

Electronic Musician®

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September 2002

The Virtual Drummer

Create slammin' drum parts
(even if you're not a drummer)

5 Hot USB MIDI keyboards reviewed

Unlock the hidden power of Digital Performer 3

#BXNMDSF *****AUTO** 3-DIGIT
#10987LNG616EG008# NOV 2003 ECMN 133

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0 09281 01816 2

14 complicated reasons (and 2 simple ones) **WHY THE 1604-VLZ® PRO MIXER** can make your creative product sound better.

Year in and year out, more professionals use Mackie VLZ® PRO mixers than any other brand. For TV and film soundtracks, ads and bumpers, for song demos, for video post and for submixing into larger consoles.

While this ad features our "industry standard" 1604-VLZ® PRO, you'll find many of the same innovations on our three other models, right down to the diminutive 1202-VLZ® PRO.

If you're serious about your creative product, you owe yourself the low noise, high headroom and sweet musical sound we've designed into all four VLZ® PRO compact mixer models.

1 16 XDR™ mic preamps get the most from any microphone. Meticulously designed to achieve the same fine definition and pristine specifications as \$2000-per-channel out-board mic preamps, XDR™ provides 130dB dynamic range to handle hot digital inputs, ruler-flat response (down just 3dB at 192kHz!) and 0.0007% THD. Our exclusive design also has the best RF rejection of any compact mixer mic preamps.

2 Warm, musical equalization. 12kHz and 80Hz shelving EQ plus swept mid with gentle 2-octave peak. The 1604-VLZ® PRO's "midrange" actually sweeps from 3kHz all the way down to 80Hz, so you can realistically use it as a second mid-bass LF equalizer, too.

3 VLZ® circuitry for ultra-low noise. 1604-VLZ® PRO owners tell us it's by far the quietest mixer they've ever used. With all 16 channels wide open, they "can't even tell it's on." Judicious application of Very Low Impedance circuitry dramatically reduces thermal noise at critical signal path points as do new, advanced 2068 op-amps.



1202-VLZ® PRO

12 total channels • 4 XDR™ premium mic preamps • 4 mono line level chs. • 4 stereo line level chs. • Extra ALT 3-4 stereo bus • 3-band equalization • 75Hz low cut filters on mono chs. • 2 aux sends per ch. • 2 master stereo aux returns with EFX to Monitor • Control Room/Phones source matrix • Rotary gain controls • Built-in power supply



1402-VLZ® PRO

14 total channels • 6 XDR™ premium mic preamps • 6 mono line level chs. • 4 stereo line level chs. • Extra ALT 3-4 stereo bus • 3-band equalization • 75Hz low cut filters on mono chs. • 2 aux sends per ch. • 2 master stereo aux returns with EFX to Monitor • Control Room/Phones source matrix • 60mm log-taper faders • Switchable AFL/PFL



4 Easy level setting. Just press a channel strip PFL Solo button and adjust the Trim Control to minimize noise and optimize headroom.

5 Constant Loudness Pan pots maintain uniform sound level when you pan hard right or left.

6 6 aux sends per channel, each with 15dB gain above Unity for cranking effects and running outboard gear at optimal output levels.

7 Sharp 18dB/oct. 75Hz Low Cut filters minimize room rumble, truck noise, mic stand thunks and P-pops without losing audible bass.

8 Flexible stereo aux return routing. Aux Returns 1 & 2 can be folded back into Aux Sends 1 & 2 (so musicians can hear EFX in their headphones); Aux Return 3 can be sent to the main mix or either Sub Bus 1-2 or Sub Bus 3-4; Aux Return 4 can be sent to Ctl Rm/Phones only.

Simple reason **1**: It's built like a tank. Solid steel main chassis. Thick mil-spec fiberglass circuit boards. Sealed rotary controls. Real metal jack sockets. Buy a 1604-VLZ[®] PRO now. Leave it to your kids in 20 years.

Simple reason **2**: It just plain sounds better. Don't believe us? Ask one of the thousands of satisfied owners. Or better yet, demo a VLZ[®] PRO series compact mixer at a Mackie dealer today.

9 Separate Aux Returns Solo button.

10 Control Room/Phones Source Matrix lets you route any combination of Tape, Subs 1-2, Subs 3-4 or Main Mix to headphones or control room monitors.

11 Separate Tape input gain control and Tape To Main Mix switch so you don't have to tie up a channel strip adding CD EFX or click tracks.

12 RUDE Solo light flashes brightly any time a channel is soloed. Doesn't sound like a biggie until you're sleep-deprived at 3 a.m. and can't figure out why no sound is coming out of the @%&\$#! mixer.

13 4-bus design with L/R assigns on each bus and bus assigns on each channel strip.

14 60mm log-taper faders provide linear level change throughout their length of travel. You can do precise fade-outs all the way down to ∞ instead of losing the sound at about -20dB. Compare to our competition and hear the difference.



1604-VLZ[®] PRO

16 total chs. • 4-bus w/double-bussed outputs • 10 XDR™ premium mic pre-amps • 8 mono line level channels • 2 hybrid mono mic/stereo line-level channels • 2 mono/stereo line level chs. • 3-band EQ w/swept mid on mono channels, 4-band on stereo channels • 75Hz low cut filters on mono chs. • 4 aux sends per ch. • 4 stereo aux returns with EFX to Monitor • Control Room/Phones source matrix • 60mm log-taper faders



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By David Battino

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By Rob Shrock



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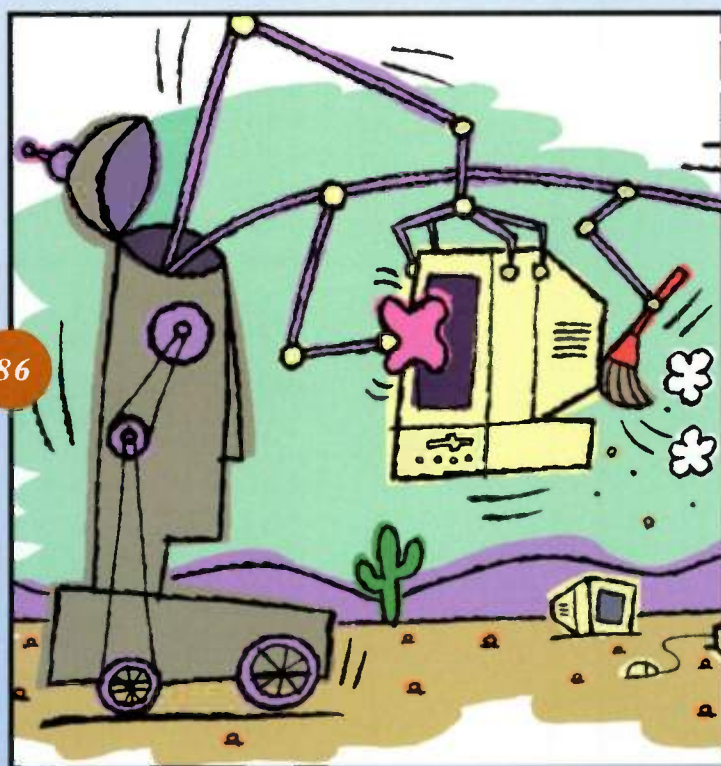
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Big Mac Attack!

Apple Computer's recent purchase of Emagic sent shockwaves through the recording industry. The acquisition was surprising enough, but Apple's decision to discontinue Emagic's Windows products as of September 30, 2002, made the deal a real stunner. Talk about a Big Mac attack!

Logic Windows users have every right to be outraged. Steinberg and Cakewalk quickly offered reasonably priced crossgrades for Logic Windows users who wanted to switch to Cubase SX and Sonar, respectively. That's good, but it won't sweeten the dispositions of committed Logic users who thought Emagic was committed to them, too.

Emagic's abandonment of the PC leaves Steinberg as the only well-established cross-platform vendor of professional sequencing software. (Digidesign is primarily a Mac developer; Pro Tools for Windows hasn't had much impact.) Years of intense competition in the sequencer market have consistently resulted in improved products. Now, a major innovator has abandoned the PC. That's bad news for Windows users.

For Mac users, the picture is murkier. According to Apple, Emagic will continue as a division of Apple, but what does that mean? It seems likely that Apple wanted Emagic's technology more than its applications and will use the Emagic audio engine in other products, especially Final Cut Pro. Perhaps it will morph the entry-level MicroLogic into some sort of iMusic to go with iTunes, iMovie, and so on. Apple could and should incorporate Emagic's high-resolution audio and MIDI interface technologies into future Mac hardware. It also seems likely that Emagic products will be sold through the Apple Store, Mac Warehouse, MacMall, and the like.

Apple is notorious for sudden changes of direction, and it is always possible that the computer maker will decide to cannibalize Emagic's technology and blow off its products. However, if Emagic's software remains profitable and its development team continues to be productive, dumping Logic, at least, makes little sense. Rather, I expect Apple will enhance the development of Logic and its plug-ins for OS X.

Given that Apple specializes in friendly user interfaces, it is possible that Logic will get a face-lift. It will be interesting to see how Emagic's development team, with its strongly held opinions about how user interfaces should be written, handles working for a company with very different and equally strong opinions on that subject. Can the differences be resolved so that Emagic's top engineers will stay for the long haul?

If Apple keeps and enhances Emagic's software and can find common ground with Emagic's engineers, this deal could turn out to be good for Mac users—assuming Apple also continues to work closely with developers that have suddenly become competitors, such as Digidesign, MOTU, and Steinberg. Fortunately, Apple's larger interest is in building a strong Mac community, not in cutting out competitors in order to sell a few more sequencers. Furthermore, MOTU has a strong hardware business, Digidesign's Pro Tools TDM is firmly entrenched worldwide, and Steinberg offers a wide variety of software. Even if Apple comes to dominate the Mac sequencer market, these companies could probably remain successful.

But at least in the short run, this deal has generated far more questions than answers.



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Giga Sound Library Spotlight



TASCAM/Christian Lane Ultimate Marimba & Vibes

NEW! With four sets of mallets to choose from, this 2-disc library features a great-sounding Marimba One 5-octave instrument and a Musser set of vibes. Multiple velocities, rolls, muted strikes and lots of extras truly make this the ultimate!



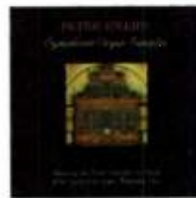
TASCAM/Jim Corrigan Nashville High-Strung Guitars

One of the coolest, most playable acoustic guitar collections for Giga. Recorded with incredible quality, this totally authentic collection of up and down strums and dynamically playable single strings for solo parts represents the sound of Nashville at its finest.



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NEW! A 6 CD library built from a set of Hinger Touch Tone timpani with calf heads. Five mallets, eight velocity levels, individual right and left hand samples and incredible detail give this library a 5/5 star rating in Electronic Musician magazine!



TASCAM/Peter Ewers Symphonic Organ

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GIGASTUDIO 160



GIGASTUDIO 96



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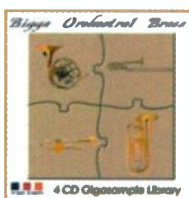


There are hundreds of sample libraries that have been developed specifically to take advantage of Giga's streaming technology. Here's a small selection of the best.



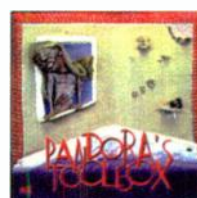
TASCAM/Scarbee J-Fingered Bass

NEW! 1046 samples are dedicated to each of the 3 pick-up settings, providing a total of 3138 samples (1.15 GB)! The musicality of this handmade Celinder J Update 4 is expressed in every hammer-on, pull-off, grace-note, staccato-release and slide. Amazing!



Bigga Giggas/Bigga Orchestral Brass

4 CD set that includes 341MB of tuba, 441MB of trombone, 302MB of french horn and 348MB of trumpet. All samples were recorded with multiple velocities at 24-bit/96kHz resolution.



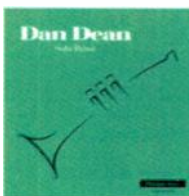
Q Up Arts/David Torn Pandora's Tool Box

70 tracks of highly unusual sounds, divided into textural, riffic and rhythmic loops. Great for adding edge and unique personality to music production, sound for picture and multimedia projects.



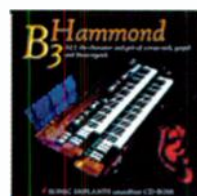
TASCAM/Larry Seyer Acoustic Bass

Over 500 MB in size, every note of every string sampled in stereo at 4 velocities with no loops. Features finger-damped staccato release resonance samples that will play on the note-up (release) and body resonance volume control, fast and slow up/down slides, riffs, special effects, and more.



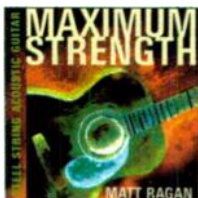
Dan Dean/Solo Brass

A 10 CD set of incredible solo brass instruments, with up to 8 levels of dynamics per note. Includes varieties of trumpet, trombone, french horn, tuba, cimballo, euphonium and more.



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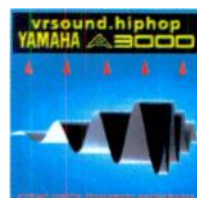
TASCAM/Matt Ragan Maximum Strength String Acoustic Guitar

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MAE LAROBIS

AM I A COMPOSER?

I enjoyed your views on loop recording ("Loop-a-palooza!" June 2002). I am a drummer turned dance-music composer, and I make a nice living. My studio does have one acoustic instrument in it—a drum kit. I basically do anything and everything in the electronic world, from ambient to brain-crushing techno running as fast as 190 bpm. I bust out library CDs, TV commercials, and programs for Roland. Some people think that I'm not really a composer because I didn't study the piano.

Also, some people assume that they can just knock out dance tracks because it's easier and because dance isn't really a creditable genre. With today's tools and hard-disk recording, creativity is out of control, I am glad to say. I sample off AM radio and then filter it to death. I'll sample noise, loop it, and filter it, and maybe something great is born.

The area that I work in is so creative and demanding. My brain will fry sometimes with the experimentation I go through. I may be some kind of new-school music scientist. If you gave me 25 raw samples and said to go to work on them, I could create an amazing piece with today's technologies and hard-disk capabilities.

To make great dance music—be it techno, house, or hip-hop—you have

to climb into this genre and find out what's hip at the moment, what's been and gone, and, especially, what's next. You have to feel the vibe, do research, experience the DJs, and see what they are spinning in the clubs. Dance music is bigger than ever, and in Europe that's basically what's going on.

Loop-based recording is wonderful and convenient. If those who dismiss it would open their eyes and ears, they would realize that they could really benefit from it. Face it—nearly every hit record that is made today is made using loops, digital audio workstations, and beautiful minds.

Nick Tidy
via e-mail

NEW GEAR—WHATEVER!

The Jon Brion interview ("Thinking Outside the Boxes," June 2002) was supremely inspirational. In fact, shortly after reading it, I wrote and recorded two pieces of music directly into my 23-year-old Sony TC-D5 stereo cassette recorder (making exaggerated use of the very musical built-in limiter) through an equally ancient Sony stereo mic—all within an hour. Fortunately, I was able to finish it up just as the dogs started barking at the gardeners.

At any rate, I think Brion's philosophy is extremely relevant in this age of ever-increasing technological overload. I hope other readers gained as much value from the interview as I did.

Alan Deremo
via e-mail

WHITHER PROTOOLS?

I've been a loyal EM reader for many years and have accumulated a great deal of music equipment, much to my pleasure and to my wife's dis-

may. I was thrilled to get the July 2002 issue, which had the article "Build a Personal Studio on Any Budget," because I thought that it would point out some things that I may not have thought of buying that might help my productions.

I realize that your writers are called upon to make subjective judgments as to what is good or best for certain environments. Even so, it was a little bit surprising that not one of the computer-based studio write-ups suggested the use of Digidesign Pro Tools. A free version is available on the Internet, and a bundled version comes with the company's \$500 and \$800 digital-audio interfaces (the USB Mbox and PCI Digi 001). Most high-end studios that I've heard of use Pro Tools, and it's way more fun to use than my old Fostex 4-track. The fact that you can take your Pro Tools files to another studio for fixes, overdubs, and mastering makes it a necessary format to support in many environments.

Also surprising was the fact that nobody mentioned using Emagic Logic Audio with the Logic Control or Steinberg Cubase with the Houston. It's a lot easier to use those programs on a board that was designed for your application than to try to mix multiple audio and MIDI channels with a single mouse. I'm a recent convert to Logic and cannot wait to get the Logic Control, which can also be used to control Logic's virtual instruments, effects, and VSTs.

I highly recommend really big monitors, like those in your high-end selections. For \$200 you can get a 19-inch CRT with reasonable quality. So you can even pick up these bad boys for your cheap computer-based studios. Heat might be an issue for some, but my Mackie board generates a lot more heat than my two 19-inch CRTs.



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Also, whatever PC or Mac you buy, fill it up with RAM. RAM is relatively cheap and makes a big difference if you're running multiple VSTs.

Finally, I would have really enjoyed more recommendations on all the little stuff that we seem to overlook when making our budgets—things such as pop filters, high-quality cables, and mic booms.

Jeff Sepeta
via e-mail

Jeff—Pro Tools Free is not in a class with Cubase VST 5.1 or Digital Performer 3.1 as a full-blown digital audio sequencer. But it's a fine Macintosh audio program, and you can't beat the price. (We have had repeated problems with Pro Tools Free and LE for Windows, however.) In retrospect, it would have been a useful addition to our Mac-based studios.

Had we added a cool hardware controller, we would have had to lose something else. You pay your money and take your choice. With respect to your specific recommendations, please keep in mind that the editors have used all of the products recommended in the story. Unfortunately, Steinberg has never sent us a Houston for testing, despite our repeated requests. On the other hand, Emagic has been eager for us to review Logic Control, but the review unit was not available in time for us to test it for the July issue. (We are testing it now and will publish a review soon.)

As for cables, pop filters, and such, please reread the section called Rules of the Game on page 52, in which I explained why we were not including these items in the story.—Steve O

SPARE AN ARTICLE, MAC?

I am frustrated with the lack of information concerning music application development for Mac OS X. I would like to request an article covering Mac OS X and its ability to make music. Specifically, I think readers want to know where Mark of the Unicorn, Coda, and Digidesign are in their development for Mac OS X.

Chris Schopmeyer
via e-mail

Chris—As of this writing, only BIAS is shipping music-production software for Mac OS X. In general, most companies won't comment on software that is still under development, but when we can publish something meaningful, we will do so.—Steve O

WHIP IT—WHIP IT GOOD

Years ago I scrimped and saved to buy a Korg Mono/Poly after exhausting the sound-producing capabilities of my Timex/Sinclair 1000 (remember the little black box with the

membrane keyboard that boasted 2k of onboard memory?), which never quite got me as close to the Thomas Dolby sound I was aspiring to.

How I enjoyed flipping through the pages of EM to find "Vintage Page" and its bio of masterpieces such as the Roland Jupiter-8, SH-101, and MC-202. Please bring "Vintage Page" back. It's what initially got me to subscribe. The reviews, interviews, and outstanding columns will keep me a lifetime subscriber.

My Devo power-dome hat is off to you and the great magazine.

Dennis Gates
via e-mail

NO SUCH LUCK

First of all, I'd like to congratulate you on the excellence of EM. You consistently feature pertinent information for small-studio owners.

I wondered if you are aware of any digital signal processing cards such as the Mackie UAD-1 or TC Works TC PowerCore that would work with Cake-walk Sonar (besides Yamaha) that have their own built-in processing.

Todd McKinney
via e-mail

Todd—Not at this time.—Steve O

ERROR LOG

July 2002, "Build a Personal Studio on Any Budget," p. 104: The phone number for HHB Communications is (310) 319-1111.


Personal Studio Buyer's Guide 2003, "Computer Based DAWs," pp. 46-47: The Digi 96/8, 96/8 Pad, and 96/8 PST are products of RME (distributed by X-Vision Audio U.S.; tel. (330) 747-3857; e-mail info@xvisionaudio.com; Web www.rme-audio.com), and not of Digidesign.

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Download of the Month *By Len Sasso*

If you're looking for retro additions to your virtual-synth kit, Big Tick Audio Software (<http://bigtick.pastnotecut.org>) might be just the ticket. Its roster includes standalone and VST plug-in instruments as


well as VST effects. All offerings are Windows compatible; some are also available for Mac and BeOS.

Cheeze Machine provides convincing emulations of the ARP Solina and Crumar Performer, while Ticky Clav emulates the Hohner Clavinet. Both are free VSTi plug-ins for Mac and PC. The EP-Station (Win; \$39) isn't exactly a Wurlitzer or Rhodes emulator, but its FM-modeled sound can be used to lay down an electric-piano groove. The latest offering, Angelina (Win; \$39), uses formant morphing and shifting to produce fat, breathy pads. Angelina can be used as a standalone synth or as a VST instrument.

Big Tick Audio's flagship product, Rainbow (Win; \$60), is a 4-oscillator synth capable of producing a wide variety of leads, pads, and effects. Rainbow starts with four multiwaveform oscillators. Each oscillator can frequency- or amplitude-modulate any

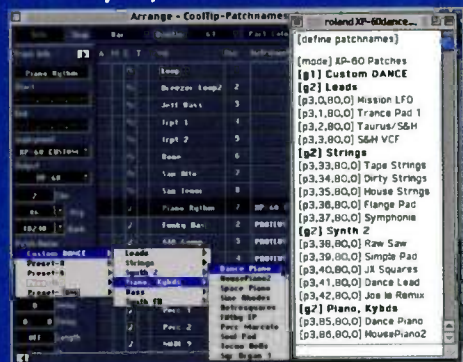
of the others (as well as itself), and each has a level envelope and waveshaping capabilities. The oscillator mix passes through a multimode filter with a dedicated envelope generator, followed by a stereo chorus. Rainbow also sports a 16-step sequencer and pitch-envelope and portamento sections.

Big Tick Audio Software also offers four free VST effects plug-ins. NastyShaper is a waveshaper capable of subtle to extreme distortion effects. Hexaline and DualDelay are stereo delay processors for short and long delay effects, respectively. Makunouchi Bento ring-modulates incoming audio using sine waves of randomly varying frequency.

The MP3 file "PassTheCheeze"  at www.emusician.com combines a Rainbow tubular-bell patch processed by DualDelay with a Cheeze Machine track processed by Hexaline. Rainbow is triggered by its built-in step sequencer.

TIPS

Cool Tip Of The Month



By making simple changes to a Cubase Patchname Script document, you can easily organize your synth patches into cascading lists of related sounds.

Organizing Synth Patches Within Cubase

The EM Cool Tip of the Month is presented courtesy of Cool Breeze Systems.

Using MIDI Patchnames within Cubase is great, but scrolling through 100 or more patches to select your favorite tuba preset can quickly get tedious. Here's a tip for organizing your patches into additional subcategories by editing a Cubase Patchname Script document.

1. Within the Scripts > patchnames folder for Cubase, open the TXT document for your synth. Duplicate the document so you have a backup copy, and then open the file using a text editor or word processor.

2. You'll notice that at the beginning

of each of the synth's patch banks there's a [g1] header/description followed by a lot of program numbers and descriptions, all containing "p2." To further organize the patches, you can create a second group level [g2] in your patch list. (For an example of this type of grouping, check out the "xg names.txt" document in the patchnames folder.)

3. To create the new levels, just insert the desired number of the [g2] sub-headers into any bank, at whatever category breaks are appropriate in your sound listing. Next, type in the appropriate name for each of the submenu

Band on the Web

By Gino Robair



DINA GOLDSTEIN

Few indie jazz groups' Web sites are as attractive as Metalwood's. The band—Mike Murley on saxophones, Brad Turner on trumpet and keyboards, Chris Tarry on fretless bass, and Ian Froman on drums—is a Canadian/American hybrid currently making the rounds of international jazz festivals behind their fourth release, *The Recline*. For this session, Metalwood invited three high-powered guests: guitarist John Scofield, percussionist Mino Cinelu, and turntablist DJ Logic.

The lazy feel and relaxed soloing on the opening track, "Strollin'," set the stage for a smooth ride through a variety of jazz styles. The majority of Metalwood's songs lean toward the open funkiness of the Jazz Crusaders and late-period Miles Davis, but their orchestration is reminiscent of Weather Report. Although that invites comparison with the jazz-flavored jams of Medeski, Martin, and Wood, *The Recline* recalls the halcyon days of jazz/rock when musicians had a deeper understanding of post-bop forms and well before the term *fusion* became

synonymous with the F-word.

Recline's second track, "Bumpus," begins with a playful overlay of guitar and turntable scratchings with processed percussion before a distorted electric-piano groove sets the mood. The next track, "Mr. Mike," is a brief tune with a twisting melody

and a standard jazz framework that mines the territory of Steps Ahead. There's plenty of solo space throughout the record and none of it is wasted.

Metalwood's Web site is designed around the same visual elements as the CD packaging for *The Recline*. The site is easy to navigate, and its pages, which load quickly, are clearly marked. Their names tell you what they include: News, Tour Dates, Contact, Store, and so on. The Media page offers a 1-minute example of each song in RealAudio format.

The Chat page takes you to the Metalwood bulletin board where fans can send messages to members of the band or network with each other. "We have the 'Ask Metalwood' section," says bassist Chris Tarry, "which is a great way for fans to find out where we are and contact us directly."

Board topics include "Live Recording," for fans who record Metalwood shows, and "I Saw The Show In..." where specific events can be discussed in detail. Registration, although free, is required.

Key Changes

By Marty Cutler

Apple Computer (www.apple.com) purchased German software and hardware developer Emagic (www.emagic.de), best known for its Logic Audio digital audio sequencer. Emagic will be run as a wholly owned division of Apple; its line of Windows-based products will be discontinued September 30, 2002 . . . **Steinberg** (www.us.steinberg.net) is offering a cross-grade (\$299) for registered Logic users who want to switch to Cubase SX for PC. The offer is good until the end of September . . . **Cakewalk** (www.cakewalk.com) is offering a Web-based crossgrade from Logic to Sonar 2.0 (\$199) and Sonar XL (\$299) . . . **Metric Halo** (www.mhllabs.com) announced support for Digidesign Pro Tools|HD systems. The upgrades to ChannelStrip and SpectraFoo (\$96.24) are compatible with Digidesign's TDM II architecture . . . **A.R.T.** (www.artproaudio.com) now distributes Alto products, including the Alphaverb digital effects processor and Alto-Comp stereo 3-band dynamics processor . . . All versions of the Macintosh real-time synthesis program **SuperCollider** are now freeware; a download is available at www.audiosynth.com . . . **Rocket Networks** collaborated with Digidesign to provide DigiDelivery (www.digipronet.com), a service that offers secure delivery of Pro Tools Session files over the Web using data encryption and lossless compression . . . **Sonic Solutions** (www.sonic.com) entered into a distribution agreement with Adaptec to distribute its MyDVD and DVDit software . . . **Fostex** (www.fostex.com) is now a licensee for Digigram's EtherSound technology, which enables high-speed digital audio distribution over standard Ethernet networks. According to Digigram, the system can carry up to 64 channels of 24-bit, 48 kHz audio and bidirectional control information to an unlimited number of networked devices . . . **Tascam** (www.tascam.com) released Mac OS X 10.1 USB drivers for its US-428 controller and digital audio interface. Download the driver free from Tascam's Web site . . . **SpinAudio** (www.spinaudio.com) released its Spin-Delay two-tap delay processor as a plug-in for Mackie's Soundscape 32 DAW.

TIPS

titles (such as "Keyboards," "Percussion," "Organs," or "Synth Leads").

4. Once you've done that in all the appropriate banks, globally replace all instances of "p2" with "p3"; otherwise the programs will show up on the same level as previously, where the submenu headers [g2] now appear.

5. Save the document and reopen Cubase. Voilà!

If you're a little more adventuresome, you can cut and paste noncontiguous patches into various groups to meet your additional production needs. PC users can further edit patch lists with the ScriptMaker utility included with the Windows version of Cubase.

To view a streaming movie of this tip from the CoolSchoolOnline library, visit [www](http://www.emusician.com/cooltip)

www.emusician.com/cooltip. Also, if you dare, take the quiz to review what you've learned!

—Steve Albanese

Maximizing GigaStudio Performance

Tascam's GigaStudio 160 is a powerful software sampler that streams Instrument files directly from the hard drive. That allows it to use mammoth loop-free samples but it also puts a strain on your hard drive when the polyphony count gets high.

To maximize performance and polyphony, Dave Casey at Tascam recommends that you install GigaStudio, along with the system software and other applications, on your main hard drive, and reserve a second, defragmented Instrument drive for your sample libraries. GigaStudio can work more efficiently if it only has to access samples

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Rev Up

By Marty Cutler

Propellerhead

Reason 2.0 (\$399) is ready for Mac OS X and offers support for 32-bit samples and dual-processor computers. The upgrade introduces a new synthesizer and sampler as well as enhancements to the program's user interface. The upgrade is free to users who purchased Reason after March 2002; if you bought Reason before March, the upgrade costs \$79.

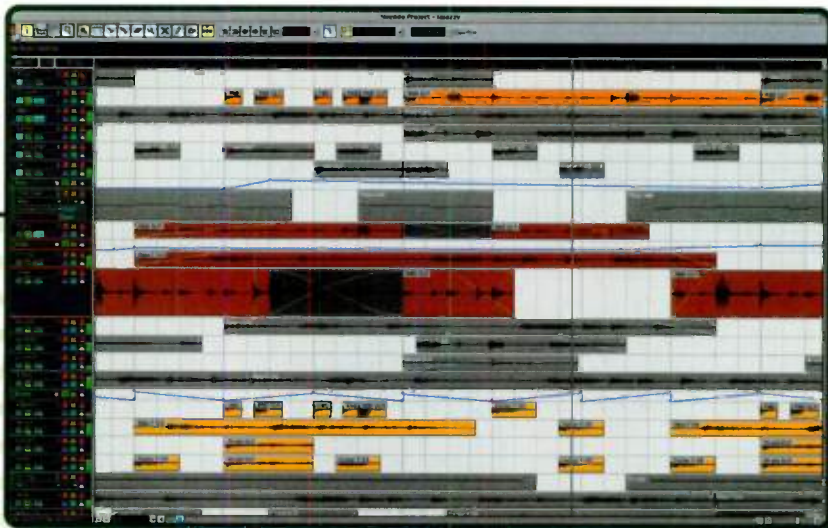
The program fully supports Mac OS X's Core Audio and Core MIDI, so there is no longer any need for OMS or ASIO extensions when using OS X 10.1 or later. Propellerhead claims that latency with Mac OS X is less than a millisecond.

New to version 2 is the Malström Grainable synthesizer, which combines granular, wavetable, waveshaping, and subtractive synthesis. The synth has two oscillators, and you can jump to random positions or sweep through wavetables while altering the sweep speed (without changing pitch). Malström features two filters with five modes: lowpass, bandpass, subtractive or additive comb filter, and AM. The Shaper section provides various facilities for distorting the waveform, including digital clipping and bit reduction, a simulation of analog saturation, and signal reshaping with a sine wave. You can process other Reason devices through the synth engine in real time.

The NN-XT sampler beefs up Reason's sampling capabilities by providing automatic pitch detection when assigning sample zones. It adds layers, Velocity crossfades, the ability to assign randomly alternating sounds for timbral variation, and more. You can route other Reason gadgets through gating inputs.

To get you started, Reason 2.0 includes Orkester, a sound library of orchestral instruments tailored for groove-oriented music.

Version 1.6 of Steinberg's Nuendo



The sampler loads SoundFont 2-format samples and comes with a conversion utility for Akai-format sounds.

The Sequencer window is detachable from Reason's virtual rack, letting you move the sequencer screen to a second monitor while leaving the rack on the first. The sequencer now offers an expanded toolbar with drawing tools and an eraser. All LFOs in Reason 2.0 sync to tempo. M-Audio (distributor); e-mail info@propellerheads.se; Web www.propellerheads.se.

Steinberg

Version 1.6 of Steinberg's Nuendo (Mac/Win; \$1,299; free upgrade) adds support for the company's VST System Link technology, which enables multiple computers to share DSP tasks. (For more information on VST System Link, please see this month's "Tech Page" column on p. 34.)

Nuendo 1.6 supports recording at sample rates as high as 192 kHz and is ready for sample rates as high as 384 kHz if and when compatible hardware appears on the market. A Mac OS X version is due soon. Steinberg North America; tel. (818) 678-5100; e-mail info@steinberg.net; Web www.us.steinberg.net or www.cubase.net.

TIPS

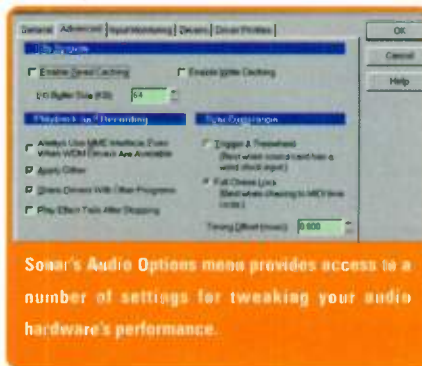
from a single optimized (defragmented) drive. Unlike program files, most GigaStudio Instruments remain unchanged during normal use, so the drive will likely stay defragmented.

However, remember not to store GigaStudio Performance data on the Instrument drive. Performance files are frequently edited and updated, and after repeated use, the Instrument drive will become fragmented, which may degrade performance during heavy use.

—David Rubin

Sharing Audio Resources

Some Windows audio programs do not play well with others. In fact, it's not uncommon to find that a piece of software has "locked out" your sound card, and even if you minimize the program, when you load a second application, you'll get a message saying "sound card in use" or something similar. If you experience this problem while running Cakewalk's Sonar or Sonar 2.0, go to the Options/Audio/Advanced menu and enable Share Drivers with Other Programs. Lo



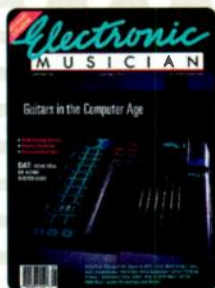
Sonar's Audio Options menu provides access to a number of settings for tweaking your audio hardware's performance.

15 Years Ago in EM

By Steve Oppenheimer

Given that EM founding editor Craig Anderton has long been both a guitarist and a synthesist, it's no surprise that we often wrote stories about MIDI guitar and guitar synths. Indeed, MIDI guitars stepped to the fore in our September 1987 issue, starting with a cover photo of the Stepp guitar synth. Captain Craig wrote the cover story, "The MIDified Guitarist," in which the maestro provided a solid tutorial on the subject. The Captain started by discussing sequencing features that were of special interest to MIDI guitarists; he then got into MIDI-controlled effects and finished up with tips on synth-patch selection. Following hard on the heels of the cover story was a collection of four assorted tips for electronic guitarists, written by three different authors.

Our cover theme was only one aspect of the issue. EM director of advertising and marketing (and later, publisher) Peter Hirschfeld delivered an in-depth analysis of DAT, then a new and controversial recording format. The controversy, of course, was caused by the fact that one could make top-quality digital copies of any recording



using DAT. That raised the ire of record labels, who dreaded the specter of rampant music piracy. Sound familiar?

In the eminently forgettable "The Zipless Track," Kirk Austin rounded up a few of his favorite new products (the Yamaha DX7II, TX81Z, and RX5) from the January 1987 Winter NAMM

show. Then-assistant editor Tim Tully followed with an "applications" story about the Korg DSS-1 sampling synthesizer that was more of an overview and review than an applications article. Tully also wrote a huge sidebar—really, a companion article—introducing Digidesign's now-legendary Sound Designer audio-editing software.

We got in trouble with our featured DIY project, "The \$10 Harmonic Sweetener." It turned out that Jules Ryckebusch's design was unwittingly close to that of Aphex's first-generation Aural Exciter, and Aphex boss Marvin Caesar was not amused. Sorry, Marvin, we weren't trying to rip you off!

Our September issue also featured a Robert Carlberg interview with long-time EM subscriber Michael Stearns. Stearns discussed his gear, his love affair with Serge modular synths, and his work com-

posing for planetariums ("the ultimate spatial environment") and IMAX film. Stearns foreshadowed currently fashionable techniques by sampling from CDs and looping and processing the resulting samples.

Of course, we also published product reviews, starting with the Casio FZ-1, one of the first affordable (\$2,499 list) 16-bit samplers, which earned a modest but fanatic following. We also explored the IVL/DigiTech Steelrider steel guitar-to-MIDI interface, which competed with a product developed by Texas steel-guitar wizard Al Petty that was based on the Photon MIDI guitar. Our other reviews included Alan Gary Campbell's evaluation of the Elka PM-13 and Fast Forward Designs MIDI-Step MIDI bass pedals; and Michael Levine's coverage of the Zeta electric-violin system.

Finally, we did a roundup of what was hot and what was cold at the 1987 Summer NAMM show. What was hot: 16-bit samplers, MIDI stringed instruments, MIDI wind instruments, and low-cost, consumer-oriented software. What was cold: keyboard samplers (rackmount units were taking over), Commodore computers, digital reverb (we saw no new ones), third-party synth patches and samples, and the Summer NAMM show itself.

TIPS

and behold, when you load a second application, it will happily play audio, even if Sonar is still running.

Of course, if your audio card has multiple output channels that appear as individual drivers in your software's audio menu, you can always assign different outputs to different programs, and you should be all set. But for the thousands of PC owners who don't have that option—Sound Blaster users, for example—being able to share is what it's all about!

—Dennis Miller

Cleaning Your Clock

Rule No. 1 for syncing devices: have only one master clock. The bad news is that it's easy to have simultaneous, conflicting MIDI Clock messages. The good news? A device can't output MIDI Clock messages when it's set to slave to MIDI Clock. The trick, then, is to make all Clock-generating devices slaves except one, which will be the master clock. To make sure you have one master and your MIDI interface supports it, you can filter MIDI Clock from all outputs but the desired source. ☺

—Marty Cutler



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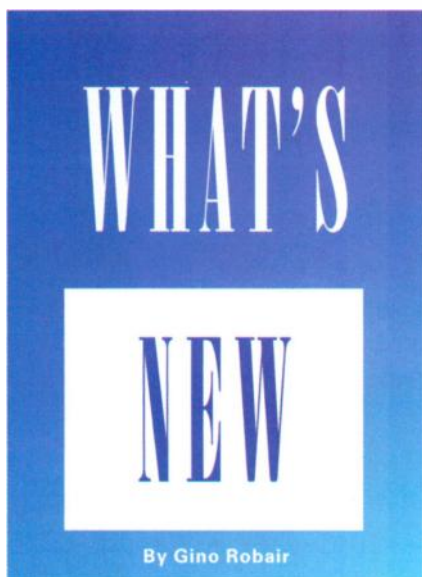
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▲ AUDIO-TECHNICA AT4040

Audio-Technica has extended its roster of quality, low-cost 40-series microphones with the new AT4040 (\$495). The AT4040 is a transformerless single-pattern cardioid condenser mic with a 1-inch diaphragm, a switchable 80 Hz (12 dB-per-octave) highpass filter, and a 10 dB pad.

The company claims that the mic's symmetrical housing assembly minimizes unwanted internal reflections. The AT4040's frequency response is 20 Hz to 20 kHz. It has a dynamic range of 133 dB and can withstand SPLs up to 145 dB (1 kHz at 1 percent total harmonic distortion) or 155 dB when the pad is engaged. The AT4040 requires 48V phantom power and comes with an AT8449 shockmount, a dustcover, and a carrying case. Audio-Technica U.S., Inc.; tel. (330) 686-2600; e-mail pro@atus.com; Web www.audio-technica.com.

► MAGIX MUSIC MAKER 7

Magix Entertainment has released Music Maker 7 (Win; standard, \$49.99; deluxe, \$74.99), a program that lets you combine video and audio content and publish the results online. The program includes an audio and video editor, a 3D-sound feature (for use with a DirectSound3DTM-compatible sound card), and software instruments such as a drum machine, a synthesizer, and the DJ-oriented Scratchbox. You can use as many as 8 virtual instruments with the standard edition and 11 with the deluxe edition. Music Maker 7 reads a variety of file formats—WAV, MPEG, AVI, MIDI—and it accepts live audio input.

With Music Maker 7, you can assemble and match digital video or scanned photos to your music. Included are 140 license-free video clips to get you started. Music Maker 7 also includes 34 templates for building your own Web site. Its interface allows you to upload songs, photo slide shows, and video streams. The Team Session feature allows users to collaborate on projects, swap files, and chat. In addition, Magix offers an online publishing forum, where users can post their produc-



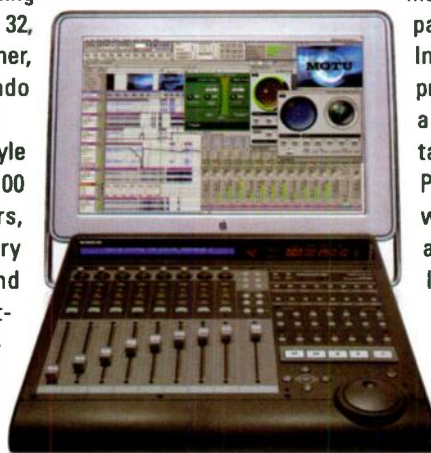
tions and get feedback from other users.

