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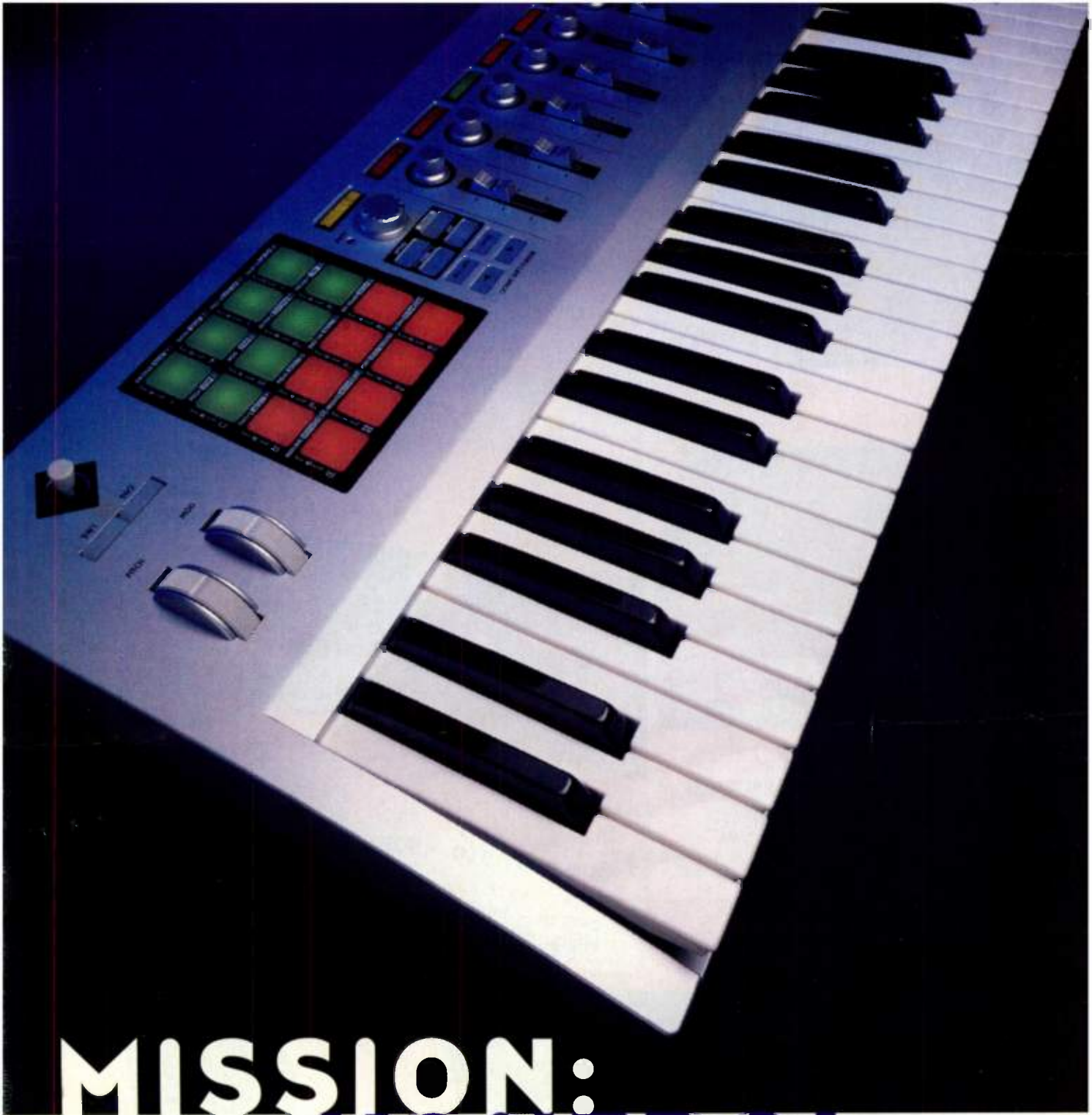

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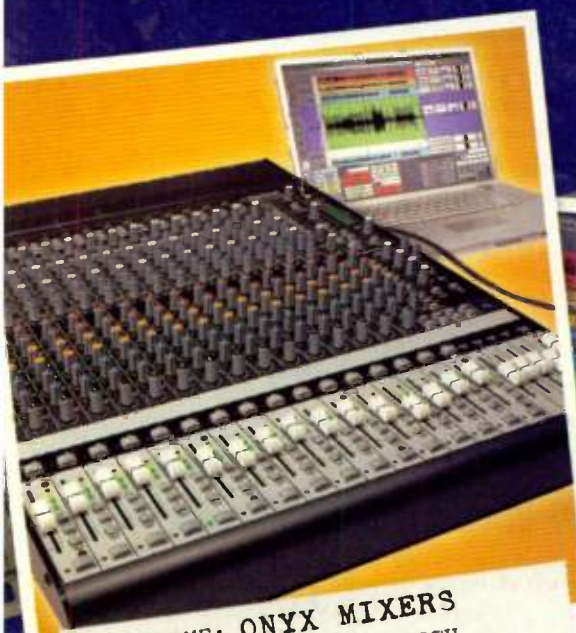

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Electronic Musician
April 2005

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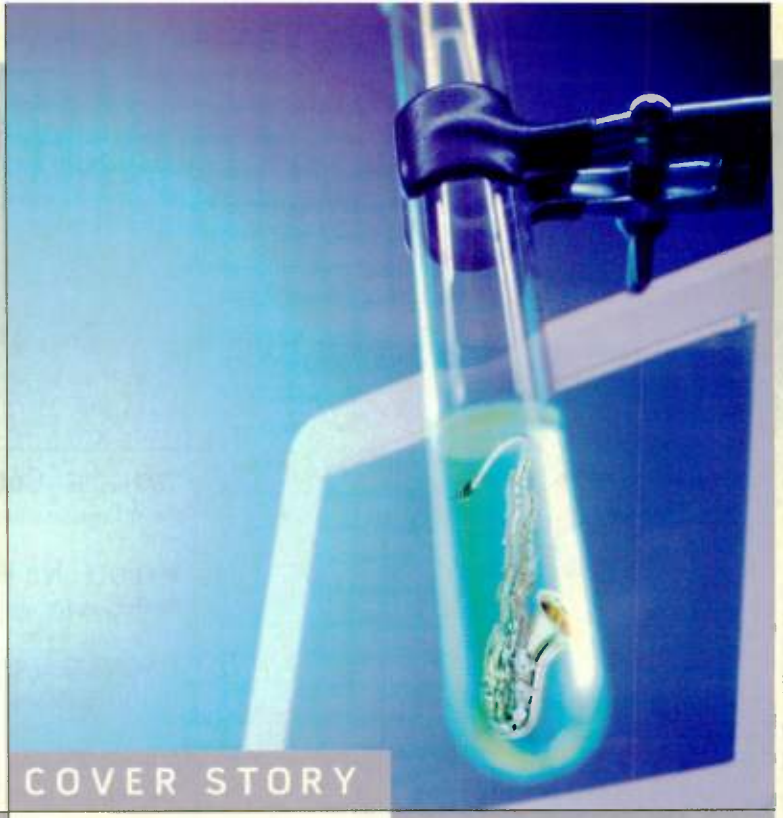

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FEATURES

COVER STORY

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DEPARTMENTS

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April 2005

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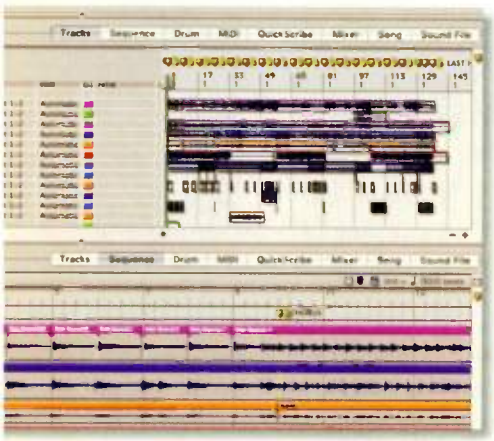

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REVIEWS

130 QUICK PICKS

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Synapse Audio Software Synth Pack Pro software synthesizer plug-in bundle (Mac/Win)

Native Instruments Reaktor Electronic Instruments 2 software instrument (Mac/Win)

Wusik.com Wusikstation 1.0.9 software instrument (Win)

Hercules 16/12 FW audio/MIDI interface

Discrete Drums *EarthBeat* multitrack drum-loop library

DV-RA1000

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Created in collaboration with Sony, the new **DV-RA1000** is the first affordable, true Direct Stream Digital recorder. It writes 1-bit/2.822 MHz DSD – the ultimate acquisition or archival format — or 24-bit PCM directly to standard DVD+RWs in real time. And then lets you edit and process the results without having to transfer to a DAW.

DSD 2.822 MHz	1-bit	109 min.
192 kHz	24-bit	66 min.
172.4 kHz	24-bit	66 min.
96 kHz	24-bit	72 min
88.2 kHz	24-bit	133 min.
48 kHz	24-bit	267 min.
44.1 kHz	24-bit	290 min.

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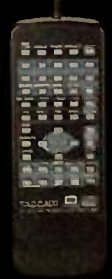

Wired remote control kit included.

Archiving. Storing all those old school 44.1 kHz masters? Get almost 5 hours per disk with the DV-RA1000.

Easy transfer to computer. The DV-RA1000 creates UDF discs, a standard format read by Mac®, Windows® and Linux computers. Or you can stream your data directly via the DV-RA1000's USB 2.0 port.

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Get the details of this major recording advancement on our web site or visit your TASCAM dealer today.

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- Word Sync In, Out, Thru
- RS-232C serial control
- PS/2 keyboard connector for title editing
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- Headphone output
- Supports UDF disk format for cross platform computer compatibility
- Wired remote control

TASCAM

* CD recording is at 44.1kHz/16-bit (Red Book spec) only.

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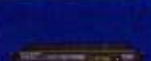

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Coming into Site

Before EM's redesign, which happened with the February 2005 issue, the "Letters" column used to contain a small table of contents for the emusician.com Web site. It listed some of the regular features on the site, which was okay up to a point. That point came when we decided to offer more content on the site and promote it in the magazine. That meant saying farewell to our little Web TOC.

Adding value to the site is an ongoing effort, and we plan to do a lot more of it in time. But we've already expanded the site's features, and to reflect that, we have implemented a full-page table of contents for emusician.com (see p. 18). Many of the items promoted in the Web TOC have been around a while, such as the eMusician Xtra newsletter, weekly online news updates, and EM Web Clips, which are supplemental files that accompany stories in the print magazine. We also have the EM Cool Tip of the Month, in cooperation with Thomson Course Technology. Incidentally, the Cool Tips are archived, so you can go back and check out previous tips.

To supplement these items, we have expanded one Web section and introduced two more. For starters, we've expanded our online reports from major music-tech shows. Naturally, we'll report on the Summer and Winter NAMM shows, the Audio Engineering Society's U.S. convention, and the Frankfurt Musikmesse. But we'll also deliver special coverage of events that we might not have covered in the past.

The Editor's Picks section is brand new; in it, one of the EM editors selects and introduces a group of favorite EM stories each month that are related topically. For example, in February, Associate Editor Geary Yelton waxed rhapsodic about his favorite compressor stories. Last month, Associate Editor Rusty Cutchin chose several outstanding studio-monitoring stories. For April, Senior Editor Gino Robair has assembled three of his favorite EM articles about microphones.

Of course, you have long been able to find topically related EM stories by choosing a product category on the home page, but that's a shotgun approach in which you find all related articles on the site. Editor's Picks are carefully selected by our team to ensure that they are up-to-date and complement each other. And we archive these collections so you can refer back to them.

JULIE BIRUM

But the new Web feature that I'm most excited about is the EM Spotlight. EM Spotlight stories are exclusive to emusician.com, and we will publish a new one each month. We'll archive them, as well, so you can revisit them and share them with your fellow electronic musicians. Some Spotlights are classic EM interviews from years past; we've already posted our interviews with John Cage (from the March 1988 issue) and Laurie Anderson (from the September 1985 issue). Most current EM readers have never seen these stories, but now you can see them at emusician.com! Other Spotlight stories are brand new, including this month's delightful interview with former Byrds cofounder Roger McGuinn. These will be published only at emusician.com—and that's no April Fool's joke.

So check out our new Web TOCw, fire up your Web browser, point it to www.emusician.com—and enjoy!

Steve Oppenheimer
Editor in Chief

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Maximum Efficiency

Three pro engineers share their strategies to help you make your personal studio and sessions productive and organized.

FEATURES

Special Treatment

Even the best reference monitors can't give you an accurate reproduction of recordings if your room hasn't been acoustically treated. We spoke with six experts to get the lowdown on acoustic problems in personal studios and how to fix them on a budget.

AC Power for the Personal Studio

Learn how to determine how much power your equipment draws, the warning signs of an overloaded system, and how to plan a power-distribution setup for the average small- to midsize project studio.

Production Values: Matt Wallace

Matt Wallace produced and mixed the hit CD *Songs About Jane* by Grammy Award–winning Best New Artist Maroon 5. Wallace offers insights into his production and engineering philosophy and his studio setup.

COLUMNS

Making Tracks: Finding the Logic in MIDI Editing

Using your sequencer's logical-editing utilities for MIDI tracks.

Sound Design Workshop: Loop Microsurgery

Revitalize your loops with these advanced techniques.

Working Musician: Set It Free

The best way to promote your music online is to give some of it away.

...and much more!

Letters

I think, taken as a whole, our coverage is balanced and accurately reflects most readers' interests.—Steve O

Learning the Ropes

I really appreciate articles like the February 2005 "Square One: Just Passing Through." Many of us who dabble in synthesizers (I'm really a guitarist and bassist) love to play around with analog synth plug-ins. Experimenting is fun, but it's nice to learn how to build sounds, and that type of article is excellent for that. I would like to see more articles in EM on basic synth programming and theory.

Curtis Swartzentruber
Chicago, Illinois

Surrounded at Home

I am a loyal subscriber of 15 years. When the heck will EM do a multipart series on 5.1-surround production? I need to know about authoring, integration with Apple's Logic Pro, burning 5.1 mixes, mastering, standard playback formats, and industry standards.

There must be a huge market interest, but as of yet, there is very little support from the electronic-music media. When I lived in Taiwan from 1990 through 1993, I had no access to information about hard-disk recording, which was new at the time. EM kept me informed and helped me figure out how to buy my first system when prices finally started coming down around 1994. I hope that you will similarly start educating your readers about this new and exciting technology that is still mysterious.

Thank you in advance for any attention that you can give to this matter.

Matthew Clark
North Babylon, New York

Matthew—We did a series of stories on surround a few years ago, and little has changed since then except that a few audio applications have added surround support. Nevertheless, we recognize that it's time to revisit the subject, and we are planning to do so in the near future.—Steve O

Back to Basics

As a newcomer to electronic-music production, it's quite daunting and intimidating to be confronted with so much science and technology at the outset. I began this task by seeking out information on sound synthesis and sampling. I scoured whole volumes of books and sites dealing with all the complexities of this field. I remember thinking, "I've been left behind. There's no way for me to make up all this lost time and catch up."

Fortunately, *Electronic Musician* is a very good place for newcomers to start. I had assumed that no monthly magazine would bother rehashing the basics that all the "pros" already know. I was delighted to read the January 2005 "Square One: Standing Tall," by Mark Ballora. It's such a clear and uncomplicated article dealing with the concept of waveforms and how to apply the knowledge of them with practicality in my amateur studio.

It's a pleasure to see articles like this that remember us beginners—and at no expense to all the veterans. Ballora's writing was uncompromisingly straightforward. His analogies were brilliant and his explanations were succinct.

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Letters

EM's New Look

I have to admit that, after a slow and deep study of EM's new image (February 2005), I am absolutely delighted. It seems to have much more information now—clearly displayed and in abundance. Two thumbs up!

Guillermo Carrasco
Caracas, Venezuela

Kudos on a great-looking new design. Being the O.G. that I am, I was fully prepared to dislike the new layout, but it is actually easier to read and navigate.

I have read EM long enough to remember that in its early days, it was an industry upstart. Now, EM's articles are the clearest and most informative of its genre, and every month Larry the O's "Final Mix" column hits closer and closer to home. His column "Opening the Door" (February 2005) should be required reading for every erstwhile musician and audio professional.

Mark Drummond
Mark Drummond Creative Svcs.

"Kudos on a great-looking new design." —Mark Drummond

The new EM format might be artistic, but it isn't very functional. I find the layout confusing, and most of the text unreadable except in very bright light. Because I don't frame my copies of EM and hang them on the wall, I prefer functionality to beauty. I cast my vote for the old format.

Robert Villwock
via email

Graphically speaking, EM's new design looks great. But the [text] font is too small and too thin! It's very difficult to read. I vote for the older font. After all, I'm not getting any younger.

Carlo P. Marchi
Hartford, Connecticut

New Frontiers

I write to you, first of all, to comment on the new layout of the magazine. Like so many, I am subject to the human condition, thus making change a painful experience. However, I found EM's new layout to be quite refreshing. Once my feet were planted firmly beneath me on this new landscape, I was able to navigate the magazine with the deft precision that I was accustomed to. Needless to say, I found some nice treasures on my adventure, and I am all the better for it. The new layout shows charisma, passion, and careful forethought. Very rarely do I heap such praises on the works of journalism, but this time it is deserved.

Secondly, there is a typo on p. 28 of the February 2005 issue in the "Download of the Month" section. The name of the VST plug-in is listed as "Tonic." Its full name is actually "MicroTonic," and Magnus Lidström uses the lowercase Greek letter Mu as the first letter. Lowercase Mu, as I am sure you know, is the symbol used to represent the metric prefix Micro (or 10 to the –6 power).

Nonetheless, thank you for taking the time to write about it, as it's my percussion synthesizer of choice.

Ric (the Obscene) Kinney
Ghettoanalog Productions

Playing Favorites

I have subscribed to EM since your publication began, but I am beginning to wonder whether you should change your name to *Computer Musician*. How could you possibly do a "best of the year" article ("2005 Editors' Choice Awards," January 2005) without including hardware synthesizers? It's not as if no hardware synths were released—I purchased an Elektron Monomachine and a Dave Smith Instruments Poly Evolver, among others. On top of that, you relegate a review of an instrument by a seminal figure such as Dave Smith to the brief review section ("Quick Picks: Dave Smith Instruments Poly Evolver," January 2005).

I think you have gone overboard on the software front. Although I've used computers for music programs since the Apple II, I still prefer hardware synths when given the choice. How about some balance?

George Sarant
via e mail

George—We considered giving an award to the Poly Evolver, but it is basically four Evolvers combined, and we have already given an Editors' Choice Award to the Evolver. Similarly, we reviewed the Evolver in depth, so we just covered what was new in the Poly version.

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* when converted to 16-bit linear format

Next Month in EM

COVER STORY

Maximum Efficiency

Three pro engineers share their strategies to help you make your personal studio and sessions productive and organized.

FEATURES

Special Treatment
Even the best reference monitors can't give you an accurate reproduction of recordings if your room hasn't been acoustically treated. We spoke with six experts to get the lowdown on acoustic problems in personal studios and how to fix them on a budget.

AC Power for the Personal Studio
Learn how to determine how much power your equipment draws, the warning signs of an overloaded system, and how to plan a power-distribution setup for the average small- to midsize project studio.

Production Values: Matt Wallace
Matt Wallace produced and mixed the hit CD *Songs About Jane* by Grammy Award–winning Best New Artist Maroon 5. Wallace offers insights into his production and engineering philosophy and his studio setup.

COLUMNS

Making Tracks: Finding the Logic in MIDI Editing
Using your sequencer's logical-editing utilities for MIDI tracks.

Sound Design Workshop: Loop Microsurgery
Revitalize your loops with these advanced techniques.

Working Musician: Set It Free
The best way to promote your music online is to give some of it away.

...and much more!

Letters

I think, taken as a whole, our coverage is balanced and accurately reflects most readers' interests.—Steve O

Learning the Ropes

I really appreciate articles like the February 2005 "Square One: Just Passing Through." Many of us who dabble in synthesizers (I'm really a guitarist and bassist) love to play around with analog synth plug-ins. Experimenting is fun, but it's nice to learn how to build sounds, and that type of article is excellent for that. I would like to see more articles in EM on basic synth programming and theory.

Curtis Swartzentruber
Chicago, Illinois

Surrounded at Home

I am a loyal subscriber of 15 years. When the heck will EM do a multipart series on 5.1-surround production? I need to know about authoring, integration with Apple's Logic Pro, burning 5.1 mixes, mastering, standard playback formats, and industry standards.

There must be a huge market interest, but as of yet, there is very little support from the electronic-music media. When I lived in Taiwan from 1990 through 1993, I had no access to information about hard-disk recording, which was new at the time. EM kept me informed and helped me figure out how to buy my first system when prices finally started coming down around 1994. I hope that you will similarly start educating your readers about this new and exciting technology that is still mysterious.

Thank you in advance for any attention that you can give to this matter.

Matthew Clark
North Babylon, New York

Matthew—We did a series of stories on surround a few years ago, and little has changed since then except that a few audio applications have added surround support. Nevertheless, we recognize that it's time to revisit the subject, and we are planning to do so in the near future.—Steve O

Back to Basics

As a newcomer to electronic-music production, it's quite daunting and intimidating to be confronted with so much science and technology at the outset. I began this task by seeking out information on sound synthesis and sampling. I scoured whole volumes of books and sites dealing with all the complexities of this field. I remember thinking, "I've been left behind. There's no way for me to make up all this lost time and catch up."

Fortunately, *Electronic Musician* is a very good place for newcomers to start. I had assumed that no monthly magazine would bother rehashing the basics that all the "pros" already know. I was delighted to read the January 2005 "Square One: Standing Tall," by Mark Ballora. It's such a clear and uncomplicated article dealing with the concept of waveforms and how to apply the knowledge of them with practicality in my amateur studio.

It's a pleasure to see articles like this that remember us beginners—and at no expense to all the veterans. Ballora's writing was uncompromisingly straightforward. His analogies were brilliant and his explanations were succinct.

With that, my money order is in the mail. Sign me up! EM

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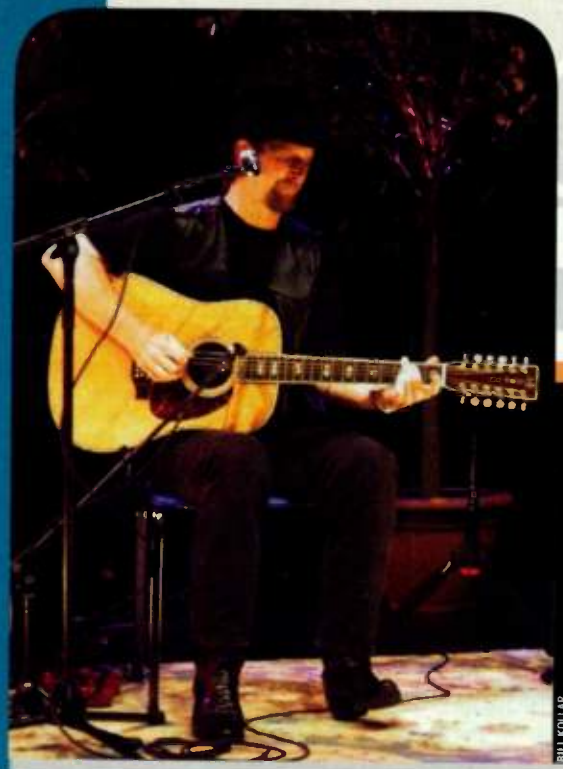
BILL KOLLAR

EMspotlight

Hey! Mr. Engineer Man

From his days as a sideman and Brill Building songwriter to the heyday of the Byrds and his subsequent solo career, Roger McGuinn has seen many recording studios. In this exclusive online interview, McGuinn talks about recording in his home studio and his most recent solo CD, *Limited Edition*.

emusician.com/em_spotlight

On the home page

EM web clips

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

EM cool tip of the month

Apple Logic Pro 7 is a powerful digital audio sequencer for recording and mixing. This month we show you how to minimize latency issues by optimizing your system.

show report

2005 Winter NAMM

The 2005 Winter NAMM show is the biggest annual musical-instrument expo in the United States. Visit emusician.com for Senior Editor Mike Levine's report on the exciting new recording gear, music software, and electronic musical instruments unveiled at this year's show.

editor's picks

Senior Editor Gino Robair offers his favorite EM articles on microphones for the studio. Topics include microphone basics and roundups, small-diaphragm condensers, and stereo mics.

emusician.com/editorspicks

EM news

A weekly update on new hardware and software releases, manufacturer contests, and pertinent industry news.

emusician.com/news

EM newsletter

Sign up for our free online newsletter, eMusician Xtra, for up-to-the-minute information about new products, software upgrades, and more.

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By Geary Yelton

Alesis Fusion 6HD and 8HD

You read it here first: hardware synthesizers will never die. Even with the steady proliferation of soft synths, the need for flesh-and-blood workstations will always be with us. The latest offerings from Alesis (www.alesis.com) are the Fusion 6HD ($2,299) and the Fusion 8HD ($2,999). Both models offer four types of synthesis, 24-bit user sampling, 8-track audio recording, 32-track MIDI sequencing, and maximum 180-note polyphony. The 6HD features a 61-note, semiweighted keyboard, and the 8HD features an 88-note, fully weighted keyboard.

At the heart of the Fusion are four synth engines: virtual analog, FM, wind and reed modeling, and sample playback. Analog modeling provides three oscillators and 13 filter types. Sampling features include graphic waveform editing and 64 MB of RAM (expandable to 192 MB). Onboard samples, which include a concert grand based on Q-Up Arts' Holy Grail Piano, are stored in the Fusion's built-in 64 MB flash RAM. You can also store your own programs, samples, and recordings on the internal 40 GB hard disk or on a CompactFlash card. The programmable arpeggiator features standard, phrase, and drum-machine playback. Other features include a 240 × 128–pixel graphic LCD, USB 2.0, coaxial and S/PDIF I/O, ADAT Lightpipe I/O, and assignable knobs, buttons, and switches.

Audix FireBall

When you need a microphone for a specific instrument, you can often rely on Audix (www.audix.com) to fill that need. The company's newest mic, the FireBall ($299), is a dynamic model expressly designed for harmonica players. Made from a solid bar of aircraft-grade aluminum, the FireBall is anodized and fitted with a dent-resistant grill that has a red pop filter inside.

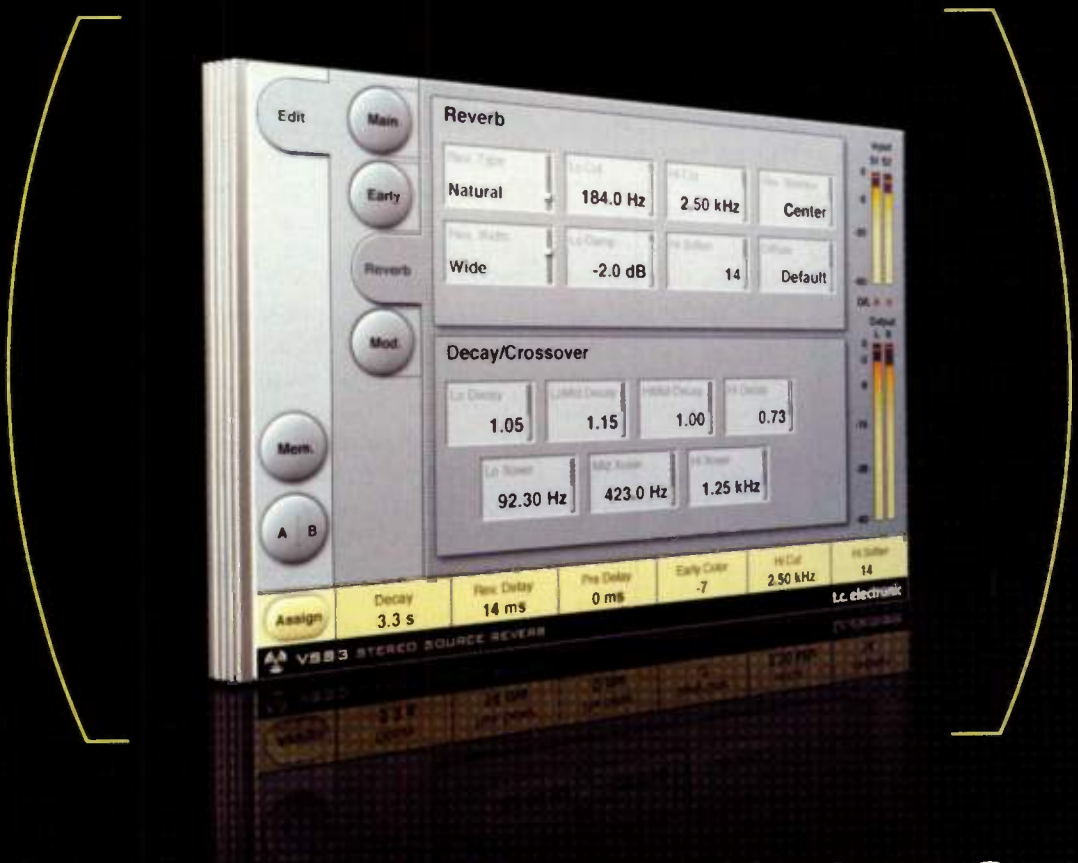
According to Audix, the FireBall is resistant to feedback and handles sound-pressure levels greater than 140 dB SPL without distortion. It has a cardioid polar pattern, and frequency response is rated at 50 Hz to 16 kHz. The FireBall is just 3 inches long, weighs 4.5 ounces, and easily fits in the palm of your hand. It includes a mic clip and a carrying pouch.

Lexicon MX200

Although most digital recording happens within software applications, hardware manufacturers are finding new ways to address the needs of virtual-studio recordists. Lexicon (www.lexicon.com), for example, has introduced the MX200 ($249), a rackmount reverb and multi-effects processor that can function as a VST plug-in running in Windows or the Mac OS. A USB connection lets you control the MX200 as if you were using software-based effects, with no draw on your CPU, offering the advantages of automation, preset management, and remote control. The MX200 is especially impressive when you consider that you could easily pay the same price for a software-only plug-in that offers the same effects.

Even without a computer, the MX200 is a versatile hardware-based signal processor. It lets you use two effects simultaneously and provides separate front-panel controls for each effect. A bank of LEDs indicates which of 32 effects types you select. Types include halls, plates, delays, compression, chorus, flanger, pitch shift, rotary-speaker simulation, and other bread-and-butter effects. The factory ROM supplies 99 presets, and an additional 99 slots are available for user programs.

Legendary Reverb now for your DAW



System 6000 Reverb powered by PowerCore

VSS3, the legendary reverb from System 6000 is now available for PowerCore, TC's hardware powered plug-in platform. Arguably the first truly high-end VST/AU reverb available for DAWs, the Virtual Space Simulation (VSS) process uses chaotic response algorithms and sophisticated modulation patterns to create the most realistic reverbs. We've even ported over the industry-standard preset package, so you'll be up and running in an instant.

Reverbs from System 6000 can be heard on thousands of albums and films. Now with PowerCore, they can be heard on yours.

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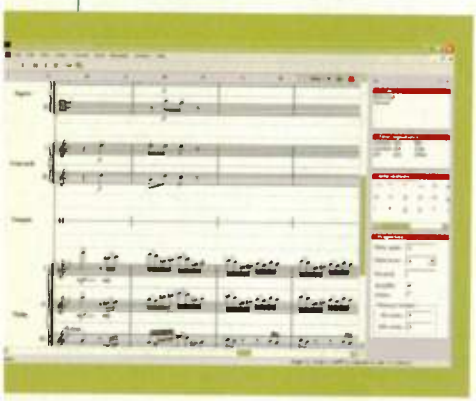
VirtuosoWorks Notion

North Carolina–based software developer VirtuosoWorks (www.notionmusic.com) has introduced its first commercial product, Notion (Win, $599), a music-notation program that interprets scores using 24-bit orchestral sounds played by the London Symphony Orchestra and recorded at Abbey Road Studios. Conceived by Jack Jarrett, former composition chair at Berklee College of Music, Notion features easy-to-use note entry and a proprietary playback engine that lets you control every aspect of performance. According to VirtuosoWorks, Notion offers unlimited polyphony and eight times the resolution of MIDI for controlling dynamic changes in loudness.

Notion's interpretive algorithms are linked to thousands of notes and articulations recorded from strings, winds, brass, piano, harp, and percussion instruments. A user-controlled triggering system called NTempo gives you real-time control over playback tempo and phrasing, making Notion suitable for live performance as well as immediate playback as you transcribe. A Mac OS X version should be complete by autumn of 2005.



Korg Kontrol 49

Korg (www.korg.com) has upped the ante in its USB/MIDI controller offerings by introducing the Kontrol 49 ($500), a 49-note keyboard with full-size, velocity-sensitive keys and a comprehensive array of assignable controls. Optimized for virtual instruments, the Kontrol 49 gives you a vector joystick, pitch and mod wheels, and two assignable switches for left-hand performance control. You can use the bank of 16 illuminated, velocity-sensitive pads to trigger samples, select sounds, or transmit MIDI commands. The pads even act as transport controls for your sequencing software, and they can recall any of 12 controller templates stored in memory.

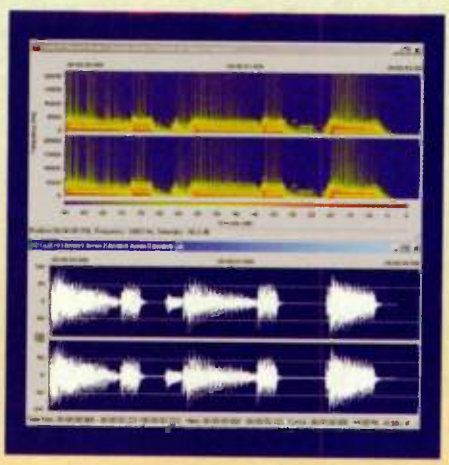
Like Korg's MicroKontrol, the Kontrol 49 has eight assignable sliders, each paired with an assignable knob and a color-coded backlit LCD that displays its function or parameter value. Function names are user-assignable, and native mode lets you set assignments and write custom text to the LCDs. On the back panel are footswitch and footpedal jacks, one MIDI In and two MIDI Out ports, a connection for the included AC adapter, and a USB 1.1 port that can supply bus power when needed.

The included editor/librarian software (Mac/Win) lets you customize setups, and provides templates for a variety of programs. Demo versions of Korg Legacy Collection, Propellerhead Reason, Applied Acoustics Lounge Lizard EP-2, Native Instrument Vokator, and IK Multimedia SampleTank 2 are bundled with the Kontrol 49.

Download of the Month

ACOUSTICA 3.2

Acoustica (Win, $34.90 download, $49.90 CD) from Acon Digital Media (www.acondigital.com) is an audio editor whose extensive feature set belies its modest price. Version 3.2 adds a host of new features that include automatic noise reduction, automatic track splitting, metatag editing, dockable windows, region markers, and many new keyboard shortcuts. Upgrades for current Acoustica users are $19.95, and a fully functional 30-day demo version is available at Acon's Web site.



Acoustica supports most common PC audio formats, including WAV, WMA, MP3, OGG, and AU. It imports audio tracks from the popular video formats MPEG, AVI, and WMV, and it rips audio tracks from CDs. Because it supports DirectX, you can process audio using plug-in effects. Acoustica also offers basic CD burning, allowing you to create tracks from any audio region as well as from audio files on your hard drive.

Most surprising in an audio editor of this price are Acoustica's analysis and editing tools. In addition to the typical, editable time-domain display, Acoustica offers standard spectral analysis and a combination frequency- and time-domain spectrogram. Among its editing tools, Noise Reduction and Click Removal are standouts. Automatic noise reduction does a statistical analysis of an audio file to determine its noise profile, and then applies its noise-reduction algorithm based on that. If the file happens to have an area consisting only of noise, you can create a better noise profile using that. Automatic Click Removal is great for restoring old vinyl recordings.

Acoustica's effects include dynamics, EQ, delay, reverb, flange, chorus, pitch shifting, time stretching, and an outstanding harmonization effect. Harmonization creates chords with as many as four voices from monophonic material, and produces interesting if somewhat unnatural effects with polyphonic material (see **Web Clip 1**). Acoustica is so well-thought-out, easy to use, and cost-effective, it's hard to think of a reason not to give it a try.

EM WEB CLIPS

—Len Sasso

Just exactly what *is* a Guitar Workstation™?

PLATINUM AWARD GUITAR WORLD QUALITY & DESIGN

"Truly, this do-it-all box beckons with enough loot to convince even old-school dudes to modernize their rigs."
– *Shawn Hammond of Guitar World*[1]

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Create: With the ultimate guitar sketch pad. Any time inspiration strikes, you can record the moment directly onto digital media with one tap of your foot. You'll never lose that elusive lick again.

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[1](Guitar World - February 2005 "*Soundcheck*" p 192-193)

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Tracktion 2 features a fully revamped MIDI editor with faster note entry, quicker editing, more intuitive keyboard control, and improved viewing of notes and controllers simultaneously.

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Tracktion 2 lets you record your ideas as fast as they come. Just drag the audio or MIDI input icon to whatever track you like and click record.

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Wanna add a VST plug-in, pull up a VSTi instrument, route to an Aux send or add some EQ? Just drag a filter to the track you want to effect. It's really that simple.

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Tracktion 2 supports Quicktime™ video playback. Select a movie and start composing music, add effects, replace your dialog, and win your Oscar®.

QuickTime

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In addition to Tracktion's ReWire host functionality for use with applications like Reason, T2 supports MIDI Time Code (MTC) and MIDI Machine Control (MMC) input/output, plus MIDI Clock output.

use 64-bit math when mixing tracks

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Much has been made about the "summing bus" in DAW software. Tracktion 2 features a new high-definition 64-bit mixing engine for uncompromising sound.

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Professional Multi-Track Recording and Editing Software, Lexicon® Pantheon™ Reverb Plug-in, Cakewalk® Pyro Express™ CD burning software; DigiTech® X-Edit™ Editor/Librarian


Built-in USB Computer Audio/MIDI Interface with 24-bit A/D/A Converters


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[1](Guitar World - February 2005 - "Soundcheck" p.192-193)

Synful Orchestra

An undisputed hit of January's NAMM show was Synful Orchestra (Win, $479), from Colorado-based developer Synful (www.synful.com). Using a synthesis technique called Reconstructive Phrase Modeling (RPM), Synful Orchestra produces orchestral sounds using additive synthesis and a database of musical phrases that are spliced together in real time. The result is a multitimbral virtual instrument that responds to performance controls to produce phrasing and articulation that sound natural.

Synful Orchestra currently generates a dozen instrument timbres, including five woodwinds, four strings, and three brass instruments. Additional instruments will soon be available as free updates. Maximum polyphony ranges from 30 to 160 notes, depending on your computer's processor. Synful Orchestra supports VST and DXi plug-in formats. You can download a user manual and a 45 MB, 15-day demo from Synful's Web site.

Eventide Anthology

Signal-processor manufacturer Eventide (www.eventide.com) has announced Anthology (Mac/Win, $1,195), a bundle comprising the company's entire catalog of nine TDM effects plug-ins. Five come from the Clockworks Legacy bundle and emulate vintage Eventide hardware. They include Omnipressor, Instant Phaser, Instant Flanger, H910 Harmonizer, and H949 Harmonizer. Two borrow algorithms from Eventide's Orville hardware processor. Octavox is an 8-voice diatonic pitch shifter, and Reverb offers nine room types with compression, parametric EQ, and twin delays. Two plug-ins have algorithms from Eventide's H3000 hardware processor; both feature MIDI control and a function generator with 19 waveshapes. The H3000 Band Delays plug-in has eight tempo-based delays and eight resonant multimode filters, and H3000 Factory lets you combine as many as 18 effects blocks.

Purchased separately, the nine plug-ins retail for $2,875. If you already own two or more Eventide plug-in products, you can upgrade to Anthology for $599. Future releases will be priced as affordable upgrades for Anthology owners. All the plug-ins are compatible with Digidesign Pro Tools|HD and Pro Tools|HD Accel.

