks, and shortening will eliminate unwanted fade-ins.

Release time is another parameter that often needs tweaking. If you find notes unrealistically ringing on after you let the key up, shorten the release time. Conversely, acoustic-instrument sounds don't stop instantly; there is a natural decay as vibrations die out in the resonating body. You may need to increase the release time a bit to get natural-sounding acoustic instruments.

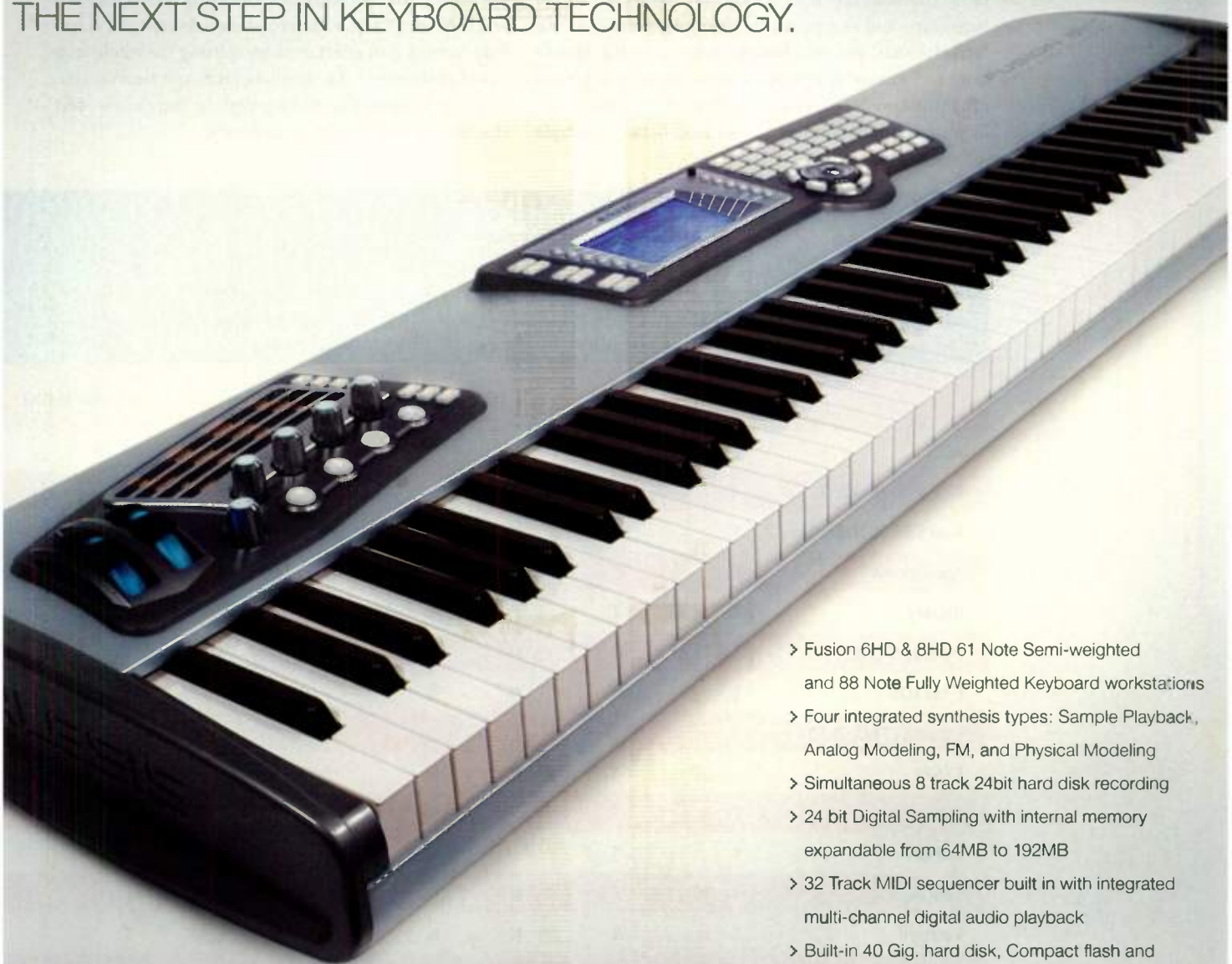
When the sound is too dark or too thin, the problem is probably the filter. If the signal path has a lowpass filter, its cutoff frequency, slope (indicated as dB-per-octave or number of poles), and envelope settings (especially amount and sustain level) all affect the high-frequency content of the sound, hence its darkness. For highpass filters, the same settings affect the bottom end (low-frequency content). If the sound is chirpy, look to the resonance setting with any mode of filter.

Trouble with Loops

When notes don't sustain as intended, either sustain level or looping is usually to blame. Ensure that a loop is defined and enabled, and increase the amplifier envelope's sustain level if it is not already fairly high; otherwise, notes will die out as you hold

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ALESIS

them. For ADSR envelopes, the sustain level is the S stage, but for breakpoint envelopes, you may need to do some sleuthing to deduce which stage sustains (see Fig. 3).

Loop settings can cause other problems, including clicking, overly obvious loop transitions, and, with extremely short loops, strange timbral and pitch artifacts. To adjust for clicks at loop boundaries, adjust the loop start- and end points in 1-sample increments. To facilitate that, you may have to zoom in to the sample level and ensure that snap-to-zero-crossing is turned off. If the sampler developer was kind enough to include loop tuning, which tunes a short loop between sample

points, try that also. For more stubborn problems, most modern samplers allow you to export to an external sample editor, and I highly recommend doing so. Editors such as SoundForge, Peak, and DSP-Quattro have excellent looping tools.

If the loop transitions don't click but are still obvious, check the looping mode (forward versus forward and backward), adjust the crossfade parameters if crossfade looping is in effect, and try shifting the whole loop in either direction. To eliminate pitch and timbral artifacts, try lengthening the loop slightly. You can also edit the original sample files as necessary.

SAMPLE LIBRARY CONVERSION

This table shows the conversion status from various formats (row headings) to various samplers (column headings). N indicates native conversion by the sampler. T indicates that separate translation software is needed. N/A indicates that conversion is not available. Cells are left blank when the source format and target sampler are the same.

	EXS24	Giga	HALion	Kontakt 2	MachFive	Reason NN-XT
ACID	T	T	T	N	T	T
Akai S-1000/3000	N	N	N	N	N	N
Akai S-5000/Z-Series	T	T	N	N	T	T
Apple Loops	N	T	T	N	T	T
Battery	T	T	T	N	T	T
E-mu E3/E3x/ESi	T	T	N	N	N	T
E-mu EOS	T	T	N	N	N	T
Ensoniq EPS/ASR-10	T	T	T	N	T	T
EXS24		T	N	N	N	T
Giga	T		N	N	N	T
HALion	T	T		N	N	T
Kontakt 1	T	T	N	N	N	T
Kurzweil	T	T	N	N	N	T
LM-4	T	T	N	N	N	T
MachFive	T	T	T	N		T
Reason NN-XT	T	T	T	N	T	
ReCycle	N	T	N	N	N	N
Roland S-7x	T	T	N	N	N	T
SampleCell I	T	T	T	N/A	T	T
SampleCell II	N	T	N	N/A	N	T
SFZ	T	T	T	N	T	T
SoundFont	N	N	N	N	N	N

The True Effect

Modulation and effects-processor settings are most susceptible to inexact translation. Not all LFOs are created equal: you can't make a breakpoint envelope out of an ADSR, and you either have a particular effect or you don't. But assuming that you aren't trying to do the impossible, tweaking modulation settings can solve a lot of problems.

When the sound is wobbling either in pitch, volume, or pan position, look at the LFO. A subtle vibrato or tremolo can be turned into a cartoon nightmare by an errant LFO amount or rate setting. LFO-driven auto-

panning may or may not sound better synchronized to tempo. The wrong LFO waveform can also wreak havoc. All these parameters are subject to mistranslation and are easily fixed.

Effects processors, if they play an important role in the original sound, can be the source of significant conversion problems. Kurzweil and Ensoniq programs commonly use effects as an integral part of their sound, for example. As with modulators, the target sampler may lack the needed effects. If you end up with a sound that is too dry, add whatever effects you have that you think will work. This is an

SampleTank	Battery	Cakewalk Dimension	Cakewalk Project 5	Emulator-X	Reaktor	Vsampler
T	T	T	T	T	T	N
N	N	T	T	N	N	N
T	T	T	N	N	T	N
T	T	T	T	T	T	N/A
T		T	T	T	T	N
T	T	T	T	N	T	N
T	T	T	T	N	T	N
T	T	T	T	T	T	N/A
T	T	T	T	N	T	T
T	T	T	T	N	T	N
T	T	T	T	T	T	N
T	T	T	N	T	T	T
T	T	T	T	T	T	N
T	T	T	T	T	T	N/A
T	T	T	T	T	T	N/A
T	T	T	T	T	T	N
T	T	T	T	N	T	T
T	T	T	T	T	T	N/A
N	T	T	T	T	T	T
T	T	T	T	T	T	N/A
T	T	T	N	N	T	N

area in which you may never replicate the original sound, but you may well get something better.

Road Blocks

You can't always get there from here; some barriers can't be hurdled. As the problems get more difficult, their solutions get more iffy. If a sample library uses a sampler feature that is not available in the destination sampler, and for which there is no viable substitute, there may not be an acceptable compromise.

Some samplers (GigaStudio 2 and SampleTank, for example) limit the number of sample references you

can have for a single key range (GigaStudio 3 raises the limit to 256, which is usually enough). Others (Kontakt, HALion, EXS24, NN-XT, and MachFive, for example) allow unlimited references. You can convert from the limited to the unlimited variety, and when the limits are not exceeded, you can go in the other direction. Otherwise, you'll leave an essential part of the library on the cutting-room floor.

Hybrid hardware samplers (especially the Kurzweil K-2x series) may use audio content contained in hardware ROM. Converting sampler instruments that use that content exclusively or mixed with unrestricted content leaves only the RAM part of the content, which usually doesn't cut it.

Sample libraries that include their own virtual instruments are not convertible when the samples used in the library are encrypted. That problem arises with many Kontakt Player, Reason Refill, and HALion3 instruments, although some instruments in those formats are not protected and can be converted.

Trigger Happy

Implementation of monophonic (mono) and legato modes is another troublesome area. Mono mode limits the number of sounding notes to one, typically implementing a note-stealing priority scheme in the process. Legato mode prevents some or all envelopes (typically amplifier and filter envelopes at the least) from retriggering when a new note is played before a held note is released. Legato mode works best, and is often only allowed in mono mode. Complex sample mapping makes mono and legato modes harder to implement for samplers than for synthesizers, and many implementations are, to put it kindly, weak. But when you need it, you need it, so caveat emptor.

Many samplers allow different settings to apply to different zones or zone groups, whereas others force the same setting on all zones. That limitation can be a deal breaker. For example, Apple's EXS24 applies the same crossfade setting to all zones, which makes it impossible to convert the varied crossfading enjoyed in many GigaStudio and

FREE SAMPLES

You can find free sample libraries of almost any kind of content on the Web. Here are some useful sources.

www.hammersound.net

Lots of great SoundFonts covering a variety of General MIDI sounds, and other synthy, ethnic, and percussive sounds.

www.hollowsun.com

Freebies are posted here monthly.

www.petethomas.co.uk/logic-exs24-samples.html

This site features sounds in EXS24 format.

www.worrasplace.com

A small collection of Worra's sounds, but offerings are changed regularly.

www.mightywight.net/mwdownloads.html

Original ethnic-flavored sounds in EXS24 format and precisely trimmed WAV files. This site also has classic, synthesized drum samples.

www.attitudei.com/ccp5/cp-app.cgi?pg=ste_downloads

Exotic percussion and guitar instruments in Giga format.

www.gigfiles.com

A variety of keyboards, guitars, and percussion instruments in Giga format. (You are required to create an account before accessing the free area.)

www.first-wave-music.de/downloads/f_downloads.html

Extensive collection of synthy-sounding EXS24 instruments. This is a German-language site.

www.ontology.com/exs24/index.html

Dirty, lo-fi drum hits, loops, pads, and instruments for EXS24. The drum hits are easy to convert to other sampler formats.

www.soundfonts.it/?a=soundfonts

Large, well-organized collection of SoundFonts covering all instrument categories.

www.johannes.roussel.com/soundfonts.htm

Synth-based SoundFonts with emphasis on pads, strings, and percussion.

www.millertone.com/samples.html

Casio VZ-1 and Yamaha RM50 samples reformatted as EXS24 instruments.

www.realfeel.freeuk.com/samples.htm

Samples created from Reactor Ensembles and converted to EXS24 format.

<http://kingstondrums.bombsquad.org/files.html>

Two great-sounding drum kits converted to a variety of formats.

Kontakt instruments. Getting the correct articulation from a layer or Velocity zone may depend on zone-specific modulation or effects settings.

The Hardware Alternative

Hardware samplers might be in the minority, but they aren't down for the count. Because they are created specifically for sample playback, hardware samplers may actually sound better and be more flexible than some software samplers. Furthermore, popular workstation keyboards such as the Yamaha Motif, Korg Triton and Oasys, Roland Fantom, and Alesis Fusion as well as drum samplers such as the Akai MPC Series and Roland MV-8000 load sampler instruments.

Chicken Systems' Translator converts most modern formats into most hardware sampler formats. Also, Translator and FMJ Software's Awake support most of the newer workstation keyboards. That enables you to convert newly released sampler instruments for use with your keyboard workstation or older hardware sampler. You can thereby avoid taking your computer to gigs and save on CPU consumption in the studio.

Remember that those structural compromises can be more radical with older samplers, especially when you are trying to cram a 100 MB instrument into a 32 MB space. Translator has some innovative schemes to deal with that, such as eliminating unnecessary fringe samples, resampling data, and truncating samples to coerce them to fit. That's often good enough, and tweaking can help.

Try It, You'll Like It

Converting between sampler formats is by nature an imperfect process and is often more art than science. As I've pointed out, that can be a good thing in providing creative options unavailable in the original library. For example, try importing a simple SoundFont

into a high-end sampler—you'll be amazed where you can take it (see the sidebar "Free Samples" for sources of SoundFont and other format libraries).

For the most part, the pitfalls of translating are obvious and easy to anticipate. Don't try to convert a library that uses the esoteric bells and whistles of a sophisticated sampler into a bread-and-butter sample player. Expect to spend some time tweaking even in like-to-like conversions. Remember that not all modules (filters, envelopes, and so on) with similarly labeled controls will sound or function exactly alike. When converting to a sampler that has more features than the source, try them out.

If you have a choice of sampler formats for a library, there are a few obvious rules to follow. If you own one of the supported samplers, choose its format even if it isn't your preferred sampler. That way, you'll at least be able to compare the results. If you need to pick a foreign format, the original format of the sample library is a good choice, and the manufacturer will usually be happy to tell what that is. On the other hand, if your sampler is less complex than the original sampler and the library has been converted to a similar format, that may be a better choice because the compromises will have been made at the factory. In the best case, the library will include all supported formats; then you can try several conversions to find the best fit.

If you have the latest samplers and aren't that picky, successful conversion won't take much extra work. If you have a less capable or more esoteric sampler, you will need to take some of the steps described here. But it's worth the effort and can make your less-expensive equipment go a lot further. **EM**

Garth Hjelte is owner, programmer, and chief tumbler of Chicken Systems (www.chickensys.com), maker of Translator software for the PC and Mac.

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By Myles Boisen

Ribbon Revival

Ribbon microphones have become personal favorites of mine for recording electric guitar, brass and reeds, and bowed strings, among other instruments. During more than ten years of professional recording, I have come to rely on a collection of ribbon transducers for their lush timbre, palpable low-end air movement, natural room sound, and punchy transient attack. And with a historical legacy reaching back to the early days of big-band jazz, ribbon mics can bring a vintage vibe to vocals, drums and percussion, and acoustic music ensembles.

The basic operating principle of the ribbon (or velocity) microphone has remained unchanged since the early RCA ribbon mics of the 1930s. (For an overview of this transducer-type mic, see the sidebar "A Brief History of the Ribbon Microphone.") At the heart of a ribbon transducer is an extremely thin ribbon of aluminum suspended by both ends. The ultralight ribbon is free to move back and forth within a magnetic field. The ribbon's bidirectional movement, coupled with its insensitivity to vibration at its sides or ends, yields a natural figure-8 pickup pattern.

A relatively low output voltage is produced from the motion of the aluminum strip in response to sound pressure. Therefore, a ribbon mic typically requires a maximum of 60 dB of preamplification to achieve a standard 0 VU signal level.

The delicate ribbon is surrounded by a weighty magnet assembly, making many such microphones

relatively large and bulky. In addition, the transducers require special handling during use and storage to avoid damage to the ribbon element.

The benefits of ribbon miking are often characterized as a smooth and natural timbre without sibilant highs, full low-end response at any distance, and high-SPL handling. Low noise and superb transient response are additional benefits, especially when a ribbon is paired with a quality microphone preamp. (See the sidebar "Preamps for Ribbon Mics.")

For this survey of modern ribbon transducers, I gathered together 13 monophonic studio-quality ribbon mics, spanning a wide range of prices. With the exception of two of the beyerdynamic models, all of the mics in this roundup are classic side-address, bidirectional, single-ribbon designs.

I have grouped the 13 models in this lineup into three classes, based on price and physical construction:

The vintage vibe of the
ribbon mic enters
the personal studio.



BOB MONTESCLAROS



Premium Classics, Entry-Level Classics, and Compact and Handheld Ribbons. (At press time, we learned of a new ribbon mic, the Crowley-Tripp Studio Vocalist, which lists for \$1,395 and is available at www.soundwaveresearch.com. Other types of ribbon mics—such as stereo and phantom-powered versions—are explored in the sidebar “Specialty Ribbon Mics.”) First, I will provide overall impressions of each mic, then I’ll examine their performance in real-world studio situations.

Premium Classics

Innovative designs with vintage flair, exceptional sound quality, and a premium sticker price distinguish ribbon mics made by Audio Engineering Associates (AEA), Coles, and Royer Labs from the rest of the pack. Those companies not only manufacture their own mics, but they also develop original designs based on the aesthetics and mechanisms of vintage ribbon models.

Audio Engineering Associates AEA R84

The AEA R84 recalls the rounded contours of the iconic RCA 77, with a cylindrical wire-mesh grille and rounded black domes capping both ends of the mic (see Fig. 1). The chrome yokemount, with locking set screws to hold the mic in position, adds its own nostalgic touch. A silver graphic on the top cap, along with the red AEA logo, indicate the on-axis side of the mic’s figure-8 pattern.

FIG. 1: For close vocal work, the R84 is available in a DJ version from AEA.



Other old-school touches include a 10-foot fixed cable attached with a plastic strain-relief and a cushion-mount at the base of the yoke to prevent stand-borne vibrations from reaching the mic. The R84 can be rotated from side to side or swiveled up and down over a wide angle around the axis at the top of the yokemount.

The R84, primarily intended for solo and spot-mic duties, is available in a DJ version, which is optimized for close vocal miking. An all-black finish TV version can also be ordered. (For more information on this mic, see the October 2003 issue of EM at www.emusician.com.)

Audio Engineering Associates AEA R92

Like its cousin, the R84, the streamlined AEA R92 sports a capsule-shaped body with an attached cable (see Fig. 2). The rounded silver caps at both ends support a cylindrical grille wrapped in black fabric.

This unique pill-shaped mic is suspended at both ends by elastic

bands, which act as a shock-mount and anchor the mic to an ingenious 360 degree swiveling yoke mount. The AEA R92 comes in a padded plastic case and is designed especially for close miking, with an extended high-frequency response and reduced proximity effect compared to other AEA models.

Coles 4038

For a number of years, the distinctive 4038 was the only classic ribbon mic available on the market. With a pedigree that dates back to the 1950s, the BBC-designed “Ringo mic” has earned its place in recording history through its use on numerous Abbey Road sessions, including records by the Beatles and Pink Floyd.

The business-end of the 4038 resembles a horse’s hoof, due to the massive horseshoe-shaped magnet inside (see Fig. 3). The assembly swivels 90 degrees at the end of its thick all-metal stem, which serves as a handle for the heavy mic, as a bracket for the separate stand-mounting hardware, and as a receptacle for a removable XLR adapter. An elastic suspension mount is also available, as well as the AEA SNT stereo-mounting bar.

Coles 4040

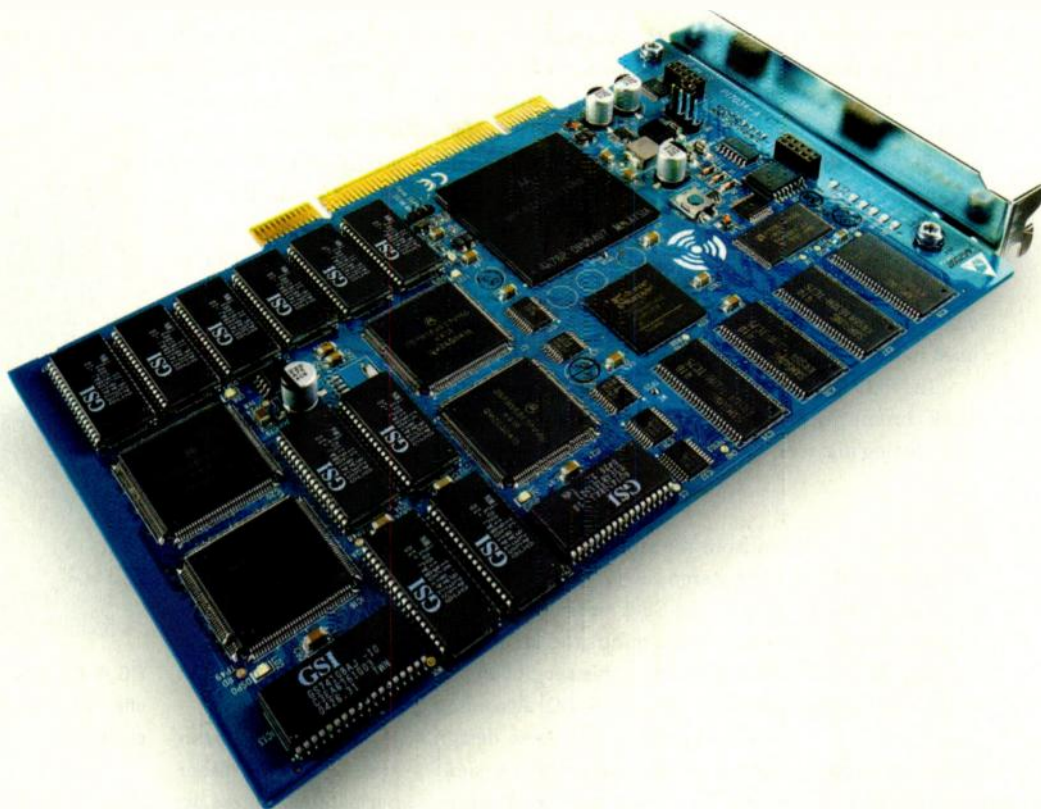
The newest model from Coles, the 4040, has a thoroughly contemporary European look and could easily be mistaken for a modern condenser mic (see Fig. 4). That is until you pick it up. The hefty, cylindrical barrel is finished in tasteful gold satin and topped with a beveled heavy-duty mesh grille. A red dot on the strip of text around the mic’s mid-section indicates the address side of the mic. The ribbon element has a protective internal pop filter, which makes it impossible to see through to the magnet assembly.

A set of three hardware mounts—a durable metal and plastic jointed swivel mount and two basic North American and European stand adapters—are provided. The interchangeable mounts screw into a threaded socket in the bottom of the mic. There are also two screw adjustments in the base, which can be locked to secure the ribbon assembly during shipping. Loosening those screws frees an internal shockmount system built within the 4040’s housing. Both Coles models come in a plastic padded case, with a protective cloth drawstring bag embroidered with the Coles logo. (The Coles 4040 is distributed exclusively in the U.S. by Independent Audio.)



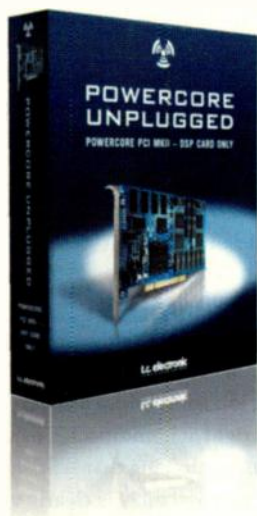
FIG. 2: The AEA R92 is suspended at both ends by elastic bands, which help mitigate unwanted low-frequency artifacts.

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Royer Labs R-121

The unorthodox appearance of the Royer R-121 traces its lineage to a vintage Bang & Olufson ribbon mic made in the 1960s. The mic's side-address grille is well protected by a series of slots in the cylindrical body (see Fig. 5). Alongside that grille, vertical ridges outline the pickup pattern's off-axis areas, or null points, located at 90 degrees and 270 degrees relative to the front of the ribbon. A raised Royer badge identifies the on-axis side of the mic. The manufacturer adds that the smaller size and the robust build quality allows the R-121 to be used in live-performance applications.

The R-121 comes in burnished satin nickel or matte-black chrome finish. All Royer Labs mics are housed in a form-fitting mic sock inside a deluxe cherry-wood box.

Royer SF-1

With a heritage drawn from the vintage Speiden stereo mic and the Royer Labs stereo SF-12 (see the sidebar "Specialty Ribbon Mics"), the SF-1's cylindrical body shape is the same as the R-121's, minus the unique fins (see Fig. 6). The SF-1, however, has a thinner ribbon and a different magnet structure than the R-121. According

to the manufacturer, these design aspects yield a superior transient response and improved high-frequency pickup. The mic body is fashioned from ingot iron and finished in matte black chrome only.

Royer Labs also distributes its own RSM-series shockmounts, along with the Audio-Technica AT-84 shockmount and the Stedman PS101 metal-mesh pop filter, which is highly recommended for use with any ribbon or condenser mic. (For more information about this mic, see the June 2001 issue of EM at www.emusician.com.)

Entry-Level Classics

Four additional companies offer classic bidirectional ribbon elements similar to the AEA, Coles, and Royer models, but at a budget price. These companies are not manufacturers themselves, but market affordable Chinese- and Russian-made ribbon mics in the U.S.

Apex 210, Nady RSM-2, SM Pro Audio MC04

Aside from minor differences in finish, connectors, and shape of the grille top, all three of these Chinese-made

mics sport the same design, body type, and specifications (see Fig. 7). The Apex 210 has a blue body with a brushed platinum grille that is beveled at the top. Nady's RSM-2 is finished in green, and comes with a rounded gold or platinum grille. The SM Pro Audio MC04 is finished in gray, and its flat-topped grille is platinum.

All of the models have a stocky round body that is suspended in a yokemount and attached by set screws, which allow the microphone to swivel up or down like the AEA R84. When finger-tightened, these mics are not locked in position and can still be easily nudged into a new position.

The metal mesh grille is flexible under normal finger pressure, and an internal pop filter is visible. The Nady and SM Pro Audio models have a cable clamp built in near the yokemount's socket, and the Apex and Nady mics have attached 10-foot XLR cables with minimal strain relief where the cable is attached.

The SM Pro Audio MC 04 has an XLR connector hub on the back, allowing you to use any mic cable. This handy feature is somewhat negated by poor placement, because the connector hub protrudes out from the body far enough to impede upward angling, with or without an XLR cable attached.

All of the Chinese mics come with a padded black nylon carrying bag. The bags are well-made, durable, and perfectly suitable for transporting and securely storing ribbon transducers. In addition, the Apex and SM Pro Audio mics come with identical aluminum carrying cases. (For more information about the Nady RSM-2, see Jonathan Segel's review in the July 2005 issue of EM at www.emusician.com.)

Electro-Harmonix EH-R1

The EH-R1 is an updated version of the Russian-made Oktava ML-52. With its slotted Art Deco grille and matte black paint job adorned with silver lettering, the EH-R1 would look right at home in a 1950s science-fiction movie (see Fig. 8). Reinforcing that sci-fi vibe, the chunky magnet and ribbon assembly is clearly visible inside its dark grille enclosure.

A jointed swivelmount, though crude and easily bent along its L-shaped arm, does allow you to position the mic



FIG. 4: The heavyweight Coles 4040 offers a beefy midrange and plenty of presence.

FIG. 3: The Coles 4038 has been a studio staple for decades. It covers everything from drum overheads and brass instruments to woodwinds and strings with equal aplomb



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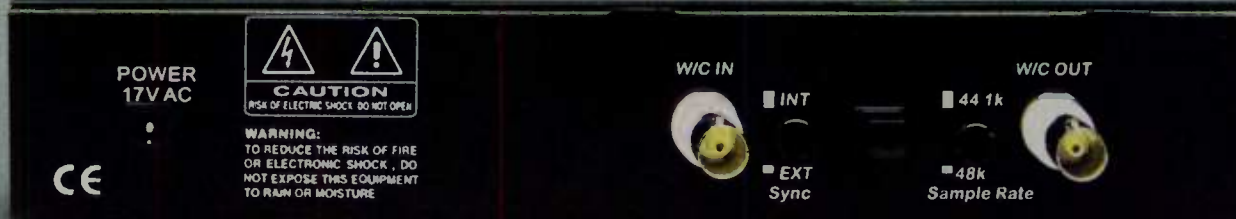
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A BRIEF HISTORY OF THE RIBBON MICROPHONE

The ribbon microphone, also known as the velocity microphone, was first developed by General Electric (and later by RCA engineers) during the late 1920s, yet its basic design principles endure to the present day. RCA's first production models dated from the early 1930s and include the 44A broadcast model, the PB 17 soundstage microphone, and the 30A lapel mic (see Fig. A). Offering dramatic sonic advantages over the carbon microphones and temperamental condenser units that preceded it, the ribbon transducer concept was simple, elegant, and reliable.

RCA's classic design suspends a light, extremely thin corrugated aluminum-leaf ribbon vertically between the two poles of a large magnet. "The element in a velocity mic vibrates because of the sound pressure difference between the front and the back of the ribbon," says Wes Dooley of AEA. Its movement within the strong magnetic flux field generates a small AC voltage. That signal is sent to a step-up transformer within the microphone body, which raises the output voltage and also increases the output impedance to a value (typically 150 to 300 Ω) that is optimal for input to a microphone preamplifier.