The deluxe version of Music Maker 7 adds CD-burning, real-time FFT filters, higher-quality video-capturing capabilities, automatic remixing functions, additional virtual instruments and effects, and a DirectX-to-VST plug-in converter. Minimum system requirements are Windows 95/98/ME/NT/2000/XP, a 300 MHz processor, and 64 MB of RAM. Magix Entertainment Corp. U.S.A.; tel. (888) 866-2449 or (310) 656-0644; e-mail info@magix.net; Web www.magix.net.

► MACKIE CONTROL

Mackie Designs offers Mackie Control (\$1,299), an automated, touch-sensitive control surface for a variety of DAW software including Mackie Soundscape 32, MOTU Digital Performer, and Steinberg Nuendo and Cubase SX.

The unit's mixer-style interface has nine 100 mm motorized faders, programmable rotary V-pots, channel- and bank-switching buttons, transport controls, a jog wheel, and dedicated Solo, Mute, Scrub, Zoom, Select, and Shuttle buttons. Mackie Control's large backlit displays indicate, among other things, channel settings, plug-in parameters, and song po-



sition in bars:beats, SMPTE, or by sample.

Mackie Control completely supports automation assignments; editing shortcuts, undo, redo, and save commands; and modifier keystrokes. Rear-panel jacks include MIDI In and Out, a ¼-inch expression pedal input, and a pair of ¼-inch momentary footswitch inputs. Power is supplied by a wall wart. Mackie offers an optional Lexan overlay that covers the unit's generic button labels and shows the software-specific functions for each supported manufacturer. Mackie Designs; tel. (800) 898-3211 or (425) 487-4333; e-mail sales@mackie.com; Web www.mackie.com.

► SUPERIORBOOKS

Joseph Befumo's *Exotic Scales: New Horizons for Jazz Improvisation* (\$19.95) begins with "Basic Harmonic Theory, Diatonic Scales, and Modes," and then jumps into scales ranging from the somewhat traditional Melodic Minor and Neapolitan Major to more uncommon ones like the Aeolian ♭7, the Dhenuka, and the Enigmatic Minor. Scales are cataloged and presented according to the number of augmented intervals they contain. Befumo shows you the intervals that build each scale, where the notes lie on a regular six-string guitar using tablature, and the makeup and function of the chords built from the scale tones.

Supporting material, available as a free download or on a CD-ROM (\$5.95), features audio examples (a melody track and background track for each scale), Standard MIDI Files, transcriptions in Adobe Acrobat PDF format, and source files that can be used with Cakewalk products, Coda Finale, SoundTrek Jammer, and Noteworthy Artware Composer. SuperiorBooks.com; tel. (518) 648-5648; e-mail info@superiorbooks.com; Web www.exotic-scales.com.

► BERKLEE PRESS

Keith Hatschek's *How to Get a Job in the Music and Recording Industry* (\$24.95) is a no-nonsense look at the kinds of jobs available in the music biz and how to snag one. The book focuses on career-building methods and finding employment in the industry rather than on how to build musical or

technical skills. Chapters such as "Analyzing Job Descriptions," "Schmooze or Lose (Secrets of a Networking Guru)," "Goal Setting Skills," and "Preparing for Your Job Search" offer tips to help you develop a marketable skill set, create a winning resume, and survive interviews.

Hatschek covers the job potential for many aspects of the audio field. Besides how to conduct a job search, topics the book covers range from internships and trade associations to writing cover letters for cold calls and resumes. The final chapter,

"Views from the Top," offers a question-and-answer session with four industry professionals: Murray Allen of Electronic Arts, Gary Gand of Gand Music and Sound, Gregg Hildebrandt of Tascam, and Leslie Ann Jones of Skywalker Sound. Berklee Press; tel. (617) 747-2146; Web www.berkleepress.com.

WIZOO

Len Sasso's *Native Instruments Reaktor 3* (\$34.95) is a hands-on tutorial covering the various aspects of this deep and powerful program. After quickly introducing the reader to the structure of Reaktor, Sasso describes the factory patches from the four basic Ensemble categories: Synthesis, Sampling, Sequencing, and Effects Processing. From there, individual chapters go into greater depth with each of the categories. "Building a

Sequencer," for example, covers pulse clocks, a basic step sequencer, MIDI sync, and an event-table sequencer.

Native Instruments Reaktor 3 finishes up with "Handy Gadgets and Tricks," a collection of useful items—radio buttons, knobs, math gadgets—that will enhance your Reaktor experience. The book includes a CD-ROM (Mac/Win) featuring numerous examples of ensembles, instruments, and macros. Wizoo GmbH; tel. 49-421-701-870; e-mail info@wizoo.com; Web www.wizoo.com.

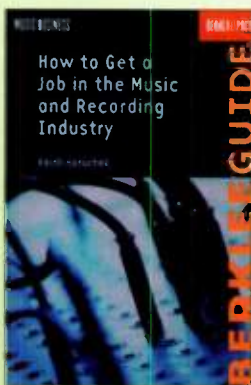
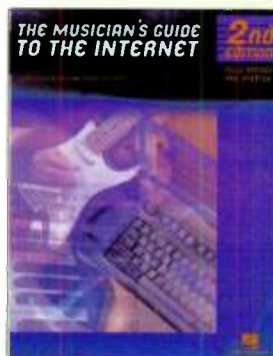
▼ HAL LEONARD

The second edition of *The Musician's Guide to the Internet* (\$12.95) was authored by Todd Souvignier

and Gary Hustwit, two writers who have extensive knowledge of music on the Web. Their book offers a wealth of information for musicians interested in using the Internet to promote their careers. Souvignier and Hustwit cover the basics, including equipment requirements, how to build a Web site, and how to go about prepar-

ing your music for the Web. The book also focuses on more conventional Internet topics such as e-mail, newsgroups, instant messaging, mailing lists, and chat rooms.

Intermediate Netizens will want to check out the chapters "Internet Radio and Streaming Audio," "Building Web Traffic," "File Sharing," and "Selling Music Online." If you've ever wondered about listing your music with IUMA or MP3.com or about selling your CD releases through Amazon.com or CDNow, *The Musician's Guide to the Internet* is a good place to begin your research. Hal Leonard Corp.; tel. (800) 637-2852; www.musicdispatch.com.





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- >> Xtreme Analog Sample CD

Price: too low to be printed

Technology with soul.

▼ METASONIX TM-2 TUBE BANDPASS FILTER/VCA

The latest addition to the Metasonix line of small tube-based effects is the TM-2 Bandpass Filter and VCA (\$399). The unit runs a pair of pentode-tube bandpass filters



in parallel, but two octaves apart: the upper filter has a frequency range of 300 Hz to 1 kHz, and the lower filter has a frequency range of 80 to 200 Hz. The output signal of the filters is sent through a third pentode tube, which is used as a VCA. The TM-2 has a frequency response of <10 Hz to 40 kHz. According to Metasonix, the filters are designed for processing drum machines and guitars.

The TM-2 offers a bypass switch and four controls (Input Level, Filter Resonance, Filter Manual Tune, and

Filter Modulation), and it uses ¼-inch jacks throughout. It has an audio input and output as well as individual Control Voltage (CV) inputs for the filter frequency and the VCA. The Filter CV input also accepts an expression pedal with a TRS plug. Metasonix also sells the TM-M (\$40), a kit for mounting TM modules into analog-synth setups by Synthesis Technologies/MOTM, Synthesizers.com, or other companies that have 5U-size modules. Metasonix; tel. (707) 263-5343; e-mail synth@metasonix.com; Web www.metasonix.com.

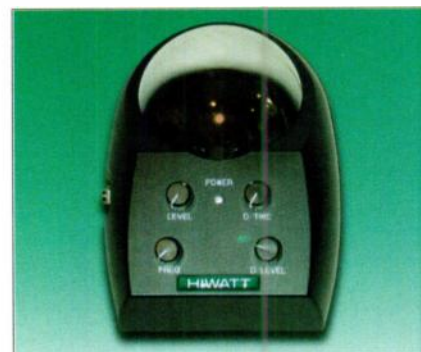
▶ HIWATT ECHO THEREMIN AND CUSTOM TAPE ECHO

Best known for its stable of respected amplifiers, Hiwatt Amplification has introduced the Echo Theremin (\$149). For pitch, the instrument has a single antenna covered with a distinctive mirror-like dome. What makes this theremin stand out from the pack is its built-in delay, which offers 300 ms of delay time. The instrument includes controls for volume level, frequency, delay time, and delay level. The unit has a single unbalanced ¼-inch output and operates on a 9V battery. An LED indicates battery strength.

Hiwatt Amplification has also released

the Custom Tape Echo (\$869). The unit has four heads—erase, record, short-echo playback, and long-echo playback—and offers a maximum delay time of 1.5 seconds. The Custom Tape Echo has one ¼-inch input on the front and one on the rear; the tape runs only when there is signal at one of the inputs. The unit offers true bypass and has controls for input volume, echo volume, number of repeats, and delay time. Pitch and speed changes can be controlled with an optional expression pedal. The lightweight unit has a low profile and is rackmountable and AC-powered. Hiwatt Amplifiers;

tel. (818) 252-6799; e-mail info@hiwatt.com; Web www.hiwatt.com.



Echo Theremin

▼ SUMMIT AUDIO 2BA-221

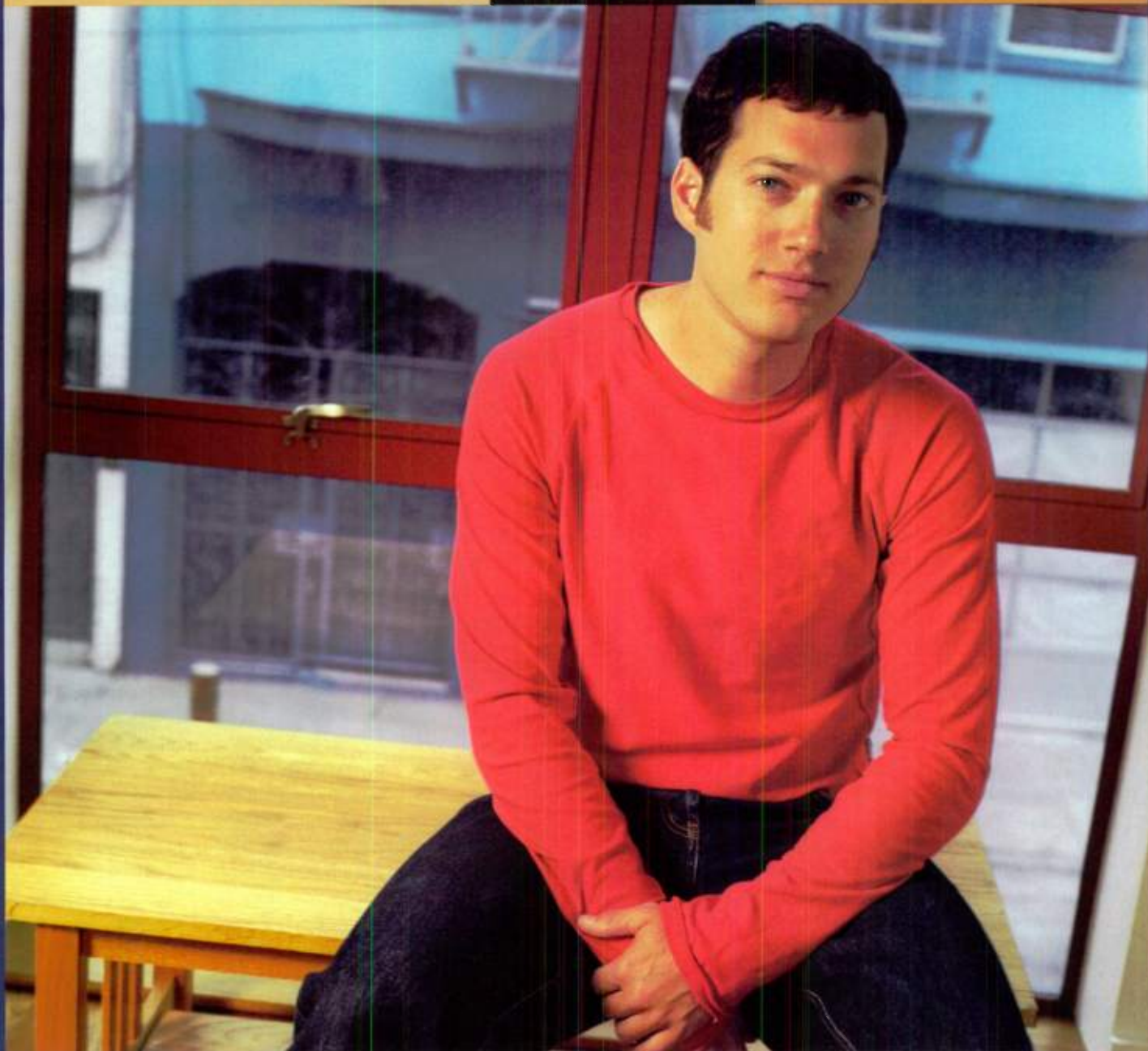
The 2BA-221 Mic and Line Module (\$695) by Summit Audio begins with a hybrid solid-state/tube-mic preamplifier and adds inputs that allow you to sum external signals with the microphone input. In addition to an XLR mic input, the rear panel includes a ¼-inch line-level input and a ¼-inch TRS insert jack. A +4 dBu XLR jack and a -10 dBV

¼-inch TRS jack give you the combined output of signals going through the solid-state and tube stages of the preamp. The 2BA-221 also has Stacked Input and Output jacks for connecting a pair of 2BA-221s: the Stacked Output jack taps the signal after the solid-state stage, before it hits the tube; the Stacked Input jack sends the signal to the tube stage, skipping the solid-state stage. That design

gives you solid-state and tube outputs simultaneously.

The 2BA-221 includes a front-panel, high-impedance ¼-inch input and three independent gain controls: a high-impedance/line-level input control, a mic-input-level control, and the Tube Output, which adds more of the tube into the circuit. The 2BA-221 offers variable microphone impedance, with a range of 100Ω to 100 kΩ. The switchable high-pass filter has a range of 20 to 200 Hz. Other features included in this ½U device are 48V phantom power, a 20 dB pad, and a polarity switch. Summit Audio Inc.; tel. (831) 728-1302; e-mail sound@summitaudio.com; Web www.summitaudio.com.





Alex speaks Analog....

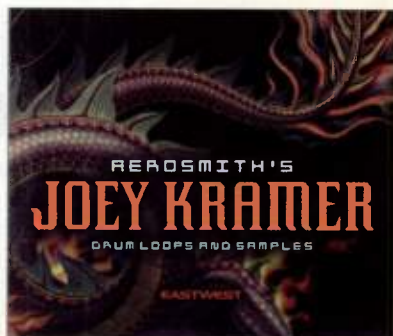
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For complete specs and a manual visit www.alesis.com/andromeda, or call 310-821-5000 for a product line brochure.

SOUND ADVICE ▲▲▲▲



▲ EASTWEST

Part of the Audio Icons series, *Drum Loops and Samples by Aerosmith's Joey Kramer* (\$129.95) is described as a "pump and thump" collection of samples and loops. The set includes two audio-format CDs that have identical material on them with one exception; the performances on disk A are recorded dry, and ambience from the room mics is added to the tracks on Disk B.

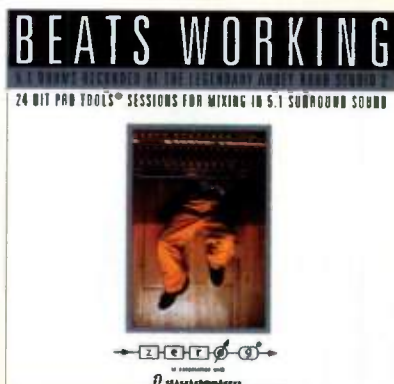
The 33 grooves are organized by tempo, moving from "Front Room" at 71 bpm to "The Bean" at 148 bpm. Each groove offers a number of variations, including versions with the ride cymbal as well as open and closed hi-hats. Occasional fills round out each pattern. Single hits on a variety of drums and cymbals complete each CD. A ten-CD set (\$495) adds eight discs with multitrack versions of the grooves, either as Digidesign Pro Tools-compatible files or WAV files.

Zero-G, in association with Digidesign, has released *Beats Working: 5.1 Drums Recorded at the Legendary Abbey Road Studio 2* (\$695), an impressive 11-CD set of drum samples recorded in 24-bit, 5.1 surround at 44.1 kHz. Nine of the CDs offer 5.7 GB of tracks as 24-bit SDII/Pro Tools Session files. Each hit and loop is simultaneously recorded without effects at different velocities using a combination of close mics, overheads, and room mics at various distances. The remaining discs offer 16-bit stereo audio tracks and Acidized WAV files of the session. Haydn

Bendall engineered session drummer Ralph Salmins's performances.

The booklet goes into great detail about the session, from the mics and recording console used to the types of instruments played. The groove styles are divided into several groups: Classic Modern, Filmic-type, Odd-time, Big Band, and Modern Pop. Tempos range from 84 to 204 bpm (the pattern at 204 bpm is described as a "Quick Funky 7/8 Groove").

Each performance is broken down into verse, chorus, breaks, fills, breakdowns, and an occasional end fill. Ride patterns are played on cymbals, hi-hats, and toms. As if all that weren't enough,



the final two discs include single hits on specific instruments. EastWest; tel. (800) 969-9449 or (310) 271-6969; e-mail sales@eastwestsounds.com; Web www.soundsonline.com.

IK MULTIMEDIA

In collaboration with Sonic Reality, IK Multimedia offers *Symphony Strings* (\$79) a plug-in for the SampleTank software synth. The CD-ROM holds 38 string ensembles, including violins, violas, cellos, basses, and full ensembles. Among the articulations offered are legato, marcato, tremolo, and pizzicato ensembles. The library has no loops or phrases; it focuses instead on playable instruments.

The producers recorded top session

players through a Euphonix mixing board and a variety of Neumann microphones. According to IK Multimedia, special mic techniques were used in recording to accurately capture the instruments' bowing details and a full, rich body. *Symphony Strings* ships with a copy of SampleTank 1.1 LE (Mac/Win) for VST or MAS. IK Multimedia; tel. (866) 243-1718 or (561) 466-9763; e-mail info@sampletank.com; Web www.sampletank.com.

▼ OMNIMAN SOUNDLABS

The two-CD *Cornerstones* (\$39.99) is a collection of percussion loops in audio and Acidized WAV formats. Loops include Latin and World-music patterns, funk, and breakbeats; some are arranged in construction-kit style so you can add or subtract elements as needed. Individual instrument loops feature pandeiro, dumbek, udu, and darbuka, as well as effects (bird calls, wind chimes). Tempos range from 82 to 171 bpm.

Loops with full drum kits and a smattering of drum-machine grooves are also included. The collection offers assorted dry mixes and mixes with room ambience, variations with ride cymbals, and solo ride cymbals and hi-hats. Most patterns provide beat variations, extended drum fills, and short pick-ups of intros. A variety of individual instrument hits round out the set. Omniman Sound Labs; tel. (415) 922-1112; e-mail info@omniman.com; Web www.omniman.com. ☺



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WEB

The Missing Link

Now that affordable computers are powerful enough to record multiple tracks of digital audio and simultaneously run software synthesizers that can play multiple MIDI parts, you might think that electronic musicians finally have everything they need to realize their creative vision. However, a corollary to Murphy's Law states that a system's capabilities will always fall just short of what's required to finish a project, giving rise to the familiar refrain, "If only the computer could handle a few more audio channels (or plug-in slots or MIDI tracks)."

Steinberg (www.us.steinberg.net) has addressed the problem with a new addition to its suite of technologies: VST System Link. This ingenious scheme lets you connect any number of computers and share their resources via one digital audio cable to and from each machine in a peer-to-peer network with a daisy-chain or closed-ring topology.

VST System Link is platform independent, allowing Mac and Windows machines to work together on the same network. Each computer must have some sort of ASIO hardware with the appropriate drivers and one or more System Link-enabled applications (which currently includes the latest version of Cubase and Nuendo). You simply connect the digital-audio output from one computer's ASIO interface to the digital-audio input of another computer, using any type of digital-audio connection, such as ADAT, TDIF, AES/EBU, or S/PDIF.

The network messages, which include synchronization, signal routing, transport control, and MIDI, are transmitted using a single bit of one digital-audio channel, providing a total network bandwidth of 96 kbps and leaving 23 bits available for digital audio. (To accomplish this, the audio's 24th bit is truncated, then added back in with a value of zero at the end of the process.) That band-

Build your own

parallel-processing

supercomputer

music system.

width can accommodate up to three MIDI ports' worth of data (each port has a bandwidth of 31.25 kbps), but a given port rarely if ever actually carries that much data. So VST System Link is designed to address 16 ports with 16 channels each for a total of 256 channels. If necessary, the System Link audio channel can be completely dedicated to data, relieving any bottleneck.

Once everything is connected, you can run any compatible application on each computer and allocate processing tasks according to each

- machine's capabilities, which lets you make use of older computers. For example, you can use one computer for digital audio tracks, another for virtual synths, a third for effects, and a fourth for mixdown. Alternatively, you could run the same program on several computers to extend its capabilities severalfold (see Fig. 1).

- The first computer in the chain is designated as the "master," which normally sends sync signals to the others, but the entire system can be controlled from any computer on the

network. Speaking of sync, Steinberg claims that VST System Link is sample-accurate, thanks to the Positioning Protocol already built into ASIO. In addition, the system can sync to an external clock source or the embedded clock.

For now, Steinberg will concentrate on incorporating VST System Link into its own products, including a video-player application that was shown running full-screen video in sync with Nuendo and Cubase on separate computers at the recent European AES convention in Munich. In addition, the next version is intended to have Save and Load commands, as well as the ability to bundle each computer's data into a "meta-project" file. Music computing will never be the same. ☹

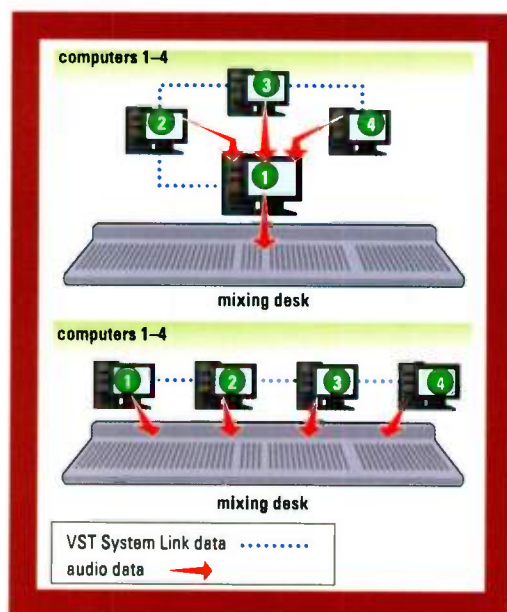


FIG. 1: Steinberg's VST System Link lets you network several computers and combine their resources. Each computer can either send its audio to a mixer separately or can route all audio to one computer for mixdown.

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Begin Transmission

Southern California band Anything Box takes its cues primarily from British influences. Since 1986, the group has investigated alternative pop, new wave, and electronic music—deftly blending the aesthetics of the Kinks, Pink Floyd, New Order, and Kraftwerk. They also revere the recording techniques of George Martin and the Beatles circa 1965 through '67. The resulting sound, the band says, is *elektrodelic*.

Each member of the quartet—Claude S, Gary S, Paul Rijnders, and Dave South—contributes guitar, bass, and synth parts that they later sample, loop, and mangle beyond recognition. Anything Box's densely layered tracks feature clean sounds wedded to raw, distorted textures and sampled beats. "We're heavily into the electronic thing," declares Claude S, who is also the band's lead vocalist.

The Universe Is Expanding is Anything Box's ninth album. "After making nine records, you get the idea of how to do them," Claude S says. "The first three albums were recorded in major studios. When I got some publishing money, we decided to build a studio" in his garage in Fullerton, California. "We built a vocal booth and treated the walls." Rijnders often works in his own studio, laying down guitar parts and remixing tracks in his apartment.

The album was tracked on a Pentium III/600 MHz PC running Cakewalk Pro Audio 9, Propellerhead ReCycle, and Native Instruments Reaktor. The computer handled vocal tracks, while other audio tracks went through a Tascam M3500 24x8 analog console onto an ADAT. The band sequenced audio tracks on an Akai MPC3000 synced to the computer through MIDI Time Clock. Eventually, they recorded all audio tracks into Pro Audio 9. Drum parts were constructed on the MPC3000 from vinyl samples. "I've collected more than

Futuristic band

Anything Box

imagines radio shows

in outer space.



6,000 kits," says Claude S. "We'll say, 'Let's mix a bit of Ringo with Keith Moon and Nirvana.'" Many drum-machine sounds originate with Gary S, who has a talent for vocal beat boxing. "We just flange him out or put him through some weird effects stuff."

Anything Box's collection of instruments includes "hundred-dollar guitars that you can get anywhere," Claude S says, as well as an Ensoniq ESQ-1 and a Roland JV-1080. A Korg T3 synth provides guitar and fuzz bass parts. "We completely distort its output," he says. Conversely, they will process guitar sounds until they resemble synths. "Raw samples are the most fun. We've used a lot of synths, but you get bored with that. We're into buying real instruments now."

"We've worked with producers and learned a lot from them," says Claude S. "We did our second album with Gareth Jones, who produced Depeche Mode." For example, Jones encouraged them to record complete performances. "Either we do it right or we screw up, erase it, and do it again." The band is averse to punching in vocals. "[Jones] said, 'Just sing the song and don't worry about mistakes. Then listen to the track, take the best of the best, and assemble it.' Sometimes we'll [accumulate] up to 15 or 16 tracks."

Claude S believes in singing to finished mixes for maximum performance. "We're all about manipulating samples, but

we like to get songs mixed as quickly as possible; if you spend too much time on it, the original rawness will be gone. The English school of thought is when you're done tracking, the mix is sitting where you want it." ☺

For more more information, contact *Presswerk.13*; e-mail presswerk@aol.com; Web www.anythingbox.com.



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d digidesign

SURFIN'

USB

Grab your board and go!

EM tests five USB MIDI keyboard controllers.

By David Battino



When software synthesizers first appeared, they were like the octopus that had learned how to open jars: an interesting novelty, but ultimately not very useful. Many of the earliest programs sounded weak, reacted slowly, coughed up only a handful of simultaneous notes, and integrated poorly with other programs and audio hardware. Those days are gone. Thanks to fast computers and extensive work by legions of programmers, today's software synths deliver outstanding sound and flexibility. The virtual instrument has finally arrived.

However, computer keyboards are built for typing, not playing. Fortunately, help has arrived. At this year's Winter NAMM convention (America's largest musical-instrument trade show), manufacturers showed a tidal wave of compact, inexpensive music keyboards designed for use with audio software. Connecting to Macs or PCs with a single Universal Serial Bus (USB) cable, the clever controllers make old-fashioned external MIDI interfaces unnecessary. By omitting audio circuitry, they also keep costs low. For maximum convenience, they even draw their power from the computer.

USB MIDI-controller keyboards aren't just a gimmick. This year, many NAMM exhibitors left their racks of synthesizers at home and demonstrated their wares using only software synths and USB keyboards. To get to the bottom of this new music-production movement, I tested the latest crop of keyboards and gathered detailed information about some that had not yet been released. Where models in a manufacturer's lineup differed only slightly, I reviewed a representative model and noted the differences in the table "USB MIDI Controllers."



I was surprised and a bit disconcerted to discover how small and light these instruments are. However, the first magical evening with my laptop, a USB keyboard, and Cakewalk Plasma put it all into perspective. According to Thinkware's Jim Larrison, "The day is here when all you need to make a hit CD is a laptop and a MIDI controller—no additional power supply, no outlet, and no wall wart. You can walk out to the top of a mountain and make a CD. Personally, I don't do it on a mountaintop; I do it on my sailboat." Although that's a tantalizing image, you don't need to wait for your ship to come in to reap the benefits of USB MIDI. It's actually quite easy.

USB TODAY

The designers of the USB format set out to build a peripheral-connection system that was inexpensive, reasonably fast, and simple to use. With more than a billion USB devices out there, they've succeeded wildly. Nearly every personal computer built in the last couple of years has at least one USB port, a half-inch-wide, rectangular socket with four internal contacts. (Two of the contacts carry data—one for each direction; the other two supply 5 VDC and a ground. Standard MIDI cables carry information in only one direction on a single data wire.)

It's also possible to add USB to an older computer. PCI upgrade cards with USB ports cost as little as \$10. However, it's worth checking the Web sites for



FIG. 2: With an onboard Sound Canvas synthesizer, two headphone jacks, and serial and USB connectors, the Edirol SK-500 would be ideal in a teaching lab.

your favorite software to see if there are any potential problems. "Our testing department is adamant that Sonnet cards are the only thing that works [for Macs]," says Timothy Chen of M-Audio. "And USB on Pentium-based motherboards has been known to drop out periodically if any PCI cards [not necessarily USB ones] are in slot No. 3."

Your computer's operating system must also support USB. Except for NT 4, Windows 98 and all later versions of Windows do. For Macs, you need at least OS 8.6; OS 9 or higher is recommended. Some Macs require the USB Floppy Enabler extension for optimum USB performance (you can get it from www.opcode.com/download). All five keyboards I tested for this article worked with Mac OS X. Because commercial music software was not yet available, I verified their output with MIDI Monitor, a free OS X utility from www.snoize.com. For Windows, I found the donationware MIDI-OX data monitor (www.midiox.com) invaluable.

DIRTY QUIRK

Although USB is supposed to be a plug-and-play protocol, it has a few quirks. The first is that it's a *host-centric* system, not *peer-to-peer* like MIDI or FireWire. That means you can connect a USB MIDI keyboard to a computer, but you

can't connect the keyboard directly to a USB sound module. The computer, or host, must play traffic cop. In fact, it isn't physically possible to connect two USB peripherals, because USB cables have a different connector on each end to ensure that you can't make such circular hookups.

To connect current USB devices when you've run out of ports on your computer, you need to use a hub, which is like an active Y-cable. Theoretically, you can continue adding peripherals and hubs until you reach USB's limit of 127 devices. Because each device draws power from the USB bus, though, things will soon grind to a halt unless you use a powered hub—one that gets its juice from a wall socket. That could be a problem if you're composing on a mountaintop with a notebook computer, especially because notebooks often supply only one USB port. Some of the keyboards in this roundup can be powered from an AC adapter or batteries for times when the host can't supply enough power.

You might also have problems getting the computer to recognize the USB device. I found that the order in which I launched the music software and connected the keyboard could make all the difference. In some cases the USB driver software supplied with the keyboards was obsolete; it pays to check the manufacturer's site for updates. Although USB is supposed to support hot plugging (swapping devices without first shutting down the computer), more than a couple of swaps often crashed my computer. That said, most musicians wouldn't be juggling five keyboards and three computers as I did. Once you get things working, though, it's plug-and-play from there, with all the benefits of



FIG. 1: The Edirol PC-300, built by Roland, is still the most compact and lightweight 49-key USB keyboard controller.



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SURFIN' USB

a compact, single-cable music system. Here are the results of my hands-on tests of five leading USB MIDI controller keyboards.

EDIROL PC-300

In the mid-1990s, music monolith Roland launched the Edirol company

to specialize in desktop music products. (The name is derived from "Editions Roland.") Among its innovations is the PC-300, the world's first USB MIDI keyboard controller (see Fig. 1). Although newer models from other manufacturers offer more features, the PC-300 has an elegant simplicity. It's also currently the lightest and most compact 49-note USB controller available. Along with its sibling, the Edirol SK-500 (reviewed next), the PC-300 had the best-feeling keys in this roundup.

The PC-300's plastic case sports a metallic gold finish and just three but-

tons: Octave Up, Octave Down, and MIDI/Select. Pressing MIDI/Select transforms the keyboard itself to a data-entry device. Labels above the keys clearly identify each one's function. To set the MIDI transmission channel, for example, you hit the MIDI/Select button, then one of the first 16 keys (labeled 1 through 16), then the topmost C key (Enter), and then MIDI/Select again. When the PC-300 is in Data mode, a tiny LED near the MIDI/Select button lights up and the keys stop transmitting notes.

To send a Program Change, you enter

DIFFERENT DRUMMERS

You don't have to be a keyboardist to take advantage of software synthesizers and USB control. The new Akai MPD16 (\$349), which was initially called the PD16, puts the revered pads from the MPC series of drum machines into a compact, USB-powered package (see Fig. A). (For use without a computer, an AC adapter provides an alternate power source.) Each pad is Velocity- and Pressure-sensitive and can transmit Polyphonic Aftertouch. The MPD16 also includes a standard MIDI Out jack for controlling samplers and other MIDI hardware.

You can access a second bank of 16 pad assignments by pressing the Bank button. Holding the button for two seconds lets you assign any



FIG. A: Because keyboards are less than ideal for playing drum sounds, Akai extracted the tactile pads from its MPC-series drum machines and added a USB interface and MIDI Out jack to create the MPD-16.

one of the 127 MIDI Control Change (CC) types to the MPD16's slider. The first ten pads enter the numbers 0 through 9; pads 12 through 16 provide one-touch access to common CCs such as Modulation, Volume, and Pan. Pad 11 maps the slider to Pitch Bend. A Mac and Windows software utility is included to simplify programming the MPD16.

Mixman, the company that transformed QWERTY keyboards into groove-performance instruments, recently pumped up its software's expressive potential by releasing the innovative DM2 controller (\$119.95). Sold in department stores for less than \$100, the 3-pound, 17.0-by-9.5-inch DM2 has become a secret weapon for underground producers and sound designers. (See Erik Hawkins's insider tips in the January 2002 issue of *Remix*, reprinted at www.remixmag.com.)

The DM2 connects to a Windows PC with USB and draws its power from the computer. Its dual turntable controllers, about the size of "personal" pizzas, feature eight buttons each for triggering samples, as well as rotating flanges that let you



FIG. B: Mixman's innovative DM2 controller transforms a USB-equipped PC into a hands-on sampler and sound warper.

"scratch" the sound (see Fig. B). A stubby joystick manipulates the software's cool-sounding effects processor for real-time sonic sculpting. You also get macro buttons, a crossfader, and two transformer switches.

Although the DM2 currently works only with Mixman software, the software imports and exports WAV files, making it easy to integrate into a production flow. The upcoming Mixman StudioPro 5 (\$109.95), an enhanced version of the program supplied with the DM2, will offer a pad-bank feature similar to the Akai MPD16's, providing fast access to 16 additional samples. The DM2 is so fast and flexible, though, I wouldn't be surprised if Mixman were cooking up new ways to use it. Check out www.mixman.com to find out.

From mic-pre to CD...



DPS24 DIGITAL PERSONAL STUDIO

The DPS24 is the only affordable integrated hardware digital workstation that offers 24 tracks of recording without data compression. Most types of data compression throw out portions of your audio during recording, and use a mathematical algorithm to approximate the original audio upon playback.

Data compression can adversely affect your audio quality and stereo imaging, especially with multiple generations of track bouncing.

Kind of sounds like your old cassette multi-track, doesn't it?

It's important to know what you're getting when you invest in any recording solution. The DPS24 was designed from its inception as a professional production tool and not simply a scaled-up portable studio.

We combined a 24bit/96kHz linear 24-track hard-disk recorder, a 48-input moving-fader automated digital mixer, a sample-accurate multi-track graphic waveform editor, 4 stereo multi-effects processors, akSys TrackView and VST plug-in platform software, and a CD mastering and archiving suite, without creating the performance or user interface compromises found in many integrated workstations.

Utilizing our Q-Link navigation design, the DPS24 offers access to any major function with one button press. The Q-Channel strip of automated LED rotary controls enables instant access to any channel strip on the mixer.

Features like two banks of inputs to eliminate re-patching, balanced channel inserts which enable external mic preamps to bypass the on-board preamps, multi-function Q-Knobs for realtime effects control, and up to 24 channels of ADAT I/O offer professional production capabilities that give you the real-world advantages you need to bring your artistic vision to its full potential.

USB MIDI Controllers

All of these controllers are Velocity-sensitive, come with a USB cable, and have a single USB port. All should be shipping by the time you read this. The names of products reviewed for this article appear here in boldface type. "MIDIThru from Computer" means the controller can route MIDI data from a computer out through its MIDI Out jack, thus functioning as a full MIDI interface.

	Edirol		Evolution		
Model	PC-300	SK-500	MK-225C USB	MK-249 USB	MK-249C USB
Price	\$229	\$649	\$159	\$189	\$210
Keys/Pads	(49) keys	(49) keys	(25) keys	(49) keys	(49) keys
Controllers	pitch-bend/ mod lever, assignable slider	pitch-bend wheel, assignable wheel	pitch-bend wheel, assignable wheel, (8) assignable knobs	pitch-bend wheel, assignable wheel, assignable slider	pitch-bend wheel, assignable wheel, assignable slider, (12) assignable knobs
Octave-Shift Buttons	yes	no	yes	yes	yes
Display	(1) LED	3-digit LED	3-digit LED	3-digit LED	3-digit LED
Connectors	USB; MIDI Out; sustain pedal	USB; MIDI Out; sustain/expression pedal; PC/Mac serial; (2) 1/4" headphone; 1/4" stereo mix in; 1/4" stereo line out	USB; MIDI Out; sustain pedal	USB; MIDI Out; sustain pedal	USB; MIDI Out; sustain pedal
MIDI Thru from Computer	yes	yes	yes, except when used with Game Port adapter	yes, except when used with Game Port adapter	yes, except when used with Game Port adapter
Power	USB or adapter	adapter	USB, joystick, or adapter (not included)	USB, joystick, or adapter (not included)	USB, joystick, or adapter (not included)
Memory	none	none	(10) MIDI Program Changes, including Bank Select; all con- troller assignments.	(10) MIDI Program Changes, including Bank Select; all con- troller assignments.	(10) MIDI Program Changes, including Bank Select; all con- troller assignments.
Special Features	Velocity scaling	64-note polyphonic, 32-part multitimbral GS/GM2 synthesizer	controller snapshot; (13) Velocity curves; controllers can transmit Pitch Bend sensitivity, Fine Tune, Coarse Tune, Aftertouch, and Velocity messages	controller snapshot; (13) Velocity curves; controllers can transmit Pitch Bend sensitivity, Fine Tune, Coarse Tune, Aftertouch, and Velocity messages	controller snapshot; (13) Velocity curves; controllers can transmit Pitch Bend sensitivity, Fine Tune, Coarse Tune, Aftertouch, and Velocity messages
Bundled Software	Steinberg Cubasis AV (Win/Mac)	YO-1 GS Advanced Editor (Win/Mac)	Sound Studio (Win), Music Teacher (Win), MusicPlanet (Win), MusicMatch Jukebox (Win/Mac), demos	Sound Studio (Win), Music Teacher (Win), MusicPlanet (Win), MusicMatch Jukebox (Win/Mac), demos	Sound Studio (Win), Music Teacher (Win), MusicPlanet (Win), MusicMatch Jukebox (Win/Mac), demos
OS Support	Windows 98, 2000, ME, XP; Mac OS 9 (OMS/FreeMIDI), OS X	Windows 95 (serial), 98, 2000, ME, XP; Mac OS 9 (OMS/FreeMIDI), OS X	Win 95 (serial), Win 98, ME, 2000, XP; Mac OS 9 (OMS), OS X; Mac drivers must be downloaded from Web	Win 95 (serial), Win 98, ME, 2000, XP; Mac OS 9 (OMS), OS X; Mac drivers must be downloaded from Web	Win 95 (serial), Win 98, ME, 2000, XP; Mac OS 9 (OMS), OS X; Mac drivers must be downloaded from Web
Dimensions (W x H x D)	32.1" x 3.1" x 6.9"	33.3" x 2.9" x 8.3"	19.0" x 4.0" x 8.1"	31.5" x 3.3" x 8.1"	31.5" x 4.0" x 8.1"
Weight	5.6 lb.	6.2 lb.	4.0 lb.	7.0 lb.	7.0 lb.