Get Smart

Although sample libraries can put a virtual symphony orchestra in the hands of any electronic musician who wants one, access to instrumental timbres doesn't give you the skills to create convincing, well-balanced arrangements. To meet the demand for expert instruction in orchestration, **Alexander Publishing** (www.alexanderpublishing.com) has introduced Writing for Strings/Living Music Book Level 1 ($159 or $179), an interactive self-study training course created by Peter Alexander. The course is specifically designed for use with a MIDI keyboard and a computer-based sampler. If you don't already own a string sample library, the higher-priced package includes a basic single-layer library in GigaStudio format.

Comprising 30 lessons, the course furnishes audio examples, QuickTime videos, PDF scores, MIDI files, an orchestration text, and a thesaurus of orchestral devices. Alexander's revised version of Rimsky-Korsakov's Principles of Orchestration is required and is available in printed ($75) or PDF ($55) format.

ASKVideo Interactive Media (www.askvideo.com) has begun shipping the first in a series of interactive tutorial DVD-ROM discs on the newest version of Steinberg Cubase SX. In Cubase SX3 Level 1 (Mac/Win, $39), JoAnn Mailloux guides you through 28 video segments—two hours in all—covering a range of topics such as audio and MIDI setup, recording, and editing; tools, tracks, and transport; and key commands and macros. Although Mailloux touches on SX3's new features, the tutorial offers in-depth knowledge about any version of Cubase or Nuendo.

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Ableton Operator

Ableton (www.Ableton.com) has upgraded Live to version 4.1, which includes an integrated demo of the company's new soft synth, Operator (Mac/Win, $149). Operator is a subtractive FM synthesis engine that runs only within Live. It has four multiple-waveform oscillators, a multimode filter, an LFO, and seven envelope generators. Like Live, Operator is optimized for ease of use, hands-on control, and maximum efficiency. You can assign every parameter to respond to MIDI Control Changes. Presets are sorted by category, and lessons are available through Live's Help menu.

To authorize Operator, you must purchase an activation code online. Until you do, using the Operator demo means that you must run Live in demo mode, which disables saving or exporting any changes. Live 4.1 is a free update for registered Live 4 users.

MindPrint TRIO

How much recording-studio functionality can you hold in one hand for less than half a grand? German hardware manufacturer MindPrint (www.mindprint.com) recently announced the TRIO ($499), a compact tabletop device that contains a Class A mic preamp, 24/96 A/D/A converters, real analog compression, 2-band equalization, and a complete monitor controller that has talkback capabilities, two headphone amps, and outputs for three pairs of speakers. When used with a computer, the TRIO gives you nine simultaneous channels and zero-latency monitoring. Dedicated knobs are available for all functions, and stereo LED meters help you keep an eye on levels for optimum gain staging.

In addition to an XLR mic input with 48V phantom power, the TRIO sports a Hughes & Kettner high-impedance instrument input stage, two unbalanced ¼-inch line inputs, two RCA aux inputs, and unbalanced ¼-inch send and return jacks to insert an external processor. RCA jacks connect the TRIO directly to your computer's analog audio ins and outs, with optical S/PDIF for digital I/O. The compressor features Adaptive Response, which dynamically adjusts the attack time to suit the audio content. With or without a computer, the TRIO offers big-studio features at a small-studio price.

Sound Advice

Two new titles from **Sony** (www.sony.com/mediasoftware), arhythmiA: Drums & Drones, Volumes One and Two ($99.95 each), are part of the Sound Series Premium Collection. Nine Inch Nails drummer Jerome Dillon and sound designer/remixer Keith Hillebrandt produced both 2-CD sets. The content consists of acoustic and electronic drum and percussion beats (most of them heavily processed), droning electronic textures, synthesized melodic and bass lines, and unnatural sound effects. Numerous one-shots are on hand, and several construction kits let you layer parts to create your own grooves. All files are in Acidized WAV format, and many beats and construction kits are also provided as REX2 files.

Pro Drum Works, Volume One ($249), from **Smart Loops** (www.smartloops.com), is a 6-CD collection of Acidized WAV files that incorporates three drum kits recorded with and without effects processing. On each kit, drummer Frank Basile plays more than 3,000 grooves and fills in rock, funk, and other pop-music styles, all of them in 4/4 time. Additional recordings include individual drum and cymbal hits played at different velocities. To simplify searching, patterns are identified by names that indicate their style, rhythmic content, and complexity. Pro Drum Works, Volume One, also offers plenty of tips for quickly arranging realistic drum parts and has useful demo files from other Smart Loops collections.

Garritan Orchestral Libraries (www.garritan.com) has announced Garritan Stradivari Violin ($199), the first sample library to use Giorgio Tommasini's proprietary Sonic Morphing technology. Sonic Morphing harmonically aligns sound waves so that notes transition seamlessly when changing vibrato or dynamic levels, greatly enhancing the realism and real-time expressiveness of sampled solo instruments. According to Garritan, you no longer hear two distinct samples during crossfades as you do with conventional sampled instruments. The 24-bit Garritan Stradivari Violin is packaged on a single DVD-ROM in Native Instruments Kontakt or Kontakt 2 format, and has its own Kontakt player.

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POWER

Redmatica AutoSampler

Have you ever wished you could sample every note of your favorite hardware-synth sounds without all the hassle of recording, trimming, looping, and mapping? With AutoSampler (Mac, $130), from Italian developer Redmatica (www.redmatica.com), you can automate all the tasks necessary to create a sample instrument that's ready to use in Apple EXS24. AutoSampler can automatically sample any MIDI instrument, hardware or software.

You begin by telling AutoSampler which MIDI ports and channels to trigger, which audio channels to record, which notes you want to sample, and at what Velocities. Click on the Start button, and AutoSampler will begin to record a series of 16- or 24-bit samples. It will name them, normalize them, truncate them, transpose them, map them, assign them to layers, and save them—all according to your specifications.

AutoSampler can record instrument samples complete with full effects processing. It can create complex samples that crossfade between different sound sources. Record a single synth program with varying parameters, and then map parameter changes to different controllers for dynamic real-time control. AutoSampler makes sampling MIDI instruments easier than humanly possible.

M-Audio Key Rig and Drum & Bass Rig

M-Audio (www.m-audio.com) has released Key Rig (Mac/Win, $129.95), a virtual rack of four essential modules for keyboardists, and Drum & Bass Rig (Mac/Win, $129.95), which offers drum and bass sounds, and loop playback capabilities. Both programs run either standalone or as VST, RTAS, or Audio Unit plug-ins. Key Rig's SP-1 Stage Piano delivers acoustic, Rhodes, Wurlitzer, and FM piano sounds. MS-2 is a virtual polyphonic synthesizer, and MB-3 Electromagnetic Organ emulates a Hammond B-3, complete with nine MIDI-assignable drawbars and a rotary-speaker effect. GM-4 features the entire GM1 soundset.

Drum & Bass Rig's LC-5 Loop Creator has 250 source loops that you can mix and manipulate by rearranging and muting slices. BL-6 Bassline is a virtual monosynth with an arpeggiator and a step sequencer, designed to emulate the Roland TB-303. The RD-7 Real Drums module contains sampled kits and individual drums, with user control over tuning, panning, ambience, and other mixdown parameters. EB-8 plays electric bass guitar samples, including fingered, picked, and slapped notes, as well as slides and harmonics. Also included are a bass amp modeler and various effects.

Rev Up

NATIVE INSTRUMENTS KONTAKT 2

Native Instruments (www.nativeinstruments.com) has updated its flagship software sampler to Kontakt 2 (Mac/Win, $579; upgrades $169). This major revision has a slew of new features, including comprehensive surround integration, convolution effects, and unlimited undo and redo with an undo history. Kontakt's sampling engine now offers virtually unlimited polyphony and is 64-part multitimbral. A RAM Purge function can free up memory by unloading samples not being used in a track. Altivec optimization ensures greater efficiency running on Mac G4 and G5 computers, and multiple processors are now supported.

One particularly promising new feature is the Kontakt Script Processor (KSP), a programmable engine that uses an easy-to-learn script language for generating and transforming MIDI and control events. Kontakt 2 ships with an assortment of KSP presets that you can modify or use right away. A KSP User Library will be posted online, allowing users to exchange script modules.

Kontakt 2 can now import more than 30 file and sample formats. The convolution effects unit comes with a library of impulse responses that generate reverb, speaker, and microphone simulations. You can even use MIDI Program Changes to load banks of 128 instruments. And, of course, a massive new sample library is included. EM

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Got QUALMS?

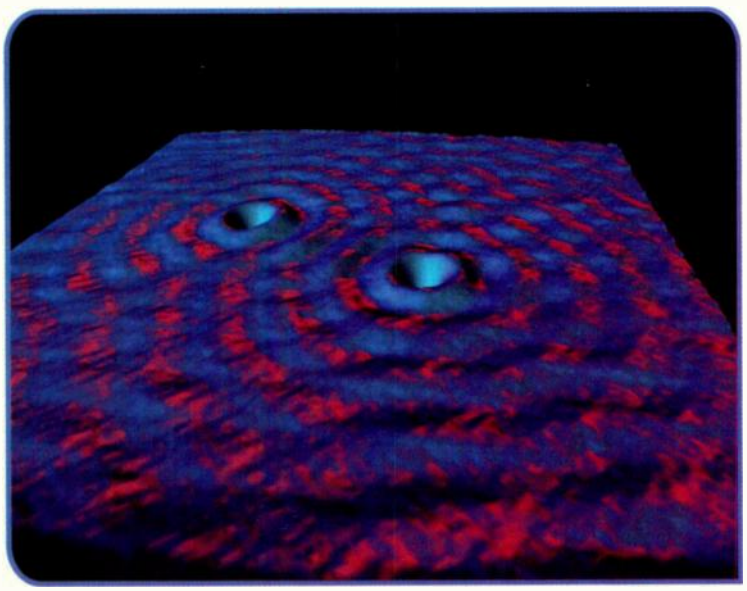
By Scott Wilkinson

Music synthesis that lets you hear your state of mind.

Physical modeling has always been among my favorite forms of synthesis. DSP technology is now powerful enough to solve the equations that describe the behavior of various acoustical systems, such as musical instruments, in real time.

A bold new step has been taken in this direction. Fu Ling Yu, a Chinese graduate student in both physics and music at the Beijing School of Heisenbergian Technology (www.bsht.edu), recently realized that acoustic-wave equations are not the only ones that can be used to model sound. He wondered if the equations of quantum mechanics, which describe the wave nature of subatomic particles (see **Fig. 1**), might be used in a modeling engine to reproduce the "sound" of the quantum realm.

From his studies in physics, Fu knew that quantum particles are described as sums of many separate wave functions, much as complex musical timbres can be described as the sum of many separate sine waves. These mathematical functions are combined to form one of the most important equations in all of physics: Schrödinger's Equation. Fu wondered what would happen if he plugged that equation into a modeling engine. What would it sound like?



COURTESY IBM

FIG. 1: In this image from a scanning tunneling microscope, electron-density waves diffract around atom-sized pimples on the surface of a copper crystal, demonstrating the wave nature of these particles.

Unfortunately, conventional computer horsepower is insufficient to render Schrödinger's Equation in real time. Fu, however, had a way around that problem: a prototype quantum computer sitting on his lab bench. He had built it as part of a project to see just how fast such a computer could search through huge tables of data, one of the most promising potential applications of quantum computing. That was precisely what Fu needed to process the data from Schrödinger's Equation in real time as if it described an acoustical system.

He decided to call his idea Quantum Linear Modeling Synthesis (QUALMS). After programming the quantum computer to spit out numbers based on Schrödinger's Equation, including octave transpositions to account for the fact that quantum waves are typically in the terahertz range of frequencies, Fu cobbled together a MIDI interface for note entry and a D/A converter to hear the resulting audio. To drive the QUALMS engine, he created a simple MIDI sequencer that can accommodate 127 billion tracks. (Quantum computers are *very* fast!)

The first time Fu tried the new synth, he heard bright, otherworldly timbres that seemed to reflect his excitement and anticipation. But when he played it for others, he was amazed to discover that their descriptions of what they heard were completely different from his; some described dark, somber tones, while others heard calm, serene textures. Over time, he also noticed that his perception of the same music was different depending on his state of mind.

Fu realized that QUALMS was behaving just like other quantum systems, which are affected by the presence of an observer. In conventional quantum experiments, the state of a particle (energy, position, spin, and so on) is indeterminate until it is observed or measured; in fact, before observation, it exists in a condition called superposition, which embodies all possible states simultaneously. The superposition "collapses" as soon as the particle is observed or measured, and the intent of the observer helps determine which state it ultimately manifests.

Similarly, the timbres generated by QUALMS exist in a kind of aural superposition, which collapses into well-defined harmonic structures depending on the listener's state of mind. In this case, however, Fu discovered that the collapse occurs in the mind of each listener independently, meaning that everyone hears timbres coming from the same audio output differently. The implications of this discovery for the future of music technology are staggering, so it seems certain that Fu Ling Yu will continue his work for years to come. EM

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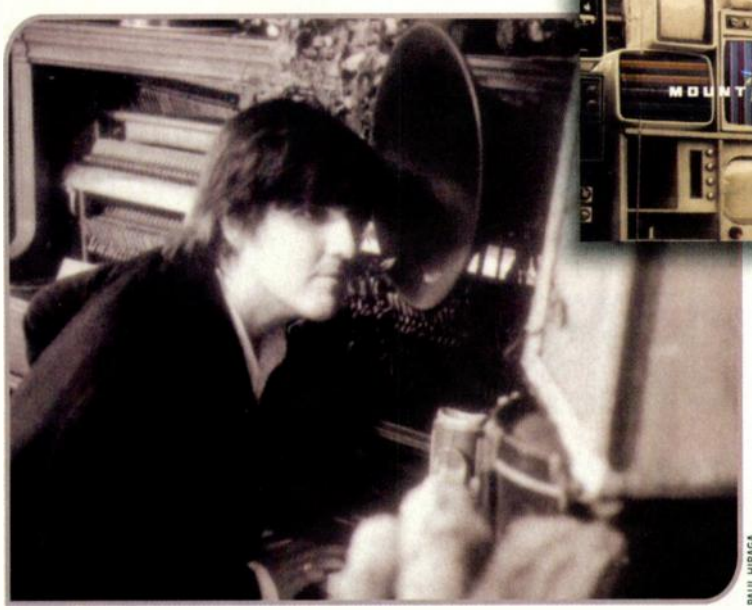
No Borders

By Matt Gallagher

Mount Analog's studio is an instrument in itself.

Tucker Martine is a Seattle-based producer, engineer, and drummer who works with noted experimental musicians, such as Bill Frisell and Wayne Horvitz. Martine also owns and operates Flora, his project studio in which he has produced sessions for Modest Mouse, Jesse Sykes, and many others. As a diversion, he formed Mount Analog, a creative collective. "It was founded on the philosophy of using the studio as an instrument," Martine says. "It's an outlet for me to try anything I want."

Mount Analog's second album, *New Skin* (Film Guerrero, 2004), features adventurous, cinematic sound collages. The album results from collaborations between Martine and Frisell, Eyvind Kang, Doug Wieselman, Jon Hyde, Steve Moore, Bruce Wirth, Keith Lowe, Tim Young, Dave Carter, and Fred Chalenor. Martine recorded different combinations of musicians playing a range of instruments such as guitar, harp, piano, viola, Mellotron, and Suzuki Omnichord. He then layered, processed, edited, and deconstructed their performances and sounds every which way.



PAUL HIRAGA

New Skin/Mount Analog

"The traditional song form is limited," Martine says. "I just wanted to hit on something captivating that felt like a place I'd never been before. How we got there wasn't so important. If a song was missing something, I'd highlight unlikely tracks to change the subject in the foreground. Sometimes I'd have people play along to only, say, the strings track without hearing the downbeats. This is a good way to get unique points of view."

When Martine recorded *New Skin*, his basement housed a control room and a live room. "The living room upstairs provided an additional recording space with wood floors, higher ceilings, and a piano," Martine says. He tracked sessions for *New Skin* onto two-inch tape using his MCI JH-16, 16-track reel-to-reel machine. He also recorded through a Digidesign Digi 001 interface into Pro Tools LE 6.1 on a Mac G4 867 MHz machine.

"About half of the record stayed on tape," Martine says. "Tape encourages a more organic process. A few pieces started in Pro Tools. A few were started on tape, transferred into Pro Tools, and then manipulated. I never tried to keep anything pure. I like the coexistence of dirtier sounds with cleaner sounds, and compressed sounds with dynamic sounds. The variety can add a lot of spatial depth to a recording."

Martine often arrived at final tracks through experimentation and accidental discoveries. "'Freeze Green' is actually two pieces combined," he says. "I made them both on tape but overlapped them in Pro Tools. The constant panning of the drums on 'Bell and Howell' was something I did out of frustration, but it gave the song what it needed momentum-wise and also gave it the depth of field I was looking for. 'Festival of Errors' came from a sound my board made when one of the channels went bad. It had this great limiting distortion. The intro to 'Giving up the Ghost' was the result of accidentally feeding an old Radio Shack reverb unit into itself and manipulating the pitch by adjusting the send level."

Martine further spiced up *New Skin* with excerpts from field recordings he made in Mali, Southeast Asia, and the United States. "I use a Sony TCD-D7 portable DAT recorder and an Audio-Technica AT822," he says. "I look for anything that jolts you out of the ordinary. Sometimes you capture something that's compelling on its own, and it's already mixed!

"For me, recording is a chance to create your own world, or highlight fascinating parts of our existing world that get overlooked," Martine says. "I look for ways to surprise myself." EM

For more information, go to www.mountanalog.com.

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MIKE CRUZ

Sharing the Load

By Orren Merton

With today's fast computers, is DSP hardware still worth considering?

When you see an audio plug-in running on a computer, it's natural to assume that the processing is being handled by the computer. The digital signal processing (DSP) software, however, may actually be running on a PCI card inside the computer or on an external hardware device connected to the computer by USB or FireWire. When DSP is carried out inside the computer, the processing is called *native*; software that uses additional hardware connected to your computer for its DSP is called *hardware accelerated*, and the additional hardware is called *DSP-accelerator hardware*. Traditionally, hardware-accelerated systems have been the realm of the high-end production studio, but today some DSP-accelerator cards are even less expensive than native plug-in bundles. In this article, I'll discuss various DSP-accelerator-hardware options and how they compare with native solutions.

Hardware-accelerated DSP offers some significant advantages, the most obvious being that it adds processing power to your computer. Arguments about whether native or hardware-based systems are more powerful miss the point; DSP hardware supplements, rather than supplants, native processing. With a Pro Tools Time Dimension Multiplexing (TDM) system, for example, you can use the DSP power of your hardware to run TDM plug-ins, and the native power of your computer to run RTAS and HTDM plug-ins. When using Universal Audio UAD-1 Powered Plug-in or TC Electronic PowerCore, you can run DSP-based and native plug-ins on your host application. You'll always get more processing power when you use a combination of hardware-accelerated and native processing.

DSP Flavors

DSP-accelerator hardware comes in a variety of flavors. PCI cards that fit inside your computer, such as the UAD-1 PCI card (see **Fig. 1**), the PowerCore PCI card, the Digidesign Pro Tools HD|Accel

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system, and the CreamWare Pulsar/Scope system are the most common. External rackmounted DSP-based hardware devices that connect to your computer via USB 2.0 or FireWire have also begun to appear. TC Electronics' PowerCore FireWire is one example.

There are two types of hardware-based DSP systems: self-contained systems and systems that work with a variety of native software hosts. With a self-contained system, everything related to audio processing is handled by the DSP hardware, including audio input, all signal processing and mixing, and audio output. Only the proprietary editor software runs native on the computer. The best known proprietary system is Pro Tools TDM. With a Pro Tools TDM system (there are Mix, HD, and HD|Accel versions available, each with different track counts and DSP power), the TDM hardware handles audio I/O using special TDM-only audio interfaces, mixes audio together with its 48-bit hardware mixer, and provides for effects processing using hardware-based TDM effects. The Pro Tools software serves as a native front end for the TDM hardware. Merging Technologies' Pyramix system is another self-contained audio production solution.

FIG. 1: Universal Audio's UAD-1 Powered Plug-in PCI card runs software models of classic analog hardware compressors and EQs, such as this emulation of the Fairchild 670.

Nonproprietary hardware accelerators are not limited to working with a specific native-audio engine and allow you to integrate their DSP with plug-ins running natively in your chosen host software. Examples include the UAD-1 and PowerCore PCI cards. Those run proprietary plug-ins on their DSP hardware that integrate with plug-ins in formats such as VST, AU, and DirectX that are running native in your host software.

Some hardware DSP devices offer several options. CreamWare's Pulsar/SCOPE is a PCI-card system that can be used as a self-contained system or as a DSP accelerator, allowing its proprietary plug-ins to be used alongside native VST plug-ins. Manifold Labs' Plugzilla and Muse Research's Receptor offer hardware-based VST plug-in hosting as well as standalone use when disconnected from the computer (see **Fig. 2**). That is especially useful for performing musicians who want to take their VST plug-ins on the road.

Extra Power

Another advantage of hardware-based DSP systems, which applies only to self-contained hardware systems such as Pro Tools TDM and Pyramix, is that they don't have the recording latency inherent in native audio systems. For those not familiar with this phenomenon, let me explain.

When you record audio on your computer, your audio interface converts the incoming analog signal to digital form, and then your computer stores chunks of the digital data in a temporary memory buffer before passing it on to your audio software for processing and writing to disk. The size of the temporary buffer determines the lag time between when the data enters the computer and when it reaches your audio software. Smaller buffers offer lower latency, but they increase the demands on the CPU because the data in the buffer has to be shuttled to the software more often. As a real-world example, recording at a sampling rate of 44.1 Hz with a 512 byte buffer calculates to a latency of 11.6 ms, a noticeable lag. DSP-based systems, on the other hand, devote their DSP hardware solely to processing the incoming audio and do not experience any buffering at all. That is why a Pro Tools TDM system can record an entire symphony orchestra with virtually no latency.

You'll always get more processing power when you use a combination of hardware-accelerated and native processing.

DSP hardware-based systems offer higher quality processing than native systems. Native software can, in theory, do everything DSP-accelerated software can; however, native systems have to do a lot more than process audio. DSP-accelerator hardware is completely dedicated to audio processing, and developers do not need to compromise performance to leave time to run

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the computer's operating system and other software applications. Developers can therefore design complex, DSP-intensive applications that would bring a native system to its knees. Some of the most sought-after plug-ins are available only for hardware-accelerated systems because they are too processor intensive to run native (see Fig. 3).

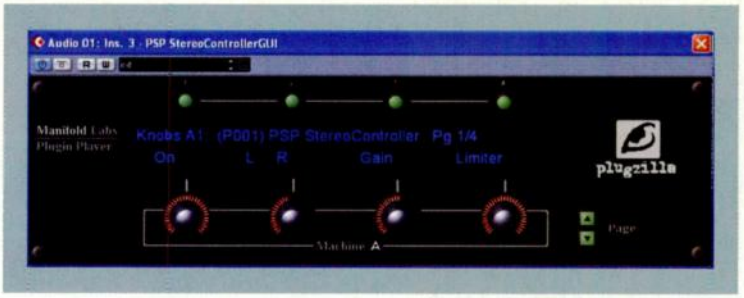


FIG. 2: The PSP Audioware ProZilla series of plug-ins allows you to use a VST host application to configure the plug-in before transferring the effect to the Manifold Labs Plugzilla.

For a Price

Using DSP hardware accelerators is not always a bed of roses. For starters, there is the price. Self-contained DSP systems tend to be very expensive—even the least expensive Pyramix or Pulsar/SCOPE system with enough DSP to record and mix a complete song will cost you more than a couple of PCs. The least expensive Pro Tools Mix system and interface retails for around $6,000. A cutting-edge Pro Tools HD|Accel rig with a high-end Digidesign 192HD interface will set you back three times that amount. Increased DSP power and I/O costs even more. Recently, DSP-accelerator hardware that's more affordable (under $500), such as the UAD-1 Project Pack or the PowerCore Element, have begun to appear, but adding more DSP or additional proprietary plug-ins can still boost the price to above that of the computer itself.

If you opt for one of the nonproprietary DSP accelerators to integrate with your native software, plug-in latency will be the bane of your existence. When you mix hardware DSP with native software, you are routing the audio from your native software to your accelerator hardware and back again, which takes time. Using DSP hardware plug-ins in native software will roughly double your latency, and unless you use delay-compensating plug-ins or manually shift your audio tracks, tracks that use DSP hardware plug-ins will not be in sync with tracks that don't. Thankfully, most audio applications are now able to compensate for this delay automatically when playing back audio. Unfortunately, it is not possible to compensate for this

DSP HARDWARE HELL

I recently assembled what I considered to be a dream system: a dual-G5 2 GHz PowerMac, a TC Electronic PowerCore PCI card, a Universal Audio UAD-1 Powered Plug-in PCI card, and a Metric Halo ULN2 FireWire audio interface. I combined the most powerful Mac ever built with two spectacular DSP-accelerator PCI cards that have excellent plug-ins and arguably the most professional-sounding FireWire audio interface on the market. I chose a FireWire interface on the assumption that keeping audio I/O on the FireWire bus instead of running everything on the PCI bus would result in better performance. So much for assumptions.

I immediately encountered an apparently intractable problem with the combination of PCI and FireWire—FireWire audio intermittently sputtered and dropped out. At times, switching applications appeared to be the culprit, but other times the audio would die without any discernable cause, and the only way to recover it was to reboot. It was clearly a G5 FireWire-compatibility problem, because it didn't happen with built-in audio or USB audio or on a PowerMac G4. My ideal system was seeming less ideal by the minute!

At first I suspected the FireWire interface, but it turned out that the problem was always immediately preceded by a specific FireWire-driver failure that was not generated by the interface. Next, I turned my attention to the DSP cards and the various native plug-ins I had installed in my system. I consulted with the various manufacturers, who were all very helpful but were completely stumped.

After months of troubleshooting, a definitive solution has still not been found, but the problem has been identified as a low-level FireWire driver-controller issue with the G5 motherboard. That manifests itself only when the G5's PCI-X slots are filled with high-bandwidth PCI cards and audio is being streamed to a FireWire audio interface. Due to some bus arbitration issue, FireWire audio is being cut off. Until Apple delivers a system or firmware update, or developers figure out a way around this issue, I'm out of luck.

So did I give up on hardware DSP accelerators? No. I knew I was on the cutting edge and, unfortunately, got sliced. I switched to an RME Hammerfall DSP 9632 PCI card for my audio interface and can now use my G5 with both DSP cards for audio processing, the ULN2 converters for their sound quality, and the RME card for audio I/O. Having the quality of the DSP cards was well worth the hassle and expense.

latency on live inputs, so it is generally not feasible to use hardware based DSP plug-ins during recording, at least if you want to monitor the results.

Perhaps the most significant price for integrating DSP hardware with native software is that there are more—and potentially more serious—compatibility issues to deal with (see the sidebar "DSP Hardware Hell"). Sometimes there are basic platform compatibility issues: for example, CreamWare is still working on OS X compatibility for the company's Pulsar/SCOPE system, the Pyramix system is PC only, and many Pro Tools TDM plug-ins are Mac only. Other times there are more subtle and insidious problems such as your PC's video card causing problems with your DSP card, your Mac's PCI cards not being arranged properly to get the best performance out of your DSP hardware, or too many FireWire devices adversely affecting the throughput of your FireWire DSP hardware.

FIG. 3: The Sony Inflator plug-in runs on the TC Electronic PowerCore series of DSP accelerators and can be accessed in any VST- or AU-compatible native audio software.

Although some people never experience any hardware issues, others are unable to ever get their hardware DSP devices to work together properly. Generally, the fewer unknowns in your system, the less likely you are to have problems. For example, Pro Tools users can rely on the Digidesign compatibility charts to determine if a particular computer model is approved for a given setup. On the other hand, users trying to integrate DSP hardware into an already extensive native setup encounter many more variables, and manufacturers' guidelines are far less specific.

DSP in the Balance

The ultimate questions are does DSP-accelerator hardware live up to its hype, and how do the negatives play out in the real world? Quality DSP-accelerator hardware really does make the grade. The UAD-1's simulations of analog compressors and EQs are spectacular. PowerCore has world-class proprietary effects and excellent third-party plug-ins. CreamWare offers some of the most well-regarded synthesizers available. The sound of the Pro Tools HD and HD|Accel mixer is practically unmatched, and many TDM plug-ins surpass anything available for native systems.

For those on a limited budget, however, self-contained hardware systems are most likely out of reach. Although a project-studio owner may be able to stretch for a Pulsar/SCOPE system or mortgage the house for a Pro Tools HD rig, that money might be better used buying a collection of high-quality microphones or other essentials. On the other hand, DSP-accelerator cards do offer a fantastic value for both project studios and home users. If you are considering spending $400 to $500 on a plug-in bundle for your desktop computer, it's definitely worth considering buying a DSP-accelerator card. EM

Orren Merton is the author of Logic 6 Power! *(Muska & Lipman, 2003) and* GarageBand Ignite! *(Muska & Lipman, 2004). He can be reached at orren@mertonfolio.com.*

Expand your sonic palette with this versatile sample format.

Experimenting with SoundFonts

By Kurt Heiden

SoundFonts are like a gift that keeps on giving. For commercially-minded musicians, SoundFonts can open the door to a potential market of millions through the creation and sale of sample libraries. For beginners, using SoundFonts can serve as an ideal way to learn about sampling and synthesis. And for just about anyone, they can be an excellent resource to add to an audio arsenal.

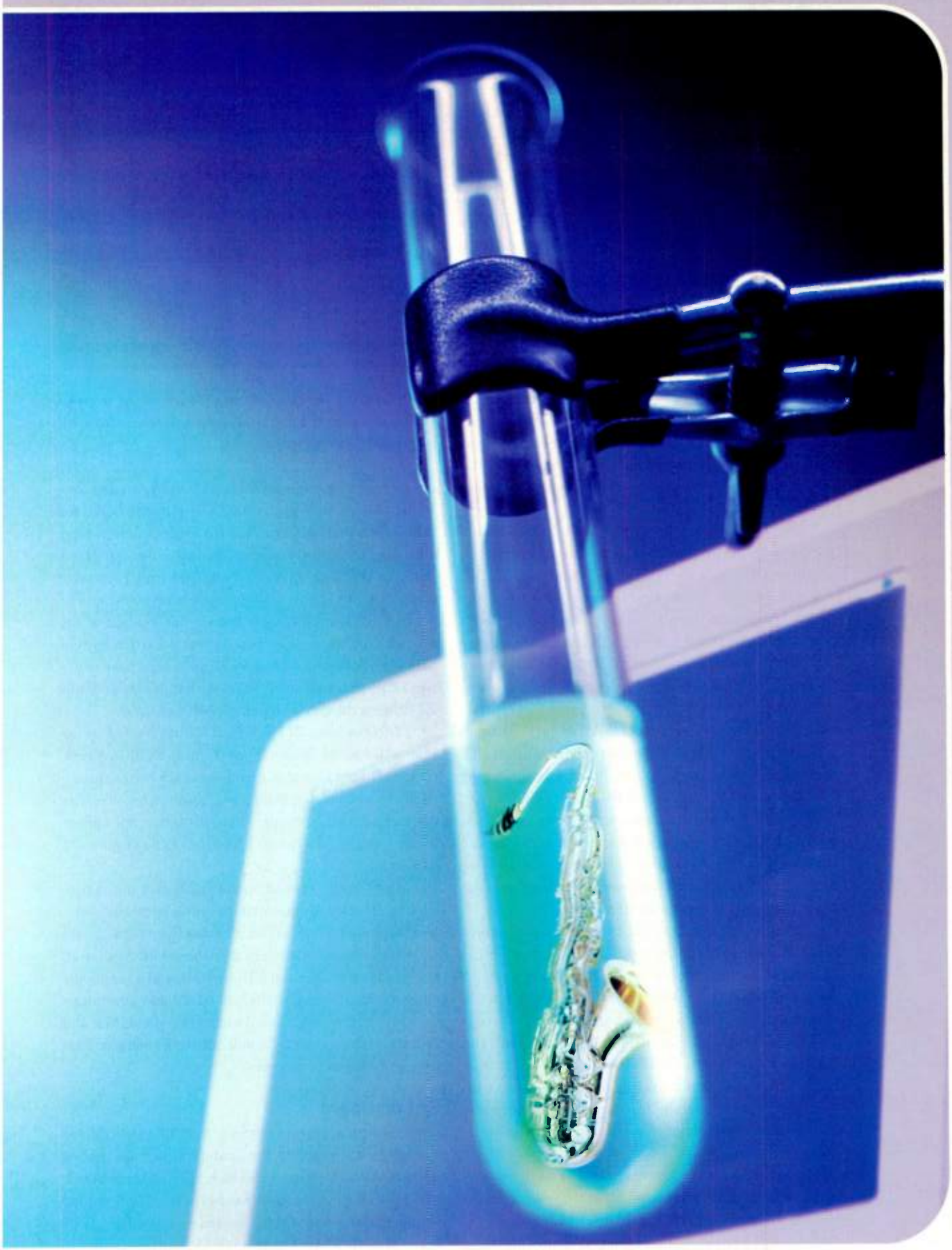
In addition to being a very flexible format, SoundFonts are a great way to share your music with others. You can send a MIDI file and a SoundFont bank via email using less bandwidth than most MP3 files, and the fidelity will be better because there isn't any compression taking place. Think of the MIDI file as your score and the SoundFont bank as your orchestra, and then bundle the two together so that the recipient hears your music as you intended.

Another great benefit of SoundFonts is that they let you completely reconfigure your hardware using just a few mouse-clicks. You can turn your generic General MIDI (GM) sound card into an E-mu Proteus 1, Vintage Keys, or Planet Phatt module, all for less than $100. That's not a bad deal.

In this article, you'll discover that using and creating SoundFonts is simple. Thousands of sound banks, several bank editors, widespread application support, and the overall flexibility of the SoundFont format could make it the perfect "instrument" for your studio.

Checking the Compass

SoundFonts are a sampling file format developed by E-mu in the mid-'90s. SoundFont banks require a synthesizer or sampler (used as an engine) for playback and software to load them into the instrument and to edit them. Until recently, the synth or sampler had to be hardware from Creative or E-mu (for example, the Sound Blaster Live or Audigy line of sound cards and E-mu's Audio Production Studio). Software instruments, however, now have many of the same capabilities.



FRANCISCO CRUZ/SUPERSTOCK

When a SoundFont bank gets loaded into a SoundFont-ready program, that program reads (parses) the sample and parameter data in the file and communicates it to the hardware, where it is rendered instantaneously into sound. Like any other patch, the sounds in the SoundFont bank are then accessible by your MIDI sequencer or controller.

The SoundFont file format is currently supported by Apple for software rendering in QuickTime 5 or higher, and is supported in hardware by nearly all Sound Blaster cards since 1997. Because Creative Labs has about 90 percent of the Windows sound-card market, there's a good chance that your studio already has SoundFont capabilities in one form or another.

Sailing Back

At first, the SoundFont format was proprietary, and all development had to go through Creative Labs or E-mu. That clearly dampened proliferation of the format. After surviving challenges by rival sampling formats DLS and DLS-2, the format was opened up for development without license in the late 1990s.

SoundFont bank files contain audio samples and parameter information about how the audio is to be processed. The first version of the SoundFont file format (SoundFont 1) was designed only for the E-mu 8000 chip used on the AWE-series sound cards. Banks in that format, which used an SBK file extension, are no longer supported, and most, if not all, have been updated to the SoundFont 2 format. SoundFont 2 added dozens of new features, including essentials such as Instrument layering and Preset-level parameter changes. SoundFont 2 files have the extension SF2, and most current SoundFont bank editors, including Creative Labs' Vienna 2.3, will convert SBK banks to SF2. The current specification is SoundFont 2.1, which also uses the SF2 extension. Note that Vienna requires SoundFont-capable hardware from Creative or E-mu to function, and AWE-series cards do not support the format beyond SoundFont 2.0.

SoundFont 2.1 introduced incredible new features that take users to the limits of the MIDI specification and in some cases, beyond. For example, it allows up to 16 MIDI controllers to control up to 34 different parameters within a single Instrument. Each of the controllers can have its own curve coefficients (see **Fig. 1**, lower left, and the section in this article called "Below Deck"). That capability is accessible when creating or editing banks with Vienna 2.3; unfortunately, however, there are currently no Mac-based SoundFont editors that give access to the multiple-controller function.

In addition to the extra controller assignments within a bank itself, additional MIDI controllers, called E-mu Enhanced Controls, are made available on CC 21, CC 22, CC 23, and CC 24. Those Control Change messages

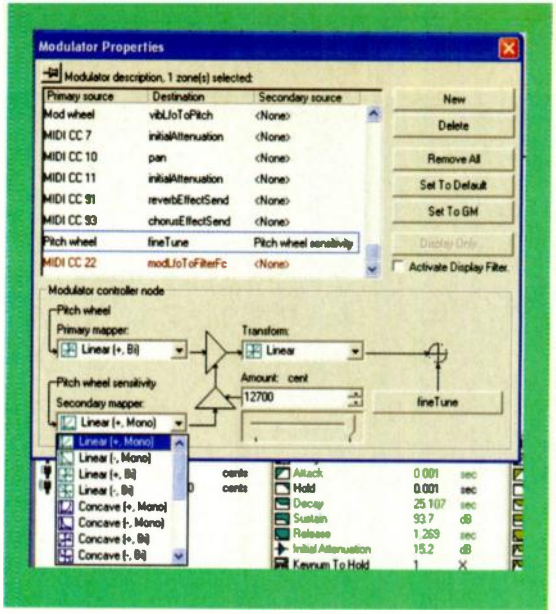


FIG. 1: Creative's Vienna SoundFont editor allows you to assign multiple controllers to a destination and provides access to the full range of SoundFont features.

can be called from any MIDI sequencer by sending controller data on the appropriate CC number and used for things such as assigning an LFO to Filter Cutoff. (A great example of that can be found at Creative's SoundFont Tutorial Web site at www.soundfont.com/tutorials/whysf21-4.html.) You can also create a keyboard split in which Pitch Bend messages impact the top half of the split with different curve characteristics than the bottom half. With SoundFont 2.0 or DLS2, you would need to use two MIDI channels to accomplish that, but SoundFont 2.1 delivers the goods on a single MIDI channel.

DLS (and later, DLS2), a rival format created by the Interactive Audio Special Interest Group (IASIG), resembles SoundFont format in many ways. DLS banks are easier to render on slower computers, however, because they don't contain all of the parameter data that SoundFont banks contain. As a result, DLS banks don't require any hardware.

Once Creative opened up the SF2 format to the public, SoundFont-capable software synthesizers and samplers appeared on the scene, allowing SoundFont banks to be used without Creative or E-mu hardware. As a result, the relevance of DLS and DLS2 waned, and SoundFonts emerged as the predominant, affordable computer-based sampler format. Today, most software on Mac and Windows that supports SoundFont banks will also support DLS banks and vice versa.

Get on Board

Most modern operating systems (including Linux) have the ability to work with the SoundFont format. A vast number of Windows machines have a Sound Blaster card, which gives them built-in hardware-level SoundFont support. Mac users will be pleased to know that as of Mac OS X 10.3, Apple has added SoundFont support

Retro is So Now

The engineers at GForce have a passion for one thing—incredibly realistic emulations of vintage keyboards. These software instruments bring back the synths that defined an era—the Minimoog, ARP Odyssey, Oxford OSCAR and Mellotron. In addition to being authentic in sound and function, these incredible emulations have the advantage of modern features like memory, additional modulation and new performance modes the original designers never dreamed of (not to mention staying in perfect tune). Use them alone or with your favorite host software.

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through the QuickTime Preference Pane. Most third-party SoundFont-capable synths are VSTi or DXi based, so they play well with nearly all MIDI sequencers.

When working with SoundFont banks, there are distinct advantages to using Sound Blaster or E-mu hardware. The hardware renders the SoundFont banks and handles all SoundFont-related DSP functions (reverb and chorus, for example) on the sound card instead of using the computer's CPU. Using SoundFont-capable hardware virtually eliminates latency and frees up computer-processing resources, allowing you to use a greater array of other tools such as effects or instrument plug-ins. It also means that you have more voices (polyphony) to work with, because the sound card acts as a coprocessor. In addition, most SoundFont hardware has MIDI, analog, and (sometimes) digital I/O.