Because of the mechanical characteristics of the suspended ribbon, sounds that originate at the front or back of the microphone are reproduced evenly over the entire audible frequency range, while sounds that arrive at the sides of the mic—which produce no pressure on the ribbon—are rejected. This polar response is known as a bidirectional or figure-8 pattern and is characteristic of classic ribbon mics. In 1933, RCA introduced the 77A, a cardioid-pattern, dual-ribbon mic. Toward the end of the decade, Western Electric introduced the 639, a unidirectional, dual-element ribbon/dynamic hybrid that combines omni and figure-8 elements.

Spurred on by the movie and broadcasting boom of the 1930s, a number of smaller American companies (such as Electro-Voice and Shure Brothers) began producing microphones, and most of them had ribbon models in their catalogs throughout the 1940s, 1950s, and even into the 1960s. A roster of long-forgotten microphone manufacturers vividly recalls the United States's glory years of industrialism, including such grand names as Altec, American, Amperite, Bell, Bruno, Carrier, Eastern Sound, Lifetime, and Universal.

Overseas ribbon-mic manufacturers included Aiwa, beyerdynamic, Coles, Lomo, Marconi, MB, Oktava, Peerless, Reslo, STC, Toshiba, and Bang & Olufsen (B&O), whose space-age silver-finned ribbon was the inspiration for the design of the Royer R-121. AKG, Neumann, and Sennheiser never marketed ribbon mics, choosing instead to concentrate on dynamic models (which were more rugged than ribbons) and high-output condenser mics. Their technological innovations, resulting in outstanding and versatile



FIG. A: The Audio Engineering Associates AEA R44C bidirectional ribbon microphone (right) is a replica of the original RCA 44B (left). The mic in the middle is an RCA 44BX.

microphones such as the Neumann U 47 and M 49, helped signal the end of the ribbon mic's golden age.

A few ribbon mics have persevered in the marketplace, and ribbons have even gained renewed popularity among a new generation of digital recordists. Notable among currently available models is the venerable Coles 4038, which has remained in production unchanged (except for a transfer of ownership) since the mid-1950s. This model, which is listed in the Beatles' recording logs as an overhead mic, was used by Pink Floyd and has often been championed by engineer Steve Albini.

My experience recording with the Coles 4038 has been that it gives you a pronounced and rounded low-end response and can help soften unpleasant upper mids and highs, making it an ideal choice for using on string instruments, electric guitar, organ-and-Leslie-cabinet combinations, jazz guitar, and woodwinds, any of which can sometimes sound scratchy when recorded with large-diaphragm condenser mics.

Despite the signs of a comeback, it is unlikely that ribbon transducers will ever dominate the industry as they did back in the 1930s and 1940s. On quiet sounds and sources that may benefit from a high-end presence boost (such as pop vocals and drums), condenser mics provide a clear advantage. Figure-8 ribbon designs can also be challenging when miking large ensembles or when seeking isolation in studio recording environments. But when used creatively, bidirectional ribbon mics can yield wonderful room ambience, as well as blends of direct and reflected sound, that cardioid patterns cannot. And nothing's quite as sweet as that old-time ribbon-mic sound for rootsy blues, R&B, jazz, swing, retro rock, and certain folk-music styles, especially on acoustic bass, cello, tuba, trombone, and trumpet.

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in any direction. The EH-R1 fits snugly in its sturdy foam-lined wooden box. A frequency response graph generated at the Oktava factory shows a broad bass boost between 60 and 200 Hz and a steep cut centered at 7 kHz.

Compact and Handheld Ribbons

With their diminutive bodies, conventional ball-shaped ends, and compact ribbon assemblies, beyerdynamic's ribbon mics are clearly in a class by themselves. Low handling noise and rugged brass construction (as well as high gain before feedback on the hypercardioid models) make these mics a viable alternative to dynamic mics for live sound use.

The space-saving ribbon elements of the M 130 and M 160 pack in an innovative dual-ribbon that is actually longer and thinner than some of the other designs in this survey. beyerdynamic's use of two ribbons mounted on top of each other offers several technical advantages, including increased output. It is also worth noting that beyerdynamic designed the M 130 (figure-8) and M 160 (hypercardioid) to work together for midside (M-S) recording.

FIG. 5: The distinctive Royer R-121 has vertical ridges that outline the off-axis areas of the mic's figure-8 pickup pattern.



beyerdynamic M 130

beyerdynamic's side-address figure-8 mic, the M 130, is the smallest and lightest microphone in this roundup (see Fig. 9). At first the address side of its spherical chrome mesh grille was a mystery to me, until I discovered that the beyerdynamic name on the thin text strip encircling the XLR end of the mic indicated the active side.

Like all beyerdynamic ribbon mics, the M 130 ships with a black padded zipper bag for storage and comes with the company's standard MKV 8 swivel mount. Each M 130 has its own frequency response printout, documenting a flat response within ± 2 dB from 100 Hz to 10 kHz. The M 130 chart also shows a bass boost between 50 and 100 Hz, and a steep drop in high-end response above 10 kHz.

beyerdynamic M 160

The M 160 is beyerdynamic's premium hypercardioid ribbon mic, and it is end-address like most dynamic- and small-diaphragm condenser mics (see Fig. 10). The frequency response chart shipped with the M 160 shows that it has a flat response within ± 2 dB from 40 Hz to 11 kHz, and an almost ruler-flat response between 200 Hz and 7 kHz.

beyerdynamic M 260

The most affordable hypercardioid mic from beyerdynamic has a specialized

FIG. 6: The Royer SF-1's ribbon is thinner than the R-121's, which helps contribute to its excellent transient response.

timbre that bears little resemblance to the other mics in this roundup. With a strong bass rolloff (which is designed into the mic's response and is not switchable), the M 260 gives you a unique solution for problems brought on by proximity effect.

The low-end cut offers a useful alternative approach for close-miked vocals and instruments in the studio or in live settings. The M 260 can be used as a handheld mic like the M 160, and beyerdynamic offers pop screens (PS 260) and windscreens (WS 260) for both hypercardioid models.

Setting the Stage

Because of the large number of mics in this roundup, I had well over 100 individual mic tests to analyze. Although bench-test results were not the purpose of this roundup, all reasonable efforts were made to create consistent test conditions.

By listening to recorded material through the mics—using test tones and music mixes in controlled loudspeaker tests—and live sources in different rooms of my studio, a clear picture emerged about the unique characteristics of each mic. The recorded test tracks were played through studio- and mastering-quality monitors, and in the end, I was pleasantly surprised to hear how much tonal variation there was among this collection of ribbon transducers.

The off-axis and rear response of the figure-8 pattern mics was not tested. AEA and Royer Labs, however, encourage users to experiment by turning their ribbon mics around 180 degrees, because the rear pickup mode can produce new and interesting timbres. The back of a figure-8 mic is polarity-reversed and out of phase relative to the front address side. Therefore, in this application, the phase relationship should be monitored and can be adjusted with the polarity switch found on many preamps and in software programs. The bidirectional pattern of most of these mics contributes strongly to their complex sonic signature, especially in a large or reverberant room.

In addition, proximity effect—the proximity-dependant bass boosting which is a characteristic of any unidirectional or bidirectional mic—has a major impact on the overall timbre of a ribbon mic. Close-miking within a foot or less is a practice that is often followed in studios to maximize output voltage and minimize



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ambient room tone or leakage. But close-miking with a ribbon mic can easily skew the timbral balance of an audio source in favor of abundant bass, because of the proximity effect. The proximity effect, combined with a frequency response that rolls off above 10 kHz, contributes to a general perception of ribbon mics as warm, bass-heavy, or dark sounding.

All of the mics in this roundup had comparable output gain—within a 6 to 7 dB range. The Coles mics and the Electro-Harmonix EH-R1 showed the hottest average output on full-frequency mixes. The beyerdynamic M 260 had the lowest output gain, due in part to its bass rolloff.

One anomaly I discovered was that the end-address Beyerdynamic M 160 was wired out of phase, producing a reverse-polarity waveform relative to the other mics in the roundup. This was corrected in my DAW—Digidesign Pro Tools LE—before I auditioned the recordings.

Ribbon-Cutting Contest

Although it doesn't cover the whole story, controlled loudspeaker testing is a revealing way to compare the signature sounds of various mics. For these tests, I played a variety of rock and acoustic music mixes through a Dynaudio

BMSA powered monitor and placed pairs of ribbon mics 16 inches away from the monitor. To avoid magnetic interference between the mics, they were separated from each other slightly. I recorded the output of each ribbon mic into Pro Tools LE at 24 bits, 48 kHz. In the signal path was a Grace Designs 101 preamp, an Apogee PSX-100 A/D converter, and a Digidesign Digi 001 interface.

The Apex 210 and the SM Pro Audio MC04 sounded similar on the loudspeaker tests. They were close enough in frequency response that I could use them as a matched stereo pair. The Nady RSM-2 showed minor relative differences in the extreme high and low frequencies, but it was also timbrally close to the other two Chinese-made mics.

At times the Chinese mics also sounded surprisingly similar to the full warm timbre of the beyerdynamic M 130 and Coles 4038. But upon closer listening, the M 130 and 4038 tracks were more clear and immediate across the frequency spectrum. A slight murkiness was always evident in the Chinese mics despite their full-frequency transmission. On a heavy rock mix, the Apex 210 had a more powerful bass presence and sounded compressed compared to the M 130, which was audibly more spacious and dynamic, and brighter on guitars and cymbals.

SPECIALTY RIBBON MICS

The new mono mics featured in this roundup are only part of an exciting resurgence in ribbon-transducer technology. The ribbon rebirth was kicked off in the mid-'90s by AEA's Wes Dooley, the country's foremost ribbon-mic enthusiast. After years of selling Coles 4038 mics and repairing vintage RCAs, Dooley decided to market an exact replica of the famed RCA 44.

The cost for being the first on your block to own a new RCA 44 is high, with these museum-quality reproductions selling for \$3,000 and up. But by all accounts, the sound of the replicas is equal to or better than the originals.

Encouraged by this success, AEA went on to develop the mics in this article, as well as the stereo R88 (\$1,895). That double-ribbon behemoth uses two Big Ribbon assemblies, mounted end-to-end at right angles to each other. Its fixed Blumlein pattern—two figure-8 patterns at 90 degrees to each other—is designed for ensemble and live concert recording, but is also useful as drum overheads or for recording piano, string sections, and vocal groups.

Royer Labs also offers a stereo mic, the SF-12 (\$2,495). With a slimmer profile, the SF-12 is basically two SF-1 assemblies placed end-to-end, again in the fixed Blumlein configuration (see Fig. B). Potential applications would be the same as those mentioned for the AEA R88.

The first major ribbon mic innovation in decades—48V phantom powering of onboard active circuitry—was pioneered by Royer Labs. The R-122 (\$1,695) was the

company's first model to incorporate an internal FET preamp and custom transformer, creating what amounts to a souped-up R-121. That active circuitry increases output gain by approximately 15 dB, making the phantom-powered ribbon comparable to modern condenser mics in terms of output level. In addition, Royer's new electronics keep self-noise low, and the impedance matching circuitry allows the ribbon to operate at its full potential regardless of the mic preamp's input impedance.

Essentially, those two mics sound very similar. But the increased gain of the R-122 expands its usefulness for recording quiet string instruments, acoustic guitar, timid vocalists, small amplifiers, and toy instruments. Royer Labs also has a phantom-powered version of the SF-12 stereo mic, the SF-24 (\$3,795). You can find an in-depth examination of the sonic differences between the R-121 and R-122 in the January 2003 issue of EM, available at www.emusician.com.



FIG. B: The Royer Labs SF-12 is a stereo ribbon mic with a Blumlein pickup pattern.

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The Electro-Harmonix EH-R1 was muffled in the high end on loudspeaker test material. It did, however, pick up more lower bass frequencies than any of the other contenders.

FIG. 7: Similar in design, specs, and sound, the three Chinese-made mics—Apex 210, Nady RSM-2, and SM Pro Audio MCO4—are designed for the personal studio on a tight budget.



On modern rock mixes, the Coles 4038 and AEA R84 were slightly bottom heavy. The Royer SF-1 showed its stuff by clearing up midbass muddiness to deliver the most listenable character while still retaining its big-ribbon power. The beyerdynamic M 130 was also clear and big, but it lacked the complex, multi-dimensional quality of the classic large ribbon mics and was slightly grating around 3 kHz.

The AEA R92 was uniformly bright and aggressive without getting harsh; its broad midrange boost around

1.5 kHz gave a hot sound on full-frequency mixes. The Coles 4040 and Royer R-121 also conveyed a penetrating midrange that worked to push vocals to the front of the mix. The 4040 lacked the airiness of the Royer and AEA models, while the R-121 had the most balanced and natural tone overall among this trio.

The Royer R-121 and beyerdynamic M 130 performed similarly on pop material, with audible differences in the treble end and warmer, thicker low mids coming from the M 130. In the same trial, the M 130 and AEA R84 were also closely matched timbrally, showing lots of warmth, good overall frequency balance, and clear highs that were pleasant and soft relative to the brighter mics. The AEA R84 had the bigger sound of those two mics, with more dimension and subtle midrange details and clearer highs on delicate acoustic mixes.

On lighter acoustic fare (featuring acoustic guitar and cymbals), the M 260 sounded especially thin and hollow. To be fair, the M 260's built-in bass rolloff puts it at a disadvantage for evaluation on distant, full-frequency mixes. The 4040 and the R-121 demonstrated a tunnel tone of excessive midrange coloration on that kind of material.

The two darkest mics—the EH-R1 and the M 160—showed very different characteristics. The EH-R1 had more highs and lows and was especially notable for its bass boost, which seemed excessive at times. The M 160's response was concentrated more in the midrange, with extra energy around 350 Hz. But in loudspeaker tests, it too was always a bit muffled, lacking the kind of midrange projection and clarity heard in the Coles 4040 or Royer R-121.

In this phase of testing, Royer's SF-1 really shone with overall accuracy and a pleasant, flat response. The SF-1 always yielded good high-end clarity and tightly focused bass response, while never getting too bright or tubby sounding.

Abundant bass was sometimes a problem with the normally balanced and full-sounding ribbons such as the AEA R84 and Coles 4038, even at 16 inches from the loudspeaker. And strong mid-to-upper-midrange coloration detracted slightly from the otherwise airy naturalness of the M 130, the R-121, and the R92.

On Electric Guitar

As part of the loudspeaker tests, I rolled a Fender Pro Reverb guitar amp in front of the test mics at a distance of one foot. The mic test pair was aligned to the center of one of the speaker cones, and the recording chain did not change. To maintain consistency in this simulated live-performance test, I played along to full-band recordings that employed both clean and overdriven, single-note and chordal textures, using a 1976 Stratocaster and SansAmp GT2.

The Coles 4040 was consistently loud and present on the guitar tracks, but it lacked character in the highs and lows. Compared to the Coles 4038, Royer R-121, AEA R84, and others, the 4040 often sounded like a smaller guitar speaker was being recorded. The 4038 sounded great on clean tones, sparkly and thick in the low end for distorted chords, and it exhibited a relative "smile curve" that lacked the midrange snarl produced by the R92 and the R-121.

The EH-R1 was generally muddy and lacking in high-end definition. But it could be just the thing for a warm jazz-guitar track, due to its abundant lows.

The R92 and SF-1 were comparable and usable for clean guitar tones. The R92 contributed plenty of snarl and sparkle on clean picking. At the testing distance of one foot, the R92 tended to pick up too much high-end hash on overdriven parts, and it lacked powerful lows on distorted rock chords. The SF-1 remained smooth through all tonal variations and was preferable with the Stratocaster on clean treble

FIG. 8: The Russian-made Electro-Harmonix EH-R1 is an updated version of the Oktava ML-52. It has a dip in the frequency response at 7 kHz, which contributes to its relatively dark sound quality.





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pickup tones. The R92 and R-121 tended to be more pointed and harsh.

The M 260 was predictably the brightest of all, but could be usable for clean picking. And despite their physical similarities, the M 160 and M 260 were as different as night and day through monitors. The hypercardioid M 160 was passable for clean sounds, but it was noticeably lacking in necessary highs for power chords. It also sounded much drier and tighter than the other mics, due to its focused pickup pattern and soft highs. But the M 160 was definitely warm and sustained in the lower midrange and sometimes even richer than the AEA R84 on interior chord tones.

The M 130 was commendably warm in all tests, and it was thick to a little dark on power chords. But it was also clear on clean picking, and it fared well alongside the large ribbon mics.

Compared with many of the mics, the R84 sounded a bit dark. But I particularly liked the punch and fullness of the R84's tone and could really feel the air movement of the speaker on undistorted low notes.

On electric-guitar sessions, I often pair the R84 in an x-y configuration with a brighter dynamic mic, such as the Sennheiser 421. That method, supplemented by stereo panning of the mics, delivers a commanding, spacious tone with incomparable lows thanks to the R84's beefy bass.

The Apex 210 and other Chinese mics lacked crucial upper-midrange elements and sounded generally smaller than the other ribbon designs, especially on rock chording. On some clean picking parts, the Apex 210 came close to the R84 timbre, but ultimately lacked air and sounded subtly filtered or harsh.

The 4038 and SF-1 tied for first place in the electric-guitar round, based on their flatter tonal fidelity, authoritative low end, and versatility across a range of styles. But the R-121 definitely takes the cake for capturing huge overdriven rock tones with loads of harmonic richness and a tangy ready-to-mix color.

Acoustic Instruments and Voice

To get a real-world experience with the microphones, I asked my friend and musical collaborator Jonathan Segel to come to my studio and do some demo tracks. Segel sang and played acoustic guitar to a recorded version of his song "Mean Mean Girls," sitting about four feet in front of a four-mic cluster.

The mics were routed to a bank of four Focusrite Green-series preamps, with the preamp outputs connected to a Digi 001 interface going to Pro Tools LE. A full 60 dB preamp gain setting worked well for all the



FIG. 10: The beyerdynamic M 260 and M 160 are unusual in the field of ribbon mics because they are end-address and have a hypercardioid polar pattern. The two mics, however, sound very different from each other, especially in the low-frequency response.



FIG. 9: The beyerdynamic M 130 is a side-address mic with a figure-8 pattern.

mics, with the hotter Electro-Harmonix and Coles models needing slightly less gain to achieve 0 dBfs digital levels.

After laying down the guitar and vocal track, Segel switched to violin and played along, again in front of the same four mics. Two more mic clusters were set up after that, with the end result being 11 pairs of guitar, vocal, and violin tracks to evaluate. Based on the previous tests, I assumed the timbre of the three Chinese mics was going to be similar, so I used only the Apex 210 to represent those models.

The M 260 sounded too thin at a distance of four feet, and it was by far the brightest mic in the lineup. While not bad on the guitar and vocal, it tended toward shrillness on the violin.

The Coles 4040 and Apex 210 sounded comparable (they were also bass lean with a defined high end) and lacking in body, especially on the acoustic guitar. The diminutive M 130 weighed in with audible improvements in low-end warmth and overall fidelity compared with the harsher-sounding ribbon mics.

The AEA R92 exhibited crystalline highs and less ambient room tone, providing excellent definition without sounding thin. The R84 had a more solid bass response and a roomier sound that emphasized nasal midrange frequencies around 800 Hz.

I noted a similar dichotomy between the Coles mics. In keeping with the previous trials, the 4038 conveyed more full lows and a natural, hi-fi character. The 4038 was also impressive for its pleasant and unhyped highs at a distance of four feet. The 4040 exaggerated upper-midrange timbres for a more aggressive sound.

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The 4038 and SF-1 were comparable in regard to timbre. The 4038 had more low punch, while the SF-1 issued more open and extended highs, as well as more ambient details of the room. I was also very pleased to find that a Coles 4038 I purchased in 1997 was still well-matched in frequency and gain to the new 4038 sent for this test.

The Royer mics had a noticeable but smooth midrange presence boost on vocals and guitar. That subtle coloration was part of a readily identifiable signature sound common to the SF-1 and the R-121. The AEA or Coles pairs did not share a similar sonic kinship. The R-121's midrange came across as more subtle and musical, adding extra dimension and presence to the guitar and vocal in

particular. The SF-1 was more open and neutral on violin, but less striking on the vocal and guitar pass.

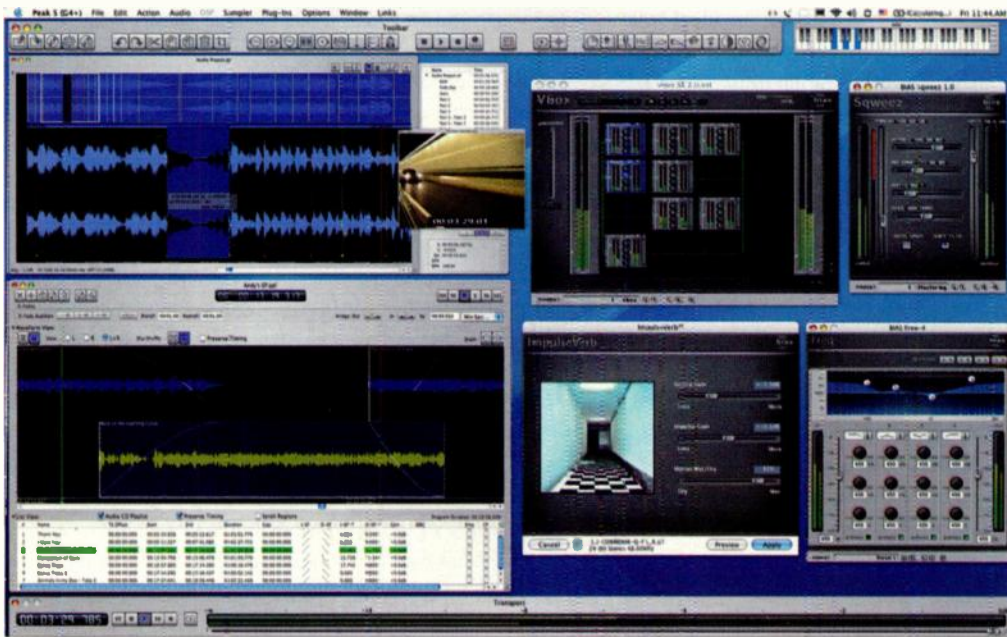
Segel's vocals were attenuated by the dull highs and upper-midrange dip inherent in the EH-R1. Delicate highs above 10 kHz seemed smothered on his violin and vocals, and the guitar's lows were boomy. The EH-R1 and M 160 were roughly comparable in terms of dark coloration, although the beyerdynamic mic had a more balanced and natural sound that really flattered the violin.

My choice for vocal and acoustic guitar miking in this setting would have to be the presence boosting Royer R-121, with the slightly brighter AEA R92 or warmer Coles 4038 and Royer SF-1 mics as commendable runners up. As an

RIBBON MICS FEATURES COMPARED

Company	Model	Address	Pattern	Ribbon Size	Output Impedance	Weight	Price
AEA	R84	side-address	bidirectional	1.8 microns × 0.185" (W) × 2" (L)	270 Ω	1.75 lbs. (with cable)	\$1,100
AEA	R92	side-address	bidirectional	1.8 microns × 0.185" (W) × 2" (L)	270 Ω	1.5 lbs. (with cable)	\$900
Apex	210	side-address	bidirectional	2.5 microns × 0.18" (W) × 2" (L)	< 200 Ω	2 lbs.	\$329
beyerdynamic	M 130	side-address	bidirectional dual ribbon	2 microns × 0.07" (W) × 1.38" (L)	200 Ω	5.29 oz.	\$839
beyerdynamic	M 160	end-address	bidirectional dual ribbon; hypercardioid pattern	2 microns × 0.07" (W) × 1.38" (L)	200 Ω	5.5 oz.	\$839
beyerdynamic	M 260	end-address	hypercardioid pattern with nonswitchable bass rolloff	2 microns × 0.07" (W) × 1.38" (L)	200 Ω	10.58 oz.	\$489
Coles	4038	side-address	bidirectional	0.6 microns × 0.23" (W) × 1" (L)	300 Ω	2.37 lbs.	\$1,335
Coles	4040	side-address	bidirectional	0.75 microns × 0.23" (W) × 1" (L)	300 Ω	2.15 lbs.	\$1,541
Electro-Harmonix	EH-R1	side-address	bidirectional	N/A	120 Ω	1.1 lbs.	\$494
Nady	RSM-2	side-address	bidirectional	2.5 microns × 0.19" (W) × 2" (L)	< 200 Ω	2.75 lbs.	\$249.95
Royer Labs	R-121	side-address	bidirectional	2.5 microns × 0.18" (W) × 1.75" (L)	300 Ω	9 oz.	\$1,195
Royer Labs	SF-1	side-address	bidirectional	1.8 microns × 0.06" (W) × 0.25" (L)	300 Ω	9 oz.	\$1,395
SM Pro Audio	MC04	side-address	bidirectional	2.5 microns × 0.18" (W) × 2" (L)	250 Ω	1.87 lbs.	\$299

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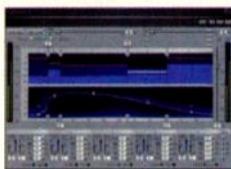
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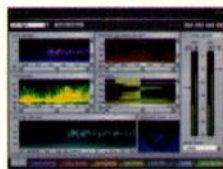
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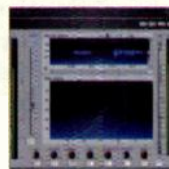
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aside, I have used the R92 on a few acoustic-guitar recording sessions and have always found it to be impressive because of its bright high end that approximates the presence boosting of a condenser mic.

As far as picking an ideal mic for violin, it's a toss-up between the smooth, transparent tones of the Royer SF-1 and the Coles 4038. The beyerdynamic M 160 ran a solid second, displaying a pleasing timbre with a drier, more focused sound due to its hypercardioid pattern. On Segel's violin at a distance of four feet, it was easy to hear the midrange coloration of the Royer R-121, the Coles 4040, and the AEA R84.

Based on these observations, for recording a mixed all-acoustic group including stringed instruments and vocals, I'd reach for the smooth, warm response of the Royer SF-1 or the Coles 4038.

Low-Frequency Vibration

All three of beyerdynamic's models, mounted in the supplied MKV 8 metal and plastic swivel mounts, were well isolated from vibration and rumble when I walked around the mic cluster. The AEA R84 and R92 and the Coles 4040 demonstrated partially effective internal shockmounting during the vibration test, as did the Royer SF-1 when mounted in a standard spring clip.

The remaining models—Apex 210, Nady RSM-2, SM Pro Audio MC04, Coles 4038, Electro-Harmonix EH-R1, and Royer Labs R-121—transmitted serious low-end rumble when I walked normally within two feet of their respective mic stands. For those six models, some form of shockmounting or decoupling from the floor is highly recommended if the mics are to be used near vocalists, foot-tapping guitarists, and percussionists.

Housing Resonance and Noise

The physical resonance of a microphone body is also a consideration in testing, especially with ribbon microphones that pick up sound bidirectionally and require lots of gain. Tapping lightly with a plastic ballpoint pen on each of the test mics and recording the resonance with about 55 dB of gain produced some unexpected consequences.

The EH-R1 rang like an empty gas can, with a strong midrange F note as well as detectable odd overtones. The Nady RSM-2 also resonated with a more restrained but clearly pitched low F. The resonance of these microphones didn't show up on a frequency sweep test, but they could conceivably produce artifacts or frequency coloration in

RIBBONS FROM THE PAST

Vintage ribbon mics offer dependable—or, at the very least, interesting—sonic qualities, and the designs range from classic to quirky. Discontinued oddities such as the Fostex and beyerdynamic printed ribbon mics are recent hybrid innovations, combining aspects of the ribbon sound with a heartier dynamic diaphragm and conventional end-address body.

Before they came up with the ML-52, the Russian Oktava factory made other original ribbon designs such as the ML-16 and ML-17. Those are rarely seen in the U.S. due to the trade restrictions of the Cold War-era.

Obscure ribbon mics from the Golden Age (1940s to the mid-1960s, when solid-state condenser mics nearly eliminated ribbon-mic production) are still plentiful among the used gear and hobbyist networks. Some mics—such as the Western Electric/Altec 639b, which allows the user to mix the output of dual ribbon and dynamic elements and the better RCA models—are collectible, pleasing to the eye, and capable of pro-studio quality.

Used ribbon-mic bargains can still be found at swap meets and flea markets, but often those are broadcast or public-address mics that were cheap and lo-fi when new, and of limited value now. Inflation has severely restricted the market for the best vintage ribbon mics, but presumably with so many good new ribbons coming on the market, vintage prices will return to reasonable levels again. RCA's top-of-the-line ribbons—notably the 44 and 77 series—always represent the best investment in vintage sound and collectability, as long as the body and ribbon have been properly cared for.

the real world. In addition, the Apex 210, the Royer SF-1, and the beyerdynamic M 260 had faintly audible ringing, while the rest of the mics issued only a low, damped transient when tapped.

The beyerdynamic M 260 was the only mic in the roundup that produced audible noise under any conditions, in the form of high-end hiss that could be heard only at above-average gain. At average listening levels, even with 60 dB of preamp gain, noise was never a problem with any of the other mics.

Forms and Feelings

As an enthusiastic user of ribbon mics for the past decade, it's no secret that my bias tends toward the higher-priced, premium ribbon mics. And during my tests for this article, I was pleased to find that the ribbon mics I generally liked best overall were brands that I had already added to my mic closet—specifically the AEA R84, the Coles 4038, and the Royer SF-1 and R-121. While all three provided lush timbres with pleasing highs, ample midrange detail, and full lows, each of those mics gave their own euphonious take on what a flat-frequency ribbon-mic response should be.

Among the other premium ribbons mics, I was most excited about the AEA R92. The sweet highs of this pill-shaped transducer make it an ideal candidate for applications that have always challenged ribbon mics—namely acoustic guitar, percussion, and modern pop vocals.