		Midiman			TerraTec
MK-361 USB	MK-361C USB	Oxygen 8	Keystation 49	Keystation 61	MIDI Master USB
\$239	\$285	\$179	\$229	\$279	\$399
(61) keys	(61) keys	(25) keys	(49) keys	(61) keys	(49) keys
pitch-bend wheel, assignable slider, assignable wheel	pitch-bend wheel, assignable wheel, assignable slider, (16) assignable knobs	pitch-bend wheel, mod wheel, assignable slider, (8) assignable knobs	pitch-bend wheel, mod wheel, assignable slider	pitch-bend wheel, mod wheel, assignable slider	pitch-bend wheel, assignable wheel, assignable slider
yes	yes	yes	no	no	yes
3-digit LED	3-digit LED	3-digit LED	3-digit LED	3-digit LED	3-digit LED
USB; MIDI Out; sustain pedal	USB; MIDI Out; sustain pedal	USB; MIDI Out; sustain pedal; USB MIDI Thru	USB; MIDI Out; sustain pedal; USB MIDI Thru	USB; MIDI Out; sustain pedal; USB MIDI Thru	USB; MIDI Out; sustain pedal
yes, except when used with Game Port adapter	yes (dedicated jack)	yes (dedicated jack)	yes (dedicated jack)	yes (dedicated jack)	yes
USB, joystick, or adapter (not included)	USB, joystick, or adapter (not included)	USB, adapter, or (6) AA batteries	USB, adapter, or (6) C batteries	USB, adapter, or (6) C batteries	USB or adapter (not included)
(10) MIDI Program Changes, including Bank Select; all controller assignments.	(10) MIDI Program Changes, including Bank Select; all controller assignments.	(5) banks of knob assignments	none	none	(10) MIDI Program Changes, including Bank Select
controller snapshot; (13) Velocity curves; controllers can transmit Pitch Bend sensitivity, Fine Tune, Coarse Tune, Aftertouch, and Velocity messages	controller snapshot; (13) Velocity curves; controllers can transmit Pitch Bend sensitivity, Fine Tune, Coarse Tune, Aftertouch, and Velocity messages	Velocity offset; unique MIDI channel per knob	Velocity offset	Velocity offset	controller snapshot; (13) Velocity curves; controllers can transmit Pitch Bend sensitivity, Fine Tune, Coarse Tune, Aftertouch, and Velocity messages
Sound Studio (Win), Music Teacher (Win), MusicPlanet (Win), MusicMatch Jukebox (Win/Mac), demos	Sound Studio (Win), Music Teacher (Win), MusicPlanet (Win), MusicMatch Jukebox (Win/Mac), demos	Cakewalk Metro SE (Mac) and Express (Win), Sonic Foundry Acid Express and Siren XPress (Win), QDesign MVP (Mac/Win), demos	Cakewalk Metro SE (Mac) and Express (Win), Sonic Foundry Acid Express and Siren XPress (Win), QDesign MVP (Mac/Win), demos	Cakewalk Metro SE (Mac) and Express (Win), Sonic Foundry Acid Express and Siren XPress (Win), QDesign MVP (Mac/Win), demos	Emagic MicroLogic Fun (Win), Steinberg WaveLab Lite (Win), MusicMatch Jukebox (Win)
Win 95 (serial), Win 98, ME, 2000, XP; Mac OS 9 (OMS), OS X; Mac drivers must be downloaded from Web	Win 95 (serial), Win 98, ME, 2000, XP; Mac OS 9 (OMS), OS X; Mac drivers must be downloaded from Web	Win 98, ME, 2000; Mac OS 9 (OMS), OS X	Win 98, ME, 2000; Mac OS 9 (OMS), OS X	Win 98, ME, 2000; Mac OS 9 (OMS), OS X	Windows 98, SE, ME, 2000, XP; Mac OS 9 (with OMS) and OS X
38.0" x 3.3" x 8.1"	38.0" x 4.0" x 8.1"	16.5" x 3.0" x 9.4"	29.5" x 2.6" x 9.4"	36.2" x 3.0" x 8.5"	31.5" x 3.3" x 8.1"
7.7 lb.	8.0 lb.	3.1 lb.	6.6 lb.	7.4 lb.	7.0 lb.

SURFIN' USB

Data mode, hit the Program Change key (A#4), type the program number you want (1 through 128) using the ten numbered keys in the top octave, then hit Enter (C7). The PC-300 also supports Bank Select commands, which are sent by transmitting a specific value of Control Change (CC) 0, followed by a value for CC 32, and finally the Program Change number. The G#4 and F#4 keys select CC 0 and 32 respectively, which saves time, but because there's no display, it's easy to get confused. Fortunately, pressing B6 will cancel your previous keystrokes, and simultaneously pressing B5 and C6 acts as a panic button, turning off all notes and resetting all CCs.

The PC-300 also offers a data slider, which you can map to any CC by pressing CC Select (F4) and then typing the CC number and Enter. The keyboard provides one-touch assignment for Reverb Depth (CC 91), Chorus Depth (CC 93), Pan (CC 10), and Volume (CC 7), as well as for Aftertouch. A final key maps the slider to Velocity scaling, which lets you alter the dynamic range of the keyboard. I wish the slider had a bigger knob, but it moves smoothly.



FIG. 3: Packed with knobs and buttons, the Evolution MK-249C USB provides hands-on control for working with music software.

Instead of pitch-bend and mod wheels, the PC-300 provides the unique Roland paddle. Moving it sideways bends the pitch; playing trills by rapidly wiggling the paddle is much easier than on a wheel. Pressing the paddle forward sends out Modulation data (CC 1), but not immediately; the values ramp up to maximum over one second. According to Thinkware's Larison, the intent was to simulate vibrato and Leslie-speaker effects more accurately, but I found it frustrating to have to push the paddle a second before I wanted to hear the result. On sounds with rapid decays, the vibrato came in too late to be heard. Still, it's easy enough to map the data slider to Modulation. The only other drawback I spotted was that the sustain-pedal jack works only with normally closed footswitches. That's also true of the SK-500.

USB driver installation was straightforward; Edirol dedicates 24 well-illustrated pages to it in the manual. The trick was finding the drivers; I initially thought they were missing because the box contained only one CD, labeled Steinberg Cubasis AV. Because I have Cubase, I didn't bother to load the disc, but of course the drivers were tucked away in a folder on it.

Surf report. The PC-300 is a good choice if you want the best keyboard feel in the smallest package and don't need knobs and wheels. I've lavished the most words on it because the other keyboards in this roundup borrow heavily from its design.

EDIROL SK-500

Barely larger than its predecessor, the curvy white SK-500 is unique among USB controllers because it features an onboard synthesizer (see Fig. 2). The

KEYS TO THE MIDI

If you're searching for the ultimate USB keyboard controller (and if price and weight aren't an issue), take a close look at the Yamaha Motif series. The 61-key Motif 6 (\$2,250), 76-key Motif 7 (\$2,750), and 88-key Motif 8 (\$3,250; reviewed in March 2002) are feature-packed workstations with onboard USB interfaces that support eight virtual MIDI cables. Unlike the lightweight keyboards profiled in this article, the Motifs all have Aftertouch and weighted keys (hammer-action keys in the case of the Motif 8).

The Yamaha Motifs also sport four sliders, four knobs, 16 mute buttons, and sequencer transport buttons. The units each contain built-in templates that map those controls to the virtual mixers in popular sequencers. By pressing a dedicated button, you can switch the sliders and

knobs among four sets of Control Change numbers, gaining quick access to 16 tracks. For high-end MIDI (and audio) connectivity, there's an optional mLAN interface, which uses FireWire connectors. The new Korg Triton Studio offers an mLAN option as well.

Expect to see more manufacturers introducing synthesizers with USB interfaces, whether for facilitating MIDI connectivity, updating the operating system, or downloading new samples and patches. Four new USB controller keyboards were announced while I was working on this article, and I learned of several others under development. Thanks to the consumer-friendly nature of USB, it's even likely that USB MIDI keyboards will hit your local consumer electronics store before long.

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audio engine is a 64-voice, 32-part multitimbral Roland Sound Canvas with 1,608 preset sounds, 64 drum kits, and GS and GM2 compatibility. Because it's designed for multitimbral playback, the individual sounds are on the thin side, but they blend very well. Weighing slightly more than a six-pack of beer, the SK-500 probably has the best overall sound per pound of any portable keyboard.

Like the PC-300, it has just three buttons, but they're configured differently. To enter Data mode, you hold the button marked Shift and press the decrement (–) button (subtitled Function) below it. To return to Play mode, you hold Shift and press the increment (+) button (subtitled Play). Two decimal points in the three-digit LED display light alternately to identify the current mode. Holding Shift and then pressing certain keys lets you change performance parameters such as Octave Transpose or Local Off without leaving Play mode.

In addition to the USB connector, the SK-500 has an old-style serial port and comes with drivers for nearly every flavor of Mac OS and Windows. Dual headphone outputs and a stereo line input (mixed with the SK's own sound) help it fit into a variety of setups. Unfortunately, all that extra circuitry de-

mands more current than USB can supply, so the SK-500 must be powered from an adapter.

As a MIDI controller, it's more limited than the other keyboards here. There's no data slider, but you can map the mod wheel to various CCs. If you have an expression pedal, you can map that to CCs as well. The main shortcoming is that Program Changes can't be entered directly on the SK-500. To get from Program 1 to Program 128 and back, you have to step through every sound in between by pressing the increment and decrement buttons. Holding one button and then pressing the other changes the values more quickly, but I would have appreciated faster access on a \$650 instrument.

Calling up the remaining 1,480 sounds is also button-intensive. Following the GM2 and GS layouts, the Variation sounds are stored in subdirectories of the 128 familiar GM presets. To select the Mild Piano variation of Piano 1, for example, you hold the Shift button and press the low F key (marked Variation +) twice. Of course, in a computer setup, you could punch up presets directly from a sequencer with Bank Select commands. Another reason to use a sequencer is that the package includes a program called GS Advanced Editor for altering patches, but the SK-500 has no memory to store them, so you'll have to save them with your songs on the computer.

Surf report. The SK-500 could be ideal in a classroom setup, thanks to its connectivity and wealth of onboard sounds.

(It also has the most helpful manual in this group by far.) In schools with computers that are too old to support USB or software synths, the SK-500 could handle all the audio, interfacing to simple sequencers or ear-training software through its serial port. In schools with no computers, it could serve as a compact yet good-sounding instrument. During this review, I used it as my only keyboard at a jam session, and I really appreciated its portability and clean sounds—when I could find them.

EVOLUTION MK-249C USB

British manufacturer Evolution is probably best known for its Dance Station (\$99), a two-octave MIDI controller keyboard that ships with a fun WAV-triggering program and 1,000 samples. This year, the company made a splash by announcing five USB keyboards. The instruments differ solely in the number of keys and knobs, so I reviewed the model in the middle of the range, the MK-249C USB (see Fig. 3).

My first impression of the 249C was that Evolution cut corners to keep costs down and get it out quickly. The keys are extremely light, to the point of feeling flimsy; something rattled inside the case; the data slider is wobbly; and the knobs are frustratingly small and slippery. The metallic silver finish is painted on rather than embedded in the plastic. The 249C's manual is a scant four pages long and covers only the most basic operations. It encourages you to visit Evolution's Web site for the full version. I did, and I found that document essential reading.

However, once I realized I could pop off its beastly knobs and replace them with the nice rubbery ones from my Keyfax PhatBoy, I took quite a shine to the 249C, which does many things right. Although its keys are delicate, they're very fast and not as stiff as those on the Midiman controllers. Furthermore, they don't do double duty as data-entry buttons, so you wouldn't normally encounter a situation in which you play a note and no sound is triggered. The 249C's keys are narrower than standard width; over the span of four octaves, the difference amounts



FIG. 4: Although bulkier, the Midiman Keystation 49 is functionally similar to the Edirol PC-300, but it offers a better display, an additional MIDI Out jack, and wheels instead of a paddle for Pitch Bend and Modulation.

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to an entire white key. If you have thick fingers, they might get stuck between the black keys.

The 249C excels at sending Program Changes. Simply press the Program button and then type the number you want on the ten numbered buttons in the center of the panel. You can also use the increment and decrement buttons to switch to adjacent programs. To send Bank Change commands, use the dedicated Bank MSB and Bank LSB buttons. For instant access, you can store up to ten Program Change presets, including any necessary Bank Change commands, in the numbered buttons. Your presets are retained even when power is off.

Assigning Control Change parameters is also quick. Press Control Select, wiggle one of the 14 available controllers (12 knobs, data slider, or mod wheel), press Control Assign, and then type the desired CC number (1 through 127). Again, settings are memorized even when power is off. Entering numbers greater than 127 opens some additional possibilities, assuming the target synth supports Registered Parameter Numbers (RPNs). The available assignments include Pitch

Bend range, Coarse Tune, Fine Tune, and Aftertouch. On my GM module, I could crank up the Pitch Bend range to two octaves, but couldn't get it back to exactly two semitones. I wish the 249C's display indicated the current data value.

The features keep on coming. You can choose among 13 Velocity curves, transmit a snapshot of all current controller values, transpose the keyboard up and down by octaves or semitones, and even trigger a short demo sequence to make sure everything's hooked up correctly. A custom MIDI-to-Game-Port adapter cable provides an alternate MIDI interface—with power—for Windows users without USB ports.

Surf report. Although I have reservations about the 249C's construction quality, it offers an unprecedented amount of convenience and hands-on control for the computer musician. With five configurations to choose from, finding a model to fit your style should be easy. According to Evolution's Iain Mackay, the company's keyboards have been very reliable in the field, with only a handful of returns. He says, "Our customers come back, but our keyboards don't."

MIDIMAN KEYSTATION 49

In the past few years, M-Audio—a company that got its start building MIDI peripherals—has grown into a major desktop music force. In addition to manufacturing a range of audio and

MIDI gear, M-Audio is now the U.S. distributor of such groundbreaking music software as Propellerhead Reason and Ableton Live.

Three USB MIDI keyboards are currently in M-Audio's lineup. All use the same driver software as M-Audio's popular Midisport interface. The Midiman Keystation 49 and Keystation 61 differ from each other only in the number of keys; the travel-size Oxygen 8 has just 25 keys, but adds assignable knobs. For this review, I requested a Keystation 49 (see Fig. 4) and an Oxygen 8.

Both keyboards were defective. The Keystation was the worst of the two, spewing random MIDI data, flashing numbers in its display, and generating what looked like a sample-and-hold waveform when I moved the pitch wheel. The Oxygen 8's pitch wheel stopped working within hours, and its mod wheel scraped against the case.

According to M-Audio, it accidentally sent pre-production units that hadn't been through quality control, and no defects have been reported in the normal stock; I'm inclined to believe it. I had also noticed that the pitch wheels on the original units were physically sluggish. The replacement models had a snappier feel and didn't leak bogus data. However, I did experience occasional stuck notes, for reasons neither M-Audio's tech support nor I could track down.

The Keystation 49 and Oxygen 8 borrow substantially from the Edirol PC-300 design, with an assignable slider and a MIDI/Select button that transforms the piano keys into data-entry buttons. Virtually all of the Keystation 49's functions are the same as the PC-300's; several of the assignments are mapped to identical keys. The two main differences are that the Keystation 49 offers a semitone-transpose feature (a welcome addition) and moves the PC-300's dedicated octave-transpose buttons onto the keyboard (a bad decision).

While the Keystation 49 is the chunkiest keyboard in this roundup, it's still quite portable. Its transparent gray plastic case seems sturdier than the cases on the other four-octave keyboards, and



FIG. 5: The Midiman Oxygen 8 is small enough to stash in a briefcase, but if you know where to look, it has the virtual equivalent of 40 assignable knobs.

The Cure for the Common PA



There's a reason that the biggest touring companies use DriveRacks on their most important tours. When you have literally tons of speakers, monitors and power amps to control, you need all of the help that you can get. DriveRacks have been designed to handle and protect expensive gear and to make setups much easier. Until now the only way to get this kind of sound quality and control out of your PA was to buy a truck-load of equipment, hire a sound company, or spend a lot of money.

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its keys have a solid—if stiff—feel. The Keystations and the Oxygen 8 each have two MIDI Out jacks. One is actually a Thru from the computer; the other is hardwired to the keyboard. That's a flexible design. On the Edirol keyboards, you have to flip a tiny switch on the back to toggle between Out and Thru. On the Evolution models, you make the switch by pressing two buttons on the front panel.

Surf report. The Keystation 49 is a strong offering that competes head-on with the Edirol PC-300. In its favor, it has traditional pitch-bend and mod wheels, a display that shows the value of the parameter you're changing, an extra MIDI Out jack, and the ability to run from battery power. On the downside, it's bigger than the other models and lacks dedicated octave-shift buttons. There's also the specter of stuck notes, although I'm apparently the only one who's run into that problem.

MIDIMAN OXYGEN 8

The tiny Oxygen 8 has been a big hit for M-Audio, and it's easy to see why (see Fig. 5). The construction quality is astonishingly good for an instrument so light and inexpensive. Its beefy plastic case would probably take a bullet for you. Like those on the Keystation, the keys are sturdy, and the knobs are everything the Evolution MK-249C's are not: big, rubber coated, and solidly bolted to the front panel. Protruding spines let you detect the orientation of the Oxygen 8's knobs even in the dark. Having only 25 keys will feel confining if you approach the Oxygen 8 as a piano or organ. It's best suited for playing drum parts or simple overdubs.

Each knob can be assigned both a Control Change type and a MIDI channel, but the process requires several more button pushes than on the 249C. Having access to multiple channels at once is a giant advantage because it lets you control the relative volumes of parts in a multitimbral synthesizer. I also discovered an excellent, undocumented feature: pressing the MIDI/Select button and then the Up button provides access to four more banks of knob memory, for a total of 40 knob assignments.

Better still, the memory is retained even when power is off.

The upcoming Ozone (\$399) is slated to add 24-bit, 96 kHz, stereo audio I/O to the Oxygen foundation, for a truly flexible and portable studio. (While software synthesizers run well on laptop computers, most have very bad onboard audio circuitry.) M-Audio says that one of the Ozone's inputs will be configured as a ¼-inch/XLR combo jack that accepts either line-level or microphone signals. Due to the limited bandwidth of USB 1.1, the Ozone won't support all combinations of sampling rates and bit depths. For the price, however, it could undoubtedly have a huge impact on mobile music production. The Ozone is expected early next year.

Surf report. Offering instant

access to 42 hardware controllers in a go-anywhere package, the Oxygen 8 is ideal for laptop owners or anyone who's short on space. Don't think of it as just a keyboard; with batteries installed, it could serve as a handy remote for adjusting effects devices or virtual mixers. Many musicians will want to hold out for the Ozone, solving two musical problems at once. The two-octave Evolution MK-225C USB is also worth a look if you want a lighter key action or a serial interface.

WHAT TO CONTROL

Once you get a USB keyboard controller, what are some outstanding programs to control with it? I posed that question to EM associate editor Dennis Miller, who has enough computers to start a cyber cafe. "Just about every soft synth can handle real-time MIDI input," he said. "Definitely mention all the great stuff from Native Instruments—Reaktor [Mac/Win; \$599] in particular."

New synthesizers, particularly plugins, arrive on the scene daily, and all the leading sequencers support at least one plug-in instrument format. Check out sites such as <http://sharewaremusicmachine.com> for listings. On my last visit there, I discovered two shell programs that run VST instrument plug-ins such as IK Multimedia SampleTank without the overhead of a sequencer. RT Player Pro (Mac/Win; \$149) is available at www.dsound1.com. For Macs, there's also the Ugly VSTi Interface, free from www.netspace.org/~leigh/max.

A new class of programs combines virtual instruments with a virtual recording studio. Cakewalk Plasma (Win; \$69) offers Acid-style loop assembly as well as plug-in synths. I had even better success with Propellerhead Reason (Mac/Win; \$399) on my laptop; it's coded so efficiently that I could get numerous parts going without audio glitches. Arturia Storm (Mac/Win; \$199) is a similar program with some unusual instruments. The performance-oriented audio sequencer Ableton Live (Mac/Win; \$349) is a natural for laptop MIDI control, and there are many more.

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THE FUTURE

It's fortunate that the USB spec supports up to 127 simultaneous devices per host; more and more music gear will be equipped with USB connectors

in the months to come. According to one major synthesizer manufacturer, the growth of USB will bring some unexpected musical benefits. Someday soon, for example, sequencers will be able to recognize USB sound modules and automatically configure themselves to match. As USB cables replace MIDI cables and thus speed up data communication, manufacturers will realize that the MIDI input processors on their synthesizers will have become the new

bottleneck. They will have to build newer instruments with much faster processors for snappier response.

Even sooner, manufacturers will begin to release MIDI controllers that use USB *class drivers*, which will enable computers to recognize the controller without first making users install a proprietary driver. That will also facilitate sharing peripherals between computers.

What about musical applications for the speedy new USB 2.0? Most audio companies I asked don't expect USB 2.0 to have much impact on MIDI music production. They said that FireWire will probably remain the standard for high-bandwidth communication. For the amount of data that controller keyboards transmit, USB 1.1 is perfectly adequate.

USB's greatest contribution to music-making is convenience. "Our theme this year is 'Redefining the Studio,'" says M-Audio's Adam Castillo. "The Surface One, Oxygen 8, and Ozone are a new breed of controller in that they become whatever the user needs them to be: mixer, instrument, or control surface. For the first time, the studio adapts to the user instead of the other way around."

The next major leap will probably come at the destination, rather than the controller. "I think Apple's next round of CPUs is going to blow the lid off the 100 percent virtual desktop studio," says Jim Cooper of MOTU. "Sure, there will always be new, cool instruments developed that push the CPU bandwidth envelope, but in the same way that disk-drive performance now easily supports more than enough tracks for most of us, the next-generation CPUs are going to do the same for virtual instrumentation."

Looks like the wave is coming in. Grab a board and jump on it.

David Battino is the editor of EM's 2002 Desktop Music Production Guide. *If he ruled the world, all computers would have Velocity-sensitive keyboards with Aftertouch.*

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Groove Shopping

By Erik Hawkins and Marty Cutler

Creating great-sounding, grooving drum tracks in a personal studio can be a difficult undertaking. Hiring a professional session drummer is expensive and therefore impractical for projects on a tight budget. Drum machines, samplers, and sound modules offer wonderful potential, but without a drummer's skills, using them to convey the proper feel is a major task. However, a crop of innovative drum libraries can help you create authentic drum tracks without setting up a single microphone or even pressing the record button.

The majority of these libraries are very reasonably priced—costs range from about \$40 for disks of MIDI data to \$300 for multitrack audio libraries. A few also feature famous players whose talent, creativity, and time would otherwise be prohibitively expensive. Purchasing these libraries is your licensing fee to use their performances, so no additional fees are required (although crediting the musician is encouraged).

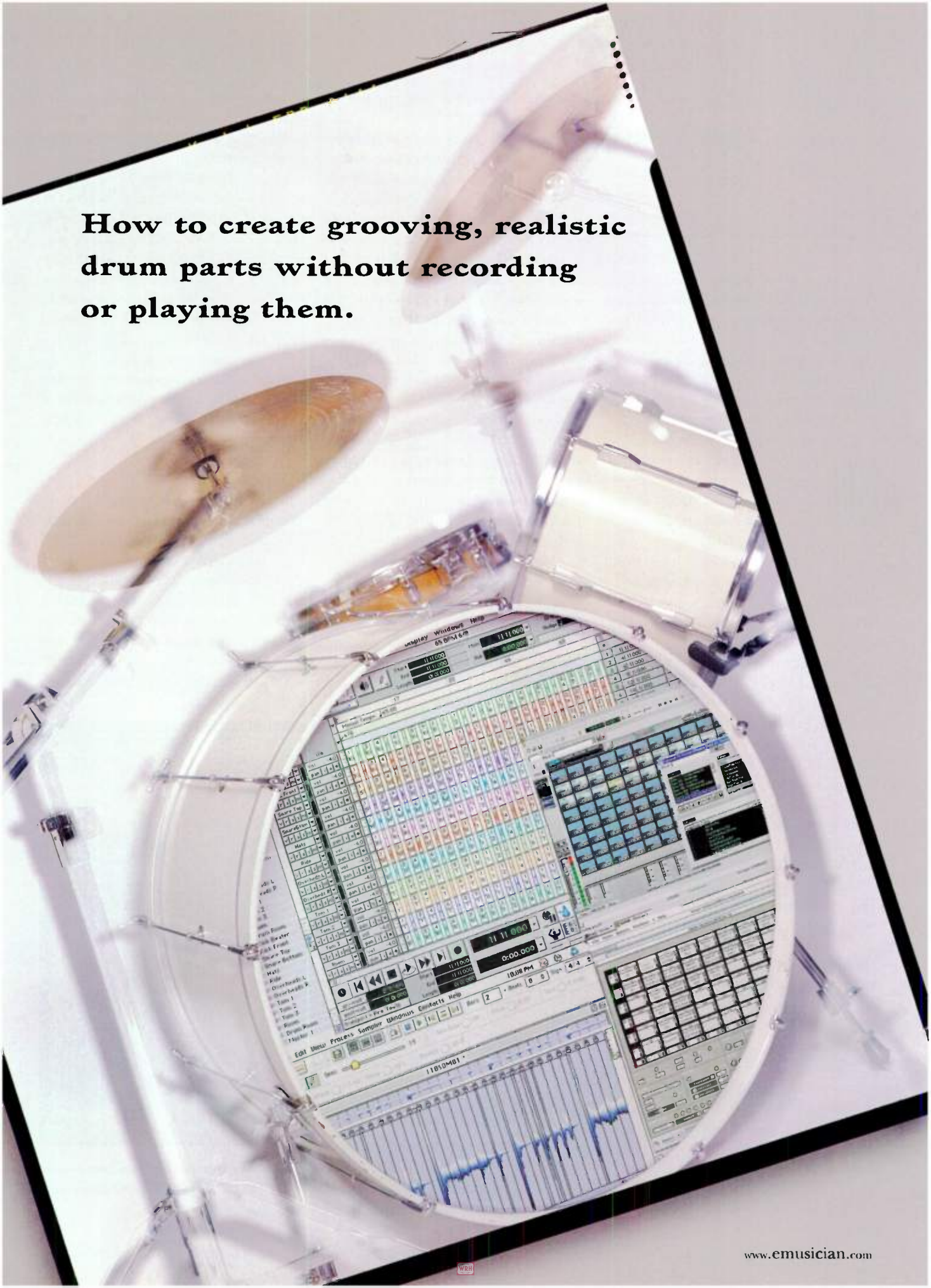
Before I list the available products, I will examine the file formats and their respective applications. Remember that composing and arranging needs differ. Consequently, the format, sounds, and feel of one library might be perfect for one person but wrong for the next.

STYLES AND FILES

Drum libraries come in a number of file formats; some libraries offer a combination of formats. Whatever the variety, the files are always one of two basic types: audio and MIDI. CD-ROM collections most commonly offer WAV-format files, because Mac and Windows computers easily recognize them. Furthermore, a good number of portable digital studios, including units from Korg, Yamaha, Roland, and Fostex, can import WAV files, letting you assemble grooves without a computer.

Photography by Robert Perry

**How to create grooving, realistic
drum parts without recording
or playing them.**





Of course, different bit-depths, sampling rates, recording resolutions, and file types (such as 24-bit AIFF and SDII files) are also offered.

Some libraries use proprietary sampler formats such as Akai, E-mu, Giga-Studio, Kurzweil, and Roland. The Akai format appears to be emerging as the lingua franca of sampler formats; most samplers can read Akai-format samples at least up to a point. Of the various Akai sample formats, the S3000 seems to be the current standard, and with the version 4 operating system, the S1000 can load its successor's samples. Naturally, proprietary parameters such as envelope, filter, and effects settings are difficult to carry over to samplers with divergent architectures.

MIDI data is most often offered as Standard MIDI Files (SMFs). Type 1 SMFs provide data on multiple tracks and MIDI channels. However, some libraries also provide Type 0 SMFs; in those files, all the parts and MIDI channels are contained on one track. Many older hardware sequencers support only Type 0 Standard MIDI Files.

LOOP GURU

The obvious problem with audio files is that their tempos are not easy to adjust. Audio tracks (unlike MIDI tracks) do not automatically follow your sequencer's tempo. There are several digital audio sequencers that have built-in bpm-based time-compression and expansion algorithms that are ideal for working with looped grooves. For example, MOTU's Digital Performer allows you to adjust a loop's tempo to the sequencer's tempo or to adjust the sequencer to match the loop. Digidesign's Pro Tools employs a time-stretching function that can snap a loop's length to the sequencer's tempo grid. Emagic's Logic Audio even pro-

vides options for changing the feel of a loop.

Although programs such as Ableton Live, BitHeadz Phraser, and Sonic Foundry Acid aren't specifically designed for traditional songwriting, they excel at processing audio files to suit new tempos and arranging files into song sections (for more information, see "Loop-a-palooza" in the June 2002 issue of *EM*). You can then import the processed drum files back into your digital audio sequencer for further production. Just remember that no matter how good your time compression and expansion algorithm is, excessive compression or stretching can lead to nasty sounding artifacts. In general, you are safe with changes of as many as 5 bpm in either direction. Sometimes you can go as far as 10 bpm without bad side effects, depending on the complexity of the loop waveforms. Third party plug-ins such as Pitch 'n Time by Serato Audio Research do an excellent job of changing tempos without altering the original loop's sound quality.

Propellerhead Software's ReCycle can separate the audio file into discrete hits; by identifying the waveform's am-

plitude peaks and troughs, it can determine where hits occur and then slice a drum loop into its individual components (see Fig. 1). Recycle sends the key-mapped slices to your sampler and provides a MIDI file that preserves the timing of each slice as a Note On event. With each hit stored as a distinct element, you can then change the sequencer's tempo and trigger each slice separately. The Strip Silence feature in Logic Audio can split up a region and keep each beat locked to its relative position on the tempo grid. Steinberg's Cubase VST has a similar feature called Match Points, and the TDM version of Pro Tools has a beat splitter called Beat Detective.

EDIT US REX

The REX format was codeveloped by Steinberg and Propellerhead Software. Any audio file can be turned into a REX file using Propellerhead's ReCycle. Steinberg's Cubase and Emagic Logic 5 support REX files, and Mark of the Unicorn (MOTU) has announced that Digital Performer will support REX files as of version 3.2. REX libraries are mono, but the newer

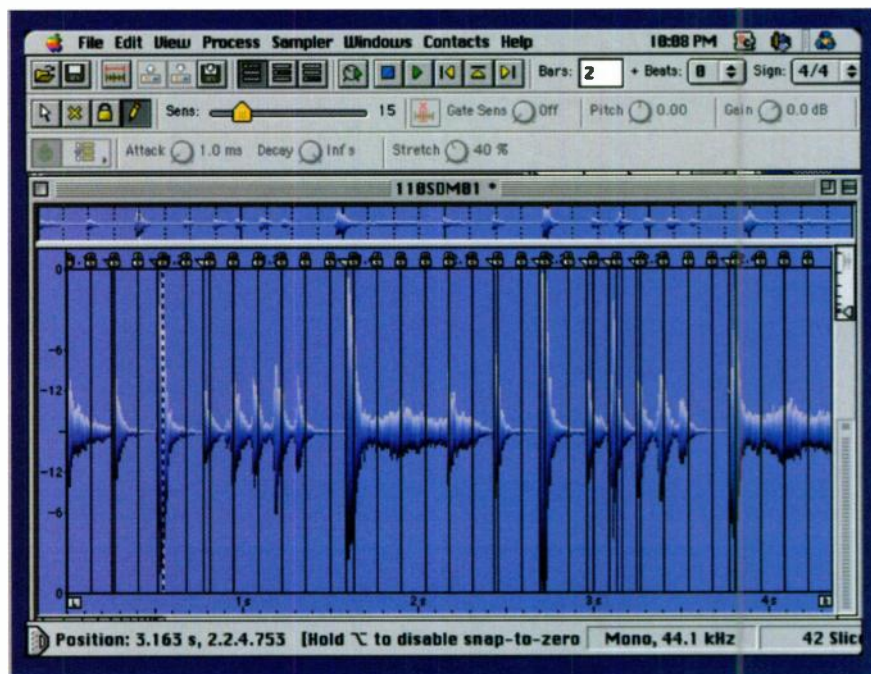


FIG. 1: Propellerhead's Recycle software interprets waveform dynamics to create individual hit points suitable for slicing. You can then save the file with markers for time stretching, send individual hits as samples, and generate a groove-quantizing template.



It's easy to make it look different.

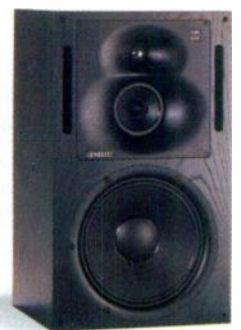
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REX2 format supports stereo files.

A REX file is a loop that has been beat mapped, sliced up, and saved with a playback script as a single integrated file. You can change the tempo of a REX file without affecting pitch and without using time compression or expansion. Changes in tempo of as many as 5 bpm either way usually sound decent, though that number may vary depending on how carefully the REX file was created (the quality of REX libraries varies significantly).

Cubase VST lets you drag and drop REX files, which makes assembling REX tracks a snap. You can mute individual REX file slices, and some programs (such as the Dr. Rex player in Propellerhead's Reason) even allow level and tuning adjustments for each slice. A groove template can be derived from a REX file because its sliced-up beat can double as a MIDI event flowchart. You can use that MIDI template to groove-quantize MIDI performances so they have a cohesive overall feel. Unfortunately, however, MIDI templates derived from REX files do not translate audio dynamics into Velocity, which is just as important as timing in recreating a rhythmic feel. That is vital if you want to apply the template to a MIDI sound source.

Groove quantizing is a feature that can superimpose the dynamics and timing from one groove onto another. Unlike standard quantizing, groove quantizing provides a grid based on realistic (and human) performance parameters, such as natural variations in timing and Velocity. A word of caution: avoid the temptation to groove quantize everything. Placing every event in lock-step with your groove can ruin the dynamics and feel of the sequence at the worst and sound overly contrived at best.

MIDI MACHINATIONS

Most MIDI drum tracks adhere to General MIDI (GM) drum maps, so if you want to build your drum tracks with MIDI files, it's a good idea to use a GM-compatible sound set. Presets that follow the GM map will save you from reassigning drum sounds to note numbers. Most recent synthesizers have fallen in step with the GM drum map, but if your device doesn't offer that convenience, there are a good number of sequencers that provide the tools for convenient and quick reassignments (see the sidebar "Remap Your Sounds").

MIDI files are much smaller than audio and REX files; that's a big help if you have limited drive space. It's far easier to change drum sounds and rearrange individual notes in a MIDI file than in any audio file.

The downside to MIDI files is that even the funkiest performance can sound canned and uninspiring, especially when the drum samples sound as if they were recorded in an anechoic chamber. It is difficult for MIDI performances to capture the ambience of a live drum kit because there is no interaction between the drums and the

recording environment—for example, the sympathetic rattle of the snare when the toms are played.

Another problem is that samplers need to deploy tricks to emulate a real drum's response to dynamics. Striking a drumhead doesn't simply change the instrument's volume; it also causes changes in pitch and timbre. Filters and Pitch Bend can help, but they tend to sound a bit synthetic. However, if the sound source has good multi-sampled and Velocity-layered drum presets, it's amazing how realistic a MIDI file can sound.

In a Velocity layer, you assign a different sample for each dynamic level. For example, a Velocity-layered snare drum is made up of several distinct drum hits, each recorded at a different dynamic level (very soft, soft, medium, hard, and very hard). When set up correctly, higher Velocities will play the samples recorded at higher dynamic levels. That helps to convey the dynamic characteristics of a real drum. With enough RAM, samplers can easily accommodate an adequate number of unique sample hits for each drum. Software drum machines, such as Steinberg's LM-4 MarkII



FIG. 2: The Velocity-layered presets in Native Instruments' Battery provide a more realistic response to dynamics.

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and Native Instruments' Battery, come with great-sounding multisampled and Velocity-layered presets (see Fig. 2).

TRIGGER, MAN

If you don't like the way a drum sounds on a particular track, you can replace it with a new sample. Trigger-to-MIDI devices measure the dynamics of an audio track and convert them to MIDI note and Velocity information. Roland's new TMC-6 is a dedicated trigger-to-MIDI converter designed to fire off MIDI events from drum pads, acoustic drum triggers, or line-level audio signals. Threshold and sensitivity adjustments tailor the TMC-6 response to dynamics, and you can select from a variety of Velocity curves to tweak the dynamics of the MIDI output. Each trigger can be assigned to a different MIDI channel, so you aren't limited to replacing drum

tracks from a single sound source. If you want to replace a multitrack performance, the TMC-6 offers six inputs.

The Alesis DM5 and DM Pro drum modules offer built-in audio-to-MIDI trigger inputs (12 on the DM5 and 15 on the DM Pro) that work wonderfully. Roland's TD-10 and TD-8 V-Drum brains also offer trigger inputs and can trigger external sounds. Digital Performer's Trigger is a trigger-to-MIDI converter plug-in that first appeared in version 3.0 of the program. Digidesign's Audio Suite plug-in Sound Replacer even allows you to assign a different sample for each of three Velocity zones. That lets you accurately follow the dynamics of the audio track with different sample hits for realistic-sounding results.

MULTITRACK AUDIO

For the most part, modern drum-loop libraries are thoughtfully engineered for easy song construction by section; entire song forms are sliced into components. You can drop the appropriate sections into your digital audio sequencer and arrange verse, chorus, fill 1, fill 2, and so forth.

In many cases, song sections are neatly trimmed multitrack loops con-

taining individually miked drums, including kick, snare, toms panned left to right, stereo overheads left and right, room ambience, and additional percussion instruments. Because drum-kit elements reside on discrete tracks, you can process, edit, and mix the tracks independently.

The following is not a shoot-out. Rather, it describes the percussion programming products that are currently on the market.

Discrete Drums. The professional edition of *Series 1: Rock/Alternative*, from Discrete Drums, is a set of nine WAV-format CD-ROMs with more than 30 songs in tempos ranging from 124 to 300 bpm. Two audio discs containing mixes of all the songs come with the library, making auditioning tracks a breeze. A separate sample disc contains AIFF files of individual drum hits at different Velocities, with and without the room ambience. The 24-bit, 44.1 kHz recording and archiving provide very high sound quality. Greg Morrow, whose credits range from Bad Company to the Dixie Chicks, holds the drummer's chair.

The songs have intro, verse, chorus, bridge, and end sections, and each section has variations. Some songs even have special "crash and burn" endings. The multitrack samples include kick, snare, stereo toms, stereo overheads, and stereo room. The stereo room sound really adds to the big rock 'n' roll feel of these tracks. However, as with some of the other libraries, an isolated hi-hat track would be a nice addition.

APO Multimedia. APO Multimedia's *Mix It* features the drumming of David Jones, who has worked with John Denver, Stevie Wonder, Seals and Croft, and Helen Reddy, among others. Over this two-CD library he lays down a collection of grooves that include funk, country, pop, and rock selections. Each genre contains intro, verse, chorus, and ending sections, and there are five different groove variations for each section.

The song sections have ample overlapping beats, which are perfect for crossfading ringing drum tones (like toms and cymbals). However, the overlapping beats make assembling sections a bit more work than simple butt-

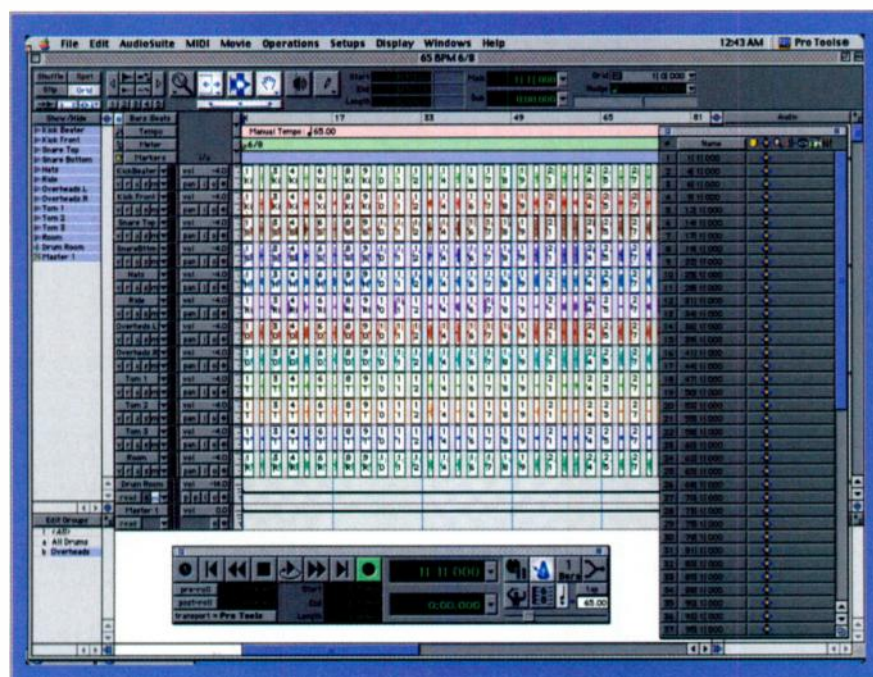
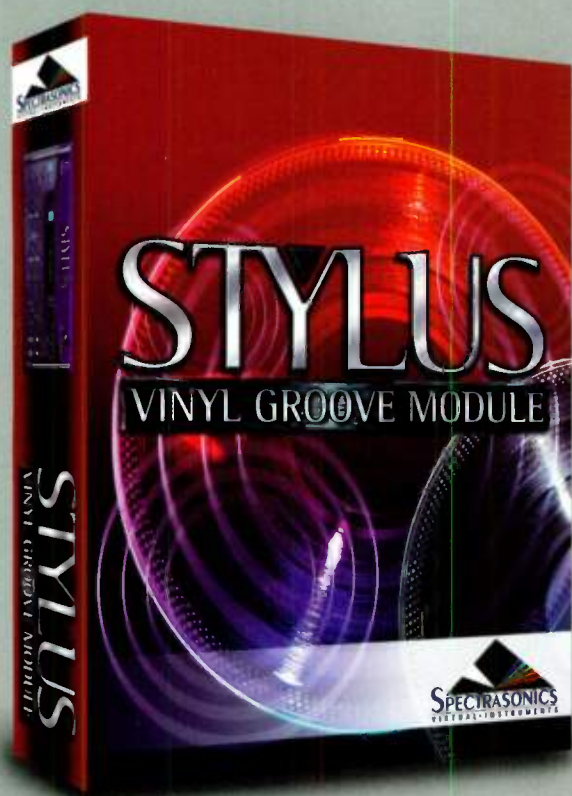


FIG. 3: Multiloops includes an associated Pro Tools session file for every song in its *Naked Drums* library.