Older ISA-based Sound Blaster cards such as the AWE series had RAM on the card itself instead of using system RAM the way the newer cards do. ISA-based cards are far less desirable because that type of RAM is no longer produced in mass quantities. Moreover, if you're interested in SoundFont banks for music production and are still using a system with ISA slots instead of PCI slots, it's probably time to upgrade your PC.

Until recently, notebook users had no hardware rendering options for SoundFonts. The new SoundFont-capable SB Audigy 2ZS notebook, however, is a pint-size PC card and a bargain at $129, even though it doesn't include a MIDI interface.

If you are not using a Sound Blaster Live card from Creative (or don't want to), you can still use SoundFonts, but you'll need a software synth or sampler that supports SoundFont bank loading and rendering. There are a handful of choices for the PC, including MAZ Sound Tools' VSampler 3, Cakewalk's Project 5, and Steinberg's Halion. Mac-based synthesizer/samplers include Bismark's BS-16, Pete Yandell's Simplesynth, and Apple's GarageBand 1.1.

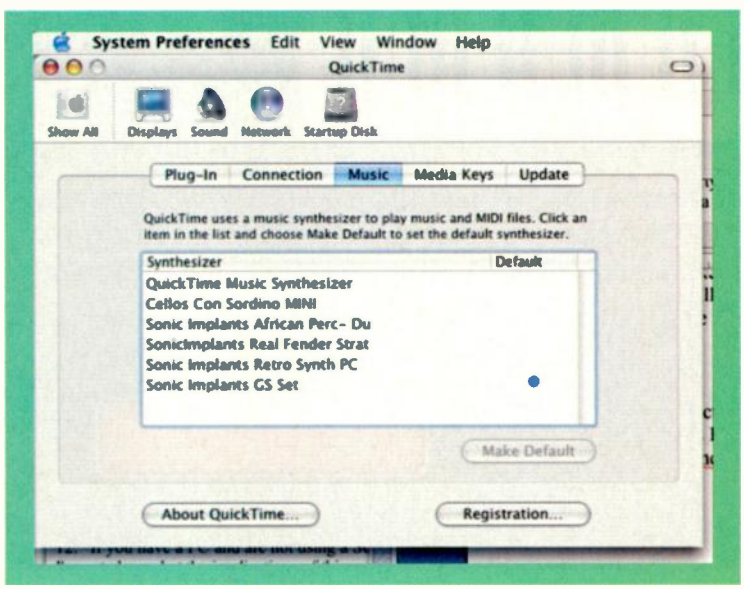

FIG. 2: By placing a SoundFont bank in the Library/Audio/Sounds/Banks folder under Mac OS X, you can control the default GM sound bank using QuickTime's Preference Pane.

Mac OS 9 users can get SoundFont hardware rendering by using Sound Blaster Live for Macintosh. Although discontinued, those cards are offered for less than $50 used on eBay and come with a useful SoundFont bank manager/librarian and excellent SoundFont performance. Creative has no plans to update the card with OS X drivers, and it doesn't run in the Classic environment, so it's only for OS 9 users.

Although there's no hardware rendering option under Mac OS X, the host CPU has SoundFont support. And given the power of most modern processors, the impact on performance is minimal. The number of software programs that support SoundFonts under OS X is growing. In fact, it was only in the past year that Apple added native support for SoundFonts, so look for more Mac-based software development in the coming months, particularly in the area of SoundFont bank management and editing.

Regardless of platform, anyone who is serious about using SoundFonts should visit www.SoundFont.com. You'll find details available regarding the format itself, including a white paper, technical specifications, application notes, tutorials, and explanations of some of the unique features that make the SoundFont sampling format stand out among others (see www.emuscian.com for a list of additional SoundFonts resources).

Secure the Riggings

At their core, SoundFont banks start with a mono or stereo 16-bit, PCM audio file (WAV or AIFF) at any sampling rate. When imported into a SoundFont editor, these files are automatically copied, converted to the native SoundFont format, and embedded into a SoundFont file. In the SoundFont editor, the sample can be structured into Instruments and Presets. The Instrument layer is where you adjust parameter settings on a per-sample basis. It gives access to customization options such as amplitude, modulation, filters, LFOs, envelopes, and tuning. The Preset layer is where you assign patch numbers and names to individual Instruments and apply any global parameters that you want. Each Preset can contain multiple Instruments (via layering), and the amount of performance-parameter data that can be included in Presets and Instruments is extensive.

The most basic use of SoundFont banks, however, doesn't involve editing or knowing anything about what's inside them. You can get your feet wet just by replacing the default system GM bank (Bank 0) with a larger SoundFont bank. Bank 0 is the bank of sounds that came with your computer's operating system or sound-card installation. Accessing Bank 0 from within a MIDI sequencer should give you a GM

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sound set on most PCs or Macs, provided that you are using the latest OS version. Depending on your system configuration, the default system bank included from Creative (through the sound card) or Apple (built into QuickTime 5 or later) is usually only 2 MB to 8 MB in size. Squeezing 128 samples into 8 MB compromises quality, and 2 MB of GM banks is even worse.

Companies such as Sonic Implants, sYnerGI, and EYE & I Productions (Voice Crystal) have 12 MB and larger SoundFont banks available that range in price from $18 to $80. Those libraries will work on Macs and PCs and typically include higher-quality samples, more attention to parameter detail, and generous use of available RAM (see the sidebar "Commercial Collections" for other commercial banks). If you do a lot of work with Apple's built-in QuickTime synthesizer or you often use the default GM bank on a PC, a quality GM SoundFont upgrade bank is an excellent way to improve upon the basic GM instruments that came with your computer or sound card.

Users of Sound Blaster Live cards can find the actual default SoundFont bank on their system by doing a file search for "SF2." You'll likely find at least one file with a name like "ct4mgm.sf2." You can use the bank manager that came with the Sound Blaster Live card to substitute a new bank for the existing one in Bank 0.

The built-in GM bank on a Mac running OS X is a 2 MB DLS bank from Roland. The file itself is named "gs_instruments.dls" and is nested deep in the hierarchy of the OS X System folder. Mac users can upgrade the default GM bank used in QuickTime with an alternative bank by placing an upgraded GM SoundFont bank in the Library/Audio/Sounds/Banks folder. Then, open the System Preferences pane and choose QuickTime. When you click on the Music tab, you'll see the SoundFont banks that you placed in the folder (see **Fig. 2**). Select the desired bank using the Make Default button, and it will be inserted as Bank 0. At that point, it will appear as an alternative to QuickTime Music Synth in GarageBand 1.1 or higher, Logic, and other OS X applications.

To access a replacement GM bank in GarageBand, select Get Info on an instrument track, and then click on the pencil icon to the right of the Generator labeled DLSMusicDevice. When the window opens, choose your new GM bank from the drop-down menu.

If you're using Mac OS 9 and want to swap out the default GM Bank 0 used by QuickTime, you'll need to create a folder called Sound Banks (if not already present) in your System Folder/Extensions/QuickTime Extensions folder. Place any replacement SoundFont banks in this folder, then run the QuickTime Control Panel and choose Music from the pull-down menu. You'll see the default QuickTime Music bank next to your newly added banks with an option to select a new default.

Keeping track of which bank is loaded into the default GM Bank 0 and which are loaded into higher-numbered banks requires a bank-management system. A few MIDI sequencers, including Sonar and Cubase, have built-in SoundFont bank management. PC users with an Audigy or new Creative sound card also get a very functional utility called SoundFont Bank Manager, which lets you manage your sample banks. By clicking on the MIDI Devices button in this program, you can adjust the amount of RAM allocated for SoundFont use. The default is only 12 MB, so that would rule out some of the more robust GM bank alternatives, such as the 24 MB GM set from Sonic Implants. I keep mine at about 100 MB so I can switch among banks at a moment's notice. Users of software synths, including those under Mac OS X, will not need to allocate RAM, as any software synth you use should do it for you dynamically.

Commercial Collections

Browse the back pages of an issue of EM or visit music sites on the Web, and you'll find a huge world of ready-made SoundFont banks available for purchase. These include a wide range of sounds such as classical, pop, and ethnic instruments; vintage Roland synths; and electronic dance collections. There are some free banks online, but you generally get what you pay for.

A great place to start looking for quality banks is directly from the source that invented the format: www.SoundFont.com, the official home of SoundFonts at Creative/E-mu. That is where you'll find SoundFont versions of classic E-mu sound modules like the Proteus and Planet Phatt. You'll also find third-party banks, including a 4 MB Bösendorfer Piano, and banks of Sequential, Moog, Oberheim, and Roland synths.

Another great source is Sonic Implants, which offers a host of reasonably priced, professional-quality banks. Sonic Implants' catalog includes synths, pianos, guitars, brass, basses, and even vocals. For dozens of free SoundFont banks, be sure to visit www.Hammersound.net. Also look to www.samplecraze.com for European SoundFont libraries, www.analoguesque.com/soundfonts.asp for vintage synths and drums, and www.houseofsamples.com for a vast array of sample collections and SoundFont utilities. While at House of Samples, check out the link to the Free Samples site, where you can find some unusual samples to use as the basis for your SoundFonts.

The View from the Deck

Now that you've tackled the default GM bank, you'll probably want to investigate adding other SoundFont libraries. Look for quality instrument samples followed by generous

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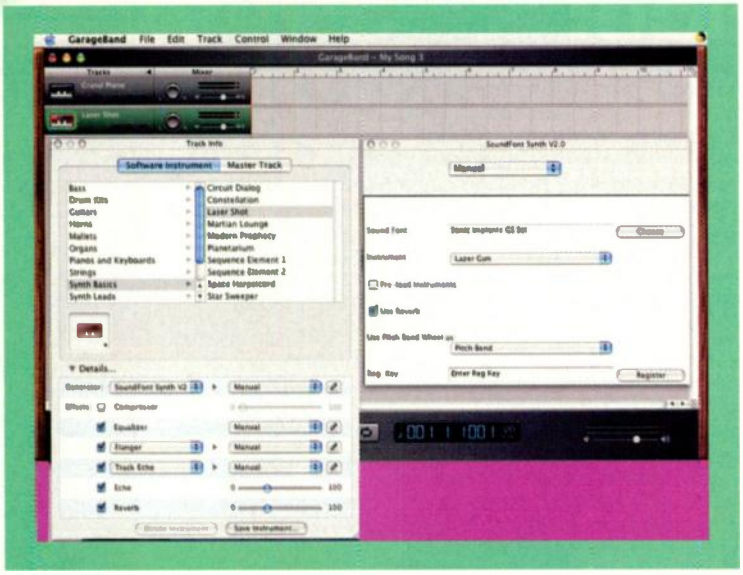

FIG. 3: Swapping banks within GarageBand is simple when using Andy Drabble's SoundFont Synth 2.0.

amounts of tweaking on the parameters. The SoundFont format supports layering, panning, and detuning Instruments, adding reverb or chorus, adjusting filter cutoff, Velocity switching, and much more. The best commercially available SoundFont banks will exploit these features to create professional-quality Presets. In general, most commercially available banks are likely to use better samples and be of higher quality than the free goods you'll find all over the Internet.

To load and manage a SoundFont bank other than Bank 0 on Mac OS 9, you'll need a Sound Blaster Live card for Macintosh. If you're lucky enough to have one, you'll need to install only the software that came with it. In addition to a bank manager and Preset editor called SoundFont Bank Manager 1.1, you'll have a handy Control Panel that will let you modify the amount of RAM that your SoundFonts can use.

A valuable download for Mac OS X users who want to load and manage banks is Andy Drabble's SoundFont Synth 2.0. It's an Audio Units (AU) plug-in that allows loading of any SoundFont bank within any AU-capable application, including GarageBand, Logic, and MOTU Digital Performer. **Fig. 3** shows SoundFont Synth in GarageBand. Here it is being used to replace the Laser Shot sound from the default Apple GM bank (left) with the Lazer Gun Instrument found in Sonic Implants' 24 MB GM bank (right).

Under OS X, Apple's built-in SoundFont-capable synthesizer, DLSMusicDevice, is addressed as an AU plug-in. SoundFont or DLS banks can be swapped inside DLSMusicDevice, and because it's a plug-in, it shows up in any AU-capable host application, including Apple's EXS24 Sampler within Logic Pro 7, GarageBand, and Granted Software's Rax. (Rax is a great way to manage banks within Apple's built-in synthesizer and SoundFont Synth 2.0 simultaneously.)

Note that SoundFont bank managers on the Mac OS typically refer to Presets as Instruments, a convention used by the DLS specification (DLS support appeared on the Mac before SoundFont support). That can be confusing because, unlike Presets, the Instrument level in a SoundFont bank does not have a bank number, patch number, or patch name. When you see "Instruments" on most SoundFont synths/samplers while working with SoundFont banks in OS X, you're actually working at the bank's Preset level.

Under Windows, the process of bank management will vary depending on the Sound Blaster card you're using. (If you don't have a Sound Blaster Live card, you'll need to pick up a software sampler or synthesizer with SoundFont support to do bank management.) Sound Blaster Live or Audigy sound-card owners will find a SoundFont Librarian/Manager under the Creative menu in their Start menu.

If you're using a PC and are serious about SoundFonts, I recommend that you purchase a used or refurbished Audigy Platinum sound card (available on eBay for less than $100) because it has MIDI In and Out. That card is also the most flexible in adjusting sample RAM and has the most up-to-date SoundFont management tools. Be sure to crank up the amount of available RAM assigned to SoundFonts by using the SoundFont Librarian/Manager, as the default is only 12 MB.

Windows users should note that Cakewalk's Sonar has a SoundFont bank manager conveniently listed on its Options menu. (That option appears if you have SoundFont hardware present. See **Fig. 4.**) Simply open

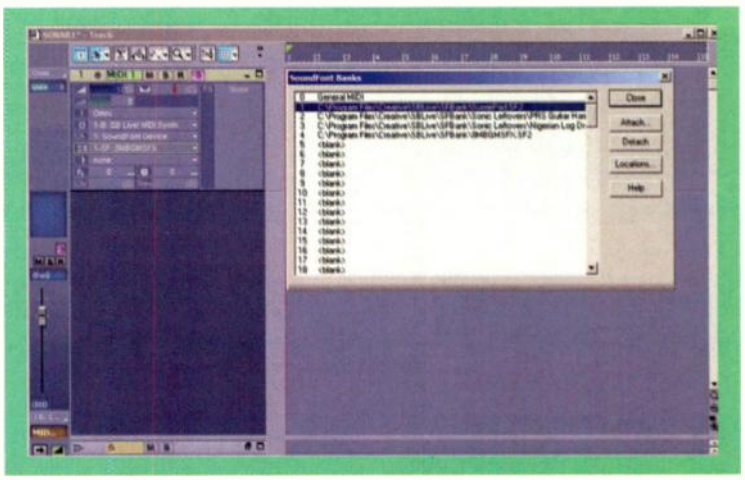

FIG. 4: Cakewalk's Sonar has an option to attach a SoundFont file to a bank. The Attach menu (right) shows the SoundFonts currently assigned as banks for use in the Track area (left).

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the SoundFont menu item, select bank 1 (or any other available bank), click on the Attach button, then click on Close. Now assign the bank to any track's Bank field, and all of the Preset names will show up on that track's Patch drop-down menu. That makes bank management quick and easy, so check your sequencer of choice to see if it contains a similar feature. Sonar 4 users without SoundFont hardware can use the included DS864 software sampler to load a SoundFont bank as a DXi instrument.

Below Deck

Although there are many high-quality banks on the market, you'll get the urge to make your own at some point. (See the sidebar "Jen's Top SoundFont Tips" for additional ideas on SoundFont creation from Jennifer Hruska, founder and president of Sonic Implants, a division of Sonic Network, Inc.) One of the first decisions you'll have to make is what sampling rate to use. The choice of rate when recording samples for SoundFont banks depends on the capabilities of the synth that will render the banks and whether you're trying to keep bank size to a minimum.

SoundFont	CC99	CC98	data (CC6-MSB, CC38-LSB)
Envelope 1 Attack	127	5	0, 5940
Envelope 1 Decay	127	7	0, 5940
Envelope 1 Sustain	127	8	0, 127
Envelope 1 Release	127	9	0, 5940
Frequency Cutoff	127	21	0, 127 (64 default)
Resonance	127	22	0, 127 (64 default)

GS/XG	CC99	CC98	data (CC6-MSB, CC38-LSB)
Envelope Attack	1	99	64 default, from 14–114, or ±50
Envelope Decay	1	100	64 default, from 14–114, or ±50
Envelope Release	1	102	64 default, from 14–114, or ±50
Frequency Cutoff	1	32	64 default, from 14–114, or ±50
Resonance	1	33	64 default, from 14–114, or ±50

FIG. 5: Using Non-Registered Parameter Numbers (NRPNs) with a SoundFont synthesizer requires sending different Control Change messages than with GS/XG synths. If you've already composed with NRPNs using another synthesizer, you'll need to do some editing.

For the best-quality sampling on a Sound Blaster Live or Audigy sound card, sample at 16-bit, 48 kHz, before importing your files into your editor. Those cards

Jen's Top SoundFont Tips

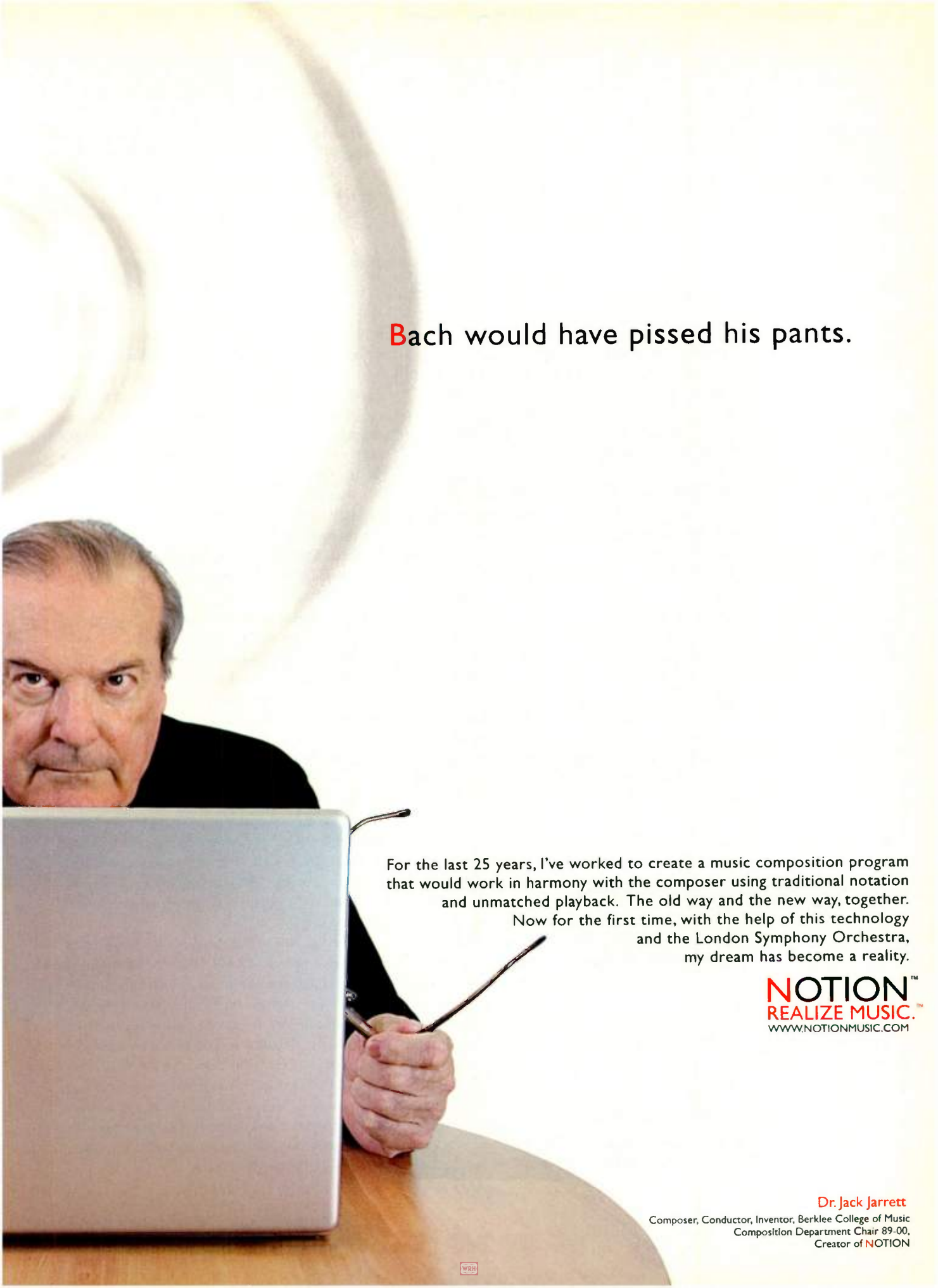
Since Sonic Implants began creating SoundFont banks almost ten years ago, the sampling industry has seen more than its share of innovation and change. Today, despite the proliferation of disk-streaming samplers, many musicians still rely on SoundFont technology for its simplicity, quality, and affordability. For those who find themselves constantly tweaking and tinkering with their commercial sounds, creating your own SoundFont banks can be a rewarding experience. With that in mind, Jen Hruska of Sonic Implants offers a few tips for helping you make the best SoundFont banks possible.

1. Get the best recordings that you possibly can. That might seem like an obvious consideration; however, like all processes that build outward from one critical stage, having a pool of quality source material will only enhance the caliber of the finished product. If you don't have the means to get high-quality recordings, consider creating variation programs from your existing SoundFonts. For example, adding new filter and other modulation settings to existing programs can make fresh new timbres for your music.

2. Consider creating multiple Velocity layers (soft, medium, and loud) for added realism. You won't have much use for that if you're sampling an old 909 or your uncle's B-3, but most acoustic instruments have timbral attributes that relate directly to the strength (or lack thereof) with which the instrument is played (for example, getting brighter as you hit harder). Capturing even some of those subtleties and layering them into your Instruments will have a significant impact on playability and feel. You can try that by assigning Amplitude to Velocity on multiple samples within an Instrument in your SoundFont editor.

3. Once you begin assembling your SoundFonts, it's important to understand the distinction between the Instrument level and the Preset level. Instruments are the place you want to do most of your parameter editing. Use Global Zones on the Instrument layer to sweeten all samples in the Instrument, and use Global Zones at the Preset level sparingly because they impact all Instruments in the Preset. Try assigning different parameters to more than one sample within an Instrument. For example, use different Pitch Bend values for sample A than you do in sample B within the same Instrument. That will make for a more expressive Instrument.

4. When working with sound samples in SoundFont banks, use traditional synthesis and sampling techniques to beef up your final Instrument, just as you would with other samplers. You'll find that all the goods are there to do what you want with almost any sample. For example, if you're sampling a saxophone, record six samples per octave: three distinct pitches with two samples per note (each pair of samples will represent left and right for a stereo sax). Import and assign samples at their appropriate key ranges in your SoundFont editor, then assign opposite panning for each pair of same-note samples. Still working at the Instrument level, add vibrato and apply reverb as needed.


Bach would have pissed his pants.
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work natively at 48 kHz, and other sampling rates will be converted up or down automatically. If you create banks with a high sampling rate and someone plays them back on a SoundFont synth that renders only at lower rates, they will be scaled as well. If you're using a software synth to render your SoundFonts, you may have more flexibility. For example, check with the manufacturer to find out if they support high sampling rates such as 96 kHz.

If keeping bank size small is important or, if artistic needs call for low-fidelity samples, use lower sampling rates. Your own tastes may vary, but most people won't hear a loss of fidelity until you dip below 22 kHz, especially if they're using multimedia speakers attached to their

Port of Call: Vienna

Vienna 2.3, the latest version of the program, provides access to some SoundFont 2.1 features that other editors don't have, such as the Modulation Properties screen. We'll use Vienna to take a close look inside a SoundFont bank.

First, a tech note: when a Sound Blaster Live or Audigy card is installed, it places a SoundFont Bank Manager directory (SFBM) on your system and puts a file called sfedt32.dll into that folder. The Vienna installer, on the other hand, currently installs an older version of the same file into the Vienna directory and uses that as the basis for editing. (According to Creative, that should be fixed in the next version of Vienna.) You'll need to copy the newer version of the file to the Vienna directory, or you won't get all of the cool editing options discussed in this article.

SoundFont's roots clearly derive from its E-mu hardware heritage, and if you frequently work with hardware samplers, you'll probably recognize many of the parameters shown in Fig. A.

Vienna provides a bank tree on the upper-left side that illustrates the hierarchy used in bank creation. Key-range assignments are on the upper-right side; pitch alteration, filter, reverb, chorus, and panning are on the lower left; and envelopes and LFOs appear to their right. All parameter functions in the lower half of the screen can be applied at the Instrument or Preset level. Instruments contain samples with user-changeable parameters and optionally Global Zones, which affect all samples within the Instrument. Presets contain Instruments with user-changeable parameters and also support Global Zones, which affect all Instruments within the Preset.

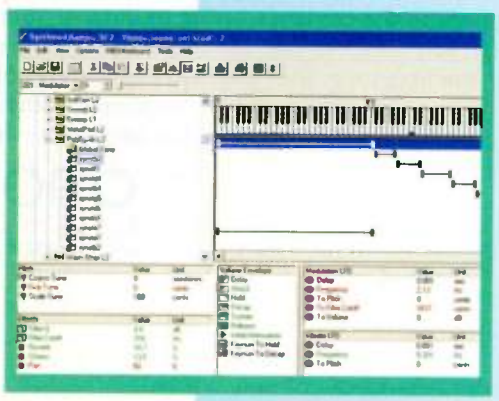

FIG. A: Those familiar with digital sampling will find themselves at home with Vienna.

Vienna uses the term *Pool* to describe groups of Samples, Instruments, and Presets. (The concept of a Pool doesn't appear outside of Vienna and is used only for organizational purposes while editing.) Finished Presets are displayed in Vienna as Melodic and Percussive Pools to help aid in organizing drum and melodic Instruments. The Presets in each Pool are accessed using different Bank Select messages. With a GM bank, you access the Melodic Pool through MIDI channels 1 through 9 and 11 through 16. The Percussive Pool is accessed through MIDI channel 10.

The Sample Section is divided into a User Sample Pool and a ROM Sample Pool. The ROM Sample Pool is a carryover from the days when ISA-based sound cards contained their own GM wavetable ROM containing 128 samples and is seldom used today. The User Sample Pool is where you import WAV or AIFF files for use in Instruments. The Instrument Pool is where you choose Samples, assign them to a key range, and have fun with parameter editing.

The Preset Section is where you chose one or more Instruments to play as a patch in your synth. When a new Preset is created, you must assign the Preset a bank and a patch number, as well as a patch name. Preset information is the only layer of a SoundFont bank that will appear in your synth and/or MIDI sequencer.

Right-clicking on a Sample within an Instrument or an Instrument within a Preset will provide access to the Modulator Properties option, where you can assign multiple controllers (see Fig. 1). In fact, right-clicking on nearly anything in the Pools sections allows access to further customization options. For example, right-clicking on any Instrument or Preset provides a drop-down menu to add Global Zones.

I created a file by modifying the Polysynth sound from Sonic Implants' 24 MB GM bank. As shown in Fig. A, I duplicated the sample synstb2.wav from the Instrument PolysynthL2. Note that it's the only sample represented twice in the same key range on the keyboard. I applied an LFO with a frequency of 2.13 Hz to Filter Cutoff (the base value was 1617), then assigned those settings to an identical sample within the Instrument but panned it to the opposite channel. The result is a new Polysynth that breathes with more life as it pans from speaker to speaker as its filter opens and closes (see Web Clip A).

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"This mic is slammin'! And if you're tired of having the cap of your snare mic being blown into pieces from a heavy stick hit—you'll love the i-5!"
Anthony Roberts, Monitors - Tower of Power

"On guitar amps the i-5, compared to the 57, was less hyped in the high mids, but had a fuller overall tone...I'm really digging using the i-5 and will be buying the review mics I was sent, if that tells you anything."
Larry Crane, Tape-Op Magazine

"The i-5 is very impressive as a bass mic. It handles the SPL's and captures the clarity of the notes while still maintaining the warmth of the low end. It's a great new tool."
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computer. Note that you can create stylized effects, such as a vocal that's supposed to sound as though it's coming from a tiny speaker or a looping scratchy-record effect if you use ultralow sampling rates.

If you know that you're going to be using large samples but want to keep SoundFont bank size low, an alternative to using lower sampling rates is to use compression. A utility from Melody Machine called sfArk allows you to use lossless compression within a bank to save space. Although I haven't tried it, consensus from online forums and my conversations with E-mu is that it works well and is quite popular with size-conscious SoundFont bank authors.

When you're ready to sample, start with clean, quality mono or stereo samples in WAV or AIFF format. If you want sampled vocals in your SoundFont bank, be sure to use a good microphone and a compressor/limiter as needed and do any other processing that you want before adding the vocal to your mix. Once imported, you'll be able to create harmonies by doubling samples and changing their pitch, but you may find that using professional processing equipment for harmonizing prior to importing vocals offers more desirable results than simply changing a sample's pitch.

When your samples are ready, you'll need a SoundFont editor to finish the job. Editors are used to make modifications to existing banks or create new ones from scratch.

There's no full-featured editor for Mac OS X yet, but I recommend Best Software Design's Polyphontics, because it's as close as you can get. Polyphontics doesn't have all the command-line requirements of some other editors, and it allows you to import samples from existing SoundFont banks or record new samples and then use them to create new Instruments. Once imported, you can set loop points, assign multiple samples to different key ranges within an Instrument, add reverb, and adjust envelopes and panning. There's no support for Global Zones or tweaking of most other SoundFont parameters, but otherwise, Polyphontics does a solid job.

Numerous editors exist for the Windows platform because SoundFonts are native to that OS. I recommend Creative's Vienna, which allows for full editing of all SoundFont parameters. (You can download Vienna free from the company's Web site.) Vienna is not overly graphic and uses numeric values for most parameter editing. See the sidebar "Port of Call: Vienna" for a closer look at some high-end editing techniques in Vienna.

There are a few alternatives to Vienna, one of which is Sound Faction's Alive. Alive has a more graphical interface than Vienna and sells for $39.

Note that if you somehow lose access to your original samples, they are not doomed to live their life inside a single SoundFont bank. You can extract the audio files from a bank and use them in another sampler or wherever you need them by using one of several utilities that offer that function. FMJ Software's Awave Studio is one of the best programs for extracting samples from banks and can convert SoundFont banks to other sampler formats and vice versa. It also serves as a capable alternative to Vienna for SoundFont editing. If you're using a Windows machine and deal frequently with multiple sampler formats, Awave Studio is a must-have tool.

Another great utility for converting to and from SoundFont banks is Translator Pro by Chicken Systems, Inc. Translator Pro runs on Mac and PC and supports dozens of sampler formats. It also allows you to extract various types of parameter information from a bank and use it in another sampler format.

Where the Hull Meets the Water

To integrate your new SoundFonts into your own music, you'll need a MIDI sequencer, software sampler, or synthesizer that supports SF2 files. Examples for Windows include Cakewalk Project 5, Steinberg Halion, Cyberware Music Waveplant CMI, and Maz Sound Tools VSampler 3. Mac users will find SoundFont support in SoundFont Synth, Halion, and Simplesynth, among others.

You may find that after triggering a few sounds, your new bank needs some polishing. Not to worry: using the SoundFont Global Zones feature, you can make quick adjustments even after finishing the main round of tweaking (Global Zones are covered in the "Port of Call: Vienna" sidebar.) Global Zones give you access to the full range of

Meeting with Captain Thorn

I managed to spend some time with George Thorn, Worldwide Director of Creative Labs' Developer Relations. Some amazing advances are coming in 2005, when we'll see the first major revision since SoundFont 2.1 was introduced in 1998. The next spec, which will be numbered SoundFont 2.4, will include support for 24-bit sampling that is scalable to older, 16-bit SoundFont engines. That is great news because with scalability from SoundFont 2.1 to SoundFont 2.4, you'll be able to create your SoundFont banks in 24-bit as an author-once, render-everywhere solution. In addition, it appears that E-mu and Creative are going to be the first to bring 3-D positional surround MIDI controllers to the mix.

Although specifics are not available on what kind of hardware is going to power this new generation of SoundFonts, I'm sure that it will be equally amazing. Look for release of new products before the year ends.

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synthesis parameters on the Instrument and Preset levels and affect all samples in a bank.

Let's say that you've created an Instrument that consists of 12 samples covering the entire keyboard range. You discover that you need the release time of all the samples to be longer. Adding a Global Zone to the Preset and adjusting the Release portion of the Volume Envelope lets you do that with just a few mouse-clicks. Global Zones are also a great way to add reverb or chorus effects to the Instrument or Preset and are an important part of making high-quality sounds.

Extending Your Stay

When you're ready to go the next step in your SoundFont explorations, Non-Registered Parameter Numbers (NRPNs) are a good place to look. NRPNs behave differently in SoundFont 2.1 than in Roland GS and Yamaha XG formats. For starters, there are two envelopes available in SoundFont banks versus one in GS or XG. Second, the LSB (CC98) values are different on nearly every parameter, and CC99 in a SoundFont requires a value of 127 instead of 1. Finally, the SoundFont specification includes many more parameters not covered by the other specifications. Although incomplete, you'll find a short list of commonly used SoundFont 2.1 NRPNs and how they differ from their GS/XG counterparts in **Fig. 5.**

Bear in mind that NRPNs are nonregistered, so there are no standards for compatibility between synthesizers. With the exception of GS and XG synths, most synths interpret NRPN data differently from one another. If you've composed music that includes NRPNs using a synthesizer other than a SoundFont synth, when you play it using SoundFonts, your real-time expression data may not sound the same.

For example, parameters like Filter Cutoff in the SoundFont specification use a different frequency range than GS or XG. Thus, a Filter Cutoff value of 64 may result in a cutoff at 5 Hz on an XG/GS synth, whereas that same value might result in a cutoff of 4 Hz in a SoundFont synth. That is an unfortunate by-product of using NRPNs, not a shortcoming in the SoundFont specification. See http://atlas.csbnet.se/livecenter/showpage_pf.php?id=15 for details on this situation.

NRPNs that are available with SoundFonts but are not in the GS or XG specs include Envelope 2 ADSR, LFO1 to Pitch, LFO2 to Pitch, Envelope1 to Pitch, Envelope2 to Pitch, LFO1 to Volume, and LFO1 to Filter Cutoff. Using NRPNs in your music is trickier than simply jamming with the Pitch Bend wheel, but they can add life in ways that other controls cannot.

Enjoying the Treasure

Using SoundFonts is like having your own sampling buffet. You can eat lightly by simply swapping out your GM bank, or you can feast by sampling sounds and tweaking them in an editor. You can also use your SoundFonts in a live performance with a vast number of real-time controls.

When the SoundFont format designers drafted the technology's detailed specifications, they set sail to create something special. Nearly ten years later, the format is blossoming into the most readily accessible and widely supported sampler format in history. In addition, it appears that E-mu has some wicked new improvements in the works (see the sidebar "Meeting with Captain Thorn"). How many other sampler formats can claim an installed hardware base of more than 10 million?

Not everyone with a Sound Blaster Live card uses it for sampling, but nearly everyone who has an interest in sampling has Sound Blaster Live or access to a software synth/sampler that handles SoundFont banks. Thanks to recent advances in processing power for Mac and Windows systems, upcoming enhancements, and an ever-growing number of devoted third-party software developers, just about anyone can enjoy the plentiful fruits from the island of SoundFonts.

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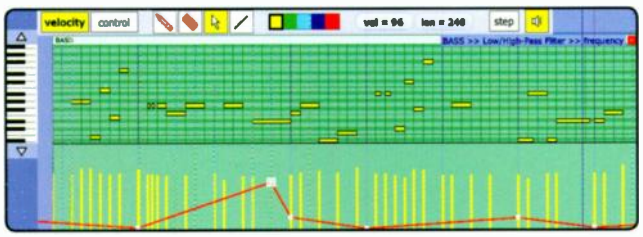
sYnerGi www.samplebanks.com

Kurt Heiden is an award-winning sound designer and composer who has worked for Roland, Creative Labs, and Interplay Productions, among others. His credits include The Bard's Tale II, Battle Chess, *and* Return to Krondor.


2

POWERFUL NEW FEATURES,

Tracktioneers will be glad to know that we preserved Tracktion's sublimely simple interface in T2. But just because it's simple doesn't mean it isn't power-packed. In fact, we've added more than 100 new features in T2 that hardcore desktop musicians demand from their software. Here's just a few. Check mackie.com for the full story.

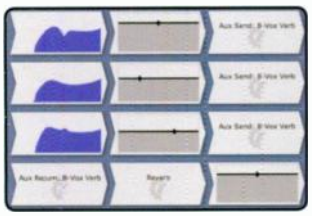


ENHANCED MIDI EDITOR

Tracktion 2 features a fully revamped MIDI editor with faster note entry, quicker controller and velocity editing, more intuitive keyboard control, and improved viewing of notes and controllers simultaneously. You can color code individual notes and even draw MIDI controller parameters with the new line tool. These enhancements (along with others too numerous to mention here) all add up to much more powerful MIDI functionality.

EXTERNAL SYNC

In addition to Tracktion's ReWire host functionality for integrating applications like Reason, T2 now offers enhanced synchronization support. This includes MIDI Time Code (MTC) input/output and MIDI Clock output for working with hard disk recorders, keyboard workstations, groove boxes, etc. Tracktion 2 can also send and receive MIDI Machine Control (MMC) commands opening the door to external transport control and integration with modular digital multi-track and hard disk recorders.



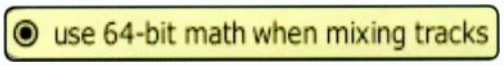
AUXILIARY SEND AND RETURN FUNCTIONALITY

Tracktion 2 provides eight Auxiliary sends and returns for tasks like sharing a single reverb across the different instrument tracks in a drum kit. Like all things Tracktion, these Aux sends and returns are simple to use for new and experienced users alike.

QUICKTIME SUPPORT

Tracktion 2 supports Quicktime™ video playback. Select a movie and start composing music, add effects, replace your dialog, and win your Oscar®. This opens the world of project studio post-production to Tracktion users. And since both Tracktion and Quicktime are cross-platform compatible, it's as easy to share video projects as it is audio.

QuickTime



64-BIT, 192KHZ-CAPABLE MIX ENGINE

Much has been made about the "summing bus" in DAW software. This is where audio streams are combined, and where software can potentially suffer versus a traditional hardware mixer. Tracktion 2 has a new high-definition 64-bit mixing option to alleviate this concern. Plus Tracktion 2 comes ready for 192kHz compatible audio interfaces for the ultimate in bleeding-edge digital audio.

MIDI CONTROLLER MAPPING

T2 makes integrating any MIDI controller a breeze. Just open the MIDI Mapper, pick a filter parameter, move the controller, and you're done. The controller and parameter are now linked, and stored in the session file for next time.

MIDI STEP RECORDING

Piano playing skills not quite up to Carnegie Hall standards? Tracktion 2 offers a step recording mode, allowing you to enter MIDI notes correctly and at your own pace. This powerful new feature lets you sequence even the most complicated passages with confidence and ease.

INTEGRATED MACKIE CONTROL UNIVERSAL AND C4 SUPPORT

Tracktion 2 offers full support for our Mackie Control Universal and Mackie Control C4 rotary controller, providing complete hands-on control of a wide range of recording and mixing parameters — including plug-ins and virtual instruments. DAW-specific overlays will be available from Mackie. In true Tracktion fashion, it's all so intuitive that you'll be enjoying the productivity boost only real knobs and faders can provide.

LOOP RECORDING

Got a client who can't sing their way out of a paper bag? Or perhaps an overzealous lead guitar player? No problem. Tracktion 2 includes "loop record mode" which makes it easy to record multiple passes and compile the best of each into the perfect take.

