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Electronic Musician®

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December 2003

32 Great Gift Ideas

Holiday Inspirations for $10 to $250

7 Cool Tips for Creative Looping

Get awesome tube-amp sounds in your bedroom!

12 HOT REVIEWS!

Native Instruments Reaktor 4.03, Røde NT1-A, Roland VariOS, and 9 more

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How I spent $1.2 million...

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The financial and emotional investment in the NT2000 has been high.

The NT2000 is not just the result of a steady model progression. The NT2000 represents a quantum leap in studio microphone design. That required courage, innovation, and a lot of money!

This is not just another mic, its a WORLD FIRST!

PIONEERING SPIRIT

While RØDE can rightly claim to be pioneers in the modern microphone category, the NT2000 is destined to change how the industry views all studio microphones, regardless of category.

STARTING WITH THE HEART

The heart of the NT2000 is the Australian designed and manufactured HF1 capsule. Named in honor of my late father, Australian audio engineering legend, Henry Freedman.

These 1" transducers are hand assembled in the fashion of a fine Swiss watch using the best components money can buy.

Machined by computer accurate lathes and mills to tolerances approaching the limits of modern technology.

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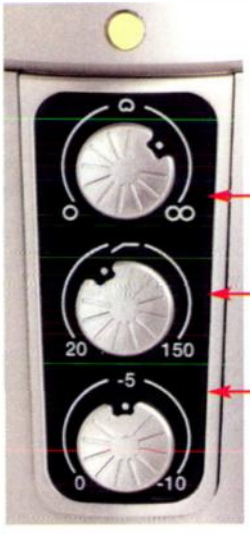
Diaphragms are 24K gold sputtered on 5 uM Mylar, and then hand tensioned and aged before being assembled and tested within our sub micron clean rooms.

Consistency from microphone to microphone is assured due to rigorous testing and our proprietary multi stage Quality assurance program.





WORLD'S FIRST!



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A superb transducer must be complemented by the best electronics. To ensure transparency and the highest fidelity, my brief to our engineers was, "I demand nothing!" RØDE's electronics designers set about designing a circuit that coupled the HF1 capsule in such a way as to add nothing. To pass the output of the capsule without coloration or distortion. I believe we have achieved that aim.

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The NT2000 is the world first superlative class 48 V FET microphone to have totally variable polar response, totally variable pad and totally variable filter all incorporated within the body of the microphone.

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All this information is meaningless unless it delivers the promise. In the end its all about the sound, I am putting my reputation on the line here.

I am saying without fear of contradiction, the NT2000 is the best sounding and most versatile 1" FET studio microphone on the world market today, regardless of cost.

We broke new ground in 1990 with the release of the NT2, the NT2000 will revolutionize the industry again.

Peter Freedman
President
RØDE MICROPHONES
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I N S I

FEATURES

Cover photo by Bob Montesclaros

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Electronic Musician® (ISSN 0884-4720) is published monthly except semimonthly in January by PRIMEDIA Business Magazines & Media Inc., 9800 Metcalf Ave., Overland Park, KS 66212 (www.primediabusiness.com). This is Volume 19, Issue 13, December 2003. One-year (13 issues) subscription is $40; outside of the U.S. it's $75. POSTMASTER: Send address changes to *Electronic Musician*, P.O. Box 1929, Marion, OH 43306. Periodicals postage paid at Shawnee Mission, KS, and additional mailing offices. Canadian GST #129597951. Canada Post International Publications Mail Product (Canadian Distribution) Sales Agreement No. 40597023.