The Coles 4040 could shine as a vocal or as an electric-guitar mic in some circumstances, and it would be worth a

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sound spectrum, with relatively flat and full-frequency response, are the AEA R84, the Apex 210, the beyerdynamic M 130, the Coles 4038, the Nady RSM-2, the Royer SF-1, the Royer R-121, and the SM Pro Audio MC04. With their attenuated high end, the beyerdynamic M 160 and Electro-Harmonix EH-R1 reside at the darker end of the spectrum.

The results of my research tell only part of the story of these products. Any individual mic can be a perfect match for your tastes when used in a particular room, with a knockout channel-strip processor or on a specific instrument. For example, one of my favorite ribbon mics for trumpet is a vintage Altec 639b mic (nicknamed "Birdcage"), which would be described in my listening tests as far from flat and very bass-lean, with a prominent midrange boost.

What Price, Ribbon

In addition to features and sound quality, price plays an important role in purchasing decisions. For a high roller's first ribbon investment, I recommend the Coles 4038 or the Royer SF-1, based on their uniform performance when used for close and distant miking. Electric-guitar enthusiasts, however, may wisely opt to beg, borrow, or earn the cash for the ready-to-rock Royer R-121.

There are also some deals for around \$1,000. At under a grand, the crisp AEA R92 is a strong contender, as is the big sound of the little beyerdynamic M 130.

I believe every studio should have at least one ribbon mic, and any one of the Chinese-made mics would be a worthwhile introduction to ribbon tone if that's what your budget allows. The Apex, Nady, and SM Pro Audio models are certainly an amazing deal for a first ribbon microphone. But at a street price around \$250, these imports shouldn't be expected to convey the dynamics, richness, or transparency that attracts critical listeners to premium boutique ribbon mics. But for the budget-conscious, the deluxe carrying case and attached cable on the Apex 210 make that import model the one to beat. **EM**

Myles Boisen is the head engineer at Guerrilla Recording and the Headless Buddha Mastering Lab in Oakland, California. Thanks to Jonathan Segel, Bart Thurber, and John LaGrou of Millennia Media for their observations and expertise.

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Get in the Game

By Jamie Lendino

Tools and techniques for game sound design.

If you've worked in the game industry, you know that each project presents a unique set of challenges. Some games, such as those for Xbox or for mobile devices, require audio tools that are specific to the platform on which you're working. Other times you're delivering straight WAV assets, and then collaborating with the development team to integrate them properly. Creating audio for games has always required myriad tools and special techniques; if anything, that's even truer today.

During the past several years, virtual synths and plug-ins have made it much easier to create audio and to switch between dozens of music cues on the fly. Hard-drive space is plentiful enough that you can rip all your sound-effects libraries to disk and implement a simple and streamlined database system. (For more information on this topic, see Nick Peck's "Finder's Keepers" article in the April 2003 issue of EM.) And game audio-specific tools such as Microsoft's XACT for the Xbox, Creative Lab's Interactive Spatial Audio Composition Technology (ISACT), and Beatnik's Mobile Sound Builder give audio professionals the ability to become much more involved in the mixing and mastering process.

Studio Gear

It used to take a rack full of Roland S-760s to generate a MIDI orchestral score worthy of at least the director's ear, if not the final product. Now you can accomplish the same thing with any number of orchestra and other instrument sample libraries. Multitrack software, a 2-track editor, some soft-instrument plug-ins, and a sound recorder with a mic still cover the basics of game audio production.

"It's getting to the point that almost everything can be created within the virtual environment, especially music," says Aaron Marks, owner of On Your Mark Music Productions and author of *The Complete Guide to Game Audio* (CMP Books, 2001). "But the addition of live instruments can add a 'real' quality that can't be duplicated virtually. I always recommend that music composed [on the desktop] have at least one live instrument—something human to break what can often be a machine-sounding composition."

Although a 2-track editor such as Sony Sound Forge or Bias Peak is indispensable and might be needed to deliver your sounds in their final format, the majority of sound development takes place in the multitrack environment. In addition to scoring cut scenes and assigning sound effects to video elements, multitrack software is great for creating original sound effects by themselves (see Fig. 1). You can easily import and manipulate pieces of canned material or use sounds that you've recorded in the field. (The new crop of noiseless, solid-state recorders, such as the Edirol R-1 and R-4 and the Marantz PMD670, is great for that purpose, though anyone who's ever strapped a mic to a race car at 190 mph or recorded an F-16 in flight probably has a different viewpoint on that.)

"One of the things that audio people suffer from is thinking that they need a ton of equipment to do good sound," says composer Kemal Amarasingham, a cofounder of dSonic (*Neverwinter Nights: The Shadows of Undrentide* [2003], the *Thief* series, *System Shock 2* [1999]). "I did all the ambient sounds for *System Shock 2* [a famous PC game that won numerous sound-design awards] using the Sound Forge Synth tool." Having

the best mic preamps and samples recorded at 24 bits, 192 kHz helps but ultimately isn't necessary. That's especially true given that you'll be compressing the final files in order to fit your effects into a limited memory space."

Even if you work primarily on a Mac, it helps to have a Windows computer around the studio so that you can test beta builds of games and

make sure your assets play back properly. In addition, many platform-specific tools, such as hardware emulators for game testing, require a PC to run. For example,

Qualcomm's BREW (Binary Runtime Environment for Wireless) is a Windows application that is often used for developing sound for cell phones (see Fig. 2).

Sound Effects

Once you have your source material, the next step is to develop sophisticated layered effects that are larger than life and jump out at the player. Layering gives you a unique final result, marking your sounds with their own sonic signature. It can also help to better integrate sounds into the game's audio landscape. For example, in *Mumbo Jumbo's Chainz II* (2005), I used a combination of chain-link sounds, taps I recorded on a metal pole, and gun and other weapons explosions to create the sound of two chains meeting and exploding on screen.

Light to moderate compression helps integrate the layers and give the sound more punch. Using EQ, shape the final sound to roll off gradually below 60 Hz, dip slightly in the lower midrange, and brighten slightly in the top end above 5 kHz. You can also use EQ to tame individual layers or to bring out certain sonic characteristics (for example, brightening the *clink* from a metal pole or adding punch to midrange gunshot sounds). Adding a touch of limiting is useful to tame any stray peaks.

Some sounds, such as fire, force-field magic-spell effects, mining, or chopping wood, have to loop. It's simple to do using the Pencil Edit (for removing clicks) and the Copy and Paste tools in a 2-track editor. (The game engine will take care of the correct number of loops; usually, you'll have to provide only one repetition of the sound from beginning to end, however short.) Always check your finished sounds on speakers and headphones to make sure there aren't any audible clicks or other artifacts.

Normalize all effects in the game to the same level (for example, 97 percent) and test them in sequence to make sure the overall volume, timbre, and EQ are consistent from effect to effect. Then get the delivery specs from your project lead. Mobile phones typically use 16-bit, 8 kHz mono; and

FIG. 1: A multitrack editor such as Cakewalk Sonar, shown here, is a great platform for scoring game music and sound effects. The video window displays a frame from Ubisoft's *Myst IV*.



COURTESY OF UBISOFT



FIG. 2: Windows PCs are often the platform of choice for hardware emulators, such as Qualcomm's BREW emulator pictured here. An emulator is used to test sounds before delivery to a client.

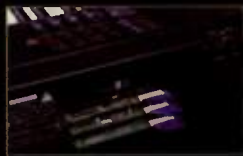
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game consoles normally use 16-bit, 22 kHz mono. Some developers prefer to use OGG format in their PC games so they don't have to pay MP3 licensing fees. Sound Forge can do all of those conversions without a problem. If you've got many dozens of effects to convert, programs such as the open source CDex (for importing) and Steinberg WaveLab (for exporting) can handle batch processing.

Composing Effective Music Cues

Placing music cues strategically has become preferable to running music in the background continuously in certain games. The original *Tomb Raider*, released by Eidos in 1996, was arguably the first popular example of that type of selective music placement. Adaptive music, which is music that changes in response to game play, has also increased in use recently. "For the project we're currently working on here [*Gauntlet: Seven Sorrows*, 2005]," said Alexander Brandon, audio manager at Midway Games, "we're using GigaStudio orchestral pieces because of the adaptive nature of the soundtrack. Sometimes the music needs to change two or three times within the design of a level."

Deciding where to place music and ambient effects can be a collaborative process with the project lead. "Normally, I'll play the game to become familiar with the level I'm scoring for—especially to get a good sense of the pace of that level," Amarasingham says. "Next, I'll go through and place all the sounds, ambience, and music, and then present the piece to the designers for review and discussion." He adds, "Understanding the role of game designers and how they fit into the production process is extremely important. I'd say about 40 to 50 percent of making

a game sound great is in the technical/implementation phase."

"It's also helpful for sound designers to have at least a taste of programming experience, especially

when dealing with programmers," says Jason Kanter, the audio director at Super Ego Games, a NYC-based developer currently working on *Rat Race* for Atari. "Sometimes having the ability to explain a problem to a programmer in his or her own language can make the difference in whether or not that problem gets solved."

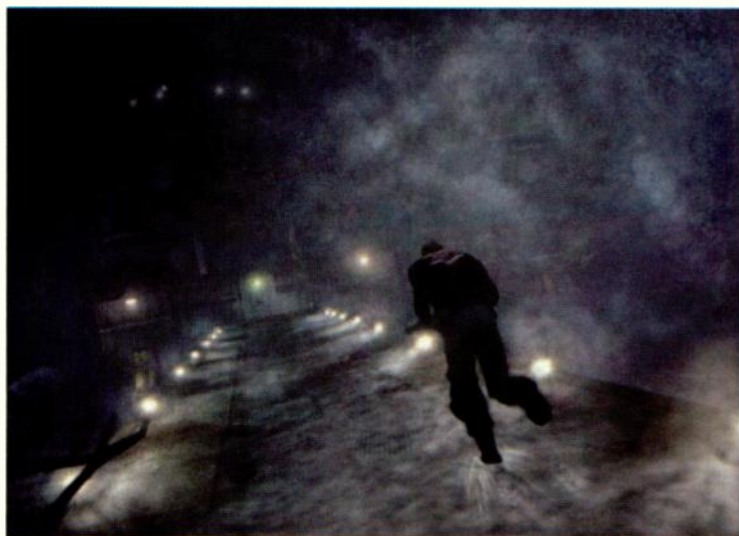
The game's genre, pace, and graphic style can dictate what types of sounds or instrumentation would be appropriate. Tom Salta is an independent composer and producer who jumped head first into the game industry in 2004. "In *Cold Fear* [Darkworks/Ubisoft, 2005], the game's environmental setting [a drifting Russian whaling ship in the middle of a howling storm on the Bering Sea] provided a great opportunity to incorporate elements such as metallic timbres, whale songs, gurgling water, a Red-Army-like choir, and lots of other unique elements into the soundtrack," he says (see Fig. 3 and Web Clip 1).

"Bigger is not always better," notes Ed Lima, audio director at Human Head Games and lead composer and sound designer for *Id's Doom 3* (2004). "An orchestra wouldn't have worked for *Doom 3*," he says. "It would have been too distracting, too in the foreground. By contrast, the orchestral score in *Fable* [2005] sounded fantastic. Peter Molyneux created a beautiful fantasy world of bright colors, and Russell Shaw's in-game score matched that perfectly."

Another game that gets high marks for effective use of sound is Electronic Arts' 2004 release *Need for Speed Underground 2* (see the sidebar "More Great Games" for other examples of great game sound). "Believable engine sounds are difficult to re-create in software because of memory constraints and the programming complexity of the software audio 'engine'," says Marks. "But this particular game manages to give a great performance. There are various vehicles and engine modifications available to the player; each one has a subtle difference in sound, which adds to the experience."

Lima offers another tip: "A player will hear more elements in the game than what they see. It's not how much you show; it's how much you infer."

FIG. 3: Darkworks/Ubisoft's *Cold Fear* provided composer Tom Salta with a creative sound-design and scoring challenge. This figure shows a scene from the game.



COURTESY OF UBISOFT

Platform-Specific Tools

Game projects often require the use of special tools. One such example is XACT, Microsoft's audio-authoring technology for the Xbox (<http://xbox.com/en-US/dev/contentproviders.htm>). Equipped with an Xbox development kit, you can listen to and mix your sounds in real time in a playable build of the game. That means you can test and mix sound effects, music cues, and even adaptive music without having to go back and forth with the development team.

To say mobile-game audio development is a moving target is to significantly understate the problem. Whereas developing a title for Xbox, PS2, and GameCube requires three separate SKUs (at least in America), you might need 50 or more to cover all the kinds of mobile handsets available. Consequently, it

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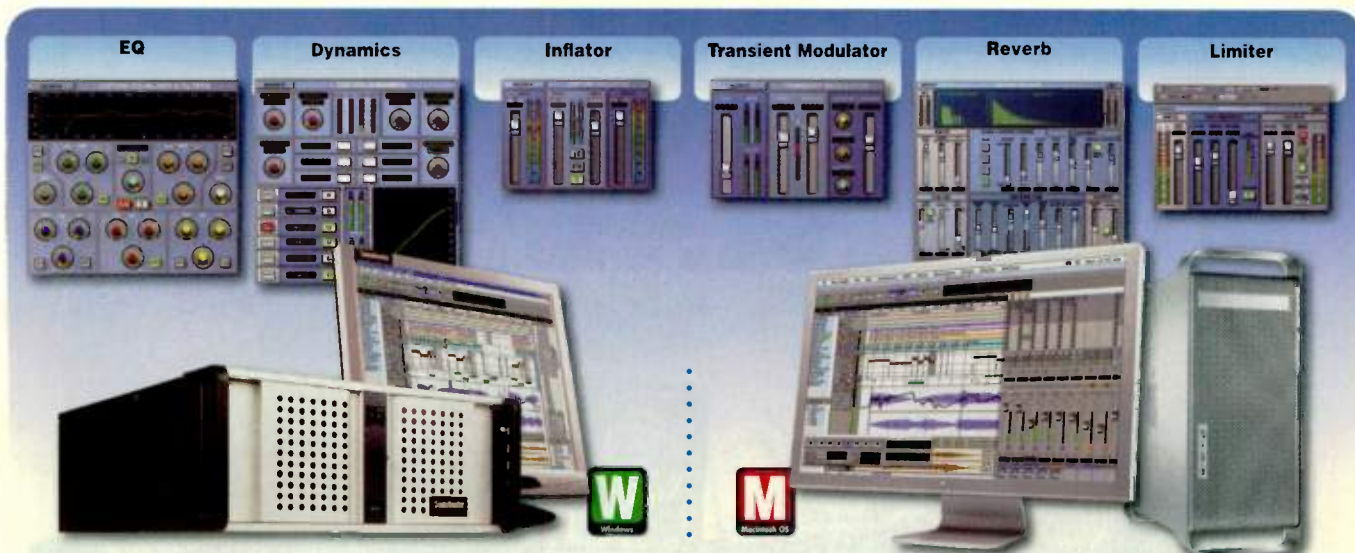
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MORE GREAT GAMES

When playing these games, pay careful attention to the sound effects, sound ambiances, multichannel sound, and music. Many of these titles also use interactive or adaptive music. Note how the music changes in dynamics and detail depending on the onscreen action.

- *Castlevania: Lament of Innocence* (KCET/Konami, 2003). The Castlevania series is known for its top-quality, atmospheric music by Michiru Yamane. This latest title is no exception.
- *Halo 2* (Bungie Software/Microsoft Game Studios, 2004). Marty O'Donnell composed a grand sci-fi adventure score for this award-winning Xbox game.
- *Hitman: Contracts* (Io Interactive/Eidos Interactive, 2004).

Jesper Kyd composed the score for this game, which won the BAFTA award in 2005 and is getting a lot of attention.

- *Myst IV Revelation* (Ubisoft Montreal/Ubisoft, 2004). This game features a beautifully composed score by Jack Wall.
- *Sly 2: Band of Thieves* (Sucker Punch/Sony Computer Entertainment America, 2004). Pay particular attention to the smoothly integrated adaptive music by Peter McConnell, who was already famous for his incredible jazzy score to Lucas Arts' *Grim Fandango* (1998).
- *World of Warcraft* (Blizzard Entertainment, 2004). The use of ambient sound design is notable in this online adventure installment of Blizzard's genre-defining real-time strategy game.

takes a lot of work to test audio on all the appropriate handsets. Some models have only enough memory for MIDI effects, and older Nokia handsets require monophonic OTT files. (MIDI-to-OTT conversion software is available from Nokia.)

One possible solution to mobile-audio development comes from Beatnik (www.beatnik.com). Beatnik's software suite gives you a sophisticated interactive

audio engine for mobile platforms—a rapidly growing market for games. Though you'll need to work with your game's development team to implement it, Beatnik's memory footprint is small and the advantages are numerous.

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capabilities and limitations of the product and the platform will help make the developer feel like you're a more integral part of the team—that you're someone who they don't have to waste their time babysitting," says Marks. "But the music you're creating will sound that much better, because you know how to take advantage of a game's potential."

You're Surrounded

Implementing surround sound requires a unique set of tools. The more the sound designer knows about the platform's capabilities, the more effectively they will be able to work with each game's audio programmers.

The Xbox is the only current-generation console platform that has Dolby Digital built into the hardware. That means you can implement 5.1 effects without having to code anything specific for the game. The other two consoles also support surround sound, but in software: the Playstation 2 has Dolby Digital, Pro-Logic II, and DTS implementations available; and the GameCube supports only Pro-Logic II.

"For a basic implementation, just having interactive sounds fly around the room, it would take good audio programmers an afternoon to upgrade their audio engine to Pro-Logic II," says Jack Buser, manager of Game Developer Relations at Dolby Labs. "You can say that mixing a game becomes quite complex, because you don't have a static mix; you have a dynamic mix that changes in real time based on what you do with your character."

Buser divides game audio into two categories: linear and interactive. Linear audio occurs in cut scenes and introductory movies. You score it like any other video. With interactive game audio, the mix is happening on the fly as you move your character around. "These are usually mono effects that are being panned by the engine in real time," Buser says. "One person [who is responsible for] creating the game audio engine takes them and places them in real time."

Creative Lab's ISACT (developer .creative.com) is a run-time mixing environment used for development on Windows machines and focuses on multichannel speaker playback systems. "We used ISACT to create gun sounds that took advantage of the system's spatial tools," Amarsingham says. "For example, we created a mini-

cannon that had the firing sounds in the front two speakers and the shells flying out the back two."

Looking Ahead

The next generation in gaming is fast approaching, so getting a head start on appropriate technologies will increase your value as a sound designer. Expect to see an increasing focus on multichannel sound development, especially now that many gamers have home-theater speaker systems. Efforts to improve team-based audio development, improved audio testing environments, and game-sound mastering are other notable trends.

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Microsoft, Sony, and Nintendo all revealed their next-generation console machines in May of this year, coinciding with the E3 Expo 2005 in Los Angeles. Games made for the Playstation 3 and the Xbox 360 will require high-definition, wide-screen support (at least 720p). The Playstation 3 is powered by a Power-PC based Cell processor clocked at 3.2 GHz, equaling the speed of the Xbox 360's Power-PC-based three-core CPU. The PS3 will use the Blu-ray disc format and will also play Super Audio CDs in addition to DVD-RW/+RW media.

The Xbox 360 will support Microsoft's XNA Studio, a team-based development environment. It will output multichannel surround at 16 bits, 48 kHz. Other Xbox 360 features include 320 independent decompression channels, 32-bit processing, and more than 256 audio channels. Technical details for Nintendo's new console (code-named Revolution) were not available at E3, but expect comparable capabilities. The clear trend is toward high-definition, wide-screen games with multichannel digital surround and powerful real-time mixing.

The next generation is already here in terms of portables. Nintendo released its dual-screen DS model at the end of 2004, and Sony's \$249 PSP hit stores in March of this year. Both consoles work best with head-

phones, which naturally limits positional cues (but not the quantity and quality of content).

"The general trend is toward improvements in quality, quantity, adaptability, hyperrealism, and immersion," says Chance Thomas, lead composer for Electronic Arts' *Lord of the Rings* series. Even on today's consoles and PC titles, just because you downsample your work to 22 kHz doesn't mean that the content itself has to suffer.

Effective game sound design doesn't always require esoteric tools. It's something on which any reasonably accomplished home recordist can get started. By practicing some of the tips and techniques outlined in this article, you can work on games using many of the tools that you already have in your arsenal. The equipment might not be very different, but there is a lot to learn in terms of skills and technical details. Still, game sound is something that's within the reach of the **EMWEB** project studio owner. **EM**

Jamie Lendino has created audio for games such as Bethesda Softwork's The Elder Scrolls 4: Oblivion (2005) and Blue Fang Games' Zoo Tycoon 2: Endangered Species (2005). He is the owner of Sound For Games Interactive (www.soundforgames.com), a sound-production studio based in Astoria, New York.



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of audio to the delay for the desired effect (see Fig. 3).

Getting Modal

Using the pencil tool is one way to write automation; Cubase SX3 also has a multimode line tool that draws automation data in various shapes. Anyone who has used a synthesizer LFO or a fairly complex effects unit will recognize these shapes (see Fig. 4). The line tool draws a straight line from point A to point B. The parabola tool draws an increasingly sloped curve up or down. The sine, triangle, and square tools draw shapes that are rounded, notched, and squared, respectively, on both sides of a center line. If you are familiar with LFOs, you know those last three shapes as pulse, sawtooth, and square waves.

An example of using the line tool for automation can be seen when creating a tremolo effect, which is simply modulating the volume. First, set the automation track to read the automation data for the volume of an audio, group, or MIDI track. Next, select the sine tool and click-and-drag along the track, which creates a sine wave-shaped curve on the track and corresponding data to modify the track's volume. The Snap value that you set in Cubase SX3 will control how quickly the sine wave pulses. The value can be set to something unusual like a 16th-note triplet or to a familiar pulse of once or twice per quarter note. You can also get interesting results with the less traditional saw and square waveshapes when creating a tremolo effect.

Using the line tool and its various shapes is also helpful when working with the wide range of parameters available in virtual instruments and effects. With a properly written VST effect or VST instrument, every knob, button, slider, and other interface element is available for control with Cubase SX3 automation. Even if the effects and instruments have their own

LFOs and other modulation tools, controlling the effect with automation data in Cubase SX3 may be easier than working with the effect itself.

FIG. 3: You can create effects with volume automation by using the pencil tool, which in this case has created an upward sloping curve to send more sound to a delay effect.

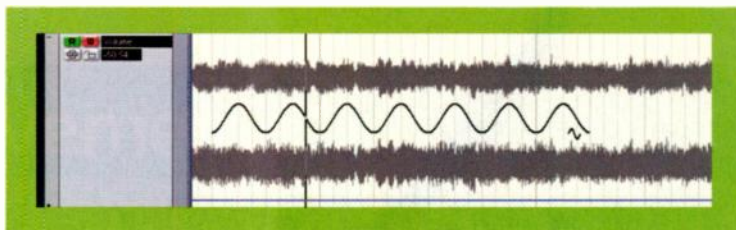
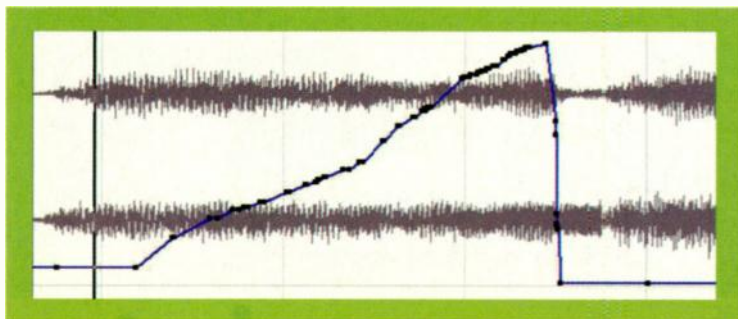


FIG. 4: With Cubase SX3's line tool you can apply wave-shaped automation curves, such as the sine-wave pattern shown here, to give targeted audio unique effects based on level changes.

For example, a software synth might have an LFO that can be mapped to filter resonance, but it may be more efficient to use Cubase SX3 automation rather than the LFO. For example, the parabola tool can be used to draw a curve that repeatedly ramps up slowly in one measure, and then more quickly in the following measure. Such a curve can be easily created using automation in Cubase SX3; creating the same curve with a traditional LFO or even two LFOs, however, would be a much more demanding task.

Further Exploration

Almost anything, from audio and group tracks to MIDI tracks and virtual instruments, can be automated in Cubase SX. MIDI tracks are particularly fun to play with, because Cubase has a mixerlike interface for changing parameters on external MIDI devices. You may find there is no need to paw through synth documentation to match synth parameters with MIDI controllers, because SX3 has a fair number of the common parameters already built in.

If you want to access more obscure functions, Cubase SX3 allows deeper editing of assignable controllers for external devices. An outboard MIDI-controllable digital multi-effects box might sound great, but it might be difficult to sync the sweep of its phase shifter to the tempo of a song. Using one of Cubase SX3's line tools assigned to the rate of the phase shifter, though, accomplishes that same task quickly and easily.

Almost every top-quality computer audio program has uncommon editing tools and capabilities that few people take the time to learn in depth. Mix automation might seem like a fairly routine part of what Cubase SX3 or other DAWs can do, and the kind of thing that only a certain kind of producer might use. But because automation can control most parameters of most tools within Cubase, the technique can be used to create anything from the forensic to the truly freaky. Learning how all of the tools for creating, modifying, and editing automation data work will greatly expand what you can do to make a mix sound as good as it can. **EM**

Thad Brown is a musician, writer, and consultant. His Web site is located at www.thadbrown.com.

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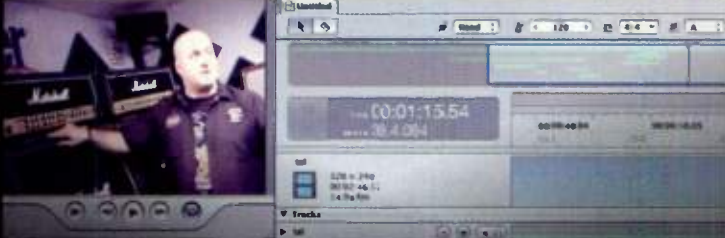
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is how far behind your head they should go. That is still a topic of some debate, with opinions varying between 90 degrees (directly to the side) and 150 degrees. One prominent standard, codified in International Telecommunication Union (ITU) recommendation 775, is 110 degrees off the center axis, plus or minus 10 degrees. The Recording Academy's Producers and Engineers (P&E) Wing has promulgated an extensive set of guidelines on surround-sound production, including advice to place the surrounds between 110 and 150 degrees, with the optimum range being 135 to 150 degrees. In general, wider angles between speakers yield a better immersive experience, while narrower angles provide better positioning of sounds. Whichever guidelines you choose to follow will represent a considered compromise between optimum localization and the greatest sense of envelopment.

Match Point

You might think that an ideal surround-speaker setup consists of five identical speakers. For the mix environment, that is indeed the preferred setup. One obvious advantage of matched speakers is that timbre, volume, and transient response—all of which can vary noticeably between different models of speakers—will not change as you pan a sound source around the room.

In many playback systems, however, the center channel is different than the rest. That is primarily because of the theatrical origin of the center channel. It was introduced for the purpose of delivering dialog from a position behind the movie screen, thereby anchoring the actors' voices to their images. Many home theaters therefore include center speakers that are optimized for dialog. The downside is that such a configuration can compromise the character of nondialog elements, so music production facilities ordinarily match the center

speaker to the right and left speakers.

In movie theaters, the left and right surround channels are ordinarily delivered through an array of speakers along the side and rear walls. The result is a diffuse surround field, and in some home theaters a diffuse surround field is accomplished with dipole speakers (see Fig. 2). Dipoles are the push-me-pull-you of audio—they house a pair of speakers aimed in opposite directions, much like a figure-8 microphone in reverse. The null is aimed at the listening position, so the listener hears

very little direct energy. The result is a theater-like diffuse surround field.

In movie soundtracks, the surround field is designed to create a realistic sense of space around the viewer, but mixers are careful never to pull attention away from the movie screen. To do so would cause the dreaded exit sign effect, a big theatrical no-no. Though it's certain that no movie moguls truly believe that if a sound effect causes you to turn your head and you see the exit sign that you will leave in the middle of a movie, it is indisputable that seeing the exit sign or the amorous couple sitting behind you will yank you out of the carefully crafted illusory world you were there to experience.

In game soundtracks, however, it's common and necessary for a character or other element to give you a sonic tap on the shoulder so that you will turn around. If your living room doesn't have an exit sign, that should have no negative effect on your experience. In music-only surround production, it's also quite acceptable to place discrete attention-getting elements in the surrounds. If your work is more like that latter philosophy, you should stick with direct radiators rather than dipoles. The P&E Wing's guidelines strongly advocate five matched full-range direct radiators for music production.

The Lowdown

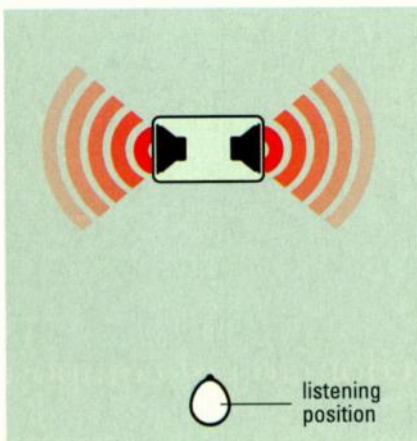
The “.1” part of 5.1 refers to the low-frequency effects (LFE) channel and the subwoofer through which it is played. The LFE is another part of surround sound's theatrical heritage and was created for the sort of floor-rattling effects moviegoers expect from massive explosions and thundering dinosaurs. Even though music production rarely requires such a dedicated bass channel, most playback systems combine the LFE channel with the low bass from each of the other five channels and send it to the subwoofer. This is a process called bass management, the details of which are beyond the scope of this discussion.

The location of the subwoofer is somewhat less critical than that of the other speakers because of the less-directional nature of low frequencies. Typically, the subwoofer is placed to either side of the center speaker.