INTRODUCING TRACKTION 2

Tracktion 2 takes everything that made the original Tracktion so innovative—then kicks it all into high gear. Many of these new features were requested by hardcore Tracktion users (a.k.a. "Tracktioneers"); while others came from the minds of programmer Julian Storer and the folks at Mackie.

Tracktion newbies, read on. For you grizzled veteran Tracktioneers, you can skip to the next page and see how we're enhancing this breakthrough software. Then visit mackie.com to download the T2 demo, or see your local Mackie dealer to get the real deal.

THE BASICS

Tracktion is easy-to-use Mac- and PC-compatible music production software that contains everything most people will ever need for creating and mixing music. Its hallmark is a clean, single-screen interface and very simple operation — whether you're recording tracks, MIDI programming, or mixing down. Tracktion offers rock solid operation and very low CPU usage with both Mac OSX and Windows XP operating systems. And it contains a whole host of professional features that you can actually use.

A CLEAN SINGLE-SCREEN INTERFACE

Tracktion's single-screen interface is clean and clutter-free. It puts all the basic tools at your fingertips—and keeps the technical stuff out of the way—so you can create music faster than ever. Mind you, technical and setup functions are always a single click away, but they never obstruct the view of your arrangement.

Tracktion uses a signal flow-based paradigm for everything. Inputs are on the left side of the screen. Audio and MIDI clips in the middle. Effects and outputs on the right. Want to record something? Just drag the **audio or MIDI input icon ❶** to whatever track you like and hit record. Want to add a VST instrument or effect? Drag a **plug-in filter ❷** into place, right next to the track you want to effect. It's really that simple.

The bottom portion of Tracktion's screen includes buttons for session-specific setups and preferences, transport controls, and the Properties Panel. All functions are clearly labeled in plain English, so you can always find the button that does what you need to do. After awhile, Tracktioneers typically pick up the "quick keys" for these functions and speed up the overall creation process.

The **Properties Panel ❸** is where the major tweaking occurs. It follows your every move, providing access to the parameters you need for the task at hand. Click on an **audio clip ❹** and and the Properties Panel displays a fade-out curve; click on a reverb plug-in filter and fine-tune the pre-delay. Whatever you need to keep your productivity flowing is right there when you need it. It sounds easy because it *is* easy.

T2 Main Features:

- **Unlimited track count***
- **Support for sample rates up to 192kHz**
- **VST instrument and plug-in support**
- **Full parameter automation**
- **Importing and exporting of all major file types**
- **Simple drag-and-drop audio editing**
- **Track freezing for conserving CPU power**
- **ReWire™ support for use with Reason™ software**
- **Powerful MIDI programming and editing with step recording**
- **Built-in Quicktime™ support**
- **64-bit mix engine for superb sound quality**
- **Built-in sampler**
- **MIDI mapping for external controllers**
- **MTC input/output, MIDI Clock output, and MMC send/receive**
- **Powerful project management features**
- **Full suite of quality plug-ins from IK Multimedia, LinPlug reFX, Bismark, Acuma Labs Raw Materials, and more**

** Depending on your computer's CPU*


TRACKTION
Kick-BS2
Kick-Boundry
Snare
High Hat
Rack Tom 1
Snare
undo
save
clipboard
import
export
timecode
click track
snapping
tracks
options
automation
help!
High Hat
select all clips in track
shrink
grow
mute/unmute all filters
auto-advance
0.0 ms
insert new tracks
insert a new clip
move track up
move track down

tracktion

If you enjoy clicking through layers of windows to create music, then Tracktion software is definitely not for you. It won't pretend to be a mixing console... It doesn't have cute 3D racks or patch cables... It doesn't contain a single instrument icon... Instead, Tracktion lets you get right to the business of making music using a single interface for everything — from audio recording and MIDI production tools to mixing and mastering. It's a revolutionary concept, as evidenced by thousands of fervent users and dozens of glowing reviews. And now we've made it even better.

THE REVOLUTION CONTINUES.

ALL THE PLUG-INS YOU NEED TO GET THE JOB DONE.

The goal was to give T2 users all the basic music-making and mixing tools right out of the box — drums, synths, samplers — the whole shebang. So we partnered with every developer who would return our calls to bring you a full suite of high-quality "name-brand" effects plug-ins, virtual instruments, and loops, worth hundreds of dollars... for FREE!
Here's just a partial list of all the goodies that come bundled with T2. *

DEVELOPER	PLUG-IN	DESCRIPTION
IK Multimedia	Sample Tank SE	*Award-winning sample player*
IK Multimedia	Amplitube LE	*Industry-standard guitar amp and effects simulator*
LinPlug	RMIV	*Intuitive analog drum machine and drum sampler*
Mackie	Mixing Suite	*Multiband compressor ducker, de-esser[1], channel strip[2] and reverb[2]*
Mackie	Soundfont-I	*Soundfont Sample Player*
Mackie	ZR-3	*B3 Organ simulator*
Acuma Labs	Final Mix	*Multiband mastering tool*
reFX	Slayer2	*Electric guitar/bass simulator*
reFX	Claw	*Analog bass synth*
Raw Materials	Tracktion Sampler	*A powerful, intuitive sampler*
Raw Materials	Full Suite	*Tracktion's own suite of EQ, dynamimcs, and effects plug-ins*
BigTick	Ticky Clav	*Clavinet simulator*
BigTick	Cheese Machine	*Analog string machine*
BigTick	Hexaline	*Delay/Modulation effects*
mda	Full Suite	*Synths, pianos, vocoder amp simulator, dynamics, EQ filters, and more*

* Visit www.mackie.com for the complete list.
Plug-in bundles subject to change without notice.

[1] Available April 2005 [2] Available June 2005

SAME SIMPLE INTERFACE

BROADCAST .WAV FILES IMPORT

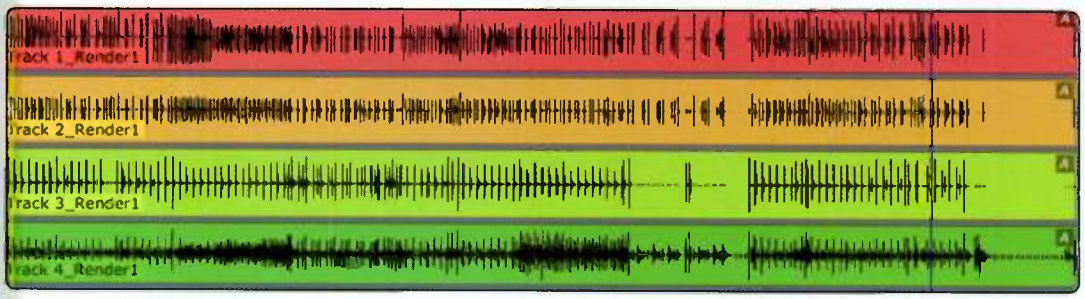
Tracktion 2 offers industry-standard broadcast .bwf file import support. This means even greater ease and flexibility for users importing audio from otherwise incompatible applications and hardware. And because these files are time-stamped, restoring them to their original position relative to other audio clips is a snap.

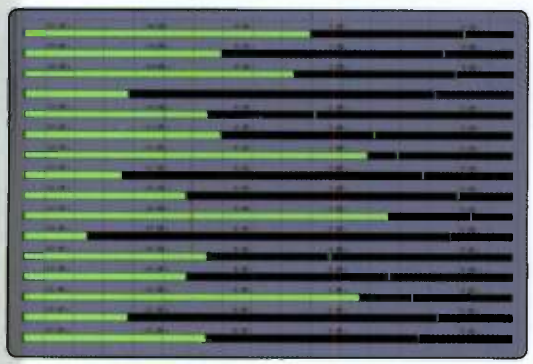
IMPORT MACKIE HDR FILES

Users of the Mackie HDR, MDR and SDR hard disk recorders can now import their project files directly into Tracktion 2, complete with all audio and edits intact. Track those rowdy musicians at the club to your hard disk recorder, then quickly transfer to your laptop and toss it in the van. When the bass player finally passes out set your laptop on his head and mix on the way to the next gig.

NEW COLOR SCHEMES

Who are we to tell you what color your T2 interface should be? With the color editor, you can customize the look of tons of Tracktion screen objects.





IMPROVED METERING

Tracktion 2 now offers more ways to visualize your audio intensity. Enhanced Input meters on every channel provide more accurate at-a-glance viewing of your input levels. The new "Large Meters Mode" transforms the horizontal tracks into a gigantic input meter bridge for super-accurate level setting. Also, user-selectable meter and peak hold response profiles let you decide how your audio levels are displayed on screen.

SCALABLE INTERFACE

Tracktion 2's single-screen interface can be scaled to virtually any size, permitting users of large monitors to devote some of those pixels to other applications, while still keeping an eye on Tracktion.

SHOW AND HIDE INPUTS AND FILTERS

With T2, you can quickly and independently select to show or hide the input and filter sections of the interface, freeing up valuable on-screen real estate when you're focused on perfecting that complex musical arrangement.

'PER TRACK' INPUT

Tracktion 2 adds a "per track input mode", offering an alternative to the standard "drag the input to the track" assignment method. If you have more than just a few inputs, you'll appreciate not having to sort through all of those input icons to find the one you need. Instead, simply select an audio or MIDI input from the new drop-down menu available on every track.

Minimum System Requirements:

Windows 2000/XP
Pentium III or better processor
256 MB of RAM

Mac OS X version 10.3 or higher
256 MB of RAM


MACKIE.

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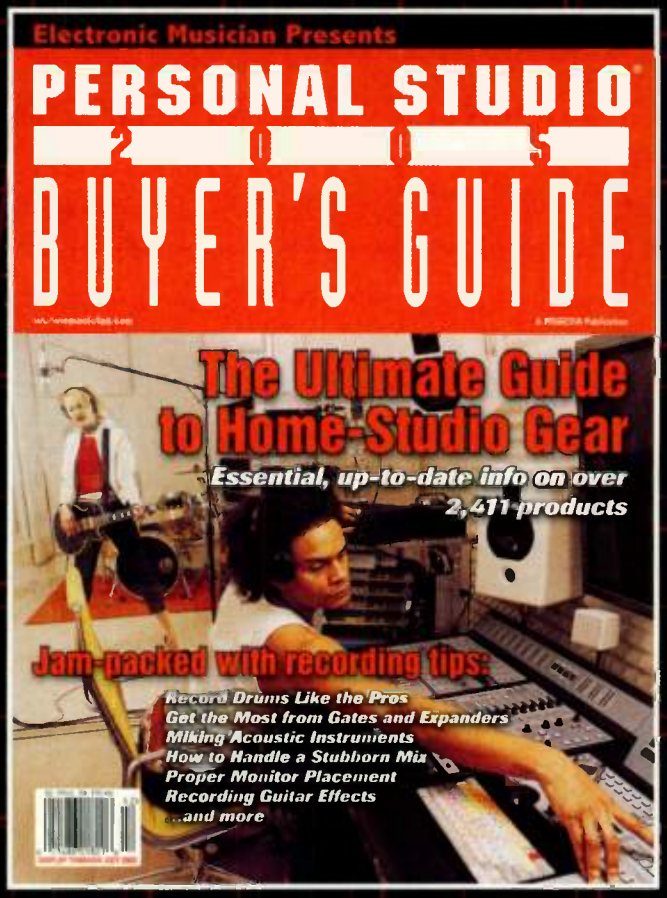

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Pro Tips for Pro Tools LE

Master CLASS

By Gino Robe

Digidesign Pro Tools has an extensive feature set that may seem endless to everyone exce the most experienced user. But even power users might not know that an update has add functionality that can change the way they approach routine tasks. And unless you hav read the latest version of the Pro Tools manual (now approaching 700 pages), the full potential the workstation will remain untapped because many of its handiest features, while not necessa ily hidden, are not immediately obvious.

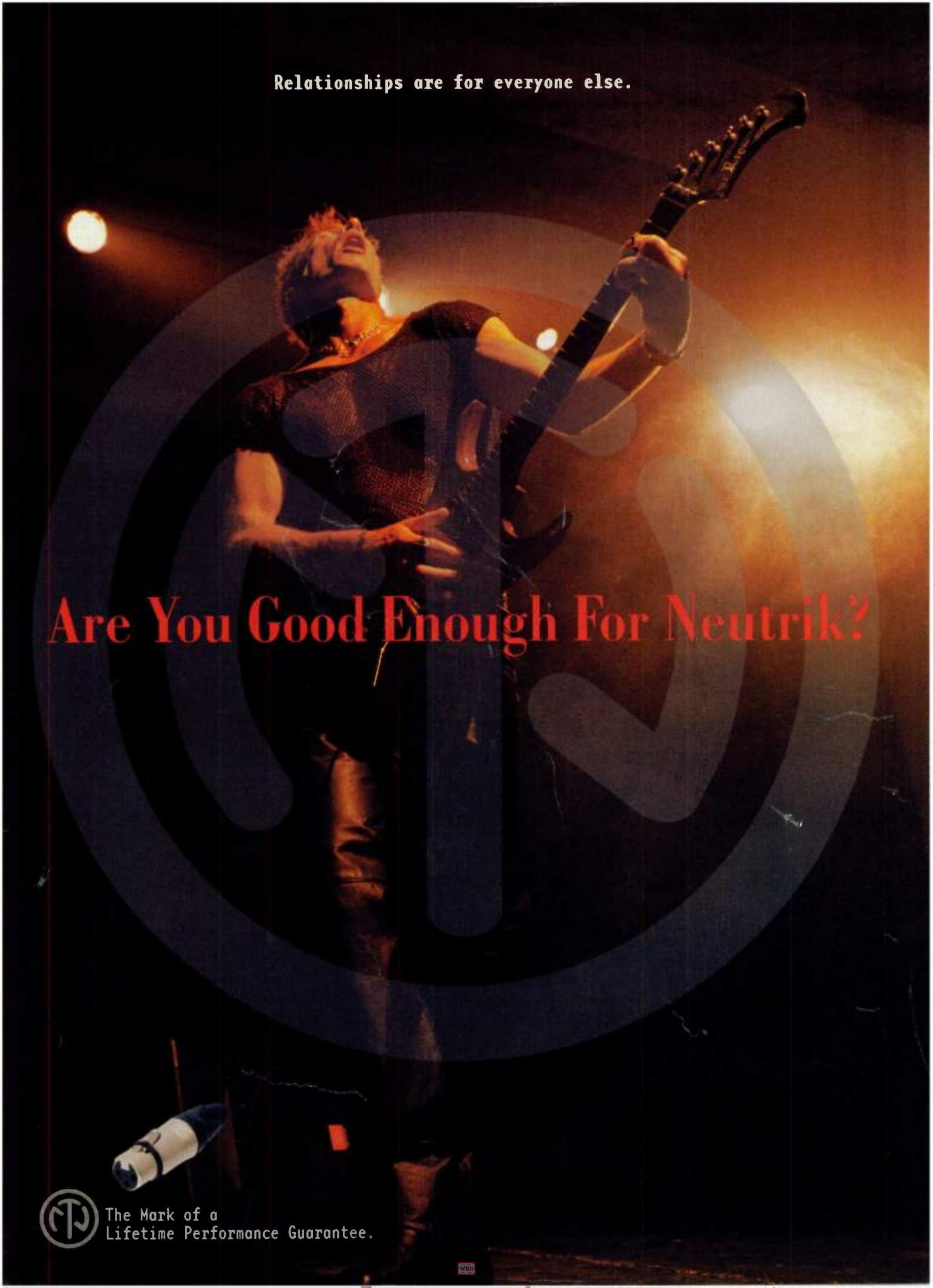
In this article, I'll focus on features and techniques that can be used to enhance your wo flow, no matter what kind of production work you do. Many of these features appear in version 6 (the most recent update), while others have existed since version 6. But whatever level of expe ence you have with Pro Tools LE, the following tips and techniques will help you increase your pr ductivity. (Because Mac and Windows keyboard shortcuts vary slightly, I will indicate both—M first, then Windows—with a slash between the two, as in Shift + Command/Ctrl + N.)

Work faster and smarter in Pro Tools LE 6.7.

PDQ Session Building

Beginning with version 6.7, Pro Tools LE lets you create all the tracks you need for a session one step. Start by going to File and choosing New Session (Command/Ctrl + N). Name the s sion, then select the audio file type, sampling rate, bit depth, I/O settings, and destination of t session folder. (You will notice that you have the option of choosing a fader gain of +6 or +12; t larger gain range will be useful if the session is destined for use in an Avid video editing syste Select Save, and then let the session build.

To add your tracks, go to the File menu and select New Tracks (or use Shift + Command/Ctrl + N The New Tracks dialog box now has the plus (+) button at the far right of the box. Click on the butt to specify as many of each type of track as you think you will need. Note that once you click on t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plus button, a minus (-) button appears next to it on each track. As you would expect, the minus button removes any track you have created. You can use your keyboard's Up- and Down Arrows to raise and lower the number of tracks you want for each kind of track, or you can type in the number of tracks.

Starting with version 6.7, you can specify whether an audio track is sample based or tick based. (Pro Tools lets you combine tick-based and sample-based tracks in the same session.) If you're working on a project that has audio files and you need tempo flexibility, tick-based tracks will lock your audio regions to the tempo grid just as MIDI does: when you change tempo, your samples remain lined up with the beat. If you want to change back to a sample base, click and hold on the Edit window rack's time-base icon (it resembles a small triangular metronome), and select Samples.

After you've selected the tracks that you want, click on Create and Pro Tools will build the session, placing the tracks in the Mix and Edit windows in the order you specified in the New Tracks dialog box (from top to bottom in the Edit window and from left to right in the Mix window). If you decide later that you want to change the order, it's easy to do: go to the Show/Hide Tracks display at the far left of the Mix or Edit window, and drag any track to the position you want it. In addition, you can sort the tracks in the Edit and Mix windows by name, type, edit group, mix group, or voice by clicking on the Show/Hide bar and selecting Sort Tracks By from the pull-down menu.

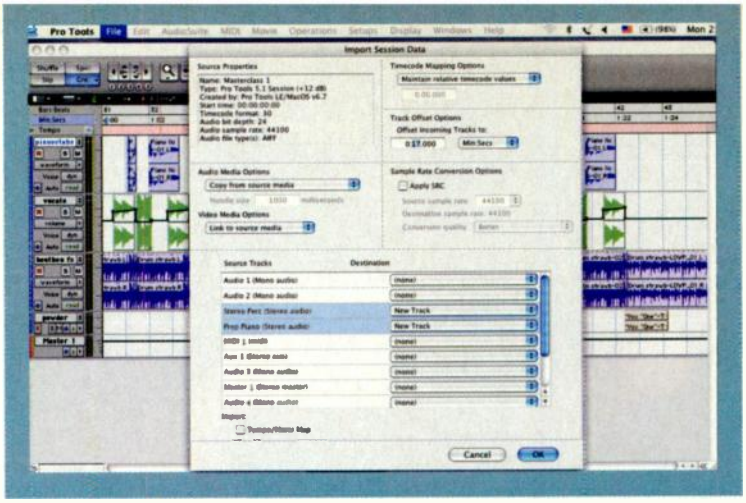


FIG. 1: In the Import Session Data dialog box, I have selected to import two stereo audio tracks (Stereo Perc and Prep Piano). Note that I have also chosen to copy the media into the new session, and offset the incoming tracks by 17 seconds.

Better Living Through Templates

Although the new functionality I have described can help you create a session quickly, you don't have to start

from scratch each time you create a new song if you have template sessions. You can have templates for all types of projects that you work on; for example, you can have a template for different band lineups, for video post-production work, or for MIDI-only sessions. Creating session templates is easy, but the steps are different for Mac and Windows machines.

For Windows, build the session that will become your template, save it with a name indicating that it's a template, and close the session. If you're a Windows user, right-click on your session icon, choose Properties, and click on the Read Only box. Now you can open and work on the file like normal. But when it comes time to save or close the session, you will be prompted to rename the file in order to save it, because it's a Read Only file. To make changes to your template, you will have to return to the Properties dialog box and deselect the Read Only box.

For the Mac, highlight the icon of your template session, go to the File menu, and select Get Info (Command + I). Click on the Stationery Pad box, then close the window. Next, double-click on your template. After the Edit and Mixer windows are built, a dialog box will appear with two options: Edit Stationery and New Session. Click on Edit Stationery if you want to modify the template file. The New Session button opens another dialog box that prompts you to rename the session and select where you want to save it. Once you press Save, you're ready to work on the new session, without damaging the related template file.

I recommend creating templates that don't include audio files, because when you rename and save new versions, the original audio files are not automatically copied into the Audio Files folder of the recently saved session. The audio files remain in the original Audio Files folder. (You can see where these audio files reside by clicking on the Audio tile at the top of the region bin and selecting Show Full Pathnames.) As long as you have access to the drive where the template's audio files reside, you won't have a problem. But if you plan to take the session elsewhere, you should use the Save Session Copy In option under the File menu. That will create a new folder for the session and copy all of the required elements into it.

Import Session Data

If you want to import audio files and other attributes from another session, use the Import Session Data option. This feature imports the specified audio tracks and video elements and maintains any associated plug-in settings and automation. In the process, audio files are automatically converted to the proper session resolution.

Under File, select Import Session Data. The first dialog box you see will prompt you to locate the session file from which you want to import data. Select the file and click on Open. In the next dialog box, select the source tracks and other session elements that you want to import (see **Fig. 1**). Click on the desired Source Tracks (or select New Track under the Destination heading for each track you want). Make your Audio Media Options selection and

click on OK. The selected elements will appear in your new session.

The Audio Media Options box determines how the audio files are imported into your new session. Select Copy From Source Media to make copies of the selected tracks and put them in the desired location. If the source files differ in file format, bit depth, and sampling rate from the destination session, the source files will automatically be converted.

If you select Link To Source Media (Where Possible), the audio regions appear in your session, but the original audio files are not copied into your new session file. They reside in the source folder, and your regions point to their location. If the source files cannot be used during playback (which would be the case if they reside on a CD-ROM or slow drive), then the files will be converted (if needed) and copied into the session during the import process.

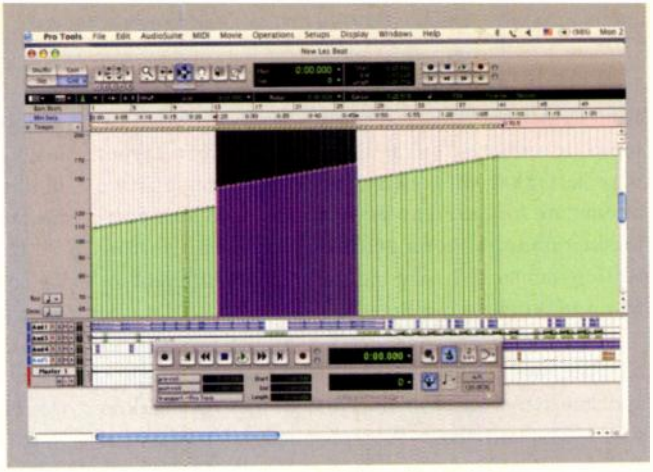
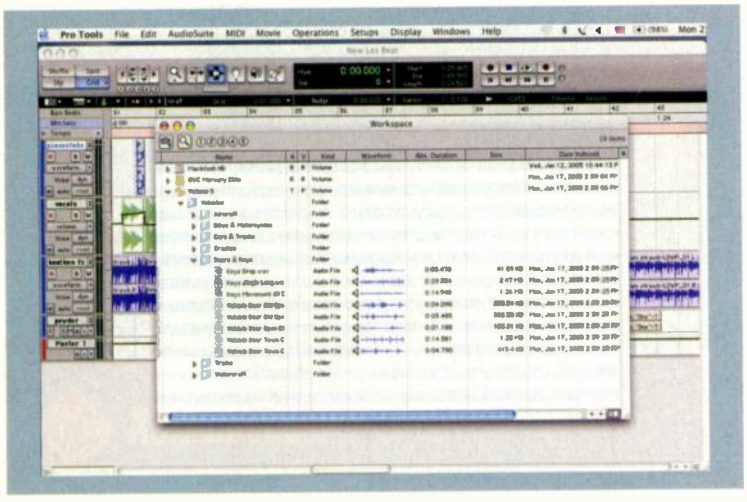


FIG. 3: Using the Grabber tool, I embedded a gradual tempo increase within another linear increase. Just after the 25-second mark, the tempo jumps to a higher number, slowly increases to the 47-second point, then suddenly decreases and finishes the initial accelerando.

Another option is Consolidate from Source Session, which copies only the audio files that are used in source session tracks, skipping the ones that aren't being used. The final option is Force to Target Session Format, which copies and converts only the source tracks, which have a different file format, bit depth, and sampling rate than the destination session. Source files that don't need conversion aren't copied; they appear in the track but read from the source file.

Other Import Session Data features include Video Media Options, Timecode Mapping Options (for maintaining absolute or relative values or mapping start time code to a selected value), Track Offset Options (user definable as Bars:Beats, Min:Secs, or samples), Sample Rate Conversion Options (including conversion quality), and the ability to import a session's Tempo/Meter Map.

FIG. 2: From the Workspace window, you can see which drives and CDs are mounted and their content. Here, you can see the waveforms for the audio files, read the duration of each, and preview a file by clicking on its icon or waveform.



Entering the Workspace

The DigiBase database provides a powerful way to organize and manage your files in Pro Tools LE. Although there are three types of DigiBase browsers (Workspace, Volume, and Project), I'll focus on Workspace. Among other things, Workspace lets you view, organize, and search for a variety of file types across multiple mounted drives simultaneously (see Fig. 2).

Open the Workspace from the Windows menu or click on Option/Alt + semicolon (;). At the far left, you will see your drives and media, as well as number of categories that will be useful for organizational purposes. Click on the arrow to view the files on each drive.

When you first launch Workspace, you will find the Waveform column in the far right panel. If the waveforms don't appear automatically, go to Calculate Waveform under the Toolbox menu. Once calculated, the waveform overviews are saved as a database file in a folder within Pro Tools LE, so when you remount the media at a later date, the waveforms will appear automatically. In addition, you can share the database file with other users of the storage volume from which you were working, allowing them to automatically retrieve the waveforms without having to wait for them to be calculated.

Select the name of the file that you want to play using the Up- and Down Arrows to scroll through the names, and press the spacebar to play it back. In addition, you can click on any point on a waveform and preview the file from that point by clicking on and holding down your mouse button. This is especially useful for browsing lengthy files.

When you've located the file that you want to use, you can add it to your session in one of three ways: drag-and-drop the file from the workspace onto a track you've already created; drag-and-drop the file into the blank space below the other tracks, which will create a new track and place the file within it; or drag-and-drop the file into the Audio Regions list. No matter which method you choose, the audio is automatically copied into your session's Audio Files folder. If you want the audio file to retain its original bit depth and sampling rate, hold down the Shift key as you drag-and-drop the file.

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You can also drag the tracks and session data from another project into the Edit window of your open session. That will automatically open the Import Session Data dialog box, which will allow you to choose specific parts of the session that you want to import.

You can reorganize the columns in the Workspace and save View Presets of five layouts. The presets are selected using the numbered circles in the upper-left corner of the toolbar. I used this feature to place the waveform display and Abs Duration columns immediately after the Name and file-type columns, so I could shrink the Workspace window and still see the file names and waveforms. To move a column, drag its name tile to the position that you want, then Command/Ctrl-click on a View Preset number.

You can search all folders and drives by metadata within the Workspace. Put a check mark in the box next to each media element—hard disks, CDs, and DVDs—that you want to search. The metadata criteria available for search in Pro Tools LE is Name and Date Modified (more options are available to Pro Tools TDM users).

The Workspace can also be used to unmount drives and eject CDs and DVDs from within Pro Tools LE. Just highlight the drive and select Unmount from the Toolbox (which appears in the upper-left corner of the Workspace window).

Draw Your Own Tempo

Another feature added to version 6.7 is the Graphic Tempo Editor, which allows you to draw automation-style tempo-change curves. (Before you begin, make sure you are not in Auto-Tempo mode. Go to the Transport window and click on the Conductor icon.) To open the Tempo Editor in the Edit window, click on the arrow to the left of the word Tempo (above the track names). The plus sign to the right of the word Tempo opens a dialog box for manually typing in a tempo between markers. You can resize the window by pulling down on the lower portion of the window and using the up/down slider and zoom (+/-) buttons. As you edit the tempo, you can set the resolution and density of the points in the left pane.

Using the pencil tool, you can draw freehand shapes or select Parabolic, S-Curve, or Line. You can even modify the tempo curve while the session plays, if you don't mind a bit of stuttering during playback.

Once you have the desired shape you can adjust it, depending on the selected resolution setting. For example, if you used a straight line to draw a gradual increase in tempo, you can grab the middle or end markers with the Grabber tool and adjust the start- and end tempos after you have drawn the line (see Fig. 3). You can also move the markers to extend or decrease the tempo shape to cover a greater or fewer number of bars.

Use Tempo Operations in the MIDI menu to make an overall tempo change for a selection. The shapes at your disposal include Constant, to even out a selection to one tempo; Linear, for a gradual tempo increase or decrease; Parabolic and S-Curve, for adding gradual nonlinear shapes; Scale, to change a selection proportionally; and Stretch, to apply a tempo shape over a larger or smaller area. In the Tempo Operations pop-up window, you can pick from a menu of simplified options (such as the start/end times of a selection) or check the Advanced box for additional shape-specific features. After you've applied the tempo shape, you can subtly tweak it further using the pencil tool or move portions of it en masse.

Time Bandits

The red diamond in the upper tempo bar is now the start-time marker. Drag it to the right on the time line to put time before the original start point. When you do that, notice the negative numbers to the left of the diamond in the Timing window.

Under the MIDI menu, select any of the top four selections, and the Time Operations dialog box will appear. Time Operations are a suite of functions that are used to modify the length of a session. That is especially useful when accommodating a change in the session length, such as when you're cutting to picture, and a new video edit—with a different length—arrives.

The Change Meter operation lets you specify a new meter, how long it will last, and where it will go. Insert Time and Cut Time let you add and remove length in the session. Move Song Start lets you precisely place the start time. Once you're done, you can use the Renumber Bars option, under the MIDI menu, to clean up everything.

RESOURCE GUIDES FOR PRO TOOLS LE

Third-party resources for Pro Tools LE abound, and many of the books include CD-ROMS with templates and session examples. Before you buy any of the titles, go to your local bookstore and make sure that they cover the skill levels you need. Sample movies of the CD-ROM tutorials can be viewed online.

The Complete Pro Tools Handbook, by José "Chilitos" Valenzuela (Backbeat Books, 2003)
The Complete Pro Tools Shortcuts, by José "Chilitos" Valenzuela (Backbeat Books, 2004)
The Musician's Guide to Pro Tools, by John Keane (McGraw-Hill/Osborne, 2004)
Producing in the Home Studio with Pro Tools (2nd edition), by David Franz (Berklee Press, 2003)
Pro Tools 6 CSi Master (2nd Edition) CD-ROM, by Steve Thomas (Course Technology, 2005)
Pro Tools 6 CSi Starter (2nd Edition) CD-ROM, by Colin MacQueen (Course Technology, 2005)
Pro Tools 6 Power!, by Colin MacQueen and Steve Albanese (Course Technology, 2005)
Pro Tools All-in-One Desk Reference for Dummies, by Jeff Strong (John Wiley & Sons, 2004)
Pro Tools for Video, Film, and Multimedia, by Ashley Shepherd (Course Technology, 2003)
Pro Tools HF_sc DVD, by Charles Dye (Kagi Media, 2004)
Pro Tools LE 6 Ignite!, by Andrew Hagerman (Course Technology, 2004)
Visual Quickstart Guide—Pro Tools 6 for Macintosh and Windows, by Steven Roback (Peachpit Press, 2004)

Learning the Alphabet

One useful feature that few people take advantage of was added when version 6 was released. The Commands Focus mode maps dozens of routine commands to letters on your QWERTY keyboard. The a...z button, which sits below the View Presets buttons, enables Commands Focus (see Fig. 4). Although there are dozens of commands to choose from—a few of which work only in TDM systems—a handful of them are easy to remember.

Start with the letters E, R, T (as in QWERTY). You can toggle the horizontal zoom of a highlighted selection in and out using E, going from the smallest view you were in to a larger view. (Use Zoom Toggle Track Height in the Display section of Preferences to set the size of the larger view.) Use R to gradually zoom out horizontally, and T to gradually zoom in.

You can perform Cut, Copy, and Paste with X, C, and P, respectively, without holding down the Command/Ctrl key. Once you've highlighted and cut or copied a selection, you can use P to move it up or semicolon (;) to move it down, preserving the start and end time of the selection. (Holding down the Option/Alt key while moving a highlighted region is another method.) You can also tab the cursor up and down using the P and semicolon keys.

Tab forward laterally through a track of audio regions using the apostrophe (') key: the cursor will stop at the beginning and end of each audio region as you hit the key. To reverse tab, use L. (Using these key commands in a MIDI track tabs you to each note.) If you want to start playback while your fingers are in the neighborhood, press the left-bracket ([) key.

Clean Up That Mess!

If you've been working on a session for an extended period, it's likely that you have accumulated extraneous data. It is, therefore, a good idea to do a little housekeeping once in a while, so that there is no wasted space on your hard disk. There are several ways to do that.

FIG. 4: Use the a...z button to enable Commands Focus mode and take advantage of numerous one-key commands.

Say you have finished recording, editing, and mixing a song, and you want to make an archival data backup that includes only the elements being used. Because some of the following steps are destructive and may potentially delete something you need, use the Save Session Copy In option, under the File menu, to make a backup of your entire session in a safe place. If you perform the following cleanup routines successfully, you can delete this backup version. Otherwise, it's there if you need it.

The first step is to remove unused audio files. Select them in the Audio region bin located at the far right of your Edit window (if it's not showing, click on the double arrow at the bottom-right corner of the screen). If you're selecting more than one region file, click on each one while holding down the Shift key until all of them are highlighted. Click on the Audio tile and choose Clear Selected from the pull-down menu. Click on Remove if you want to take those files out of the session but leave them on the hard disk. Click on Delete if you want to permanently remove the files from the disk.

The difference between Remove and Delete is important to understand: the Delete function is a destructive one, so if you are sharing files with another session or project, choose Remove. Otherwise, you will negatively impact other songs by deleting the shared audio files.

But what if your region list is a mile long, and you can't easily tell which regions aren't being used. Go to the Audio pull-down menu again and choose Select. Highlight the Unused Regions Except Whole Files option and click on it. The unused regions in the session will be automatically highlighted. Go to the Audio pull-down menu once more, choose Clear Selected, and click on Remove in the Clear Audio box. If you want to remove (or delete, if you're feeling confident) all unused audio files in the session, highlight Unused Regions under the Select category in the Audio menu. Then go to Clear Selected and choose Remove or Delete as needed.

Once the unused data is gone, it's time for one more step that will minimize any wasted space in the session and allow for a streamlined backup. The Compact Selected command permanently deletes any audio data that is not being referenced by a region. (That is why I used Remove to clear—but not destroy—the unused region data that I wanted to keep. Any detritus left over will be removed for good after that process.) If you are completely done with your session, choose Select All under Audio. Then go to Audio and click on Compact Selected. In the dialog box, you are prompted to select the amount of "padding" (a user-specified amount of time around the remaining files) that you want, which will be used for crossfades. Click on Compact, and the program will process and remove any remaining unused audio and then automatically save the results.

Play the session to make sure that you didn't inadvertently delete something useful. If it plays correctly, use Save Session Copy In to copy and place all of the session

elements into one centralized location. Now you have a complete copy of your session that you can burn to disc and place in your archive.

More Good Housekeeping Secrets

Maximum system efficiency should be one of the main goals of the Pro Tools LE user. Because the program relies on your computer's CPU for every task, you want to use those cycles judiciously. One way to save CPU cycles is to make inactive any tracks that are not being used at a particular point in a session. When a track is inactive, its associated automation, plug-ins, sends, and voice allocation is deactivated, so it doesn't require any CPU time. To make a track inactive, go to the track in the Mix window and Command + Control/Start + click on the Track Type indicator. The track will become gray when it is inactive.

Another way to buy back CPU time is to reduce the number of automation breakpoints. Under Setups, select Preferences, then click on Automation. Check the box marked Smooth and Thin Data After Pass, and Pro Tools will automatically delete unnecessary breakpoints in the automation.

If your song has a lot of edits and you're beginning to notice playback errors, try reducing the edit density in certain sections. For example, the strings of small regions and crossfades clustered together in a loop-based production may be putting a strain on your disk drive's ability to find and retrieve data. To mitigate the problem, use the Consolidate Selection function. Once your regions are set and you're sure that you're finished making changes, highlight them and select Consolidate Selection under the Edit menu. The regions will be rendered into one file and automatically placed in the right spot in your session. Later, when you've finished the song and are removing unwanted regions before compacting your piece for archiving, you can select and remove the region files that your consolidated region replaced.

Digidesign also suggests that Mac users turn off the journaling feature for any media drives that they plan to use with Pro Tools LE. If you're using the Apple Disk Utility to format your drive, select Mac OS Extended rather than Mac OS Extended (Journaled). If you're recording to your boot drive with Pro Tools LE, you can select Disable Journaling using Disk Utility for better performance (although that will increase your computer's recovery time after a power failure).

Manuals and More

In addition to the features mentioned earlier in the article, version 6.7 added the Undo History window (select Show Undo History under the Windows menu), MIDI Detective, and Beat Detective LE (which is worthy of its own Master Class article). As with any program that has become an industry standard, there is plenty of reference material available for Pro Tools LE users. Start with the Pro Tools Reference Guide PDF, which is available for free online at www.digidesign.com/support/docs. At 678 pages, you may not want to print the entire document. It is, however, well organized and indexed. (A spiral-bound version is available online from the DigiStore.) Digidesign's document page also includes a PDF manual devoted to DigiBase, which is well worth reading. Any time you spend with either manual will pay off many times over.

For those of you looking for something to supplement the Digidesign documentation, there are numerous third-party resources available in book and CD-ROM format (see the sidebar "Resource Guides for Pro Tools LE"). EM

Gino Robair is a senior editor at EM.

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Sound Advice

When the band Run Don't Walk decided they were ready to move up to Pro Tools® to produce their album, they smartly chose the experts at Sweetwater to help guide their purchase decisions. They didn't know that all Pro Tools LE systems — Mbox,™ Digi 002,™ and Digi 002™ Rack — include over 30 free plug-ins and applications. Richard particularly looked forward to creating cool backing tracks with Reason Adapted, Live Digidesign Edition, and SampleTank 2 SE.

However, their friendly and informative Sweetwater Sales Engineer also told them that by investing just a little more money, they could upgrade to the Pro Tools LE Factory bundles — providing them with a plethora of additional plug-ins from Bomb Factory and Digidesign.™ They jumped at the opportunity. Green loves how the BF-3A makes her vocals sound. Tiffany can't get enough of the Tel-Ray Variable Delay on her guitars. Run Don't Walk has never sounded better.

Player Against the Machine

By Rusty Cutchin

The right groove for the job.

Now that musicians can find a loop to fit any style, and have access to programs that can break down loops to their component parts for endless manipulation, it's more tempting than ever to let the computer do the work of the composer—as well as the arranger, conductor, and performer. The amount of work the computer does usually depends, however, on what kind of music is being made. Hardcore dance styles demand that the computer be a recognizable "player." Injecting too much realism into a techno track with the use of the "humanizing" features on a sequencer can detract from the hypnotic waves and seamless pulse that most groove artists are trying to create.

At the other end of the style spectrum, songwriters or commercial composers working in traditional genres such as R&B, jazz, and classic rock still need to create the feeling of a live performance. Those are the types of projects that make the best use of features such as groove quantizing of MIDI data. Yet players working in those styles know that old-school music needs the human touch—literally. Just because you can order your sequencer data around like a sloppily dressed drummer at a society-wedding gig doesn't mean it's always productive to do so. Quantizing is a wonderful thing, but drum tracks, horn ensembles, and other musical performances associated with real people can benefit from the "flaws" in your own performance skills.

FIG. 1: Shown here is Digital Performer's main Quantize window, which provides options for making MIDI data follow or deviate from a set time grid.

Groove This

For more than 20 years, MIDI has been making life easier for recordists who wanted to work without the hassles of miking a drum kit, hiring a string ensemble, or developing the chops of Oscar Peterson. MIDI also took a lot of the guesswork out of groove creation: set a tempo, punch Play on the drum machine, and say good-bye to arguments with drummers.