Electronic Musician®
DECEMBER 2003 VOL. 19, NO. 13
www.emusician.com

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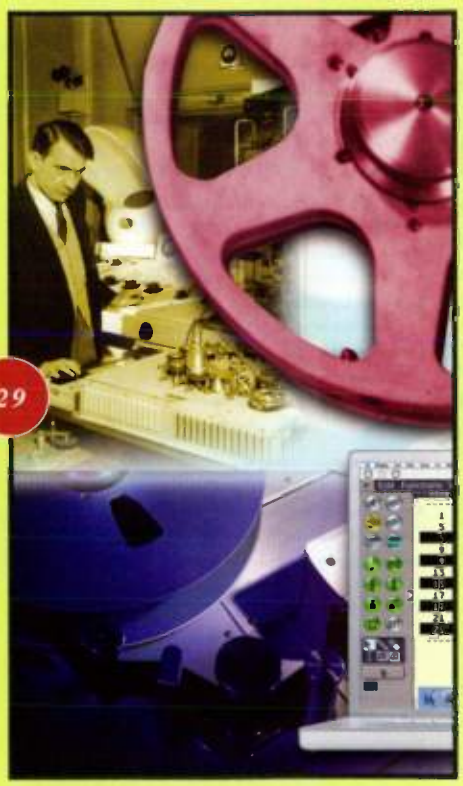

REVIEWS

Picture This


ANTHONY PIDGEON

To a large extent, audio and video producers have long inhabited different worlds that met only in high-ticket professional production or in low-end consumer gear that lacked editing capabilities. Most video producers and manufacturers of video equipment treated audio as an afterthought. Until recently, video-editing programs offered only rudimentary audio features, and although many audio-editing programs have at least some tools for scoring to picture, you rarely find a product with strong features for both audio and video production.

Fortunately, this situation is changing rapidly. Affordable DV cameras and editing programs like Adobe Premiere and Apple Final Cut Pro and Final Cut Express are becoming increasingly popular as home-video producers discover how easy it is to create impressive effects and make sophisticated edits. At the same time, digital audio-editing software has matured and come down in price. As a result, it appears that the worlds of digital audio and video are finally converging.

The big money is in video, so it isn't surprising that several companies that develop video-editing software have purchased music-software companies, rather than the other way around. The harbinger was Avid's purchase of Digidesign several years ago, but Avid exclusively addressed the needs of video professionals. Apple's recent purchase of Emagic and its independent development of its Soundtrack loop sequencer/editor, Pinnacle's acquisition of Steinberg, and Adobe's purchase of Syntrillium's Cool Edit Pro are significant because although these companies certainly address the needs of professionals, they also develop products for semipros and hobbyists. Sony Digital Pictures recently joined the fray by purchasing the software assets of Sonic Foundry, a company that had already introduced Vegas Video, an integrated audio-and-video-editing program.

It seems fair to conclude from all this activity that, in the future, audio will no longer be viewed as the poor stepchild of video. When companies like Adobe, Apple, Pinnacle, and Sony invest in the same industry, either something very good is about to happen or we're going to see a train wreck. I suspect the former is more likely.

Two noteworthy exceptions to this development are Mark of the Unicorn and Cakewalk. MOTU hasn't indicated any major changes in direction, but Roland Corporation recently bought an undisclosed interest in Cakewalk, and the two companies have a codevelopment agreement. This is worth noting because although Roland makes musical equipment, it also owns Edirol, which makes digital video-editing products, as well as music products. Furthermore, the new Roland V-Synth and MC-909 include the new V-Link feature for controlling Edirol video hardware. Add Cakewalk to that mix, and you have the potential for integrated multimedia-production solutions.

Hopefully, in the rush to develop multimedia products, the new owners won't forget about musicians' specific needs. Hang on—it's going to be an interesting ride!