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splicing. To get around that, set your digital audio sequencer's tempo to match the sample and snap your cuts to whole bars. If you do that, the overlapping beats won't be a big deal. The multitrack samples include kick, snare, hi-hat, stereo toms, stereo overhead, and an occasional ride.

Each *Mix It* multitrack title comes in stereo WAV or REX2 formats with six extra groove variations to each song section. Jones's grooves, despite the different song genres, all tend to have a rock flavor to them.

Multiloops. There are three titles in the Multiloops *Naked Drums* series: *Rock*, vol. 1, and *Pop R&B* are both four-disc sets, and *Odd-Time Grooves* comes on nine discs. Songs are named simply by their tempos, which range from 60 to 240

bpm. *Odd-Time Grooves* features a selection of songs in different time signatures, including 6/8, 19/16, 5/8, 7/8, and 9/8.

All of the songs are offered as 24-bit, 44.1 kHz WAV files and as Pro Tools session files that can be used with Pro Tools versions 4.x, 5.1.x, and Free-5.x (see Fig. 3). The sessions are laid out on a tempo grid with markers to designate the different song sections. Each song has a ton of sections cut into one- and two-bar lengths that can easily be scooted about to arrange your song. That is very convenient for Pro Tools users. You can import the WAV-format files into your digital audio sequencer with no trouble.

All of the recordings are clean, and the grooves feel tight without sounding uptight. Multitrack elements vary from title to title. *Rock*, vol. 1, offers

kick, snare, stereo overheads, and toms 1, 2, and 3. *Pop R&B* adds a hi-hat track. For *Odd-Time Grooves*, all of the mics were pulled out of the mic cabinet, adding snare top and bottom, kick front and beater, ride, and room tracks.

Pocket Fuel. *Acoustic Rock Drum Loops* is a multitrack collection in the Radical Architectural Design Systems (RADS) series from Pocket Fuel. The collection

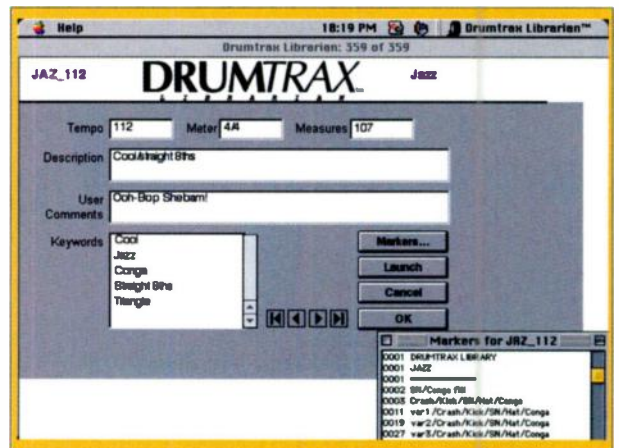


FIG. 4: Vamtech Drumtrax provides scads of Standard MIDI files recorded by live drummers. The software includes a Librarian to find the tracks you need.

Product Summary		Audio	MIDI	REX	Individual Drum Hits	Price
Manufacturer	Suggested Titles					
APO Multimedia	David Jones <i>Mix It</i> , vols. 1 and 2	yes	no	yes	no	TBA
Beatboy	Rod Morgenstein— <i>Progressive Rock</i>	no	yes	no	no	\$49.95
Discrete Drums	<i>Series 1: Rock/Alternative</i> (professional edition)	yes	no	no	yes	\$299
FXpansion	Session Drummer (plug-in)	no	yes	no	no	\$599 as part of Sonar XL
Keyfax Software	Twiddly Bits <i>Bill Bruford Packet of Three</i>	yes	yes	no	yes	\$333.33
Keyfax Software	Twiddly Bits <i>L.A. Riot MIDI Drum Loops</i> , vol. 1, <i>Paul Kodish Dangerous Drums</i>	no	yes	no	yes	\$40 each
Ilio/Spectrasonics	Groove Control <i>Ethno Techno</i> , <i>Stark Raving Beats</i> , <i>BackBeat</i>	yes	yes	no	no	\$199 each
Multiloops	<i>Naked Drums Rock</i> , vol. 1; <i>Pop R&B</i> ; <i>Odd-Time Grooves</i>	yes	no	no	no	\$150, \$150, \$250
Pocket Fuel	Radical Architectural Design Systems <i>Acoustic Rock Drum Loops</i>	yes	no	yes	yes	\$60
Smart Loops	<i>Percussion Kit</i>	yes	yes	no	yes	\$69
Vamtech	Drumtrax	no	yes	no	no	\$50
Wizoo	VST Drum Sessions <i>Pop</i> , <i>Rhythm & Blues</i> , <i>Straight Rock</i> , <i>Soul Dance</i> , <i>Big Beats</i> , <i>Heavy Rock</i>	yes	yes	yes	no	\$80 each



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features multiple file formats—WAV, AIFF, and REX—organized into 90, 100, and 110 bpm folders. Each folder contains several chorus and verse groove variations as well as a selection of fills. The 90 bpm folder also contains several intro beats.

You get separate tracks for kick, snare, stereo overhead, and room. The room track adds a nice wet vibe to the kit. Of course, you can eliminate the room track and add your own reverb. The absence of an isolated hi-hat track can be bothersome, especially if you want solo hi-hats in a break. A stereo-mix file of each section is provided to help you arrange song form without hassling with the multitracks right away. This title's sound quality is not outstanding, but there's nothing that can't be massaged during mixdown. *Acoustic Rock Drum Loops* has a pretty straight-ahead rock feel with a healthy swing element.

Keyfax Software. There are more than two dozen titles in Keyfax Software's Twiddly Bits series. Each title captures live performances to MIDI data. Styles include hip-hop, drum 'n' bass, jazz, blues, country, rock, funk, reggae, and new age. Every title has tons of songs and a wide variety of patterns. The patterns are either two or four bars long. Along with the typical MIDI file formats, some of the titles also provide files with each drum note split out to its own track, making it easier to send drum notes to multiple sound sources.

Bill Bruford is well known for his innovative playing and wonderful feel. He has worked with such legendary progressive rock acts as Yes and King Crimson. Twiddly Bits *Bill Bruford Packet of Three* offers stereo audio loops that mirror the included MIDI file performances. An audio-CD set of samples

from his drum kit is included that so that you can build your own virtual Bruford trap set. If you want to stretch out and work with some great jazz-flavored rock grooves, check this title out.

Vamtech. Vamtech's Drumtrax presents a virtual world of drum and percussion stylings from an unusually wide variety of genres including funk, alternative, jazz, and world music. Each MIDI file contains a full song-form arrangement and includes multiple variations. All variations are delineated

▼

**If you want to work
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with part markers for easy rearranging.

You get a choice of Type 1 SMFs with each MIDI track harboring a drum-kit element; Type 1 with a track each for drum kit and percussion; and two vari-

ations of Type 0 files, with one offering everything on one track and the second offering one track for drums and one for percussion. For tweaking and reassigning individual drum elements, the split Type 1 files are preferable. They are also useful when you want to commit tracks to a recording but your sound source doesn't have individual outputs or the signal-processing resources to treat different kit elements individually. Split MIDI tracks let you solo and record a track at a time.

The included Drumtrax Librarian software is useful for finding just the right tracks; the main screen shows the file name, the style, the meter, a short description, and user comments (see Fig. 4). The librarian can sort files using any of those parameters as a searchable field, and it can hide sequences that don't meet your qualifications. If your clients include nitpicky types who insist on a quarter-note ride cymbal on bars 4 through 6, you're in luck; clicking on the Markers button engages a pop-up window with a list of just those elements. For example, the marker will indicate that a section offers four bars with quarter-note ride bells with tom fills. The Preferences menu lets you set



FIG. 5: The FXpansion Session Drummer is a unique MIDI effects plug-in that comes standard with Cakewalk's Sonar XL. Dragging preset MIDI patterns into tracks makes drum programming a breeze.

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up a link that causes any sequence you launch to open up in the sequencer of your choice. You also get a table of drum and percussion note assignments.

Nearly all of the Drumtrax sequences

offer strong grooves, although some of the R&B sequences are a tad heavy-handed at times. Otherwise, the grooves are supple with delicately phrased ghost notes and slammed dynamics when needed.

Beatboy. As with many of the Keyfax titles, a good number of Beatboy's collections are live performances by drum and percussion luminaries, captured as MIDI data. The Standard MIDI files are arranged as single-track song-form performances. Among the outstanding titles Beatboy offers is *Rod Morgenstein*—

Progressive Rock. Morgenstein is best known for a long tenure with the Southern-fried progressive band Dixie Dregs.

Like Bruford's, Morgenstein's performances focus on the progressive end of the spectrum, though they have a somewhat less "polite" attitude. The collection contains a fair number of MIDI files with odd meters such as 7/4 and 5/4, as well as files with duple meter feels and even odd-meter feels superimposed over 4/4 time signatures. There are some fills that seem nearly

REMAP YOUR SOUNDS

One of the most important advantages of using a MIDI performance is that you can remap the file's data. If you are unhappy with any individual instrument's performance or sound, you can instruct your virtual drummer to, for example, lay back on the snare, or even play a different hi-hat set, snare, or other instrument. There's no way to do that with the typical sampled groove.

Most SMFs are arranged for General MIDI (GM) drum sets. Although consistent drum maps can be handy, not all sound sources adhere to GM note assignments. Furthermore, the collection of instruments that GM provides is limited. Press rolls and other drum articulations can sound unmusical or even downright

silly when played on a single snare sample. Few GM drum kits provide the natural variations in timbre created by differences in the location or the force of a strike. As convenient and hassle-free as MIDI drum-grooves are, it's good to know how to move things around a bit.

Some MIDI files offer split-track files (see Fig. A). Split tracks simplify remapping by placing every instrument

on an individual track. That makes it easy to send the data to another device, transpose parts, or even tweak the timing or Velocity. Split tracks let you focus on a specific element of the groove without the confusion of viewing the entire drum-kit performance. If your MIDI files hold everything on a single track, it's a bit more work to sort the groove into individual tracks, but

let you cut all notes of a single pitch so that you can paste the data into a new track for reassignment.

After I reassign an instrument to a new sound source, I listen to that instrument in isolation to make sure that the sound speaks properly. I occasionally further split a track by Velocity ranges. I might want to send softer snare hits to a lighter sounding snare

with a longer decay time, for example—particularly if I'm editing a snare roll. Nothing sounds sillier than an overly curt snare sample playing a roll. I then listen to the collective snare tracks in isolation to ensure that I'm successfully conveying a wide dynamic range. The next step is to listen

critically to the entire drum track. Do the new timbres meld properly with the original kit? Does the track still groove? MIDI devices can differ enough in response time to make the groove sound rushed or lazy. If my new tracks sound too laid back or too pushy, I can always shift the events backward or forward as needed.

—Marty Cutler

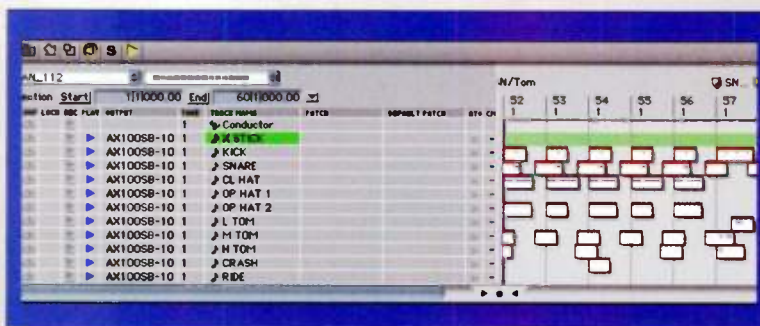


FIG. A: With each component of the drum kit on a separate MIDI track, it's a simple matter to reassign MIDI channels and devices to create a composite drum kit. You can easily change any track's output to a different device and tweak as needed.

it's almost always worth the extra effort.

Most sequencers offer convenient ways to split tracks. For example, you can simply split tracks sorted by MIDI Note; every MIDI note in the performance goes to its own track with each track assigned to the same MIDI channel. You can then reassign tracks freely. Just about any sequencer will

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impossible for a single drummer to execute—unless you've heard Morgenstein in live performance. Make sure you play these through a sound

source with a fast MIDI response time.

Despite the preponderance of aggressive grooves, the files cover a wide dynamic range, with plenty of ghosted instruments for contrast. Whereas the Bruford MIDI files tend to swing, Morgenstein's playing tends to push the beat just a bit. That is not to say that Morgenstein's performances don't swing when they need to, but the collection tends toward a driving feel.

FXpansion. FXpansion's Session Drummer (see Fig. 5) is a stock MIDI

plug-in that originally appeared in Cakewalk's Pro Audio 9. It has since migrated to Sonar, Cakewalk's flagship digital audio sequencer. Session Drummer is a library of MIDI grooves packed into a plug-in that is so easy to use it's sinful. Insert the plug-in on a MIDI track, select from a list of styles, drag some patterns into the arrange window in the order you want, and you have assembled a song's drum tracks. When you enter Play on the sequencer, Session Drummer begins synchronized playback just like a locked-in drum machine. For detailed pattern editing, Session Drummer's patterns can be sent to one of the sequencer's MIDI tracks.

There are a good variety of categories to choose from: alternative, blues, rap, Latin, odd meter, and world. Each one offers subcategories; Latin subcategories, for instance, include flamenco, samba, cha-cha, and Bolero. Of course, you can mix and match categories freely. Although the patterns are MIDI captures of a live drummer, some of them sound a bit stiff.

Ilio/Spectrasonics. A relative handful of Ilio's and Spectrasonics' large library of sample collections has made it into the Groove Control series. Every Groove Control loop is meticulously beat mapped, chopped, and saved as an instrument along with its unique MIDI performance file. The end result is a system that allows a high degree of tempo control without compromising pitch or fidelity. The operating principle behind it is similar to the one behind ReCycle.

The files are provided in Akai S3000 sampler format. If you have an Akai-compatible sampler and a CD-ROM drive, you're good to go. If not, you will need to convert the instruments and samples to your sampler's format. That can be a very time-consuming process, even with the best conversion program, because of the sheer number of instruments and samples per disk. Despite the extra steps, however, the end result is well worth the effort.

One title from the Groove Control series is *Ethno Techno*; it doesn't have any standard drum kits, but it offers a

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wealth of percussion instruments, both traditional and homemade. The main percussionist for *Ethno Techno*, Bashiri Johnson, has worked with Whitney Houston, Madonna, Celine Dione, and Boys II Men, just to name a few.

The majority of the loops are four bars, though there are also many two-bar patterns. There are no separate pattern variations for each groove; however, the variety of the performances within the grooves and the user's ability to control every loop's individual beats make variety easy to achieve.

Wizoo. Wizoo, in cooperation with Steinberg, offers several REX-format titles in its VST Drum Sessions series: *Pop*, *Rhythm & Blues*, *Straight Rock*, *Soul Dance*, *Big Beats*, and *Heavy Rock*. Though the REX files can be played in any compatible digital audio sequencer, Cubase VST session files are provided for every song. The session files open all of a song's REX files in a standard song format (for example, count-in, intro, verse A, chorus A, verse B, bridge, chorus B, and ending). Consequently, arranging a song in Cubase VST using these particular REX libraries is a piece of cake (see Fig. 6).

The multitrack layout is well conceived and includes tracks for kick; snare; hi-hat; high, mid, and low toms; rides; crashes; and an occasional percussion track. The accompanying Cubase VST sessions have MIDI tracks that run in parallel with the multitrack REX files. If you don't like the way one of the REX tracks sounds, simply mute it and assign a new drum sound to its parallel MIDI performance. The VST Drum Sessions are wonderfully well thought out.

2-TRACK HONORS

Although multitrack drum samples offer the most flexibility, sometimes a stereo file will get the job done nicely.



FIG. 6: A Steinberg VST Drum Sessions file for Cubase VST opens with all of its REX files laid out in song form.

Of course, plenty of pattern variations, tempo control, and a top-notch mix will help make your production that much better. The groove-controlled version of Ilio and Spectrasonics' *BackBeat* fits that bill.

BackBeat's grooves are excellent, and the mixes sound big and professional. There are several pattern variations of each groove along with fills and ending licks. Its many wonderful performances come from the best drummers in the industry, including Gregg Bissonette, Eric Boseman, Bob Wilson, and John Ferraro. The same production team behind Ilio's other groove-controlled libraries (notably Eric Persing) helped make this title's sound quality and flexibility equally outstanding.

When you just need that extra percussion part, check out Smart Loops' *Percussion Kit*. This title contains more than 300 Acidized WAV files of percussion loops performed by Eugie Castrillo, who has played with Tito Puente, Steve Winwood, and Michael Brecker, among others. There are loops of traditional Latin drums (such as congas, bongos, and maracas) along with tablas and frame drums. All of the grooves have a great Latin feel tempered with a bit of swing, and each loop is offered at six different tempos (from 95 to 120 bpm).

In addition to the sampled loops, *Percussion Kit* provides WAV-format samples of individual instruments and SMFs that replicate the groove of the loops. Consequently, you can load the WAV files into your sampler, utilize your sampler's individual outputs, and process individual instruments as you would with multitrack audio loops.

CHOPS FOR SALE

An enormous pool of creativity, talent, and sheer grooving know-how goes into these production-expediting tools. They only require a minimum of effort on your part, but don't let that stop you from adding your own creative touches. Slice, dice, and reverse your drum tracks; create groove templates, process individual instruments—there's no limit to the pulsating sonic delights you can build.

Visit Erik Hawkins's fledgling record label at www.muzicali.com to hear music made with today's hottest studio gear and check out his new book, *Studio-in-a-Box* (Artistpro.com). As a studio musician in New York, EM associate editor Marty Cutler shared tracks with and learned groove from masters Bernard Purdie, Steve Jordan, Richard Crooks, and others.

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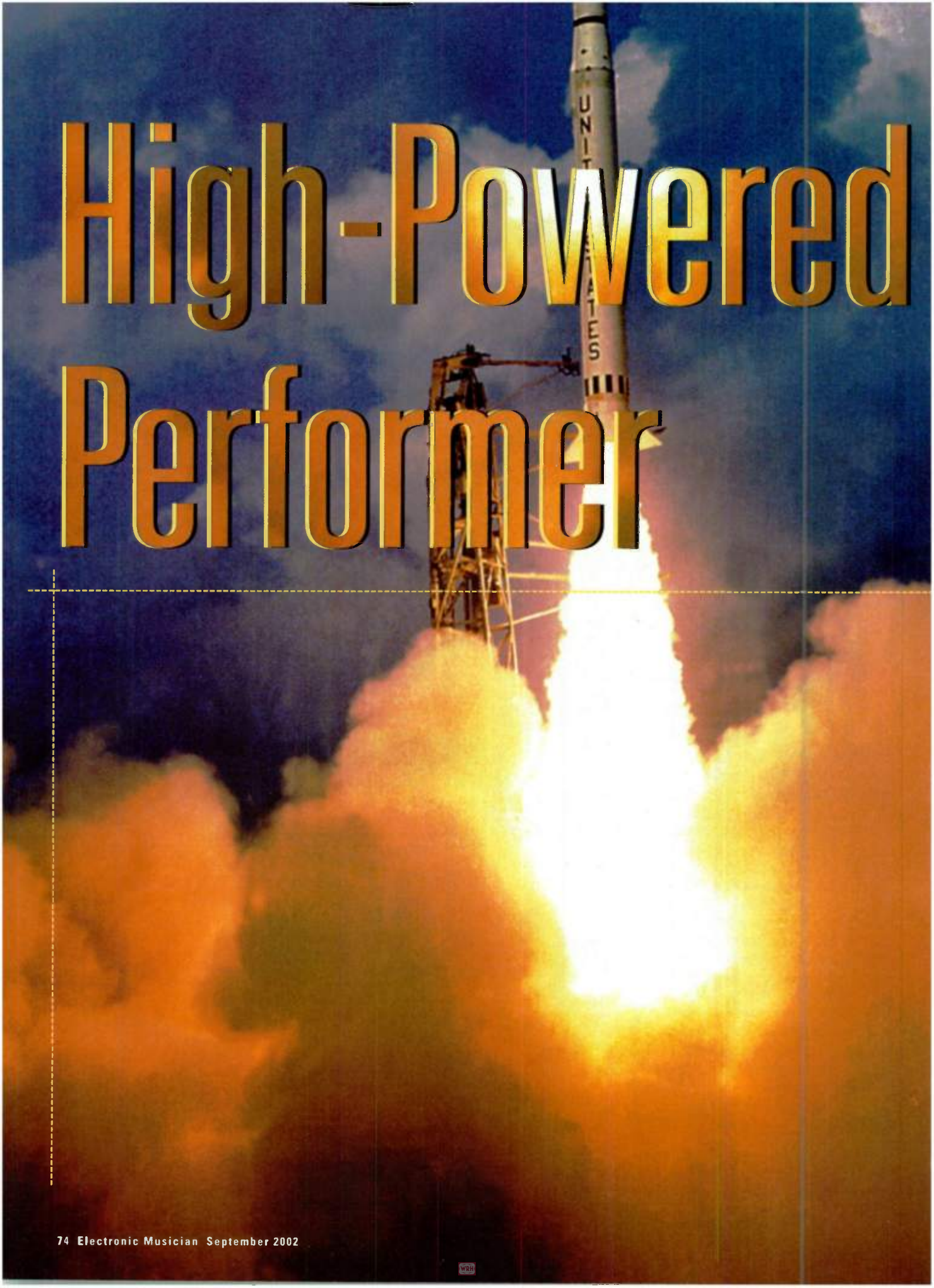
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A photograph of a rocket launch. The rocket is white with black markings, including the word "UNITED STATES" and the number "6". It is ascending vertically, leaving a massive, bright orange and yellow fireball at its base. The background is a clear blue sky with some light clouds. The title "High-Powered Performer" is overlaid in a large, bold, orange-yellow font with a 3D effect. A dashed horizontal line is positioned across the middle of the image, and a dashed vertical line is on the left side.

High-Powered Performer

M

MOTU's Digital Performer has long been one of the most popular and powerful digital audio sequencers. The current version, Digital Performer 3 (DP3), is laden with sophisticated new features and capabilities. Having reviewed Digital Performer twice for EM, I've learned that there isn't much that this powerhouse can't do when it comes to MIDI sequencing and audio recording. However, many of the features DP3 offers are either commonly overlooked or not covered in the documentation. To help you make the most of the program, I'll take a look at some of those features and, hopefully, enhance your productivity when using DP3.

GETTING ORGANIZED

It's a good idea to customize the way Digital Performer responds to your working style by adjusting the Preferences settings that apply globally to the program and by creating templates for features that are specific to individual files. (DP3 Preferences now consist of eight separate files.)

If you have certain instrumentations that you work with regularly, creating templates for them can save you a lot of time in the long run. Your template should include the tracks with their names and the MIDI and audio input and output assignments as applicable. The Default Patch setting automatically calls up a synth's preset, and holding down the Control key while pressing the up or down arrows scrolls through the patches sequentially (a great way to audition preset sounds).

The Audio Assignments mini-menu lets you assign the inputs or outputs of multiple audio tracks in a single operation. That mini-menu also includes a new Automatic Voice Assignment feature that assigns voices (audio-engine resources) to tracks using the existing pool, so you don't have to manually assign voices in the Tracks Overview list. Voices are assigned top to bottom in the Tracks list, and "Auto" becomes italicized if there aren't enough available voices. That's an easy way to tell if you need to increase the number of voices in the Studio Configuration dialog box.

Grouping instrument types by color also helps later with visual navigation. You can assign multiple tracks to the same color (or different shades of a color) in one operation by using the Assign Colors command under the Basics/Color menu. Because I almost always print my MIDI tracks to audio (to take advantage of further editing and processing), I like to use the same color assignments for both the MIDI and the audio version of a track. That helps me keep my color and instrument assignments clear. (Bass is always dark blue, pianos are purple, and so forth.)

I also use lowercase letters for the MIDI names and uppercase for the audio tracks to further distinguish between the two. In my Tracks Overview window, MIDI always stays at the top and audio stays at the bottom. In addition, I create "dummy" MIDI tracks to serve as dividers and labels for groups of tracks; I always use yellow as their color assignment (see Fig. 1).

MOTU's Digital

Performer 3 is

packed with

little-known

features that can

boost your

efficiency and

productivity.

By Rob Shrock



High-Powered Performer

READY, SET, WINDOW

One of the first things I suggest is getting your Window Sets arranged to your liking. Window Sets let you save and recall the size and position of multiple editing windows. Well-thought-out Window Sets enable you to quickly navigate the common functions that you use throughout a project by typing simple key commands to recall various screen layouts. You'd be surprised at how much accumulated time you can save by not having to constantly move and resize windows. (Window Sets are saved in a separate Preference file, so any sequence you open in Digital Performer will conform to your settings.)

I suggest creating your screen layouts using an existing song that has MIDI and audio tracks rather than using an empty template. That way you can get the default zoom settings for the MIDI notes and audio waveforms the way you want them right from the start. I use eight basic screen setups that concentrate on common tasks such as sequencing MIDI, editing audio, and mixing. I assign the

setups to the key commands of Option + F1 through F8 to call them up. For those times when I want to see the computer's desktop without having to manually close all the current DP3 windows, I have created a special Window Set (Option + F12) with no windows open except for the Transport Control Panel.

The Commands menu lets you customize the key bindings (key commands) for almost all operations; it applies them globally to all DP3 files. If you're used to the key commands of another application, such as Studio Vision, you can apply its key-binding scheme; DP3 provides key-binding setups for several popular programs.

Once you get Digital Performer and your templates arranged, you can apply other techniques to boost your productivity. If you have a quick question about the function of a button, knob, or command, Digital Performer provides a handy built-in Help file. Place the cursor over the item in question and hold down Command + Option + Shift; a little balloon pops up with a simple explanation of the feature. Not all the explanations are clear or detailed, but they serve well as a reminder of basic operations.

Markers are a great way to identify sections of a song or specific cues and hit points in a piece of music. You can add

Markers in real-time while the sequence is playing, and the key command to add a Marker can be customized (I use Control + M). If you create a Marker that you wish to delete later, just drag it downward in the Tracks Overview window until you see the little garbage can appear. Immediately to the right of the position bar in the Transport Control Panel is a little arrow that accesses a drop-down menu of the Markers. You can use that menu to, say, jump quickly from the first verse to the last chorus of a song after you have your Markers in place.

MAXING THE MIXER

Digital Performer's Mixer window is both elegant and extremely powerful. One of the features that I really like is the ability to "glide" (click, hold, and drag) across buttons in the Sequence Editor and Mixer windows to enable or disable record, mute, and automation functions for a number of tracks in one sweep.

One little-known feature is the pre/post divider line in the insert section. At the bottom left of the inserts is a small box; position the cursor over the box and a set of arrows appears (see Fig. 2). Dragging the arrows produces the divider line, which you can place anywhere within the number of inserts that you have designated (you can have as many as 20 inserts per channel). All insert effects above the line are prefader effects; all inserts below are postfader effects.

One of my complaints about the mixer in Digital Performer is that it provides only four sends per channel. Although each send can be routed to any available destination, it's an odd limitation given the fact that each channel can have up to 20 inserts. There is, however, a fairly easy work-around: create an aux track. Route the output of your original track to an unused bus (or bus pair for stereo), and make the input of the aux track the same bus. That provides you with 4 more sends, 20 more inserts, and another fader. Of course, you can chain even more aux tracks without worrying about signal degradation.

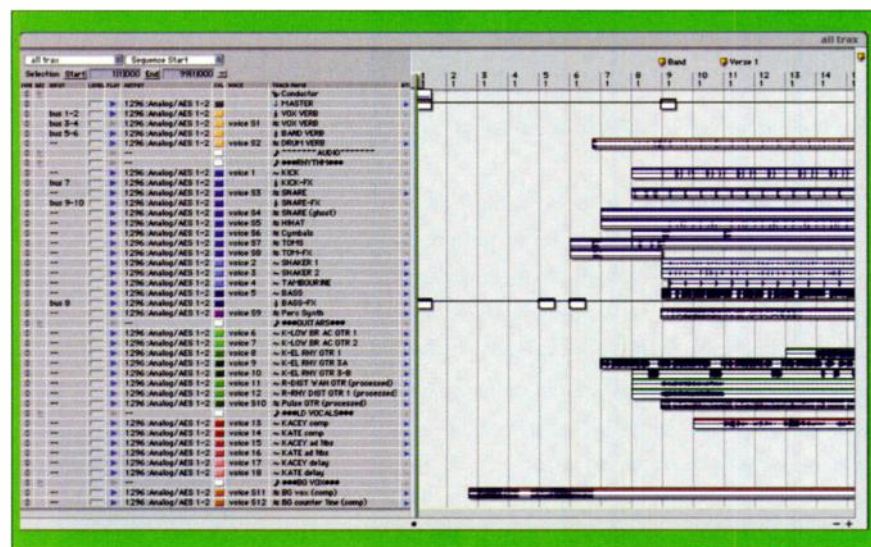


FIG. 1: In this example, the track layout is organized by instrument type as well as by color to aid in identification and editing. The drums and bass are assigned different shades of blue, the guitars are green, and the vocals appear in the red-orange color range. Digital Performer provides many basic color schemes, and users can customize the color palette as needed.

KEYS TO PRODUCTIVITY

The Option, Control, and Command keys are your friends, so it's worth getting

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Check out online demos of the new PLG boards at www.motifator.com



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to know what they can do for you. If you're like me and prefer to use key commands whenever possible, take a few minutes to check out the main DP3 menus while holding down each of those keys. You'll find an altered set of commands that you may not have known existed. (You can further customize those operations in the Commands window).

Of the three modifiers, the Option key is the most powerful. For example, Option-clicking on a track name lets you rename the track. You can also use the Option key to "gang" various operations, such as adjusting two sends simultaneously or programming multiple channels in the Delay plug-in. When you hold down the Option key in the Sequence Editor, resizing adjustments made to one track apply to all visible tracks. That makes it easy to change the waveform scaling or height of all tracks to the same size in one move.

Holding the Option key in the data display area of the Sequence Editor



FIG. 2: Clicking the tiny box in the lower left of the insert section (as seen in the first channel) produces a double-arrowhead cursor (as seen in the third channel). You can then drag the dividing line to separate the prefader from the postfader effects. In channel two the divider appears between Trim and Delay.

brings up the Zoom tool. Drag over an area while holding the Option key, and the selection fills the edit window. After making your edit, hold down the Shift key and Option-click, and your zoom resolution returns to its original setting. Nifty, huh?

The Command key is one of my favorite modifiers. I often use it to reverse the behavior of the edit snap-to-grid feature in the Sequence Editor. If snap-to-grid is turned on and set to 16th notes, for instance, holding the Command key down lets you drag notes or waveforms without having them snap to the nearest 16th-note position. That also works in reverse: if the Snap button is turned off, holding the Command key temporarily activates the snap-to-grid function. Command-double-clicking an audio waveform in the Sequence Editor also automatically opens that Soundbite in the waveform editor without making you hunt around for it in the Soundbites window.

The Edge Edit Copy command is another important feature in the Sequence Editor. When it's turned off (unchecked) as it is by default, changing the edge of a Soundbite (making the Soundbite shorter or longer) affects all copies of the Soundbite that appear in the file. For example, if you have a four-bar background vocal phrase that you have copied several times throughout your song and you wish to make the last chorus version only two bars long, dragging the edge of the Soundbite to shorten it would also shorten all of the other phrases. With Edge Edit Copy turned on, however, any edits made to the length of a Soundbite automatically create (and rename) a new Soundbite, leaving the others untouched. Of course, if you make a lot of changes to the edges of various Soundbites with this feature turned on you can accumulate a lot of unnecessary Soundbites. Using the Edge Edit Copy feature selectively and deleting unused Soundbites should keep things in order.

CLEVER CLIPPING

Clippings are one of the most powerful and underutilized features in Digital Performer. A Clipping window is like a



FIG. 3: The Clipping window is a handy way to store and retrieve a variety of data types. In this window, MIDI, audio, graphics, and text files appear along with effects setups.

clipboard on steroids, allowing you to save a combination of data types for later use (see Fig. 3). There are two types of Clippings: Digital Performer Clippings (DP Clippings) are global and are available to all Digital Performer files; Project Clippings are available only within a specific file. You can save MIDI and audio track contents in Clippings, which is a slick way to move extensive track data from one file to another.

If you drag the Clipping window contents of multiple tracks to the left pane of the Tracks Overview window, the contents will be pasted in, and the track names and I/O assignments will also be automatically created. The only requirement is that each track contain at least one data event. I recently created a Clipping window that contained my 47-track MIDI orchestral template. I put a single starting MIDI Volume event in each track. Now, in one move, I can add my complete sweetening setup of tracks to an existing sequence.

One of the best uses of Clippings is to save a group of insert plug-ins in a sort of "superlibrary" of effects chains. Let's say you've set up three insert effects that you really love—a compressor, an EQ, and a tape-simulation effect—for a vocal track. Those effects and their settings can be saved as a Clipping and called up any time you want to repeat that sound without having to manually call up each effect and setting.

First, create a new Clipping window (create a DP Clipping window if you want to be able to use the chain in any file) and give it a name, such as "My favorite

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VOX FX." Move the new Clipping window to a place where it is still visible with the Mixer window open. Shift-click on two or more effects on a channel in the mixer to highlight them (this works only with plug-ins in series on the same track); then, move the cursor to the left side of the highlighted inserts. A hand icon appears; simply grab the highlighted insert effects and drag them to the Clipping window where they appear as a single Clipping item. You can rename the Clipping later if you want.

When you want to use that effects chain, just reverse the process: open the desired Clipping window and drag the Clipping onto the inserts of the destination track. (The icons for DP Clippings and Project Clippings are different in the Clippings drop-down menu.)

TAKES AND BUNDLES

With DP3's new Audio Bundles window (see Fig. 4), you can store and recall elaborate multichannel I/O setups, which is helpful for managing routings to multiple hardware boxes and surround mixes. However, things can get a little confusing with all that I/O, because Audio Bundle configurations are not saved globally; they're saved individually with each file. That can be especially confusing if you open a file that originated from someone else's setup. To preview Soundbites through your main output pair (with the speaker icon toggled on), be sure that the outputs you wish to use are at the top of the list in the Output section of the Audio Bundles window. (They can be dragged into the desired order.)

DP3's handy Take function enables each track (MIDI and audio) to hold an unlimited number of performances. In Record mode, Option + Control + N creates a new Take. If you set loop points and highlight the Overdub button, you can cycle through a section re-



FIG. 5: The Studio Configuration dialog box lets you optimize hard-drive performance by setting the buffer size per voice.

peatedly and record multiple Takes in real time without stopping. The Takes are numbered sequentially for you to sort through later. That's a great feature for tracking solos or other difficult passages.

One cool feature that is commonly overlooked is the ability to simultaneously switch Takes on multiple tracks instead of switching them one at a time. That capability comes in handy, for example, when comping multiple passes of multitracked drums. Leaving the group of tracks in Record mode, you can hold down Option + Control and use the up and down arrows to scroll through the Takes. However, remember that you must leave the tracks record-enabled for this feature to work. Because you're only playing back while auditioning Takes in this fashion, it's not a problem. As an extra precaution, be sure you have recently saved your file.

BAFFLING BUFFERS

There are two types of buffers in Digital Performer, and they each affect the program differently. The first type is the voice-allocation buffer (Studio Configuration), which determines the size of the read/write buffers for each audio track (see Fig. 5). That buffer setting is related to hard-drive performance, not the latency of input signals. The higher the buffers are set, the longer it takes to



FIG. 4: The Audio Bundles window allows elaborate routing of inputs, outputs, and buses. In this composite graphic, a 5.1 surround mix is assigned discrete outputs on a MOTU 1296 audio interface. Input and output assignments are created and edited in separate displays.

SETTING UP VIRTUAL INSTRUMENTS

The process of setting up native MAS and VST instruments in Digital Performer is not overly complicated, but the procedures are different for each type. Be sure to increase the amount of memory allotted to Digital Performer, because plug-ins and instruments use DP3's RAM. I'll cover how to set up three popular virtual instruments in Digital Performer: Native Instruments' B4, Steinberg's Halion, and Propellerhead's Reason.

B4

B4 supports the native MAS format and does not require a shell. The application runs independently in the background (as do all Native Instruments soft synths), and upon proper installation, a file called "B4 input" appears in the MOTU Plug-ins folder in your Extensions folder. After starting Digital Performer, open B4. Under the System menu, set the Audio Port to Digital Performer/MAS and, in MIDI Settings, choose FreeMIDI from the Selected MIDI System drop-down menu.

In Digital Performer, create an aux track and name it "B4 return" or "B4 monitor." That is where you will hear the playback while sequencing. For the input of the aux track, create a new stereo Audio Bundle, choosing "B4 1-2." You can now select a B4 MIDI channel as the input to a MIDI track.

After you have sequenced your organ part, simply create a stereo audio track and choose "B4 1-2" as the input. (It will automatically show up.) Mute the aux track and record the file to hard disk. If you want to monitor the organ track as it's being recorded, set the Input Monitoring Mode (under Basics/Configure Hardware System) to "Monitor record-enabled tracks through effects."

HALION

Halion is a VSTi sampler that is currently being hailed as GigaStudio for the Mac because it streams large sam-

ples from the hard drive in much the same way (see Fig. A). It may not be GigaStudio, but it is extremely powerful. It requires the use of a VST shell; currently the best one to use is Audio Ease VST Wrapper 3.0, which allows multiple VST instruments to run at the same time. In addition, all settings for VST instruments and plug-ins are saved with the Digital Performer file.

Start by creating a mono (not a stereo) audio track in Digital Performer and name it "Halion." Open the Halion plug-in under VST Wrapper as an insert effect; that automatically changes the mono track to a stereo track. Sixteen Halion MIDI channels are now available for sequencing, and you can repeat the process for multiple instances of Halion (as much as your CPU can bear).

The "Program and ST 1+2" outputs of Halion default as the inputs to the audio track that I created for monitoring and can't be used for recording. When

you're ready to record the tracks, assign the outputs of the Halion instruments to any of the other available 3 through 12 channels in the Chan/Prog page. A dialog box under Options lets you assign Halion output channels 3 through 12 to Digital Performer buses. (The defaults are buses 1 through 10.) Create the appropriate mono or stereo audio tracks in Digital Performer and set the proper buses as the inputs, and you're ready to go. (As before, if you want to monitor the tracks as they're being recorded, set the Input Monitoring Mode to "Monitor record-enabled tracks through effects.")

REASON

Reason is a self-contained virtual MIDI studio that even includes a matrix pattern sequencer. Many people don't realize that, in addition to synchronizing

Reason's playback with Digital Performer, you can use Reason as a stand-alone sound module, allowing you to sequence entirely in Digital Performer, using Reason sounds alongside your other sound sources.

To use Reason, you must run Digital Performer under OMS or use OMS Emulator with FreeMIDI. Open Digital Performer first, then open Reason. If you're running FreeMIDI to synchronize the transports of Reason and Digital Performer, set the FreeMIDI Preferences to FreeMIDI Applications Only and check the Interapplication



FIG. A: Steinberg's Halion is a powerful VSTi sampler, but you'll need a VST shell to use it with Digital Performer.

MIDI box. If you're using OMS, check "Play in background."

Create an aux track and name it "Reason"; then, create a new stereo Audio Bundle input to the aux using "Reason mix 1-2" or any of Reason's 64 outputs. (You can also create multiple auxes for monitoring various output pairs of Reason.) The MIDI routing to the various modules in Reason is handled by the MIDI patch bay in Reason; the modules now show up in Digital Performer's MIDI instrument list.

When you're ready to record the tracks, simply mute the auxes, create the desired number of audio tracks, and set the inputs appropriately from the choice of Audio Bundles. (If you want to monitor the tracks as they're being recorded, remember to set the Input Monitoring Mode to "Monitor record-enabled tracks through effects.")