As MIDI sequencing developed, however, a backlash developed against the robotic evenness of the drum machine. The power to quantize data had led to rhythmic abuses not heard since the Monkees tried to perform without studio musicians. Along with the extra power of sequencing applications for computers came refinements that could provide a compromise between the unrelenting symmetry of the drum pattern quantized to 16th notes and the ham-fisted performances of guitar-players-*cum*-MIDI-keyboardists.

For example, in addition to its original Quantize tool (see **Fig. 1**), Digital Performer offers Smart Quantizing and Groove Quantizing (see **Fig. 2**). With basic MIDI quantizing, you can shift the note-on and note-off positions of MIDI notes while leaving durations unchanged, use various strength and sensitivity settings to limit the effect of quantization, and even make a track "swing" by forcing 8th-notes to occupy a space around the third note of a triplet. (Smart Quantizing in DP is designed to facilitate translating the track to music notation.)

The newer tool is Groove Quantizing, which can apply the characteristics of a predetermined rhythm pattern or groove to the track you're creating. You can designate a pattern you've created as a groove and then apply its characteristics to a new target track. You can use graphic sliders to modify Timing, Velocity, and Duration elements in Groove A and then transfer those characteristics to Groove B. In DP's Groove Editor, you can permanently alter grooves, so naturally it's best to build a groove database and duplicate grooves when you want to have access to the original.

The fundamental principle underlying this groove methodology is the continued relevance of MIDI as a production tool. When you apply DP's Groove Quantization to an audio loop (sound bite in DP), it can't affect the timing within the sound bite; it can affect only its placement within the broader track.


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Full Circle

What do MIDI quantization tools matter in a music world dominated by prerecorded audio loops? Loops not only dominate hybrid rock-rap and jazzy hip-hop productions, but they also can be dissected by programs such as ReCycle and broken down to their component parts to provide sounds that can be controlled by a sequencer like any other instrument sample. Why should a composer care about MIDI tools that help music sound like it was performed?

One answer is that there is plenty of old-school music to be made, and every day expert composers using MIDI and basic sounds create music that's indistinguishable from tracks with live players. If a player is interested in the music business beyond the world of the recording artist, he or she will benefit from knowing how to cop a live feel and also from developing the keyboard chops to control sequencer input in a more natural way.

Several years ago I took a break from studio engineering to return to my roots as a gigging guitar player. After several years of programming dance and R&B tracks at major studios, I was again learning other people's music—primarily rock and country. I was also doing some radio production work that required recording song parodies of licensed songs.

I developed a new appreciation of drummers and the "live band feel" during this period and learned some tips that I still find helpful when using MIDI to create music in different genres. For example, country songs (and most live-band tracks) don't maintain a single tempo, even when it sounds like the drummer is playing to a click track. Choruses generally speed up, and the tempo will drop back on a following verse or bridge. Since the song usually goes out on a chorus, the fade will be at the highest tempo, though the increased rate will barely be perceptible.

Similarly, in creating jazz tracks with MIDI, programmers often arrange drum parts as though they were designed for a rock track. Experienced players know that a kick drum is used mostly for accents on, for example, a traditional swing tune or ballad and doesn't maintain a steady pulse.

On R&B, funk, and blues tracks, bass players and drummers often have a symbiotic relationship that comes either from genetics or from years of learning how to play behind the beat in just the right amount to put the groove in the pocket. Mastering that kind of feel with MIDI requires more than Groove Quantizing, although it's a very helpful tool. A fundamental human irregularity is what makes the music sound right.

A fundamental human irregularity is what makes the music sound right.

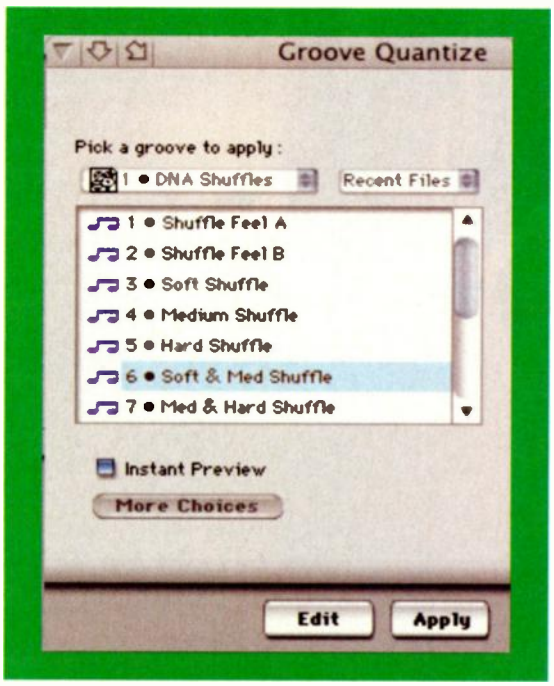

FIG. 2: DP's Groove Quantize feature lets you apply the characteristics of one rhythmic pattern to another and create a database of grooves.

Keep It Real

One way to harness that irregularity is to become a better keyboard player. That doesn't mean taking lessons for years; it just means developing the facility to play rhythmically, even if you play with only two fingers. If you sequence and hard-quantize an entire bass track, for example, go back and play along with the finished part live until you can maintain a groove that stays close to the sequence. The same drill can help you create more natural sounding kick and snare or hi-hat and snare parts. You'll have to do some editing, but you'll be surprised how the flaws become less noticeable if the overall feel is right. If you doubt this, take a techno CD and play it next to any track by Motown's Funk Brothers.

With all the tools available for manipulating MIDI and audio tracks, it seems new sounds and new styles emerge on a daily basis. But MIDI still gives the music maker the best compromise between working with someone else's rhythmic feel and forcing yourself to work with an ornery drummer. By developing your own keyboard skills, you can create rhythms that sound more live, and by understanding how players play, you can create music that speaks to the soul of the listener as well as to the ghosts in the machine. **EM**

Rusty Cutchin is an associate editor of EM. *He can be contacted at rcutchin@comcast.net.*

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WRH

Convolution Reverb and Beyond

By John Duesenberry

Broadband audio files as impulse-response sources.

Convolution reverb imposes the characteristics of a real-world reverberant space on an input signal. To create convolution reverb, an impulse response (IR) signal that is recorded in the reverberant space is convolved with the input signal. You can go well beyond the confines of reverb processing, however, by substituting other audio material for the IR signal (see **Web Clip 1**).

I'll start with an example of stereo convolution reverb, and then demonstrate how easy it is to generate a much less conventional reverblike effect using a sample of a crash cymbal in place of the IR signal.

Hack Away

Many sample editors and other audio applications now support convolution. Here, I'll use SoundHack (www.soundhack.com), Tom Erbe's Mac OS shareware utility. SoundHack is easy to set up and use, but you should keep two things in mind. Under OS 9, your should set the memory partition to at least 16 MB before performing the examples here. Under OS X, SoundHack may not recognize your audio interface, in which case you'll need to temporarily set the Default Output to Built-in Audio in the Audio MIDI Setup utility.

You'll find my audio source sound files on the EM Web site (see **Web Clip 2**). For more details on convolution theory, see "Square One: Convolution Number Nine" in the June 1999 issue of EM. For a survey of convolution reverbs, see "Trading Spaces" in the October 2004 issue, available online at www.emusician.com.

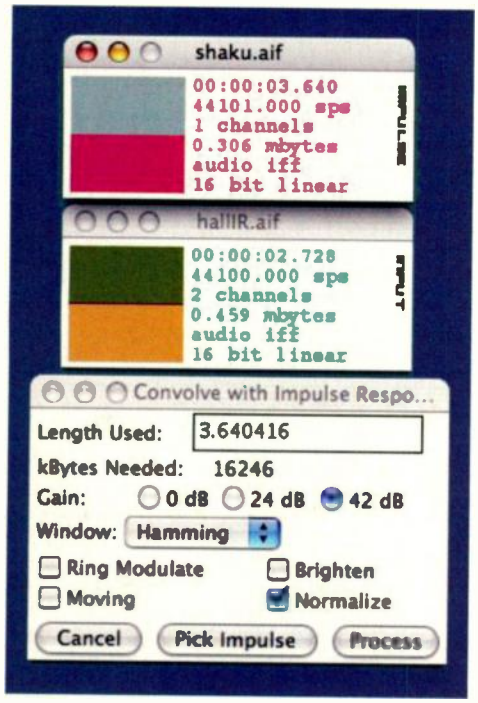


FIG. 1: Top to bottom: shaku sound-file window; hallIR sound-file window; convolution options settings.

Shaku Shaku

For convolution reverb, I'll convolve a dry shakuhachi sample with an IR taken from a large hall. I created the IR sample by recording 2.6 seconds of reverberation from a short (roughly 100 ms) noise burst.

First, open the file shaku.aif in SoundHack and play it back by pressing the spacebar. Notice how the signal transitions from a clearly pitched narrowband spectrum to a noisier, breathier broadband spectrum.

Next, open and play the file hallIR.aif. Notice that the spectral energy is distributed fairly evenly across a broad frequency range, much like pink noise. That is desirable in a convolution reverb IR signal.

Convolution analyzes and multiplies the spectra of two signals. This process reinforces frequencies that are common to both signals, while attenuating frequencies that are not. There will generally be many common frequencies when a broadband IR spectrum is convolved with another signal's spectrum, and that will tend to preserve the attributes of the second signal.

Getting the Hack of It

Convolving in SoundHack is simple. First, activate the hallIR.aif window and select Convolve from the Hack menu. When the Convolve With Impulse Response window opens, select the Normalize checkbox option and leave all other options at their default values. Next, click the Pick Impulse button and, using the file selection dialog box, select and open shaku.aif. You should now have three windows visible (see **Fig. 1**).

Click the Process button to start convolution processing, and select a name and location for the output file in the Save dialog box. Click Save, and in a few seconds the convolved sound file will open. Press the spacebar to play it back.

CymbalVerb

Next, I'll use a cymbal crash as an IR instead of the hall recording—an effect I call CymbalVerb. First listen to the sound file called crash.aif and notice how similar it is to the hall IR, containing an initial impulse followed by a long decay. Its spectrum is also similar but confined to a narrower frequency band, much like highpass-filtered noise.

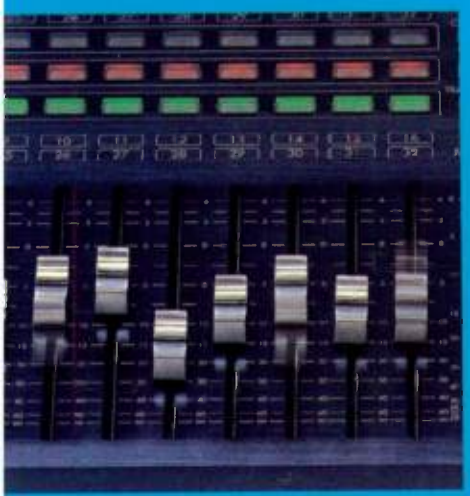
Repeat the previous convolution steps, substituting crash.aif for hallIR.aif. The result is on the borderline between a very strange reverb (shakuhachi played inside a cymbal) and a hybrid instrumental sample.

Try using other instrumental sounds as IRs. Virtually any signal can function as the impulse response of some space, even if that space is imaginary. EM

John Duesenberry would like to hear about your convolution successes. You can email him at johndu@theworld.com.

D1200MKII

D1600MKII



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D16XD

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Get with the Program

By Mark Ballora

A look inside your favorite music software.

Have you ever wondered what's under the hood of your digital audio sequencer? Your favorite program more than likely has hundreds of thousands of lines of code. That code describes a vast network of interactions that make up your sequencer, audio editor, and any other modern, mature program. When you launch Digital Performer or WaveLab, you are executing a "stored program" (to put it in geek speak); that is, you are loading a library of functions into your computer that lurk in the background, waiting to be activated.

Remember Your Numbers

Like a post-office box, a computer's memory cells have their own unique address and contents. The contents are in the form of binary numbers (the number 0 means "off" and 1 means "on") and represent either data or instructions, depending on their value and context. Enter the right instructions, and you can retrieve a value, work with it, and re-store it.

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FIG. 1: Inventors J. Presper Eckert and John W. Mauchly operate the Electronic Numerical Integrator and Computer (ENIAC) with lab assistants. This was the first general-purpose computer, used by the U.S. government from 1946 through 1952 for work in ballistics, weather prediction, cosmic-ray studies, thermal ignition, random number studies, and wind-tunnel design.

Instructions tell the computer how to access and manipulate the contents of the computer's memory. A sample instruction, such as "Retrieve the data from two locations and add them together, then store the result in a third memory location," would consist of four binary numbers: one number that commands the computer to add; a second number that has the address of the first value; a third number, which has the address of the second value; and a fourth number, which identifies the location for the result.

When people communicate with a computer using binary numbers, they are using a machine language. Computer operators in the 1940s and the 1950s used machine languages by moving physical switches up and down, creating the "off" and "on" combinations needed to retrieve, generate, or store values (see Fig. 1). Switches were abandoned in favor of punch cards that contained the desired commands. Punch cards use rows of chads, either punched or unpunched, and those two states represent the values 1 and 0.

Using sets of punch cards, entire libraries of familiar instructions could be created. The instructions could be loaded into the machine by feeding it cards one by one, giving it functions that could be carried out when the right command was entered. Thus, the stored program was born. With stored programs, computers evolved from being fast calculators to becoming flexible problem-solving machines, equipped with tools to address a variety of situations. To more easily create stored programs, programming languages were invented starting in the 1950s. Punch cards were eventually replaced by other forms of media on which to store programs—first magnetic tape and magnetic drums, then magnetic discs, and finally optical discs, which is the medium in use today.

Higher and Higher

Nowadays, the only people who type binary instructions are the folks in hardware design. High-level programming languages such as Pascal, Fortran, and Basic are used to write software programs and have superseded binary machine languages. Programming languages allow a developer to create software using English-like statements (called source code). A common language for music software is C, which is a midlevel language; it operates close to machine level, addressing memory directly, making it fast and flexible. C's structure allows sets of statements (called functions or subroutines) to be named, which enables a single action (such as clicking on a button or selecting an item from a menu) to call the function and trigger a series of steps. For example, a single function call could invoke a series of calculations to derive the value of the sine of *x*.

Modern programmers implement algorithms, which are reusable sequences of functions. An algorithm to create a wavetable might use one function that generates a sequence of values, another function to perform trigonometric calculations on each value, and bookkeeping functions to ensure that the sample values are stored properly (see Fig. 2).

Source code for any program is written using a text editor. Once written, the program can be either run immediately

by an interpreter or compiled into an executable program. (Programmers typically use an Integrated Development Environment (IDE), such as Metroworks CodeWarrior, to facilitate the creation, testing, and compilation of program code. An IDE most often contains a text editor, compiler, and debugger.) An interpreter executes program instructions one statement at a time and executes the source code while it is reading it. A compiler translates the code into machine language for a specific platform, such as Macintosh or Windows, and creates the executable program.

Java, a programming language written at Sun Microsystems in the early 1990s, can be used to create a single version of an application that will run on any platform. Originally designed for creating software for appliances such as microwave ovens and TV remote controls, Java now dominates Internet-based applications.

FURTHER READING

For more information about programming, check out these resources:

Computer Music: Synthesis, Composition, and Performance (2nd edition), by Charles Dodge and Thomas A. Jerse (Schirmer Books, 1997)

The C Programming Language (2nd Edition), by Brian W. Kernighan and Dennis M. Ritchie (Prentice Hall, 1988)

C++ Algorithms for Digital Signal Processing, by Paul M. Embree and Damon Danieli (Prentice Hall, 1998)

The C++ Programming Language: Special Edition, by Bjarne Stroustrup (Pearson Education, 2000)

SmallTalk: Best Practice Patterns, by Kent Beck (Prentice Hall, 1997)

MUSIC-DSP Mailing List and Web Site:
http://shoko.calarts.edu/~glmrboy/musicdsp/music-dsp.htm

Go to the Head of the Class

A revolutionary step in program organization was object-oriented programming (OOP), started by the Norwegian Computing Center in the mid-1960s. An OOP version of C, called C++, was developed at Bell Labs in the early 1980s. An object is a self-contained unit of code that carries out a specific task, like a worker bee. It understands certain types of messages, such as commands entered from the keyboard or the mouse or values generated by another object, and outputs information by storing or displaying new values. That information may in turn be ingested and processed by another worker bee. An example is Cycling '74's Max/MSP, an object-oriented programming language for MIDI and audio written in C++. Max/MSP uses a graphical user interface to show the OOP idea: select object types to use, connect their inlets and outlets, and create customized signal flow.

An OOP lets you create hierarchies of objects based on a "parent" design, called a class. (Think of a class as a template or type of object.) For example, James McCartney's object-oriented synthesis language SuperCollider for Mac and Linux has a general class description for unit generator, which is a template for algorithms that create or process audio. The unit generator class has some overall guiding parameters, such as whether audio is being produced at audio rate (44,100 samples per second) or control rate (a slower processing rate, about 689 samples per second). Real work, though, is done by subclasses of the unit generator class.

```
While IpfButton.state = ON:
{
Grab a buffer of n samples from the audio signal.
Let a value i increment from 2 to n and do the following:
        {
        now = Sample[at location i]
        then = Sample[at location i-1]
        OutputSample = (now + then) * 0.5
        }
Grab another buffer of samples and repeat
}
```

FIG.2: This algorithm shows the process of a simple lowpass filter.

Subclasses of unit generators are all related. They inherit all properties of the unit generator class, such as an understanding of sampling rates, but have specific functions that equip them for their particular tasks. Subclasses make it easy to create specialized versions of a generalized parent class. Subclasses can, in turn, be subclassed.

In SuperCollider, two subclasses of unit generators are oscillators and filters. The oscillator class can receive messages regarding the frequency and amplitude of a waveform. Subclasses of oscillators inherit those capabilities, but each outputs a different wave shape (for example, sine, sawtooth, or triangle). The filter class can receive messages in the form of an input signal and a reference frequency. Subclasses of filters inherit an expectation of those messages and behave as lowpass, highpass, bandpass, or other filter types.

Plug It In

Programmers don't always create entire applications from scratch. Plug-ins are miniprograms that are linked to a host program. Cakewalk, for example, supports plug-ins created in DirectX format. The C++ library is used to create a DirectX plug-in and provides a starting framework for such programs. In OS X, Apple introduced Audio Units, which are generic plug-ins written in Objective C (another object-oriented version of C) for any Macintosh audio software. In Max/MSP, new objects can also be created with C++; Max/MSP, in turn, can be used to build plug-ins in Steinberg's VST format, which many applications are able to host.

Programming opens up a world in which you can make your own tools and give yourself options that exceed the capabilities of off-the-shelf software. But watch out, it can become delightfully habit-forming. EM

Mark Ballora teaches music technology at Penn State University. He can be reached at ballora@psu.edu.

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The Personal Touch

By Lory Kohn

A little artist TLC goes a long way in the studio.

Most project studios have the firepower to produce radio-ready tracks. But why is it that some studios stay consistently booked while others stagnate? Studio owners and engineers frequently focus on having the best studio gear, often overlooking the value of having good people skills. To help attract, maintain, and expand your clientele, implement the eight people-friendly practices listed below to keep the human element intact in your technical studio environment.

1. Schmooze. This term means going to places or events with the intention of making business contacts and meeting potential clients. After contacts are made, you begin to form alliances, presenting yourself as a genuine professional with whom clients can feel comfortable. Effective schmoozing is one of the cornerstones of building good people skills. Potential schmooze sites include local live-music clubs, hip restaurants, events sponsored by your local Recording Academy chapter (visit www.grammy.com for a list of chapters and events), and your local Chamber of Commerce.

CLAIRE MACGILLVRAY

Geoff Gray of Far & Away Studios recognizes the value of good people skills.

2. Put people at ease in the studio. Most artists often base their studio choice on how well they get along with the engineer or studio owner/manager, not on whether the studio employs $1,000 or $10,000 worth of A/D conversion. Help shape their first impression by maintaining a good attitude and providing an environment that is conducive to creativity. Clients often hire someone that they can relate to, someone with whom they won't mind hanging out for more than 12 hours a day.

3. Feed the troops. "I know it sounds silly as it relates to people skills, but food is one of the most important things that affects a session," says Geoff Gray, owner of Far & Away Studios in Boulder, Colorado. "People get so wrapped up in the moment that time flies by and hypoglycemia becomes a factor. Always have emergency rations around." Also, never underestimate the value of unlimited bottled water and fresh coffee.

4. Become a great listener. When clients want to share their recording hopes and dreams, listen to them with the same intensity that you would accord a playback. Can you break out of engineer mode for a few minutes and focus on what the artist is saying without planning brilliant retorts and comments at the same time? Being a good listener puts the artist at ease, benefitting the project and your studio's reputation.

5. Immerse yourself in the project. "I immerse myself in everybody's project," says Gray. "I rev up to the same enthusiasm level as the client. Once your level of excitement matches theirs, you're in. I want people to be so happy that they can't believe it. Everybody who walks in the door should leave happier than they ever expected." That kind of passion is contagious.

6. Display infinite patience when an artist struggles with his or her creation. We all have bad days, artists included. Sometimes it's not an artist's best day for a particular performance on a particular song. "You can't get frustrated when they get frustrated," Gray emphasizes. "You have to know when to pull the plug. Move on to another song before they can focus on the problem. When high expectations aren't met, get disappointment out of the building as fast as possible."

7. Broach sensitive subjects delicately. The decision to bring in studio musicians is one example of a sensitive subject; the way you approach that topic is a good indicator of your level of people skills. In this case, tell the client that you're willing to record his or her project until the cows come home, but that they may want to consider using studio musicians to get that perfect sound. In any potentially ego-bruising situation, try giving positive feedback first, then follow up with constructive criticism.

8. Communicate between sessions. This is the cherry on top of the client-cultivation sundae. Sending an email or calling between sessions hammers home the message that you truly care about the artist and his or her dream. Artists who believe that you consider their dreams as important as they do will generate a positive buzz surrounding you and your studio. And that positive buzz can propel your studio to a more solidly booked, people-friendly status. EM

Lory Kohn is a Boulder, Colorado-based technical writer, engineer, and producer and is a founding member of The Milkmen. You can schmooze with him at loryjacobs@yahoo.com.

"I Got a $ix-Figure Indie Label Deal Because I Joined TAXI"

Jenna Drey – TAXI Member – www.jennadrey.com

My name is Jenna Drey. That's me sitting next to TAXI president, Michael Laskow.

For as long as I can remember, I've wanted to be a recording artist. I've studied music my whole life. I've read all the books. I've been to the seminars. In short, I've done all the same things you're probably doing.

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A Record Deal With Lots of Zeros!

Seven months after joining, TAXI connected me with a great Indie label that's distributed by Universal. The president of the label heard my song, "Just Like That," and just *like* that, I was offered a record deal, and that song became my first single.

Madonna, Bowie, Jagger, and me!

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REVIEWS

RME Fireface 800

A high-quality FireWire audio I/O with plenty of features.

By Nick Peck

The Fireface 800 is the most recent audio I/O device to come from RME, a company known for its reliable, high-quality products. Striking a compromise between audio quality and economic reality, the Fireface 800 may be the company's best product yet. It offers plenty of features and flexibility, making it an excellent choice as a front end for portable recording systems and personal studios.

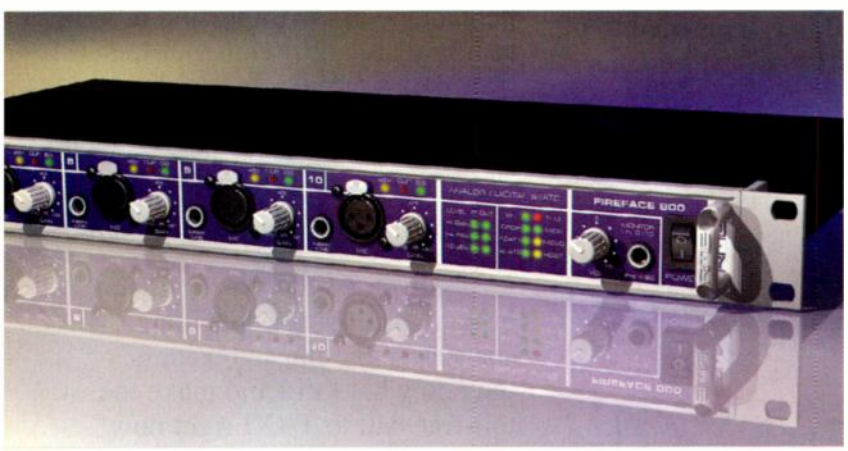

FIG. 1: The RME Fireface 800 is a FireWire audio I/O and preamp offering sound quality that is on par with units that cost much more.

The 1U unit is a 24-bit, 192 kHz audio interface with 10 analog line inputs and outputs, 4 mic preamps, an instrument input, a headphone out, 16 channels of ADAT optical I/O, and stereo S/PDIF I/O (see **Fig. 1**). It is also a single-port MIDI interface and includes word-clock in and out on BNC connectors. Routing software and low-level drivers are included to allow you to connect the Fireface 800 between the physical gear in your studio and your DAW software of choice. The unit operates at all common sampling rates between 32 kHz and 192 kHz, with pull-up, pull-down, and adjustable clock speeds supported as well.

The Fireface 800 is compatible with Windows 2000 (Service Pack 4) and Windows XP via ASIO, WDM, MME, and GSIF, and with Mac OS X 10.3 and above through Core Audio and Core MIDI.

Gazintas, Gazoutas

The Fireface 800's front panel features instrument and microphone inputs, a small status-information display, and a headphone jack. There are four female XLR mic inputs and four ¼-inch TRS balanced line inputs on the front. The line inputs can handle balanced or unbalanced signals at +4 dBu or –10 dBV. All four mic inputs offer 48V phantom power that can be individually assigned using the Fireface's software control panel.

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All front-panel inputs have gain knobs as well as signal and clip LEDs. The single-instrument DI input features overdrive and speaker-emulation effects and a more mild automatic distortion effect when the input signal exceeds –10 dBFS. The instrument input is referred to as input 1, while the mic/line inputs are inputs 7 through 10. This arrangement looks a bit peculiar but makes sense once you have mastered the Fireface's signal flow.

A ¼-inch TRS headphone jack on the front panel has its own gain knob and can double as stereo line outputs 9 and 10. While there is adequate gain to drive most headphones to a moderate degree, there was not enough there to allow my AKG K240Ms to become excessively loud. Nonetheless, what did come out sounded clean and detailed.

The front-panel status LEDs show bare-bones system information including analog input- and output-level settings; presence of MIDI input and output signal; and synchronization with the word-clock, S/PDIF, ADAT, and timecode digital streams. That information is useful for basic debugging, but the majority of the Fireface's parameters are viewed and adjusted through the included software.

The rear panel (see **Fig. 2**) is a study in efficiency. Power comes in on a standard IEC cable, so no external wall-wart transformer is required. There are single MIDI In and Out ports, and two independently functioning ADAT optical connectors that allow for 16 simultaneous channels of digital I/O. Stereo S/PDIF in and out on RCA jacks is available, as well. In the analog realm there are eight ¼-inch TRS analog line ins and outs, each of which can operate at +4 dBu or –10 dBV.

The Fireface 800 also has word-clock in and out on BNC connectors. The word-clock input offers optional 75Ω termination, and the word-clock output is a refreshed, low-jitter signal synced to the system's current master clock, giving the unit additional usefulness as a digital-clocking hub in complex, multiple-unit situations. An optional timecode card will allow it to receive positional information from linear timecode (LTC), which is great for post-production applications, as well as slaving to analog decks striped with SMPTE timecode.

The Fireface 800 offers three FireWire ports for connecting to your computer: one FireWire 400 port, and a pair of the newer, faster FireWire 800 ports. The 400-type port is sufficiently fast to handle significant high-resolution audio passing between your computer and the Fireface. You can, however, use up to three Firefaces simultaneously if you connect to your computer using the FireWire 800 port.

FIG. 2: The rear panel contains analog and digital I/O as well as MIDI and word-clock connections.

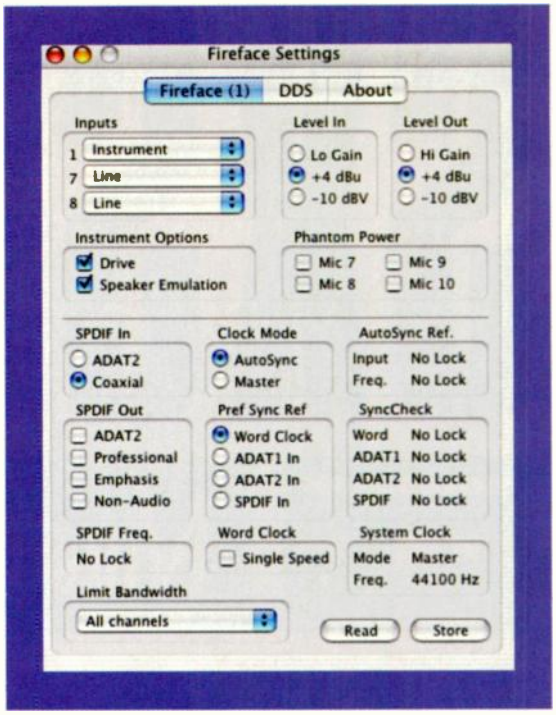

FIG. 3: The Fireface Settings software is a virtual front panel for the unit.

Totally Mixed

As soon as the Fireface 800 is connected to your computer, a pair of programs—Fireface Settings and TotalMix—automatically boot and stay resident. The former is a simple, nondescript front end for adjusting the Fireface 800's system parameters (see **Fig. 3**). TotalMix, on the other hand, is a virtual mixer and patch bay, designed to act as a software layer between the Fireface 800 and your DAW of choice. It allows routing of all hardware inputs to any hardware or software port desired.

You can create submixes, headphone mixes, and talkback/listenback mixes. You can view and adjust pan, level, mute, and solo information for input, playback, output, and submixes simultaneously. If that sounds like an incredible amount of information to fit on a single computer screen, it is. TotalMix is effective, but the channels are so small and crammed together that the information is hard to read and confusing (see **Fig. 4**). Fortunately, you don't need to stare at TotalMix that much—once you configure your routings, you'll spend your time looking at your DAW instead.

TotalMix features a 56 × 28 routing matrix; it shows you at a glance which inputs are connected to which outputs. For Windows users, RME also has the DIGICheck software, a

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nifty program that gives you floating level-meter windows and channel-status displays, which are handy for analyzing and debugging your system.

Under the Hood

RME has added some of the best innovations from its previous products to the Fireface 800. What impresses me is how many different technological solutions to common digital-audio problems are present under the hood of this box. The company's SteadyClock low-jitter clock technology cleans up jittery incoming digital signals and creates a stable reference clock at the digital outputs. SyncCheck continuously monitors all incoming digital signals to determine if they are referencing the same master clock. If not, SyncCheck flashes a warning LED referencing the offending input. An optional AutoSync mode continuously polls all digital inputs for a valid signal. If it finds one, it automatically slaves to it; otherwise, it defaults to its own internal clock.

Finally, the Fireface 800's internal-direct-hardware routing provides for Zero Latency Monitoring (ZLM). That feature makes it possible to monitor incoming signals without passing them through the computer first.

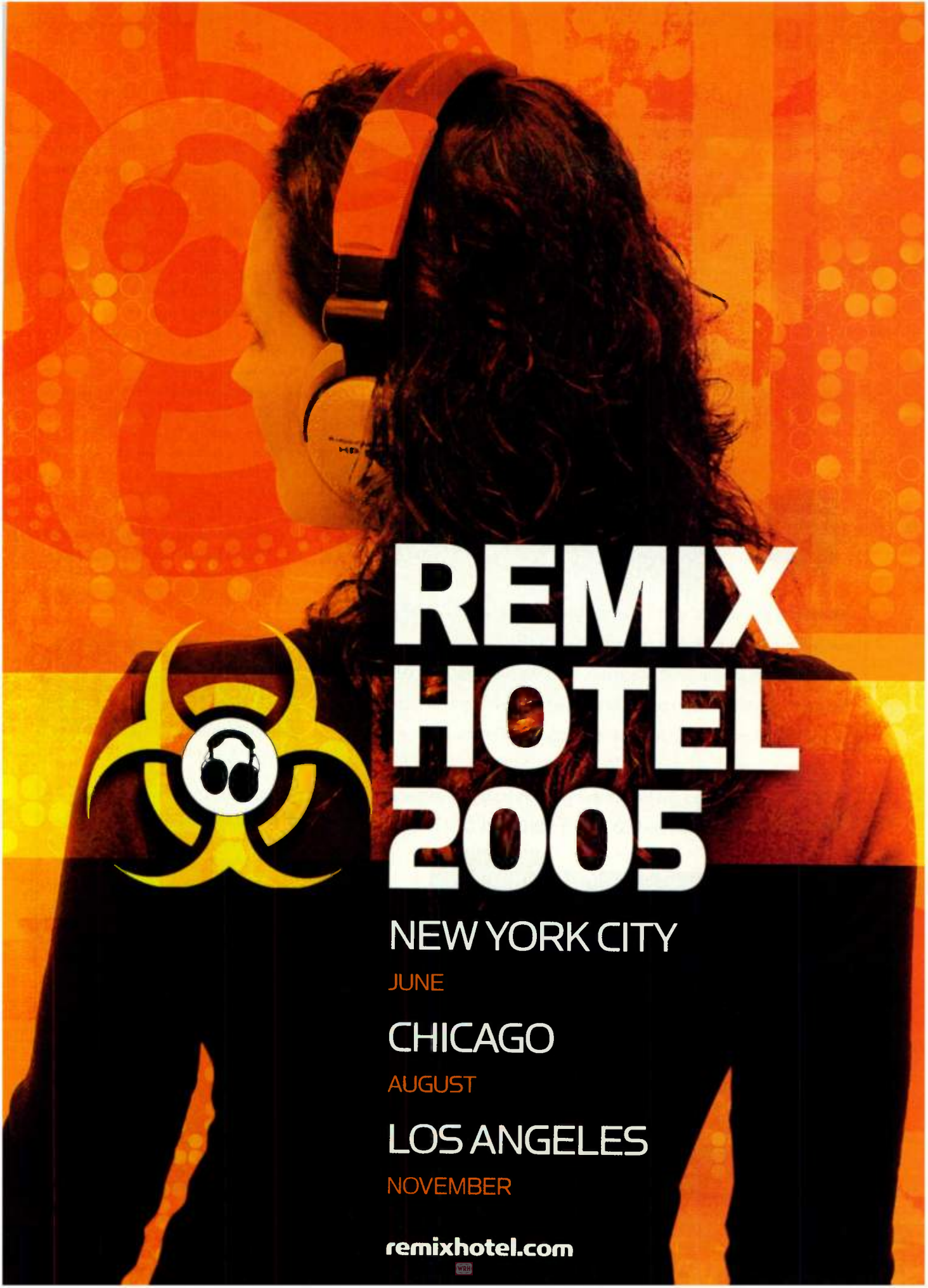
Real World

I recorded with the Fireface 800 using a Pentium IV–based PC laptop running Nuendo, and a 600 MHz Apple iBook G3 running GarageBand and Tracktion. It worked under all circumstances, although there was some confusion during setup due to old internal drivers in the unit itself. On the PC, once I upgraded the internal firmware to version 1.66, everything proceeded without a hitch.

On the Mac, I had repeated problems with glitches and ticks in the digital audio, and crashes when using early versions of the driver. Version 1.2, which was released shortly before Christmas of 2004, solved my digital audio glitching problems but didn't eliminate the crashing issue. Version 1.2(1) was released just as I was

FIREFACE 800 SPECIFICATIONS

Analog Inputs	(8) ¼" TRS line (inputs 7–10 duplicated on front panel); (1) ¼" TRS; (4) XLR mic, all servo balanced; (1) ¼" TS unbalanced
Analog Outputs	(8) ¼" TRS line, servo balanced, DC-coupled signal path; (1) ¼" TRS headphone unbalanced
Digital Inputs	(2) ADAT optical, (1) SPDIF optical
Digital Outputs	(2) ADAT optical, (1) SPDIF optical
MIDI	In, Out
Dynamic Range A/D	109 dB RMS unweighted, 112 dBA
THD A/D	< –110 dB (< 0.00032 %)
THD+N A/D	< –104 dB (< 0.00063 %)
Crosstalk A/D	> 110 dB
Dynamic Range D/A	116 dB RMS unweighted, 119 dBA (unmuted)
THD D/A	< –103 dB (< 0.0007 %)
THD+N D/A	< –100 dB (< 0.001 %)
Crosstalk D/A	> 110 dB
Sampling Rate Internally	32-, 44.1-, 48-, 64-, 88.2-, 96-, 128-, 176.4-, and 192 kHz
Sampling Rate Externally	28–200 kHz
Frequency Response A/D/A	–0.1 dB: 5 Hz–21.5 kHz (sf 48 kHz)
Frequency Response A/D/A	–0.5 dB: < 5 Hz–43.5 kHz (sf 96 kHz)
Frequency Response A/D/A	–1 dB: < 5 Hz–70 kHz (sf 192 kHz)
Dimensions	19" (W) × 1.7" (H) × 8.1" (D)
Weight	5.5 lbs.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completing work on this review. That version fixed the crash bug and appears to work smoothly with my Mac. In any case, be sure to download the latest drivers and firmware from RME's Web site before you use the system.

I tested the Fireface 800's analog audio quality by comparing it with a common high-end audio production solution: a Digidesign Pro Tools HD system with a 192 I/O. I recorded a Mason and Hamlin grand piano through a pair of Earthworks QTC-1 omni mics, first using a Millennia HV-3D mic preamp, and then the Fireface's mic preamps. I also recorded Tibetan bells and tambourines. All tests were recorded at 24-bit, 96 kHz. The results were pretty close.

The Fireface captured the piano with good detail, creating an even, well-balanced, and realistic recording. The Digidesign 192 did sound a bit more musical, creating a more integrated and slightly warmer recording. When comparing the Fireface's mic preamp to the Millennia, the latter (which costs $3,000) came out on top, which wasn't a big surprise. The Fireface preamps had a sharper, edgier sound that, while detailed and clean, did not quite capture the richness of the instrument the way that the Millennias did (see **Web Clips 1** through **3**).

What really impressed me about the Fireface 800, though, was how slight the sonic differences were between it and the Digidesign and Millennia systems. Bear in mind that the Pro Tools system and the Millennia mic pre cost many times what the Fireface does. The Fireface 800 sounded far better than some other USB and FireWire audio interfaces I have evaluated. I wouldn't hesitate to use a Fireface 800 to make an album, record a concert, or score a film. For an integrated, all-in-one audio I/O in its price range, the Fireface 800's sound quality is outstanding.

I also tested the Fireface's instrument input under OS X with GarageBand.

PRODUCT SUMMARY

RME Fireface 800

FireWire audio interface
$1,799
OVERALL RATING [1 THROUGH 5]: 4

PROS: Superb audio quality for its class and price range. Large numbers of inputs and outputs, both analog and digital. Handy instrument input with internal speaker emulation and drive effect. Internal power supply, no wall wart. SteadyClock feature reduces jitter on incoming digital signals. Three FireWire ports. Zero latency monitoring.

CONS: TotalMix software is confusing. Mac OS X drivers and software had problems that appeared to be fixed with driver version 1.2(1).

MANUFACTURER
RME/Synthax (U.S. distributor)
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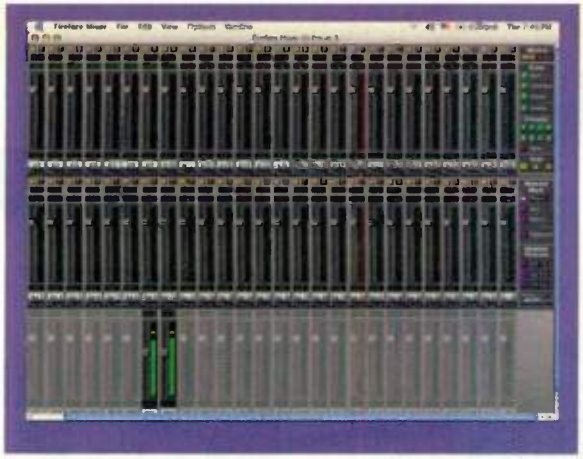

FIG. 4: The TotalMix software puts lots of information on one screen, but is confusing and hard on the eyes.