As it expands the sonic landscape, so does surround sound expands the variables you must contend with when setting up your studio. Beyond number, type, and position of speakers, one must also consider the acoustics of the room, which are arguably more important in surround mixing than in stereo. You can expect engineers to debate surround monitoring as much or more than they have stereo monitoring, but these guidelines will get you off to a good start. **EM**

Brian Smithers is a musician, composer, engineer, and educator in Orlando, Florida.

FIG. 2: A dipole speaker is a front-to-back array. In home-theater playback systems, it is aimed sideways at the listening position to provide a diffuse surround image.



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By Thad Brown

Choose wisely when setting up your music site.

It used to be that either a musician or a band that had a Web site was considered “hip” or “techie.” No more. If you’re serious about your music career, a Web site is an integral part of your self-promotion. But for many musicians, putting together a site can be a complicated and daunting task. There are so many possible ways to go about it that it’s easy to get confused or to end up settling on the path of least resistance.

Although your site will likely be a continuously evolving entity, the initial choices that you make have a big impact on its long-term success. With that in mind, the advice offered here is aimed to help you successfully begin to establish your site.

Domain of the Name

First, you need to find a domain name for your band or project. Your domain name is a unique identifier for your Web site. Just like a telephone number, a domain name has to be one-of-a-kind so that information can be delivered to and picked up from the correct location.

The right to use a domain name is secured by registering the name with ICANN, a private, not-for-profit entity that maintains

the Internet infrastructure. Individuals don’t typically register directly with ICANN. Instead, they let their Web-hosting company or a firm specializing in domain registration handle it for them. A well-known example of the latter is Register.com (www.register.com). Its home page has an easy interface where you can determine whether the domain name you want is available in .com, .org, .net, or another top-level domain.

Thanks to my relatively rare first name and my decision to register early, I was able to secure thadbrown.com. Searching my name on Register.com shows that thadbrown.net and thadbrown.org were registered by someone else. thadbrown.biz and thadbrown.info are still available.

What do you do if somebody else has already registered the .com domain that you want? One work-around is to use .biz or .us instead. Another strategy is to add to the end of the name to make it unique. If it’s a band name, putting “theband” at the end often does the trick.

Host with the Most

After you find the right domain name, your next task is to choose where the site will reside. Almost everyone uses a commercial hosting company. Hosting companies vary from mom-and-pop outfits running off of a cable modem in a house or a small office to multimillion-dollar corporations managing multiple fault-tolerant data centers.

Many people make the mistake of choosing a hosting company based only on the amount of server space allotted and the price per month. Price is certainly important, but many bargain hosting companies severely limit what customers can do with their sites. They might also sneak their pop-up windows, other advertising content, or worse into customer Web pages. Higher-quality hosting companies usually cost only a few dollars more per month, and they include Web-based site administration (very useful if adding new users or accounts to a site), multiple email accounts, blogging and message-board tools, and more.

Finally, the better hosting companies allow a site to grow easily over time. A musician might want to build a customized Web database in the future to generate an email list of fans with mailing addresses near upcoming gigs. Or, a band might want to add

FIG. 1: Hosting companies often provide Web site templates to make site designing easier. This one, from AllWebCo Design and Hosting (www.AllWebCo.com), is one of that firm’s many music-specific templates.





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Chuck Henry – TAXI Member

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an e-commerce feature so that it is able to sell CDs, T-shirts, and tickets over the Web. It's easy for a quality hosting company to move a customer from a personal site to a small-business plan that supports secure credit-card transactions and other business-related features.

My own experience has shown me the benefits of choosing a quality outfit. When I first created my site, I did research and asked friends and colleagues for advice, eventually settling on Hostway (www.hostway.com). It has plans starting at \$8.95 per month (only a few dollars over the cheapest, shadiest Web hosting on the Internet), will register a domain name for its customers, includes multiple email accounts with each site, and provides secure Web mail and remote administration for all of its customers.

In the years that I have used Hostway, downtime has been only hours per year, the site-management tools have improved consistently, and support emails have generally been answered in minutes. I bring up Hostway not for endorsement purposes, but to point out that when choosing a host, musicians should look for a well-established outfit that offers a similar level of service.

Design and Maintain

The final step before you go live is to create the actual Web pages for your site. Often the initial decision is whether to develop the site alone or to hire the work out to an expert. Musicians often know other creative types such as Web and graphic designers, and they can beg or barter with them for help.

Talented Web designers are an incredible resource. But if a designer cannot be found or the cost is prohibitive, you still have other options. Many hosting companies offer decent templates for starting up a site (see Fig. 1), and many also employ in-house designers who will create your site for a reasonable rate.

Finally, there is the pure do-it-yourself method of building a site from scratch. Web pages are written in HTML, which is not terribly hard to learn. Underneath it all, Web pages are nothing more than text files that tell a Web browser what to display.

Commercial HTML editors such as Macromedia's Dreamweaver are superb Web-creation programs, but they are expensive. You can get the job done with far cheaper tools. For instance, Windows users can download a full-featured free software editor called Nvu (<http://nvu.com>), while OS X fans can get Taco HTML Edit (<http://tacosw.com/index.php>). Other low-cost or free applications are also available.

HOSTING FOR MUSICIANS

If you're okay with a site designed from a preexisting template, consider one of the hosting services aimed specifically at musicians. Such outfits make it easy for you to get a site up and running and offer musician-friendly features—like audio streaming and CD sales—that even an above-average commercial-hosting company might not have.

Services such as Broadjam (www.broadjam.com), Hostbaby (www.hostbaby.com), and GarageBand are examples of musician hosting sites. They give you good-looking, music-specific site templates with at least some tools for modifying the look and feel. You also typically get ready-to-use tools for Web streaming, journaling and blogging, guestbooks, mailing lists, and listener feedback. One key feature that distinguishes Hostbaby and Broadjam from GarageBand is that they let clients use their own domain name (Hostbaby will even do the registration), so that URLs, email accounts, and mailing lists will look as professional as possible.

Even if your band has a professionally designed site, it's advisable that someone in the group acquire basic HTML skills to update the site and troubleshoot problems. No designer wants to be emailed every time one word on a page needs to be changed.

Keep It Fresh

Once your site is up, a major challenge is to keep exciting, fresh content on it. For a musical act, a big part of doing so involves posting of music files. Good hosting companies will have media-streaming server software of some kind already installed. Its format (for example, RealAudio or Windows Media) will likely dictate the format in which your files will be posted. If all else fails, all sites should be able to link to MP3 files, which almost every computer in the world can play back in one way or another.

Some bands have tracks uploaded on popular indie-promotion sites such as CD Baby (www.cdbaby.com), GarageBand (garageband.com), or even Myspace (myspace.com). If you have such a page, be sure to link it from your main site and vice versa.

Finally, nothing will keep people coming back to the site more than regular updates. Even if those updates are just blog entries and information about works in progress and dates for shows, updates will attract more regular visitors.

The Right Start

Although there is much more to a great Web site than what I've described here, the first steps are almost always the most important. Registering a catchy name, choosing a good hosting company, and getting a solid handle on HTML will give you the best chance for long-term success promoting your music on the Web. **EM**


Thad Brown is a musician, writer, and computer geek based in New Haven, Connecticut. One of his musical endeavors lives at www.moldmonkies.com.

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REVIEWS



MACKIE Tracttion 2.0.1.2 (Mac/Win)

An efficient GUI with lots of extras.

By Rusty Cutchin

When Mackie's Tracttion first appeared a couple of years ago, the program looked like another handy, low-cost aide for the entry-level recordist—an interesting, one-screen, do-it-all piece of software that could help the novice make music but certainly couldn't stand toe-to-toe with heavyweight audio applications. Those who spent time with the program, however, began to appreciate its wealth of features and, more important, its thrifty, no-nonsense approach to handling MIDI and audio.

With version 2.0, the program capitalizes on a growing fan base by adding, according to Mackie, more than

100 new features. After taking the new version for a spin, I increasingly like it as an alternative to the bloated RAM hogs that the major software DAWs have become.

To be sure, Tracttion still has quirks to go along with its improvements. (For example, Tracttion offers no controls in the Windows or in the OS X menu bar. All disk I/O, interface settings, and other functions are accessed from within the application's windows.) For the new features, a host of new plug-ins and loops, and some much better documentation, you'll pay a new list price of \$199. Considering the program's ease of use and robust feature set, Tracttion is still a bargain.

Kicking the Tires

Tracttion requires a Pentium III (or better) PC with 256 MB of RAM running Windows 2000 or XP. The Mac version requires a G4 (or better) with 256 MB of RAM running OS X (10.3.9 or higher). I tested the Mac version on a dual 2 GHz G5 with 1 GB of RAM running OS X (10.3.9).

I described Tracttion's original user interface in a sidebar to my review of Mackie's Spike recording system, with which the program was included (this sidebar is available online at emusician.com). Tracttion differs from audio applications that add new windows for every new function and emphasize realistic graphics for items such as mixing-board windows and plug-in front panels. With Tracttion



FIG. 1: Tracttion's main window (the Edit screen) provides access to practically every function that the program controls other than file management and interface settings.

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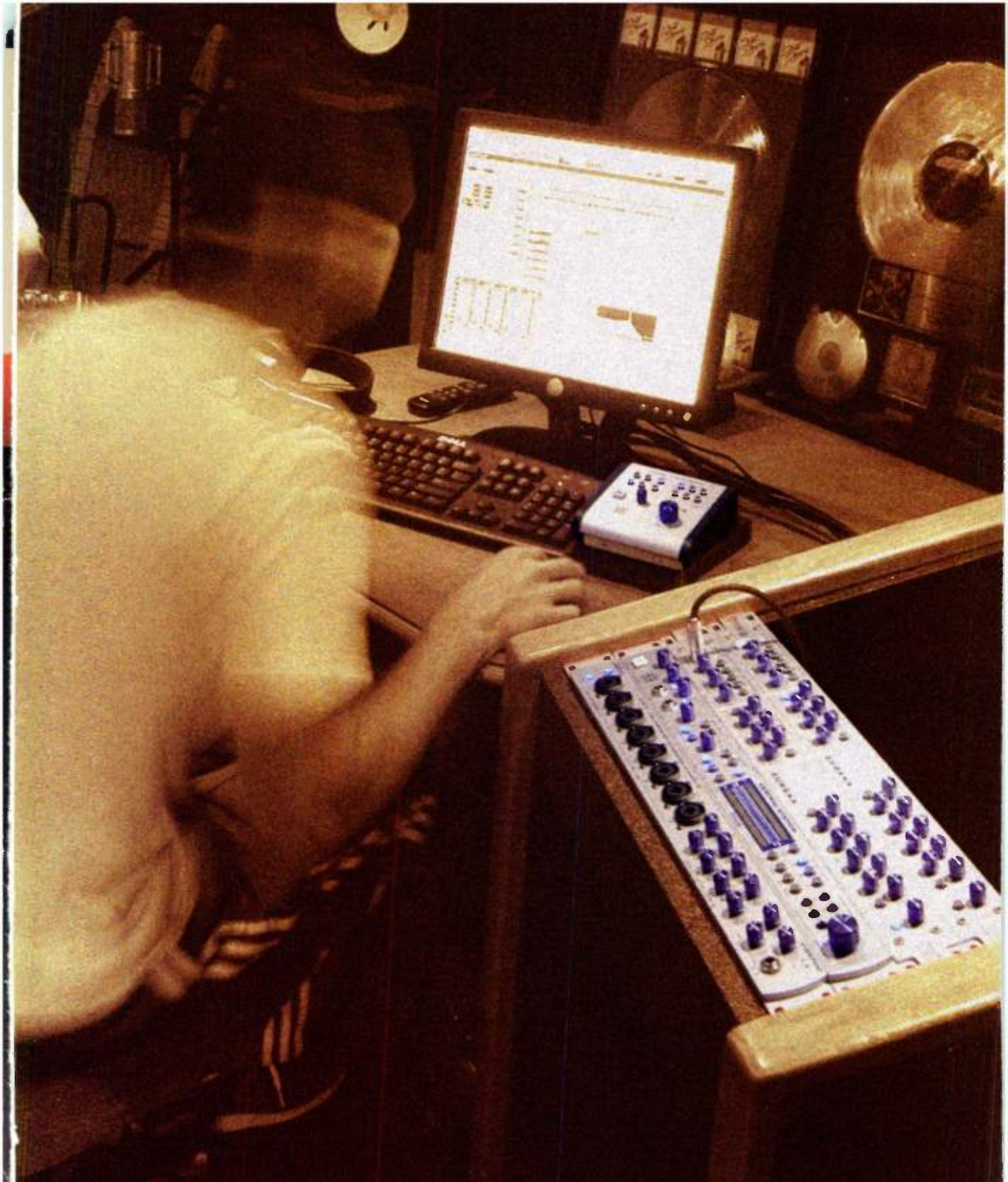
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you get one main window (resizable in the new version) that displays audio and MIDI tracks in the traditional way, stacked vertically,



horizontal timelines (see Fig. 1).

Everything else in the window, however, departs from DAW convention. You drag-and-drop a filter icon onto a track for any process that affects it (see Fig. 2). For a MIDI track, you drop a MIDI input icon onto the beginning of the track. For EQ or a compressor, you drop those icons into the appropriate area at the end of the track. Any time you select a filter for dragging-and-dropping, a pop-up window lets you select from options that now include IK Multimedia's AmpliTube SE and SampleTank SE, LinPlug's RM IV drum machine and FreeAlpha synthesizer, and reFX's Slayer 2 guitar processor and Claw single-oscillator synth.

Mackie's own plug-in suite features the Final Mix mastering plug-in and a slew of dynamics processors and keyboard emulations, including the M-Clav, a Hohner Clavinet knockoff, and M-Pad, which Mackie likens to an ARP Solina or Crumar Performer. (In Macintosh versions of Tracktion, the M-Clav and M-Pad go by their original names of Ticky Clav and CheezeMachine, respectively. Both are freeware plug-ins developed by Big Tick Software.) There's also a SoundFont player and a drawbar organ, called the ZR-3.

Back again are several plug-ins from Maxim Digital Audio (mda) and Raw Material Software, the company of Tracktion's creator Julian Storer. Owners of the PC version also get sound manglers from Big Tick. Hundreds of freeware VST plug-ins can be used with

Tracktion, and ReWire is implemented for communication with other programs.

New Treads

The enhanced plug-in set is a welcome addition, and Tracktion's design allows for its faster and virtually seamless use. Although third-party plug-ins appear in their full graphic versions as they do in other audio applications, their panels can be hidden while you control them from Tracktion's Properties panel, the central area at the bottom of the

FIG. 2: Icons are dragged into the area at right to apply filters (which range from EQs to software instruments) to the track. The icons represent (from left) a compressor, an EQ, a volume and pan filter, a level meter, and a mute and solo filter.

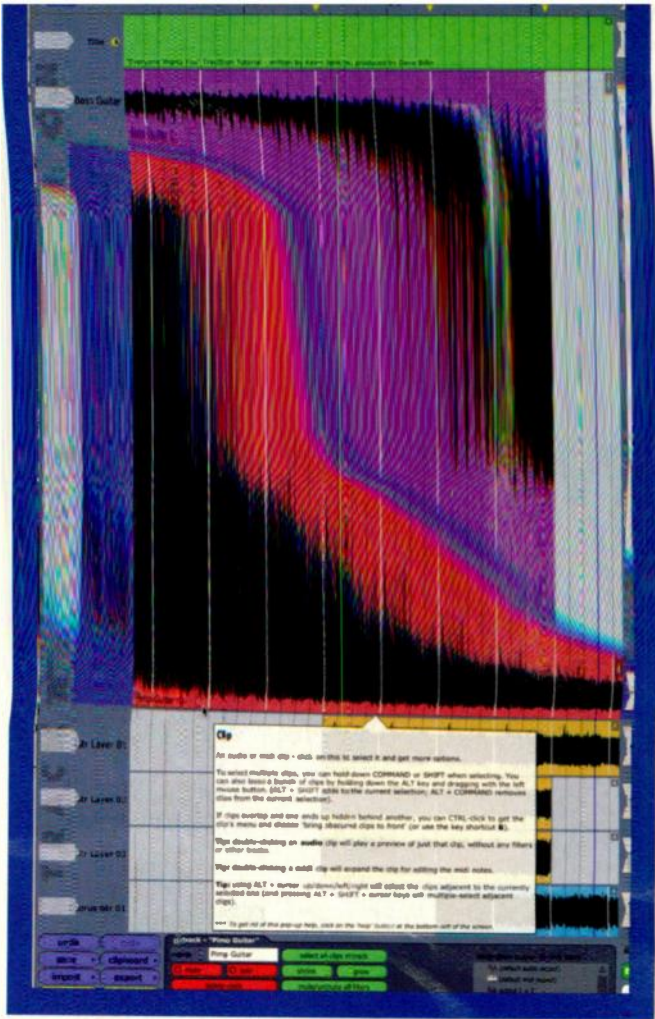
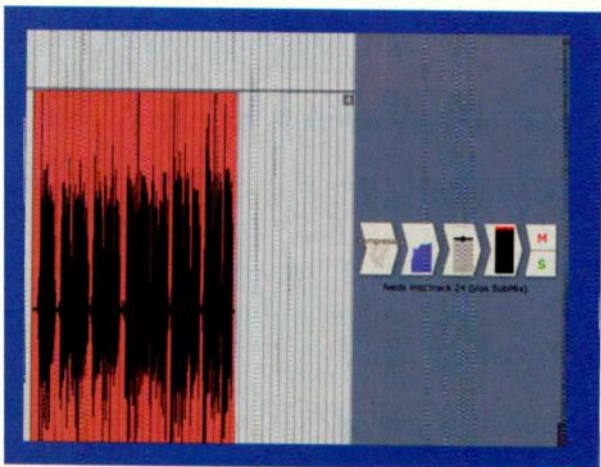


FIG. 3: Tracktion's extensive pop-up help system, which covers virtually every aspect of the program, can be delayed and disabled as a user becomes more familiar with the program's operation.

main screen, where all in-progress adjustments are made. The Properties panel contains all the settings for the currently selected parameter. If you're working on the EQ of track 7, for example, you don't see the graphical knobs and faders of other tracks.

Tracktion requires a slight reorganization of your thinking about DAW layout, but once you realize where everything is and that almost every control has a keyboard shortcut or is visible in the main screen, it can free your mind of clutter. The working action takes place in the Edit screen, one of three tabbed windows (as in a tabbed Web browser) that are always available at the top of the screen. When the program launches, you get tabs for the Projects screen, in which you select or initialize a project, and a Settings screen for communicating with your interface and setting overall preferences.

The Projects screen displays Tracktion's unique filing system, which keeps track of MIDI, audio, and edit files within a project or even shared among projects. All "open" projects displayed are considered to be works in progress. If a project has been closed, it won't appear in the list until it has been opened. The window provides a search box to locate, for example, samples from one project that you wish to use in another. The filing system takes some of the hassle and duplication out of the process of keeping all of a project's associated sound files on the same folder, a must with most other digital audio applications.

As with the Edit screen, the Project screen's control area is the Properties panel at the bottom of the window. This convention ensures that every control for every screen always pops up in the same place. In the Project screen, for example, waveforms of selected samples show up. You can launch a separate waveform editor here or perform basic operations (rate convert, normalize, truncate, and others).

One of Tracktion's more noticeable features is the "rollover" help system. A pop-up screen is available for almost every area a cursor can reach (see Fig. 3).

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Those screens enable you to understand how Tracktion works the first time you use it. As you become more familiar with the program, you can delay the time at which the screens pop up and then turn the system off altogether.

Hitting the Road

As I found when I worked with the original version of Tracktion, the program offers an abundant feature set that confounds expectations. Version 2 proves that the original design can handle enhancements that more advanced users expect. For example, the program's new MIDI editor is more flexible, allowing notes to be entered at a fixed velocity and length regardless of zoom level. You can now use the line tool to repeat notes at a set velocity and duration. Step Entry mode allows more accurate note placement and editing.

Mackie has also made improvements to Tracktion's onboard sampler (see Fig. 4), and finally added studio basics like external sync options, including MIDI Time Code (MTC) I/O, MIDI Clock output, and MIDI Machine Control (MMC) commands. The new Tracktion also has eight aux sends and returns for sharing effects and providing headphone mixes.

Mackie, with its 64-bit, 192 Hz-capable mix engine, has shown a commitment to forging ahead of more-established DAWs by addressing the widespread hand-wringing about "summing bus" design in DAW software. Tracktion's 64-bit math mixing option (the program also handles 192 kHz recording with compatible audio interfaces) worked well and flawlessly rendered every mix I

reduced with it.

The only flaw worth mentioning is that the program has too many new features, when Mackie should have spent more time enhancing existing ones. In addition to those features I've mentioned, Tracktion now also supports QuickTime playback, MIDI controller mapping, and the control surfaces Mackie Control Universal and C4. There's also loop recording, full-screen input metering, and many more that put Tracktion in a more-advanced category of digital audio application than before.

Gripping the Pavement

Tracktion's user interface continued to be a source of amazement as I built projects and played with the ones supplied by Mackie.



FIG. 4: When filters such as a soft sampler are dropped into a track and selected, the filter's controls and settings become visible in the Properties tab at the bottom of the Edit screen.

Glitches and flaws that I thought would sink my opinion of the program usually turned out to be my own fault. Playback became distorted and garbled because I had set latency too low (under 1.4 ms) on the Settings page. A failure to record audio was similarly caused by having the wrong mixer channels assigned on the Onyx 1620, with which I tested Tracktion.

Timing issues were not a problem. No communication issues sprung up with the FireWire audio or USB MIDI interfaces I used. As a guitarist who still likes to use MIDI for traditional piano parts, I wished that Tracktion's quantizing scheme had some of the humanizing features of more-advanced sequencers. But the expanded editing capabilities made my keyboard clams easy to fix.

In terms of pure audio quality and capabilities, Tracktion's supporting cast of plug-ins made the overall output of the program first-rate. I have always been able to get usable tones from AmpliTube SE for my projects, and SampleTank SE's library is full of worthy instrument sounds that users at any level can take advantage of. I also liked the presets in Slayer 2, especially its over-the-top metal textures.

Checked Flag

There's not enough space here to go into all the extras that Tracktion supplies, but its collection of dynamics, EQ, and effects plug-ins are serviceable at worst and inspired at best. More important, they can be auditioned with almost no lag time because of the program's efficient management of resources and ease of use.

It's unlikely that longtime users of high-end audio applications will abandon their workstations for Tracktion—even its improved version. But users from novice electronica buffs to grizzled veterans with earlier-generation RAM-starved laptops should check out Tracktion as it gets more established. Mackie provides a functional demo on its Web site. There are many programs for creating complex audio tracks these days, from the underpowered to the overdressed. For most projects, Tracktion gets the job done with power to spare.

Rusty Cutchin is an associate editor of EM. You can email him at rcutchin@comcast.net.

PRODUCT SUMMARY

MACKIE Tracktion 2.0.1.2

music production software
\$199

OVERALL RATING (1 THROUGH 5): 3.5

PROS: Many new features. One-screen interface. Comprehensive help screens. Extensive and well-balanced assortment of plug-ins. Unique file system. High-resolution mastering at 192 kHz.

CONS: Limited audio editor. No Windows or Mac menu bar options. Unfamiliar naming conventions.

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FIG. 1: In addition to its modeling and multi-effects functions, the DigiTech GNX4 is an 8-track recorder, a USB MIDI and audio interface, a mic preamp, a looping device, and much more.

DIGITECH GNX4

Much more than a modeling processor.

By Mike Levine

When I first heard about DigiTech's GNX4 Guitar Workstation—a modeling and multi-effects processor that's also a pedalboard, a standalone 8-track digital recorder, a USB audio and MIDI interface (with included DAW and editor-librarian software for Mac and Windows), a looper, a drum machine, a mic preamp-DI, a card reader, and more—I was skeptical. I wondered if its feature set was overly ambitious.

But after working with it for several weeks, my skepticism has vanished. The GNX4 does what it promises, and does it well. It's an intelligently designed unit that will benefit any recording guitarist, especially one who is new to digital multitracking.

But the GNX4 is more than just a recording product—it's a formidable live-performance tool. It provides gigging guitarists with a wide range of sounds and effects and, because of its speaker-modeling capabilities, you have the option of plugging straight into the P.A.

The unit's onboard CompactFlash-based 8-track recorder and MP3 player would be a godsend for solo acts that use backing tracks. They could record or import their material into the GNX4 and control playback using the unit's footswitches. Because EM focuses on the per-

sonal studio, however, this review will emphasize the GNX4's recording functions.

Pedals to the Metal

At just under 22 inches in width, the metal-housed GNX4 is wider than a typical pedalboard-style processor (see Fig. 1). It's outfitted with seven large footswitches (a row of five and a row of two), an expression pedal, and an assortment of hand-controlled switches and knobs.

Most of the rear panel (see Fig. 2) is dedicated to I/O. You get a high-impedance instrument input, an XLR input for the built-in dbx mic pre (which has a -20 dB pad and switchable 48V phantom power), a pair of ¼-inch balanced line inputs, two ¼-inch balanced line outputs with an output adjustment knob and a speaker compensation (simulation) switch, two balanced XLR line outputs (with an output adjustment knob, a speaker compensation switch, and a ground lift switch), a footswitch input for an optional recording-control unit, a ¼-inch headphone output, MIDI In and Out jacks, and a USB port.

DigiTech clearly made an effort to keep the user interface (especially for the guitar-sound engine) as straightforward as possible, considering the unit's ample feature set. The GNX4's GeNetX Amp Controls Matrix—



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FIG. 2: The GNX4's rear panel is where connections are made for its various types of I/O, which include analog and digital audio, and MIDI.

a gridlike combination of buttons, knobs, switches, and parameter names on the unit's front panel—is used for programming effects and amp models. Along with the two main LED displays, it allows you to thoroughly and quickly edit guitar-sound parameters without having to dig deep into menus.

The trade-off for this easy-to-use interface is that the size of the parameter names printed on the front panel had to be shrunk in order to fit. They were so small that even when I sat down with the GNX4 on the floor below me, I found them difficult to read. It was virtually impossible to read them when standing above the unit. As a result, I had to do most of my serious guitar-sound tweaking (when I wasn't using the included XEdit software) with the unit on my lap or on a table—neither of which is conducive to programming a unit that's primarily foot operated.

When you aren't programming sounds, the four LED displays on the unit's front panel show you everything you need, and they can easily be read from a distance or even on a dark stage. The largest of the displays

gives you the patch names and shows the status of various functions and settings, depending on which one you're adjusting.

Just to the right of it is a small 2-digit LED that reads out patch numbers, the recording destination (the USB output or the onboard recorder), and many other status indicators. On the extreme left of the unit are two LEDs for the digital recorder; one reads out song number, and the other reads out elapsed time. Many of the GNX4's knobs and switches have LED status lights.

Sounding Out

The heart of the GNX4 is its impressive guitar processing. It uses DigiTech's GenetX technology, which the company used in previous GNX and Genesis products. It allows you to take two amp models and Warp (morph) them to any degree you like. Once accomplished, you can store your new hybrid-amp model (called a HyperModel) to one of nine memory locations. You can then Warp it with one of the other models to create yet another HyperModel. The possibilities are endless.

All that Warping would be pointless if the models didn't sound good, but they definitely do. The GNX4 has 15 guitar-amp models, emulating amps by, among others, Fender, Marshall, Mesa/Boogie, Vox, and Matchless. You also get a decent acoustic-guitar simulator, and ten bass-amp models that mimic amps from such brands as Hartke, Acoustic, Trace Elliot, Ashdown, Sunn, and Fender. For further tone shaping, you can choose from 22 speaker-cabinet models, covering a wide range of guitar and bass enclosures.

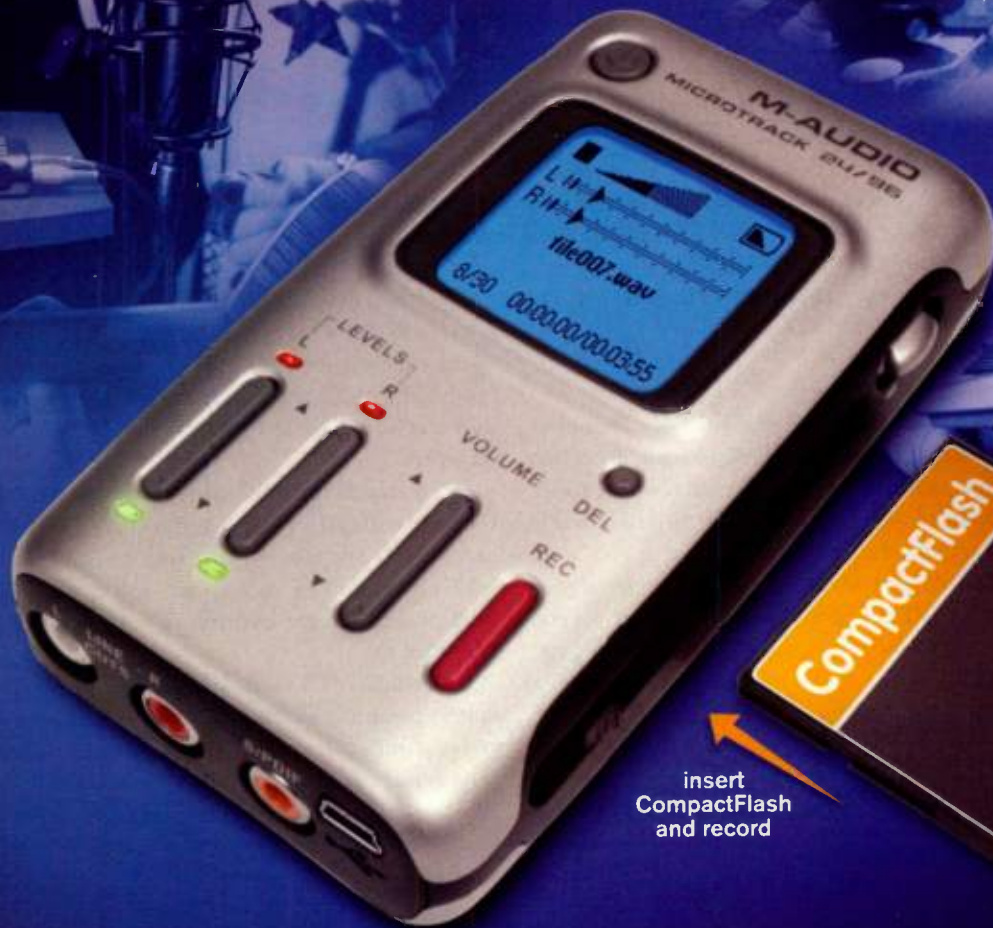
I was impressed by the sounds overall, especially when I started doing my own programming. I was even able to get some convincing clean sounds, which is often difficult with modeling devices.