[illegible]

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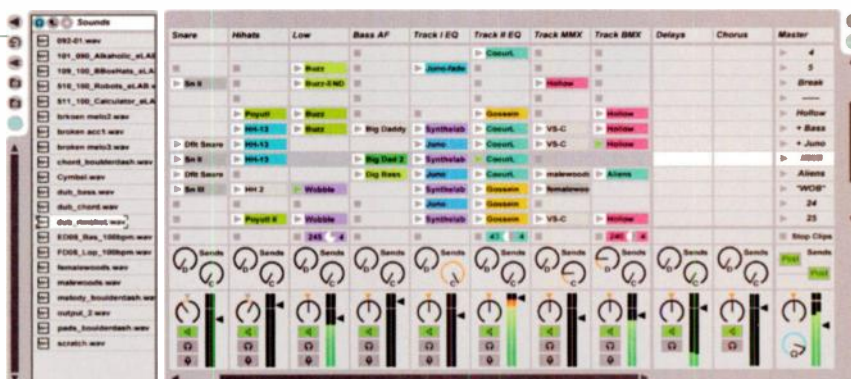
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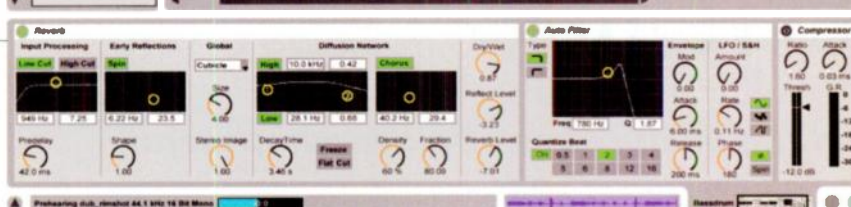
Real Time Audition

Audition audio clips along with your music in Reason, Logic, Nuendo, Cubase, and Digital Performer. Audition via headphones before dropping the clip into the mix.



Real Time Effects

Drag and drop effects without stopping the music. Chain Live's built-in high-impact FX (including one of the finest reverbs you'll ever hear) and VST plug-ins in each track, the master and up to four send channels.



Real Time Quantizing

Playback, record, and loop audio clips, at the same time. Live's unique Real Time Quantization keeps it all sync'd and in time, all of the time.

Connect Yourself

Connect via multi-channel soundcards, ASIO, Direct X, Mac OS 9.x, Mac OS X, ReWire (master and slave), and VST.

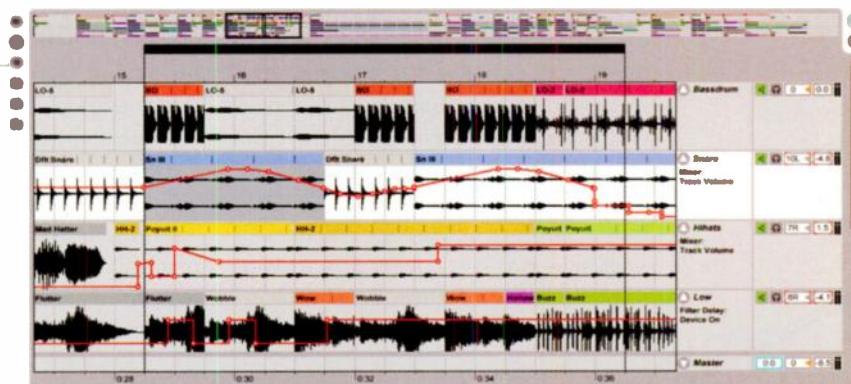
Real Time control

All mixer and FX parameters can be fully automated and operated using any MIDI controller.

live. sequencing instrument

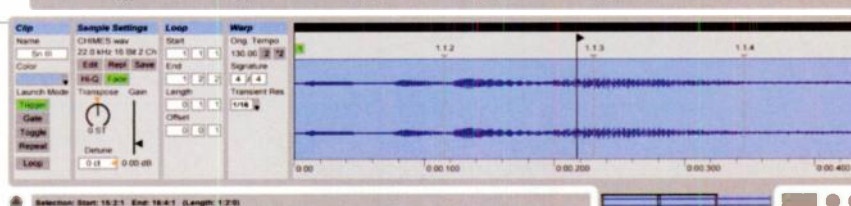
Time Warping

Bring together audio from any source. All clips will automatically play with the project tempo—even long pieces with tempo changes. You can even scale the tempo of each clip relative to the project tempo, and it always stays in sync.



Launch Modes

Not all clips are played equally, so Live offers more launch modes than any other software. Trigger, Gate, Toggle, Repeat, and Loop. Tell your clip when to start and stop, to play once, to play forever, to stutter, and more.



Say goodbye to your hardware sampler

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CPU Recycling

You can extend the useful lives of older computers.

By Zack Price

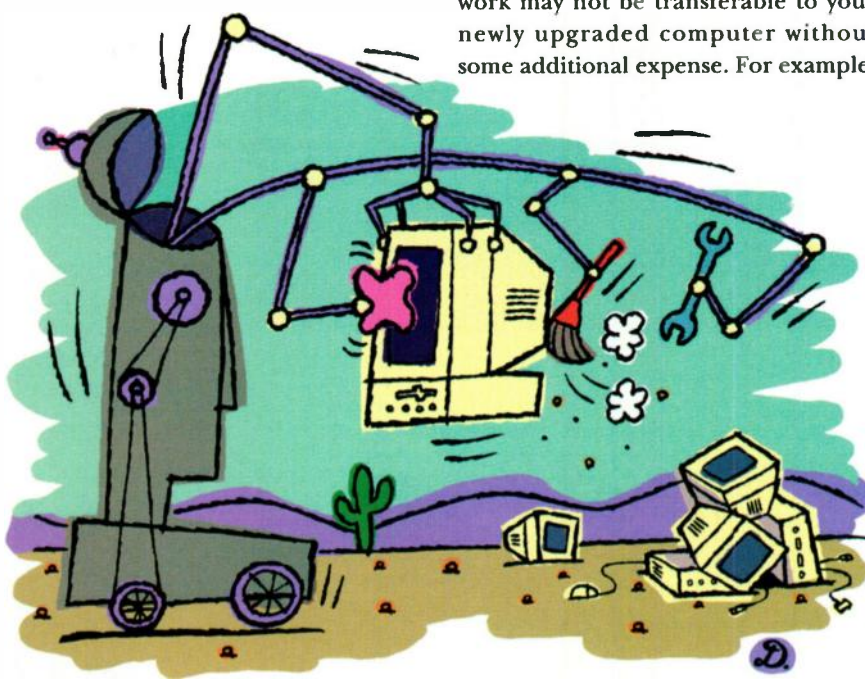
Congratulations—you've just bought a brand-new computer! In your enthusiasm over your latest purchase, however, you probably haven't considered what to do with your old computer. You could sell it, but you'd be lucky to recover a quarter of its original cost, even if the system is only two years old. Furthermore, the specialized peripherals you bought just to make that stock computer usable for music-related work may not be transferable to your newly upgraded computer without some additional expense. For example,

new Macs no longer have serial ports, which means you can't use older serial MIDI interfaces with them unless you also purchase a serial-to-USB adapter. And despite their potential for accommodating legacy technologies, new Windows PCs work best when used with the latest, fastest peripherals.

Although your old computer may not have much resale value, it's far from worthless. After all, it's a finely tuned machine that you've configured over time to operate at peak efficiency. You know what it's capable of doing, so why get rid of a familiar and valuable computer just because it's no longer your fastest system? With a little effort, planning, and maybe a small cash investment, you can still find plenty of uses for your aging computer.

TAKING INVENTORY

Before deciding what to do with your older computers, take an inventory of each machine's processor, RAM, operating system, and ports (see the table "Taking Inventory"). That should be easy to do, because computer users generally update their systems according to the platform path they started on. For example, Pentium 4 owners are often former Pentium III users and were often Pentium II owners before



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that—they might even have an old 486-based system lying around. Likewise, current Mac G4 owners were probably G3 owners and might also have a 604e or Quadra system somewhere in a closet.

Next, take stock of all the software and peripherals that you own and make note of their connection protocols. If you're like me, you've collected a number of sound cards, MIDI interfaces, and many versions of software over the years. In addition, you probably have older versions of the same programs that may be best suited to specific system speeds and operating systems. That's especially true for Mac users, and it's becoming more common for Windows users, as well (see the sidebar "Tales of the OS").

Also, note the connection protocols that each system currently supports or can potentially support. From that, you can determine how easily your current computers can work with each other and what type of investment you'll need to make to enable current and future systems to interact. For example, all my Pentium systems have USB ports, and my Pentium II/450 MHz and Pentium II/300 MHz are also set up to share external SCSI devices.

Although I could also configure my Pentium III to share SCSI devices, I want to invest in hot-swappable FireWire peripherals for the Pentium III and any future systems. Fortunately, the Pentium II systems also have the required CPU speed, expandability, and

operating systems to employ FireWire devices. Even though the initial cost may be greater, configuring all three systems for FireWire technology extends their usefulness further into the future.

Making a detailed list of your computer systems, hardware peripherals, and software will help you to determine when it's feasible to take advantage of used or closeout technology for your older machines. For example, Mac users who had NuBus systems were able to pick up reconditioned NuBus versions of Pro Tools systems at bargain prices a few years ago when Digidesign introduced PCI-based Pro Tools systems.

As always, there are plenty of good deals that extend the scope and power of older systems. However, remember that products become closeouts for one of three reasons: an improved version is about to be released, the product never met sales expectations, or the product doesn't work well. Thoroughly investigate the item in question before you buy.

PRIMARY TASK

Once you've taken inventory of all your older systems, consider what the primary task of your new computer is. For example, many musicians use their fastest system for multitrack hard-disk recording and use a slower computer for MIDI sequencing. Some musicians, however, use their fastest systems for playing virtual synthesizers and samplers because it takes more processing

power to play virtual instruments than to perform hard-disk recording.

In addition, ask yourself if you need to network your computers to share information (for a detailed discussion of LANs, see "Linking Up" in the August 1999 issue of *EM*) or if you'd prefer to treat each system as an independent platform. I treat each of my computers as an independent platform because doing so offers greater flexibility, and I can distribute tasks among different computers in a way that takes advantage of each system's strengths.

As you read about applications for slower computers, keep in mind that *older* and *slower* are relative terms. Some of you might find it difficult to view a Pentium II/300 MHz or a G3/266 MHz as a slower system if that's the fastest system you own. However, speed (or the lack thereof) isn't the point. You need to think in terms of what you can do with your various computers and the role that each computer can play in your studio.

PROPER SEQUENCE

You can use just about any computer for MIDI sequencing as long as you have the appropriate software and MIDI interface. For instance, musicians who perform live and rely on presequenced material often use an older laptop or a compact desktop computer, such as a Mac Plus or a Performa, purely as a playback sequencer. An entire setlist can reside on a few floppies or on the computer's hard drive, and some sequencing programs include file-playback utilities that allow you to organize your setlist.

A word of advice, however: if you create your sequences on your new desktop system, be sure that the sequence files you generate are supported by the sequencer version you're using on the older system. Many programs change their native file format as they update, and they aren't always backward compatible. The safest bet is to use Standard MIDI Files for live work.

Older computers with multiport MIDI interfaces can also control MIDI lighting systems in sync with MIDI instrument playback and MIDI-controlled effects processors. However, sometimes it's better to use separate

Taking Inventory

This table lists my current collection of older computers. It shows each system's specs, so I can determine how easily the computers can work with each other and which tasks they are best able to perform.

CPU	RAM	OS	Ports
Pentium III/1 GHz	512 MB	ME	standard, USB
Pentium II/450 MHz	256 MB	ME	standard, USB, SCSI-2 (external devices only)
Pentium II/300 MHz (laptop)	160 MB	98SE	standard, USB, SCSI-2 (external devices only), PC Card (2)
Pentium MMX/200 MHz	64 MB	98SE	standard, USB, SCSI-2 (internal devices only)
40486 DX2/66 MHz (laptop)	20 MB	95	standard, PC Card (2)
Atari 1040STe	1 MB	TOS 1.4	serial, parallel, DMA, MIDI, In/Out

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computers for sequencing and lighting, depending on the amount of MIDI data each application generates. After all, you don't want your show to suddenly stop or go dark because the MIDI data stream got clogged. Just be sure that both systems have at least dual-port MIDI interfaces, so you can set one computer as the slave to the other using MIDI Clock.

Older computers can also work very well in a studio setup. For instance, despite the capabilities of computer-based digital audio workstations (DAWs), some studio operators still prefer to lay down tracks on tape because they don't have to deal with the problems associated with computer-generated noise. Using a quieter, older laptop or tabletop system to synchronize virtual MIDI tracks with physical tape tracks may reduce computer noise to manageable levels. Better still, using an older, air-cooled computer such as an Atari 1040ST eliminates computer-noise problems altogether.

SYNTHS AND SAMPLERS

Computers have been potential synthesizers ever since the first sound cards were installed, and the sound quality of those cards has steadily improved since the early days when cheesy FM synths were the norm. Now sound cards use system RAM to play back high-quality sampled instruments. Granted, you may have to record and play back the instrument parts through a sequencer running on the same platform as the installed sound card, but you can also use MIDI Clock to slave the sequencer to the sequencer running on your faster machine.

Furthermore, hardware-based synths and samplers for computers aren't just limited to inexpensive multimedia cards. Professional products such as Symbolic Sound's Kyma sound-design system or Digidesign's Sample Cell II use PCI cards and run on modest Pentium and Mac systems. You may even manage to come across ISA or NuBus versions of those products.

Nowadays, though, standalone software synthesizers and samplers are the norm, and computer requirements for those virtual instruments vary widely. In addition, the number of parts the

synths and samplers can play simultaneously depends on platform performance. Although some software instruments perform adequately on a Pentium/166 MHz or a modest G3, you can expect polyphony to increase in proportion to increases in processor speed. A faster processor also means you'll be able to play progressively more complex instrument patches.

Some software synthesizers and samplers are actually total music-production programs. Propellerhead's ReBirth 2.01, for example, includes emulations of two Roland TB-303s, a TR-808, a TR-909, and a 16-step, 32-pattern sequencer for each part. The program has relatively minimal system requirements—a Pentium/

75 MHz PC or a Macintosh with a 601-based 66 MHz processor—and can sync to other sequencers using MIDI Clock. More sophisticated music-production programs such as Arturia's Storm, Sonic Syndicate's Orion Pro, and Propellerhead's Reason have more demanding system requirements but can still function adequately on modest Pentium II and G3 systems. Their sequencers can also sync to incoming MIDI Clock, thus expanding the main sequencer's virtual tracks to another platform.

ROUND AND ROUND

If you own a digital-audio-editing program that lets you assign MIDI note numbers to sound files or sound-file

TALES OF THE OS

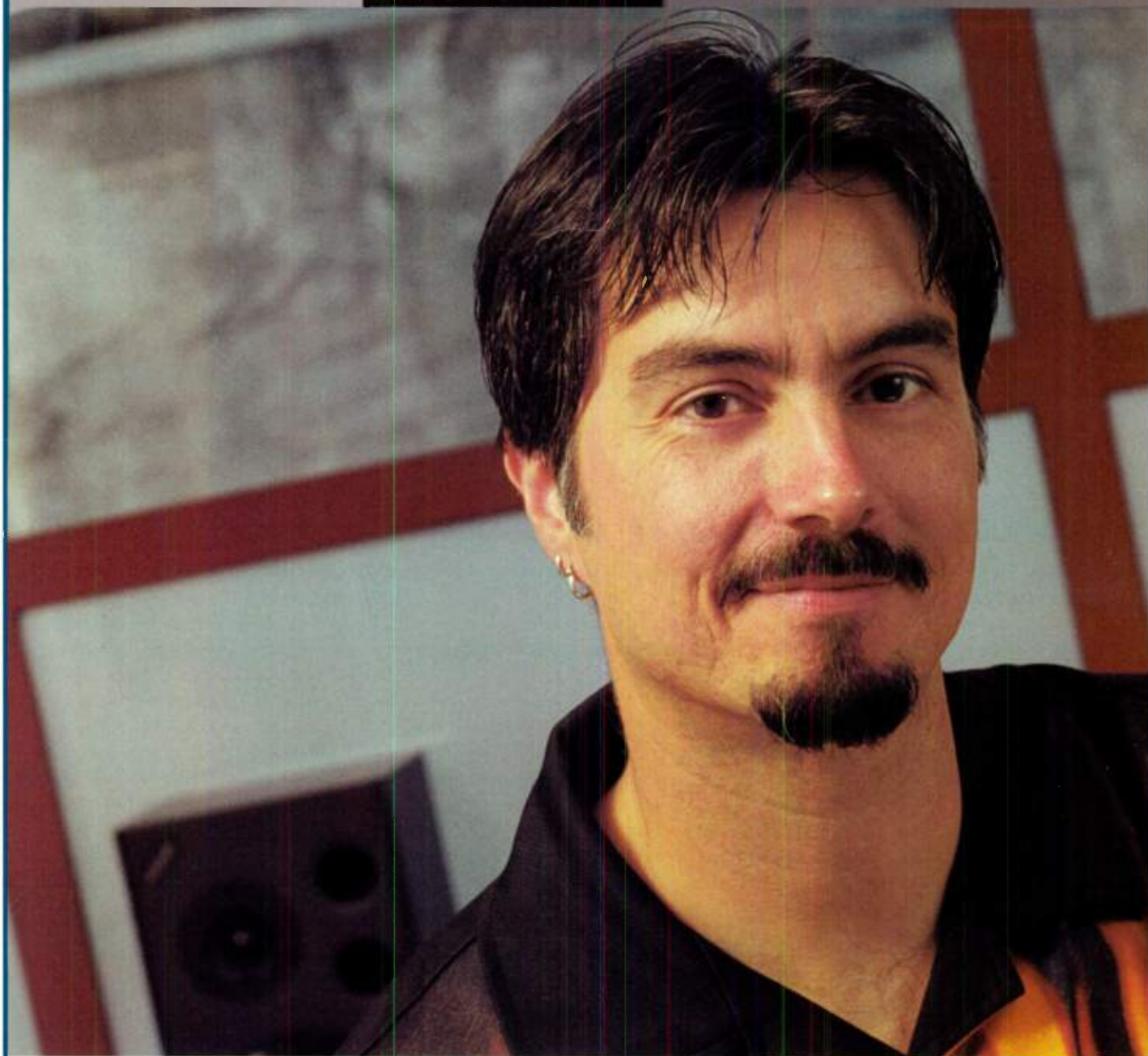
Following a single-platform path makes you familiar with the history of its operating system, which is important when you're trying to determine what software you should use with a particular computer. Mac computers and operating systems, for example, have historically had major upgrades on a regular basis. Major Mac OS changes in the past have often caused big problems for users running older software and hardware. Some programs didn't function in fast machines with Mac OS 8, for instance, but worked just fine in a slower SE30 running Mac OS 7.5.5. Furthermore, some old installers wouldn't work with OS 8, so you couldn't reinstall those programs if you had a disk crash. OS X is the latest significant release, and it isn't providing a very smooth transition for Mac-based music makers, either.

In general, OS changes have not been as much of a problem on the Windows side. Software that worked in Windows 3.1 usually works in Windows 95, 98, and ME. The only programs that don't follow an upward path are applications such as disk utilities, which work with a specific version of the operating system. On the other hand, Windows programs are

not necessarily backward compatible. For example, an application written specifically for Windows 95 might not work under Windows 3.1.

Windows musicians have had other troubles to contend with, as well. It was often difficult to find audio and especially MIDI programs that worked well in Windows NT. One reason was that many audio cards and MIDI interfaces didn't have NT drivers, so even if the software could run, there was little hardware support. Also, NT had serious MIDI-timing problems, which prevented an otherwise robust OS from working with many music applications.

However, Windows 2000 and the recently released Windows XP rectify many of those problems. MIDI-timing problems have been corrected, and the development of WDM drivers offers a simpler and faster way for the OS to interact with audio cards and MIDI interfaces. Some programs will have to be updated to take advantage of WDM, and card developers will need to update drivers to the WDM standard to stay current with XP and 2000 software. Fortunately, the transition to 2000 and XP seems relatively smooth for Windows users. Even so, hang on to your older operating systems. You never know when you'll need them.

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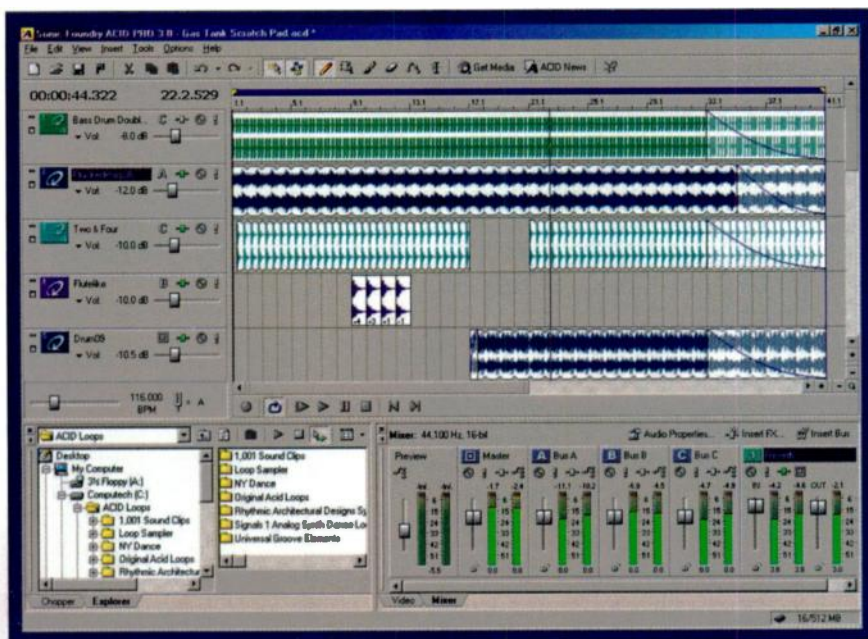


FIG. 1: Sonic Foundry's Acid Pro 3.0 is one of several powerful music-production tools that still run fine on earlier CPUs.

regions, you have a ready-made simple phrase sampler that can easily run on older computers. You can precisely trigger drum loops with Note On data or improvise with loops and phrases using Note On and Note Off messages to change phrase lengths. You can also use such a setup to drop in sounds on the fly, triggering them with MIDI or with a keystroke.

With a faster system, you can create loop-based music arrangements. For instance, Sonic Foundry's Acid Pro 3.0 performs quite well on Pentium II systems and can synchronize to an external MIDI Clock (see Fig. 1). A similar program, BitHeadz Phrazer, works with Mac G3 systems. It not only synchronizes to MIDI Clock but also uses MIDI Note On messages to trigger phrase loops and to mute and unmute loop tracks.

CREATE AN EFFECT

While most DSP-based computer DAWs usually include some form of effects processing on their cards, standalone card-based effects processors have been a rarity. The Lexicon NuVerb and the DSP-FX PowerFX cards are excellent NuBus and ISA effects-processor cards and make great acquisitions if you have

older systems that are able to accommodate them.

Currently, though, most effects processors are host-based plug-ins and require the appropriate digital-audio application. Many plug-ins process only recorded digital-audio tracks, although it's becoming more common for programs to allow users to process incoming audio if it is being simultaneously

recorded. Software that can process live audio without recording it is even common. DSound's RT Player Pro for Mac and Windows, among others, turns computers with VST plug-ins into real-time multi-effects processors (see Fig. 2). As a bonus, RT Player Pro also lets you play VST Instruments as standalone synths and samplers in real time without a host application.

I LIKE IT LIKE DAT

It's a given that eventually you have to mix down your music to a stereo format. If you work exclusively with digital-audio tracks, you can record a virtual mix directly to a stereo file on the same platform. However, if you record on an MDM or combine audio with MIDI tracks, you probably mix down to a separate DAT deck and then transfer the digital audio back to the computer for final mastering.

Why not eliminate one step in that process and mix down directly into an older computer? A computer that's equipped with a high-resolution audio card and the appropriate software could allow you to mix your music with 24-bit resolution. You could use the same computer to perform the necessary edits and side sequencing without tying up your main computer. With an onboard CD-R drive, you could



FIG. 2: DSound's RT Player Pro can turn computers into real-time multi-effects processors using VST plug-ins. The program also lets users play VST synths and samplers as real-time standalone instruments that don't require sequencer-oriented VST hosts.

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even burn your master right there or archive the sound files and session settings onto a CD-ROM.

Moreover, an old laptop computer could substitute for a portable DAT deck. With a high-quality PC Card or USB digital-audio interface, you could easily record 24-bit stereo files live and perform all the editing and processing on location, if necessary. Tote a CD-R drive along and you can hand the client a finished CD right on the spot.

THAT'S SHOWBIZ

So far, all the uses mentioned for older computers have centered on ways of making music. However, the music business is a business, and it's a good idea to keep business-related applications—such as accounting, word-processing, contact management, and scheduling software—on a separate system. Most business applications really don't demand a fast computer, and you don't need a fast computer to run a basic telecommunications center that handles voice mail and faxes.

You might also want to use an older computer if you do a lot of Web browsing and file downloading. That secondary system can act as a fire wall that allows you to check downloaded files for viruses and to verify that downloaded programs decompress and run properly. Once you determine that the programs are safe to use, you can transfer the downloaded files to the appropriate work system.

OLD DOGS, NEW TRICKS

The preceding examples demonstrate just some of the ways in which you can make your older computers work for you. In some cases, they extend the capabilities of your fastest setup. In other cases, they provide an alternative means of performing a particular task. Either way, it should be apparent that your older computers still have plenty of life left in them as long as you give them a reason for living.

Zack Price spends way too much time playing with the ghosts in his machines.

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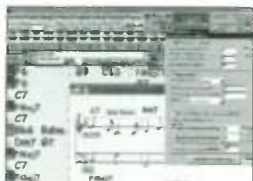
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This interactive program is designed to help you learn to solo like a professional jazz guitarist. Musicians studying improvisation frequently learn by copying other soloists' performances. Since guitar is a "visual instrument", it is often easier to learn to play by watching the fretboard than by reading the music from a staff. The on-screen guitar fretboard in The Master Jazz Guitar Solos PAK shows you exactly which notes and chords are being played, in real time as you hear the music. We've even included "guide notes" for common fretboard positions that are displayed on the on-screen guitar fretboard to help you learn the note names, string and fret positions. The Master Jazz Guitar Solos PAK contains over 150 songs designed to illustrate basic skills to the beginning guitarist while enhancing the skills of more advanced guitarists.

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Breaking Up Is Hard to Do

Calling it quits can yield legal and financial struggles.

By Michael A. Aczon

There are four words that should be a reality check for every band that takes on the music industry: *the Beatles broke up*. Despite all efforts to maintain an “all for one, and one for all” approach when you are making music, the fact remains that at some point, your entertainment entity will be restructured, whether that involves a shuffle of personnel or the actual dissolution of the band. A number of business issues will arise when it

comes time for you to break up the act.

This discussion could apply to a number of entertainment businesses. Production companies, songwriting teams, and studios are all similarly affected when personnel, art, and ego shake-ups occur. Throughout this column, I'll refer to all of these entities collectively as an *act*, so fill in your particular business structure where necessary.

IS IT REALLY OVER?

The first issue to address is determining if the members of an act really intend to break up. Taking apart a business entity is tricky stuff, and the decision to do so should be objectively thought through rather than be based purely on emotion.

Decide among yourselves whether the occurrence of certain actions—such as skipping rehearsals, meetings, recording sessions, or gigs—is enough to be interpreted as a desire to break up the act or whether those actions merely signal the need for better and increased communication. The phrase “I quit!” shouted out by a bass player during a particularly frustrating recording session doesn't quite have the finality of a letter signed by all parties stating that they wish to break up the act.

Many legal battles have been fought



No level of success can ensure that your band will stay together. The Beatles are proof of that.



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over whether a member of an act voluntarily resigned or was forced out against his or her will. The terms of a member's separation from a band help determine whether that person is entitled to a buyout of the business (sometimes worth hundreds of thousands or even millions of dollars) or is left out in the cold with no piece of the action in present or future earnings. Once it is agreed that breaking up is indeed the best course of action, then a variety of issues should be carefully reviewed.

DIVVYING UP

Breaking up an act is much like divorce. From beginners to multi-Platinum-selling superstars, one of the major issues of a breakup is the property settlement. Deciding what to include in a property settlement, what the value of each asset and liability may be, and how to split it all up can range from being very simple to very complicated.

First of all, it is a good idea to separate real and personal property from intellectual property. Real property and personal property can be identified and have their value determined relatively quickly. Intellectual property's potential value, on the other hand, is trickier, because intellectual property usually does not have a dollar figure attached to it until it generates royalties.

Real property is real estate and any rights attached to real estate (such as a lease or a lien). Personal property includes the *hard assets* owned by an act such as money, equipment, and vehicles. Identifying cash in the bank is a pretty straightforward matter, provided there are no questions regarding accounting methods, loans made to members of the act, or unpaid bills. Issues may arise when it comes to equipment, because many acts commingle their gear when putting together a band or a studio. I've seen individual members of some acts each "take back" what they originally brought into the act and then split up the equipment that's left; others

or by selling all of the equipment and splitting up the money.

Take into account that the price of real estate, audio, and studio equipment can fluctuate. A rehearsal or recording warehouse that is co-owned or leased at a long-term rate may be worth more or less after an act breaks up because of market rates or rental to another business. A recording console or vintage amp may be one of those rarities that has increased in value over the years or, conversely, ends up worth much less at current street rates than the original purchase price. For this reason, enlisting the aid and appraisal of an expert is advised when splitting up hard assets.

▼
**One of the major
issues of a breakup
is the property
settlement.**

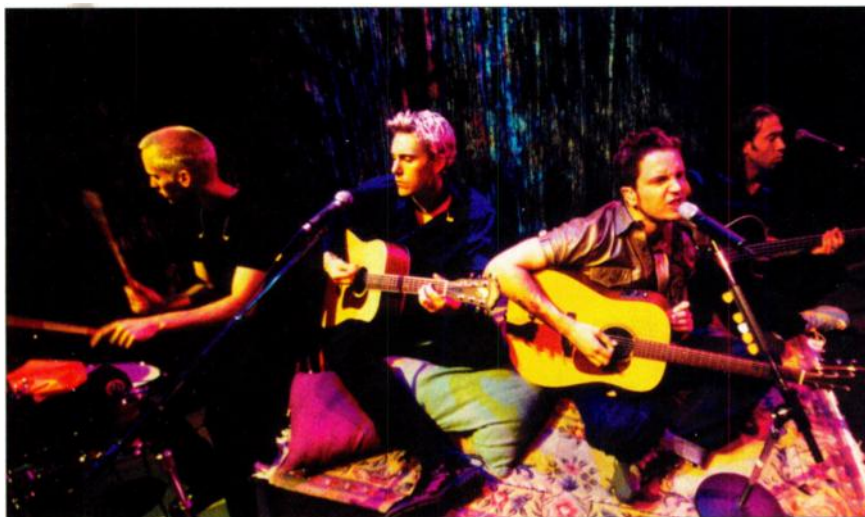
will treat the gear they brought in as being of equal value and then split up all the equipment. This can be done by all members agreeing on dollar figures for each piece of equipment and taking out their individual shares in pieces

INTELLECTUAL PROPERTY

Potentially more valuable than real property and personal property rights are intellectual property rights. Trademarks, copyrights in songs and masters, clients lists, who owns or administers these rights, and the future earnings generated from these various forms of intellectual property should all be considered when breaking up an act.

The name of an act is a trademark and is the act's most valuable asset. When an act breaks up or restructures, a major issue to consider is whether the act's name should be extinguished completely, should not be used by anyone, or should continue to be used by any of the individual or collective members. Alternatively, the issue of how a member who leaves the fold may use the act's name is sometimes hotly contested. I recently spoke to a promoter who almost had to cancel a concert because it featured an artist who left a big-time act, promising not to use the band's name in any manner. It turned out to be a legal no-no to advertise the artist using the phrase "formerly a member of —." Many of the "reunion" or "revival" acts that tour around the world today contain only one or two members of the act that made the name famous, but those are the members who were able to obtain ownership of the name and the right to use it as performers.

Ownership of master recordings and musical compositions is another major



STEVE JENNINGS

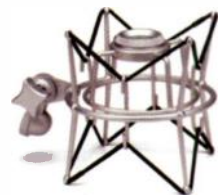
Shortly after being fired from Third Eye Blind in February 2000, guitarist Kevin Cadogan (second from left) filed a lawsuit against his former bandmates and their management, attorneys, and record label, claiming he was denied songwriting credits on several of the band's songs and was promised 50 percent ownership of the band. The case settled out of court in June 2002; details were not disclosed.

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issue when it comes to breaking up an act. With the millions of dollars made in the licensing of masters and songs, it is important to establish which of the various shares of these valuable assets, if any, belong to the members of the act, particularly those members who are leaving an act. Along with the ownership rights (thus the right to participate in future fees and royalties), it is important to consider which parties are allowed *administration rights*, meaning the right to seek uses, make deals, and collect money in connection with the masters and songs.

As with real estate or equipment, the valuation of intellectual property rights can sometimes require an expert. Obviously, the bigger and potentially more valuable the name and the intellectual property, the more this is an issue. For example, an unreleased song or master written by U2 is likely to be more valuable than an unreleased song or master by the corner band.

CONTRACT RIGHTS

Even after an act has broken up, contracts that the members have entered into may still have value and need to be factored into the breakup proceedings. Say, for example, that a guitarist leaves his or her band, but the band has gigs that have already been contracted. Should the guitarist come back for the gigs? Should he or she compensate the rest of the band for lost wages if the gig is canceled because the act is no longer the same as when contracted?

Additionally, if a band with a recording contract breaks up, royalties will still be earned, even though the band is no longer in existence. It is wise for the members of the act to have a mechanism in place to collect and disperse those royalties.

THIRD PARTIES

Members of an act can't be concerned with only themselves when breaking up; they need to take into account contracts that they have made with third parties, as well. Many times an act will make a contract with a third party "individually and collectively," so even though an act might break up, the individuals may con-



Former Weezer bassist Matt Sharp (second from left) left the group in 1998 but filed a lawsuit against the band in April 2002. Sharp is seeking credit for songs he claims to have cowritten, royalties, and payment for his part in establishing the band.

tinue to have obligations with third parties. Recording contracts and management contracts often use these individual and collective provisions as an incentive for an act to remain together even though the members want to split up.

Liabilities that the act may have with third parties need to be factored into a breakup, too. Liabilities including existing debts, long-term contracts such as leases, and promises to perform or deliver product are all taken into account when determining what an act is worth when it breaks up.

THE GOLDEN PARACHUTE

After the total value of an act is determined, if the act is completely dissolving, the parties involved must split up their assets and create a method to collect and disperse any future earnings. Sometimes acts designate a member or a third party as a trustee to carry on the business affairs of the act as long as there is business to be conducted. If members remain that will carry on the business, they will need to craft a cash buyout or "cash plus future earnings" buyout of the individuals leaving the act.

Whether you are in a local garage band or a superstar act with years be-

hind you, many of the potential sticky issues of a breakup can be avoided if a partnership or similar agreement between all members of your act can be crafted early into the relationship, anticipating and addressing as many of these issues as possible. Provisions such as determining when and how individual members can be added or leave, how to value property, and procedures to dissolve the act are all important factors and are likely to be more objectively dealt with well before tempers and frustrations leading to a breakup flare.

Even though it is a very real business issue packed with emotion, the blow of breaking up an act can be softened somewhat with some planning and communication between the parties. Hopefully, you won't be singing the breaking-up blues when it is time to move on.

Michael A. Aczon practices entertainment law and is a member of the music-business faculties of San Francisco State University and Diablo Valley College in Northern California. He is still crying over the breakup of the Beatles.

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REVIEWS

EVENT ELECTRONICS

EZBUS

*A digital mixer,
a control surface, and
an audio interface in one.*

By Brian Smithers

The EZbus from Event Electronics is an impressive hybrid that combines a digital mixer, a virtual control surface, and an audio/MIDI interface into a single package costing about what you would pay for a unit dedicated to any one of those functions. The EZbus's mixer impressed me the most—it offers lots of inputs and outputs in a compact footprint, its signal routing is versatile, and its layout is easy to learn and navigate.

As a control surface, the EZbus comes off pretty well, too, with multiple layers of control assignments and a straightforward programming applet included. Getting its audio interface functions running properly was a bit more of an adventure than I expected, but the folks at Event were helpful in getting it all sorted out. Here's a closer look at each of these functions.

ALL MIXED UP

The EZbus is one of the most economical digital mixers on the market. All

of its analog inputs and outputs feature 24-bit, 96 kHz converters, and the S/PDIF will pass the same resolution. Its Lightpipe connections don't do sample splitting, though, so they go up



FIG. 1: The EZbus provides two mic/line inputs with phantom power, two instrument/line inputs, and four sets of three summed line inputs. In addition to the I/O functions of a digital mixer, the unit features transport and other controls for sequencing and DAW programs.

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Event Electronics EZbus

114

Digidesign Pro Tools|HD

126

TC-Helicon VoicePrismPlus

136

M-Audio Duo and Quattro

142

Boss SP-505

150

Quick Picks: Artistpro.com, LLC *Studio-in-a-Box*; Analogue Systems RS240 Frequency Shifter; Sebatron Copernicus Stereo Resonant Filter; Spectrasonics *Metamorphosis*; Steinberg *Virtual Guitarist*

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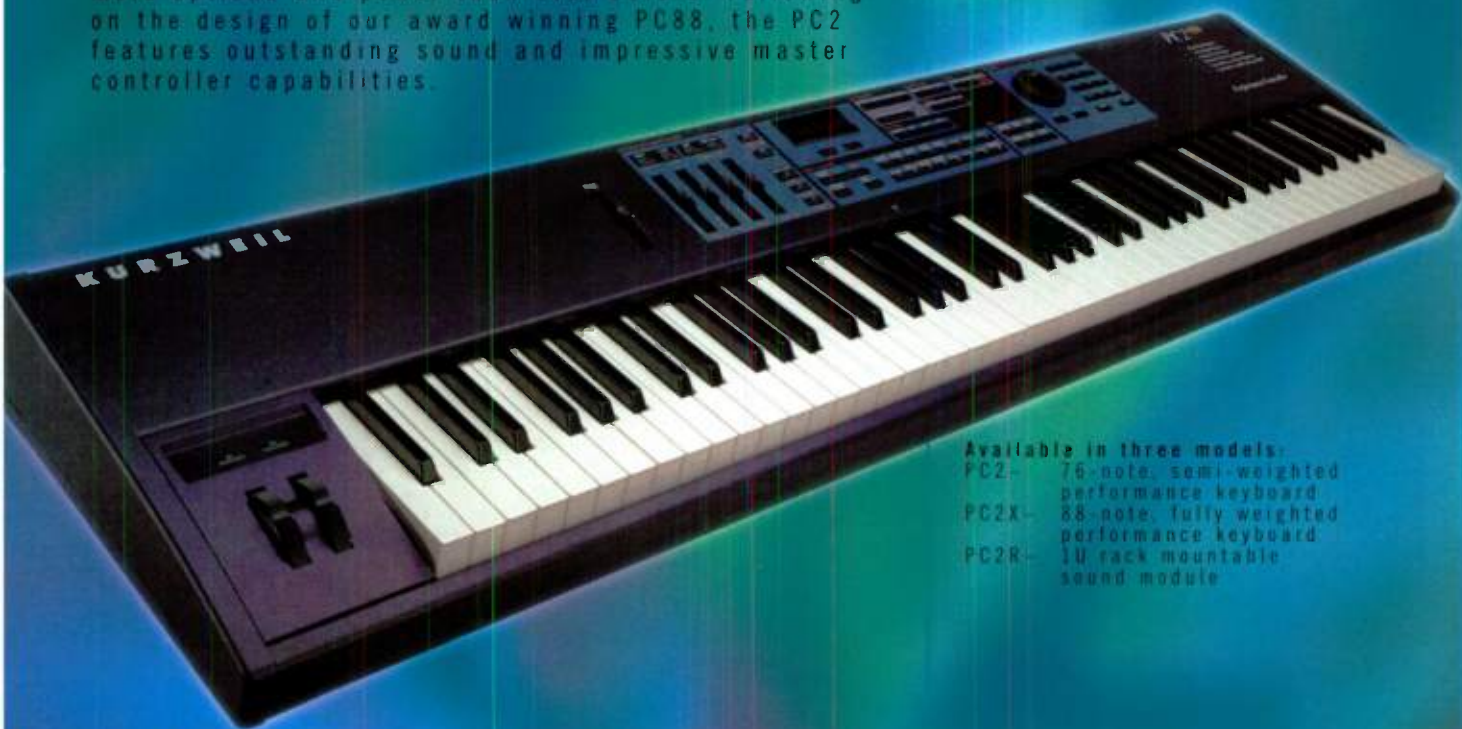
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FIG. 2: The rear panel of the EZbus provides both ADAT Lightpipe and S/PDIF digital I/O (including two S/PDIF outputs), a USB port, two pairs of MIDI In and Out ports, and word-clock output on a BNC connector.

to only 48 kHz sampling rates (though still with 24-bit resolution).