I plugged an ancient Wurlitzer 200A electric piano into the instrument input, first recording the signal dry, next recording it with the Fireface's speaker emulation on, and lastly, recording it with its overdrive effect on. The direct input was perfectly usable. The speaker-emulation effect was subtle but added a nice touch to the direct signal. The overdrive effect was harsh, edgy, and no replacement for a dedicated overdrive pedal (see **Web Clips 4** through **6**).

In Your Face

There's no doubt that RME's Fireface 800 is a remarkable piece of engineering. RME clearly tried to address every possible need for a product of this type and did a bang-up job. The number of features crammed into the 1U box is impressive, and the price—while not bargain basement—is within the reach of many musicians and project-studio owners.

Although there are some design quirks—you may have to wrestle with drivers and preferences a bit—and the audio quality isn't on par with the best digital audio systems I've heard, you'd need to spend at least four times the Fireface 800's retail price to move up appreciably. I don't usually say this, but this is such a fabulous box that it gets my highest recommendation. EM WEB CLIPS

Nick Peck is a composer/sound designer/audio engineer living in the San Francisco Bay Area. By the time you read this, he will be a new father. You can email him at nick@perceptivesound.com.

FIG. 1: The Roland V-Pro TD-20S is a complete electronic percussion system, combining six V-Drum triggers, three V-cymbal triggers, the V-Hi-Hat, and the TD-20 sound module.

ROLAND V-Pro TD-20S

A new benchmark for electronic percussion.

By Gino Robair

For nearly 20 years, Roland has been an innovator in the field of electronic percussion, diligently designing MIDI controllers that give drummers useful sounds and a natural feel. The latest top-of-the-line kit is the V-Pro TD-20S ($6,495), which offers plenty of new features in a system that's ready to play right out of the box (see **Fig. 1**).

The V-Pro comes with the new TD-20 Percussion Sound Module, five dual-trigger V-Pad drum controllers, a V-Kick bass-drum and stand, three V-Cymbals (including the 3-way CY-15R Ride), the new V-Hi-Hat controller, and a rack and cables. All you need are hi-hat and snare stands and a bass-drum pedal.

The V-Pro is priced in the range of Roland's previous high-end kit: the V-Session ($6,295), which I covered in the article "In Control: Banging Out the Bits" in the May 2001 issue of EM (available online at www.emusician.com). That system helped introduce the V-Cymbal pads, which were a major breakthrough in terms of feel and control. That set, however, used the FD-7 hi-hat controller, which worked well but lacked realism. Because much of the new V-Pro system is similar to that which we reviewed in our February 1998 issue (available online at www.emusician.com), I'll focus here on the latest hardware innovations, the new sound module, and the overall playability of the system.

Outside the Box

If you're new to electronic percussion, it may seem overwhelming at first: what most publicity shots don't show you is the web of cabling that's required in an electronic kit. The 16 controller cables needed for the V-Pro are conveniently labeled at each end and inserted through the stand's tubes, appearing in convenient spots around the kit. For example, the two plugs that go into the three-zone, ride V-Cymbal come out of the tube close to where you're instructed to attach the pad. Having all the cables labeled and in the right place cuts the setup time significantly. (The default hardware setup is for right-handed players: southpaws will have to rearrange the cables if they plan to relocate the instruments and TD-20. Roland's Web site provides instructions on how to do that.) In addition, the V-Pro system comes with plenty of setup instructions, manuals, and a helpful TurboStart DVD, making kit configuration relatively painless.

Once again, the support rack has been redesigned, now with ergonomic improvements: the side rails slope down toward the player, and there are quick-release cams on the four legs to adjust the height to suit your needs. This feature also allows you to shorten the legs for easier transport or storage.

The set comes with three boom stands for the V-Cymbals. Two of them attach directly to the rack next to the upper toms, and are easily adjusted using quick-release cams. The third

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cymbal stand and four toms attach to the stand with large plastic clamps. The clamps, which can be hand tightened, require a drum key to lock them in and are strong enough to hold things steady, no matter how hard you play. Roland thoughtfully provides cable ties to keep the trigger cables out of harm's way, a sheet of extra labels for the cables, a plastic bass-drum beater, and a drum key.

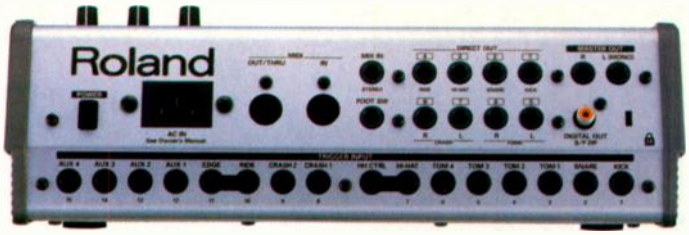

FIG. 3: Besides the master outputs, the TD-20's rear panel has eight direct outputs. Four aux trigger inputs are available if you want to add controllers to the V-Pro TD-20S.

Brains Before Brawn

The V-Pro is built around the sounds and capabilities of Roland's new TD-20 sound module. In addition to holding 560 sampled and modeled sounds, the module has a MIDI sequencer, a General MIDI sound set (although it doesn't have a GM mode), and support for Roland's V-Link protocol, among many other features. Nevertheless, the TD-20 is remarkably intuitive to use; you won't need the manual for most of the basic tasks, such as choosing and editing instruments or adding effects.

Dedicated buttons for important functions, such as sequencer transport controls, effects editing, and kit and instrument selection (see Fig. 2), are located on the face of the module. The eight faders, which are assigned to specific instruments, let you set volume levels on the fly. The large increment, decrement, and Velocity-sensitive Preview buttons, as well as the Value wheel and cursor buttons, are easily accessible, and the generous LED display shows plenty of information without being cluttered.

FIG. 2: Whether you're getting the right mix, editing a sound, or recording a sequence, the TD-20 is easy to use: a button is dedicated to nearly every important feature.

The physically modeled sounds are primarily drums and cymbals, and Roland's Composite Object Sound Modeling (COSM) technology lets you tweak the instruments in a variety ways. For example, you can change the size of a V-Cymbal from 1 inch to 40 inches, determine how long it will sustain, select a chain or rivet type of sizzle, and pick one of five mic positions. Snare drum options include shell material and depth, head type, tuning, muffling, strainer tension, and mic position. You can even add sympathetic snare-buzz resonance to the toms and kick drum.

The remaining sounds are samples with limited editing capabilities—primarily pitch and decay time. Overall, the sound set is great and covers an enormous range, from acoustic and electronic drums to world percussion and sound effects. The 50 factory kits provide a great way to explore the sound library.

When you're done customizing your instruments and arranging them into kits, you can determine the room they're in (starting with the size and material of the walls) and add effects (compression, EQ, and reverb). If you're into tweaking the playability of the instruments, you can adjust the Velocity curves, the rim-shot response, the cross-stick threshold, and the length of time that a double-trigger is masked, among other parameters. The amount of editing options is staggering, so be sure to leave yourself plenty of time to actually play the drums.

The TD-20 can hold 50 kits at a time, and your customized kits can be saved and loaded from a CompactFlash card. The sound module automatically saves any changes that you make to the instruments and kits, which has its good and bad points: it's good that you'll never have to remember to press Save as you work, but it's bad if you want to backtrack to something you did earlier. If you need to restore the factory presets, it's simple to retrieve them one at a time or en masse: just make sure you back up the work you want to keep to your CompactFlash card or via MIDI.

Although you cannot augment the TD-20's sound set by importing samples, the module will accept an expansion board (although nothing was available while I was reviewing this product). Unlike the previous V-Pro module, the TD-10, you don't need the expansion board to use the three-way ride trigger.

If you want to step through your kits in a particular order, the TD-20 lets you organize up to 32 kits in a row as a chain. You can store 16 chains.

The TD-20's sequencer can be used to record your own playing (with or without quantization or a metronome) or create instrumental accompaniments using MIDI. You can assign any trigger zone to start and stop a sequence, or

you can use the trigger to step through a pattern of notes. The module comes with 100 preset patterns and has space for another 100 user patterns. The sequencer offers quantization capabilities and will record positional sensing and cymbal chokes. Be sure to quantize as you record if you need it, because you cannot change the quantization afterward. Step-time sequencing is not supported.

The module accepts 14 controllers, including four aux dual-trigger inputs for additional pads or percussion controllers (see **Fig. 3**). The rear panel also sports two ¼-inch master outputs, eight ¼-inch direct outputs, S/PDIF digital output, a ¼-inch footswitch input, a ¼-inch TRS input for playing along with external audio sources, and MIDI In and Out. The edge of the front panel has a ¼-inch headphone jack and a slot for the CompactFlash card.

That's *Mr.* Hi-Hat, to You

The most exciting part of the V-Pro is its new VH-12 V-Hi-Hat controller (see **Fig. 4**). Say good-bye to the rubber block and remote-pedal hi-hat system: the VH-12 comes with a pair of special V-Cymbals—a 12-inch top cymbal and an 11-inch bottom cymbal—that attach to a traditional hi-hat stand for a realistic playing experience. The hi-hats are electronically linked with a short cable between the cymbals, and two cables run from the bottom cymbal to the TD-20. Before you begin playing the hi-hats, you'll need to adjust the VH Offset—a simple two-step procedure. From there, you're ready to rock.

The resulting physical feedback is very satisfying—much more so than other hi-hat controllers. The VH-12 can sense edge and bow strikes and foot closure. In addition, the closed-tone on some of the hi-hat sounds changes as you apply foot pressure while striking the cymbals.

The manual cautions you against striking the underside of either of the cymbals: if you're a jazz player who taps the bottom cymbal while playing a ride pattern on top (à la Max Roach's "Mr. Hi-Hat"), you're out of luck. But for regular jazz and rock playing, the chubby rubber V-Hi-Hats are exceptional.

New Pads on the Block

The V-Pro has five redesigned mesh-head pads with black shells. The 12-inch PD-125 and 10-inch PD-105 have an improved triggering mechanism, which Roland says offers greater evenness in triggering, as well as head and rim sensors. The dual-trigger toms are a welcome addition that allow you to create unusual kits to fit nearly any application. I wanted to build a kit to inspire new Latin grooves, so I placed a shaker sound on the head of the high tom, a high timbale on the tom's rim, and long and short guiro scrapes on a low tom's head and rim, respectively. The short guiro conveniently gates the long guiro in a realistic fashion when triggered.

Going a step further, I put three unusual sounds on the ride cymbal: a hip-hop style bass drum on the bell, an electronic sound on the bow, and a synth guiro on the edge. As a result, I had to adjust the crosstalk levels for the cymbal to minimize false triggerings between the three playing areas. But the resulting kit was, indeed, inspirational to play (see **Web Clip 1**).

Many of the V-instruments in the TD-20 support positional sensing on the V-Drums and V-Cymbals for added sonic realism. The positional sensing capabilities are most noticeable when playing rim shots on the snare: as you strike from the edge to the center, the timbre changes. The snare pad also senses brush strokes (nylon brushes are recommended) and cross sticking.

FIG. 4: The VH-12 V-Hi-Hat is a major improvement in hi-hat controllers. The two cymbals are connected by a cable between the cymbals, and the assembly fits on a normal hi-hat stand.

TD-20 SPECIFICATIONS

Sound Generator	Physical modeling and sample playback
Instruments	560 drums/percussion, 262 backing
Maximum Polyphony	64 notes
Drum Kits	50
Drum Kit Chains	16 (32 steps per chain)
Effects	compression, EQ, reverb, chorus, delay, flanger, phaser, pitch shifter, enhancer, overdrive, distortion, ring mod, lo-fi
Tempo Range	20–260 bpm
Trigger Inputs	15 dual-trigger
Analog Outputs	(2) master, (8) direct, (1) headphone (all unbalanced ¼-inch)
Analog Input	(1) TRS ¼-inch stereo
Digital Output	(1) coaxial S/PDIF
Expansion Slots	(1) memory card, (1) expansion board
Dimensions	12 ⅛" (W) × 4 ⅜" (H) × 10 ⅛" (D)
Weight	6 lbs., 7 oz.

The mesh heads can be tightened and loosened like acoustic drum heads, allowing you to set a tension that matches your playing style. The manual warns not to play with the heads that are too loose, or you'll damage the triggering basket beneath it. The mesh heads have a springier feel than do acoustic drum heads, which takes a moment to get used to. But unlike many percussion controllers on the market, they're easy on the wrists when playing for long periods of time.

What's Not to Like?

Even though the new V-pads offer a richer playing experience than before, a few details need to be ironed out in the next hardware revision. The first thing I'd like to see is a larger ride-cymbal bell. The current one is not very big, and its sweet spot seems to be on top, next to the wing nut. Even after tweaking the pad sensitivity and crosstalk settings, which increased the sweet spot, getting it to trigger on its own while playing a complex groove can be tricky.

The TD-20 does not have multitimbral capabilities, so you can't layer drum sounds on a pad. It would be nice to have an Undo function for recording drum sequences and editing. If you make a mistake when recording drum sequences, you have go through several button presses to erase what you recorded and begin again. In addition, I'd like to be able to erase a pass of an entire instrument while in Loop Record mode, so I don't have to scrap an entire session because I hit the wrong pad.

And nothing gives away the fact that you're playing a virtual kit more quickly than the sound of the rolls. Some of the V-instruments—snares and cymbals, in particular—have a feature called interval control, which, in essence, lengthens the attack of the notes when you play a succession of quick hits. These instruments roll remarkably better than the standard ones, which still have a machine-gun sound during rolls. But even with interval control, buzz rolls can sometimes sound unnatural. I'd like to see a feature, found in some software drum machines, that alternates two sounds—simulating a drummer's right and left hands—for a more realistic roll.

PRODUCT SUMMARY

ROLAND V-Pro TD-20S

electronic drum set
$6,495

OVERALL RATING [1 THROUGH 5]: 4

PROS: Great sounds. COSM-modeled drums and cymbals. Realistic cymbal and hi-hat controllers. Mesh heads. Easy to set up. Intuitive to use.

CONS: Can't sample or add your own sounds. Can't layer sounds on the pads. No Undo. Expensive.

MANUFACTURER
Roland Corporation U.S.
www.rolandus.com

V Is for Victory

The bottom line is that the V-Pro TD-20S is a pro-level kit that sounds great and is a blast to play. The drums are equally at home onstage, in the classroom or practice studio, and in the recording studio for tracking or sequencing realistic drum parts. There are plenty of instruments to choose from, and you can easily mold them to fit your music. The factory kits provide a nice jumping-off point for creating custom setups, so don't get discouraged if, for example, the Metal kit isn't your kind of metal sound. Once you start mixing and matching the wide array of COSM drums and cymbals and tweaking the effects, you'll find the sound that you're looking for in no time.

And if you're still uncertain about the possibilities that electronic drums offer, spend a little time behind a V-Pro kit at your local music store. The sound and feel will knock your socks off.

EM WEB CLIPS

Gino Robair's first electronic drums were the Star Instruments Synare 3, attached to the nonquantizable Synare sequencer.

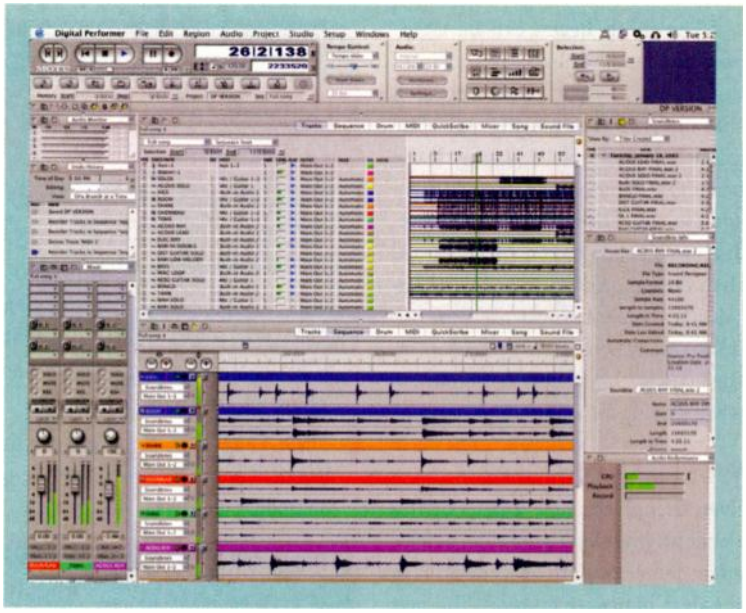

FIG. 1: The latest incarnation of Digital Performer offers plenty of useful new features including the Beat Detection Engine, plug-in latency compensation, and a redesigned user interface.

MOTU Digital Performer 4.52

A perennial stalwart gets even better.

By Mike Levine

With the release of Digital Performer (DP) 4.5 and the subsequent updates of 4.51 and 4.52, MOTU has once again upped the ante in the supercompetitive market of digital audio sequencers. Version 4.5 brought with it several major additions: a brilliant revision of the user interface, the feature-rich and flexible Beat Detection Engine, plug-in latency compensation, and improved Pro Tools support.

Other useful improvements included MP3 export, the ability to see markers in QuickScribe mode (great for scoring), additional voices and sends, support of Apple Loops and Acidized WAV files, and much more. Version 4.51 (a free update) added new features such as Dynamic CPU Management, which enables supported plug-ins to go into a resting mode that disables their CPU demands when they're not processing audio, and the ability to save bounce settings and configure multiple bounces. Version 4.52 (also free), the latest available at the time of this review, is a maintenance upgrade that included additional refinements (see Fig. 1).

Because EM has covered DP's basic features in previous reviews, this article will focus on versions beginning with v. 4.5.

Consolidate, Consolidate

When you open a new file in DP 4.5*x*, the first thing you notice is the Consolidated window, which makes getting around a whole lot easier. This major upgrade of the DP graphical user interface makes it much easier to manage multiple windows, and thereby lets you get the most from your computer monitor's available real estate. Rather than having several windows open, as was the case in previous versions—and therefore having to constantly hide windows, bring them to the front, send them to the back, and open new ones—the Consolidated window puts multiple windows together in one large, user-customizable display.

The Consolidated window is designed around what MOTU calls the Main Body, a scalable space that can accommodate multiple vertically stacked edit windows (the default is two). A series of tabs running across the top of each edit window lets you choose whether it will display the Tracks, Sequence, Drum, MIDI, QuickScribe, Mixer, Song, or Sound File (Waveform) editors (see Fig. 2).

You have the option to open additional windows, called sidebars, on the left and right edges. The sidebars can be configured as single vertically oriented windows that span the top-to-bottom length of the Consolidated window, or you can open additional smaller windows within that same vertical space. For instance, Fig. 3 shows a Consolidated window that's been optimized for tracking. The Main Body is composed of the Tracks editor on top and the Sequence editor underneath it. The left sidebar is the mixer and has been left relatively thin, so as to show only one channel strip. Whenever a track is selected

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in the Tracks or Sequence editor, the left sidebar shows the channel strip for that track.

In this same example, the right sidebar shows (from top to bottom) the Audio Monitor, the Soundbites window, and the Performance meter. (You have a number of other window choices for the sidebars.) In older versions of DP, selecting one of the main editors would often cover up such auxiliary windows, making it frustrating to keep visible essential windows such as the Audio Monitor. Now, you can configure such windows so that they stay at the top level all the time, which is a big improvement. Pull-down menus in the various sidebar windows let you quickly and easily switch between a variety of edit and utility windows.

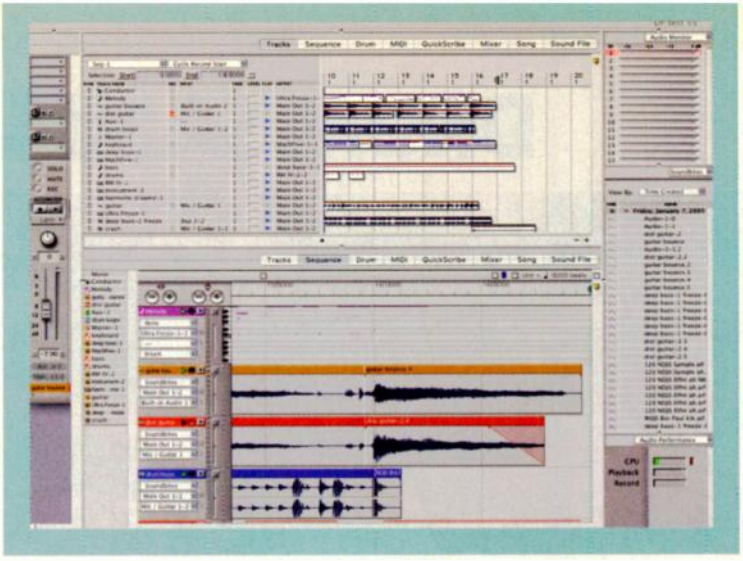


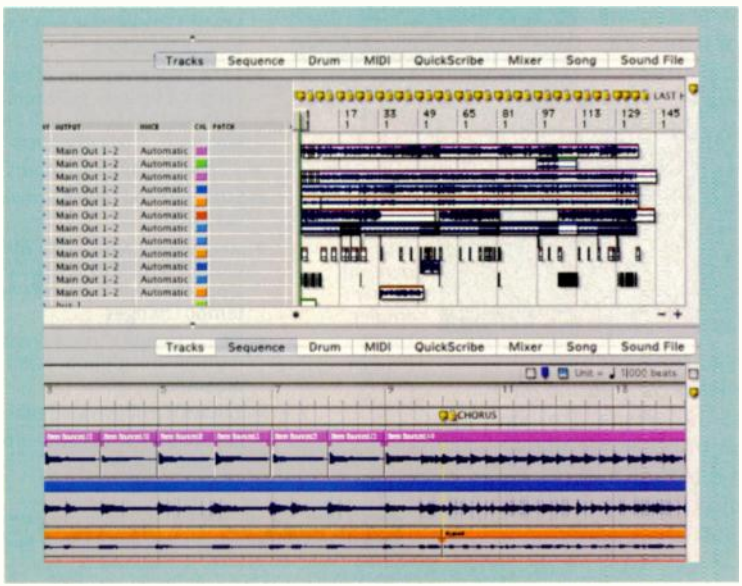
FIG. 3: This screen shot shows an example of the Consolidated window with sidebars. A single mixer-channel strip has been configured on the left side of the Main Body (which is showing Tracks and Sequence editor windows), and Audio Monitor, Soundbites, and Audio Performance windows have been enabled on the right.

You can resize all the sidebars and the windows in the Main Body by dragging from points on their vertical or horizontal axes, and the sidebar windows can be moved around by dragging and dropping. Individual windows can also be "popped" in and out of the Consolidated window. You can save your Consolidated window setups as window sets, making it easy to have custom setups for tracking, editing, and mixing. (DP provides a menu of handy presets, which make good starting points.)

In the Consolidated window, it's possible to have edit windows open for more than one Chunk, so it's important to pay attention to the small text field in the left-hand side of any editor window, which indicates the Chunk for which that window is active. Otherwise, you might make tweaks in an editor only to realize that you're editing the wrong Chunk. It's a minor point, but it would be helpful in a future upgrade if the Chunk name was made more obvious.

Overall, though, the Consolidated window makes a huge difference in the speed and efficiency with which you can use Digital Performer. If you prefer to work in the old style, with separate windows, DP lets you do that, as well. In the newly revamped Preferences window, you specify whether files from older versions of DP will open with the old or Consolidated style.

FIG. 2: The Consolidated window's main section (the Main Body) consists of a user-configurable number of editor windows, each with tabs across the top for quickly changing to different editors.



The Thin Blue Line

The Beat Detection Engine (introduced in DP 4.5) is an extremely deep feature, offering numerous ways in which to edit the rhythmic content of your audio. It analyzes your audio files (either automatically or on a file-by-file basis) looking for transients, which it interprets as rhythmic information. As a result, it works best on audio with clearly defined transients.

From a rhythmic standpoint, the tools in DP's Beat Detection Engine allow you to edit audio in almost the same way as MIDI data. Getting the desired results, however, isn't always as cut and dried. In fact, using many of the Beat Detection features successfully is, as MOTU freely admits, more of an art than a science.

Before applying any Beat Detection features, you need to make sure that your audio has been analyzed for beats. In the Sequence editor, a region that has had its beats detected displays thin blue lines layered under the waveforms.

You can control the level to which beats are affected by the various features by tweaking the Adjust Beat Sensitivity and Adjust Beat Detection sliders. Adjust Beat Sensitivity lets you set an amplitude threshold below which the engine won't detect beats, and Adjust Beat Detection sets a threshold based on a number of factors, including rhythmic value.

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(MOTU is deliberately vague about what the other variables are, considering that a trade secret.) You can also go into the Waveform editor and manually disable selected beats so that they're not affected by beat-editing operations (see Fig. 4). There are a lot of choices.

Probably the most dramatic feature of the Beat Detection Engine is its ability to quantize audio within a Soundbite. Assuming that DP has already analyzed the beats in a particular piece of audio, you can use the regular Quantize window to apply those same processes to an audio region. Simply adjust the What to Quantize setting to Beats within Soundbites. Much of the time, this feature works as advertised. For instance, I was able to easily change a shuffle drumbeat to a straight-eighths beat, and a synth line with a straight-eighth-note feel to a shuffle.

In another instance, I was putting together a loop-based drum part but found that one loop I wanted to use had a snare drum that was ahead of the beat and didn't match the feel of the other loops in the song (although it did match sonically). Using the Adjust Beat Sensitivity and Adjust Beat Detection features, I configured DP to recognize only the snare hits in the loop. I then quantized them using the Beats within Soundbites setting and was able to give them a more laid-back feel. Audio quantizing didn't always work out as expected, though. Sometimes the quantized audio had artifacts—perhaps caused by trying to make too drastic a change.

One of the coolest of the Beat Detection features is the ability to extract grooves from audio files and apply them to other audio or MIDI files. That works great for, say, a section in which you want to lock the bass drum up with the bass. It was most successful when working on 1- or 2-measure regions.

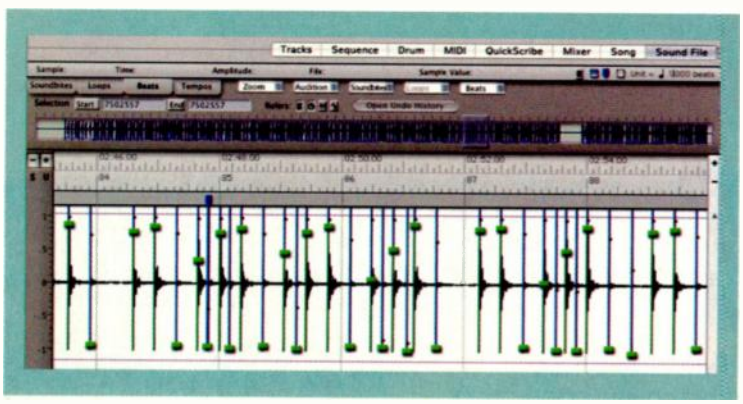

FIG. 4: In the Waveform editor, beats show up as blue lines with green handles. Here, you can perform such operations as changing a beat's Velocity and disabling a beat so that it's not affected by beat-editing operations in the Sequence editor.

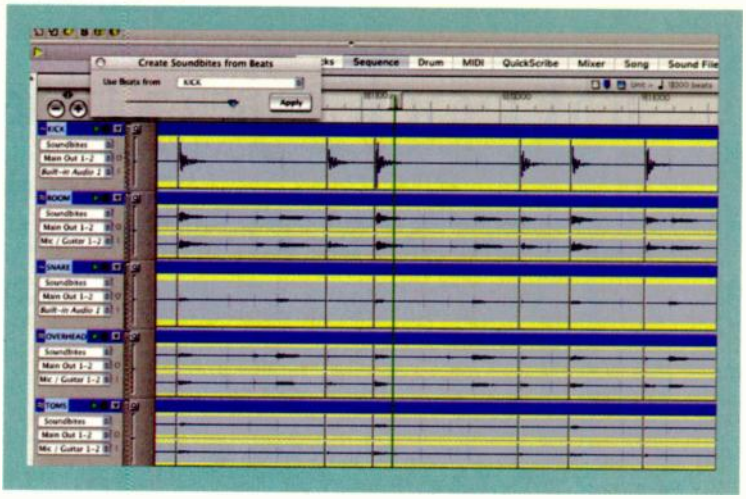

FIG. 5: The Create Soundbites from Beats command lets you preview and adjust the level of beat detection before splitting up a track. It also allows you to choose a guide track that will govern the beat divisions over all selected tracks.

Yet another way to quantize audio using the Beat Detection Engine is to cut up a file into separate sound bites and quantize them, à la Recycle.

There are two ways to do this: one is to analyze a piece of audio, turn on the Beat grid (which is a separate feature from the conventional Edit grid, which you should turn off for this operation) and drag the scissors tool over the region. That automatically cuts the piece up into separate beats. Then you can use the Quantize command (with the Soundbites setting selected) to affect those separate sound bites.

Regions can also be split according to beats using the Create Soundbites from Beats command. That allows you to split single or multiple tracks by their beat divisions, and even lets you designate a single track as a guide track to determine the beat divisions for all selected tracks (great for maintaining phase coherence when editing multitrack drum parts). You can preview the split while adjusting a slider showing the beat divisions, and then apply your edit (see Fig 5).

The Beat Detection Engine can automatically read audio files with embedded tempo information, making it easy to import Apple Loops and Acidized WAV files. If you set the Automatic Conversions preferences to convert all imported files to the sequence tempo, you only need to drag the Apple or Acid loop into a sequence, and it will automatically change to the correct tempo. (Changing pitched loops to match the key of your sequence will still have to be done manually using Spectral Effects or an external editor.)

Space doesn't allow me to go into all the possibilities and features of the Beat Detection Engine, but suffice it to say, it gives you a great deal of flexibility for correcting and manipulating the rhythmic aspect of audio files, but doesn't always give you instant gratification. Be ready to experiment.

Always on Time

Another key feature introduced in 4.5 is Plug-In Latency Compensation. If you have plug-ins in your collection

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The Master at Work

DP 4.5 marks the debut of the impressive MasterWorks EQ plug-in (see **Fig. 6**). MOTU states that it emulates legendary "British large-console EQs," and the company has imbued the plug-in with a retro, big-console look. The EQ, which comes in stereo and mono versions, offers four fully parametric bands that can be switched in and out of the signal path, each with four selectable filter curves. Adjustable highpass and lowpass filters can also be switched in if needed.

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There are lots of handy extras in the MasterWorks EQ, including an FFT display so you can see a real-time graphic rendition of the audio file, which makes it easier to dial in the right frequencies; a feature called Audition with Noise that plays pink noise corresponding to the frequency you're tweaking (also designed to aid in frequency selection); an adjustable frequency response display; and more. MasterWorks EQ sounds great, offers plenty of

parameter control, and is quite user-friendly. It made me wish that MOTU had added more plug-ins to DP's collection, which is not as extensive as that offered by some of its rivals.

Send Me, Pan Me

The list of significant new features just keeps going. The number of available voices has been raised from 96 mono voices, 64 stereo voices, and 32 stereo buses to 99 of each of those three categories. You can now have a maximum of 20 sends per track, as compared with a maximum of 5 per track in version 4.12.

MOTU also changed the sends so that you can configure a stereo or mono aux automatically from a send's pull-down menu, rather than having to go through the multistep process of selecting a new Aux track, then setting up its input and so forth. In addition, when you set up a stereo Aux, a panning knob now appears on the channel strip, giving you control over the Aux's stereo image. Those working in surround will get a surround panner when they set up a surround Aux.

Describing the Scribe

DP has always been popular with composers working to picture, and several improvements will endear them to it even more. DP is now latency-compensated for DV-formatted QuickTime playback over FireWire, allowing for frame-accurate output during playback and when the video is stopped. Additionally, the new QuickScribe Film Cues view lets you view markers with their SMPTE time locations clearly displayed above the staff in QuickScribe view. MOTU has improved DP's marker support by adding the capability to number markers and then locate to them using the Go to Marker command.

New export options have been added—most notably the ability to export files as MP3s. You must first download and install the third-party freeware Lame Framework, but once that's done, you can export MP3s directly from the Soundbites window in a range of quality levels, or you can bounce tracks to disk as MP3s.

As mentioned earlier, the Preferences window has been revamped and now contains many preference settings that previously resided in various other menus within the program. This is handy because, especially with the advent of the Beat Detection Engine, you'll switch preferences a lot more than you did in the past (turning the Beat Detection Engine on and off in the background, changing whether files are automatically tempo converted, and so on).

Plugged In

Also new and significant is a feature called Dynamic CPU Management, which helps users squeeze the most processing power out of their Macs as possible. It disables supported plug-ins when they're not receiving audio. Say you have a reverb that you're only using in one section of a song. Instead of it staying active for the entire song, thus using up valuable CPU power even when no audio is fed into it, the reverb plug-

in now taps into your processor only when it receives and processes audio.

According to MOTU, this feature supports all of its own MAS plug-ins and all third-party AU plug-ins (both instruments and effects). A third-party MAS plug-in must have support for this feature written into its code for it to see the power savings. Presumably, third-party developers will make sure that future versions of their MAS plug-ins are compliant.

When used with supported plug-ins, Dynamic CPU Management makes a dramatic difference. I used it with a host of MOTU plug-ins, and when the song reached a part in which no audio was feeding them, the CPU indicator in the Performance Meter dropped noticeably.

Another important addition (which was added in DP 4.51) is Bounce Settings and Multi Bounce. The Bounce Settings feature lets you save custom bounce-to-disk settings for each project, so you can reinitiate specific bounces without having to reconfigure the settings. What's more, you can assign a key command to each saved bounce setting, making it easy to initiate a mix without even going to a menu. I love this feature because if I run a mix and then discover that I need to make a few more tweaks, I don't have to reset the bounce settings before rerunning the mix.

The Multi Bounce feature lets you set up DP to bounce multiple saved bounce files in one operation. If you have to make alternate mix types for a single song (for example, a full mix, a TV mix, an instrumental mix, and a background-vocal mix), you can set the bounces up in advance. Then, if you have to make several revisions of your mix, you can press one key combination to set

PRODUCT SUMMARY

MOTU Digital Performer 4.52

digital audio sequencer
$795
upgrade from v. 4.12 or earlier of DP $149
OVERALL RATING (1 THROUGH 5): 4

PROS: Consolidated Window improves user interface. Beat Detection Engine offers new options for editing rhythms in audio files. Dynamic CPU Management reduces CPU load. Latency Compensation reduces plug-in timing problems. Increased number of voices and sends. New Aux shortcuts make configuring the mixer easier. MP3 exporting. Support of Apple Loops and Acidized WAV files. Improved support of Digidesign hardware.

CONS: Quantize Beats within Soundbites feature sometimes causes audio artifacts. Beat Detection Engine has large learning curve. MasterWorks EQ is the only new plug-in. Lame Framework must be downloaded and installed for MP3 export features to work.

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The Automatic Voice Allocation feature is designed to make it simpler to configure your projects. Mono and stereo sends are now supported, as is send automation. In addition, Instrument Track support enables DAE users to fully use TDM instruments in DP.

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I tested the various versions of DP 4.5*x* on a dual G5/2 GHz running OS 10.3.5, and on a G4/733 MHz running 10.2.8. DP ran well on both machines, although it was a lot faster on the G5.

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BLUE MICROPHONES Robbie

A wonderfully clear tube preamp.

By Rich Wells

Blue Microphones has always attracted attention with its splashy industrial designs. Products such as the Ball-series dynamics and the Mouse and Dragonfly mics, which sport rotating capsules, are eye-catchers. The company recently expanded into signal processing and developed its first product—a tube mic preamp called Robbie—that also serves as a DI (see **Fig. 1**). Robbie's features are basic: a single XLR input and output; a power switch; and buttons for mic or DI use, phase reverse, a –20 dB pad, and 48V phantom power. The front panel has only a ¼-inch instrument input and a big gain-control knob. Robbie's design upholds Blue's reputation for producing products with visual flair. As for the sound, the emphasis is on loads of gain and extreme clarity.

Look and Feel

The Robbie preamp is an homage to Robby the robot from the sci-fi classic *Forbidden Planet* (the preamp's logo is a caricature of the legendary bot), and Robbie's chassis reflects the curvaceous legacy of '50s-era design. Blue's stated design goal is elegance in appearance and simplicity of use. The preamp's chassis has semicircular sides, which enhance the look of the two main features of the front panel: an oversized chrome potentiometer and a transparent round turret that juts out from the surface. Robbie's ECC88 twin triode tube is housed in this turret, as is a spring that spirals around the tube.

A blue light emanating from behind the front panel surrounds the two front cylinders. The pot's range markers are regularly spaced translucent circles that produce more soft blue light. On our review unit's pot, another smaller blue light glowed when Robbie reached unity gain. According to Blue, however, this light has caused some confusion with customers and is being eliminated from future production runs. The preamp's tube also glows in its turret.

The more I used Robbie, however, the more I felt that the space taken up by the large front-panel cylinders could have been allotted for the switches and connectors, all of which (except for the DI jack) are shunted to the rear panel (see **Fig. 2**). That won't be a major hassle if you set Robbie on a tabletop, but it's a case of form trumping ergonomic function. For $25, Blue offers a rackmount adapter plate, but a rackmounted Robbie (with its rear-mounted switches) would be difficult to fully adjust unless it was on a sliding rack tray. Robbie is also somewhat of a space hog; although it's a half-rackspace unit, it's 3U in height.

Robbie's chassis is set on a circular metal ring with threaded holes for the rackmount adapter screws. The ringed base encompasses slightly more than half of the chassis's total area. That could affect the unit's stability when

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it's placed on an unusually unlevel surface or if another unit is stacked on top.

Loud and Clear

Robbie's preamp is a Class A discrete tube design that uses high-quality metal film resistors and polystyrene capacitors to lower self-noise and distortion. The attention to detail pays off; you'd have to work at it to make Robbie sound bad.

I first used Robbie in tandem with a Blue Bluebird as a close mic on a Martin dreadnought acoustic guitar. With the Bluebird positioned a foot away, finding an optimal playing position was tricky. Minute changes in position yielded dramatic differences in the sound, perhaps attributable to the Bluebird's response pattern. For a close-mic setup, Robbie's sound was very clear once I located the sweet spot (placing the mic at the eighth fret pointing at a 30-degree angle toward the sound hole). Robbie provided exactly what I was looking for: a sound that was crisp but not overly bright and not too woofy. For some tracks, the guitar player wanted to be able to move around a bit, so I backed the mic off another foot or two. The differences in response to playing position changes decreased (and a bit more ambience crept in), while the clarity of the highs and lows remained even.

FIG. 2: Robbie's rear panel houses a power switch and buttons for selecting mic or DI mode, phase reverse, –20 dB pad, and 48V phantom power.

I had a matching pair of high-quality tube mics at my disposal during the testing period, enabling me to record male vocals with the same mic model through different preamps simultaneously. With levels matched, Robbie was a bit more compressed sounding, seemingly due to its big, clear low-end response. Without that extended low end, the solid-state pre was sensitive to the singer's every head bob and weave, while Robbie stabilized the audio.

I used a Shure SM57 with Robbie and was amazed; the difference Robbie made with that ubiquitous mic was huge. I compared it directly with another SM57 that was connected to one of my best solid-state pres. Both mics were placed in the same relative position on separate speakers of a 2 × 10 bass cab. Although each sounded good, Robbie would have been a better choice for a situation in which only one mic could be used. Robbie had a more natural and somewhat less electric sound. In addition, Robbie's sound was more like the sound coming from the cab than that of the solid-state pre. The difference was noticeable, and the blending of the two mics yielded an incredible sound.