There are 80 user and 80 factory preset memories available, and you can save 80 more if you've installed a Type 1 CompactFlash

GNX4 SPECIFICATIONS

Audio Inputs	(1) ¼" TS unbalanced instrument, (2) ¼" TRS balanced line, (1) XLR balanced mic
Audio Outputs	(2) ¼" TRS balanced line, (2) XLR balanced line, (1) ¼" TRS headphone
Digital I/O	USB Type B
MIDI	In/Out
Phantom Power	48V
Presets	80 factory, 80 user, 80 card (with optional CompactFlash card installed)
A/D/A Converters	24-bit
Sampling Frequency	44.1 kHz
CompactFlash Card Interface	Type 1 (solid-state cards; up to 2 GB)
Onboard Digital Recorder	8-track, 16-bit, 44.1 kHz resolution
MP3 Player	32–320 kbps supported
Onboard Drum Machine	110 patterns, 5 metronome settings, 8 drum kits
Dimensions	21.5" (W) × 3.25" (H) × 9" (D)
Weight	10 lbs.

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card (which is not included) into the GNX4's card slot. Each preset contains two amp channels, which can be assigned to different models. You can switch between them or set the expression pedal to control the Warping process.

You can set the GNX4 to three modes, each of which allows foot-switch control of different functions. Preset mode lets you use the footswitches to choose between various presets. Stompbox mode lets you turn effects on and off within a preset and switch between amp models. Recorder mode allows you to control the onboard recorder or the Cakewalk Pro Tracks Plus 2.2 DAW software.

Wahs and Yahs

Each preset can include one of the GNX4's Stompbox models, which re-create various well-known distortion pedals. You get Rodent (ProCo Rat), Screamer (Ibanez Tube Screamer), and Big MP (Electro-Harmonix Big Muff Pi), among others.

The GNX4 also offers a generous variety of good digital effects. Each preset can have one of several delays, a choice of reverb algorithms, a noise gate, compression, and a chorus or a modulation effect (such as flanger, phaser, wah, auto-wah, Ya Ya [a superb talkbox-like effect], tremolo, auto pan, rotary speaker, detune, and fixed pitch shift).

Each preset can also have an effect from the Whammy-IPS-Talk category, which includes various specialized pitch effects. Whammy is taken from DigiTech's own Whammy pedal, and it lets you bend your note by a specified interval (or add a harmonized bend) using the expression pedal. You can do everything from dive-bombing effects to more subtle bends.

In addition to controlling Whammy, the expression pedal can be

programmed to work with a huge range of parameters. A wah is available at any time by pressing the toeswitch of the expression pedal. The sensitivity of the switch can be adjusted, but the default setting on my review unit was just right. The pedal action, however, was a bit stiff.

IPS stands for Intelligent Pitch Shifter. Unlike the fixed shift effect found in the unit's Chorus/Mod section, this one is based on a user-specified interval, scale type, and key. As a result, you can play some very musical guitar harmonies with yourself (see **Web Clip 1**).

The Talker is a talkbox effect that works in conjunction with the built-in mic input. You plug in a mic and talk while playing, and it imparts vocal qualities to your guitar sound. It was a disappointment; I wasn't able to get very discernable effects from it. For talkboxlike sounds, I much preferred the Ya Ya and Auto Ya effects.

Bang on the Drum Machine

Another useful feature of the GNX4 is its drum machine, whose patterns and sounds can be used with the onboard multitrack. It can be also function as a MIDI drum module or simply as a practice aid.

You get 110 patterns, covering styles such as funk, jazz, rock, metal, and country. The patterns are basic but are fine for songwriting and practicing purposes. You can't, however, chain patterns together into a song, which is somewhat limiting. You get eight kits, each with sounds representing a particular musical style. The drum sounds are average, at best.

If you've installed a CompactFlash card, you can use the unit's card-reader function (which makes the card appear to your computer as an external drive) to import MIDI drum files into the GNX4. You can then play the MIDI files using the unit's internal sounds. Therefore, you aren't limited to the onboard patterns, and you can even dump song-length MIDI drum tracks into the drum machine.

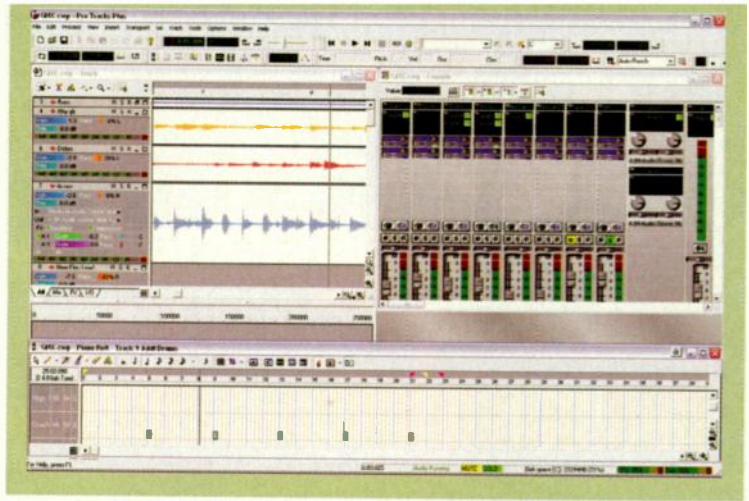


FIG. 3: One of the programs included with the GNX4 is Cakewalk's Pro Tracks Plus (Win), a fully featured digital audio sequencer.

PRODUCT SUMMARY

DIGITECH GNX4

guitar workstation
\$ 699.95

OVERALL RATING (1 THROUGH 5): 4

PROS: Excellent sounds and effects. Warp feature adds additional flexibility. Onboard multitrack looper, drum machine, and MP3 player. Card reader makes exchange of data to computer easy. Functions well as USB audio and MIDI interface. Dbx mic pre. Recording and editing software (Mac/Win) included.

CONS: Drum-machine patterns can't be chained together. Drum patterns and sounds are mediocre. Parameter information printed on the unit can be hard to read. Recorder and interface functions difficult to learn. Talker effect unimpressive.

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You can also use the card-reader function to import MP3s into the GNX4. One excellent use of this feature would be to import backing tracks into the unit to perform or practice with.

Let's Record

The GNX4 offers two choices for recording: the built-in, 8-track multitrack, and the unit's USB audio interface for recording into a computer.

Before getting into the specifics, I should mention that the unit has three different audio-input options. You can plug your guitar in directly through the instrument input, plug a mic into the built-in mic preamp, or patch line-level signals into the balanced line inputs.

Because DigiTech is under the same corporate umbrella (Harman Music) as dbx, it was able to include a dbx mic preamp in the GNX4. I tested the preamp out on acoustic guitar (see [Web Clip 2](#)) and on vocals, and it sounded good but a tad darker than the other pres in my studio.

Multitrack Onboard

The GNX4's 16-bit, 44.1 kHz onboard digital recorder isn't as fully featured as a dedicated multitrack or DAW, but it is useful and portable. You must install a

CompactFlash card for it to function. Your total recording time will vary greatly depending on what type of card you get. For example, a

FIG. 4: The included XEdit software (Mac/Win) makes the job of editing and storing the GNX4's guitar sounds a snap.



32 MB card will yield a total of 6 minutes. A 2 GB card (the maximum compatible size) gives you 6 hours and 24 minutes. (To calculate the available recording time per track, divide the total time by the number of tracks that you plan to record.)

The GNX4 lets you set a number of recording preferences, including whether to have a countoff and whether to play with the click track or the drum

machine on. You can set the drum machine to play along or to record to two of the tracks. Once you have configured everything, recording is a snap. You don't even need to use your hands, because the recorder's transport can be controlled with the unit's footswitches.

When it's time to mix, you can control level and pan for each track. You can either output your mix to an external 2-track through the analog outputs or use the card-reader function to transfer the individual tracks to a DAW for subsequent mixdown. If you want to keep your mix onboard, you can bounce it to two of the tracks (see [Web Clip 3](#))—and you don't need to leave open tracks to do so.

Does It Compute?

The other recording option is to use the included DAW software—Pro Tracks Plus 2.2 for the PC or BIAS Deck SE 3.5 for the Mac (or other compatible DAW software)—and use the GNX4 as a USB interface. Pro Tracks Plus has more-thorough integration with the GNX4 than Deck SE does. You can even control Pro Track Plus's transport with the GNX4's footswitches (see [Web Clip 4](#)).

Pro Tracks Plus (see [Fig. 3](#)) is a very capable sequencer that can handle audio and MIDI recording, editing, and mixing. Cakewalk adapted the software from its Sonar line. Having such a fully featured application included is a real plus. In addition, you get the Lexicon Pantheon reverb plug-in (another benefit of the Harman connection), which also comes in a Mac version for Deck SE.

I successfully tested the GNX4's USB drivers with Cakewalk's Sonar 4 and Project 5. I was not able to get the audio to work correctly with Sony's Acid Pro 5.

On the Mac side, Deck SE 3.5 is a capable recording program but is more limited than Pro Tracks Plus because it doesn't offer any MIDI-sequencing features. I also tested the GNX4's USB interface successfully with several other Mac programs including MOTU Digital Performer 4.52, Apple GarageBand 2.01, and Logic Pro 7.1.

The GNX4 offers a wide range of options for outputting audio to the computer. You can choose between stereo, mono, with effects, without effects, and several other options. It also has settings that facilitate reamping tracks from the computer using the unit's models and effects. In all, the GNX4 handled its role as an audio and MIDI interface quite well.

XEdit (see [Fig. 4](#)), the editor-librarian program (Mac/Win) that comes with the GNX4 software package, gives you a graphic representation of all the guitar and effect parameters in the hardware unit. Editing with it is a breeze, and you can save and recall your favorite patches.

PC users get Cakewalk Pyro Express in the GNX4

software package, which is a light version of Cakewalk's Pyro, and lets you burn and rip CDs.

Loop and Jam

The GNX4's digital recorder also serves as a looping device. The feature is called JamMan and is loosely based on the Lexicon JamMan—a classic looping device that's no longer in production. The GNX4's looper lets you overdub multiple passes (limited only by the size of the CompactFlash card) over a looping section.

Unlike the original JamMan, the DigiTech unit lets you do multitrack looping. The GNX4's versatile footswitches allow hands-free control of all looping functions.

User-Friendliness

Because of its many and varied functions, the GNX4 is relatively difficult to learn. Although DigiTech attempted to keep things as simple as possible, the GNX4 has so many features that it takes a while to get comfortable with the unit's operations. Even after several weeks of testing, I still had to refer to the manual fairly often—especially for the recorder, digital-output, and data-transfer functions, which have more menus and hidden features than the relatively straightforward guitar-processing section.

Fortunately, the manual is informative and

comprehensive. My only complaint with it is that it has no index, although it does have a detailed table of contents.

Genetically Engineered Music

Overall, the GNX4 is an ambitious unit that succeeds at what it sets out to do. Its guitar-sound engine is flexible and deep. Combine that with the onboard recorder, the drum machine, and the dbx mic pre, and you have a self-contained, songwriting and demo studio that can be used anywhere that has electricity. The ability to transfer tracks to the computer for further polishing is also handy.

The GNX4's capabilities as a MIDI and audio interface (albeit somewhat limited in terms of I/O) and its facility to store and transfer data from a CompactFlash card allow it to work as a functional front end for Mac and PC setups. The included software is quite good (especially on the PC side) and adds a lot of value to the total package.

Although the GNX4 is aimed most directly at guitarists who've previously been reluctant to jump into the computer-recording world, its versatility will make it attractive to many recording and performing guitarists.



Mike Levine is an EM senior editor.

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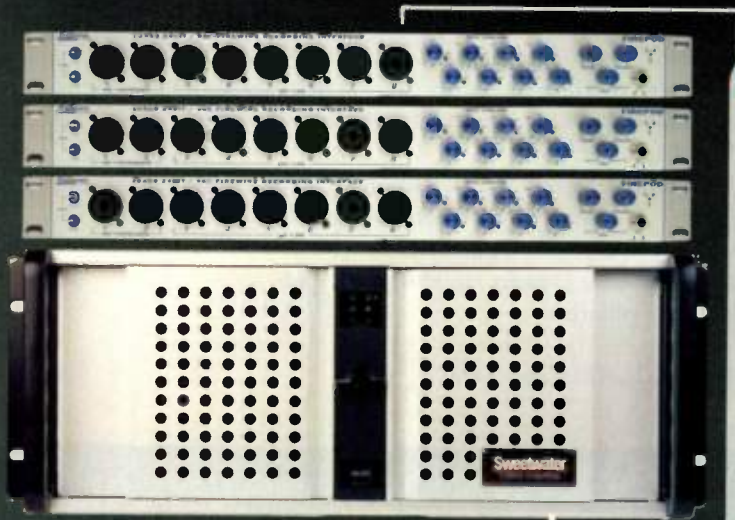
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This function allows for direct integration of external hardware effects processors into the VST audio mixer just like software! The first step in the Steinberg/Yamaha collaboration is called Studio Connections "Total Recall". This modular editing system builds a powerful bridge between the virtual and physical studio. Opening a project can not only recall an entire studio setup within seconds but allow full graphic editing right inside Cubase SX3.



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FIG. 1: In addition to instruments and Banks, Kontakt's rack now features an output mixer, an interactive keyboard, a Multi Header panel, and a Master Tempo section for global tempo, tuning, and metronome settings.



NATIVE INSTRUMENTS Kontakt 2 (Mac/Win)

This is the sampler to beat.

By Len Sasso

With the release of Kontakt 2, Native Instruments has raised the bar for software samplers. Features such as automatic translation for a large and growing assortment of sampler formats, a built-in MIDI Script Processor, an impressive collection of effects (including a flexible convolution reverb), a 15 GB instrument library with usable content, and numerous enhancements to the user interface make Kontakt 2 a whole new beast (see the May 2003 issue for a review of Kontakt 1.1).

Kontakt's library and feature set easily justify its somewhat high price tag

Kontakt 2 arrives in a box containing three discs and a printed manual. The installation disc is a CD, which allows you to install it even if your computer lacks a DVD drive. The Kontakt library fills two DVDs: one holds the 7.5 GB Kontakt edition of the *Vienna Symphonic Library*, and the other holds the remainder of the library. Kontakt 2 comes in standalone and plug-

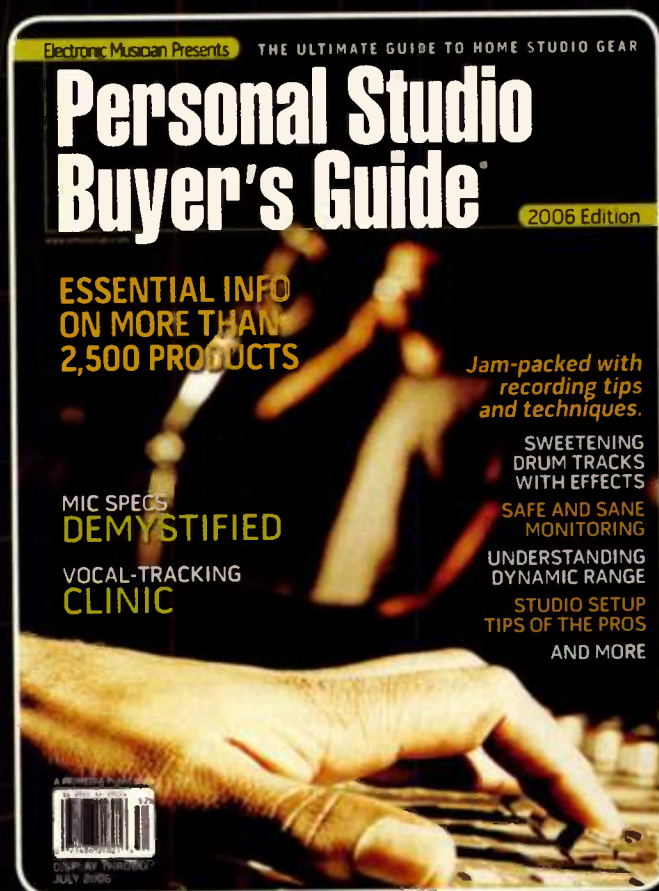
in versions for Mac OS X and Windows XP. VST, Audio Units, MAS, and RTAS plug-in formats are supported on the Mac, and VST, DXi, and RTAS formats are supported on the PC.

Back in the Rack

One thing that hasn't changed about Kontakt is its rack-of-gear paradigm; getting around in the rack, however, is significantly easier. For example, you can now use the browser to drag effects and modulators to the instruments in the rack and to assign remote controllers to control-panel knobs and sliders.

The main section of the rack holds Kontakt instruments. Instruments can be freely spread over four rack pages, with each page capable of holding 16 instruments. Each instrument can be assigned its own MIDI port and channel, and Kontakt 2 supports simultaneous input from four MIDI ports. That allows for 64-part multitimbral operation with a fully loaded rack, although that would push the limits of almost any computer. (A convenient Purge function makes it possible to winnow out all but those samples used in

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a project, thus greatly reducing the memory required for a multitimbral setup.)

Collections of instruments can be saved as a single multitimbral object called a Multi. A Multi contains all instruments on all pages of the rack, and the rack can therefore hold only one Multi. It would be nice to be able to combine Multis by dragging several to the rack, but I imagine that could raise more problems than it would be worth.

Bank on It

Kontakt 2 introduces a new rack object called a Bank. Banks work just like preset banks in synthesizers, and their primary purpose is to allow different instruments to be called up instantly using MIDI Program Change messages. Beyond that, Banks, with their onscreen menu for selecting individual instruments, are handy for organizing instrument sets. Furthermore, any instrument in the Bank can be opened for editing. The only downside to opening a Bank is that all samples used in all instruments in the Bank will be loaded into memory, which is necessary for smooth instrument switching. For direct-from-disk (DFD) instruments, the memory hit is not that large.

In addition to instruments and Banks, Kontakt's rack sports several new modules (see Fig. 1). A Master Tempo panel allows for global tempo, metronome, and tuning settings. A Multi Header panel gives quick access to the rack's four pages and has buttons for collapsing, expanding, and displaying auxiliary sends for all modules. A user-configurable output mixer provides multichannel mixing (including full surround support) and send-effects management. Finally, an interactive onscreen keyboard displays the note range and the currently held notes for the selected instrument.

FIG. 2: Kontakt's Instrument editor contains sections (from top) for editing the sound source, inserting effects, and managing modulation settings and routings. Sections expand as necessary for further editing.



Instrument editing is now a rack mode—clicking on an instrument's Wrench icon opens the editor for that instrument and simultaneously hides the Multi Header panel and all other instruments. Although instrument editing still involves a good bit of unavoidable scrolling, you won't accidentally grab and adjust a control for the wrong instrument.

Instrument editing is now a rack mode—clicking on an instrument's Wrench icon opens the editor for that instrument and simultaneously hides the Multi Header panel and all other instruments. Although instrument editing still involves a good bit of unavoidable scrolling, you won't accidentally grab and adjust a control for the wrong instrument.



FIG. 3: The tear-off Loop editor serves two purposes: beat slicing and loop management. As many as eight loops can be defined simultaneously.

Editorial License

There's no getting around the fact that Kontakt's instrument architecture is complex, and that is reflected in the Instrument editor (see Fig. 2). The action starts with the Source section, which does everything you ever wanted to do with samples, and then some.

The Source section's Mapping editor, for mapping samples across MIDI key and Velocity ranges, can now be torn off and resized (standalone version only), and it has a new List view as well as Kontakt's original Zone view. List view is particularly welcome for editing maps whose zones overlap.

Samples are loaded by dragging them to the Zone view either individually or in batches. When dragging, horizontal motion positions the sample(s), and vertical motion controls the zone width (or, equivalently, the MIDI note range). In a nice touch, dragging multiple samples to the keyboard at the bottom of the Zone view divides the samples across equal-size Velocity zones at the targeted key.

Samples can be assigned to Groups, and most Kontakt settings can be made for individual samples or all samples in a Group. In addition, each Group has eight insert-effect slots, and a utility insert effect called Send Levels allows Groups to have independent sends as well.

Mean Machines

Each sample in an instrument can be assigned one of six sample-playback methods: Sampler, DFD, Tone Machine, Time Machine, Time Machine II, and Beat Machine. Sampler and DFD are standard sample-playback modes that play from RAM or stream from disk, respectively.

Tone Machine is a granular resynthesizer that replaces the pitch content of the source audio. You can use its formant shifting to tweak or mangle vocals and other sounds. The two Time Machines are optimized for independent pitch shifting and time stretching. Time Machine II is higher quality, whereas Time Machine is better suited to special effects.

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Kontakt's Loop editor, which can now be torn off just like the Mapping editor, has always been one of its strong points (see Fig 3). It allows you to define as many as eight loops—each with its own number of repetitions (see Web Clip 1).

In Beat Machine mode, the Loop editor is used to place slice markers at individual events within an audio file, which it does using threshold sensing. Threshold sensing is most successful with rhythmic loops that have clearly defined events, but you can add and delete slice points at will, so any audio file can be sliced to your specifications.

Beat Machine sequences the slices created in the Loop editor; you can vary the speed at which they are sequenced either as a percentage of the original speed or in note increments at the master tempo (or host tempo in the case of the plug-in). The rhythm of the slices (that is, their relative spacing) is preserved in either case. Kontakt can automatically map individual slices to individual keys in the sample map and generate a matching MIDI file to play them back in rhythm. That gives you the flexibility of reordering and otherwise munging the slices.

Plug for Plug

Kontakt 2 introduces a new drag-and-drop architecture for managing effects and modulators. The browser's Modules tab has Effects, Filters, and Modulators sections—each of which has subsections for displaying mod-

ules and, optionally, a description of their operation (see Fig. 4).

A variety of envelope generators and LFOs, as well as a modulation step sequencer, an envelope follower, a glide (portamento) con-

FIG. 4: The Module Browser allows effects and modulators to be dragged to the instrument rack. Here a breakpoint envelope has been dragged to modulate the instrument's pan position.



FIG. 5: The Script Processor allows as many as five scripts to be run in series. The factory drum-sequencer script is shown here.

trol, and MIDI-message-routing modules, are available. As in previous versions of Kontakt, you can assign any modulator to any control using modulation drop-down menus. But Kontakt 2 allows you to drag the modulator from the browser to the desired control, after which it inserts the modulator's control panel at the bottom of the rack and inserts a modulation router below the targeted control.

Additionally, MIDI Control Change messages and, when Kontakt 2 is running as a plug-in, host-automation messages can be assigned to Group controls by dragging from the browser's Auto tab. Assignments made this way differ in two ways from the MIDI-message modules just described: they support Soft Takeover, whereby the target control isn't affected until the incoming value matches its current value, and they allow you to set the control range as a percentage of the target control's minimum and maximum values.

Filters and Effects

Kontakt 2 has the standard array of compression, distortion, and delay effects. Beyond those, there is a high-end convolution reverb with 150 MB of impulse-response samples and a sophisticated surround panner that can be used with output configurations ranging from 1.1 mono to 16.0 surround. A separate Filters subsection contains 18 filter types.

Kontakt 2's filters are divided among four categories. Sampler Filters are an assortment of 1-, 2-, 4-, and 6-pole lowpass, bandpass, highpass, and notch filters. The Synth Filters section contains emulations of the classic Prophet 5 and Moog Ladder filters and a multimode filter containing three 2-pole elements that can be freely mixed. An all-pass filter for phasing effects and two formant filters make up the Effect Filter section. In the EQ section, 1-, 2-, and 3-band parametric filters round out the complement.

Filters and effects can be inserted at three locations in individual Kontakt 2 instruments: Instrument Insert slots, Group Insert slots, and Instrument Send slots. There are eight slots of each type, and each Group has its own complement of eight slots. Group Insert effects affect only the samples assigned to the group, which allows you great variety in processing an instrument's samples. For example, you can easily apply different compression and EQ to different

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Velocity layers. Effects and filters can also be inserted in the output and auxiliary channels in the output mixer.

Effects and filters are inserted in instruments by dragging them from the browser to the desired slot. Their controls then become accessible from the slot's Edit tab. Each effect and filter has its own preset menu, and there are global preset menus for instantly recalling effects chains for each slot type. Effects are inserted in the output mixer using drop-down menus.

The Word

Kontakt 2's Script Processor is one its most powerful new features (see Fig. 5). In short, it runs MIDI-processing scripts and comes with an editor for creating them. A separate PDF manual is devoted

to creating scripts. Creating scripts probably won't appeal to most users, but there are many useful factory scripts, and scripts are constantly being added to the Kontakt User Library on the Native Instruments Web site. The upcoming Kontakt Experience library will contain many new scripts.

The Script Processor can run as many as five scripts at a time; multiple scripts are run in series with the MIDI output of each one feeding the next one in line. Typically, scripts process incoming MIDI, performing tasks such as arpeggiation, automatic chord generation, and MIDI echo. They can also, however, be constructed to run by themselves (for example, as step sequencers and drum machines). There's even a

MIDI-recorder script, complete with a prerecorded Bach harpsichord piece to show it off.

Scripts aren't limited to clever effects, either. The MIDI-monitor script is useful for discovering why notes aren't playing or why a MIDI controller isn't doing what you expect. Many of the VSL instruments have custom scripts that make it easier to execute nonkeyboard playing techniques from a keyboard.

Sprechen Sie

One goal of Native Instruments with version 2 of Kontakt is to make the software sampler format-

transparent, allowing you to load samples, instruments, and Multis in any format you own, regardless of the sampler they were designed for. To that end, the company commissioned Garth Hjelte of Chicken Systems (www.chickensys.com) to build a version of his Translator software into Kontakt 2.

The list of supported sampler formats is long, with popular entrants such as Tascam GigaStudio, Emagic EXS24, Steinberg HALion, MOTU MachFive, and Soundfont2, as well as a variety of legacy hardware-sampler formats from Roland, E-mu, and Akai. Digidesign's SampleCell II format was curiously omitted (it is supported in earlier versions of Kontakt), but SampleCell II support is slated for a future upgrade.

I tried a variety of sampler formats on my Mac, and aside from occasionally having to manually locate samples or remove non-ASCII characters from filenames, they all imported without problems. Some tweaking was required for more-complex instruments, but that's to be expected considering the variety of samplers involved.

All popular sampling formats are supported: AIFF, WAV, .S, .SND, and the sliced formats ACID, REX I and II, and Apple Loops. If you drag one of the sliced formats to a blank space in the rack, Kontakt 2 will build an instrument in Beat Machine mode using the embedded slices, which makes it almost ready for tempo synchronization (you need to manually select one of the Beat Machine's note-increment modes to sync to tempo). It would be handy to see compressed formats such as MP3 and AAC supported, but perhaps that will also come in a future release.

Not Quite Paradise

A database feature has been added to Kontakt 2's browser. Its purpose—refining the file tree to show only relevant files—is noble, but the current implementation is flawed.

Anytime you create or modify an instrument, Multi, or Bank and save the result, you need to manually invoke a database update—a process that can take 10 to 15 minutes on a large hard drive. If you delete, move, rename, or otherwise change files manually, you must rebuild the database—a process that can take several hours. (On my system, rebuilding the database constantly crashed Mac OS X Tiger; it worked properly, however, in Panther.)

The shortcomings of the database made it so inconvenient as to be unusable, and I went back to using the standard file tree. But therein lies another problem: convenience shortcuts such as favorites categories have been removed from the standard file tree and now apply only to the database. Because there are no key commands for moving around in the file tree, locating objects without those shortcuts requires a lot of mouse activity.

PRODUCT SUMMARY

NATIVE INSTRUMENTS Kontakt 2

software sampler

\$579

\$169 upgrade

OVERALL RATING (1 THROUGH 5): 4

PROS: Huge, well-documented library of sounds. Multiple sample-playback methods. Large array of effects and filters with flexible routing scheme. Drag-and-drop modulation and automation setup. MIDI script processing. Built-in file translation for other sampler formats.

CONS: Browser's database implementation is somewhat flawed.

MANUFACTURER

Native Instruments USA, Inc.
www.native-instruments.com

A Trip to the Library

Kontakt 2's 15 GB library of samples, instruments, Banks, and Multis is spread over ten categories. The separate 90-page PDF manual is an indication of the importance Native Instruments attributes to the library. While most of the content comes from outside vendors (Web links can be found in the documentation), this is no demo library—all the collections are complete and useful.

Roughly half of the content is taken up with the Kontakt edition of the *Vienna Symphonic Library*. The next largest categories contain 2.1 GB of instruments illustrating the Script Processor and 2 GB devoted to pianos: Steinway D and August Foster grand pianos along with several prepared pianos (see **Web Clip 2**). The keyboard collection is rounded out with selections of electric pianos, organs, harp-sichords, and synthesizers.

Percussion is divided into three categories: Acoustic Drums, Electronic Drums, and Percussion. Many of the kits conform to the General MIDI drum-map standard and can, therefore, be used with any GM drum sequences you may have. Many of the kits also make use of the Script Processor's Drum Sequencer script, with which you can step sequence five drums at a time.

Finally, there are bass and guitar libraries, a collection of 250 loops and construction kits, and 1 GB of surround instruments, including a 5.1-surround cathedral organ. Banks containing all instruments in each category make auditioning similar instruments a breeze.

Get Creative

It's easy to lose sight of what Kontakt 2 is all about in a blizzard of features. Although the library of ready-made instruments and its ability to import instruments in many other formats may fill all your sampler needs, Kontakt 2 offers a world of creative potential.