The unit's first two analog channels can be accessed through either balanced XLR or 1/4-inch TRS jacks (see Fig. 1). The XLR connectors provide mic preamps with switchable 48V phantom power; the 1/4-inch jacks allow for mic- or line-level sources. The next two analog inputs feature 1/4-inch TS connections at instrument or line level. Those two inputs are designed for use with instrument-level signals, though they can also accept line-level signals.

Four more line-level inputs are available, each of which features three 1/4-inch TRS connections summed together. For anyone with several synth modules, it's a cost-effective way to get a lot of signals into the mixer without repatching all the time.

SWEET SIXTEEN

This adds up to a total of 16 mono analog inputs available at one time—not a bad channel count if you can deal with the interdependence of those summed inputs. Inputs 1 through 4 are

completely independent in terms of pan, level, and internal effects; inputs 5 through 8, however, require a bit of planning. For example, if you're using the summed inputs for L/R outputs of synth modules, you could simply plug the first module in to inputs 5A and 6A, the second in to inputs 5B and 6B, and the third in to inputs 5C and 6C, and then you could pan inputs 5 and 6 hard left and right. Before you get bummed about having three synths sharing the same soundstage, keep in mind that you can use MIDI pan and volume controllers to separate and balance individual timbres and each synth module's master volume to balance the levels of the three devices.

Three pairs of analog outputs are available on 1/4-inch TRS jacks, and there is also a 1/4-inch stereo headphone output with a dedicated volume control. The Main output pair carries whatever is assigned to the Main Mix, and the Sends 1 and 2 output pair carries

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whatever is assigned to Sends 1 and 2. The Aux output pair, however, can be assigned to carry the Main Mix, the Alt Mix, Sends 3 and 4, or a direct output of any analog or digital input. The headphone channel offers the same possibilities and the ability to carry Sends 1 and 2. Although the EZbus has no surround features per se, it would be easy enough to create a mix preset that utilized these outputs for a 5.1 monitoring setup.

Digital connections on the EZbus consist of ADAT Optical (Lightpipe) and S/PDIF coaxial I/O (see Fig. 2). A second, independent coaxial S/PDIF output is also available, and the Lightpipe input can detect and automatically switch to accommodate optical S/PDIF. All digital connections support 24-bit audio, and the coaxial ports support sampling rates up to 96 kHz. The coaxial S/PDIF input has a built-in sampling-rate converter, so

you could be working on a 44.1 kHz project and bring the signal from a 48 kHz device into the EZbus; that signal would be downsampled on the fly to 44.1 kHz. The optical ports, however, max out at 48 kHz. In terms of mixer architecture, the USB port can be considered another stereo digital I/O pair (48 kHz maximum). Though labeled L & R, the USB channels are actually two mono channels and can be treated as such.

EZ BUSING

A quick run through the EZbus's signal path will give you an idea of the unit's flexibility. Any digital or analog input can be assigned to the Main Mix, the Alt Mix, or both through one of Primary Audio Channels. Each of those eight channels provides digital trim and phase controls, equalization, dynamics, four sends (independently assignable pre- or postfader), pan, level, mute, and solo. The Main Mix

PRODUCT SUMMARY

Event Electronics

EZbus
digital mixer
\$749

FEATURES	4.5
EASE OF USE	4.0
AUDIO QUALITY	4.0
VALUE	4.5

RATING PRODUCTS FROM 1 TO 5

PROS: Flexible mixer architecture. Plentiful analog and digital I/O. A/D/A conversion is 24-bit, 96 kHz. Cost-effective, multipurpose design. Thirty-two mix snapshots. Thirty-two "pages" of MIDI control per profile. Useful ancillary applets.

CONS: Needs better documentation of control profiles. Needs profiles for more programs. Fully supported only in Windows ME/XP. Mac OS X 10.x required for 24-bit audio. Requires USB Universal Host Controller.

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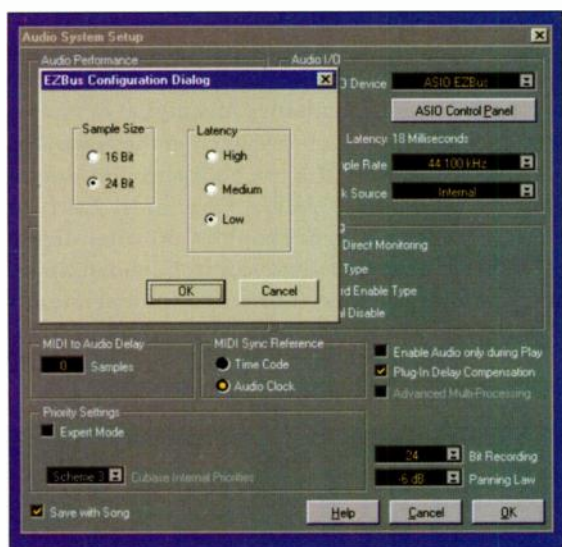


FIG. 3: The EZbus Profile Editor lets users modify and create sets of MIDI controller assignments for any program that allows such remote controls. Its functions are deep, but its documentation could be better.

can also carry as many as four additional inputs through Returns 1 through 4. Returns 1 and 2 provide level and pan controls, and Returns 3 and 4 act as a stereo pair, providing only level controls.

CREATIVE ROUTING

At a glance, you can see that the EZbus doesn't allow you to mix all of its inputs simultaneously. Nevertheless, using the inputs in the most efficient way, you could have 2 mic signals, 2 guitar signals, 12 (4 by 3) synth signals, and 4 channels of digital input, all running to the Main Mix simultaneously, for a healthy total of 20 inputs. Four of those inputs (the Sends) would not have EQ and compression, and the summed inputs (5 through 8) would be processed together.

It's worth noting that the Alt Mix isn't actually an independent mix but merely an alternate set of Primary Audio Channels. A Channel belongs to either or both of the Main and Alt Mixes, but it carries only one level and one pan value, regardless of where it's assigned. The Alt and Main mixes do, however, have independent level controls, making the Alt mix useful for the control-room monitor signal.

Although the Main Outs and Sends 1

and 2 are hardwired to carry the Main Mix and Sends 1 and 2, respectively, the other digital and analog outputs can carry a variety of different sources. With some exceptions, you can route the Main Mix, the Alt Mix, the Sends, the output of any Primary Audio Channels, or the unprocessed signal from any analog or digital input to any remaining digital or analog output. The unit is essentially designed to allow routing of any input to any output. You could, for example, go directly from line input 3 to the Universal Serial Bus (USB), bypassing virtually every-

thing in between. Also, when you go from a digital input directly to a digital output—say, from an ADAT input to a S/PDIF output—a direct bit-for-bit copy is produced.

The 3-band EQ available on each Primary Audio Channel features high and low shelving and a fully parametric midband. Each band offers 12 dB of gain, and the midband's center frequency ranges from 62 Hz to 10 kHz. Per-channel dynamics processing includes a gate and a compressor. The compressor also has a look-ahead function, which, in combination with the "infinite" ratio setting, allows it to be used as a limiter, as well.

All mix parameters can be saved to one of 32 snapshots. Snapshots can be recalled either from the front panel or by a footswitch. It would be great if you could recall snapshots through MIDI Program Change messages, but that is not possible. However, a handy Mix Librarian applet is included, allowing you to edit, back up, and load banks of snapshots. In a live scenario, you could have a different mix for each song, arrange them in set order, and load in other snapshots on a break, if needed. The load time is under one second, so you could easily load between songs.

CONTROL MYSELF

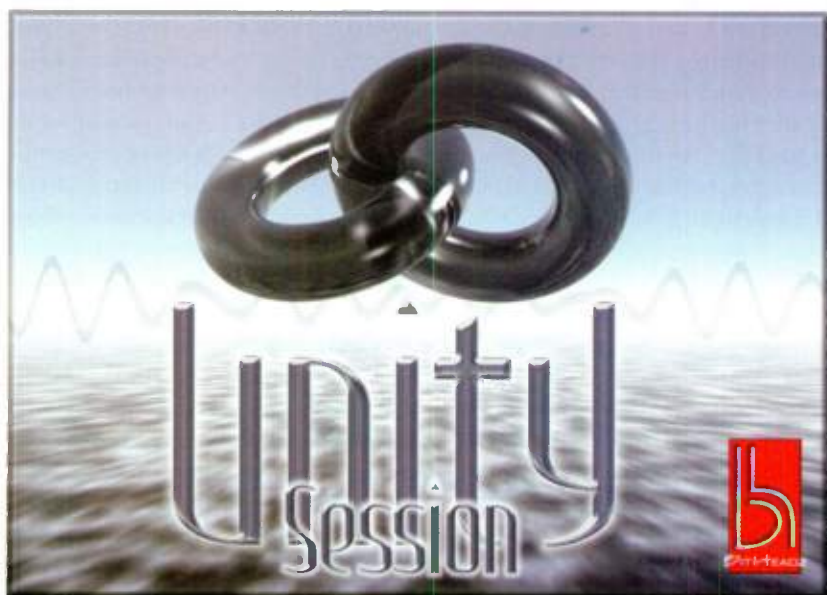
At the touch of a button, the EZbus converts from a digital mixer to a control surface for your favorite software. Several device profiles are available: Steinberg Cubase, Nuendo, Model-E, and LM4; Cakewalk Sonar; Emagic Logic Audio; Native Instruments B4; IK Multimedia SampleTank; Propellerhead Reason and ReBirth; a CS-10 emulation for Pro Tools; and even a generic MIDI mixer. Profiles for Syntrillium Cool Edit Pro, MOTU Digital Performer, and BIAS Deck should be available by the time you read this. In addition, the included Profile Editor applet (see Fig. 3) allows you to adapt the mappings to whatever program you wish to control, and Event recently posted a Profile Downloader applet for the Macintosh.

Under Windows ME and XP, the EZbus is able to send MIDI and audio data to the computer simultaneously through the USB port—its control messages require no additional connection. However, under Windows 98SE or 2000 or under Mac OS 9.0.4 through OS X 10.1, the EZbus supports audio through USB only. Therefore, if you are using a separate MIDI interface, the EZbus is able to send its control messages through either of its MIDI ports to communicate with those operating systems. Mac OS X 10.2 will support audio and MIDI simultaneously through USB, so no additional MIDI interface will be required.

On my XP and ME machines, I was able to get control of my software easily. The included profiles for Cakewalk Sonar and Steinberg Cubase VST/32 were laid out in a sensible fashion, and they worked as advertised. Each Profile implements bank select in a different way. For example, the Next and Previous buttons get used in Sonar, whereas the VST profile allows you to switch banks by using Shift + C and pressing a Channel Select button. That way you can jump from, say, bank 1–8 to bank 57–64 without having to page-up or -down through all the banks in between.

The eight buttons dedicated to Inputs, Outputs, EQ, and so forth (when

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the EZbus is in Audio mode) become V-buttons in Virtual mode. Each V-button has as many as four pages of control assignments, for a total of 32 pages of virtual controls. Within each page, you can assign MIDI notes, controllers, RPNs, or NRPNs to each of the nine faders and channel-select buttons. The Mute and Solo buttons act as modifier (Shift) keys, adding three additional functions to each select button. The data wheel can send a different message with each select button, as well.

The transport buttons can function as indicated, or they can be assigned to other functions—for example, triggering drum sounds and loops. The transport buttons do double duty by default, setting and recalling Locate points in conjunction with the channel-select buttons. A standard momentary footswitch (not included) can be used to advance through Mix settings or as another source of virtual control.

HIGH PROFILE

The Profile Editor applet strikes a good balance between power and ease of use, but it could use better documentation. It took trial and error (though not a lot of genius) to determine that I needed to double-click on the line describing a particular page to open the editing window for that page—there is no dedicated button or menu item. Furthermore, it took me a bit of reverse engineering to figure out that, within a page's Edit window, if an item such as Channel Fader (1–8) is assigned to controller 12 on channel 16, then channel faders 1 through 8 send controllers 12 through 19, all on channel 16. Functions for each page of controls are described on the EZbus's LCD, which provides two 20-character lines. Loading a new profile into the EZbus is a one-click operation, and it takes only a couple of seconds for the entire profile to load.

My favorite aspect of the EZbus's control-surface functioning is the way the faders behave when their physical

position doesn't coincide with the value of their function. On a control surface with motorized faders, each time you move from one bank of tracks to the next, the faders update with the values of the new tracks. On a nonmotorized device such as the EZbus, moving from bank to bank presents a potential problem. On some control surfaces, if the fader is at unity but its corresponding track's onscreen fader is at a different value, as soon as you move the physical fader, the onscreen fader jumps to unity and moves with the physical fader from there. That makes it virtually impossible to make subtle adjustments without stopping to match the faders to the onscreen values—a process called *nulling*.

The EZbus solution is to null the faders on the fly. When the physical and virtual controls don't match up, the physical control will not affect its virtual counterpart until it reaches the onscreen value. In the previous example, then, you would have to move the fader from unity to the onscreen fader's

EZbus Specifications

Analog Inputs	(2) balanced XLR mic; (2) balanced ¼" TRS mic/line; (2) unbalanced ¼" TS instrument/line; (12) balanced ¼" TRS (4 sets of 3 summed)
Analog Outputs	(2) balanced ¼" TRS (main); (2) balanced ¼" TRS (aux); (2) balanced ¼" TRS (send); (1) ¼" stereo (headphone)
Digital I/O	(1) USB port; (1) S/PDIF coaxial input (RCA jack); (2) S/PDIF coaxial outputs (RCA jacks); (1 pr.) ADAT Lightpipe (Toslink)
Other Ports	(2) MIDI In, Out; (1) ¼" footswitch; (1) BNC word-clock output
A/D/A Converters	24-bit, 96 kHz
Digital Signal Processing	24-bit
Sampling Rates	32–96 kHz, selectable (analog, S/PDIF, AES/EBU); 44.1, 48.0 kHz (ADAT Lightpipe)
Analog Aux Sends>Returns	4/4
Channel EQ	3-band (on each primary audio channel): low shelving; high shelving; parametric midband
Faders	(9) 60 mm
Automation	32 internal snapshots of all mix parameters
Dynamics Processors	compressor/limiter/gate (on each primary audio channel)
Display	2 × 20-character LCD
Locate Points	8
Frequency Response	20 Hz–20 kHz (±0.5dB)
Signal-to-Noise Ratio	>101 dB
Total Harmonic Distortion + Noise	<0.003%
Crosstalk	<110 dB
Power	internal
Dimensions	16.75" (W) × 2.25" (H) × 9.50" (D)
Weight	12 lb.

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position before it would “catch” the onscreen fader and begin adjusting its value. Alternatively, if you hold down the channel-select button and move a fader, you can make immediate *relative* changes in the value of the onscreen fader. There’s also a fader page in the Mix menu that shows whether a fader is *clean* (that is, the physical position matches the fader value) or *dirty* (the fader and value do not match), as well as a bar graph showing the relative values of all the faders. All makers of nonmotorized control surfaces should adopt those implementations.

UNSEEMLY BEHAVIOR

Although much of the negative talk about using the USB for digital audio is overstated (if not downright unfounded), there is still often a bit of voodoo involved in getting it to work correctly. Lack of conformity to the standard in controller hardware and operating systems has made the job of USB audio developers rather similar to the task of clearing minefields. (According to Event, the EZbus adheres strictly to the USB Audio Device Class and USB MIDI Device Class specifications.) I’ve tested most of the USB audio interfaces on the market, and each of them has ended up working properly—but only after I jumped through a hoop or two.

My EZbus experience was no different. I installed the EZbus first on my Celeron 1 GHz notebook and tried recording into Sonar and Cubase. I had mixed results in Cubase. When recording an audio track into Sonar, however, my computer crashed repeatedly. Actually, it was more like a spontaneous shutdown. (I wish that the computer would shut down that quickly when I turn it off!)

A call to the friendly folks at Event tech support yielded Safety Tip No. 1: 24-bit operation requires Sonar 2.0. Fortunately, 2.0 was already sitting on a shelf waiting for me to find time to install it. After further discussion with Event, we also discovered that my notebook uses a USB Open Host Controller (OHC) instead of a Universal Host Controller (UHC). Turns out that that’s

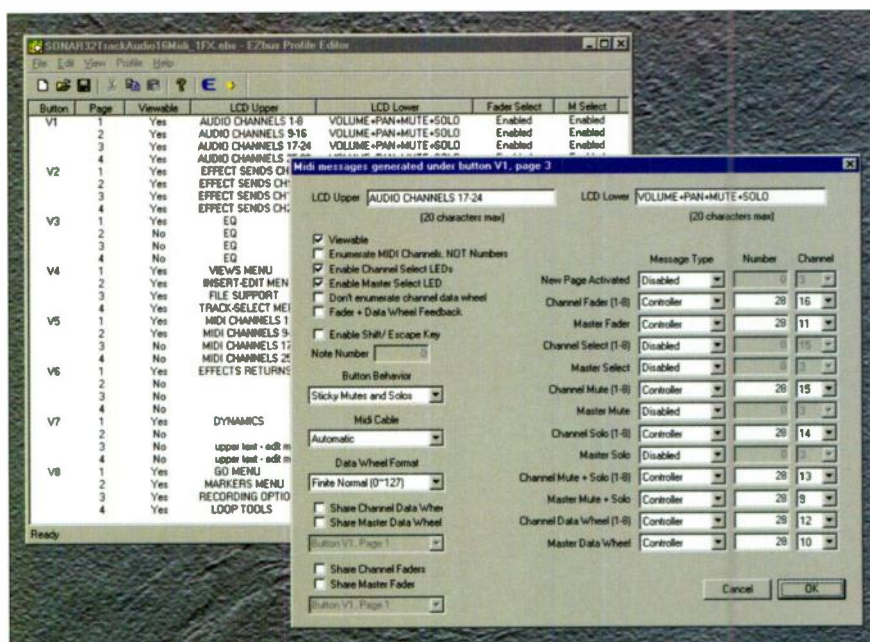


FIG. 4: Selecting the EZbus ASIO driver in Cubase VST/32 yields latencies as low as 18 ms. That is low enough to give reasonably responsive performance with virtual instruments, although it’s not ideal for software monitoring of audio inputs. Fortunately, the EZbus is also a digital mixer, ideally suited for hardware-based monitoring of audio inputs.

a bad thing, which leads me to Safety Tip No. 2: if you’re planning a system with an EZbus, first do some homework to determine what your machine uses. On a desktop computer, you could add a PCI-to-USB card to resolve the problem; on a laptop, try a PC Card-to-USB adapter. (Note that, according to Event, the OHC problem is not specific to EZbus—it’s a problem with *all* USB audio devices. OHCs are used on budget laptops because the chip set is inexpensive. The unfortunate trade-off is that OHC chip sets are more prone to problems than UHCs.)

My solution, which yielded a huge improvement, was to start from scratch on my desktop machine. My desktop computer uses an Intel Universal Host Controller, and the installation went beautifully. Event offers an online help file called 24-Bit Sonar Fix that instructs you to change one setting in Sonar’s aud.ini file in order to get 24-bit operation running smoothly. The WDM drivers allowed me to achieve a latency of around 13 ms on a Pentium III/450 MHz. That is acceptable for playing soft synths, one of Event’s stated intentions for the EZbus. How-

ever, when recording audio tracks, 13 ms is uncomfortable for software monitoring, so I chose to monitor the audio inputs directly from the EZbus. Monitoring that way, you get essentially zero latency.

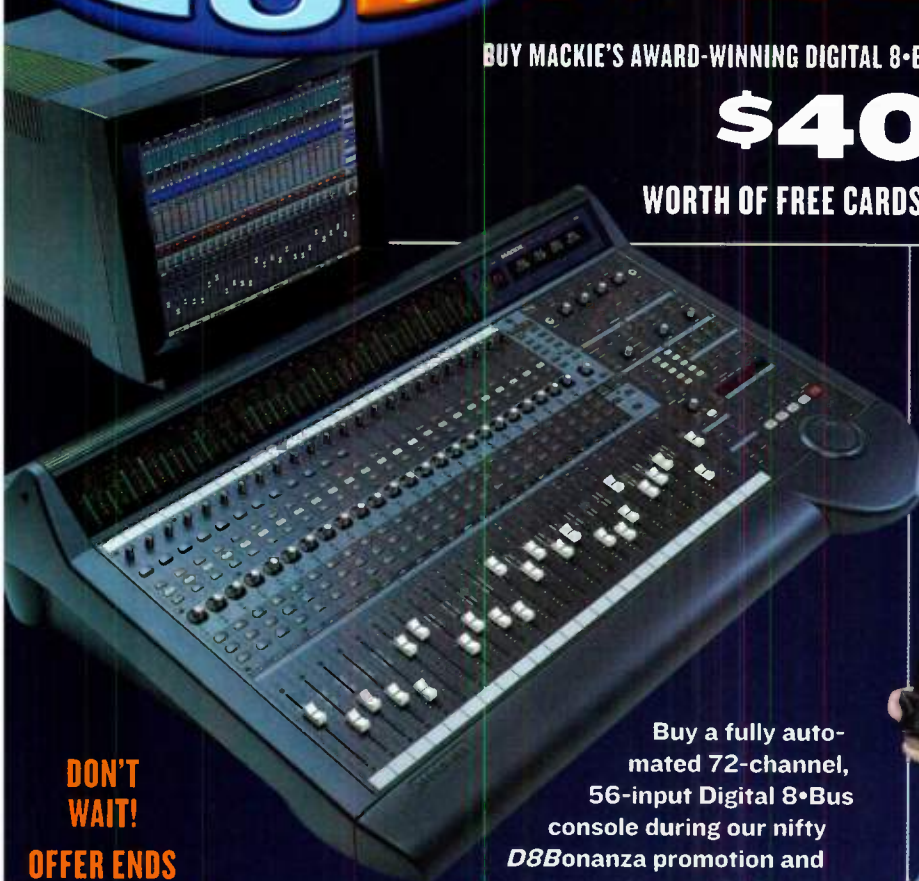
For some strange reason, Cubase wouldn’t recognize the EZbus ASIO drivers at first. Fortunately, another call to tech support led to a quick resolution. It required entering a simple command from the DOS prompt—interesting if only for the nostalgia factor—which forced the computer to take notice of the ASIO driver. (Another way to do the same thing is to drag the asioezbus.dll file over the Regsvr32 icon, avoiding DOS entirely. That ASIO registration procedure can be found on Event’s Web site with the latest ASIO driver.) Once I restarted the computer, I was able to select the EZbus ASIO driver in Cubase (see Fig. 4) and get the kind of performance I expected. The latency was around 18 ms, which is borderline for playing virtual instruments. For most applications, I was able to adjust to the delay; for a serious keyboardist playing technically demanding parts, however, it could be a problem.

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Mac OS 9.x users will be disappointed to learn that there are no ASIO or MOTU Audio System drivers available, leaving only 16-bit Sound Manager support. For someone who is using an EZbus and a PowerBook to play live, that factor isn't a big issue. But it definitely limits the unit's appeal, at least as an audio interface, for Mac-based personal studios. Of course, OS X allows 24-bit operation (and reportedly with very low core-audio latency), and as more applications are updated to support the new operating system, the OS 9.x limitations will become less of an issue.

MULTIPLE PERSONALITIES

It's hard to argue with a product that offers as much as the EZbus. Used in a live rig, the EZbus provides boatloads of I/O with built-in EQ and dynamics and 32 mix snapshots. If a computer is part of your setup, you can add multiple banks of snapshots, transport controls for your sequencer, and the ability to play virtual instruments to the unit's bag of tricks. You can also combine virtual synths with your hardware synths.

In a project studio, the EZbus makes a great hub for linking your instruments, mics, tape decks, and other devices to your monitor system and to your computer for recording and playback. With the addition of Event's EZ8 PCI card (\$199) or a similar Lightpipe interface, you can record and play back eight audio tracks at a time using the EZbus's Lightpipe I/O. Its compact size makes it ideal for the typical space-starved studio, and its uncolored mic preamps and converters leave you the flexibility to process and color the sound as you see fit.

If one or more of the EZbus's personalities fits your needs—and your OS and USB controller match up with its requirements—you'll definitely want to check this unit out. The EZbus not only delivers what it promises, but it does so with an exceptionally big bang for the buck.

Brian Smithers is course director of Audio Workstations at Full Sail Real World Education in Winter Park, Florida.

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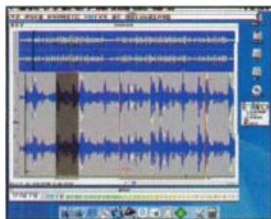
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By Nick Peck

Change is guaranteed in all things. But when it comes to digital hardware, change comes quickly, and it always means more, faster, and better. Digidesign, the 100-ton gorilla of the digital-audio-workstation (DAW) industry, has changed most of its Pro Tools product line with the introduction of the HD system (HD stands for high definition—in this case, 24 bits at 192 kHz). Its new TDM-based system boasts more digital-signal-processing (DSP) power, better I/O, and higher sampling rates at roughly the same price as its previous TDM systems.

IN THE CARDS

At the heart of the Pro Tools|HD are two 64-bit PCI cards: HD Core and HD Process. As in previous Pro Tools systems, one master card (in this case, HD Core) provides basic system processing as well as some plug-in processing power. Additional DSP cards (called HD Process) provide more processing juice. The HD 1 system consists of an HD Core card and no HD Process cards. The HD 2 and HD 3 consist of an HD Core card and one or two HD Process cards, respectively. Additional HD Process cards are available at \$3,995

each. Not one of these bundles comes with an audio I/O device: the I/O devices are sold separately.

The HD Core card supports as many as 96 tracks simultaneously (provided, of course, that you have enough SCSI throughput to shovel that much data through the system), can connect to two I/O units with as many as 32 channels, and provides a serial port for direct connection to the Sync I/O. The HD Process card is physically identical to the HD Core card but is used only for plug-in processing. Each HD Process card can connect to two additional I/O units.

The HD Process card is an improvement over the Pro Tools|24 Mix Farm cards of the previous generation. They use the same family of Motorola DSP chips but with a couple of important differences. First, there are nine chips on each HD Process card, compared with six on the Mix Farm card. Each of the newer chips is about 25 percent faster than those on the Mix Farm card, which means an HD Process card has roughly twice as much processing capacity. In addition, RAM is available on all chips (which was not the case in the Pro Tools|24 Mixplus system), which means that there is less internal shuffling of RAM-intensive plug-ins such as delays and reverbs.

In addition, the new TDM II architecture promises more efficient DSP management, all of which points to about 2.5 times more power in an HD Process card over a Mix Farm card. I tested this by seeing how many instances of the Focusrite D2 six-channel EQ I could get on each card, running at 24 bits, 48 kHz. I got 36 instances on the Mix Farm card and 63 instances on the HD Process card. Thus, in my real-

world test, the HD Process card had 1.75 times the processing capacity of a Mix Farm card.

This extra power does come at a price. The TDM II system requires upgrades to all your existing plug-ins. As of this writing, major TDM plug-in manufacturers—such as Waves, McDSP, and, of course, Digidesign—have ported their families of plug-ins to the new platform. According to Digidesign, it and a few of its partners (Focusrite, McDSP, and Aphex) offer free plug-in upgrades to registered owners, whereas IK Multimedia, Waves, and Wave Mechanics, among others, require upgrade fees.

Moreover, higher sampling rates require proportionally more DSP time for plug-ins. A compressor running at 192 kHz requires four times as much DSP as the same plug-in running at 48 kHz. That leads to a limitation in high-resolution sessions: a single instance of a plug-in must fit within one DSP chip. If a particular plug-in requires enough DSP horsepower to take up more than 25 percent of a single chip at 48 kHz, it will not run at all at 192 kHz. That means that manufacturers need to optimize their processor-intensive plug-ins in order to run at 192 kHz.

Digidesign adds that plug-ins used in a 192 kHz session will require four times the RAM as that same plug-in in a 48 kHz session. That means, for example, that there may be enough MIPS available on a DSP chip to run a particular plug-in at 192 kHz, but there might not be enough RAM. To solve this problem, Digidesign introduced a new plug-in category called *HTDM* plug-ins. Like RTAS plug-ins, HTDM plug-ins run on the host CPU and use host RAM.

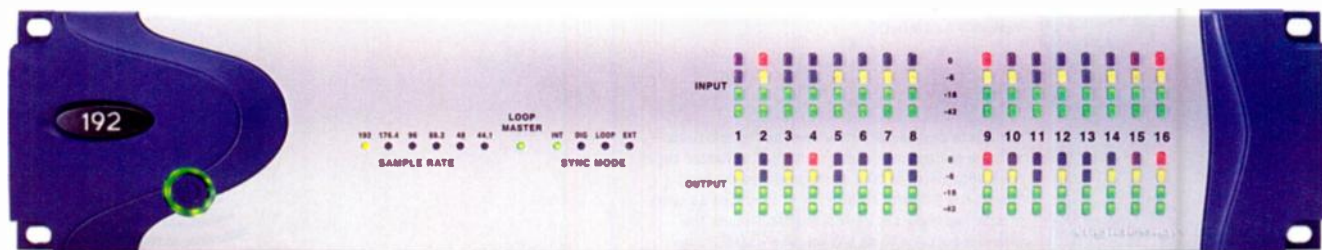


FIG. 1: LEDs on the front panel of Digidesign's 192 I/O indicate sampling rate, clock source, and metering.

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HD I/O

The 192 I/O (\$3,995) is Digidesign's new flagship audio interface (see Fig. 1). Boasting 16 simultaneous channels, sampling rates as high as 192 kHz, superb audio quality, and a wide range of format connectivity, it is a big step forward.

The only control on the front panel is a power button. Six LEDs indicate the sampling rate, and four others show the clock source for the 192 I/O.

The Loop Master light shows whether the unit is acting as master clock for the whole system. The 192 I/O has four-segment LED meters for each of the 16 input and output channels. However, high-resolution systems demand high-resolution metering: I wish that these were 16- or 20-segment meters instead.

The rear panel (see Fig. 2) is divided into five regions: four I/O bays with removable cards and a permanent I/O


section. Three of the removable bays come with cards installed, and the fourth bay is empty but ready for expansion. The first bay, for analog input, has two DB25 connectors for eight +4 dBu balanced and -10 dBV unbalanced 1/4-inch inputs. The analog output bay has a single 8-channel, +4 dBu DB25 balanced output connector, but a special cable can be purchased to pad the levels to -10 dBV.

Soft-clip limiting is now available on all analog inputs, which is great for eliminating digital overs while maintaining a healthy gain structure. Another cool touch is that the analog I/O bays each have two sets of trim screws. With these trims, you can store two sets of calibration settings for the system, such as differing headroom amounts for film and music applications.

The third bay holds a digital I/O card, which supports eight channels of AES/EBU, TDIF, and ADAT Lightpipe. The AES/EBU and TDIF ports use DB25 connectors, whereas the ADAT ports use standard Lightpipe connectors. You can send signals to multiple ports and then switch between them in software. This is terrific for, say, recording in through a digital mixer and then laying back your mix to a Tascam DA-88 or an Alesis ADAT. Note that the AES/EBU port can handle eight channels at 96 kHz but only four channels at 192 kHz in Dual-Wire mode. Real-time sampling-rate conversion allows you to stream 48 kHz input over a Lightpipe or TDIF connection directly into a 96 or 192 kHz session as well as 96 and 192 kHz data into a 44.1 or 48 kHz session over AES/EBU.

The fourth bay can be loaded with an additional analog input, analog output, or digital I/O card. Installation is easy and can be done by the user.

In addition to the I/O bays, there is a permanent set of connections. These include additional pairs of AES/EBU, S/PDIF, and Lightpipe that can each support two channels at 24-bit, 96 kHz audio. Word clock comes in and out on four BNC connectors: one pair in the high-resolution Loop Sync format and a pair in the older 1x or 256x word-clock standards.



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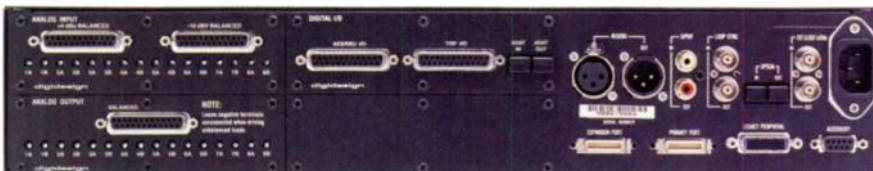


FIG. 2: To make the best use of space, DB25 connectors are used for analog and digital I/O on the rear panel of the 192 I/O.

The new DigiLink port is for connecting I/O units to each other and to the Pro Tools cards. The 192 I/O has a primary DigiLink port to connect to the cards and an expansion port to connect to another new I/O unit. DigiLink cables can run as long as 100 feet for sessions at 96 kHz (50 feet at 192 kHz), making the connection between computers in a machine room and the I/O units much easier than before.

LEGACY

In an effort to allow you to retain some of your older Pro Tools gear, Digidesign has included a legacy peripheral port.

This port lets you connect 16 channels of older I/Os (888/24, 882/20, 1622, or an ADAT Bridge, but not a 16-bit 888) to your Pro Tools|HD system. On first glance, that seems like a great idea. However, the legacy peripherals cannot be used on sessions running at sampling rates higher than 48 kHz.

One of the main reasons for using the HD system is to take advantage of high-resolution recording. If you are upgrading and need a large simultaneous channel count, you might want to consider selling all your old units and buying a 96 I/O as a second unit instead of using legacy I/O.

My biggest gripe about the 192 I/O is that most of the multichannel connections come in through DB25 ports. This means that special snakes will need to be made or purchased, requiring significant revision (and expense) in order to integrate it into an existing studio. Digidesign offers DigiSnakes for use with the 192 I/O.

Digidesign's previous generations of I/O had separate XLR connections for each analog channel and each pair of AES/EBU channels. However, the vast number of ins and outs on the 192 I/O would have required three or four rack-spaces to accommodate all the individual jacks. Nonetheless, I would have preferred 56-pin Elco connectors as a standard instead of the DB25s, because they are sturdier and can stand up to more abuse.

Gripe No. 2 is the inclusion of a fan to disperse heat. I record a lot of Foley and quiet acoustic music in my studio. The fan on the 192 I/O is quiet, but

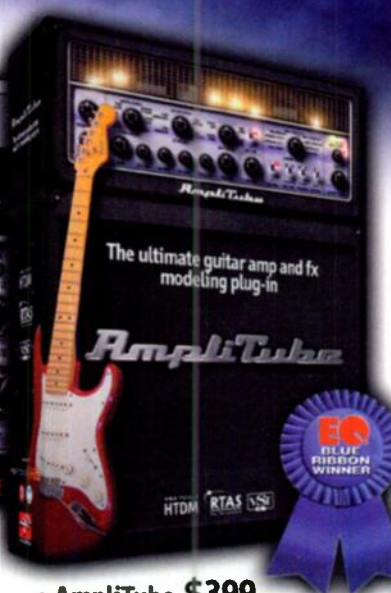
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FIG. 3: In the Pro Tools|HD system, the Sync I/O is the high-definition replacement for Digidesign's Universal Slave Driver.

not quiet enough for my critical recording tasks (pro studios will want to stash it away in the machine room). I wish the company had used a passive heat-dispersal system instead. But Digidesign maintains the fans are necessary to combat the heat generated by 192 kHz A/D converters: the fans turn on only when needed, and the fan speed varies with the internal temperature of the device.

SYNC I/O

The Sync I/O (\$2,095) is a high-resolution replacement for Digidesign's Universal Slave Driver (USD; see Fig. 3). Invaluable in film work, the Sync I/O

acts as a master clock for a post-production studio, slaving to and generating various types of time code and word clock. It can handle pull-ups and pull-downs and can even overlay a SMPTE window burn over a video signal.

The Sync I/O behaves almost identically to the USD, except in two ways. First, it handles every sampling rate up to 192 kHz (although the film world has certainly not made the switch to these higher sampling rates yet). Second, the separate 1x and 256x word-clock inputs and outputs (necessary on a Mixplus system to accommodate 1x digital mixers and recorders in con-

junction with 256x Digidesign I/O units) have been combined into a single pair of BNC jacks. The 256x clock has been superseded by Digidesign's new Loop Sync standard.

ALL IN THE FAMILY

In addition to its flagship 192 I/O, Digidesign is offering a series of other I/O units for different needs. These include the 96 I/O (\$1,995), a less expensive, less flexible 16-channel unit that is limited to 96 kHz. The Pre (\$2,495) has eight mic preamps that connect directly to Pro Tools I/O and can be controlled from within the Pro Tools application.

The MIDI I/O (\$595) is a ten-input, ten-output USB MIDI interface that supports Digidesign's MIDI time-stamping feature for accurate recording and playback. Unfortunately, not one of those devices was ready as I prepared this review, but they will be shipping by the time you read this.

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HOW DOES IT SOUND?

Are the benefits of 24-bit, 192 kHz audio perceptible? Can the difference between 192 and 96 kHz even be perceived?

I must confess that I was skeptical about the sound quality promised by the higher sampling rates (see the sidebar "A Solution in Search of a Problem?"). The move from 16- to 24-bit recording certainly makes sense to me: the greater dynamic range, for example, seems to be a quantifiable improvement. But humans can't hear frequencies above 20 kHz, so is it really worth the large amount of additional data to create a high-sampling-rate recording?

I decided to answer the question with a sampling-rate shoot-out at Spark Recorders in Emeryville, California. Spark boasts a pristine recording environment and a terrific-sounding Yamaha Disklavier grand piano. Engineer Mike Bemserderfer miked the piano with a pair of Neumann KM 184s running into Millennia Media

Origin STT-1 channel processors and then straight into both Pro Tools|HD and 24 Mixplus systems. We played the same quiet, subtle classical piano piece on the Disklavier into both systems at 24 bits, 48 kHz and then into Pro Tools|HD at 24 bits, 96 kHz and 24 bits, 192 kHz. We also recorded acoustic guitar, rain stick, and jingle bells the same way. Monitoring took place directly out of both systems through a Digidesign Control|24 control surface into Meyer HD-1 monitors.

The results made our jaws drop. There was a startling difference between the Mixplus system's 888/24 and the HD system's 192 I/O running at the same sampling rate and bit depth. The Mixplus system's recording was an accurate rendering of the piano, with a decent amount of detail and the full frequency response of the instrument. But the 192 I/O brought a musicality to the sound that was not present in the 888/24. The 192 I/O created a fully fused, integrated

PRODUCT SUMMARY

Digidesign

Pro Tools|HD
digital audio workstation

HD 1: \$7,995

HD 2: \$10,495

HD 3: \$12,995

FEATURES	4.5
EASE OF USE	3.0
AUDIO QUALITY	5.0
VALUE	3.0

RATING PRODUCTS FROM 1 TO 5

PROS: Spectacular sound quality. More DSP power than previous systems. Flexible I/O units. Connections for all popular formats.

CONS: Very expensive. Fan noise on the 192 I/O. Most multitrack connections are DB25. Not all plug-ins have been ported. Not all plug-ins will work at 192 kHz. Easier to start from scratch than to upgrade an existing system.

Manufacturer

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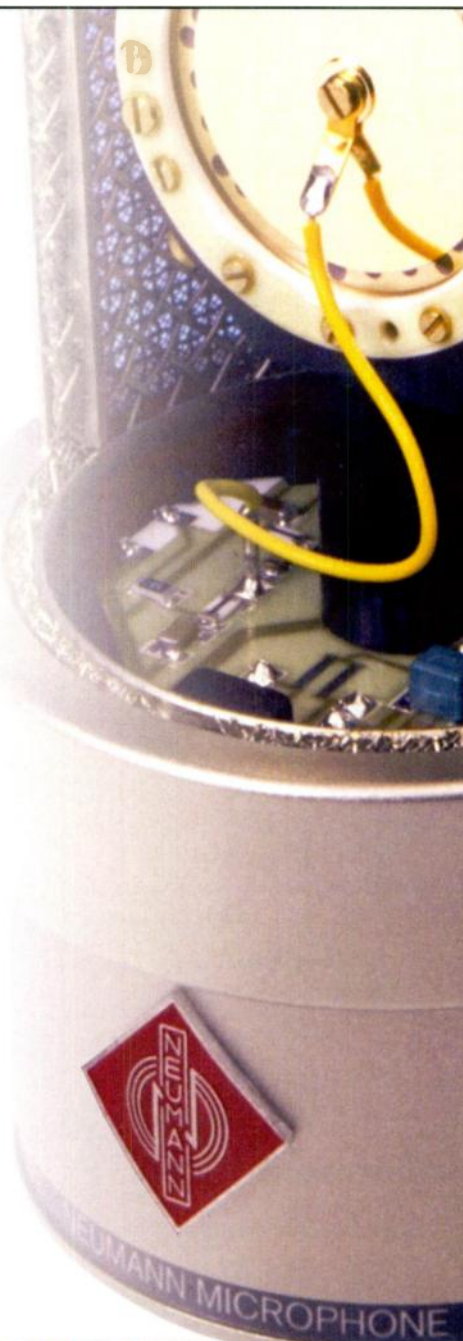
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● PRO TOOLS|HD

stereo experience, whereas the 888/24 sounded like dual mono. The 888/24 sounded flat and lifeless in comparison with the 192 I/O.