ROBBIE SPECIFICATIONS

Analog Inputs	(1) balanced XLR (1) unbalanced ¼" inst.
Analog Outputs	(1) balanced XLR
Mic Input Impedance (20 Hz–20 kHz)	5 kΩ (2 × 2.5 kΩ)
Hi-Z Input Impedance	1 MΩ
Gain	8 dB–68 dB
Frequency Response (±2 dB)	10 Hz–100 kHz
THD + Noise @ 60 dB gain (10 Hz–20 kHz, +22 dBu output)	< 0.006%
Maximum Input Level (8 dB gain, 20 Hz–20 kHz)	+22 dBu w/o pad
Maximum Output Level (20 Hz–40 kHz @ 10 k)	+34 dBu
Output Impedance	50Ω (2 × 25Ω)
Phantom Power	+48 VDC, ±1.5 VDC
Power Consumption	8W
Dimensions	8.25" (W) × 8.5" (L) × 5.25" (H)
Weight	7 lbs.

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DP 4.5 marks the debut of the impressive MasterWorks EQ plug-in (see **Fig. 6**). MOTU states that it emulates legendary "British large-console EQs," and the company has imbued the plug-in with a retro, big-console look. The EQ, which comes in stereo and mono versions, offers four fully parametric bands that can be switched in and out of the signal path, each with four selectable filter curves. Adjustable highpass and lowpass filters can also be switched in if needed.

FIG. 6: The MasterWorks EQ is a new parametric equalizer that is flexible, sounds good, and is easy to use.

There are lots of handy extras in the MasterWorks EQ, including an FFT display so you can see a real-time graphic rendition of the audio file, which makes it easier to dial in the right frequencies; a feature called Audition with Noise that plays pink noise corresponding to the frequency you're tweaking (also designed to aid in frequency selection); an adjustable frequency response display; and more. MasterWorks EQ sounds great, offers plenty of

parameter control, and is quite user-friendly. It made me wish that MOTU had added more plug-ins to DP's collection, which is not as extensive as that offered by some of its rivals.

Send Me, Pan Me

The list of significant new features just keeps going. The number of available voices has been raised from 96 mono voices, 64 stereo voices, and 32 stereo buses to 99 of each of those three categories. You can now have a maximum of 20 sends per track, as compared with a maximum of 5 per track in version 4.12.

MOTU also changed the sends so that you can configure a stereo or mono aux automatically from a send's pull-down menu, rather than having to go through the multistep process of selecting a new Aux track, then setting up its input and so forth. In addition, when you set up a stereo Aux, a panning knob now appears on the channel strip, giving you control over the Aux's stereo image. Those working in surround will get a surround panner when they set up a surround Aux.

Describing the Scribe

DP has always been popular with composers working to picture, and several improvements will endear them to it even more. DP is now latency-compensated for DV-formatted QuickTime playback over FireWire, allowing for frame-accurate output during playback and when the video is stopped. Additionally, the new QuickScribe Film Cues view lets you view markers with their SMPTE time locations clearly displayed above the staff in QuickScribe view. MOTU has improved DP's marker support by adding the capability to number markers and then locate to them using the Go to Marker command.

New export options have been added—most notably the ability to export files as MP3s. You must first download and install the third-party freeware Lame Framework, but once that's done, you can export MP3s directly from the Soundbites window in a range of quality levels, or you can bounce tracks to disk as MP3s.

As mentioned earlier, the Preferences window has been revamped and now contains many preference settings that previously resided in various other menus within the program. This is handy because, especially with the advent of the Beat Detection Engine, you'll switch preferences a lot more than you did in the past (turning the Beat Detection Engine on and off in the background, changing whether files are automatically tempo converted, and so on).

Plugged In

Also new and significant is a feature called Dynamic CPU Management, which helps users squeeze the most processing power out of their Macs as possible. It disables supported plug-ins when they're not receiving audio. Say you have a reverb that you're only using in one section of a song. Instead of it staying active for the entire song, thus using up valuable CPU power even when no audio is fed into it, the reverb plug-

in now taps into your processor only when it receives and processes audio.

According to MOTU, this feature supports all of its own MAS plug-ins and all third-party AU plug-ins (both instruments and effects). A third-party MAS plug-in must have support for this feature written into its code for it to see the power savings. Presumably, third-party developers will make sure that future versions of their MAS plug-ins are compliant.

When used with supported plug-ins, Dynamic CPU Management makes a dramatic difference. I used it with a host of MOTU plug-ins, and when the song reached a part in which no audio was feeding them, the CPU indicator in the Performance Meter dropped noticeably.

Another important addition (which was added in DP 4.51) is Bounce Settings and Multi Bounce. The Bounce Settings feature lets you save custom bounce-to-disk settings for each project, so you can reinitiate specific bounces without having to reconfigure the settings. What's more, you can assign a key command to each saved bounce setting, making it easy to initiate a mix without even going to a menu. I love this feature because if I run a mix and then discover that I need to make a few more tweaks, I don't have to reset the bounce settings before rerunning the mix.

The Multi Bounce feature lets you set up DP to bounce multiple saved bounce files in one operation. If you have to make alternate mix types for a single song (for example, a full mix, a TV mix, an instrumental mix, and a background-vocal mix), you can set the bounces up in advance. Then, if you have to make several revisions of your mix, you can press one key combination to set

PRODUCT SUMMARY

MOTU Digital Performer 4.52

digital audio sequencer
$795
upgrade from v. 4.12 or earlier of DP $149
OVERALL RATING (1 THROUGH 5): 4

PROS: Consolidated Window improves user interface. Beat Detection Engine offers new options for editing rhythms in audio files. Dynamic CPU Management reduces CPU load. Latency Compensation reduces plug-in timing problems. Increased number of voices and sends. New Aux shortcuts make configuring the mixer easier. MP3 exporting. Support of Apple Loops and Acidized WAV files. Improved support of Digidesign hardware.

CONS: Quantize Beats within Soundbites feature sometimes causes audio artifacts. Beat Detection Engine has large learning curve. MasterWorks EQ is the only new plug-in. Lame Framework must be downloaded and installed for MP3 export features to work.

MANUFACTURER
Mark of the Unicorn
www.motu.com

Robbie produced natural-sounding electric and bass guitar sounds. In addition, Robbie helped effected sounds by taking the edge off the processed sound. That wasn't a by-product of a reduced high-frequency response; rather, it's a by-product of a better low end.

As a DI, Robbie provided clear, round, and even sound. It was much better on guitar than I would have expected (it didn't emphasize the sound's spikiness as do some other DIs). And with its great low-frequency response, Robbie sounded absolutely fantastic with a direct bass guitar. I was somewhat surprised while playing electric guitar, because the output was so strong (even stronger than the bass) that I had to employ the –20 dB pad. I'd have no problem using Robbie as a DI in most situations, and the preamp's portability makes it ideal for DI use.

Sonic Beauty

Although I wasn't that attracted to Robbie's shape and layout, those issues may not be problems for many users. I wouldn't be inclined to rack Robbie; the shape lends itself to mobility. (Use both hands; the round sides are slippery.) The inclusion of great-sounding DI circuitry made me want to take it from the control room to the studio and back again as necessary. In the end, I was using it sideways. There's nothing helpful to look at on the front anyway; the knob on the pot is simple to operate; and I had visual and tactile access to the rear-panel stuff.

I wish Blue had used a stepped attenuator instead of the large-knob potentiometer. The unlabeled dots of light around the pot don't do much to aid repeat setups. One small knob and a ¼-inch jack accomplish same thing in a smaller space. On the other hand, dialing in a level is quick and easy.

What I personally prefer in this kind of device is a plain box with full control, easy access, and excellent sound quality. Ultimately, in evaluating a standalone preamp, good sound is the clincher. Robbie's sound is great, and anyone can appreciate that. If you also appreciate flashy design and don't mind reaching around back to get at some controls, then you'll enjoy working with Robbie.

PRODUCT SUMMARY

BLUE MICROPHONES Robbie

tube mic pre
$1,299
OVERALL RATING (1 THROUGH 5): 4
PROS: Great clarity and extended low end.
CONS: No meter. Controls relegated to rear panel.

MANUFACTURER
Blue Microphones
www.bluemic.com

Rich Wells oversees the Supreme Reality, a recording studio and band in Portland, Oregon.

FIG. 1: Tubifex is PowerCore's emulation of tube amps using the ubiquitous 12AX7 tube.

TC ELECTRONIC PowerCore Compact 1.9.3 (Mac/Win)

PowerCore Compact—big things come in little packages.

By Len Sasso

PowerCore Compact is the middle entrant in TC Electronic's suite of three hardware DSP devices. Since it's the most compact device of the three, it's ideal for laptop applications; and with two 150 MHz Motorola 56367 DSPs and a 266 MHz PowerPC processor, it has plenty of DSP power.

Unlike the original PowerCore DSP devices, which were PCI cards that needed to be installed inside your computer, PowerCore Compact 1.9.3 and its rackmountable big brother, PowerCore FireWire, plug in to your computer's FireWire port. That makes them more expensive, but also portable and much more convenient. (A PCI version, PowerCore Element, is still available.)

You don't need a tremendously powerful computer to run PowerCore Compact 1.9.3—the whole point is to increase your processing power. Since it's FireWire based, however, it does require a fairly modern computer and operating system. For the Mac you'll need a G4 or G5 processor running at least OS X 10.2.8, and for the PC you'll need at least a 500 MHz Pentium III processor running Windows XP.

Boot Me Up

Installing PowerCore Compact 1.9.3 is easy, and once installed, the hardware is transparent (except when setting preferences). The first step is to install the PowerCore software driver on your computer; that's supplied on CD, but TC Electronic advises you to check for and download any updates from the company's Web site. Once the drivers are installed, just shut down your computer, connect the PowerCore to the computer with the provided FireWire cable, and restart your computer.

PowerCore Compact 1.9.3 comes with 12 DSP plug-ins, which are installed at the same time as the drivers. The plug-ins are in Steinberg's Virtual Studio Technology (VST) format on the Mac and the PC, but an Audio Units (AU) shell called TCAU makes them available to AU hosts on the Mac as well.

In addition to the included plug-ins, a fairly extensive collection of premium plug-ins is available from TC Electronic and third-party vendors. Although premium plug-ins are packaged with the CD, you need to go online to download and register them. Depending on Internet traffic, the process can be slower than necessary, but it does get the job done. For AU compatibility, you also need to run a portion of the PowerCore driver installer again, so it's good to keep it on your hard drive.

Something Old, Something New

Seven of the 12 plug-ins that come with PowerCore Compact 1.9.3 are from the original PCI PowerCore (version 1.5), which I reviewed in the April 2002 issue of EM. After a brief rundown of the original plug-ins, I'll

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concentrate on the new plug-ins and the three premium packages for this review.

The seven holdovers from version 1.5 include one synth—the mono PowerCore 01—which is modeled after the famous Roland SH-101. The effects are the high-end MegaVerb reverb; Chorus/Delay for chorus, flanging, and echo effects; the 5-band equalizer EQSat; and three dynamics-processing plug-ins: PowerCore CL, VoiceStrip, and MasterX3.

PRODUCT SUMMARY

TC ELECTRONIC PowerCore Compact 1.9.3

hardware DSP device
$995

OVERALL RATING (1 TO 5): 3

PROS: Compact package. FireWire interface. Included plug-ins cover all the standard DSP functions. Numerous premium plug-ins available at various price points.

CONS: Included plug-ins are standard fare and are showing their age. Processing power limited to two DSP chips.

MANUFACTURER
TC Electronic
www.tcelectronic.com

CL is PowerCore's workhorse compressor-limiter. It features hard- and soft-knee compression, full-range limiting, and a soft-saturation stage. You can pack six mono or four stereo CLs on a single DSP. VoiceStrip is a compression, an EQ, and a de-essing channel strip designed especially for cleaning up vocals. MasterX3 is a 3-band expander-compressor-limiter best suited for mastering and finalizing applications.

Something Borrowed

In PowerCore Compact version 1.9.3, four plug-ins are emulations of classic hardware signal processors. While not all of them are intended to emulate the exact sound of the hardware unit, they do mimic its look and functionality.

Modeled after Lexicon-style digital reverbs, Classic Verb is simpler and easier to set up than MegaVerb. Surprisingly, it also uses slightly more DSP than MegaVerb. Classic Verb has 15 reverb types divided among halls, rooms, ambiences, and plates. An interactive graphic allows you to set pregain and predelay for initial reflections, delay time and initial gain for the decay phase, and the decay time. (Those parameters can be set numerically as well.)

A somewhat mysterious modulation section is provided for the decay phase of the reverb. Three types of modulation—named I, II, and III—are offered, each with width and depth controls, which set the rate and amount of modulation, respectively. What gets modulated is left to your imagination; the results are definitely subtle.

FIG. 2: Character is a simple but powerful spectral enhancer that analyzes incoming audio for frequency and dynamics and adapts its processing accordingly.

Down the Tubes

Tubifex is a guitar-amp emulator (see **Fig. 1**). It has three tube stages modeled after the 12AX7 vacuum tubes featured in Marshall and other classic guitar amps. Tubifex is unique in that it uses PowerCore and native processing to minimize latency, making it suitable for live performance.

Tubifex has separate controls for each of its three tube stages. In Simple mode, you set the gain for each stage (off is an option). In Expert mode, controls for Voltage, Character, Body, and Bright allow you to dial in the exact quality you're after. The output section has a 3-band equalizer and speaker presence, distortion, and axis controls.

Finally, a new compressor-limiter has been added. Called the 24/7C, it's intended to be your everyday dynamics tool. The 24/7C's control panel is identical to the classic Universal Audio 1176LN, and it definitely colors the sound as that unit did. You get input and output gain, attack and release time, and four compression-ratio buttons that can be used in combination.

Something Blue

One of the more innovative PowerCore plug-ins comes from Finnish software developer Noveltech. Character (see **Fig. 2**) combines filtering and compression to add character to the sound.

Character's Mode knob selects among its three modes of operation, which are optimized for percussion and vocals (mode 1), guitar and synth (mode 2), and bass and pads (mode 3). The large Character knob determines the amount of processing, and the smaller Target knob selects the frequency zone for processing. The Target knob's range and overall processing nature is based on frequency and dynamics analysis of the incoming signal.

Character is best described as an analyzer-enhancer that requires a minimum amount of human intervention. You can clearly hear dynamic and spectral enhancement and some degree of coloring. **Web Clip 1** is an example of Character's effect on piano, bass, and percussion.

Something Else

Filtroid is an update of the original Filtrator PowerCore plug-in. Its two resonant multimode filters can be placed in series or in parallel, and its filter modes include 12-, 18-, and 24-dB-per-octave highpass, bandpass, and lowpass. Drive (distortion) and damping (high-frequency

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There's a new fully-featured **Piano Roll Window,** similar to the type found in many sequencer programs. This allows you to edit the Melody or Soloist tracks with greater ease and precision.

The Guitar window is enhanced, and now supports **Alternate Guitar tunings,** including DADGAD, Drop D, Double Drop D, Open G and 11 others, including Nashville High Strung tunings! Guitar bends now show up in real-time on the guitar fretboard.

New 3, 4, and 5-part Jazz Harmonies are added with voicing in Fourths.

"Auto Endings" are added for styles that don't have endings, such as styles made from MIDI files. **Synthesizer Patch file lists** (.PAT files) can now be made easily by converting PowerTracks or Cakewalk patch lists.

"Jazz Chord-Symbol Graphics" (triangles for major, circles for diminished and a circle with a slash for half-diminished) are now supported. A new **"Vocal Wizard"** displays and transposes to the best song keys for your vocal range.

Editing of the Audio Track is now **non-destructive**, so changes only become permanent if you save the file. The TC-Helicon Audio Harmonies have been enhanced with **Vocal Pitch-Styles** (automatic "Vibrato" and "Scooping") that can be added to the vocal harmony parts. **Multiple sound cards are supported**—you can now choose which sound card to use. **Full Stereo or Mono support** has been added for the Audio Track. There are now on-screen **VU meters** to monitor the Audio Track.

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Multiple lines of Lyrics are now supported on the Fake sheet and Printout. Chords and Lyrics can be displayed on separate lines on the Big Lyrics Window. A new **Play-Loop feature** allows you to select an area and play it in a repeated loop.

The SongPicker can display in subfolders, and you can add styles to the StylePicker. Karaoke files (.KAR) can now be read directly, including lyrics and analysis of chord symbols... **and much more.**

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"4-Star Rating" MacWorld

"Editor's Choice" Electronic Musician

"Technical Excellence Finalist" PC Magazine

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attenuation) stages are placed after each filter. It is one of PowerCore's most interesting effects, but it is also a DSP hog, taking up more than half a DSP chip.

Filtroid's modulation section is what makes it special. Each filter has a dedicated multiwaveform and tempo-synchronized LFO that can be applied to the filter frequency and resonance as well as to the amount of drive and damping. In a useful twist, an envelope follower is supplied for controlling the LFO amounts, and the envelope follower can track the main signal or a side chain. **Web Clip 2** illustrates what that can do to guitar, bass, and strings.

The Sincerest Flattery

Assimilator ($249), which is one of three premium PowerCore plug-ins covered in this review, is a phase-linear spectral-matching EQ. Assimilator analyzes two audio clips and calculates the equalization necessary to match one of their spectra, called the target, to the other, called the reference. The reference may come from a single track or a total mix, and the target would most likely (but not necessarily) be taken from similar material.

Assimilator takes the process of matching EQ to a new level by allowing you to morph between two pairs of settings. You may, for example, want to match targets from two parts of a song to reference curves from two mastering styles. You would use Assimilator's morphing feature to make a smooth transition between the two sections of the song matched to the different reference styles.

Good Intentions

Intonator HS ($249) is a software version of TC Electronic's hardware pitch corrector, Intonator, and it does everything from minor touchup to radical pitch bending, with commensurately unnatural-sounding results.

Intonator HS is easy to set up. You choose a scale from the Scale/Mode menu, choose a root using an onscreen keyboard, and then set the range, in cents, within which correction will take place (notes outside of that range of scale notes are not corrected). Instead of using the scale-and-root method, you can create your own scale using the onscreen keyboard or in real time using MIDI input.

Intonator HS's other controls include a pitch wheel with a 6-semitone range, an amount control that determines what percentage of full correction is applied, and an attack control that determines how fast the correction is applied. Very fast attacks produce the Cher effect. Finally, there is an optional, adaptive low-cut filter on the output.

Something Pricey

The MD3 Stereo Mastering bundle ($999) is at the high end of the premium offerings. Its two plug-ins, MD3 Multi-Band Dynamics and BrickWall Limiter, are software plug-in realizations of algorithms in TC Electronic's high-end System 6000 audio processing hardware.

MD3 combines a 3-band compressor, an expander, a normalizer, a 4-band parametric

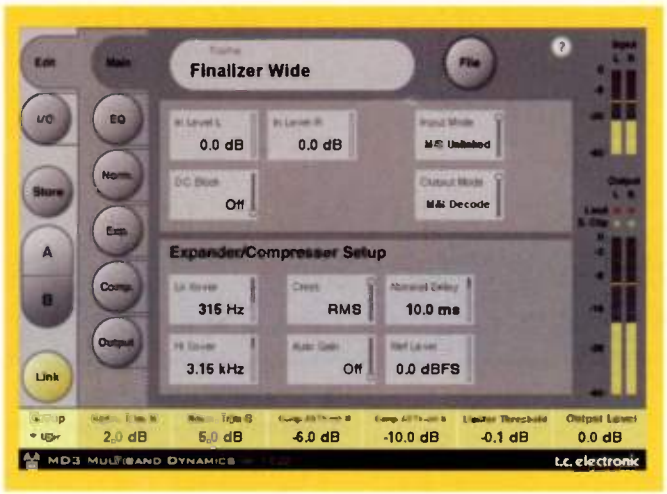

FIG. 3. MD3 is a high-end mastering tool featuring multiband compression, expansion and normalizing, and parametric EQ for stereo, dual-mono, and midside material.

EQ, and a limiter (see Fig. 3). It features 48-bit internal resolution and can operate in dual-mono, stereo, and midside configurations.

The BrickWall limiter is designed to mollify the effects of very hot maximized mixes when played by commercial CD players or processed by data-reduction encoders to produce, for example, MP3 or AAC format files. Both plug-ins give access to every conceivable setting and come loaded with useful presets.

PowerCore Compact 1.9.3 is a portable and cost-effective solution for taking some of the DSP load off of your computer, leaving more power for track playback and virtual-instrument processing. PowerCore FireWire has twice the DSP and several more plug-ins for less than twice the price of PowerCore Compact; however, for portable use, PowerCore Compact can't be beat.

The included plug-ins, although not terribly innovative, are high quality and cover all the standard DSP functions. Some of them are a little long in the tooth (which is most obvious in their control panels), but because they were high quality to start with, that's not a big issue. Perhaps the primary incentive to get PowerCore is the expanding array of plug-ins that are not available for, and probably could not be handled by, native processing. You'll find the full catalog of products at the TC Electronic Web site. EM WEB CLIPS

Len Sasso is an associate editor of EM. *Special thanks to Orren Merton for his account of PowerCore plug-ins history.*

FIG. 1: The Central Station's front panel contains most of the unit's controls and its large, colorful LED meters.

PRESONUS Central Station

A monitoring solution for the personal studio.

By Eli Crews

PreSonus has built its reputation by manufacturing high-quality gear at affordable prices. Over its decade of existence, the Louisiana-based company has put out one innovative and useful piece of gear after another. One of its recent successes is the Central Station, which is designed to solve problems associated with monitoring multiple sources on different sets of speakers.

Into the Station

The front of the 1U box features the company's elegant blue-on-silver design scheme. Knobs, switches, and indicator LEDs all share the same pretty cobalt hue, while the level meters stand out with their bright green, orange, and red LED segments (see **Fig. 1**). As with other PreSonus products I've used, I have a big problem with the design of the shiny blue knobs. Although they look nice, they reflect light in such a way that it can be difficult to read where their silver indicator lines are pointing.

The Talkback section resides at the far left of the unit. A large-format console-style square button serves as the momentary switch for activating the internal omni condenser mic. The mic's gain is controlled by a front-panel knob.

Two ¼-inch TRS headphone jacks on the face of the unit have independent level control. Each one can have its source derived from the Main or Cue sections, which allows for quite a bit of flexibility for two pairs of headphones in the control room. Each gain pot also serves as a source switch when pushed in.

The Cue section has an Output Level control and four Input Select switches, allowing the signal present at the Cue outputs on the back of the unit to be toggled between any one of the five input sources: TRS 1, TRS 2, Aux, or Digital (S/PDIF or Toslink). The Main section has the same four input switches and a control knob for setting the overall level of the Aux input. Next to that section is a pair of switches for determining whether the digital signal is coming from the S/PDIF or the Toslink digital inputs.

The tricolored 30-segment fast-acting peak-program meters have markings for the dBfs (digital) and the dBu (analog) scales. The red overload LEDs have a hold feature that lets them stay illuminated until the Clear Peak button to the right of the meters is depressed. A Calibrate button allows you to match the meters' response to those on your DAW or analog mixer.

The Passive Speaker Control section has three Speaker Select switches (A, B, and C), a switch for summing the stereo image into mono, and buttons for muting and dimming the monitor outputs. Speaker Select switches A and B toggle each other off to allow for smooth A/B-ing of two sets of monitors. (Some of the Central Station's switches would occasionally pop back out too far when pressed, extending themselves from the box. They didn't fly out completely, but it was disconcerting to have to push the tiny plastic cylinders back in without breaking them.)

The C switch can be activated simultaneously with either A or B, which lends itself to having a single subwoofer set up for

FIG. 2: The rear panel houses the unit's analog I/O and digital inputs.


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FIG. 3: The optional CSR-1 remote duplicates the major controls from the Central Station's front panel and includes its own talkback mic.

use with both sets of stereo speakers. (Be advised that using a subwoofer this way requires special attention to setting proper crossover frequencies for all speakers used.) This section also has six screwdriver-accessible trim pots that can be used to level-match the individual speaker outputs.

Finally, there is the large Main Level knob, which sets the level for the currently active speakers. This knob, which has a range of –80 dB of attenuation to unity gain, has a smooth action. As indicated by the knob's negative range, there is no amplification of the signal. The signal path is purely passive for an absolute minimum of coloration.

Behind the Music

The Central Station's rear panel is packed with inputs and outputs (see **Fig. 2**). At the far left is the connector for the external, lump-in-the-line power supply. The Digital Input section has Toslink optical and RCA S/PDIF jacks. Note that the Toslink port is not compatible with the ADAT Lightpipe format; it is intended for stereo optical inputs only. The optical and the RCA jacks can sync to and convert a digital signal to a maximum 24 bit, 192 kHz.

The Speaker Outputs (A, B, and C) are on three pairs of ¼-inch TRS jacks, which carry a line-level signal to as many as three sets of powered monitors or power amplifiers. The Line Outputs can carry stereo signals over pairs of ¼-inch TRS jacks to a mixdown deck (Main) and a studio headphone amp (Cue). The level at the Main output is not affected by the Main Level control knob. That allows you to turn your speakers up or down without changing the mixdown level. The nomenclature is slightly confusing, however, because the word "Main" is used to describe the overall monitoring level and the level going to the mixdown deck.

The Analog Input section has two pairs of ¼-inch TRS jacks for inputs 1 and 2, and a pair of unbalanced RCA jacks for the Aux input. The Console Remote Control section has a DB9 connector and a switch for activating the optional CSR-1 remote control. Rounding out the back of the unit is a ¼-inch TS pedal jack for connecting a talkback footswitch, and an XLR mic input with an activation switch should you use an external talkback mic.

Testing . . . One, Two

I've used the Central Station in my studio for a few months as the hub between my analog mixing board, two DAW systems, and a CD player, running into two sets of stereo monitors and a subwoofer. The unit's sound quality is top-notch (it sounds as good as some large-format consoles I've mixed on)—a clear upgrade from my previous IC-based speaker-switching system. Its converters are at least as good, if not slightly better, than those of my two sound cards. All switching functions are smooth, with an absolute minimum of popping, dropout, and overlap.

I wish, however, that the unit had more than one S/PDIF digital input. Because I was connecting two DAWs to it, and neither of them had a Toslink output, I had to buy a Toslink-S/PDIF converter (about $30) to digitally connect the second DAW. That isn't a huge deal, but I would have preferred another S/PDIF or, even better, an AES/EBU input. It's possible, though, that adding such additional ports would have caused the unit's price to go up.

Remotely Speaking

The optional CSR-1 remote (see **Fig. 3**) is a stompbox-size unit that connects

CENTRAL STATION SPECIFICATIONS

Analog Audio Inputs	(4) ¼" TRS (line); (2) RCA (aux); (1) XLR (for external talkback mic)
Digital Audio Inputs	(1) RCA coaxial S/PDIF; (1) Toslink optical S/PDIF
Audio Outputs	(6) ¼" TRS (speaker); (2) ¼" TRS (main); (2) ¼" TRS (cue)
Additional Ports	(2) ¼" TRS (headphones); (1) ¼" TS (talkback footswitch); (1) DB15 (remote console)
Input Impedance	2–5 kΩ (TRS); 8 kΩ (Aux); 2.4 kΩ (XLR)
Output Impedance	51Ω (at main and cue outputs)
Internal Microphone Type	Omnidirectional electret condenser
Gain Range	+15 dB to +55 dB (mic preamp); –90 dB to 0 dB (speaker/cue outputs)
Maximum Output	150 mW/channel @ 60Ω (at headphone outputs)
Frequency Response	10 Hz to 50 kHz
Total Harmonic Distortion	<0.0025% (at main outputs)
Sampling Rates	44.1 kHz, 48 kHz, 88.2 kHz, 96 kHz, 176.4 kHz, 192 kHz (DAC)
Input Meter	dual 30-segment LED w/ peak hold
Dimensions	19" (W) × 1.75" (H) × 5.5" (D)
Weight	5 lbs.

to the main box using a DB9 connector on the rear panel. (A 9.8-foot cable is included, and a 19.7-foot cable is available as an option.) The remote allows the engineer to have control over input switching, speaker switching, and monitor volume from a comfortable seated position, and has a talkback mic with the same stylized square button and level-control knob found on the main unit. (The remote's Mic Level knob is a bit on the loose side, as if it were anchored only to the PC board underneath and not to the chassis.)

The switch to activate the remote is located on the back panel. For the sake of convenience, I would have preferred it to be on the front. When activated, the remote's Main Level knob takes over from the one on the main box, but other than that, all switches and knobs on both units are active.

The Last Stop

Despite a few minor flaws, the Central Station is an outstanding piece of gear. It is transparent sounding, extremely useful, and loaded with extra features. It will be particularly appreciated by any engineer who is used to working on a large console, because it brings a lot of the functionality of the master section into the personal-studio price range.

There's nothing like having a solid knob to control your monitor level (if you like having that knob right at your fingertips, I recommend the CSR-1 remote, as well). Throw in a superclean signal path and high-quality D/A conversion, and you have one of the most impressive boxes I've used in quite some time.

Whether you are recording to a DAW or to tape—with or without a mixer—if you are looking for a way to manage your monitoring, cue, and talkback, I highly recommend the Central Station.

Eli Crews is an engineer and musician who is based in Oakland, California. For more information on Eli and his studio, visit www.newimprovedrecording.com.

PRODUCT SUMMARY

PRESONUS Central Station

audio controller $699.95
CSR-1 remote control $199
optional (19.7-foot) remote cable $49.95

OVERALL RATING (1 THROUGH 5): 4

PROS: Excellent, transparent sound. Fully featured. Speaker trims allow for precise level matching. Plentiful I/O. Accurate metering, with calibration capabilities. Stellar documentation.

CONS: Knob markings difficult to read. Activation switch for remote on back of rackmount unit. Buttons sometimes pop out past proper resting position. Toslink digital input not as useful as a second S/PDIF or an AES/EBU input would be.

MANUFACTURER
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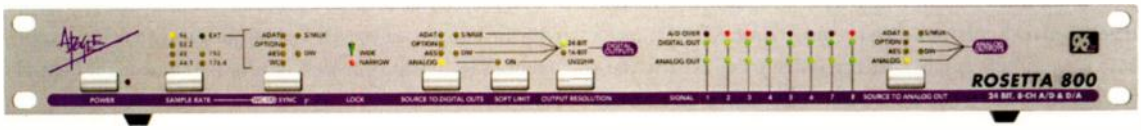

FIG. 1: The Apogee Rosetta 800's logical front-panel layout helps make it an easy converter to use.

APOGEE ELECTRONICS Rosetta 800

Eight channels of A/D/A conversion the easy way.

By Myles Boisen

fter dealing a winning hand with its affordable Rosetta 2-channel converters, Apogee has upped the ante by producing an 8-channel version. The Rosetta 800 offers 24-bit, 96 kHz multichannel A/D/A conversion for analog, ADAT or S/MUX optical, and AES/EBU signals. To facilitate multiple-format transfers and simultaneous A-to-D and D-to-A processing for a computer or MDM recording system, the Rosetta 800 also offers independent switching and conversion for its separate digital and analog signal paths.

Low-jitter clocking, UV22HR dithering for 16-bit output, and Soft Limit analog input limiting are standard features on the Rosetta 800. External word-clock sync in and out is a new addition to the Rosetta. And if that weren't enough, all this digital firepower is housed in a single rack-space unit, graced with an uncluttered control panel.

The First Reading

The Rosetta 800's gleaming brushed-aluminum face is adorned with Apogee's familiar purple highlights, and the layout is a triumph of simplicity with clear menu functions and only seven switches across the bottom (see Fig. 1). Each switch-selectable menu option is printed in black and has its own LED indicator. The logical layout makes the Rosetta 800 easy to use right out of the box.

> The Rosetta 800 worked some extra magic on percussive sounds.

On the front panel's far left is the AC power switch, and, in a departure from convention, the LED for that control is lit when the unit is off. The first multiple-option menu is Sample Rate, with indicators for 44.1-, 48-, 88.2-, 96-, 176.4-, and 192 kHz and a green EXT LED for selecting external word-clock sync. AES/EBU signals at 88.2 kHz or higher can be run as either single-wire or double-wire (DW) connections. Using the Rosetta 800 at 176.4 or 192 kHz requires an optional factory modification, which adds $1,000 to the list price.

The WC I/O Sync menu is enabled and lit only when the EXT function is selected from the Sample Rate menu. That grouping has all connection options: ADAT (44.1 or 48 kHz), ADAT + S/MUX (88.2 or 96 kHz), Option (optional card slot), AES, AES DW, and WC (word-clock in).

The Rosetta 800 uses a dual-stage clock to reduce jitter, and the lock status of the clocking circuit is displayed to the right of the WC I/O Sync selector. Wide lock is confirmed when the green cone shape is lit, and narrow lock is indicated by a red LED directly beneath it. The net effect of a verified wide and narrow lock is not only confidence that your signal is clocking accurately, but also a cheery green and red exclamation point beaming from the panel.

The next section governs source selection for the digital outs. As with the WC I/O Sync menu (and the Source to Analog Out), the menu choices are uniformly laid out. Sources to route to digital outputs include ADAT, ADAT + S/MUX, Option, AES, AES DW, and Analog. A blinking LED indicates that a selected digital input source is either not present or not properly synced. It is also possible to assign a combination of

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PRODUCT SUMMARY

APOGEE ELECTRONICS Rosetta 800

8-channel A/D/A converter
$2,995

192 kHz version $3,995

OVERALL RATING (1 THROUGH 5): 4

PROS: Independent A/D/A conversion at high bit rate and high sampling rates. Performs format transfers between ADAT optical, AES/EBU, and analog. Low-jitter clocking. UV22HR dithering for 16-bit output. Soft Limit analog limiting. Word-clock I/O. Easy-to-use control layout with metering. Front-panel AC power switch.

CONS: Professional price. Does not support 2-channel S/PDIF optical.

MANUFACTURER
Apogee Electronics
www.apogeedigital.com

analog ins and one digital source (limited to 1–2, 3–4, 5–6, and 7–8 channel pairs) to the digital outs, using switch combinations outlined in the manual. Additional switching options associated with digital output sourcing are Soft Limit (on/off for all eight analog inputs only) and 24- or 16-bit dithering using Apogee's UV22HR process (on/off for all digital outputs, 44.1 or 48 kHz only).

Located on the panel's far right, Source to Analog Out uses the same menu as the digital out selections: ADAT, ADAT + S/MUX, Option, AES, AES DW, and Analog. As with the digital output section, it is possible to route analog-to-analog output along with a single digital input source on that menu.

A basic metering area separates the digital and analog output menu sections. Each channel (1 through 8) has a pair of variable-intensity LEDs to indicate analog and digital output levels, along with an LED to show analog-to-digital overload. These A/D Over lights help with power-user setups for combined analog and digital source routing.

When using the Rosetta 800 to perform independent digital and analog conversions, the same word-clock/sampling rate (or multiples thereof) must be used. Word-clock out is always the same as word-clock in.

In addition to a standard IEC power connector, the rear panel has word-clock I/O on BNC jacks; multipin analog input and output, and AES I/O on 25-pin D-sub connectors; and optical ADAT or S/MUX I/O (see Fig. 2). The Rosetta 800 does not support 2-channel optical S/PDIF signals, even though the manual states that it will interface with a DAT machine through the Toslink bay.

The Option card slot on the rear panel accepts Apogee I/O cards including the Pro Tools X-HD ($595), the Pro Tools X-DigiMix ($595), and the X-FireWire ($595), for use with Mac OS X and Windows XP computers. Apogee also manufactures multiconnector D-sub-to-AES/EBU and D-sub-to-analog XLR cables for the Rosetta 800.

Unlocking the Secrets

During a period of a few months, the Rosetta 800 was used at my Guerrilla Recording studio as either the main or supplemental D-A output converter on several Pro Tools mixes for commercial release. Those sessions covered a range of rock, world music, electronica, and jazz instrumentation.

For studio use, the Rosetta was reliably quick and easy to set up. It connected seamlessly with the optical ADAT outputs from a Digidesign Digi 001 interface. Always sonically neutral and never fatiguing, the Apogee converter made my preferred method of computer mixing—from Pro Tools through an analog board and hardware—a delight. Adding the Rosetta 800's eight outputs to the Digi 001's ten outputs is a cost-effective method of getting 16 or more discrete 24-bit channels out of a basic ProTools LE setup. For 24-bit mixing sessions, I'm generally pleased with the quality of the Digidesign Digi 001's analog outputs. But after a series of A/B comparisons, it became clear that the Rosetta 800's 8-channel converter offers significant improvements.

On a variety of digitally recorded sources, the Rosetta 800 was unquestionably more dynamic, adding depth and realism to individual tracks. Foreground mix elements were much more lively and present through the Apogee unit, creating a dramatic relief from the flatness that is often attributed to digital recordings. It was

ROSETTA 800 SPECIFICATIONS

Analog Inputs	(8) DSub
Analog Outputs	(8) DSub
Digital Inputs	(8) AES, (8) ADAT, (8) on optional card
Digital Outputs	(8) AES, (8) ADAT, (8) on optional card
Word-Clock Ports	In, Out
Resolution	24 bits
Sampling Rates	44.1, 48, 88.2, 96 kHz (±10%); 176.4 and 192 kHz (optional)
Frequency Response	10 Hz–20 kHz (± 0.2 dB) @ 44.1 kHz
THD+N	–105 dB (A/D), –103 dB (D/A)
Dynamic Range	114 dB A-weighted (A/D + D/A)
Dimensions	1U × 11.75" (D)
Weight	15 lbs.

FIG. 2: The Rosetta 800 uses 25-pin D-sub connectors for analog and AES/EBU digital I/O.

also easier to appreciate the detail and dimension of low-resolution background sounds through the Rosetta 800.

With superior conversion of this type, every instrument in a mix sounds better. And the boost in subtle details enhances an overall spaciousness that makes it easier to distinguish and savor each mix element. In the testing I did against the Digi 001, the Rosetta worked some extra magic on percussive sounds. For example, the Rosetta 800's conversion juju made the snare in an Afro-pop mix jump out with increased transient snap. Upon closer listening, I was shocked to hear that the Rosetta 800 brought bigger midrange tone and higher definition to this drum, as though a high-end mic preamp had suddenly been slipped into the signal chain.

When comparing the Rosetta 800 to an Apogee PSX-100 using the same methods (two sets of identical 24-bit tracks in Pro Tools routed to each converter, with output levels carefully matched), I noticed only minute qualitative differences. After repeated listenings, the PSX-100 seemed to deliver slightly crisper highs and better background details, but the two were certainly very close in overall character.

Final Translation

Although its list price puts it solidly in the pro category, the Rosetta 800 offers significant two-for-one value with its ability to perform independent dual-stage conversion. And for studio owners like me who may be juggling Pro Tools sessions, 8-channel MDMs, mixed-format transfers, and remote recordings, the Rosetta 800 is one of those versatile and invaluable Swiss Army–knife studio tools.

When it comes to sound, the dramatic impact of the Rosetta 800's converters are not merely a subtle exercise for pros, audiophiles, and tweakers. Assuming that A/D/A conversion is an important aspect of your studio setup, the Rosetta 800 delivers the kind of readily audible difference that is clearly worth the investment. And if there were a Less Is More award for user interfaces, Apogee would get my vote for making the powerful Rosetta 800 smart, simple, and very user-friendly.

Myles Boisen owns and operates Guerrilla Recording and The Headless Buddha Mastering Lab in Oakland, California.

FIG. 1: Joemeek's half-rackspace threeQ features a mic pre, photo-optical compressor, and 3-band equalizer.

JOEMEEK threeQ

A low-priced triple-threat channel strip.

By Orren Merton

oemeek has developed a reputation for building signal processors with a unique sonic signature, and the company's threeQ continues this tradition. The unit is a single-channel, half-rack channel strip featuring a mic pre, photo-optical compressor, and Meequalizer 3-band EQ (see **Fig. 1**). With its low price ($299), the threeQ aims to deliver three hardware processors in one affordable package.

Jack-of-All-Trades

The threeQ's features—such as its controls, fixed compression ratio, and fixed EQ frequencies—were chosen to make the unit as useful as possible. The threeQ offers a balanced XLR mic input and a ¼-inch line input (balanced or unbalanced), as well as a post-mic-pre TRS insert jack. The unit also has a ¼-inch line-level Mix Input that lets you combine a separate source with the signal being processed.

> The compressor added punch without removing high frequencies.

The threeQ also offers two parallel line outputs, which can be switched between +4 (balanced) and –10 (unbalanced) output levels. The two outputs can't be individually switched. If one of your cables is unbalanced, both outputs will be unbalanced, even if the other output cable is balanced.