Even if you artificially restricted yourself to basic waveforms as source material, you'd have a sophisticated modular synthesizer at your fingertips. Add MIDI programming using the Script Processor, five varieties of effects routing, layering and zoning of individual instruments, and the four playback Machines, and you have the power to make Kontakt 2 do exactly what you want it to.

The move from previous versions of Kontakt to Kontakt 2 was a huge undertaking, and Kontakt 2 bears only a superficial resemblance to its predecessors. In spite of a few things that need smoothing out, Kontakt 2 is a job well done. If you're currently a Kontakt user, upgrading is a must (and it does not overwrite or disable your previous installation should you need it). For new buyers, Kontakt's library and feature set easily justify its somewhat high price tag.



Len Sasso is an associate editor of EM. He can be contacted through his Web site at www.swiftkick.com.

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FIG. 1: The Millennium Media TD-1 combines a mic pre, a tube and solid-state DI, EQ, and multiple I/O options in one unit. It also gives you remarkable sound quality at a relatively low cost.



MILLENNIA MEDIA TD-1

A high-quality yet affordable channel strip.

By Myles Boisen

As a maker of high-end hardware that traditionally spares no expense, Millennium Media has never been a household name in personal-studio circles. But that might change as a result of the company's new TD-1, a world-class quality and multifaceted channel-strip processor that is financially within reach of most studio owners.

To say that its chunky frame holds a wealth of features is an understatement. The unit offers Millennium's

there are many DI options for ground lifting and reamping, and the rear panel offers outputs for almost every application.

The Outside Scoop

The half-rack TD-1 is a tabletop unit, but a pair of them can be bolted together and rackmounted to fit a 2U space using an optional mounting kit (\$10). My review unit arrived with four thick rubber feet attached and a metal top-mounted handle wrapped in a black-leather sleeve. The TD-1's well-vented chassis is heavy-gauge steel.

The TD-1's glossy black front panel is bedecked with an assortment of lit push-button switches and machined black metal knobs, as well as plenty of white text (see Fig. 1). The only jack connections on the front are a 1/4-inch

The unit coaxed thick and gorgeous tone from a delicate bamboo flute.

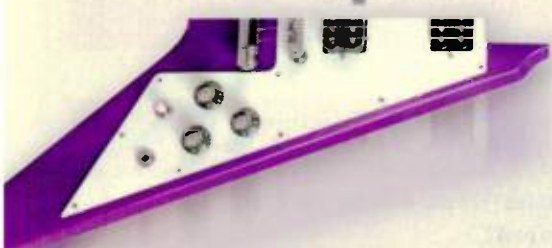
premium HV-3 solid-state mic preamp, two bands of mastering-quality EQ, and a full-featured DI input.

Designer John LaGrou's Twin Topology routing allows one-touch switching between tube and solid-state processing for the DI signal path. Mic- and line-level processing is discrete solid-state. What's more,

unbalanced DI input (instrument or speaker level) and an XLR input for balanced line-level signals. That line-in can also be used as an input for signals to be reamped; you can output from the TD-1 to a guitar amplifier for additional processing and rerecording.

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Beneath those two jacks is a pair of impedance-matching switches. Used in combination, the switches offer three impedance settings for the DI input: 470 kΩ, 2 MΩ, and 10 MΩ. Selectable impedance is most critical when connecting to passive or active pickups, but the timbre of some keyboard instruments can also be fine-tuned with those settings.

Switches for +48V phantom power, input ground lift (DI), and polarity reverse (mic, line, speaker, or DI) offer conventional channel-strip functions. The Soak switch enables the connection of a speaker-level power amp output (300W maximum) to the DI input. Beneath

that row is a continuously variable gain-control knob, with a maximum of +45 dB of gain for DI signals and +65 dB for mic signals.

Equalize It

Equalizer controls are a major part of the TD-1's user interface. Two fully independent parametric EQ bands are provided, with a bypass on each. The low frequencies are continuously adjustable between 20 and 250 Hz, while the high-frequency band covers 200 Hz to 2.5 kHz. A ×10 switch for each band produces a tenfold increase in frequency. That control

TD-1 SPECIFICATIONS

Audio Inputs	(1) ¼" TS unbalanced instrument/speaker, (1) XLR balanced line/reamp, (1) XLR balanced mic
Audio Outputs	(1) ¼" TRS balanced line, (1) XLR balanced line, (1) ¼" TS unbalanced line, (1) XLR unbalanced line, (2) ¼" TS reamp, (1) XLR balanced XFMR, (1) ¼" TRS headphone, (1) ¼" TS direct
Minimum Gain	8.5 dB
Maximum Gain	65 dB (as high as 85 dB on request)
Total Harmonic Distortion + Noise, 35 dB Gain, 10 Hz–20 kHz Bandwidth, +27 dBu Out	< .001%, Typ. < .0005% (< 5 PPM)
Maximum Input Level, Mic	+23 dBu unpadding
Maximum Input Level, Line	+23 dBu unpadding (+43 dBu with pad = 110V RMS or 300V peak to peak)
Maximum Input Level, Tube DI	+18 dBu unpadding (+25 dBu with pad = 14V RMS or 39V peak to peak)
Maximum Input Level, FET DI	+18 dBu unpadding (+26 dBu with pad = 15.5V RMS or 44V peak to peak)
Maximum Output Level, Active Balanced	+32 dBu
Maximum Output Level, Active Unbalanced	+26 dBu
Maximum Output Level, DIT-01 Transformer	Nominal mic level (3 Hz–300 kHz transformer response)
Phantom Power	+48 VDC, ±2 VDC
Equalizer Maximum Boost and Cut	±15 dB (21 step detent)
Power Requirements	100 to 240 VAC, user selectable (50–60 Hz), 40W nominal
Dimensions	8.5" (W) × 3.5" (H) × 13" (D)
Weight	15 lbs.

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allows for an upper bandwidth limit of 25 kHz for the unit and potential overlap on the two bands between 200 Hz to 2.5 kHz.

Bandwidth (or "Q") is sweepable on a knob ranging clockwise from 4.0 (narrow) to .4 (wide) on each band. The large cut and boost gain knobs for the two EQ bands have centered zero detents, as well as ten incremental steps for cut and boost over a total gain range of ± 15 dB.

Another vertical row on the panel's right side includes small LEDs to indicate output-signal overload, signal present, and AC power. Below those LEDs are switches for EQ in/out, tube or solid-state-FET

processing (Millennia's Twin Topology routing for DI), input select (instrument or line/mic), and a -20 dB pad (all inputs). Because they are relay based, the Twin Topology and primary EQ in/out switches mute the output momentarily when engaged. That can make comparing processed and unprocessed signals a bit more difficult. Individual EQ-band switches are non-muting and noiseless.

Making Connections

Around the back of the TD-1 (see Fig. 2) are an XLR microphone input, two ground-lift switches, and an AC-power switch, connector, and fuse bay. There's also an array of output connectors, including two $\frac{1}{4}$ -inch TRS reamp jacks (single-coil and humbucking pickup emulations), a $\frac{1}{4}$ -inch TS direct out (multed from the DI input), $\frac{1}{4}$ -inch TRS and XLR balanced line outs (+4 dBu), $\frac{1}{4}$ -inch TS and XLR unbalanced line outs (+4 dBu), and an XLR balanced transformer out (mic level). There is no provision for -10 dBV input/output, and there isn't an insert.

The addition of a $\frac{1}{4}$ -inch mono headphone out may qualify this unit as the world's most high-tech bedroom practice amp. A recessed screw, accessible through a small hole in the back panel, controls the headphone level. Thorough

PRODUCT SUMMARY

MILLENNIA MEDIA TD-1

channel-strip processor
\$1,675

OVERALL RATING [1 THROUGH 5]: 4.5

PROS: Superb channel-strip processing in a compact package. Twin Topology (tube or solid-state) DI with impedance switching. Millennia HV-3 mic pre-amp. Mastering-quality EQ. Reamping and other specialized features. Polarity reverse for all inputs. Heavy-duty steel chassis. Thorough manual.

CONS: Muting on primary EQ and Twin Topology switching is a distraction during A/B testing.

MANUFACTURER

Millennia Music & Media Systems
www.mil-media.com

documentation on all I/O connections and controls, as well as useful applications and other tech tips, are found in the 36-page manual.

Glowing Inside

The TD-1 has a single 12AT7 vacuum tube for the DI input. The review unit came with a NOS (new-old stock) tube—a vintage Mullard CV 4024—which costs \$30 extra.

A heavy-duty black gig bag (\$100) is offered as an option for those who want to take the TD-1 out on the town. As is, the 15-pound unit is built to survive being run over by a pickup truck (see the company Web site for proof). The custom-made bag should keep the TD-1 Recording Channel free of scratches, dust, and tire tracks.

Try It, You'll Like It

I spent an afternoon at my studio evaluating the TD-1's DI on a Fender Squier P-Bass and a custom Tele/Strat-style guitar. I compared the TD-1's FET routing with that of a Grace 101 preamp, and found that the sound from the Millennium offered superior midrange details, thicker bass response, and dramatically richer harmonics.

The TD-1's midrange reminded me of the DI in a Langevin Dual Vocal Combo. In the Solid-state mode, the TD-1 direct produced increased clarity and was generally more dynamic and pleasing on bass and guitar than the Langevin.

Using the TD-1's DI tube circuitry, I was able to produce deeper bass fundamentals and much greater high-end clarity than an all-tube Peavey VMP-1 DI. The Universal Audio 2-610 offered thick and tubey low-end response and got closer than the Peavey did to the detailed mids of the TD-1.

In all the tests using electric bass, however, the TD-1 smoked the competition by offering deeper bass, outstanding midrange detail, and a more defined and immediate presence without getting too bright or clacky. With the possible exception of the punchy and highly colored Peavey VMP-1, I can't think of another DI/preamp I'd need for bass recording. In addition, the TD-1 delivered the best direct guitar sound of anything in my racks.

For those who record a direct and an amp'd signal from the same source (as is

typically done with bass and guitar), having a polarity reverse switch available for the DI input is a big bonus.

The TD-1's impedance switching didn't have much effect on the sound of my Fender bass. On guitar (single-coil and humbucking pickups), the 10 M Ω setting was more open and airy, while at 470 k Ω there was improved bass punch. Both settings resulted in usable guitar tones, and impedance switching didn't produce any noticeable gain change.

At the 10 M Ω value, the TD-1's FET circuit seemed to offer deeper bass response, while the DI's Tube

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Topology sound was more aggressive in the upper mids. And in Tube mode the TD-1 brought out harmonics to give extra-rich presence to bass guitar. During tests I was amazed to hit a bass chord and effortlessly hear the natural decay of the harmonic series from high to low partials.

Ears on the Mix

For the next phase of testing, I used a loudspeaker playing full-spectrum mixes, miked by a Manley Cardioid Reference tube mic. Splitting the mic's output to pairs of preamps opened my ears to the qualities of the TD-1's HV-3 mic preamp.

In a phase-null comparison (a procedure used for level matching in critical listening tests), the TD-1 closely matched the audible-range frequency response of a Grace 101 preamp. The HV-3 mic pre gave more heft to kick and bass but was just as airy as the solid-state Grace. I was impressed to hear that the TD-1 electronics offered improved resolution, enhancing reverb, room sound, and low-level mix elements.

When compared against a Focusrite Red 6, which is a warm solid-state pre with a transformer-enriched low end, I found once again that bass instruments were more focused and present in complex mixes through the TD-1. The Focusrite had a hair more presence around 7 kHz; otherwise, however, it was comparable in terms of timbre.

When contrasted with the Universal Audio 2-610 (a favorite tube preamp of mine), the word that instantly came to mind when auditioning the TD-1 was "clarity." Millennia's preamp delivered a smooth and seemingly limitless high end, and mixes through the TD-1 were more dynamic across the entire frequency spectrum.

Session Tales

The TD-1 and its HV-3 mic preamp got a good workout during a soundtrack-recording session for composer and multi-instrumentalist Fred Frith. The unit coaxed thick and gorgeous tone from a delicate bamboo flute, and drew positive comments from the composer when employed as a bass DI. Paired with a Royer R-122 ribbon mic, the Millennia brought amazing presence to a violin track without ever sounding scratchy.

When used with Frith's amplified string-instrument prototype (a compact zither with guitar pickups), the TD-1's EQ was a big help in adding high-end sparkle. The muting of the audio signal when engaging the master EQ switch hindered A/B comparison. But it was easy enough to hear that some major



FIG. 2: The rear panel includes a range of outputs such as balanced and unbalanced ¼-inch and XLR jacks and a pair of ¼-inch reamp outputs for rerecording guitar parts.

EQ magic was taking place between the DI input jack and the line output.

The TD-1's EQ is wonderfully subtle and usable right out to the extremes of the bass and treble ranges. Boosts at 25 kHz are easily audible and wonderfully airy, while low-end adjustments remain transparent and free of muddiness.

As a further testimonial to Millennia's precision work, solid-state and tube DI output levels matched exactly. I was also pleased that the TD-1 worked on an unbalanced insert with my Soundcraft mixing board—something that most balanced devices will not do.

One for the Millennia

Millennia's TD-1 has already been nominated for several industry awards. And its truly superlative sonics, abundant world-class features, and indestructible build quality would enhance any operation, from well-stocked pro facilities to modest personal studios.

Discriminating DAW users in particular are advised to savor the sonic upgrade that the versatile TD-1 offers. The portable charms of its DI and HV-3 mic preamp should also appeal to gigging musicians and remote recordists.

Though the price tag is upscale, Millennia has packed this box with outstanding value. The TD-1 will stand the test of time and put smiles on the faces of those in the control room. Its Twin Topology super DI had more presence and rich definition than any other DI/preamp that I tried on bass or guitar. Additionally, the airy highs and deep resolution of the HV-3 mic preamp were equal or superior to my favorite solid-state pres. And in all applications, the EQ was a joy to use and truly deserving of the phrase "mastering quality."

With all those things going for it, readers may wonder how a gearhead like me can go on engineering without the TD-1. The fact is, I can't. The TD-1 is a keeper and receives my highest recommendation.

Myles Boisen funds his gear habit by offering recording and CD mastering services at Guerrilla Recording/ The Headless Buddha Mastering Lab in Oakland, California.

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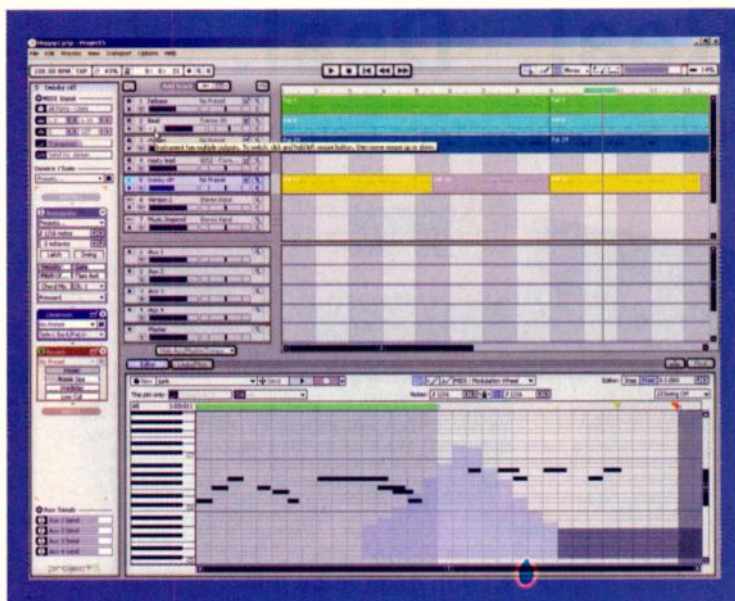
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FIG. 1: Project5's cool, clean interface keeps pop-up window clutter to a minimum. The MIDI editor is at bottom. Track parameters are in the columns at left.



CAKEWALK Project5 2.0.1 (Win)

A bold redesign with a new synth and interactive groovin'.

By Jim Aikin

Cakewalk's Project5 2.0.1 is a software update that has several improvements over the original version: the user interface has been streamlined, a great new soft synth has been added, and a new interactive feature called the GrooveMatrix has made Project5 eminently usable onstage.

Project5 2 and the 2.0.1 update installed smoothly on my 3 GHz Pentium PC, which is equipped with 1 GB of RAM and runs Windows XP Home Edition with Service Pack 2. As a minimum, Cakewalk recommends a 1.2 GHz Pentium or Athlon processor system, running

The new GrooveMatrix makes Project5 eminently usable onstage.

Windows 2000 with 512 MB of RAM and 2.5 GB of hard-disk space.

When I first launched the program, however, its audio output was very low. The installation disk's ReadMe file explained that, with some hardware interfaces, Project5 can't determine whether to send

the least or the most significant byte of each sample word first. With my M-Audio FireWire 410, the program guessed wrong. After I switched the byte order in Project5's audio preferences box, the output level was fine.

The Big Picture

At first glance, Project5 2.0.1 (see Fig. 1), looks more like a standard DAW than its predecessor did. The program includes a basic suite of built-in effects and can host VST and DX plug-in effects and instruments. Project5 can also operate as a ReWire host or client. In the release version, its MIDI tracks can play only soft synths and not external MIDI hardware synths. Cakewalk, however, provides a free MIDI-out plug-in from RGC Audio at cakewalk.com/Products/DXi/RGC.asp.

Project5 has no dedicated mixer window; you use the track parameter area to control track levels, panning, and effects. But the program does provide an arpeggiator, a Browser pane, and a generous selection of MIDI and audio instrument loops. You can save all of the settings for a track, including the soft synth and any plug-in effects, as a Device Chain preset. Device



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Compared with mature DAW software, Project5 has some limitations. While it can transmit MIDI Clock and Song Position Pointer, it doesn't transmit MIDI Time Code and can't be synchronized to external hardware. (Project5's transport synchronizes when the program is used as a ReWire client within a synced host). Project5 doesn't have a MIDI event list or a video window for scoring to picture, and doesn't offer notation editing or printout. The audio editing is limited to groove-oriented processes affecting Acidized WAV files.

In sum, Project5 borrows some of the better features of DAWs, but at heart it's still a one-stop virtual-synth workstation. Cakewalk includes Dimension and DS864 (sample playback modules), PSyn II (virtual analog synths), nPulse (an analog-style drum box), Velocity (a sample playback drum box), Cyclone (an Acidized loop player), and the Roland GrooveSynth (a GM2 sound-set player with GrooveBox sounds and basic editing tools).

GrooveMatrix

The GrooveMatrix (see Fig. 2) is a rectangular grid of cells. The horizontal rows of the grid correspond to tracks—up to 64 cells per track are allowed—and whatever is in a given row will be processed by the effects attached to that track. You can load MIDI patterns into the cells of MIDI tracks, and load audio loops or one-shot samples into the cells of audio tracks. You then can play back the audio using the mouse, or give the MIDI patterns remote control assignments. You can set cell start and stop times globally to musical values such as measures and quarter notes.

Any vertical column of cells (Cakewalk calls those grooves) can be started or stopped as a unit. You can also manually mix and match individual cells. It's even possible to have several cells from the same track playing at

the same time, though that requires control-clicking from the computer. Starting a new cell through MIDI always shuts off other cells in the same row.

FIG. 2: MIDI and audio patterns loaded into the GrooveMatrix can be triggered interactively onstage. Patterns that are playing currently are light green and display progress bars.



FIG. 3: The Dimension soft synth has four sample-playback oscillators and built-in effects. The unlabelled horizontal line at the lower right of the screen is used for keyboard scaling.

By putting the GrooveMatrix in Record mode, you can record your improvised arrangement into the linear track area. Once data is recorded into the tracks, you can choose whether any individual track will play back using the GrooveMatrix, the track data, or both. With this system you can easily set up the structure of an arrangement ahead of time, and then improvise over the top of it. The GrooveMatrix and tracks are displayed in a single window, which makes it easy to see what you're doing.

Dimension

Like many hardware workstation synths, Dimension (see Fig. 3) has a couple of global effects processors and four independent oscillators—each with its own filter, envelopes, LFOs, and other settings. For the most part the user interface is easy to understand, but even after reading the manual I had trouble figuring out how to set up Velocity modulation of an envelope; the feature is implemented, but hard to find. A few operations, such as setting envelope sustain and loop points, lack onscreen buttons and are accessed strictly by QWERTY key commands.

The voice design is surprisingly powerful. Each signal path (which Cakewalk calls an Element) includes a multimode resonant filter, overdrive, lo-fi bit crunching, 3-band EQ, five envelopes, five LFOs, and its own inline chorus-delay effect. There are 16 general-purpose MIDI modulation routings with smoothing.

The envelopes, which are hardwired to pitch, cutoff, resonance, panning, and amplitude, can have as many segments as you might need. The curvature of each segment is freely adjustable. Each envelope can loop, and each segment can be modulated individually by Velocity or MIDI key number. Those are great features, but I wish the envelopes could sync to Project5's transport for rhythmic effects. As things are, the lengths of segments are displayed in milliseconds, so you can set up rhythmic envelopes the hard way. But if you should later change the tempo of your project, you'll need to reedit the envelopes.

Dimension comes with 3 GB of samples, which are used in hundreds of presets, including 179 in the ambient and effect-oriented Dimensions folder. That's on top of 94 Synth Bases, 166 Pads, and smaller but ample lists

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in multiple instrument categories, including Real Bases, Drums, Drum Grooves, Guitars, Layers, Splits, and so on. Many of the waveforms are Velocity cross-switched, and while Dimension itself offers no editing interface for the sample zones, you can open the .sfz files in a text editor and customize the presets if you need to.

The largest Dimension preset is a 230 MB grand piano. Hidden behind the panel are hammer release and a damper-pedal-down sympathetic resonance simulator (adjustable from the mod wheel). That's pretty amazing stuff for a built-in soft synth.

Other Synths

As a basic sample playback instrument, DS864 (see Fig. 4) functions well. It has dual filters, three LFOs, and four DADHDR (delay-attack-decay-hold-decay-release) envelopes. Sample zones can be edited graphically, and key and Velocity layering of zones is allowed. While you can load WAV files to create your own presets, the data for the 49 presets is not stored in WAV format, which means there's no way to mix and match the existing sounds. The DS864 will layer up to eight presets into a composite sound, but the manual doesn't explain how to set up layers.

PSyn II, a very capable virtual analog synth, has four oscillators (with suboscillators and pulse-width modulation), five envelopes, three LFOs, and two filters. The pairs of oscillators can operate in several modes, providing ring modulation, sync, and linear and exponential FM.

The Velocity sample playback synth is specialized for playing drum sounds. It comes with a nice starter collection of individual hits, which can be installed in as many as 18 cells for playback. Sample layering is allowed, and each cell has its own resonant lowpass filter and Velocity response.

Individual slices of a WAV file can be pitched up or down, panned, and volume-shifted either within a track or within the Cyclone loop player. Cyclone offers the ability to drag individual slices forward or backward in

time relative to other slices. With that feature you can completely rearrange a sampled beat.

FIG. 4: The DS864 plug-in handles sample playback with programmable key zones.



The nPulse analog-style drum box has 12 slots for percussion sounds—each slot providing seven or eight knobs for sound control. The various slots have differing features: for instance, the snare slot has Snap and Noise knobs, while the bass drum slots have drive and modulation knobs. Although limited, nPulse is a nice source for electro percussion.

Automation

You can automate plug-in parameters at the track level and within individual patterns. At the track level, you record automation by clicking-and-dragging a graphic slider in the track parameter area. There are only eight sliders per soft synth and four per effect, but that is not a limitation. Any of the parameters that the synth or effect makes available for automation can be assigned to a slider, and after recording one parameter, you can reassign the slider without losing the automation you just recorded.

You can record automation data into individual patterns. The data will loop when the pattern loops. That type of data can also be used for automating parameters either at the track level or within patterns, as long as the soft synth can respond to MIDI Control Change data.

You can edit automation data graphically with a pencil tool. You draw straight lines by holding down the shift key while dragging the tool. The main limitation of controller-data editing in Project5 is that only one "lane" of data can be displayed at a time within a given track or pattern.

MIDI Recording and Editing

I use MIDI rather than sampled loops for a lot of my music, so I'm picky when it comes to MIDI editing. While Project5's piano-roll edit window handles the basic necessities, I was less satisfied with the MIDI features than with any other aspect of the software.

Dragging notes around works as expected, and you can edit velocities and controller data with a pencil tool. Quantization to basic values is supported, and there's also a groove quantize function, though the latter is crippled by the fact that you can't define new grooves unless you own Cakewalk Sonar. Project5 supports swing/shuffle quantizing, but the swing percentage has to be the same for all patterns that use swing.

When overdubbing a MIDI track in an area where a pattern is already playing, you can either overdub into an existing pattern in the piano-roll window, or you can record into the track. With overdubbing into the piano-roll window, however, you don't get to hear the rest of the arrangement, because the pattern is soloed. Recording into the track always creates a new pattern overlaying the old one, and an extra step is required to combine the two into a single new pattern. After that, the original patterns will still clutter up the Not In Use list in the Browser. Allowing overdubbing into MIDI patterns at the track level would be much better.

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In the 2.0.1 release, Project5 MIDI patterns can't be exported as Standard MIDI Files. They're exported as .PTN files, which are readable by Sonar and Kinetic (both Cakewalk products) but not by Steinberg Cubase, Mackie Tracktion, or Ableton Live.

Browser

Project5's Browser pane has three views: Browse, Explore, and In Project. The Browse view gives you a categorized list of the content in the Patterns folder (which lives in the Project5 2 folder on your hard drive). By customizing the contents of that folder, you can put what-

ever you'd like in the Browse display. Unfortunately, however, the Browser will ignore shortcuts/aliases to folders elsewhere in the system. The Explore display provides a conventional Windows Explorer-type interface, with which you can grab anything on the hard drive. Naturally, items you click on in the browser will be played back at the current tempo and using the settings of the currently selected track.

The In Project view displays a list of the patterns being used in this project and another list of the patterns that have been loaded but that haven't been assigned to tracks. If you've tried out a number of audio patterns, visit the list of Not in Use patterns from time to time and delete them. That's because Project5 stores all of the audio in the project (except audio files recorded to and streamed from disk) as part of the song file—even audio clips that are not currently in use. Storing everything in the song file is good, but song files with a lot of unused loops can easily get large.

Included Audio Effects

Project5's suite of effects includes standard reverb, delay, chorus, EQ, compression, and bit crunching. There's no distortion (an odd omission), but a mod filter with its own LFO and envelope follower is included.

The Spectral Transformer effect, however, definitely isn't standard issue. It has four slots into which exotic processes with names like Accumulate, Trace, Exaggerate, VOC-Transp, and Band Shift can be loaded. Five LFOs are available to modulate process

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PRODUCT SUMMARY

CAKEWALK Project5 2.0.1

virtual-synth studio workstation
\$429

OVERALL RATING (1 THROUGH 5): 4

PROS: Excellent synthesizers. Interactive loop triggering for live performance. Easy to use. Starter library of MIDI and audio loops.

CONS: No user-editable groove quantizing. Doesn't export Standard MIDI Files. Marginal documentation.

MANUFACTURER

Cakewalk
www.cakewalk.com

parameters. The results range from metallic sweeps and subtle changes in formants to rich gargling feedback.

Spectral Transformer uses a phase vocoder to perform analysis of the incoming waveform. As a result, it always imposes some latency on the output. If you're using Spectral Transformer to process drums or any other material that needs rhythmic precision, you'll want to render the output as an audio file, import it into an audio track, and then slide the audio data forward to bring it back into the groove.

MFX and Arpeggiator

Every MIDI track in Project5 has its own arpeggiator, and dozens of preset patterns are included. You can create your own by saving a MIDI pattern as a .ptn file, after which the arpeggiator can load it. The shapes with which pattern data is mapped onto notes (such as Inward Circle and Forward Circle Inclusive) sound intriguing, but they aren't explained in the manual.

The MFX (MIDI effects) area includes options like echo, data filtering, and Velocity processing. More interesting is Synchron 32, a cute polyphonic step sequencer. It stores 32 patterns, each with up to 32 steps. Synchron patterns are gated by MIDI notes in the track belonging to whatever instrument Synchron is playing.

With 5, You Get Egg Roll

In general, Project5 proved stable and bug-free. I ran into a problem with stuck notes when using the Camel Audio Cameleon 5000 synth, and had a couple of crashes. When playing the Project5 synths under ReWire with Cubase SX3 as the host, I encountered some timing instabilities, which Cakewalk confirmed. Project5 comes with a 90-page booklet that offers scant information on programming the synths. The built-in Help documentation could use more graphics and more-thorough explanations of complex procedures.

Nonetheless, Project5 is an attractive package with great features. The included synthesizers and effects are excellent. ReWire and plug-in support are well implemented, and the live-performance possibilities with GrooveMatrix are quite respectable. Project5 doesn't go as deep in certain areas as other programs, but it gives you the more relevant features of several different programs in one integrated, easy-to-use application.

Jim Aikin writes regularly for EM and other publications. His two most recent books are Power Tools for Synthesizer Programming (Backbeat Music Essentials, 2004) and A Player's Guide to Chords & Harmony: Music Theory for Real-World Musicians (Backbeat Music Essentials, 2004).

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FIG. 1: The Black Box combines a USB recording interface with an AdrenaLinn-inspired guitar-modeling and sequenced-effects processor, as well as a drum machine.

M-AUDIO Black Box

A guitar processor, drum machine, and USB audio interface . By Orren Merton

Although the Black Box is a brand-new product, it has an established pedigree. M-Audio teamed up with Roger Linn of Roger Linn Design—famous for designing Akai’s MPC MIDI-production centers in the 1980s and subsequently his own AdrenaLinn and AdrenaLinn II beat-sequenced guitar processors—to design this new device.

The combination of Linn’s experience (and algorithms) from the AdrenaLinn series and M-Audio’s considerable expertise with USB audio interfaces was fruitful. It resulted in a distinctive product that’s part guitar processor and part USB audio interface. In my opinion, it provides more for the recording guitarist than anything previously released by either developer.