We then listened to the Pro Tools|HD at various sampling rates. We found virtually no difference between the 48 and 96 kHz sampling rates. But 192 kHz was another ball game entirely. All of a sudden, each piano note took on a separate,

distinctive life of its own. The cohesive, integrated stereo performance had a three-dimensional depth that seemed to extend far behind the speakers. The frequency response had not changed, but the instrument had a gorgeous, musical sheen. It was simply the best digital piano recording that I have ever heard.

Recordings of the steel-string guitar, rain stick, and jingle bells reinforced

PRO TOOLS|HD Specifications

Sampling Rates	44.1, 48, 88.2, 96, 176.4, and 192 kHz
Bit Depths	16, 24
Simultaneous Audio Tracks	128
Simultaneous MIDI Tracks	128
Simultaneous I/O Channels	96
Plug-In Architectures	TDM II, HTDM, RTAS, AudioSuite
Interface Connection	DigiLink (cable runs up to 100 feet)
Card Type	64-bit PCI II
192 I/O	
Analog Inputs	8 channels +4 dBu; 8 channels -10 dBV (all on DB25 connectors)
Analog Outputs	8 channels +4 dBu (all on DB25 connectors)
Digital I/O	10 channels AES/EBU; 16 channels Lightpipe; 8 channels TDIF; 2 channels S/PDIF
Simultaneous Audio Channels	16
I/O Card Bays	4
Sampling Rate	44.1, 48, 88.2, 96, 176.4, 192 kHz ±10%
Dynamic Range A/D	120 dBA, 118 dB (unweighted)
Dynamic Range D/A	118 dBA, 115 dB (unweighted)
Total Harmonic Distortion + Noise A/D	0.00035% (-109 dB); +21 dBu, 20 Hz-20 kHz
Total Harmonic Distortion + Noise D/A	0.00056% (-105 dB); -1 dBFS @ 997 Hz
Frequency Response A/D	±0.05 dB @ +2 dBu, 20 Hz-20 kHz
Frequency Response D/A	±0.05 dB, -20 dBFS, 20 Hz-20 kHz
Digital Sync	Loop Sync I/O; 1×/256× word-sync I/O
Additional ports	Main DigiLink; Expansion DigiLink; Legacy I/O; Accessory
Dimensions	2U × 15" (D)
Weight	19.65 lb.
SYNC I/O	
Frame Rates	30 drop/nondrop, 29.97 drop/nondrop, 25, and 24 fps
Clock Sources	video ref, video signal, LTC, AES, word sync, biphase, internal
Time-Code Formats	LTC, VITC, biphase, MTC out
Digital Sync	Loop Sync I/O; 1×/256× word-sync I/O; AES null clock out
Additional Ports	(2) 9-pin machine control ports; host serial port
Video Window Burn	SMPTE (hours:minutes:seconds:frames)
Dimensions	1U × 10.5" (D)
Weight	5 lb.

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Methods:

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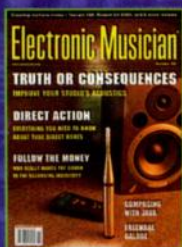
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● PRO TOOLS|HD

A SOLUTION IN SEARCH OF A PROBLEM?

Although there is no doubt that audio recorded at high sampling rates sounds great, the question remains: who will actually hear it at that quality level? Consumers have yet to embrace a standard for delivering 192 kHz audio, though the industry has been pushing for quite some time to make it so. The average consumer still listens to compact discs at 16 bits, 44.1 kHz, as well as the convenient but decidedly low-fi standard MP3. Theatrical releases continue to use

the Dolby Digital standard (a compressed format) for which 16-bit, 44.1 or 48 kHz audio is perfectly adequate.

There is a high-resolution turf war between DVD-Audio and Sony's SACD format, but consumers have not flocked to either camp yet. However, if you are authoring for standard DVD-Video, you can take advantage of its 96 kHz sampling rate and 24-bit word depth. High-resolution audio is in the future, but its development is still in the early stages.

our impressions. In each case, the depth and musicality of the instrument was greatly enhanced at 192 kHz. Each pebble in the rain stick became an individual, discernable element. The jingle bells, our acid test of high-frequency material, maintained coherency and sounded smooth and beautiful, without a trace of the brittle harshness I have grown used to in recording metallic sounds digitally. The guitar took on a larger-than-life character that sounded (dare I say it?) decidedly analog.

UPGRADE OR SQUARE ONE

Despite the sound quality, the question remains: is such high-resolution audio worth the investment? If you don't already have a Pro Tools system and you think the increased power and resolution will be good for your business, then I recommend investing in an HD system.

If you are already a Pro Tools user, the learning curve is nonexistent but the upgrade is costly, and rethinking your existing digital-hardware layout can be a real headache. For example, the price of an upgrade from a Pro Tools|24 Mix-plus system to an HD 2 system is \$4,995, and you will still need to purchase at least one of the new I/Os. If you have any 16-bit 888 I/Os, you won't be able to use them because the Pro Tools|HD supports only 20- and 24-bit legacy I/Os. Of course, if you are planning on using

any legacy I/O devices, you will not be able to run the Pro Tools|HD at sampling rates above 48 kHz.

If you have a digital mixer that runs at less than 192 kHz, you will have to replace it or else you will not be able to hear the increased sampling rate (analog mixers still work just fine). If your Mac is older than an AGP graphics-based G4, you will need a new computer.

Additionally, all of your existing plug-ins will need to be upgraded. If you have a USD, it will need to be sold or traded in, and a Sync I/O will need to be put in its place.

SOUND FOUNDATION

Digidesign completely revamped its Pro Tools TDM product line to allow increased audio quality, I/O flexibility, and DSP power at the same price point as its previous generation of hardware. The Pro Tools|HD system is a powerful and stable DAW that sounds excellent and should last for a long time.

Whether you already have a TDM-based Pro Tools system or are starting from scratch, be prepared to make a serious financial investment. With the Pro Tools|HD system, you definitely get what you pay for.

Nick Peck creates sound for film and games (www.perceptivesound.com) and will have just gotten hitched by the time you read this article. You can reach him by e-mail at nick@tyedye.com.

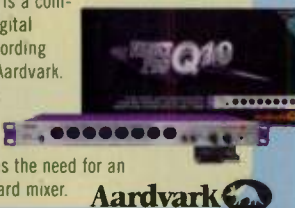
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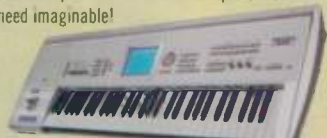
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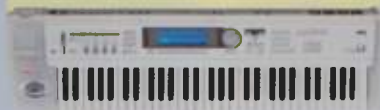
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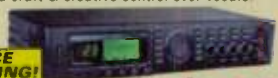
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MENTION CODE
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TC-HELICON

VOICEPRISMPLUS

*Meet the future of
voice modeling.*

By Mark Nelson

Not content to rest on its laurels after it debuted the stunning VoicePrism last year, TC-Helicon has unveiled the next generation of vocal processors. More than simply an upgrade, the VoicePrismPlus uses TC-Helicon's new voice-modeling technology, which could fundamentally change the way many of us record.

Like its predecessor, the VoicePrism-Plus is at home both onstage and in the studio. Think of it as a full-featured channel strip—complete with preamp, EQ, effects, and dynamics—coupled with an intelligent four-voice harmony processor. What sets VoicePrismPlus apart is the addition of voice modeling on the lead voice—for the first time, you have control over the physical characteristics that make an individual voice *individual*. You can alter the apparent size and shape of the singer's mouth and throat, add or subtract breathiness and rasp, create realistic vibrato, and even change gender without a trip to the doctor.

Owners of the original VoicePrism haven't been overlooked—all the new features, including digital I/O, voice modeling, and expanded effects, are available in a card that fits into the expansion slot in the back of the older unit (see the sidebar "Upgrade Path").

SAME, ONLY DIFFERENT

The VoicePrismPlus user interface is the same as the original: edit and utility pages on the display screen are grouped by function, Menu Tab keys navigate through nested pages, and four assignable soft knobs change parameters. Global functions are on the right of the data wheel, and edit functions are on the left (see Fig. 1). As on the VoicePrism, selecting Harmony or Effects mode limits the data wheel so that it shows only presets related to those modes (the unit ships with 127 factory presets). Each preset can be overwritten and restored. Turning the Lead, Harmony, or Effects-output knobs all the way down effectively mutes their signals.

Next to a ladder-type input meter are LEDs that show MIDI activity and also indicate when the pitch-detection circuitry has locked onto the lead voice, which is vital for harmony functions. LEDs indicate the sample rate (44.1 or 48 kHz) and flash to warn of an unstable digital-clock signal. Context-sensitive Help screens containing useful information that augments the manual are accessed using a single button.

The most obvious change is on VoicePrismPlus's back panel, where the new VoiceCraft card occupies the expansion slot covered by a metal plate in the original (see Fig. 2). The card sports a pair each of AES/EBU and S/PDIF digital ins and outs—handy for processing recorded tracks without leaving the digital domain. The left and right sides of the digital inputs are routed to either the Lead or Aux inputs with the newly added Utility/Routing page. Signals sent to the Aux input can be mixed into the two internal effects generators along with the lead and harmony voices. A new Digital I/O page offers dithering op-

PRODUCT SUMMARY

TC-Helicon
VoicePrismPlus
voice processor
\$1,898

FEATURES	4.5
EASE OF USE	4.5
AUDIO QUALITY	4.0
VALUE	4.5

RATING PRODUCTS FROM 1 TO 5

PROS: Easy to use. Voice modeling allows unprecedented control over lead voice. Realistic harmonies. Extensive MIDI implementation. 24-bit processing. Digital I/O.

CONS: No independent outputs for lead and harmony vocals. No insert points. Only two bands of EQ for lead and harmony voices.

Manufacturer
TC-Helicon/TC Electronic (distributor)
tel. (805) 373-1828
e-mail info@tcelectronic.com
Web www.tc-helicon.tc

tions for the VoiceCraft's digital outs. Internal processing is always at 24 bits.

A second coaxial S/PDIF output, a carryover from the original VoicePrism, now acts as a direct 24-bit digital stereo out for both the mic/line (on the left side of the stereo out) and analog aux inputs (on the right side). That lets you send the processed and dry lead vocals to two different digital targets. I wish this great feature had been mentioned in the manual—I learned about it during a call to TC-Helicon on a related subject.

LIVIN' IN HARMONY

The VoicePrismPlus retains the original's four harmony-generation modes, which cover almost any situation you may encounter. Each mode offers extensive control and as many as four distinct voices (see my review of the VoicePrism in the August 2001 *EM*).

Shift mode creates harmonies at a fixed interval above or below the lead voice, much like an old-fashioned pitch shifter. Scale mode constrains harmonies to a user-defined scale and key. Though Scale mode works best with simple diatonic



FIG 1: TC-Helicon's VoicePrismPlus, an updated version of the original VoicePrism, offers voice modeling, digital I/O, and other performance enhancements.

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FIG. 2: The rear panel of the VoicePrismPlus has the new I/O options provided by the VoiceCraft card in addition to the MIDI and audio connectors found on the original unit.

material, there are some interesting possibilities using alternative scales. Shift and Scale modes are either Smooth (harmonies follow subtle pitch variations in the original voice) or Stepped (harmonies are pitch corrected).

The impressive Chordal mode creates harmonies from chords entered manually or using MIDI—great for songs with complex chords or key changes. Chord recognition with MIDI works well. The Step function allows you to configure sequences of as many as 50 chord changes and move through them using an optional footswitch for MIDI-free operation. With the ability to store

as many as 50 user-defined sequences (called songs), the VoicePrismPlus can handle even the most demanding gig.

The two Manual modes are the ultimate in realism and can generate as many as four independently moving harmonies from incoming MIDI data. Input can be on a single channel (Notes mode) or on four adjacent channels (Notes 4CH) for even greater control. Each harmony voice responds independently to a variety of humanizing parameters: timing, scoop (a vocalist's habit of bending up to a desired note), vibrato, tuning, level, panning, and effects. For even greater authenticity,

many of these can be randomized.

A simple twist of a knob modifies a variety of formant-based parameters, creating male and female voices. Icons—from a husky bass singer to an angelic soprano to tiny babies and aliens—let you identify the gender settings at a glance. Preset libraries for gender and other parameters make quick changes a breeze. You can access almost all editable functions on the VoicePrismPlus with MIDI messages. The mic preamp and onboard effects are solid and add considerable value.

One caveat: the VoicePrismPlus needs time to analyze and process the incoming signal. Setting the system latency lower than 20 ms in the Utility menu sacrifices quality somewhat, which is a necessary trade-off onstage where even a slight delay could throw you a curve.

MODEL BEHAVIOR

Acoustically, the human voice is simply a bunch of frequency components

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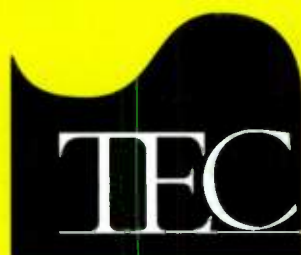
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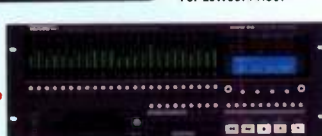
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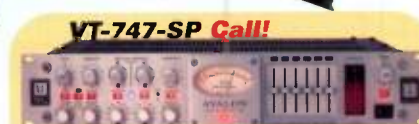
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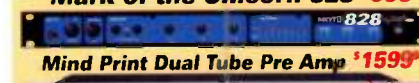
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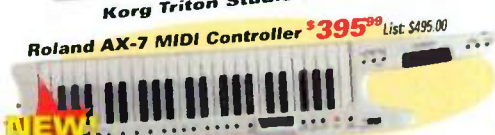
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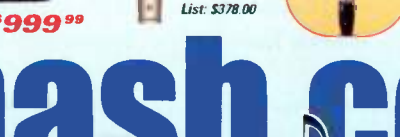
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UPGRADE PATH

Own one of the original VoicePrisms? TC-Helicon hasn't forgotten about you.

The VoiceCraft Human Voice Modeling Card (\$599) plugs in to a slot on VoicePrism's the rear panel. It adds voice-modeling technology as well as 24-bit digital I/O, DSP power, new algorithms, and other enhancements to the VoicePrism, upgrading your unit to the same specifications as the VoicePrism-Plus. The upgrade kit includes EPROMs to upgrade your operating system to take advantage of all the new features.

Already upgraded? Check your software version. The current software, version 1.05, adds more processing power to the delays, fixes a few minor bugs, and decreases the lowest latency settings for smoother live use. Download it at www.tcsupport.tc.

produced in a resonant space. Features such as the length of your throat and the shape of your mouth contribute fixed-frequency resonances called *formants*. That's the reason simply pitch shifting a vocal can turn even Barry White into a Munchkin. But formants aren't the whole picture. Your voice is a wind instrument: you can push harder for a bluesy edge, lighten up to get a whisper, and slide up to a note or hit it dead in the middle.

TC-Helicon says voice modeling technology is "real-time reshaping and resynthesis of the human voice." With it, you can add breath, vibrato, rasp, and growl; change inflection; and simulate the effects of head and chest resonances.

But don't expect to hear your favorite singer's voice modeled here. An individual's style is dependent on more than just the size and shape of the head and throat. No box made can capture phrasing, intonation, and taste, though I'm sure someone is working on it.

TAKE CONTROL

As with the original, the VoicePrism-Plus's effects presets are designed for solo-voice processing. The presets show off some of the processor's tricks, such

as subtle thickening and wild gender transformations. Names like "Wonder?," "Broadway," and "Old Bluesman" offer some idea of what's in store. Voice modeling is always available on the lead voice, even in the Harmony presets.

Although fun to use, many of the presets sounded overly processed and artificial; thankfully, editing on the Voice PrismPlus is simplicity itself. The Lead menu lets you set the dry/processed mix level and offers separate pan controls for each as well as a control to detune the modeled voice. The next five screens control various parameters. The options in the Vibrato, Inflection, and Glottal screens are what you'd expect. Inflection lets you imitate the way a singer scoops up or down; Glottal offers nonpitched vocal sounds that create breathiness, rasp, and growl.

Two additional groups of parameters require more definition. Spectral selects various EQ curves to simulate the control a singer has over his or her voice. These curves are separate from the two EQ blocks. Warp modifies formants to model various vocal-tract dimensions. According to the manual, Spectral and Warp are designed to interact; first select a Warp preset, then modify it.

Each of those five screens has two menus: Style and Amount. Style selections in the Glottal menu include Delta Blues, Whisper-Light, and Sweet Voice;

Vibrato selections include Ballad, Pop-Diva, Opera Tenor, and the ever-popular Sheep. With names like those, it's easy to dial up just the settings you need.

I wish the Warp styles were as descriptive. Some names, such as "Palate-Thick," are fine, but "Transmute" doesn't convey much information. Incidentally, onscreen choices differ from those in the abbreviated manual. The Transmute styles create subtle changes that affect each voice differently, sometimes radically so. The nine style variations are not a continuum, nor do they lend themselves to descriptive names.

Armed with that knowledge, I recorded a vocal and looped it. I dialed in about 40 percent of the Warp amount and scrolled through the styles, one after the other. Transmute 2 wrought an immediate improvement. My voice sounded richer and less tired, as if I'd gone back and sung the part again with better technique. In contrast, Transmute 3 exactly simulated the effect of a head cold. The best way to use the VoicePrismPlus is to isolate the modeling parameters to pinpoint the effect, and then just use your ears.

I next set about fixing a track recorded by a female singer. The original performance suffered from a deep, chesty attack and lots of breath—quite a challenge. After a few minutes of tweaking, though, I came up with a subtly sweeter

VoicePrismPlus Specifications

Analog Inputs	(1) balanced XLR (mic); (2) balanced ¼" TRS
Analog Outputs	(2) balanced ¼" TRS
Digital Inputs	(1) S/PDIF; (1) AES/EBU
Digital Outputs	(2) S/PDIF; (1) AES/EBU
A/D/A Conversion	24 bits, 100 dBA dynamic range
Control Ports	MIDI In, Out, Thru; (1) ¼" TRS footswitch
Sampling Resolution	24-bit, 44.1/48 kHz
Harmony Types	Shift (Smooth, Stepped); Scale (Smooth, Stepped); Chordal; Manual (Notes, Notes 4CH)
Vocal Processing	thickening; spectral; warp; glottal; inflection; vibrato thickening; humanizing; compression; noise gate; EQ
Effects Processing	chorus; flange; delay; reverb
Display	128 × 64 pixel backlit LCD
Dimensions	2U × 8.2" (D)
Weight	7.8 lb

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voice that sounded far better for the track. That result alone would make me say that voice modeling is a fantastic addition to any producer's toolkit.

A NEW YOU

What about the manufacturer's claims that the VoicePrismPlus can create entirely new vocal textures? I selected tracks by a number of vocalists and went to work. As before, a style or effect that sounded great on one voice wouldn't cut it on another. Yet in every case I was able to make fundamental changes that sounded natural, turning a pure tenor into a late-night rocker and darkening up an alto to the point that you might be forgiven for thinking she had a beard.

I can't say I'm thrilled with the sound of all of the transformations; even tiny amounts of the Whisper styles overpower the lead voice. The same is true of some of the portamento settings: a little goes a long way. Radical changes almost always sounded synthetic, though that could

be a good thing if you are looking for a sound that no one else has.

For the record, the technology used to create gender effects in the harmony voices differs from voice modeling. Just for fun, I recorded a track with a single gender-mutated harmony, then processed it as if it were a lead voice. The result was a much more realistic virtual singer.

WISH UPON A STAR

The VoicePrismPlus has twice as many EQ effects as the original processor: now there are two bands for the lead voice and two for the harmony voices. Likewise, the effects have been upgraded with longer delay times and smoother-sounding reverbs. The compressor lacks fine control, but at least now there's one each for lead and harmony voices.

My wish list is pretty short. Separate outputs for the lead and harmony voices and insert points would be useful, but the increased cost might push

the unit out of reach for most users. A tutorial and a printed list of parameters, styles, and presets (with descriptions of what they do) would also be nice.

THIS YEAR'S MODEL

Voice-modeling technology isn't perfect, but few innovations are. Not all the voice-modeling styles sound realistic, and sometimes the effect overwhelms the lead vocalist. Yet it is light years ahead of anything else I've heard.

The VoicePrismPlus is a snap to use, but it isn't a one-size-fits-all effects box. In every case, however, the VoicePrismPlus created effects that were both useful and interesting, which is all anyone can ask for. When you add up all the things that the VoicePrismPlus does exceptionally well, its value is obvious.

Acoustic musician Mark Nelson lives and works in Southern Oregon's Applegate Valley. A reviewer once described his voice as "not unpleasing."



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* Another 3-way switch allows "Sensitrig" (which makes the triggering twice as sensitive for, e.g. clean string pad filtering) and "Limit", which leaves the filters more "breathing room" for self-oscillation if the input stage is extremely overdriven. * A 3-way switch has 2 general transpose functions : +1 Octave and + Quint which provides monophonic signals with harmonic enrichment. * A 3-way switch for the really powerful and quite revolutionary "Tracking" function - a monophonic pitch follower, that tunes filter 2 to the incoming pitch, and makes filter 1 slave of filter 2 via the harmonics switch. E.g. in position 2, filter 1 will be pitched one octave higher than filter 2, but still following the pitch. This extra switch activates the "tracking" in a normal or deep "track low" position, with stunning basses as result. The unique aspect of this function is that never before any similar system enhances "on the spot" harmonics and creates new harmonics with fat analog circuits. * A white LED indicates when the tracking system is "locked on". * At last there is an 3-way switch in the LFO section, allowing sawtooth wave shape or AR retrig : this forces an LFO restart from the AR trig with pumping grooves as unavoidable result.

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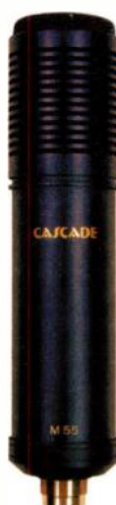
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- Polar Pattern: Cardioid
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- Output Impedance: <200 ohm
- Output Noise: <17 dB (A weighted)
- THD: <0.5% at 125 dB SPL
- Power Requirement: Dedicated Power Supply, includes switchable 115V to 220V



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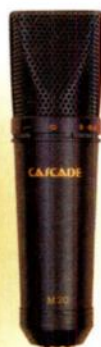
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CASCADE M-20

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- Output Impedance: <200 ohm
- Output Noise: <17 dB (A weighted)
- THD: <0.5% at 120 dB SPL
- Power Requirement: +48V



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- Frequency Response: 7Hz-44kHz, +/- .5 dB
- Sample Rates: 32kHz, 44.1kHz, 48kHz
- Analog Inputs: 8 Inputs Total
- 8 XLR Discrete Mic Preamp w/Input trim or 8 1/4" Balanced Line (+4 dBu/-10 dBv) w/Input Trim
- 2 1/4" Hi-Z Guitar Inputs (replaces Line In 7, 8) w/Input Trim
- Inserts: 4 1/4" Inserts for using Mic preamps w/outboard effects
- Analog Outputs: 10 Balanced 1/4" Line (+4 dBu/-10 dBv), 2 are Monitor Out
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M - A U D I O

DUO AND QUATTRO

*Pint-size USB boxes
deliver big-time audio
performance.*

By David Miles Huber

With the widespread acceptance of USB as the next best thing in convenience and connectivity, it's simple human nature that those people involved in audio and music would want to integrate USB audio components into their portable-a-go-go world. In response, M-Audio has introduced two new USB audio interfaces to its line of professional products: the Duo and the Quattro.

Both compact devices are housed in heavy-duty silver metal cases and are powered by 9 VAC wall warts. Each unit includes 1/4-inch line-level inputs and outputs that you can independently switch (in I/O pairs) to +4 dBu or -10 dBV levels. The units are shipped with drivers that support ASIO, EASI, MME, and WDM.

DUO

The Duo is a 2-in/2-out professional interface that records and plays back a maximum of 24-bit, 96 kHz resolution. In addition to having two line ins and outs, the Duo includes a pair of high-quality mic preamps that sport XLR inputs, switchable phantom power, independent 20 dB pads, and signal/clip LEDs (see Fig. 1).

In the unit's normal mode, the mic preamps or the line-level inputs are automatically routed to the digital-input section. However, by pressing a front-panel Stand Alone Mode button, the Duo also can be used as an independent mic preamp, without the need for a computer. Simply plug in the mics and then plug the box's line-level outputs in to any device input. In that mode, the Duo can also be used as a stand-alone 24-bit A/D converter by streaming the line or mic inputs through to its S/PDIF outputs at selectable rates of 44.1, 48, 88.2, and 96 kHz. You can also configure the box as a handy stand-alone headphone-monitor amp; just plug a signal in to the line-ins and monitor through the headphone output. (In normal operating mode, the headphone jack monitors the output signal.)

QUATTRO

The Quattro is a 4-in/4-out audio interface that also works at resolutions

Minimum System Requirements

Duo

MAC: USB (native)-equipped G3; 128 MB RAM; OS 9.1
PC: USB-equipped Pentium II/333; 128 MB RAM; Windows 98SE/ME/2000/XP

Quattro

MAC: USB (native)-equipped G3; 128 MB RAM; OS 9.1; OMS 2.3.8 for MIDI
PC: Pentium III/500; 128 MB RAM; Windows 98SE/ME/2000/XP

up to 24 bits and sampling rates up to 96 kHz (see Fig. 2). Because of USB's limitations, the box can deliver only a 4-in/4-out throughput when processing 16-bit audio with 44.1 or 48 kHz sampling rates. It also provides 2-in/4-out or 4-in/2-out processing at 24-bit resolution with the same sampling rates. At the top of the scale, the Quattro offers 2-in or 2-out processing with 24-bit resolution at 88.2 or 96 kHz sampling rates. The Quattro also includes a Direct Monitoring feature that can route inputs 1 and 2 as well as 3 and 4 directly through to their respective outputs, thereby eliminating monitoring latency when recording.

In addition to offering front-panel MIDI In and Out ports, the Quattro includes provisions for an optional 15-pin DB connector that can be used to connect an M-Audio Omni I/O interconnect/mixer box directly to the Quattro's four input and output buses. Plugging in the portable Omni I/O provides access to two mic preamps, a mixing section with eight additional inputs, two headphone sends, an FX send and return, a dedicated monitor and output bus section, and an auxiliary input section.

USB ADVENTURES

I started by plugging the Duo in to my brand-spankin'-new Dell Inspiron 8100 laptop running Windows XP. (A lot of people have been buying this laptop for audio applications because of its high display resolution, dual-monitor capabilities, and high-quality onboard audio card.) It's important to follow the Duo manual's simple directions, because the Audio Configuration Manager needs to



FIG. 1: M-Audio's Duo USB audio interface combines high-quality mic inputs, 2-channel analog I/O, and S/PDIF I/O in a compact case.

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FIG. 2: M-Audio's Quattro multichannel USB audio interface delivers 4-channel recording and playback with built-in MIDI I/O.

be loaded for the Duo to work properly, even after XP tells you that the device is loaded and ready for use.

After the necessary software was installed, I started off by playing back several 16-bit, 44.1 kHz sound files using Syntrillium's Cool Edit Pro with the Duo's MME drivers. I quickly encountered loud bursts of digital hash caused by a power-saving feature called Speed Step that is designed into many newer

PC laptops. The feature acts like an intelligent gear shift that throttles the CPU speed up and down to save on battery power while meeting current processing demands. Although that's good for most applications, it can get in the way of high-demand USB media devices. After Speed Step was turned off, the loud noises went away and the laptop played back and recorded stereo files without a hitch.

Once the laptop was working, my next step was to use the Duo with my studio desktop computer. The unit worked perfectly, although plugging it in disabled my main audio card, an M-Audio Delta 1010. When I unplugged the Duo's USB cable, the 1010 came back online. That also happened on a second generic PC that was fitted with a simple Sound Blaster card. It turns out that desktop PCs share USB resources with a physical PCI card slot on the motherboard—specifically, slot 3 on Intel-based systems and slot 4 on AMD-based systems. If you lose your audio card when you plug in a high-bandwidth USB device, try moving your sound card to another slot.

You're probably starting to see that USB on the PC isn't always fun and games. However, the problems that you're likely to encounter stem from the PC's design architecture and aren't the fault of either of M-Audio's devices. Reportedly, there are far fewer setup problems when installing such USB devices on a Mac. If you'd like to learn more about optimizing your Windows XP PC for making music, a good place to visit is www.musicxp.net.

TRIAL RUN

I tested both audio interfaces on my laptop with the ASIO driver and Steinberg's Nuendo. The Duo's sound quality was what I've come to expect from M-Audio: superb. The unit worked like a charm with 16-bit, 44.1 kHz and

Duo Specifications		Quattro Specifications	
Inputs	(2) balanced XLR mic with switched 48V phantom power; (2) unbalanced 1/4" line (+4 dBu or -10 dBV)	(4) balanced 1/4" (+4 dBu or -10 dBV)	
Outputs	(2) balanced 1/4" (+4 dBu or -10 dBV); (1) 1/4" headphone	(4) balanced 1/4" (+4 dBu or -10 dBV)	
Resolution	16- and 24-bit	16- and 24-bit	
Sampling Rates	44.1, 48, 88.2, 96 kHz	44.1, 48, 88.2, 96 kHz	
MIDI I/O	n/a	(1) In, (1) Out	
Digital I/O	S/PDIF coaxial (16-, 20-, and 24-bit output)	n/a	
Dynamic Range	105 dBA (line in to line out); 107 dBA (mic in to line out)	101 dBA (input); 104 dBA (output)	
Total Harmonic Distortion	<0.002%	<0.002%	
Frequency Response	22 Hz–22 kHz (+0, -0.3 dB)	22 Hz–22 kHz (+0, -0.3 dB)	
Dimensions	8.50" (W) × 1.75" (H) × 5.00" (D)	6.00" (W) × 1.75" (H) × 5.00" (D)	
Weight	2.4 lb.	1.7 lb.	

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24-bit, 96 kHz audio. The mic preamps stacked up to the better preamps in my studio; they sounded present yet warm and full-bodied. I love the fact that the Duo can be used as a standalone mic/line preamp and digital audio converter. That feature makes the box an important addition to any on-the-go audio toolbox.

The Quattro's converters are as high in quality as the Duo's, and they worked without a hitch. The Direct Monitor

function eliminates any latency that might be introduced by the system or audio editor, and it lets you monitor your input signal at the press of a button. I also discovered that, contrary to popular belief, you can stream more than six audio channels over USB at one time. Simultaneously recording and playing back from all of the Quattro's audio ins and outs at 16-bit, 44.1 kHz worked perfectly.

Speaking of I/O, when the MME

PRODUCT SUMMARY

M-Audio

Duo and Quattro
USB digital audio interfaces

Duo \$349.95

Quattro \$349.95

FEATURES	4.5
EASE OF USE	4.0
AUDIO QUALITY	4.0
VALUE	4.0

RATING PRODUCTS FROM 1 TO 5

PROS: Support rates up to 24-bit, 96 kHz. The Duo can be used as an audio interface or independent mic preamp and A/D converter. The Quattro delivers simultaneous 4-in/4-out audio at 16-bit, 44.1 kHz as well as MIDI I/O.

CONS: When using MME drivers, only two of the Quattro's channels can be used by an audio application.

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(and WDM) driver is chosen from the software Audio Configuration Manager, only two of the Quattro's I/O channels can be accessed, no matter what sampling rate is chosen. In addition, even when you choose the MME driver in the Audio Configuration Manager (for the Duo or the Quattro), the settings always revert to the default ASIO driver when the PC is turned off; the software won't retain its last setting.

BUDDY SYSTEM

All in all, once I configured my laptop, the Duo and the Quattro were top-notch and highly versatile digital audio interfaces. The Duo was a particular favorite for its amazing range of mic-preamp and interface applications. It is indeed a mean little USB mic pre and standalone A/D converter.

David Miles Huber is the author of *Modern Recording Techniques* (Focal Press, 2001). Learn about the book and find industry-related links and info at www.modrec.com.

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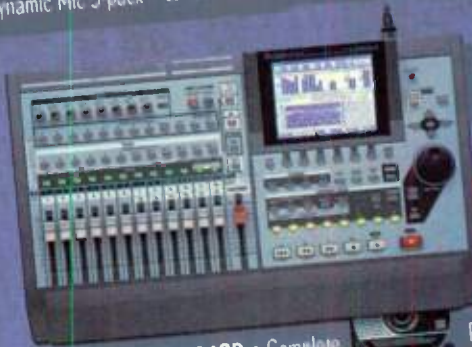
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B O S S

SP-505

The simpler sampler.

By David Battino

Nothing ignites a song like a tasty sound bite or a slamming drum loop. But for many musicians, traditional samplers are too expensive, complex, bulky, or slow at loading sounds. Software samplers address some of those issues (load time in particular) but aren't always road-worthy. Fortunately, for those people who like instant gratification, there's another option: the *phrase sampler*.

Phrase samplers are compact instruments that store samples in flash RAM, so they're ready to play the moment you turn them on. Their voice architecture has more in common with drum machines than synths, making them simpler and less powerful. To keep the cost down, manufacturers also limit the polyphony. Four to eight notes are all you get, though that's usually adequate for weaving stereo loops together.

But simplicity has its virtues. Phrase samplers are easier to grasp (physically and conceptually) than general-purpose keyboard samplers, and their groove-

centered design makes them better suited to certain types of music production. The latest generation of phrase samplers also features automatic time stretching to sync sampled phrases.

MEET THE NEW BOSS

Roland and its Boss division have been refining the phrase-sampler concept since 1995, when Roland rolled out the MS-1. That highly portable instrument, which did little more than trigger samples, spawned the SP-202, the SP-303, and now the SP-505 (see Fig. 1). Boss, a Japanese company, probably skipped SP-404 because the Japanese words for *four* and *death* sound the same, making four an unlucky number.

Nomenclature aside, the SP-505 is a big leap beyond the previous models. It also delivers compelling advantages over its competition in the phrase-sampler market, the Yamaha SU200 and Korg Electribe-S. However, the SP-505 has some surprising drawbacks as well, which I'll get into later.

MY PAD OR YOURS?

The SP-505 is about the size of a chunky laptop computer, but at just over three pounds, it's a lot lighter. Part of that is because of the plastic case, but the construction is reasonably sturdy. The front panel sports 16 drum pads, which, like those on the Yamaha and Korg, light up when a particular sample is playing but aren't Velocity sensitive. The sounds do respond to Velocity over MIDI, however.

A 17th pad, Ext Source, acts as an unmute button for an external signal connected to the analog inputs. You can sequence this pad just like the others or, with two clicks, route its signal through the SP-505's hands-on effects processor. Not only does that let you use the SP-505 and a second instrument (or a CD player) without a mixer but it also means you can process a feed from, say, a vocal mic, adding emphasis to certain words during live performance. A Pad Bank button calls

up 15 additional banks of samples (31 with expanded memory) for more than 500 sample locations.

Moving up, the next row of SP-505 buttons contains the sequencer transport controls, including a tap-tempo button and four illuminated buttons for muting the sequencer's four tracks. The adjacent Phrase Control section accesses the SP-505's time-stretching and rhythm-slicing features as well as a pitch-shifting function reminiscent of Roland's magical VP-9000 VariPhrase sampler.

Things really get interesting in the next row up, which controls the effects processor. The SP-505 offers 26 effects, each with three parameters that are mapped to the three knobs in this row. Although somewhat slippery, the knobs turn smoothly, and their current position and assignments are shown in the LCD above them. Dedicated buttons to the right let you quickly select effects, enable them, or assign them to pads. The sonic quality of the more common effects, particularly the reverb and distortions, is poor, but used sparingly, they help enhance the sound. I had more fun brutalizing samples with the wackier effects, such as Tape Echo, Lo-Fi, Chromatic Pitch Shift, and Voice Transformer.

Whereas other phrase samplers communicate through a one-line LCD or even a numeric LED, the SP-505 provides a generous 128-by-64-pixel backlit display—a major advantage. Three "soft" buttons, a data wheel, Enter and Exit buttons, and four cursor buttons make navigation fast and easy. Most features are accessible with one or two clicks, and many values can be set instantly by punching one of the 16 numbered drum pads. The only controls I missed were dedicated sample-reverse and -repeat buttons. It's nearly impossible to retrigger a pad quickly. (The Electribe-S has a Roll button for just that application.) I was also disappointed that the SP-505 has no hi-hat cutoff option that would silence one pad when a related one is pressed.

WATCH MY BACK

For a phrase sampler, the SP-505 is especially well endowed with connectors



FIG. 1: With up to 66 minutes of 44.1 kHz sampling time, a graphic display, and three real-time effects controls, the Boss SP-505 sets a new standard for compact phrase samplers.



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(see Fig. 2). There's a power jack with a cord lock (the external adapter is a "line-lump" type with a 12-foot cord), a multifunction footswitch jack, MIDI In and Out, a socket for an antitheft cable, optical and coaxial S/PDIF inputs, stereo RCA inputs and outputs, a headphone jack, and a monophonic mic input.

Two design issues are worth noting. First, the RCA outputs provide line-level signals only when the volume knob is at about three o'clock. Crank it higher, and the signal distorts. It's not a bad-sounding distortion, but it isn't mentioned in the manual. If you're used to maxing out the volume knob to get the best signal-to-noise ratio, you may be rudely surprised. Second, the S/PDIF inputs are just for sampling; they don't feed the Ext Source bus, so you can't use them to mix in audio while the sequencer is playing.

Around the front is the final connector, a well-protected slot for adding a



FIG. 2: Microphone, stereo line-level, and two types of S/PDIF jacks await your input. The padlock slot accepts a computer-style antitheft cable.

SmartMedia memory card. On the Yamaha and Korg phrase samplers, SmartMedia is used only for backup and WAV-file import, but the SP-505 uses it to extend its internal memory as well. This means that removing or inserting the card while the SP-505 is on can destroy data. For that reason, Boss secured the slot with a cover and two thumbscrews, although there's no warning sticker on the cover itself. (For more background on SmartMedia, see the Yamaha Motif section of the March 2002 EM Links at www.emusician.com.)

SIMPLE SAMPLING

Out of the box, the SP-505 holds 2 minutes of 16-bit, 44.1 kHz audio (half that amount for stereo). Add a 128 MB SmartMedia card (about \$50), and it gains a whopping 64 additional minutes of sample memory. By reducing the sampling rate (and thus the quality), you can extend that to nearly seven hours.

To achieve its impressive capacity, the SP-505 uses data compression, but the results are largely transparent at the highest sampling rate. A 20 Hz to 20 kHz sine-wave sweep that I fed the unit introduced significant distortion and

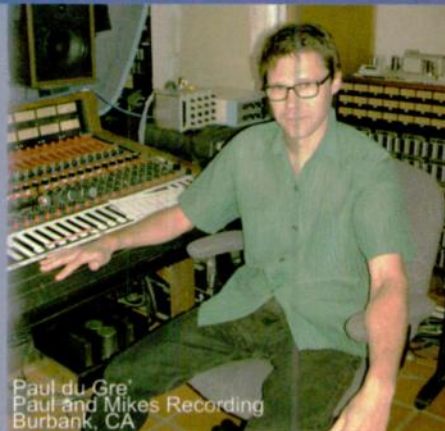
Artists With Ears—Take 2

Paul du Gre' Discovered That Solid Silver Cables Really Do Make A Difference...

Tracking in analog is truly an art and Paul du Gre' is considered one of the masters. He has recorded Bad Religion, Los Lobos, Rosie Flores, Dave Alvin and the seminal guitarist Leo Kottke. Having recently added DB digital conversion in his studio to archive & master 24 tracks at 96K, he knows what he hears—what works and what doesn't.

Currently, Paul is tracking Leo Kottke and Mike Gordon of Phish on their duet CD. The entire front end in Paul's studio uses Zaolla Microphone, Instrument, S/PDIF and Clock cables. Leo, has added the G Series Silverline cable to his live rig because "...[Leo] no longer has to EQ the highs of his 12 string and can't wait to take this cable on the road."

Paul knows Zaolla Silverline cables outperform what he considered to be the best copper cables around and believe it, he simply is not easily impressed. "I like the completely open sound, without coloration of the highs and more definition in the bass and mids, these cables articulate the sounds I record, as I actually hear them."



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FIG. 3: The SP-505 is the only phrase sampler with a full graphic display, and it makes the most of it. These screens show the Chop feature, real-time effect control, and sequencer event editing.

noise in the higher frequencies, but real-world samples such as drum loops and guitar riffs sounded fine, if a mite duller. More telling, I could hear no tonal difference between sounds I imported from SmartMedia or sampled through the analog inputs, which indicates that the SP-505's 20-bit analog-to-digital converters are quite good.

Thanks to its flashing buttons and informative display, the SP-505 makes sampling easier than falling off of a greased unicycle. Simply press the large Sampling button, hit the pad you want to sample into (all available pads start flashing), choose an input source (line, digital, or mic), set the input level, and hit the Sampling button again. Recording begins immediately, and the display counts down the time remaining. Tap the Sampling button once more to stop recording. You can also choose to have sampling start automatically as soon as an input threshold is reached. You can even sample through the effects processor while playing its knobs.