All input and output jacks, the power cable input, the output level control, and the 48V phantom power button are on the rear panel (see **Fig. 2**). The line input selector, however, is on the front. Placing the inputs on the front would have been more convenient. I also wish that the threeQ had a power button; you can only turn off the unit from a power strip or by unplugging it. Although I didn't mind having the phantom power button on the rear, I would have preferred that its LED were on the front. As it is, you have to get to the back of the unit to see if phantom power is on.

Getting (Pre) Amped

The threeQ's mic pre features a gain range of 10 to 60 dB for the mic input, and –35 to +15 dB for the line input. The threeQ's detented Preamp Gain knob allows for 21 steps between 10 and 25 dB (the 12 o'clock position) and 19 steps between 25 and 60 dB settings. In addition to the threeQ's well-designed 8-stage LED level meter, the mic pre offers a peak LED that lights up when the signal reaches 6 dB below clipping.

The EQ and the compressor can be switched out of the signal chain, and the mic pre can be bypassed by using the insert jack if you use the threeQ's Compressor and EQ with a different mic pre.

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FIG. 2: The threeQ's rear panel contains the unit's input and output jacks, output level control, and 48V phantom-power button.

The documentation, which is short and excellent, notes that at its maximum gain, the preamp is quite noisy (the noise floor rises to an audible –68 dBu) and recommends keeping the mic-pre gain under 40 dB. I found that 32 dB of preamp gain was more than enough to boost the signal of my guitar, a Gretsch G6128T, to the point of clipping. A range of 30 to 40 dB provided a usable level for a Shure SM57 dynamic microphone and a Neumann TLM 103 condenser microphone, without causing clipping. Once you have a strong signal, you can raise the Output Gain without generating an unacceptable noise level.

Within the usable range of the mic pre, it is quiet, musical, and true to the source material while adding a bit of low-end color around 75 Hz and 200 Hz, which could enhance sources with a deficient low end. For a unit in this price range, I was impressed that it didn't dull or accentuate the highs.

One-Hour Photo Optical

Joemeek compressors are known for their unique re-creation of the original 1960 Joemeek photoelectric compressors. The threeQ's exact compression ratio is not adjustable, and it depends on the incoming signal level. At just over the threshold setting, the compression ratio is nearly 1:1. The ratio rises to 5:1 as the compressor is driven harder, but the ratio decreases slightly for loud transients to retain more of the signal's brightness. The compressor can be either in or out of the signal chain; an LED above the Comp button is activated when the circuit is engaged.

The compressor offers three controls. The Compress knob controls the threshold. Unfortunately, the knob is labeled with a 0 to 10 scale that doesn't equate to real threshold settings. For example, while a value of 10 (the highest clockwise position) results in the most compression, the number represents the lowest threshold value. Those numbers may be useful as an indicator of how much compression is being applied, but they won't help anyone attempting to reach a specific threshold value.

The Attack knob controls how quickly the compressor reacts to peaks exceeding the threshold, and is adjustable from 1 to 100 milliseconds. The Release knob controls how long the compressor continues compressing signals once they drop below the threshold, and is adjustable from .1 to 3 seconds. The threeQ offers an adjustable Output Gain control from -∞ to +16 dB to make up for any level changes due to the Compressor and EQ.

Living Color

By turning the Compress knob past 7 on the dial, the compressor will add the low-mid punch and thump for which Joemeek compressors are renowned. Of course, that thump, when not controlled, can cause guitar-picking attacks

threeQ SPECIFICATIONS

Preamp	
Analog Inputs	(1) balanced XLR, (1) balanced/unbalanced TRS, (1) Mix, (1) TRS insert
Analog Outputs	(2) balanced/unbalanced TRS
Input Impedances	mic, 1.2k ; line, 20k
Preamp Overall Gain	0 dB–60 dB
Maximum Input Before Clipping	mic, +19.5 dBu; line, +44.5 dBu
Headroom Before Clipping	+19.5 dBu
Equivalent Input Noise	–128.5 dBu (unweighted)
Compressor	
Threshold	–6 dBu–+20 dBu (variable)
Ratio	5:1 (typical)]
Attack Time	1 ms–100 ms (adaptive)
Release Time	0.1 sec–3 sec (adaptive)
Equalizer	
LF Frequency	80 Hz
Mid Frequency	300 Hz–5 kHz, variable
HF Frequency	12 kHz
EQ Boost and Cut	±15 dB
General	
Distortion	.001% (below compressor threshold)
Frequency Response	10 Hz–70 kHz (–3 dB)
Output Impedance	75
Output Level Switch	12 dB attenuation
Noise Floor	–85 dBu (typical, with 40 dB mic gain)
Dimensions	½U × 7" (D)
Weight	2.2 lbs.

PRODUCT SUMMARY

JOEMEEK threeQ

mic pre/compressor/equalizer
$299
OVERALL RATING [1 THROUGH 5]: 3.5

PROS: Inexpensive. Flexible for its price range. Microphone preamp sounds very musical in its usable range. Compressor is very effective. "Joemeek sound."

CONS: No power button. Phantom power LED on rear. Cannot remove preamp from signal chain. Preamp noisy at max gain. Fixed compression ratio. Unclear Compress knob scale. Fixed LF and HF EQ frequencies.

MANUFACTURER
Joemeek
PMI Audio Group (distributor)
www.joemeek.com

and vocal sibilance to sound like explosions. But used judiciously, the compressor does a solid job of controlling dynamic range and adding punch without unduly removing high frequencies.

Like the compressor, the Meequalizer can be removed from the signal chain. When the EQ is engaged, the LED above the EQ button lights. The EQ section includes three peak filters, with the center frequency of the low and high frequency bands fixed at 80 Hz and 12 kHz respectively, and the mid frequency band sweepable from 300 Hz to 5 kHz. Each band offers from –15 to +15 dB of cut or boost, with a detent in the knob at unity gain. The Q for each band is fixed at 0.9 (1⅔ octaves). (A misprint in the manual puts the Q value at 1.9.)

The EQ offers some sound sculpting over most of the frequency range, but I would have liked to see more; the fixed 80 Hz low-frequency and 12 kHz high-frequency bands are too limited. When using the threeQ with vocals or electric and acoustic guitars, I reached only for the sweepable midrange control.

The Meeq Shall Inherit the Earth

Overall, the Joemeek threeQ offers a lot of value for its low price. The unit is flexible, and the mic pre and compressor are usable. Nobody would ever call this unit transparent, but if you are looking for the unique Joemeek color in an affordable package, the threeQ will deliver.

Orren Merton is the author of Logic 6 Power *(Muska & Lipman, 2003), and can usually be found playing guitar through one of his many of vintage and modern amps.*

QUICK PICKS

MOOG MUSIC

Moogerfooger MuRF MF-105

By Orren Merton

Most stompboxes attempt to either recreate vintage effects or offer slightly original variations of existing effects. Moog Music's new Moogerfooger, the MuRF MF-105 ($449), gives you something unique. The MuRF (Multiple Response Filter Array) contains eight resonant bandpass filters, each with its own level slider, and with its center frequency silk-screened below the slider. Front-panel knobs and numerous control inputs let you modulate the filters for a variety of distinctive effects.

The MuRF offers hard bypass (often referred to as "true bypass" on guitar pedals). When bypass is engaged, the audio input is passed directly to the output with no tone-altering components in the signal path. The input accepts instrument and line-level signals, and the output is mono or stereo. A Drive knob and an Output knob let you adjust the input response and output level.

Moog Music's Moogerfooger MuRF MF-105 combines an outboard bank of eight bandpass filters with an assortment of modulation possibilities, delivering a wide palette of authentic analog effects that you won't find anywhere else.

Animation Festival

The filter complement is only the beginning of the MuRF's features. Perhaps its most arresting attribute is its Animation section, comprising a Bank switch and the Pattern, Envelope, and Rate knobs. The Pattern knob selects from 12 patterns that trigger envelopes for the eight filters at a speed determined by the Rate knob. The Bank switch toggles between two filter banks, for a total of 24 available patterns. Bank B activates an LFO that subtly modulates filter frequencies, and Bank A patterns are unmodulated.

The Envelope knob is very dynamic, completely changing the shape of the envelopes affecting the filters and generating completely different effects depending on the setting. With settings from 1 to 3, the Envelope control closes the envelope quickly, resulting in very percussive, staccato sounds (see **Web Clips 1** and **2**). Between settings 3 and 7, the Envelope control blurs the various pattern steps, resulting in less staccato, more phaserlike effects (see **Web Clip 3**). Settings above 7 reverse the envelopes sent to the filter, resulting in staccato effects that sound backward. The Mix knob adjusts the balance of dry to processed signal sent to the outputs.

Like existing effects in the Moogerfooger line, the MuRF MF-105 offers extensive real-time control by means of control inputs that accommodate expression pedals, synths with control-voltage (CV) outputs, or MIDI-to-CV converters. There are control inputs for Rate, Mix, Envelope, and LFO/Sweep. In fact, a control input is the only way to control LFO/Sweep, which sweeps the filters' center frequencies by ±15 percent in Bank A patterns and changes the LFO rates in Bank B patterns.

When using a control input, the control range is centered around the current position of the relevant knob, and the controller's range can never exceed the range of the knob. For example, if you use the optional EP-1 expression pedal ($40) to control the rate, and the Rate knob is set at 5, the control range of the EP-1 will be the full rate range of 0 to 10. If the Rate knob is set to 3, however, the EP-1's range is only from 0 to 8. I discovered that using a continuous controller to sweep the MuRF's LFO resulted in clicking artifacts at extreme values. Fortunately, Moog says that the problem occurred with no more than 30 of the first units shipped, and it has been fixed.

The MuRF MF-105 is the first Moogerfooger to offer a tempo-tap option using a momentary switch such as Moog Music's FS-1 ($39). The MuRF interprets the time between taps as half the tempo; if you are tapping to quarter notes, the resulting rate will be in eighth notes. When you use Tap Tempo, the Rate knob is ignored. If you subsequently adjust the Rate knob, it supersedes the tempo set by tapping.

Stage or Studio

I used the MuRF MF-105 as a live guitar pedal and as an outboard processor for prerecorded synthesizer tracks. As a guitar effect, the MuRF MF-105 quickly became an inspiration. By adjusting the filter volume sliders and Animation section controls, I was able to create mind-bending step-sequencer and arpeggiated filter effects. Add a continuous controller and a momentary pedal for tapping the tempo, and the options are almost unlimited.

Although stereo outputs would make the MuRF MF-105 more useful as an outboard processor, I was blown away by its fun and creative processing options. It is definitely on the expensive side of boutique effects boxes. If you are looking for an unusual and creative filter bank, however, the Moogerfooger MuRF MF-105 won't disappoint. EM WEB CLIPS

Overall Rating (1 through 5): 4.5
Moog Music
www.moogmusic.com

SYNAPSE AUDIO SOFTWARE

Synth Pack Pro (Mac/Win)

By Len Sasso

Synth Pack Pro ($139) is a bundle of three of Synapse Audio's synthesizer plug-ins (also available separately). Hydra ($99) is a 3-oscillator subtractive synth featuring three phase-modulation signal-routing models. Scorpion ($59) is a classic subtractive synth, and Plucked String ($49) uses physical modeling to emulate different stringed instruments, with emphasis on guitar and bass.

All three synths are provided in VSTi format for the Mac and PC, and in DXi

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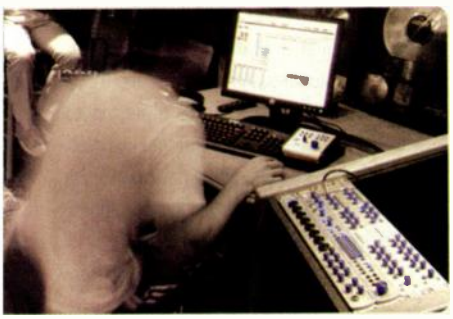

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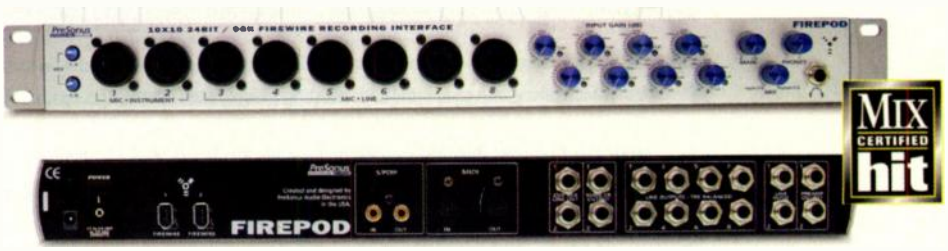

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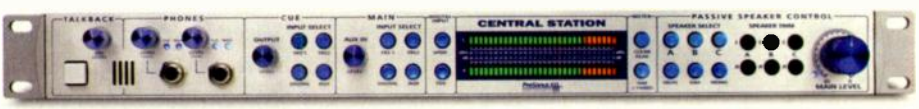

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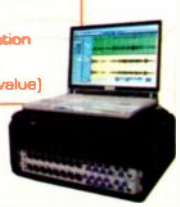

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format for the PC. I used each in a variety of Mac and PC hosts, including VST-AU converted versions in Logic Pro 7. The only host-related problem I encountered was not getting audio from Scorpion in Live 4.

Heads Up

Hydra uses different phase-modulation signal routings to produce sounds similar to FM synths. Two of Hydra's oscillators offer a selection of 39 waveforms, whereas the third, which is used solely as a modulator, is limited to a sine wave.

Hydra features three oscillators that can be arranged in three different phase-modulation routings. A multimode filter, along with chorus and bass-boosting effects, round out the signal path.

With the first signal-routing model, Oscillator 3 phase-modulates Oscillator 2, which is then ring-modulated with Oscillator 1. That's well suited for gong and for tuned percussion sounds that have more sparse frequency spectra than FM usually produces.

The second routing is a cascade: Oscillator 3 phase-modulates Oscillator 2, which, in turn, phase-modulates Oscillator 1. That piles sidebands on top of sidebands to produce thick inharmonic spectra suitable for chaotic, noise-based percussion and instrument-attack sounds.

In the third routing, Oscillators 2 and 3 are mixed and then routed to modulate Oscillator 1. Oscillators 2 and 3 have their own decay-sustain amplitude envelopes and modulation-amount controls, allowing you to crossfade between modulators. That makes it excellent for bright, clangorous sounds like bells and mallet instruments; the designers missed an opportunity, however, by not offering delay and attack stages on at least one of the modulating-oscillator envelopes.

The Bends

Hydra's signal path ends in a multimode filter followed by chorus and bass-enhancer effects. An LFO and routers for MIDI Velocity, Aftertouch, and Modulation Wheel are provided for modulation. A unique Pitch Up, Pitch Down system uses separate delay-decay-release envelopes to bend the pitch up and down. Finally, Single, Dual, and Unison performance modes allow one, two, or all Hydra voices to be allocated to each note. Dual mode, which introduces a random detuning and pan offset between the voices, thickens the sound without usurping all voices.

One of Hydra's greatest charms is that you can change a preset's signal-routing model to produce a completely different sound. That works well with a large number of the 150 factory presets.

That Stinging Sensation

Scorpion's two oscillators offer only a sawtooth waveform, but Oscillator 2 has variable phase, can be inverted, and can be forced to reverse direction at each Oscillator 1 cycle (similar to traditional hard sync). Those options allow you to produce a variety of waveforms, and the oscillators can be ring-modulated as well.

The oscillators are followed by a resonant lowpass filter, which in turn feeds an effects chain consisting of reverb, chorus, delay, and a filtered waveshaper. Although Scorpion has a decidedly nonvintage effects chain and is programmed somewhat differently from a vintage synth, it is fully capable of classic-synth sounds, as its 100 factory presets attest.

Lots of Pluck

Plucked String starts with five physical-modeled string emulations, and adds fine control of timbre, elasticity, and plucking strength. The sound generator is followed by a lowpass filter with a Damp control that affects the filter's slope (the rate at which the highs are rolled off). Consistent with the plucked-string model, there is no filter envelope, the output envelope is ADR, and there is a delayed LFO for adding vibrato.

Plucked String has multivoicing modes similar to Hydra's; Single, Double, and Triple modes assign one, two, and three voices to each note. Even in Triple mode, you can still play eight simultaneous notes if you've set ployphony to its maximum of 24 notes. Plucked String is obviously designed to do one job, and it does it very well.

My one complaint with all three synths is that you must retrigger notes to hear settings changes, but that's a small issue. They all sound good, are stable, and are not CPU hogs (see **Web Clip 1**). Considering the wide variety of sounds this trio can produce, Synth Pack Pro is a bargain at the price. You can download save-disabled (but otherwise fully functional) demos from the Synapse Audio Web site. EM WEB CLIPS

Overall Rating (1 through 5): 3.5
Synapse Audio Software
www.synapse-audio.com

NATIVE INSTRUMENTS

Reaktor Electronic Instruments 2 (Mac/Win)

By Len Sasso

Reaktor Electronic Instruments 2 ($119) is Native Instruments' second bundle of premium Ensembles for Reaktor and Reaktor Session. It has two synths, two drum machines, three effects processors, and a soundscape generator that practically defies description. If the first Electronic Instruments bundle (which is

still available as a download for $69) got your attention, then this one will lift the top of your head off.

Akkord, the first (and simpler) of the two synths in the bundle, uses modulation and distortion techniques followed by filtering and a bevy of effects to produce sounds that range from clear and crisp to edgy and ephemeral. That provides excellent fodder for Akkord's built-in chord sequencer, which can be used simultaneously with live MIDI input.

In Perfect Akkord

Akkord's chord sequencer holds eight 32-step chord patterns. It can step forward, backward, forward and backward, or at random, and step sizes range from whole to 32nd-note triplets (listed as 48th notes). Chords are entered on a two-octave keyboard graphic either by clicking on one note at a time or by using a chord-preset menu and clicking on the desired root. Convenient chord-shift, -copy, and -paste as well as pattern-copy and -paste buttons make chord setup relatively fast (though not as fast as step recording MIDI input).

Photone is a subtractive synth, but a quick spin through its five banks of presets will convince you that it is anything but standard. Its four oscillators offer a variety of waveforms, including multisampled digital wavesets. The oscillators—together with two other generators, a ring-modulator, and a scanner—can be routed in any combination to any of Photone's four filters. The signal path ends with a waveshaper, an EQ, and two multi-effects. In addition, there is extensive modulation-routing for its LFOs and envelope generators. Although Photone can deliver almost any class of sound, it excels at huge pads and swirling ambiences.

Let's Get Metaphysical

Metaphysical Function starts playing as soon as you open it; MIDI is neither used to trigger notes nor control pitch. Two 6-oscillator sound generators and a sample player are mixed and ring-modulated, and then passed through a variety of effects. Virtually every parameter can be independently automated to create long, evolving soundscapes. Tweaking and randomizing Metaphysical Function's settings provides instant gratification, even if you have no idea what you're doing (see **Web Clip 1**).

For the most part, Krypt is to drum boxes what Metaphysical Function is to synths. It combines a 6-track sequencer with a 6-voice granular sample player. In addition to triggering the samples, however, the sequencer exerts indirect control over the sample player by triggering Velocity-dependent variations in eight individual voice parameters: sample selection; grain pitch, speed, and size; pan position; filter cutoff; and reverb size and amount.

Krypt's separate Snapshots for the sequencer and sample player can be linked using the built-in Snapshot module and sequenced in pairs using the Song module. A multitude of intelligent randomization options allow different groups of parameters to be randomized, and there are keyboard shortcuts for the various randomization options as well as for Snapshot selection.

Into the Lite

Limelite is a more standard-fare drum machine. Its five sample pads (Kick, Snare, Hat, Tie, and Pod) are triggered by a 7-track step sequencer (there are separate tracks for open and closed hi-hats, and a track devoted to modulation). Tie and Pod use FM techniques and are particularly well suited to tuned percussion.

Limelite's step sequencer holds four separate patterns, which can themselves be sequenced using an 8-step pattern sequencer. A clever Remix module inserts a fill every 2-, 4-, 8-, 12-, or 16 bars. The signal path ends in a chain of complex effects, which can also be used separately to process external audio.

Lasting Effects

Cyan is the most straightforward of the effects Ensembles. It uses six feedback-delay lines to create choruslike effects. FastFX is designed for loop manipulation. It contains a built-in loop player but can be used to process live input as well. Resochord is a 6-bank resonator. The pitch of each resonator can be controlled by incoming MIDI, or MIDI can be used to select among six user-configurable chord presets.

Electronic Instruments 2 takes full advantage of the new graphics, MIDI, and audio features of Reaktor 4. Each of its Ensembles is unique and has one or more banks of excellent Snapshots. If you've been put off by Reaktor's DIY nature, grabbing Reaktor Session ($289) and this bundle might be worth considering.

EM WEB CLIPS

Soundscape generator Metaphysical Function mixes and ring modulates multi-oscillator sound generators A and B and then processes the output with the effects across the top.

Overall Rating (1 through 5): 4.5
Native Instruments
www.native-instruments.com

WUSIK.COM

Wusikstation 1.0.9 (Win)

By Len Sasso

Wusikstation ($99.95) is a multilayer VST synth plug-in for Windows. Four of its six layers have a one-oscillator subtractive synthesis engine, and the remaining two feature a 12-track wave-sequencing engine. Individual layers can be played simultaneously or played separately using MIDI Note and Velocity zones. Multitimbral operation (separating zones by MIDI channel) and separate zone outputs are in the works.

The subtractive synth engine's deceptively simple appearance belies its range of features. For one thing, the selection of oscillator waves is huge and includes single-cycle waves, sampled and multisampled instruments, sound effects, and a variety of loops. You can import WAV files. You can also use a free utility to create your own multisamples. There are 384

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(continued next page...)

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factory-sampled waves to choose from, and the collection is expandable with additional downloadable free and inexpensive SoundSets.

The oscillators feed two filter banks: a 4-stage resonant multimode filter followed by a four-stage EQ section. The multimode filters can be arranged in series or in parallel and offer lowpass, highpass, bandpass, and notch modes with either 2- or 4-pole slope. The EQs include low- and high-shelving and two EQ bands, all with adjustable frequency and gain. Each layer has sends for two global effects, and in an unusual touch, separate glide (portamento), voice count, and pitch-bend range settings. You can, for example, layer a mono, gliding, lead synth having an octave pitch-bend range with a polyphonic pad having no glide or pitch bend.

Surf's Up

On the two wave-sequencing layers, the oscillators are replaced by 128-step, 12-track sequencers. Each sequencer track can be set to control a variety of parameters, which, most importantly, include the oscillator's waveform. In other words, each step in the sequence can play a different waveform, subject to a 32-waveform limit for each wave-sequencing layer. Other parameters provided are volume, pan, relative step duration, crossfade (between steps), and effects send amounts. Tracks can also be assigned as modulation-sources, allowing the wave-sequencing layers to function as nonsounding control sequencers.

Wusikstation's single-window control panel contains layer selectors (top), a layer settings section (middle), and a modulator and modulation-routing section (bottom).

The wave-sequencing layers' sequencers are always synchronized to host tempo, but they can be locked, forcing each voice to play the same sequence step, or they can be unlocked, so that each note starts a new sequence. You can produce very complex percussion sequences using unlocked polyphonic wave-sequencing layers. The step size can range from eight bars to 128th-notes, and devoting a track to relative step size allows variable step duration.

In addition to an individual ADSR amplitude envelope for each layer, there are eight user-routed ADSR envelopes and eight multiwaveform LFOs. Routing is set up using a 32-row modulation-matrix, which also allows you to route MIDI messages, all layer parameters (including audio out), and the modulation rows of the wave sequencers. Destinations include most Wusikstation parameters, and multiple sources can be sent to the same destination, in which case the values will be multiplied. That allows you, for example, to use a Mod Wheel to control LFO amount. Each modulation-routing also has minimum, maximum, and amount settings.

Twisted

If you haven't realized by now that Wusikstation is a complex beast, you haven't been paying attention. In spite of Wusikstation's complexity, it is surprisingly simple to program, thanks to a well-written manual and 512 factory presets of all flavors to get you started. Additional free banks are downloadable from the Wusik.com Web site, and three large commercial banks—Dopetwistas, Prepared Rhodes, and The Second Wave—deserve special mention (see **Web Clip 1**).

Dopetwistas ($19.95) is a hip-hop-influenced bank of 96 percussion-oriented presets. The first 50 are multisampled percussion sets and come with matching MIDI groove files. The remaining 46 are complex layered presets.

Prepared Rhodes ($29.95) applies the prepared-piano techniques developed by John Cage to a Rhodes electric piano. There are two primary multisampled SoundSets, one covering 72 keys and the other covering 52. Each note has a different mechanical preparation and was recorded for its full duration at several Velocities. These make exceptional semituned percussion instruments. For more conventional playing, 19 presets are provided that map a single sound across the keyboard.

The Second Wave ($49.95) is the latest and largest (420 MB) SoundSet. It starts with a huge collection of multisampled acoustic and electric instruments together with one-shot effects samples. Two banks totaling 152 presets mold the sounds into evolving pads, pulsing rhythms, and eerie effects sequences. With or without the additional sound libraries, Wusikstation is a lot of synth at a relatively modest price. It's also surprisingly CPU efficient. Download the time-limited demo and you'll be hooked.

EM WEB CLIPS

Overall Rating (1 through 5): 4
Wusik.com Software
www.wusik.com

HERCULES

16/12 FW

By Doug Eisengrein

Hercules, a company known mostly for manufacturing PC video cards, has gotten into the studio interface game. The 16/12 FW ($899) is a FireWire-based, 16-in/12-out audio and 2-in/2-out MIDI interface housed in a 13.4-inch-wide chassis. Removable brackets are provided to make it a 1U rackmount device. Two Neutrik combo XLR/TRS jacks, each with an individual gain pot and a button to select high-impedance operation, are on the front panel. MIDI In and Out ports, a single 48V phantom-power switch, and a ¼-inch headphone jack with its own volume knob are also up front. A bank of tricolored LEDs indicates activity on all audio and MIDI ports.

Ten balanced inputs and eight balanced outputs on gold-plated TRS jacks are on the back panel. Next to those are optical and coaxial S/PDIF in and out, word clock in and out, a second pair of MIDI ports, a single FireWire port, and a 15V DC connector. The FireWire bus can't power the 16/12 FW, and the included adapter accommodates an AC source from 100V to 240V.

The 16/12 FW supports 24/96 audio, and all 16 inputs can operate simultaneously. The unit is compatible with Mac OS X 10.3 and above and Windows 2000 and XP. It ships with a nice selection of software, including Ableton Live 2 Special Edition (Mac/Win), Steinberg Cubase LE (Mac/Win), and demos of Cakewalk Sonar 3 (Win) and Project5 (Win).

Test Track

I tested the Hercules 16/12 FW on a Power Mac G4 running OS X 10.3.7. I downloaded and installed the latest driver from Hercules's Web site. When I launched iTunes for a quick playback test, the audio sounded good on my Tannoy monitors, with excellent stereo imaging.

To make a basic recording, I patched my CD player into line inputs 1 and 2 and popped in a well-recorded studio album. Then I launched BIAS Peak and chose 24-bit, 44.1 kHz as my CoreAudio record settings. When I pressed the Record button, music streamed through at a low volume, peaking at around –8 dB. I tested the headphone jack with AKG K 240 Studio and Audio-Technica ATH-M40fs headphones; although I heard no distortion at full gain, the sound was lacking in the low frequencies.

To remedy the low-output problem, I launched the virtual 16/12 FW Mixer, which was well-laid-out and easy to read. All output sliders were preset to maximum, and the input sliders were set at their lowest setting of 0 dB. I pushed them up to the maximum position of +12 dB, which yielded better recording volume. The Mixer lets you save custom settings to a drop-down list, and all channels can be stereo linked or delinked. The CD recorded beautifully in Peak, and the sound was full with no noticeable digital artifacts.

My next test was to try out simultaneous recording and playback with a multitrack work-in-progress. I routed 23 stereo tracks from Apple Logic to all eight analog outputs simultaneously; the 16/12 FW performed without a hiccup. I then patched all the analog outputs to the first 8 analog inputs and bounced down all 23 tracks, first to 4 stereo tracks and then to 8 mono tracks. The Hercules also handled those tasks with no problems. Next, I added stereo effects and a synth pad to the mix using inputs 9 through 12; the 16/12 FW performed like a champion.

The Hercules 16/12 FW is a FireWire interface that offers 16 analog inputs, 12 analog outputs, S/PDIF I/O, 32-channel MIDI operation, and a pair of phantom-powered mic preamps.

Finally, I tested the preamps by recording some guitar and vocals through a studio condenser mic. Recordings made at normal gain were fine (but not exceptional), and the preamps added neither coloration nor

transparency. The knobs, however, didn't feel sturdy, and both pots were quite noisy when performing gain sweeps (especially toward the top). I also heard a persistent noise when I pushed the gain all the way up, with or without phantom power engaged. Another area of concern was the FireWire connection, which also produced noise during hard-disk operations; that noise didn't lessen when I moved the unit away from my Mac.

Line-Level Performer

The Hercules 16/12 FW is useful for project or mobile studios that need a reasonably priced portable interface. Although I recommend it for heavy line-level use because it offers a variety of inputs and outputs and can handle plenty of simultaneous I/O, better preamps would improve the unit's performance when using mics and electric guitars. Better grounding would also score some positive points. Overall, the 16/12 FW is a versatile unit with room for improvement.

Overall Rating (1 through 5): 3
Hercules
www.hercules.com

DISCRETE DRUMS

EarthBeat

By Mike Levine

Every time you look around, it seems as though another drum-loop library has been released. The musical styles of these products vary, but there's one thing that most have in common: they offer only stereo loops. Although stereo loops are convenient for quickly putting drum parts together, they limit you to using a mix that was made independent of your song or project. Discrete Drums provides an alternative by offering drum libraries in multitrack format, which allow you to create your own mix of the individual drum and percussion tracks. Stereo loops are provided as well.

The recently released *EarthBeat* ($229) follows in the footsteps of Discrete Drums, series 1 and 2. But unlike those collections, which concentrate on pop and rock, *EarthBeat*'s content is focused on world-music styles.

Under the Hood

EarthBeat comes on eight discs in a utilitarian wooden box. It is composed of 16 songs, each offering several verse, chorus, bridge, and breakdown variations, and a number of fills.

The multitrack parts come in the form of 24-bit WAV files and are contained on five CD-R discs. For each song, you get separate files for the various parts (verse, chorus, fill, and so on), and each of these is broken up into kick, snare, toms, overhead, and room tracks. The kick and snare are mono, and the others are stereo. The percussion tracks are offered individually (most stereo, some mono) and mixed together.

Another 24-bit CD-R contains individual samples of all the drum and percussion instruments, offering both "dry" and "room" versions of the various hits, giving you the raw materials to supplement the loop performances and to set up some impressive sampled kits. Yet another disc offers the stereo versions of the loops in 16-bit WAV-file format, with the drum and percussion loops offered both separately and mixed together.

Manual Override

An audio CD for auditioning the different songs and parts before loading them into your sequence or sampler is also provided. On the audio CD I received for the review, however, the first two songs ("Box of Rocks" and "EarthBeat") were reversed on the listing on the back of the CD. And for some of the songs, the audio CD tracks didn't play the parts in the same order as the listings provided on the disc jackets. Discrete Drums has posted the accurate track information for the audio CD on its Web site.

I recommend using the audio CD for getting an overview of a particular song. You are better off listening to the specific song segments in the file-browser window of your sequencer (assuming that it has an audition feature) before importing them into your project.

Earthy Kit

The heart of *EarthBeat* is its stellar grooves. The songs have a range of

EarthBeat is a collection of great-sounding multitrack drum-and-percussion loops with a world-music flavor.

solid drum grooves with cool, multilayered percussion on top. The percussion, played in African and Latin styles, adds the world-music feel to the performances. It doesn't seem as though Discrete Drums was trying to re-create world styles beat for beat, but rather to use the percussion (played by Eric Darken) to lend a world-music flavor to the rock, funk, and pop grooves (laid down by drummer Greg Morrow). The content is extremely well recorded, and the drums have a big, clean, beefy sound. The *EarthBeat* tracks are among the best-sounding loops I've heard.

Plenty of room sound has been mixed in on the 16-bit stereo WAV versions of the songs. If you're using the 24-bit multitrack loops, you have control over the mix and can tailor it as you wish. To maximize the loops' organic sound, the leakage between tracks has not been gated or edited out. Therefore, depending on your mixing style, you may want to apply gating to some of the tracks. Overall, the quality of the drum and percussion recordings is so good that mixing them is a breeze.

Because each song segment has five tracks of drums and several percussion tracks, you'll be loading a lot of files and will need to be well organized to avoid confusion. If you use Ableton Live, Discrete Drums has provided Live Sets, which load up an entire song's content at once.

They Got the Beat

You get a lot for your money with the *EarthBeat* collection, including well-recorded and well-played loops that feature huge-sounding drums and multiple layers of percussion. You also get the flexibility of having multitrack and stereo files. More detailed documentation would be helpful, but overall this is another winner for Discrete Drums. EM

Overall Rating (1 through 5): 4
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Building Character

By Larry the O

Recently, I participated in an interesting email thread that discussed how the user interfaces of current electronic instruments tend to impede one's workflow. I heatedly agreed with that premise. Then I had the chance to hear someone playing a piece for EM Contributing Editor Scott Wilkinson that was created in a loop-based "easy composition" program. Never before that moment had I wished for a massive electromagnetic pulse in the atmosphere to occur that was strong enough to disrupt the functioning of every electronic device.

As I rushed home for an emergency dose of Debussy's La Mer to soothe my offended musical sensibilities, I began rethinking the issue and slowly realized that flow might actually be the enemy of making good music. When doing something is too easy, no effort is required. And without effort, there is no value.

Why did it take Ricky Wagner 26 years to complete his Der Ring des Nibelungen (Ring Cycle)? Why did it take the Beatles thousands of hours to make Sgt. Pepper's Lonely Hearts Club Band? It took that long because it was hard to create those works, and in that difficulty was forged the character that such works exude, which makes them classics.

I didn't even have to aim the hammer; it was as if the tool knew the way into the monitor.

Today, a person can load a sound from a library of thousands into his or her software synthesizer, click Record, fiddle with it for about for a minute, loop it, layer a few things on top, and—voilà!—a new "tune" is born. No spirit, no soul, nothing but beat and sounds.

In the early days of synthesizers, it took hours to create a single sound that one could never replicate. Oscillators went out of tune so frequently that Wendy Carlos sometimes only recorded a few notes of "Switched on Bach" before having to stop and retune. Yet that album turned out to be a masterpiece.

I decided to put this idea to the test and create a piece using methods that were not so easy. I resolved to use only analog equipment. I pulled out an old reel-to-reel tape deck and a spring reverb. I used only modular analog synthesizers and acoustic instruments. I'd forgotten how many cables it took to hook up an analog studio, and soon used every cable at my disposal. Actually, the FireWire and USB cables went untouched.

After an entire weekend setting up and connecting the equipment, I was ready to go. I powered everything up and there was a nasty buzz, but it took only about an hour and a half to find. It turned out to be a bad shield connection in a connector, so I chopped the molded end off the cable and soldered a new one on. I had the oddest sensation of simultaneously feeling frustrated at all of the hassle, yet exuberant at how much effort was going into creating this work.

I'll skip all the stuff about calibrating and aligning the tape deck, accommodating the lack of headroom in my old analog mixer, the dead synthesizer modules, and the difficulty in properly calibrating the old Dolby noise-reduction unit I unearthed.

Eventually, however, I managed to complete the entire piece, only to be faced with the fact that I would be forced to use the computer to master and make a CD. In danger of getting soft with the ease of using a computer, I helped my cause by using a "x.0" version of my audio editor, so that I would be assured of lots of bugs with which to contend. Still, the mastering process proceeded smoothly, which worried me, as I saw all my hard-earned character evaporating.

And then inspiration struck. I knew how to make sure things didn't get too easy! I simply switched off the computer monitor. Alas, I succumbed to temptation after an hour and turned it back on. But art requires sacrifice.

I didn't even have to aim the hammer; it was as if the tool knew the way into the monitor, just as the knife homed in on the speaker cones by itself. Now I was getting somewhere! I felt like Jackson Pollock or Pete Townshend. But it was definitely the ghost of Pollock that filled me as I went through an entire case of cola, shaking each can and opening it over a piece of equipment.

Now that, dear friends, is the artistic spirit in action! EM

Larry the O has been called "a twisted individual" by violinist Cat Taylor, who receives special thanks for contributing to the delinquency of a writer.

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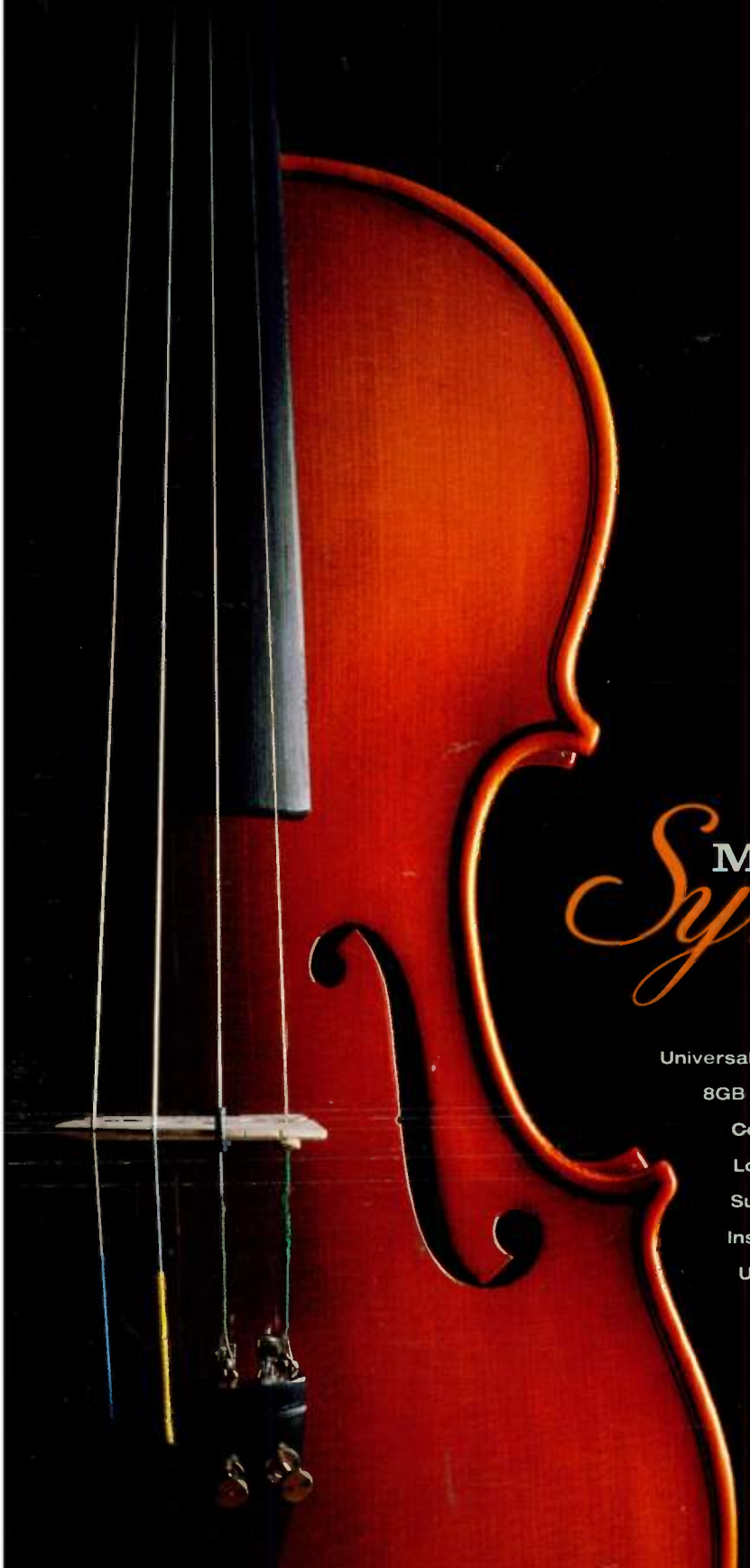

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