New Jack City

The Black Box is a tabletop unit that gives you the connectivity you need to record guitar and vocals (see Fig. 1). The front of the unit sports a mono, unbalanced ¼-inch guitar input and a stereo ¼-inch headphone output.

A pair of stereo TRS ¼-inch balanced outputs and an XLR microphone input reside on the rear panel of the unit. The functionality of the latter is limited. Although the 40 dB of gain that it provides is enough

to power a dynamic mic on a loud source such as vocals, it may not be enough for acoustic-instrument sources. The mic input has no phantom power, which means that if you want to use a condenser mic, it will need to have its own power supply.

You also get an RCA jack for S/PDIF output. Because the Black Box has no S/PDIF or word-clock input, it must be the clock master when used with other digital audio devices. Additionally, the rear panel has three mono, unbalanced ¼-inch inputs for expression and momentary pedals (see the sidebar “Three on the Floor”).

All of the unit’s ¼-inch jacks are bolted securely to the chassis, which helps make the Black Box one of the most solidly constructed M-Audio products that I’ve seen. The unit comes with a USB connector and an input for the included 9V, 1A power adapter. The Black Box cannot be bus powered.

On the Button

The user interface is composed of buttons, knobs, and an LCD display. Two vertical rows of five buttons are located on the left side. The left-most row contains a Tap Tempo button and two sets of Up-Down buttons; one for selecting between the 99 drum rhythms, and one for choosing from among the 99 presets. The next row features Amp, FX, Delay, and Utility parameter buttons, and the Stop/Start button for the internal drum machine.

The backlit LCD screen takes up most of the Black Box's top panel. It gives users a clear readout of the name of the preset; the currently selected processing block; whether the effects, delay, or the drum machine are active; and which parameters the four knobs beneath the LCD will adjust. Level-adjust knobs for the mic input, the monitor mix between the input signal and the playback signal, the output level, and the guitar-input signal are on the right side of the screen.

What's Inside

Using the Black Box couldn't be easier. Just plug your guitar in and start playing. You can monitor yourself through the headphone jack, the speaker outputs, or through your computer monitors if you're using the USB connection. The guitar-processing section features goodies that are similar to the AdrenaLinn II, including amp models, effects, filters, sequenced filters and arpeggiators, and drum rhythms. There are lots of those to choose from, but you get only about half as many amp models and less effects than are in the AdrenaLinn II.

THREE ON THE FLOOR

At press time, M-Audio disclosed that it is releasing a dedicated foot-control unit for the Black Box, the Black Box Pedal Board (\$59.95). The announcement came too late for it to be included in the testing for this review. The unit is scheduled to be released well before this issue hits the stands.

The board (see Fig. A) features a metal chassis, two momentary switches, an expression pedal, and a cable snake for connection to the Black Box. The switches control functions such as turning the tuner or the effects on and off and starting and stopping the drum machine. The expression pedal can control functions such as wah and delay volume.



FIG. A: The optional Black Box Pedal Board adds an expression pedal and two momentary switches to the unit.

The Black Box gives you single-channel models of 12 amplifiers. The usual suspects are all represented, such as Fender Blackface, Marshall Plexi, Vox AC30TB, and Mesa/Boogie Dual Rectifier. You also get some less-common classic amps (Hiwatt and Mesa/Boogie Maverick) and boutique amps (Soldano SLO and Bogner Uberschall).

You can adjust only three parameters for each model: drive, bass, and treble. That is quite limited compared with other guitar-interface modelers such as the Line 6 Guitar Port. The Black Box's parameters, however, can be adjusted by turning knobs on the unit itself, rather than having to make adjustments on the screen of a connected computer (as with Guitar Port).

To my ear, none of the Black Box's amp models were totally convincing. Nevertheless, many of them are usable. The Soldano SLO model, for example, sounds nothing like the lead channel of my SLO, but I could still get a gritty, enjoyable tone from it. The parameters all are adjustable between 1 and 99. If you want, you can easily tweak a conventional amp tone into digital burping and "motorboating" (self-oscillating distortion), which is sure to please fans of industrial-metal music.

Effects Box

The Black Box has 43 effects to choose from, including various tremolos, filters, flangers, choruses, autowahs, and more.

BLACK BOX SPECIFICATIONS

Analog Inputs	(1) ¼-inch TS instrument, (1) XLR mic
Analog Outputs	(2) ¼-inch TRS output, (1) ¼-inch stereo headphone
Digital I/O	USB, S/PDIF (output only)
Sampling Rate	44.1 kHz
Input Gain	40 dB (mic input), 30 dB (instrument input)
Output Gain	+14 dBu (analog outputs)
Signal-to-Noise Ratio	-98 dB (A-weighted)
Dynamic Range	98 dB (A-weighted)
THD + N	.0049% (XLR input), .003% (instrument input)
Frequency Response	±0.5 dB, 20 Hz to 20 kHz (XLR input); ±0.3 dB, 20 Hz to 20 kHz (instrument input)
Crosstalk	-100 dB
Dimensions	9.84" (W) × 1.88" (H) × 6.69" (D)
Weight	3.54 lbs.

As with the AdrenaLinn units, it's the sequenced filter and arpeggiator effects that really stand out. Those go far beyond the normal guitar effects and allow you to create exciting modulations, pulsating rhythms, evolving melodies, and spacey soundscapes (see **Web Clip 1**).

My favorite use of the Black Box was to produce beat-synced effects. I'd pull up a guitar sound that I liked, find a sequenced arpeggiator or filter effect that complemented the rhythm I wanted to play, and then let the effect inspire my creativity. Although the Black Box doesn't let you program

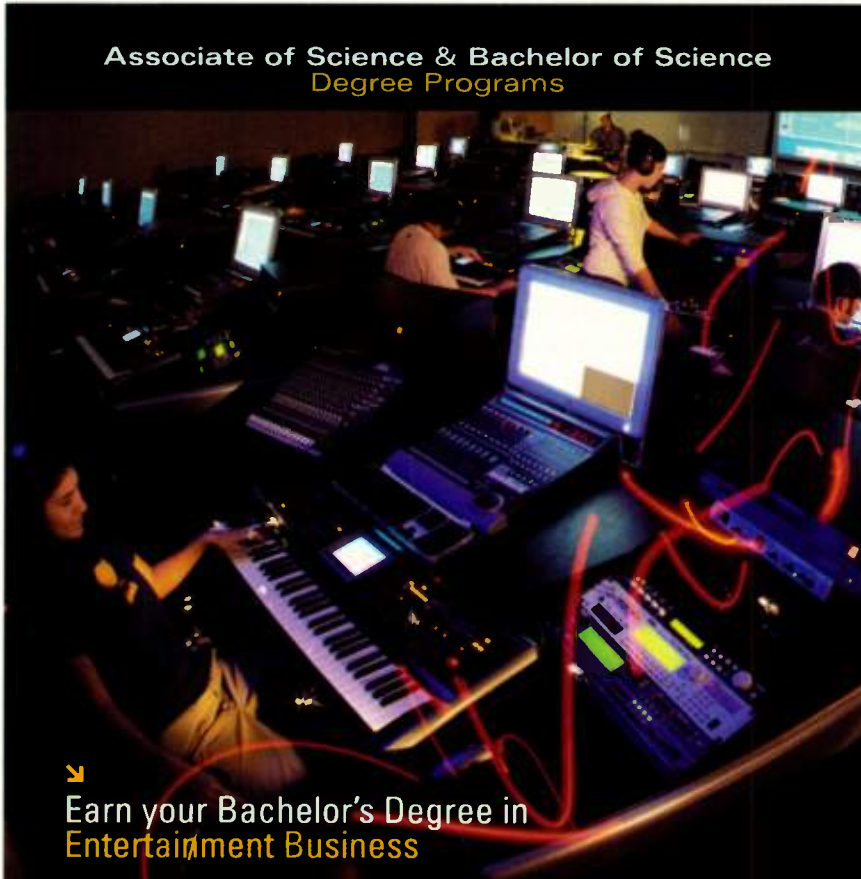
your own sequences like the AdrenaLinn II does, it has enough of them to keep a creative user busy for quite a while.

Like the amp models, you can adjust only three effects parameters: Speed (or frequency, depending on the effect), FX Depth (or key, depending on the effect) and FX Wet-Dry (mix). Although you have plenty of sequenced filters, arpeggiators, and modulation effects to choose from, the Black Box does not offer a reverb effect, which I missed. Like the AdrenaLinn II, the Black Box lets you access only one of its effects in addition to the delay in a given preset.

The Black Box's beat-sequenced effects and dedicated delay effect can be synced to the tempo of host software, to MIDI clock (if controlled through its USB drivers), or to the user-adjustable tempo of the internal drum machine. (Even if you choose to turn the drum sounds off, the effects will stay synced to the selected tempo.) You can control the delay time, the repeats, the volume, and the amount of drum machine signal that goes to the delay or the input signal. The delay is very clean and usable, and sounds good when used with the guitar signal and the drum machine (for more tripped-out rhythms).

The drum machine has a solid sound and 99 preset patterns, which can't be edited. Luckily, the presets cover a wide

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PRODUCT SUMMARY

M-AUDIO Black Box

guitar processor and USB audio interface
\$329.95

OVERALL RATING (1 THROUGH 5): 3.5

PROS: Affordable. Good sound quality. Excellent sequenced effects. Useful drum module. USB class compliant for basic functionality. XLR input. Solid construction. Ableton Live Lite 4 GTR included.

CONS: Few adjustable parameters. Only one effect at a time. No sequence programming. No reverb. Can't process XLR through effects without USB connection to computer. No phantom power.

MANUFACTURER

M Audio
www.m-audio.com

variety of styles and patterns, from four-on-the-floor rock and techno to more exotic styles and odd time signatures.

Safe Driver

As you would expect from M-Audio, the Black Box can be used as a USB recording device and as an audio interface. It's a class-compliant USB device, so connecting a USB cable to your computer and the Black Box instantly gives you recording and playback capability, even before you install any drivers. True to form, when I plugged the Black Box into either my Mac or my PC, it was immediately recognized and selectable as an audio-input source.

If you install the included drivers, you will gain MIDI sync capability, access to the dry guitar signal, and access to the XLR input. You will also gain the ability to update the Black Box through USB, download presets from M-Audio's Black Box Tone Room (www.blackboxtoneroom.com), and process the XLR signal through the Black Box. It is unfortunate that the unit has to be hooked up to a computer to set the effects to process the XLR input. I would love to be able to use the unit live as a sequenced filter for vocals.

Ready, Willing, and Ableton

The Black Box ships with Ableton Live Lite 4 GTR. Although its feature set is stripped down from the full version of Live—it's not capable of MIDI remote-key operation and is limited to four audio and two MIDI tracks—it can record unlimited numbers of clips per track and has Live's other innovative and unique features. M-Audio also throws in 160 MB of Pro Sessions drum loops to use with Live Lite 4 GTR. Black Box owners can upgrade to a full version of Ableton Live if they choose. The Black Box comes with drivers for ASIO II, WDM, and Core Audio, making it compatible with all popular DAW software.

Overall I was impressed with the Black Box. With its roots in the unique AdrenaLinn processor and M-Audio's affordable USB audio interfaces, the unit should appeal to guitarists who are looking for a simple yet fully capable guitar- and vocal-recording station and processor that doesn't break the bank. This device won't be everything to everyone, but it offers a lot of value for a reasonable price.



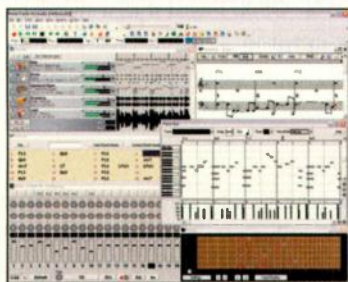
Orren Merton is the author of *Logic Pro 7 Power!* (Course Technology, 2004) and co-author of *Logic 7 Ignite!* (Course Technology, 2005).

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Electronic Musician



FIG. 1: GT Player offers guitarists plenty of options for processing live guitar, for playing live ReWire and audio-file accompaniment, and for making use of MIDI control.



DSOUND GT Player 2.5.4 (Mac/Win)

A virtual-effects rack for guitarists gets new features.

By Orren Merton

DSound's GT Player began as a standalone host for a built-in set of guitar-oriented plug-ins that had been modeled on classic stompbox effects. The most recent version, GT Player 2.5.4, demonstrates that DSound has kept pace with guitarists' live-performance needs. The program has been completely updated to handle many duties that a modern guitarist might want, with new features that make it more useful than ever.

GT Player has grown into a standalone host for most VST instruments and effects. It furnishes a Track

Player for playing back audio files and recording performances, and a ReWire Player for controlling ReWire-compatible applications (see Fig. 1). You can even use GT Player as a VST plug-in within another VST host application.

GT Player is compatible with Windows XP and with Mac OS X 10.2 and above. It supports ASIO in Windows and Core Audio in Mac OS X. I used it as a standalone and as a VST plug-in within Ableton Live 4.0.4 on a Power Mac G5/dual 2 GHz running Mac OS X 10.3.9. I also tested it using Live as a ReWire slave.

The Desired Effect

Because GT Player is first and foremost a VST effects host, I'll start by describing its plug-in-hosting abilities. Its main effects window (appropriately named the Effects Unit) looks like a rackmounted effects processor, and it operates in one of two modes. In

Program mode, you can load, save, and create presets that encompass numerous plug-ins and their routings. In Effect mode, you can browse through each plug-in's parameters using a small LCD-

style display on the rack front. Effect mode can be tedious, but it comes in handy when selecting parameters for assigning MIDI control.

To access GT Player's effects-hosting capability, click on the Effects Unit's Edit button (like most

GT Player takes full advantage of all the data that your MIDI guitar can send.

Player for playing back audio files and recording performances, and a ReWire Player for controlling ReWire-compatible applications (see Fig. 1). You can even use GT Player as a VST plug-in within another VST host application.

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everything in GT Player, the Edit Program window is also accessible by using a key command). The Edit Program window offers three chains containing insert slots for eight plug-ins (see Fig. 2). You can configure Chain A and Chain B in parallel, with one affecting the left input and the other affecting the right. You can also configure them to apply effects to the same input (either right, left, or stereo inputs), and you can mute and solo them separately. Any effects that you place in Chain C will be applied to Chain A and Chain B, and Chain C cannot be soloed or muted.

Use the pull-down menu in one of the insert slots to instantiate effects, and then select a plug-in from any of your available VST folders. Each effects slot has buttons to open its respective plug-in's graphical user interface (GUI) and to solo or bypass the plug-in. Two buttons let you remove all effects either for the entire program or for each chain, and open the GUIs for all the plug-ins in each chain. The effects plug-ins open connected to each other in tiles toward the bottom of the monitor. The setup looks great alongside DSound's own stompbox effects, but it gets awkward if any of your plug-ins have large GUIs. The Program Editor window in the Mac version includes buttons to transfer plug-ins to the OS X Dock.

Unfortunately, GT Player has no way for you to rearrange effects within programs other than to deinstantiate and reinstantiate the plug-ins in different slots. Although DSound flawlessly hosts its own stompboxes, I had trouble with some of the third-party plug-ins I tried. When I tested several overdrive and amp-simulator effects, Nomad Factory's Blue Tube Driver and

FIG. 2: GT Player's Edit Program window lets you set up a chain of VST effects and instruments.

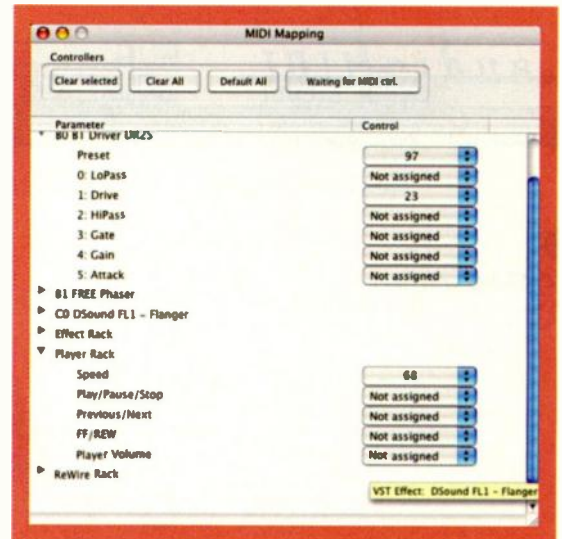
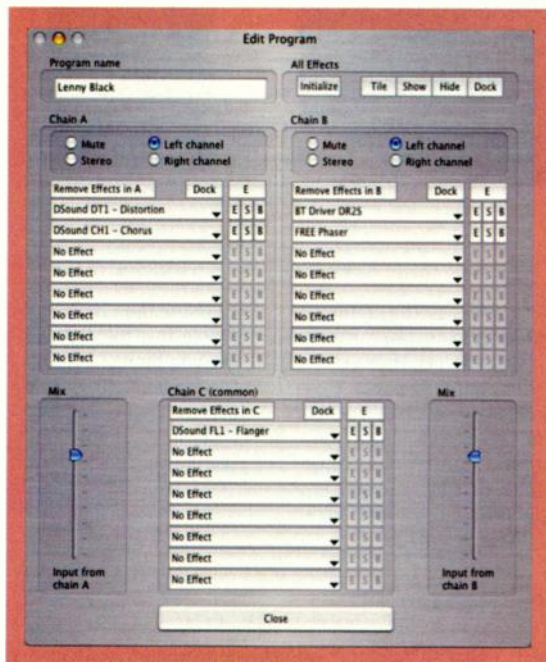


FIG. 3: GT Player furnishes extensive MIDI control of plug-in parameters and rack-unit controls.

Rock Amp Legends plug-ins worked fine. I was able to play and change presets in Native Instrument's Guitar Rig, but I could not use nor even click on its GUI. IK Multimedia's AmpliTube 1.2.0 crashed GT Player every time.

On Track

GT Player's Track Player module lets you create a playlist of audio files that will accompany your live performance. You can play back an entire playlist one track at a time or loop playback within a single song. You can also repeat a single track or all tracks. In addition to normal transport controls, Track Player has a Speed dial for time stretching.

Track Player provides a recorder for recording your own performance along with the audio files you play back. In addition, it will record any ReWire slave being controlled by GT Player's ReWire Player (see Web Clip 1). Though you can set the record path, you cannot change the name of the audio files that ReWire Player records.

The Mac version of GT Player plays all media types supported by QuickTime (WAV, AIFF, MP3, AAC, and so on). It also supports user-definable crossfades between tracks. The Windows version supports playback of only mono or stereo WAV files.

To help you learn songs and riffs, GT Player's Speed knob increases or decreases an audio file's playback rate without altering its pitch. To achieve that task, the program requires QuickTime 7 to make use of its excellent time-stretching algorithms.

Wired Up

If you have ReWire and one or more ReWire-savvy applications installed, you can use ReWire Player to control a ReWire device. You can use GT Player as a ReWire Master that controls another program's

transport functions and playback tempo, mixing the ReWire device's stereo audio signal with its own output. You can move the ReWire device's locator position using the ReWire Player's shuttle wheel. ReWire Player also allows you to set loop points for ReWire applications.

Controlling ReWire applications worked as advertised, but it took a heavy toll on the CPU. With a playlist and an effects program in GT Player that came nowhere near taxing my Power Mac G5, GT Player inevitably glitched and sporadically reported a CPU overload whenever I launched Ableton Live 4.0.4 to play what should have been an undemanding song with no effects. Turning off ReWire immediately cured the problem.

Got MIDI?

GT Player 2.5.4 offers flexible MIDI support. You can control any effects parameter, as well as the controls and program selection for GT Player's own rack unit using any external MIDI controller that can send continuous-controller information. You can either scroll through effects parameters in the Effects Unit Edit mode or use the MIDI Mapping window (see Fig. 3). You can also select a MIDI channel for the control messages.

If you're a guitarist with a guitar-to-MIDI converter that allows you to

send continuous controller messages, GT Player takes full advantage of all the audio and MIDI data that your guitar can send. You can process your guitar audio through amp-modeling VST plug-ins, DSound stompbox plug-ins, and other effects. GT Sound's VST support lets you trigger software synthesizers and control effects parameters or rack-unit controls with MIDI continuous controller messages.

Plugged In

You can use GT Player 2.5.4 as an effects plug-in within a VST-compatible host application. I had initially hoped that that would mean I could use GT Player as a fully functional VST matrix, similar to the now-discontinued TC Works Spark FX Machine. Unfortunately, though, GT Player is limited as a VST effect. It can play back its own DSound Stomp Box plug-ins, but it can't play any third-party plug-ins. Although you can control the plug-in using MIDI Control Change messages, you cannot reassign any MIDI controllers from within the plug-in. There's no support for MIDI, audio, or help tags unless it's provided by your host program. What's more, GT Player's keyboard shortcuts do not work in the plug-in version. DSound has said that an Audio Units version is currently being tested and may be available by the time you read this.

Even though GT Player 2.5.4 has me excited about its future, it needs some fine-tuning in order to become a guitarist's dream. I found GT Player stable (other than the aforementioned AmpliTube crashes), but its VST support is touch-and-go. Its recording facility works well, but it doesn't let you name your files. Its ReWire support is a welcome touch, but it is processor-heavy. The GT Player VST plug-in, though useful for creating chains of DSound effects, is far more limited than it could be. GT Player 2.5.4 has more going for it than against it, however, and when these shortcomings are addressed, this application will be an **EMWEB CLIPS** all-around winner.

Orren Merton is the coauthor of Logic 7 Ignite! (Thomson Course Technology, 2005) and author of Logic Pro 7 Power! (Thomson Course Technology, 2004).

PRODUCT SUMMARY

DSOUND GT Player 2.5.4

virtual effects rack
\$119

OVERALL RATING (1 THROUGH 5): 3

PROS: Supports VST effects and instruments. Play back audio files while performing. Simultaneously records performances and file playback. Can be used as a ReWire master. Excellent MIDI support.

CONS: Incompatible with some VST plug-ins. Cannot rearrange effects. ReWire control is processor-heavy. VST plug-in version is limited.

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I certify that all information furnished on this form is true and complete. Signature and title of Editor, Publisher, Business Manager.

FIG. 1: The GuitarPort USB interface is the lone hardware component in the GuitarPort RiffTracker bundle. All user-interface functions, except for setting input volume, are handled in software.



LINE 6 GuitarPort RiffTracker

Combining hardware and software for recording guitarists.

By Orren Merton

Line 6 has made some recent improvements to its GuitarPort USB audio interface. First, the company upgraded the unit's software, which serves as its operating system and control interface. The software is also where the GuitarPort's amp, cab, and effects-model data resides. The software (now at version 2.5) features a revamped model set, along with several other improvements.

In addition, Line 6 introduced the GuitarPort RiffTracker bundle, which includes Sonoma Wire Works RiffWorks recording software that was developed specifically for the GuitarPort. Although the bundle costs more than the GuitarPort alone, it gives you integrated recording capabilities (including built-in drum tracks) to go along with the modeling, effects, and USB I/O capabilities of the GuitarPort.

In Port

The GuitarPort fits into Line 6's product line somewhere between the software approach of its Amp Farm plug-in and the hardware approach of its Pod

series of processors or its various lines of modeling guitar amps. Once you've installed GuitarPort's software on your PC, the unit allows you to input your guitar signal to your computer, where it's processed through the amp model, cabinet model, and effects that you have selected in the onscreen interface. You then have the option of routing the processed signal to a recording application (using ASIO, Direct Sound, or MME drivers) or listening to its output as it comes back through the software and the interface's D/A converters.

Although GuitarPort's software has changed significantly, its hardware is the same as it was when EM first reviewed it in the November 2002 issue (available at www.emusician.com). It has a single ¼-inch guitar input, and a USB cable is provided to connect the unit to a PC (GuitarPort doesn't support the Mac) running Windows 2000 or higher. The 32-bit floating-point DSP processing is all done in the computer.

The top of the unit features a volume knob for setting the guitar level and the overall volume (see Fig. 1). The back houses a USB port, RCA speaker jacks, an ¼-inch headphone output, and another

1/8-inch output for connecting to a multimedia sound card. The GuitarPort is USB powered.

Rock Out

A central feature of the GuitarPort 2.5 software update is its new DSP set, culled from Line 6's PodXT. Users can choose from among 16 amplifier models, 24 speaker-cabinet models, and 24 classic stompbox and hardware-effects models. GuitarPort installs with more than 100 guitar-sound presets featuring emulations of classic sounds from various genres and guitarists. If you want more sonic options, you can purchase additional Model Packs (prices range from \$49.95 to \$99.98). If you install all the Model Packs, you'll have all the same amp and effects selections as in Line 6's Vetta II amp.

The GuitarPort software's user interface is intuitive, giving you quick access to graphic editors for each amplifier and effects model. Line 6's software designers gave the individual models distinctive faceplates, which makes them easy to distinguish from each other at a glance. Once you've tweaked a preset to your liking, you can save it.

The software offers stereo-signal meters and a Hum Reducer feature. The latter is basically a "denoise" algorithm designed to learn your guitar's pickup noise, and then remove it from the signal. With the hum-free Seymour Duncan pickups in my Patrick Eggle Berlin Pro V or the quiet FilterTrons of my Gretch Duo Jet, I didn't notice much difference when using the Hum Reducer. Perhaps the results would have been more noticeable on a guitar that has noisy single-coil pickups. (According to Line 6, the Hum Reducer was designed into the GuitarPort



FIG. 3: The bundled RiffWorks application integrates with the GuitarPort's software to allow users to quickly build up a song by recording Riffs.

when CRT monitors, which cause more hum than flat-panel displays, were more prevalent.)

The sound quality of the models is very good. It's equivalent to what you'd get from a PodXT. I particularly liked the Plexi and Brit J-800 amp models, which have a recognizable and dynamic Marshall-like feel. I was less convinced by the sound of the Fender and Vox models.

My favorite models were the Line 6 originals: Spinal Puppet, Chemical X, and Treadplate, which have their own distinctive sounds. My preferred cabinet models were the 4 x 12s, which I liked more than the models of smaller enclosures. Like other modelers I've reviewed, I got the best results by adjusting the presets to my specific guitars and playing technique, or by starting from scratch.

Turn It Online

Perhaps the most engaging feature of the GuitarPort is GuitarPort Online, which is a Web-based collection of lessons, songs for download, GuitarPort presets, scale- and chord-generator tools, user forums, and more. Provided that you have an open Internet connection, it can be accessed from inside the GuitarPort software (see Fig. 2). You can download guitar lessons or search through artist lessons to learn the techniques of your favorite guitarists. You can download full versions of popular songs, versions without the guitar, and versions without the guitar solo.

The GuitarPort Online interface includes a fully functional WAV and MP3 player that not only plays a track, but also allows you to view tablature or lesson information while playing along. You can even select a part to loop continuously while you practice. The audio player can play back a song at half speed without changing the pitch. Although the time compression adds some artifacts to the sound, it's still acceptable for practice purposes. GuitarPort 2.5's new built-in metronome helps you keep in time when playing along with lessons or jamming with downloaded tracks.

I was impressed with GuitarPort Online. It offers the novice guitarist lots of great information and lessons, and some of the downloadable presets are quite good.



FIG. 2: GuitarPort Online is accessed directly from the GuitarPort software.

The bad news is that Line 6 charges a \$7.99 per month subscription fee to use GuitarPort Online. (You get a one-month free trial when you first sign up.) According to Line 6, this fee is necessary to defray the costs of licensing the many copyrighted popular and classic songs that are posted on the site. The company reports that jamming along with those songs is the most popular feature of GuitarPort Online.

Straight to Disk

The GuitarPort application itself doesn't include any recording facilities. The ASIO drivers provided with it, however, are useful for routing its output into other Windows audio applications.

Another option is to plug in the included 1/8-inch cable between the GuitarPort's output and your multimedia sound card's input. Such a setup allows the GuitarPort to function like a PodXT or other outboard processor. It also lets you use the speakers that are already plugged into your sound card for your system sound.

It was convenient for me to feed my multimedia speakers directly from the GuitarPort's output. In that scenario, I configured GuitarPort as the only ASIO device with all the audio from my PC running through it.

PRODUCT SUMMARY

LINE 6 GuitarPort RiffTracker

soft sample player
\$995

OVERALL RATING (1 THROUGH 5): 3.5

PROS: Plug-and-play USB device. Good sound quality. Optional model packs available. Direct integration between GuitarPort and REX player in RiffWorks software. ReWire player in RiffWorks. GuitarPort Online offers many features.

CONS: Mono input only. Not all models convincing. No access to GuitarPort control panel in ASIO applications. No third-party plug-in support for RiffWorks. GuitarPort Online has a subscription fee.

MANUFACTURER

Line 6
www.line6.com

GUITARPORT SPECIFICATIONS

Analog Inputs	(1) 1/4" TS; (1) 1/8" stereo minijack (for multimedia soundcard)
Analog Outputs	(2) RCA unbalanced (L/R); (1) 1/8" stereo headphone
Other I/O	USB 1.01 port
Bit Rate	16-bit or 24-bit
Sampling Rate	44.1 kHz or 48 kHz
Frequency Response	20 Hz–20 kHz (±1dB)
Signal-to-Noise Ratio	103 dB
Included Software	GuitarPort application, RiffWorks application, supporting video tutorials
Dimensions	5.5" (W) × 1.0" (H) × 5.5" (D)
Weight	1.44 lbs.

The RiffWorks interface has three main sections, but the one you'll use the most is the Riff Recorder. It looks like a rack unit with transport buttons, master pan, gain, and meters. You can set the count-in, tempo, length, and time signature before recording. You can also open the GuitarPort control panel from inside the Riff Recorder to adjust your guitar sound.

You can record multiple passes of a Riff, and each is saved as a separate Layer. Layers can be individually named, and you can adjust their panning, gain, effects, solo, or mute status. You can duplicate Layers and delete unwanted ones. If you have more Layers than will fit on the screen at once, RiffWorks includes a scroll wheel for easy navigation.

The effects section in RiffWorks lets you add as many as seven built-in effects to each Layer, and you can add master effects to the entire Riff. You can't change the order of the effects, nor can you use any third-party DX or VST effects. The included RiffWorks effects were clean sounding but bland.