A final parameter called With BPM makes looping nearly automatic if you input the source's tempo before record-

ing. (The SP-505 supports tempos from 40 to 200 bpm, with a resolution of 0.1 bpm.) To use this feature, you terminate sampling a fraction of a second after the point where you want the phrase to loop—during the downbeat of the third bar, for example, or even in the middle of a bar if you want a two-beat loop. The SP-505 then backs up a tad and sets the loop point to the mathematically correct sample. Once, with a slow loop, I had to adjust the loop point

manually to smooth the transition, but overall, this feature is a huge time-saver.

SAMPLE AGAIN

The SP-505 can also *resample* its output—a handy way to layer sounds and overcome the eight-note polyphony. By resampling a sound repeatedly through different effects, you can also create dramatic variations. Visit www.emusician.com to hear some examples.

In the first of two resampling modes,

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Auto, you specify up to four source pads (two pads if they contain stereo samples) and hit the Sampling button. The resulting sample will be as long as the longest source sample. Unfortunately, the tail of any effect you may have assigned to the source will be cut off.

In the second resampling mode, the SP-505 keeps recording until you tell it to stop or until memory runs out. You can perform on multiple pads and twirl the effect knobs, and everything will be recorded. However, you can't switch pad banks during resampling, and you can't resample a sequence. Worse, the SP-505 disables MIDI input during resampling, so you can't drive it from an external sequencer, either. That's disappointing, because sampling a sequence would have been a great way to develop new loops. (The Electribe-S can sample its sequences; the SU200 doesn't have a sequencer.)

CHOP TILLYOU DROP

Editing samples is also easy, especially because the SP-505 is the only phrase sampler with a waveform display (see Fig. 3). Dedicated buttons let you zoom in vertically and horizontally, and the cursor buttons scroll the window side-

ways. Waveform editing is limited to setting the loop point; deleting the waveform's beginning, middle, or end; and boosting or attenuating the entire waveform or a selected region. (You can boost up to 400 percent for crunchy clipping effects.) The maximum resolution is 16 samples, but I had no trouble making loops, so perhaps the SP-505 does automatic crossfading.

You can also set the following non-destructive playback parameters:

- level reduction;
- panning (left, center, or right only, though that could be useful for feeding external effects);
- loop on/off;
- reverse on/off;
- Pad mode (In Trigger mode, the first push starts the sample and the second stops it. In Gate mode, the sample plays only while the pad is held, although a separate Hold button lets you lock it down, if desired. In Drum mode, the sample always plays completely through; subsequent hits retrigger it); and
- playback type (In Single mode, the sample always plays at its original tempo; in Phrase mode, it will be time stretched to fit the current

PRODUCT SUMMARY

Boss

SP-505

groove sampling workstation

\$595

FEATURES	4.0
EASE OF USE	4.0
SOUND QUALITY	3.0
VALUE	4.0

RATING PRODUCTS FROM 1 TO 5

PROS: Enormous memory. Informative display. Rapid sampling. Efficient layout. Digital inputs. Playable effects.

CONS: Can't sample sequences. Knob moves aren't recorded. Gritty effects. No hi-hat cutoff. No roll button.

Manufacturer

Boss/Roland Corporation U.S.

tel. (323) 890-3700, ext. 2463

Web www.bossus.com or

www.rolandgroove.com

tempo. For phrases, you can also specify the number of measures and the time signature, though some values are refused).

Like the groundbreaking Propellerhead ReCycle, the SP-505 can chop mono samples into their component beats and assign them to as many as 32 sequential pads. You can easily reposition the slice points in the waveform window if the box guesses wrong, but I had good luck with this feature. It was a blast to turn on some echo, sample myself scatting into a mic, and press the Chop button to create an instant vocal drum kit. The slices are stored in two dedicated Chop banks; to gain full access to them for sequencing, you copy them to the SP-505's handy clipboard and then paste them to a standard bank. The clipboard holds up to 16 items.

WICKED PITCH

Surprisingly, the SP-505 doesn't come with a CD of samples, but it does supply three banks of drum sounds and a bank of the note G played on various bass, piano, synth, and organ patches. What good is a single note? Press the Pitch button, and the SP-505 will pitch-shift it

SP-505 Specifications

Polyphony	8 notes (4 stereo)
Program Memory	(250) internal user locations (incl. 26 pitched); (256) optional external-card user locations
Maximum Sampling Time	17 min. (lo-fi)/5 min. (long)/2 min. (standard) internal memory; 395 min. (lo-fi)/129 min. (long); 64 min. (standard) with optional 128 MB SmartMedia card
Sample Import Formats	WAV, AIFF (8/16-bit, 44.1 kHz); loop points ignored
Effects Processing	(26) types, (1) simultaneous; enabled per pad
Sequencer	(4) tracks; (15,000) events; (40) preset patterns; (100) user patterns; (20) songs; 96 ppqn resolution
Controllers	(1) footswitch (play, sample, pad 1-16, FX on/off); (3) assignable effects knobs; (1) tap tempo; (1) bpm sync; (1) bpm adjust
Audio Inputs	(1) ¼" mic; (1) stereo RCA line; (1) optical; (1) coaxial S/PDIF
Audio Outputs	(1) stereo RCA; (1) ¼" stereo headphone
Additional Ports	(1) MIDI In, Out
Dimensions	11.75" (W) × 2.56" (H) × 10.00" (D)
Weight	3.12 lb. (excluding adapter)



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Genre: Soul - R&B



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to cover an entire octave and then paste the new samples into one of two Pitch banks so that you can play the pads as you would a keyboard. As with Roland's high-end VP-9000, this function changes the pitch of a note without changing its duration. Unlike the VP-9000, it sounds rather furry, but it's handy for working out bass lines, inserting chord stabs, and creating special effects.

The SP-505 also offers time stretching, which changes the duration of a sample without changing its pitch. Samples set to Phrase mode are automatically stretched to fit the current sequence tempo. By hitting the BPM Sync button, you can also synchronize phrases with different tempos as you play the pads. Sound quality depends on the type of sound—sparse drums work best—and the amount of stretching. The SP-505 isn't prone to generating clicks the way the SU200 is, but don't expect the smoothness you'd get out of something like Sonic Foundry Acid.

SEQUENCING

With four tracks, playback-only swing quantization (meaning your original parts are never altered), and an Event-Edit screen, the SP-505 has a fairly capable sequencer. It comes with 40 forgettable house and hip-hop patterns, but you can store (and name) as many as 100 of your own. (It's a pity samples can't be named, as well.) Each pattern can be as long as eight beats, but you can store the mute status of each track in a pattern, so it's easy to create variations and switch among them on the fly.

The SP-505 doesn't record knob movements, so to use a varying effect in your sequence, you have to resample the pad while wiggling the knob. The Event-Editor screen is welcome, however. It allows you to move notes forward or back in time or change their Velocity, gate time, or pad assignment (sound). It's easy to get lost, though, because the SP-505 doesn't play the notes as you step through the list. Granted, many of the

notes will trigger loops, so you wouldn't want to hear the whole sample, but a half-second preview would be invaluable.

GROOVE TO GO

There's something appealing about a 3-pound box that lets you store and reshape 500 custom loops. More than just a phrase sampler, the SP-505 approaches the power of a high-end sampling drum machine, although I definitely missed Velocity-sensitive pads and the ability to resample sequences, hear events in Edit mode, and record knob moves. I also wish the effects were cleaner. I started to dream about building a similar but more powerful system out of a laptop computer, the Ableton Live audio sequencer, a MIDI keyboard, and a portable audio interface, but then I realized that that was exactly the point of the SP-505. For thousands of dollars less, you get a lightweight, one-piece, instant-on musical collaborator. This is one boss you'll be glad to have around. ●

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Overall Rating: ★★★★★ (5/5)
Sound Quality: ★★★★★ (5/5)
Usability: ★★★★★ (5/5)
Programming & disc layout: ★★★★★ (5/5)
Value: ★★★★★ (5/5)



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Quick Picks

ARTISTPRO.COM, LLC

Studio-in-a-Box

By Howard Jonathan Fredrics

With the right dose of knowledge, today's desktop musician can assemble a powerful yet cost-effective virtual studio that incorporates plug-in effects, software synths, MIDI control surfaces, and more. To help you better understand the hardware and software issues, Erik Hawkins's 263-page, nine-part *Studio-in-a-Box: The New Era of Computer Recording Technology* (\$34.95) provides a comprehensive overview of virtual-studio technology along with helpful, practical tips and concise product reviews. The book progresses from general and basic concepts to increasingly complex and detailed examinations of virtual-studio applications, enabling the novice to achieve a higher level of understanding.

Laying the Foundation

Parts I and II discuss the reasons for "going virtual," including applications for mastering, scoring to picture, and auto-

mated mixing. The book broadly examines the essential functions of a virtual studio with descriptions of computer hardware, digital audio sequencers, plug-ins, audio cards, MIDI interfaces, and controllers.

Hawkins explores the maze of options for configuring a computer system. The book compares Mac OS, Windows, Linux, and BeOS operating systems, examines different processor speeds and types, and discusses system RAM requirements. He also gives practical, in-depth coverage of hard-drive types and sizes (although he doesn't mention more recent 160 MB-per-second transfer-rate units) as well as the use of PCI expansion cards, various backup solutions, dual-monitor configurations, and options for rack-mounting computer hardware and for assembling a portable laptop-based system.

Meat and Potatoes

Part III focuses on the details of digital audio sequencing. It describes various multitrack recording, MIDI-sequencing, and editing functions and has a useful shopper's guide that is written as a series of brief and insightful product reviews.

Part IV covers effects plug-ins and includes an overview of plug-in formats, followed by discussions of RAM and processor considerations and methods for inserting effects into a mix using a host application. The book reviews essential plug-ins for EQ, dynamics, reverb, modulation, and delay. It also looks at more unusual plug-ins that are especially useful for experimental music and sound design. Several mastering, sweetening, emulation, and utility programs are also examined.

Part V explores the world of virtual instruments, including synthesizers, samplers, drum machines, and models of real-world instruments. It also includes short reviews of several popular products. Surprisingly, Tascam's GigaStudio and GigaSampler are omitted from the chapter on software samplers.

In part VI Hawkins identifies four basic types of audio interface cards: basic I/O, multi I/O, multi I/O with MIDI, and laptop connections. He explains important concepts, such as A/D versus D/A converters, connector types and digital formats, audio-quality considerations, and audio-driver types. After discussing concepts, Hawkins provides a set of reviews covering each card type.

Part VII explains the basic concepts relating to MIDI interfaces, drivers, and connections. Despite small errors in terminology, editing, and organization, the section on MIDI is informative and the brief product reviews are helpful.

Part VIII gives you a complete understanding of common as well as uncommon varieties of MIDI controllers. It presents reviews of performance controllers and control boxes and also focuses on digital mixer interfaces and combination audio and MIDI control surfaces.

Putting It Together

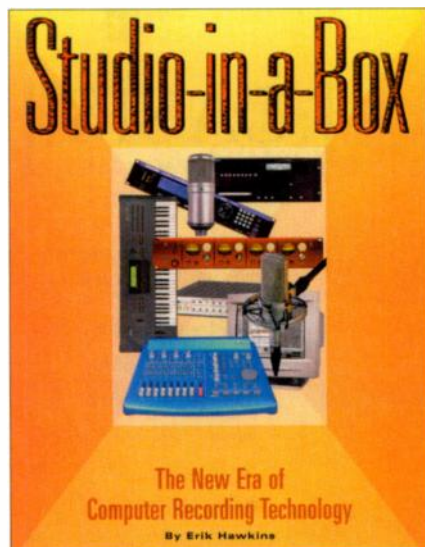
The final section of the book consists of a number of practical tips for setting up a virtual studio and for making the most of your system. It offers vital suggestions for keeping your power sources clean and consistent, avoiding ground loops, developing an efficient monitoring system, warming up your signals, and configuring your plug-in routing. Hawkins also offers excellent hints for obtaining good studio ergonomics.

This section provides a variety of useful tricks for ensuring that your sessions go smoothly and efficiently. From file saving and organization tips to system performance enhancements, Hawkins covers all the bases.

Box of Tools

Studio-in-a-Box is one of the best books available for learning how to buy, assemble, and effectively use a virtual studio. Hawkins's clear and concise writing style is perfect for beginners as well as more experienced readers. The book's organization lets you choose an appropriate level of study, and it lets you focus on the topics that are most relevant to your musical needs. The author provides lots of product-feature summaries, though I wish he had provided individual chapter summaries. A handy list of manufacturers and a glossary of terms makes the book a valuable reference source.

My only criticism concerns some minor editing and factual errors and omissions. I also regret that the subject matter is by its nature so time-sensitive. Many of the product reviews will become obsolete within a relatively short period as new products and systems are introduced. However, with Web updates available at the author's Web site (www.erikhawkins.com), those



Erik Hawkins's *Studio-in-a-Box* from ArtistPro is a comprehensive primer of virtual-studio technology with summaries of popular products.

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Quick Picks

shortcomings could be repaired. Because Hawkins also offers up a lot of excellent technical information of a more general nature, I expect that much of the book will remain a useful resource well into the future.

Overall EM Rating (1 through 5): 3.5

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ANALOGUE SYSTEMS

RS240 Frequency Shifter

By Gino Robair

Analogue Systems recently added the RS240 Frequency Shifter (\$795) to its roster of RS Integrator analog synth modules. The RS240 is based on the coveted Bode 735 frequency shifter, created by Harald Bode in 1970. However, the RS240 fits the 3U, Eurorack form factor, making it compatible

with Analogue Solutions and Doepfer modular synths, among others.

The RS240 requires a power supply (± 12 VDC) and a rack. The review unit came in an attractive walnut case that included an RS80 VC-LFO (\$119) and a power supply. (The price for such a standalone setup varies depending on the module accompanying the RS240.) The desktop configuration made it easy to integrate the RS240 into my studio.

Major Shift

A hardware frequency shifter works in the same way as a ring modulator: it takes two signals and gives you the sum and difference tones, called sidebands. Unlike a ring modulator, a frequency shifter gives you independent outputs for the sidebands (called "up shift" and "down shift"). A hardware frequency shifter requires a lot of parts, and consequently, it's an expensive and somewhat complex module to build.

The difference between pitch shifting and frequency shifting is simple: pitch shifting



The Analogue Systems RS240 Frequency Shifter similar to a ring modulator but offers independent outputs for the sum and difference sidebands.

transposes a tone by multiplying it by a fixed number. The pitch-shifted tone and its associated harmonics can therefore be transposed equally in musical intervals (such as a minor third or a perfect fourth). That allows the harmonics in the overtone series to maintain their original harmonic relationships, preserving much of the character of the sound.

Frequency shifting, on the other hand, adds or subtracts a fixed amount to or from

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the tone and its harmonics. It is a mathematical, linear shifting of the frequency spectrum, which changes (compresses or expands) the mathematical relationships of the overtones, thereby distorting the overtone series. The result is added timbral complexity. Put the frequency shifter under voltage control, and you have a powerful analog processor.

Plug and Play

The RS240 has a simple front-panel layout, featuring unbalanced 1/4-inch (3.5 mm) jacks for audio and CV I/O, five knobs, and a switch. The module has one audio input, three CV inputs, separate outputs for the upper (Out B) and lower (Out A) sidebands, and three mix outputs.

The largest knob controls the amount of frequency shift, with an exponential range of ± 2 kHz and a linear range of ± 50 . The Scale control has four pitch-range settings, as well as Exp (exponential response) and Zero. The Scale ranges—5 (± 5 Hz), 50 (± 50 Hz), 500 (± 500 Hz), and 5K (± 5 kHz)—determine the amount of shift for each positive and negative voltage swing. For example, in the 5K setting, each volt at the CV input causes a 1 kHz shift in the signal (up shift and down shift). The higher the setting, the wider the range and the more pronounced the timbral effects will be. In the Exp setting, each volt adds an octave change to the source input.

The Mixture knob sets the balance between upper and lower sidebands at the Mix outputs. The Squelch on-off switch and Squelch Threshold control are for gating system noise when the input signal is low. I found them to be especially useful because signal from the VC-LFO seemed to bleed into the RS240 when there was no external signal present.

On the subject of noise, the outputs are noisy around 3 kHz. If you're processing simple, low-level audio sources, you may find yourself reaching for the EQ.

The Zero Adjust control is used to calibrate each setting on the Scale control. The closest you can get to hearing the input signal unprocessed is to set the Scale control to Zero, position the large knob at 12 o'clock, switch off the Squelch, and set the Zero Adjust so that the LED goes dark. In both cases, finding the zero point in this way was difficult. Each time I tried, the light

would drift on and off slowly. However, this setting was great for creating slow-moving spatial effects, when the signals from Out A and Out B were hard panned left and right, respectively. Ah, the joys of analog processing.

Frequed Out

The RS240 is a powerful module that's easy—and fun—to use. In extreme settings, it can make your tracks unrecognizable. For example, I used it to create complex rhythmic material by dramatically shifting talk-radio broadcasts until the words disappeared.

The RS240 is also great for subtle processing, such as adding 2-channel movement to a mono signal. Although it's a bit pricey, the RS240 is a worthwhile investment if you want a processor with teeth.

Overall EM Rating (1 through 5): 3

Analogue Systems/Enport (distributor);
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SEBATRON

Copernicus Stereo Resonant Filter

By Mike Peake

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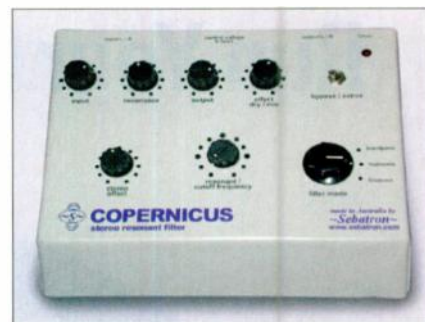
Australian newcomer Sebatron offers up the Copernicus (\$349), a true stereo multi-mode analog filter. The Copernicus has low-pass, highpass, and bandpass modes, with external CV control of the cutoff frequency. The unit is intended for tabletop use or for DJ coffins and lacks the large bypass foot-switch of its guitar-oriented brethren.

The true stereo design lets you manipulate stereo signals from a single set of knobs or by using control voltages. That simplifies the sweetening and mangling of stereophonic material.

Filter Cosmology

The Copernicus has two unbalanced 1/4-inch inputs, two unbalanced 1/4-inch outputs, and a TRS 1/4-inch CV input. Power is supplied by a 12 VAC wall wart, which is available separately. The Copernicus seems sturdy and its knobs turn smoothly.

The unit has a Bypass/Active switch for



The Sebatron Copernicus is a true-stereo filter that is easy to set up and use.

introducing the filter effects. The Effect Dry/Mix knob, as you would expect, balances the dry input with the processed signal. Setting the Effect Dry/Mix control to its midpoint mixes the filtered and unfiltered signals together, giving you the interesting phase anomalies you would anticipate.

The Input and Output gain controls on the Copernicus allow you to add overdrive to the signal. The Stereo Offset control, as the name implies, offsets the response of the left and right filters. That lets you change the stereo spread in interesting ways. Incoming CVs can be offset as well.

The Low- and Highpass modes sound warm and clear. Bandpass mode acts like a band of voltage-controlled, boost-only parametric EQ. I especially enjoyed the character of the Highpass mode, with the resonance set just before self-oscillation begins. It adds a hollow, whispery detail which, when offset and mixed with the dry signal, consistently produced interesting results. To create a deeper response slope in any mode, the left output (filter 1) can be plugged in to the right input (filter 2). However, that setup lets you process mono signals only.

The Copernicus I tested offers only manual control over filter cutoff, which has a slightly skewed response; there is little change up to the center position and most of the audible spectrum is swept in the final quarter turn of the pot. With Cutoff set to or near minimum, manipulating the Stereo Offset pot produces an audible scratching sound. In addition, I detected a low-level hum at those settings. The manufacturer states, however, that these problems occur only in the early production run and have been fixed in the newer models.

When RZA goes to work in the A.M., the E-MU MP-7 is his Briefcase

Photo: Jason Gould

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Plug It In

The Copernicus may be controlled from a modular analog synthesizer or other CV source. The TRS CV jack sends 0 to 5 VDC over the ring connection, in proportion to the front-panel Cutoff control, with 5V output at the minimum setting. External voltage is received over the tip connection. This allows you to control another Copernicus or an external device that accepts CVs, with the caveat that the voltage range is inverted from what is typical in the world of synthesis. Signals from 0 to 5 VDC will change the filter cutoff frequency, but 0 VDC opens the filter completely and 5 VDC closes it completely. That means that a small voltage will sweep the filters at the top of their range, while larger voltage excursions lower the cutoff frequency.

The Copernicus has a few other quirks. For example, it doesn't respond according to either the volt-per-octave or hertz-per-volt standard. Additionally, quick voltage changes from a keyboard or analog sequencer produce an audible tick. The Copernicus responds to control voltage with the same exaggerated slope as its Cutoff control. I would enjoy seeing the unit altered to exhibit the standard volt-per-octave response, to simplify interfacing with a modular synthesizer setup.

A device such as the Big Briar Moogfooger CP-251 (reviewed in EM's March 2001 issue) would be an ideal companion to the Copernicus because it provides the offset that is necessary for doing small sweeps at low cutoff frequencies. A CV expression pedal can also be used with the Copernicus, but again, you will need a device such as the CP-251 to manage its behavior.

Input and Output

The Copernicus is a clean, clear-sounding filter that will add character to any audio source. The convenience with which it can be added to a stereo setup is enticing. However, I wouldn't recommend the Copernicus to audiophiles or users who have complex CV requirements.

Overall EM Rating (1 through 5): 2.5

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SPECTRASONICS

Metamorphosis

By Dan Phillips

.....

I admit it: I always look forward to reviewing a new Spectrasonics CD-ROM. The company always seems to deliver well-considered, great-sounding, impeccably organized, and easy-to-use products. The latest in Spectrasonics' distinguished line of loop libraries, *Metamorphosis: 21st Century Grooves* (CD-ROM, \$199; audio CD, \$99), doesn't disappoint.



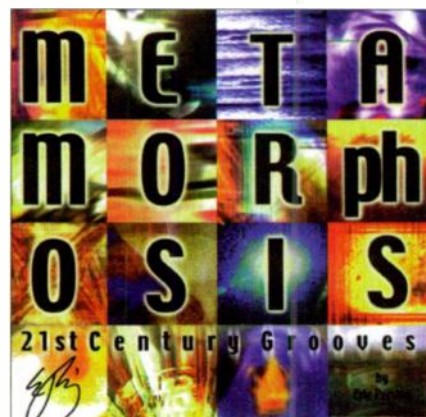
This massive collection ships on four CD-ROMs available in Akai/E-mu, Roland, and Giga formats. I reviewed it using an E-mu e6400 Ultra sampler. Spectrasonics provides each of the 300 loops in four different forms. The first disc includes WAV versions of each loop for use in audio programs—a great convenience. The remaining three discs offer standard loop, Groove Menu, and Groove Control versions of every loop in the native format of the selected sampler.

Slice and Dice

Groove Control and Groove Menu formats provide contrasting methods of freeing the user from tempo-matching concerns. Groove Control has become a standard feature of Ilio and Spectrasonics loop libraries. With Groove Control, loops are sliced up so that each hit is a distinct sample. The hits are matched with a custom-designed MIDI sequence (available in all major sequencer formats) so that playing the sequence re-creates the sound and feel of the original loop.

Groove Control offers wonderful possibilities: it's dead simple to change the tempo of a loop without changing its pitch, switch from straight to swing feel or vice versa, match loops to custom quantization grids, and so on. That also makes it much easier to layer different loops together. Finally, it also opens the loops up to manipulation, such as removing an extraneous snare accent and swapping sounds—very cool.

Groove Menus are a bit more traditional but no less useful. Each CD (except the WAV-format disc) has a set of these menus, which include all of the disc's loops set to identical tempos and laid out across the



Metamorphosis from Spectrasonics combines completely malleable sampled grooves with extensive audio processing.

keyboard. That makes it easy to experiment with layering, including beat-offsets between loops—just grab a handful of notes and go. Each Groove Menu is available in tempos ranging from 50 to 180 bpm.

Sounds Groovy

Enough about formats; let's talk about the sounds. Two words that come to mind are *interesting* and *useful*. The collection makes extensive use of creative hardware and software signal processing, yet most of the loops are ear catching without being overly complex or frequency rich. That makes them suitable for layering because they'll enrich a mix without overwhelming it.

You get a good amount of stylistic variation, from the smooth, tabla-driven groove of Indiatek to the edgy, urban Collisions and from the ominous, Nine Inch Nails-inspired, delay-driven, four-on-the-floor Gummo to the light, swirling Clodhopper. Fans of *Liquid Grooves*, a previous Spectrasonics outing, will find echoes of its lush, ambient textures on tracks such as Paulo, Roton, and Angelhair. There's a quirky sense of humor, as well, in the bleeps of Buzzer and the oddly biological-sounding jaw harp of Thump.

As always with Spectrasonics, the documentation is attractive and well organized. In addition to clear track listings, it includes notes on format compatibility and tips on getting the most out of the Groove Control and Groove Menu features. All in all, *Metamorphosis* is yet another spectacular collection from Spectrasonics, with intriguing timbres, solid grooves, and

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STEINBERG

Virtual Guitarist

By Nick Batzdorf

Virtual Guitarist (\$249.99) is a pair of VST plug-in instruments developed by Wizoo and marketed by Steinberg that merges over 1.5 GB of acoustic and electric guitar samples with a sophisticated MIDI playback and processing engine. Virtual Guitarist plays realistic guitar picking patterns that follow your sequence's tempo and meter as you trigger specific chords on a key-

board or other MIDI instrument. The notes you play—either complete chords or only one or two notes—tell the plug-in exactly which samples to play.

Virtual Guitarist comprises two separate VST instruments, Virtual Acoustic Guitar and Virtual Electric Guitar. Each plug-in contains a diverse collection of sample sets called Players. Each Player lets you choose from eight patterns called Parts. Each Part plays back the samples in a different order. The patterns have been sliced up to facilitate playback at different tempos and, by omitting slices, different meters.

The collection of Players covers a wide range of musical styles, including rock, heavy metal, funk, folk, blues, boogie, and country. Each Player uses a suitable guitar and, if the guitar is electric, a complementary amplifier. Guitars range from Martin D-35, National Duolian, and Landola



Steinberg Virtual Guitarist is a VST instrument that tackles the age-old challenge of playing realistic guitar parts on a MIDI keyboard.

acoustics to Fender Strat, Fender Tele, Gibson ES-335, and Les Paul electrics. The collection is consistently well played and recorded.

Stacks of Chords

Available chords are dependent on which Player and which of three Chord Sets (ECO, MID, or XXL) you select. Virtual Guitarist's

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chord vocabulary covers major, minor, 7th, and sus4 chords in every key. The larger Chord Sets also include diminished, 6, +5, -5, m7-5, and 7 sus4 chords, but no 11 or 13 extensions. Virtual Guitarist always displays the current chord.

Patterns were recorded in all keys and with many variations, including riffs and fingerpicking patterns, fret noise, muted strings, and hard, soft, fast, and slow strumming in both directions. You can control various aspects of playback—shuffle, loose or exact timing; note decay; double or half time; dynamic range; and so on—using on-screen controls or MIDI commands. Virtual Guitarist's playback engine responds to Velocity, and you can trigger pattern variations with MIDI Control Changes or by playing a specified octave on your MIDI controller. To keep the pattern playing after you release the keys, for example, MIDI CC 64 (Sustain) enables Latch mode.

Virtual Guitarist isn't difficult to play, but note that individual Players respond to your playing in different ways. To get the most out of Virtual Guitarist, you must become familiar with the way each Player is mapped to the keyboard. Some are so picky that I had to edit the trigger notes in my sequencer, but Virtual Guitarist's Chord Quantize feature helps to minimize errors.

If you don't want to use the Parts provided, you can access an alternate playing method on MIDI channel 16, but the technique takes a lot of coordination. Playing the left side of the MIDI keyboard selects the chords, and playing the right side triggers individual sample slices. Using that method might prevent your guitar parts from sounding like everyone else's.

You can apply a high-frequency Enhancer control and Low Cut filter to acoustic Players and a Presence control and Pickup Selector to electric Players (the pickup's second position is a filtered version of the recording). Although Virtual Guitarist also provides a comb-filtered Stereo Width control and an automatic doubling effect, it's more effective to set up two variations of the same Player on different channels panned left and right.

Virtual Success

With a reasonably fast computer, you can use Virtual Guitarist in any PC- or Mac-based digital audio sequencer that sup-

ports VST instruments. I tried it in several Mac programs, including Steinberg Cubase and Nuendo, Emagic Logic, and MOTU Digital Performer. Digital Performer requires a third-party shell program to run VST plugins; the latest version of Audio Ease VST Wrapper (3.0.18) is the only one that successfully passes the tempo and meter information from Digital Performer to Virtual Guitarist.

With care, Virtual Guitarist can sound quite credible in a mix. It's also useful as a

writing tool, as a source of temporary guide tracks, or as a foundation that you'll later augment with real guitars. Virtual Guitarist is a unique and well-implemented software instrument that fills a definite need. ●

Overall EM Rating (1 through 5): 3.5

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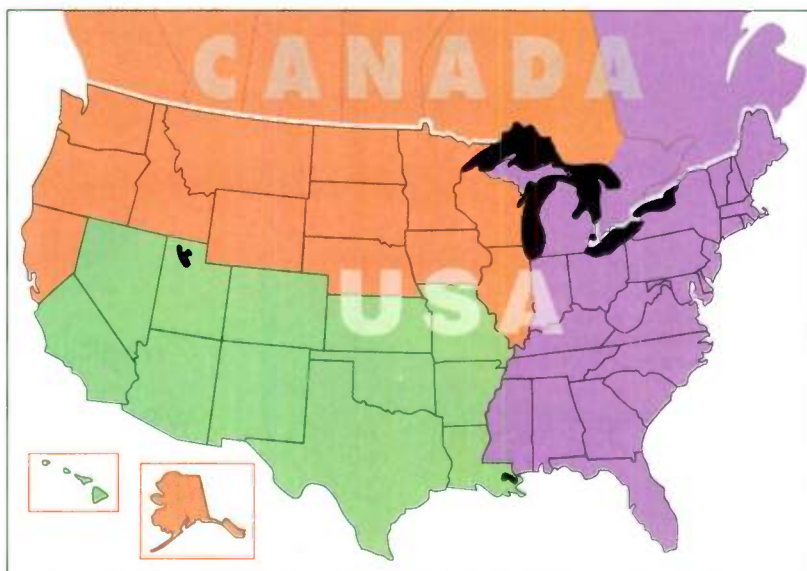
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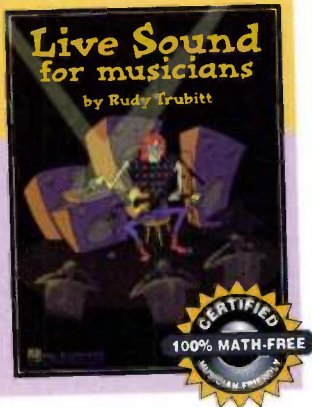
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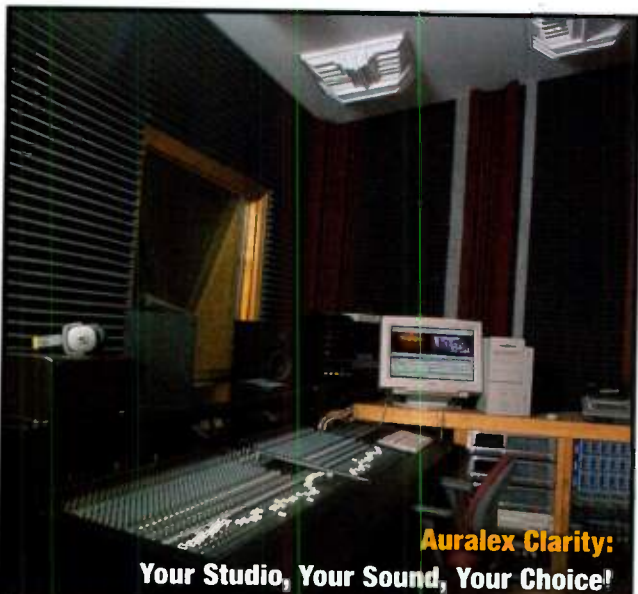
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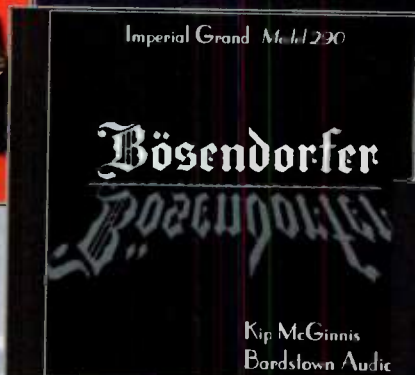
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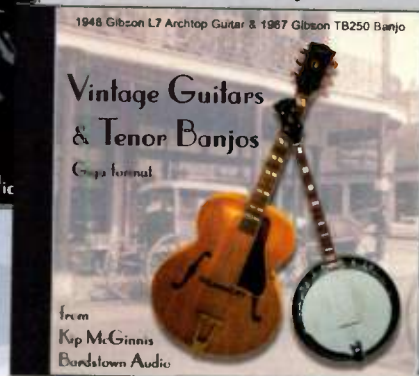
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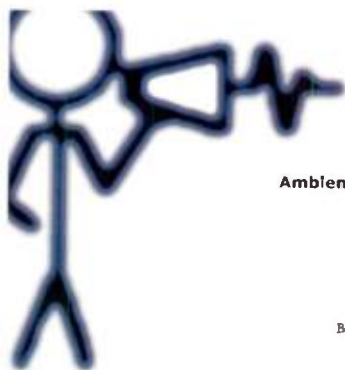
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Tannoy Ellipse 8

Tannoy's new Ellipse 8 monitor is the first of an entirely new generation of studio monitors featuring Tannoy Wideband technology. Frequency response up to 50kHz. Exceptionally wide sweet spot. Discrete power amps. Striking appearance. The perfect monitor for your MOTU-based studio.



Mackie UAD-1 Powered Plug-ins

UAD-1 is a PCI card that allows you to run dozens of sophisticated effects plug-ins inside Digital Performer without bringing your Mac to its knees. What's the secret? A custom-built, monster DSP. It's like adding an extra \$20,000 worth of effects gear to the dozens of native plug-ins included with DP.

UAD-1 ships with this growing list of powered plug-ins:

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The most flexible, natural sounding reverb available. Design your own rooms, down to the smallest detail.

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Teletronix LA-2A Leveling Amplifier

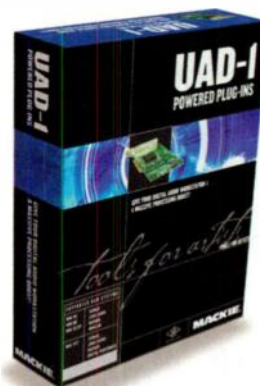
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The Funk Factor

This month I would like to engage in some discourse on a matter casting significant weight on the scales of life, yet rarely mentioned in the halls of academe. I refer, of course, to the various and nefarious phenomena called "Funk Factor." What is Funk Factor, and how does one obtain it? Is it a desirable thing?

All right, I'll start there. Yes, Funk Factor is desirable, at least sometimes. It might as well be desirable, seeing as how it's unavoidable.

To get even more basic, what *is* Funk Factor? It is a variety of things with many shades of meaning, both positive and negative, occurring in a multiplicity of circumstances.

At its most obvious level, Funk Factor consists of a bass player and drummer steaming along on some lowdown thang and just slapping it *in the pocket*. But Funk Factor is also whacking the ends off of two audio cables and twisting the wires together because you suddenly need some bizarre cable that scares you to even think about, and you have no adapters that could be made to work.

Funk Factor is being in the middle of "Honky Tonk Women" at a biker and workingman's bar somewhere in New England in the dead of winter, when the local hookers, sick of freezing their patooties off, start marching into the club and doing free lap dances to raise the interest level of the clientele. Or having six speaker cabinets of which three or four are working at any given time. ("Oh, I thought that that one worked the last time I was recording guitar . . . sorry.") Or opening the outlet cover to plug in your gear on the stage of an old, musty, shut-down dance hall, only to have a mouse suddenly scurry out and off into the shadows.

Clearly, Funk Factor is more desirable sometimes than other times. But like I said, we might as well make the best of it.

I worked at a studio with an SSL board. SSL gives you extra buttons in case you want custom functions, and this SSL had one custom function: a button marked "Funk." This button finally gave us, the engineers, a response when a client would whine, "That's really nice,



but it needs a bit more *funk*." "Oh, sure," you reply, "I'll just hit the Funk button up here, and things should get a little funkier." Having that button definitely added Funk Factor; the Factor would have been much higher had it actually done anything.

The Funk Factor that came out of the button was put into it by the inspiration from which it sprang, the true source of funk in that situation. It seems fair to say right now—I might change my mind later—that that is generally the case. The interesting question that arises is "Whose inspiration?" In the case of the SSL, at least, the answer to that was clear.

Funk Factor can also be the source, rather than the result, of inspiration. Take the blues, for instance. It would go too far to call the plantation life that begat country Delta blues "Funk Factor," but it might not be far off to say that the grit of post-World War II urban life was the Funk Factor that led to electric Chicago blues.

Other times Funk Factor seems something like a rude inside joke between you and the cosmos. The "Honky Tonk Women" incident is an example of that.

Having established these general principles, we can return to the unanswered question of how Funk Factor can be obtained, if you still want it after everything said up to this point. Surprisingly, Funk Factor can be successfully sought out, though it will just as often find *you*. How can you find it? The boho lifestyle is a longtime favorite and is usually successful to a greater or lesser degree.

Note that Funk Factor is entirely dependent on frame of reference. Gigantic quantities of Funk Factor can be overlooked by some twit with his nose in his face. (Hey, that *sounds* like what I want it to mean.) A person attuned to Funk Factor can spot it in a moment's interchange between two people on a bus.

Now you know. So keep framing your references, and you'll find Funk Factor Inspiration the next time you walk into some small studio with a bunch of nice condenser mics and no working phantom-power supply. ☹

We welcome your feedback. E-mail us at emeditorial@primediabusiness.com.

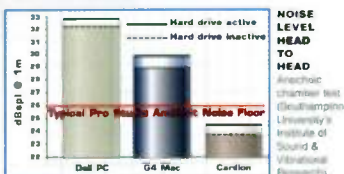
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"Since installation the Carillon has sat there and worked 24 hours a day, 7 days a week without faltering."



Mark Knopfler's Celtic and American influences spirited him towards Nashville and a famous association with Chet Atkins in the early 90s. He's worked in the town regularly since, and early on, top producer/engineer Chuck Ainlay was recommended.

Albums for the likes of Lyle Lovett had already earned Ainlay a fine reputation and having produced each Knopfler album from Golden Heart onwards, he is now a vital element of the artist's sound on record.

Always an early adopter of leading edge technology, Ainlay is also one of the world's leading surround mixers. This was an important factor in his choice of the 96 kHz Nuendo platform - that and Nuendo's "32 bit floating point operation which means processing and plug-ins don't degrade the sound quality".

For the follow-up to Knopfler's acclaimed Sailing to Philadelphia, Ainlay specified a Nuendo loaded Carillon AC-1 2GHz Pentium 4 PC system with two Nuendo 9652 audio cards and three Nuendo 8 I/O 96 kHz 24 bit converters. A striped RAID 0 array with four 73GB SCSI drives provides ultra fast high bandwidth drive access and a 60 GB removable IDE is used for transfer and back up. AES/EBU connections come by way of Nuendo's DD8 format converter and a Midex 8 and Houston enhance MIDI and hands-on control respectively.

Chuck Ainlay's AC-1 specification

- Intel P4 2 GHz • Win. XP Pro
- 1 GB 400MHz RDRAM
- 20 GB system drive & 60 GB drive in removable caddy. (EIDE Seagate Barracuda Softsonics)
- 4x 73 GB Seagate Cheetah Ultra 160 SCSI drives in RAID 0 array
- Neovo 18" LCDs & Matrox G550
- dual head 32MB video card
- 2 x Nuendo 9652 audio cards
- 3 x Nuendo 8 I/O 96kHz AD/DA converters
- Nuendo DD8 format converter
- Steinberg Houston controller
- Steinberg Midex 8
- Rosendahl Nanosync
- Steinberg Nuendo Software
- Nuendo Surround Edition
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- Steinberg GRM Tools 1&2
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- Native Instruments B4

"The system runs like a dream and despite having to cope with massive audio files, operates at near zero latency. And I love details like the custom keys - even though I'm using Nuendo all the time, they're a boon."

"The Carillon computer rocks! The hardware is beautifully designed and barely audible. It's also really well configured - working with upwards of 50 tracks of 24/96 in Nuendo, the processor is just ticking over"

Chuck Ainlay
Producer/Engineer

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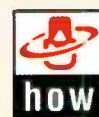
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