Just Add Water

RiffWorks also includes a percussion feature called InstantDrummer, which lets you add prerecorded audio drum tracks (provided by Drums on Demand) to your song. It gives you knobs to adjust the intensity, ambience, and gain of the tracks, and a knob for randomly introducing variations. That feature was fun to play with and useful for breaking up a mechanical-sounding drum pattern.

You can't create your own patterns for InstantDrummer, but it comes with a healthy selection. You can purchase Add-On InstantDrummer Sessions, which consist of additional patterns from Drums on Demand's

Working the Riffs

Presumably, purchasers of the GuitarPort RiffTracker bundle will primarily use the RiffWorks software (see Fig. 3) for their recording. RiffWorks is an intuitive and effective application that integrates nicely with the GuitarPort's software. It allows you to construct songs by recording Riffs and arranging them in a timeline. The only audio-input device that RiffWorks recognizes is the GuitarPort, however, which limits its usefulness as a general-purpose recording application. On the positive side, it requires no additional driver installation.

premium drum libraries, for \$9.99 in the Line 6 Online Store.

If you want to add your own beats to a recording, RiffWorks has a simple REX2 Player that allows you to load as many as four REX files, each with independently adjustable gain and pan controls. There is also a ReWire Player that lets a maximum of four ReWire-compatible applications slave to RiffWorks. RiffWorks has an independent gain control and stereo meters for each ReWire channel.

In the Mix

RiffWorks's Song section lets you organize your Riffs into a finished composition by placing them in a timeline. The controls in that section let you open, save, and create new songs.

When your song is ready, you can press the Mix button to bounce it down as a stereo WAV or Ogg Vorbis file. (Ogg Vorbis is a free compression scheme akin to MP3.) You can bounce an entire song down into a single Riff, which can be reloaded into the Riff List and used as part of another song.

RiffWorks has no printed or electronic manual. Nevertheless, after watching the Line 6 video tutorials (available from the Line 6 site and linked through the RiffWorks help section), I was able to quickly record

a song consisting of five Riffs with multiple Layers, effects, and an InstantDrummer drum accompaniment (see Web Clip 1).

Into the Red

Taken for what it is—an amazingly affordable guitar interface with full modeling capability and bundled recording software—GuitarPort RiffTracker is a great value. You get PodXT-equivalent sound quality and a plug-and-play mono audio interface for any Windows-equipped PC.

The bundled RiffWorks software is an intuitive, simple, pattern-based recording program that will get beginners up and running quickly. Serious recordists will eventually want to advance to a more fully featured recording application, so it's unfortunate that you cannot open the GuitarPort control panel from inside other applications besides RiffWorks. I also like GuitarPort Online and the community that it offers, although I wish it weren't a fee-based service.

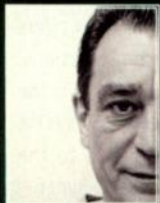
Overall, the GuitarPort RiffTracker bundle is an attractive one, especially for a novice looking for an easy way to record realistic guitar tones.



Orren Merton is the author of Logic Pro 7 Power! (Muska & Lipman, 2004), GarageBand Ignite! (Muska & Lipman, 2004), and Logic 7 Ignite! (Muska & Lipman, 2005).

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HARTMANN

Neuron VS 1.0 (Mac/Win)

By Geary Yelton

In 2003, Hartmann Music introduced the Neuron, a \$4,995 keyboard synthesizer that took a unique approach to creating sounds. It was filled with fantastic new timbres and was a joy to use (see the article "7 Deadly Synths" in the September 2003 issue of EM, available online at www.emusician.com). The Neuron's cost, however, put it beyond the reach of most musicians.

The Neuron keyboard resynthesizes sampled sounds, a process that analyzes audio recordings and algorithmically reproduces their characteristics. The advantage of resynthesis is that sound

could use the Nuke to control software other than Neuron VS.

sive virtual synth that harnesses what it called *neuronal* synthesis. Neuron VS consists of software and hardware. The software component is a plug-in that supports Audio Units on the Mac and VST in Windows and Mac OS X. It provides most of the keyboard synth's functionality in two windows that you can easily switch between. Unlike the original, Neuron VS is not multitimbral, it doesn't support surround, and it lacks one envelope level and the keyboard's master effects (reverb and delay).

Hands On

The hardware is a compact tabletop unit called the Nuke, which also serves as a copy-protection dongle; Neuron VS will not run unless the Nuke is connected to your computer. In addition to four assignable knobs, three status LEDs, and a single button for switching between modes, the Nuke has an orange plastic

could use the Nuke to control software other than Neuron VS.

The joystick moves one of the corresponding vector controls onscreen. In fact, the joystick is the only way to move those controls, which don't respond to clicking-and-dragging. According to the manual, the software should record joystick movements, but the current version doesn't implement that feature.

Power Hungry

Although the system requirements specify a minimum Pentium III/850 MHz with Windows XP or a G4/800 MHz with Mac OS X, don't expect to play more than one or two notes at a time unless you have something more substantial. Even when playing monophonically with the minimum setup, though, some patches may not play at all unless your sequencer's buffer is set high enough to detect latency.

I began this review on a Power Mac G4/dual 1 GHz with 1.5 GB of RAM, which led to frequent CPU overloads in Digital Performer 4.6, Logic Pro 7.1, and Cubase SX3. There were no graphical anomalies or any problems of that sort, but some patches quickly overwhelmed the computer. Fortunately, you can specify the plug-in's polyphony, from 1 to 32 notes, on a per-patch basis. I upgraded to a Power Mac G5/dual 2.3 GHz and was surprised that Neuron VS still managed to occasionally overload the CPU and shut down the sound engine, even with the default polyphony of six notes. Obviously, the ability to freeze tracks will come in handy for recording Neuron VS.



Neuron VS is a plug-in version of the acclaimed Hartmann Neuron synthesizer. It includes a hardware controller called the Nuke, which also serves as a copy-protection dongle.

becomes more malleable than traditional sampling allows. By offering a flexible set of user parameters, the Neuron made it possible to drastically reshape resynthesized samples (which Hartmann calls Models) in real time.

In 2005, Hartmann released Neuron VS (Mac/Win, \$899), an expen-

x-y joystick identical to those on the Neuron keyboard. Because the joystick is so fragile, a spare is included; otherwise, the unit feels very solid. A third window in the software lets you assign the knobs' parameters, as well as parameters assigned to Aftertouch, Expression, and so on. It would have been nice if you

Out of the Ordinary

Another stumbling block is Hartmann's nomenclature. The two sound sources, called Resynators (short for resynthesis oscillators), provide hands-on control. The Blender is a mixer that offers cross-modulation and other functions. The envelope-generation section is the Shaper, and the only assignable LFO is called Mod. Silver—analogue to the COSM section in Roland's V-Synth—combines a multimode filter with two multi-effects processors, Freq FX and Time FX. None of the time-related parameters can sync to MIDI Clock.

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QUICK PICKS

Overall, Neuron VS generates expressive, evocative sounds that only its namesake can reproduce. The factory patches are almost identical to its predecessor's (see **Web Clip 1**).

It has been a year since the software shipped, and Hartmann hasn't issued a single update to address problems such as CPU inefficiency and missing features. Assuming that Hartmann has the resources to continue its development, I expect that Neuron VS will grow into a formidable virtual instrument. In the meantime, you'll have to deal with a few serious limitations if you want to live on the cutting edge.



Overall Rating (1 through 5): 2.5

Hartmann Music/Russ Jones Marketing Group (distributor)
www.hartmann-music.com

TRACKTEAM AUDIO

LiveFills (Mac/Win)

By Len Sasso

TrackTeam Audio produces content packages, called LiveFills, for Ableton Live. There are three titles in the series: Tacklebox 001 (\$49 CD-ROM), Beatbox 01 (\$39 download), and Travelbox 01 (\$39 download). The trio can be purchased as a bundle for \$99. As the name indicates, LiveFills are similar in concept to Refills

for Propellerhead Reason, and TrackTeam Audio also makes a Reason Refill called Fusebox 01.

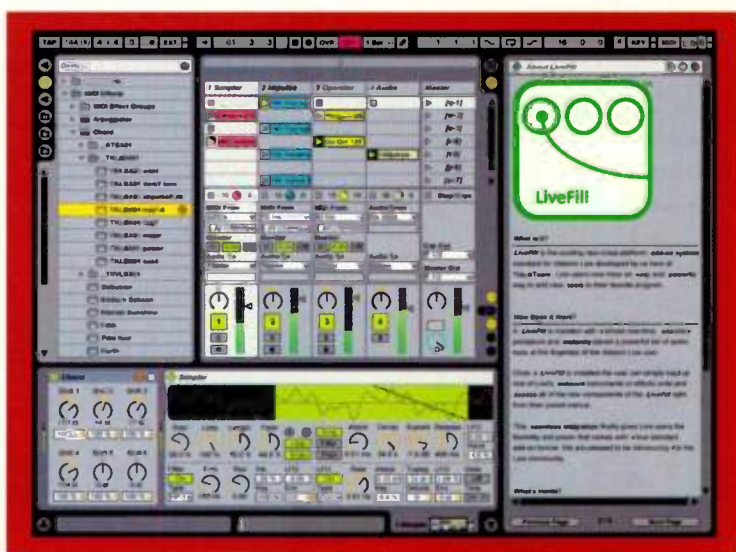
LiveFills consist of presets for Live's instruments and effects plug-ins; Live Clips, which are Device Group presets with accompanying MIDI files; and audio files, which consist primarily of waveforms used in Simpler and Impulse presets. Tacklebox contains 500 MB of audio loops. All three packages take full advantage of the new features in Live 5.

Gone Fishin'

Tacklebox draws its inspiration from classic analog synth and electric piano sounds. Its collection of audio files covers a cross-section of ambient synth sounds, short Rhodes riffs and stabs, beat loops, and low-frequency material (see **Web Clip 1**). All audio files have accompanying Live analysis files, which makes them quick loading.

The synth audio files span a broad range of leads, pads, sound effects, and rhythm patterns but are united by their synthy nature. Although all the synth audio files have tempo assignments and are set up for looping, many of them are more suitable as one-shots than as loops.

The Rhodes audio files are almost equally divided between chords and lines, with tempos ranging from 90 to 120 bpm. The files were recorded on the same Rhodes, so they combine well. They are the most straightforward part of the collection.



LiveFills documentation is integrated into Live's Lesson View (right). LiveFills presets and accompanying MIDI files are used exclusively in this Clip view song.

Hitting Bottom

The low-frequency audio files combine bass lines with synthy low and ultralow sounds. The emphasis is on effects, and you will undoubtedly use this part of the collection sparingly.

The beat-loop audio files, which range in tempo from 80 to 195 bpm, emphasize electronic percussion, though there are a number of acoustic loops as well. All the beat loops blend nicely with Tacklebox's collection of Live Clips for Impulse.

Tacklebox's Simpler presets are divided into basses, effects, leads, pads, and shapes. Many of the waveforms are taken from classic synths, and the collection has a vintage feel. Most of the presets are part of a Device Group with effects programmed to enhance the sound.

Big Bang


Beatbox is devoted to Impulse drum kits and complementary bass presets for Simpler. There are four categories of Impulse drum kits: standard kits; Hybrid kits, which contain more complex events such as snare rolls; Slice kits, which have a short section of a drum loop on each pad; and Stab kits, which have an instrument, vocal, or sound-effect clip on each pad.

Travelbox highlights world and ethnic sounds and is the only LiveFill with presets for Live's FM synth, Operator. The Simpler presets are divided into bowed, plucked, reed, and wind sounds, and all are sampled from real instruments. The Impulse presets feature a broad cross-section of world drums and percussion instruments, and like Beatbox, the collection also includes a number of Slice kits. Some of the Operator presets have an ethnic twinge, but mostly they are just well-crafted sounds. As with Tacklebox, most of the Beatbox and Travelbox instrument presets are part of Device Groups.

Fill Up

All LiveFills contain presets for most of Live's effects plug-ins, including the MIDI effects. The collection is a welcome addition to Live's somewhat limited selection of factory effects presets, and the effects presets are well-thought-out to complement the instrument presets. The inclusion of a substantial number of Device Groups and Live Clips, as well as their

organization in Live 5's new library format, make LiveFills a pleasure to use.

Each LiveFill adds very usable content to Live's library and does so at a modest price. At roughly 150 MB each, downloading Beatbox and Travelbox can take a lot of time and is probably prohibitive without a broadband connection. The Tacklebox CD is the more viable choice in that case. All three LiveFills are well worth investigating, and demos are available from the TrackTeam Audio  Web site.

Overall Rating (1 through 5): 4

TrackTeam Audio

www.trackteamaudio.com

DRUMS ON DEMAND

Bass on Demand, vol. 1

By Marty Cutler

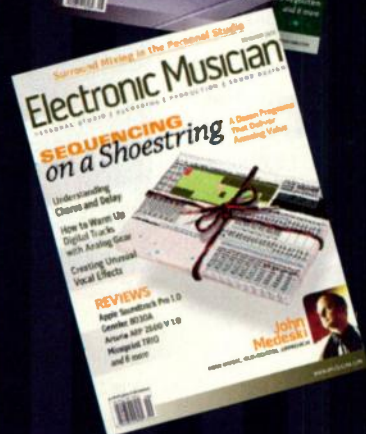
If you're an electronic musician, you can choose from an enormous variety of sample collections featuring exquisite-sounding basses that you can play with your MIDI controller. Although multi-sampled instruments let you control the phrasing and develop ideas that you won't find using prerecorded bass loops, something may be missing. For example, it's often difficult to convey the tonal changes between one note and the next, the nuances of fret and string noise, and a broader sense of dynamics using only 128 Velocity levels. And such aspects of real-time musicianship add appeal to a performance.

You'll find plenty of bass loops available for purchase, but for many, the problem is one of focus: their stylistic target is often too narrow or too wide. Sometimes the playing is too virtuosic and flamboyant to sit well in a simple track; you probably don't need a show-boating bassist to add bottom to your songwriter demo.

Bass on Demand, vol. 1 (\$49.95), from the folks who brought you *Drums on Demand*, strikes a successful balance between neutral, bland accompaniment and overplayed, lick-oriented bass tracks. A single CD-ROM contains

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roughly 1,800 loops, either in Apple Loops format or as 16- or 24-bit Acidized WAV files recorded at 44.1 kHz. I auditioned the 24-bit WAV version.

Get Organized

Bassist Rob Honey works a rich, warm tone from his 5-string Fender American Deluxe Jazz bass. Capturing the instrument through a Demeter VTMP-2B tube preamp and a Summit Audio TLA 100A compressor gives the instrument a well-finished, rounded tone that helps the bass sit in tracks without any need for additional processing. Honey's playing is clean, but not to the point of sterility; you can hear the occasional ghosted note from an adjacent string and sliding noise and subtle rattle from the frets. Unlike some loops I've heard, though, such effects are not unnaturally hyped.

The disc covers familiar pop and rock territory. Each folder gathers loops for a particular tempo and feel. For example, 070 Blueberry contains files recorded at 70 bpm in a style suggested by the Fats Domino tune, "Blueberry Hill." To ensure good organization, the file names contain tempo and style information as well as key signature and the loop's role in the overall song form (for

only four keys, with loops replicated an octave apart. According to Drums on Demand, the 2-octave mirrored patterns provide more flexibility for pitch-shifting loops to other keys. With a few exceptions, when I transposed the files in MOTU Digital Performer 4.6 and Ableton Live 5.0, the files easily survived the 2-semitone transpositions between the loops provided. In some cases, ironically, it sounded as though some of the saturation that gave the instrument such an inviting tone and some of the performance artifacts—such as undamped, sympathetically vibrating notes—became pronounced and distorted during even relatively short-ranged transpositions.

The Song Remains the Same

My one major gripe about the *Bass on Demand* collection is that the constituent patterns of each style spring mostly from a similar set of rhythmic and melodic motifs. Consequently, I heard little in the way of leading tones that a bassist might play for harmonic motion. Repetition is often the mainstay of rock and pop, but rather than adapt to song structure, the patterns are essentially a couple of variants on the same theme played in different keys. For example, a pattern with a sixth in it doesn't have a dominant-seventh variation in the set. A set of loops that suggest a major or a minor key would require you to make adjustments to the third. In instances like those, pitch-shifting a single note proved to be a thorny process.

The collection furnishes plenty of styles to cannibalize loops from, but then you'll need to search through other folders—a consequence of more eclectic loop collections that this set was supposedly designed to avoid. To be fair, the lack of leading tones is a frequent symptom of loop collections I have heard, bass and otherwise. Despite the typical drawbacks mentioned here, *Bass on Demand* presents a solid set of exceptionally toneful and in-the-pocket loops at a rock-bottom price.

Overall Rating (1 through 5): 3.5

Drums on Demand
www.drumsondemand.com

BIG FISH AUDIO

First Call Horns

By Marty Cutler

First Call Horns (\$299.95) from Big Fish Audio is a sampled horn collection designed for Jazz, Latin, and Pop projects. The package's single DVD holds about 1.4 GB of 24-bit brass and woodwind instruments in solo and ensemble configurations with samples of improvisations. The performances exhibit specific playing techniques too difficult to emulate with modulation controls alone.

Native Instruments' Kontakt Player is the sound set's host instrument. The multitimbral (as many as eight parts) plug-in lets you create your own ensembles, add to existing ones, or build ensemble and solo-instrument combinations. Surprisingly, it is less flexible than the Kompakt instrument, another Native Instruments vehicle for sample playback.

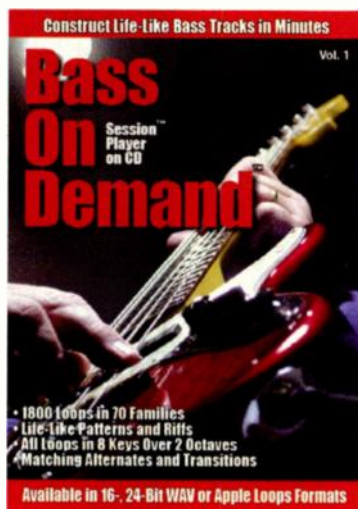
I tested *First Call Horns* on a dual 1.42 GHz Power Mac G4 with 2 GB of RAM and running OS X (10.3.9). Host programs included Ableton Live 4.1, Granted Software RAX 1.2.3, MOTU Digital Performer 4.6, and Steinberg Cubase SX 2.2. The *First Call Horns* installer provided VST, RTAS, DXi, and Audio Units versions of the instrument.

Horning In

The Kontakt player's interface displays eight slots just below the strip of logos at the top of the virtual keyboard. To select an instrument, you first select one of the slots, and then click on the Load button at the keyboard's right side. That will display a drop-down list from which you select a patch. You can also move through patches one at a time using the Up and Down buttons that flank the main button's center. Either way, it takes only a moment to load the sample set.

Every instrument (with the exception of soprano saxophone and French horn) includes a corresponding folder of "section" samples (multiple instruments playing in unison). There is a French Horn Duet patch, but it's hard to hear the presence of a second instrument. In every instance, samples are not looped

Drums on Demand's *Bass on Demand* presents roughly 1,800 loops of five-string Fender Jazz bass played by an expert, in-the-pocket bassist



instance, Db1.Fill1.blueberry.70.wav). To ease the loop-selection process, a separate Groove Finder folder holds 2-bar examples of each style.

Although the company's product description says that the loops are in eight keys over two octaves, I found

and envelopes are as originally played; the Kontakt Player doesn't give you any envelope controls or filters. For the most part, that's not a problem, although it does impose limitations.

Most important, the samples and articulations are superb. The included reverb, saturation, and EQ controls, although minimal, add a modicum of sound-shaping capability. Because of the absence of synthesis parameters, however, there is little else you can do to adapt the instruments to your own needs. For example, ensemble swells play out as recorded, so if they fade out too early or too late, you're stuck. Of course, typical modulation assignments for filters and vibrato rarely sound convincing in programs with a single layer of samples. Considering *First Call Horns'* abundance of solo instruments, the absence of envelope and legato mode controls is a disappointment. Hopefully, they'll be included in a future update to the playback engine. It's hard to create authentic-

sounding horn solos when the envelopes retrigger with each note.

Horns of Plenty

Still, there's an awful lot to like about *First Call Horns*; the beautifully played and recorded key-switched instruments feature realistic-sounding brass and woodwinds with a variety of articulations created by the authentic playing techniques. The patch TPT SEC KEYSW, for example, loads trumpet-section patches that you can switch with keys assigned below the range of the instrument. These patches include section swells, falls, Harmon-muted sections, and staccato performances.

You also get a nice assortment of combined-instrument ensembles, such as swells with alto sax, trumpet, and trombone. The soprano sax instruments are about the best I have heard, and there's a wonderful collection of solo lines grouped by instrument and key. With the addition of a modest set of envelope controls and legato mode, *First*

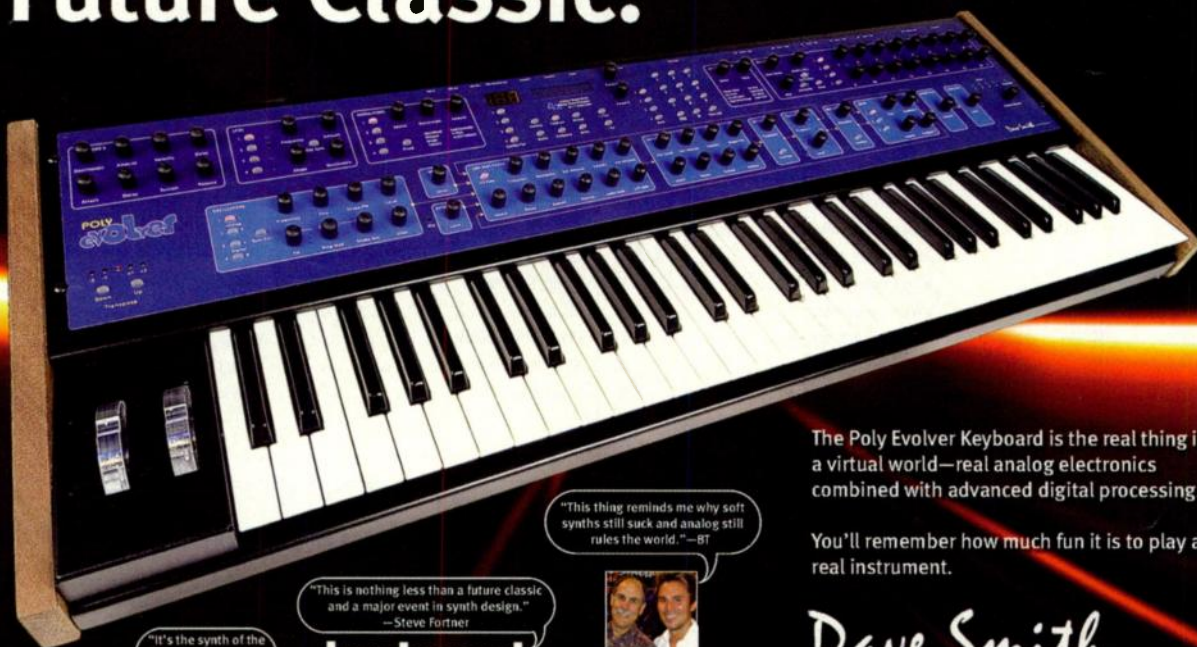


First Call Horns from Big Fish Audio contains realistic-sounding brass and woodwind samples with a variety of authentic playing techniques.

Call Horns could be the killer collection of pop-oriented brass and woodwinds that it was meant to be. As it is, I still highly recommend the set. **EM**

Overall Rating (1 through 5): 3.5
Big Fish Audio
www.bigfishaudio.com

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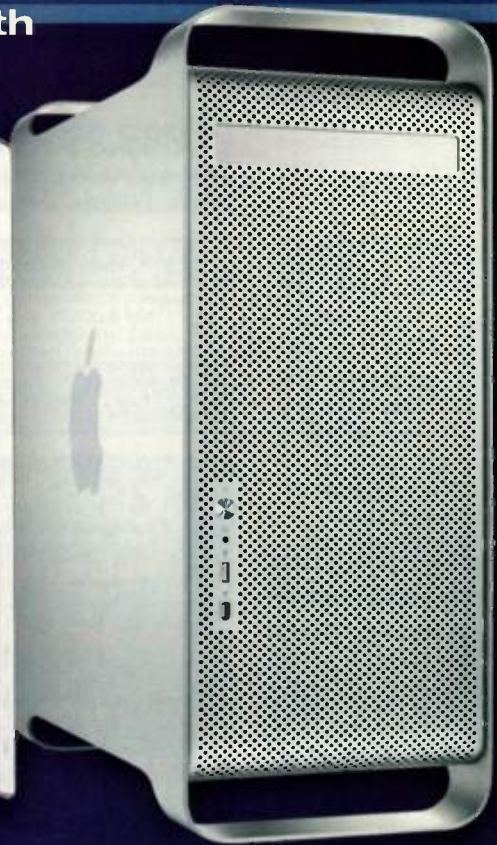
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D Is for Details

If the devil is in the details, then Old Scratch must stay busy in the audio world. We deal with so many details and so much confusion that it is amazing we manage to get anything done. Confusion can result from the complexity of details, from the lack of sufficiently detailed information, or simply from not paying attention to simple details.

A classic example of confusion due to complexity is the subject of AC grounding. Most of us understand that ground loops occur when there are multiple paths to ground in an audio system. That seems simple enough, but things get more challenging when one attempts to put a proper grounding scheme into practice. It's not so easy to figure out how to be rigorous with such a scheme when faced with long cable runs, components that can be interconnected in a variety of ways, and pieces of equipment that have differing internal ground systems.

An offshoot of this problem is the question of how to interface unbalanced connectors with equipment that has balanced I/O. Are the connections transformer-coupled or transformerless? Should you connect the "cold" conductor to the shield, leave the shield unconnected at one end, or connect only the shield to the connector shell? And so on.

The confusion that results from a lack of sufficient information can easily be seen by people attempting to take measurements. It's not that measurements are difficult, but it is important to dot all the i's and cross all the t's for them to be meaningful, and there are a lot of i's and t's involved in setting up a valid measurement.

Truly wondrous to me, though, are the questions that were resolved years ago that remain questions nonetheless. For instance, why is there still a pin 2-/pin 3-hot controversy with XLR connectors? Pin 2 should

might deliberately buck the standard, but there is a standard, and its purpose is to define what is "right." There should be no controversy.

Here's another case: the confusion surrounding dBV versus dBu or, occasionally, dBm. Admittedly, there are several similar ideas kicking around here, and some of those units of measure were created decades ago for reasons that are irrelevant today—but come on, people! Those units have been well documented and explained for decades, and keeping them straight is not that hard! I recently encountered the confusing question of dBV versus dBu. That one is a little harder to track down. Why? Because that very question emerged so soon after the two measures were introduced that dBu was quickly changed to dBV. The dBu measurement had a short life, and that was a long time ago; why is anybody still talking about it?

Similarly, I have seen a nominally authoritative source assert that the difference between the two most common signal references, -10 dBV and +4 dBu, is 14 dB. The "V" and the "u" mean that two different references are being used; the difference is actually about 11.8 dB. That fact has been in so many *Electronic Musician* articles that it should be granted Hall of Fame status.

Our field is complex enough as it is. We have to keep track of a lot of fine details just to deal with our tools, and perpetuating befuddlement about long-settled issues has no advantages.

Worst of all is when sources of confusion combine—for instance, not paying attention to complex details. Extending that example as an illustration, the voltage reference for 0 dBu is 0.775 volts, according to two international standards. But the dBu reference was derived from the 0 dBm reference, defined as the dis-

sipation of 1 mW into a 600Ω load. That calculates to 0.774596V, a difference of 0.0045 dB. Uh-oh—here comes the fog.

All three sources of confusion cited here can be overcome, although complexity is an ongoing

Truly wondrous to me are the questions that were resolved years ago that remain questions nonetheless.

be hot according to the international standard, yet some manufacturers still put out products with pin 3 hot. There are a number of valid reasons a manufacturer

challenge. Although you can choose to deliberately buck the details, when doing so, you risk having to contend with Old Scratch. **EM**

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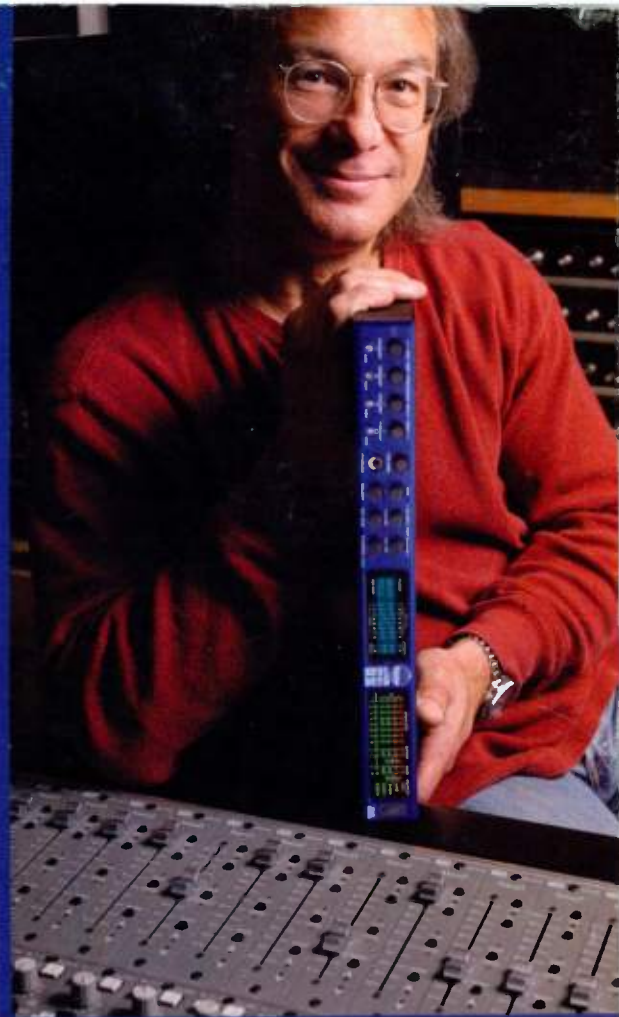


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