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A PRIMEDIA Publication

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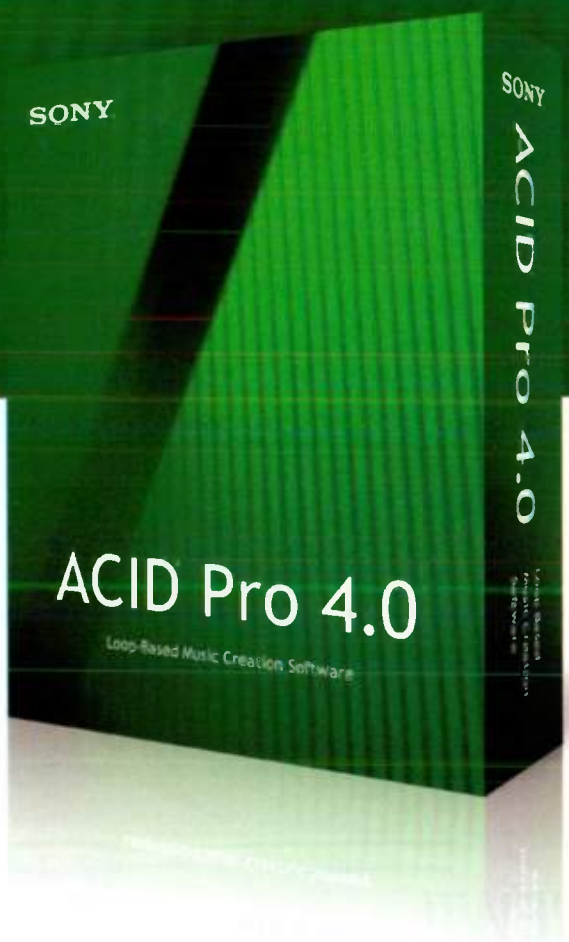

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DJ AND PRODUCER

PERSONAL CREATIVITY

MASTERING UNVEILED

I was somewhat surprised to see your mastering article ("Masters on Mastering," September 2003), because **EM** often focuses on subjects that are germane to the musician. The mastering community is a small and elite group, and the science of mastering is usually reserved for AES journals.

I was involved in the recording industry in New York from the early '70s through most of the '80s. Mastering was always considered an art, and mastering engineers were "secret weapons" who ensured the success of a recording. Your article offers real pearls of practical, technical wisdom and is very useful to anyone who records, mixes, and produces today. Thanks.

Tom Lanik
North Star Audio

DON'T BELIEVE THE HYPE

Thank you for reviewing the Shure KSM141 condenser microphone in the July 2003 issue of **EM**. I enjoyed the article and benefited from reading it. However, one judgment ought to receive further clarification or be retracted: one of the cons in the Product Summary sidebar states that the 141 is an "Electret rather than [a] 'true' condenser'" microphone. The author makes this statement out of hand without ever speaking to it in the body of the review.

In what way is fixed-charge (aka electret) microphone technology in its entirety a con? In fact, in terms of sound quality, fixed-charge microphone technology has no fewer inherent advantages than externally polarized technology.

The original electret designs were not implemented well, and the stigma of those designs has remained attached to the name of the technology. Of course, there is nothing stopping anyone from producing a bad-sounding or unreliable electret. But the technology itself is not flawed. Using the words *true condenser* in advertisements is part of an effort to differentiate the externally polarized designs from the electrets, and nothing else. This clever choice of words plays up the myth that electret designs are inherently flawed.

Before learning how microphones are made, I assumed that there must be some technical truth that lay behind this marketing bullet used by so many companies. But *true* in this case is not a technical term and should be left to the advertisements, not your reviews.

Thank you for your attention and the continued support of your most outstanding magazine.

Joseph Lemmer
via e-mail

Author Richard Alan Salz replies: Joseph—I certainly agree with your contention that some well-designed electret condenser microphones are being manufactured today. However, if you take a close look at most manufacturers' offerings, you will see that, generally speaking, electret condensers inhabit the low end of the marketplace. In the price range that the Shure mics inhabit, all of its serious competitors are externally polarized.

Consider, as well, that no electret condenser microphones are sought after in the way that Neumann U 47s or AKG C 12s are. That's not to say that the technology is without merit, but as a group, most electret condenser microphones that I have used have not hit the mark sonically. Granted, that is not the case with a precision-engineered product, but I believe that those products are an exception to an overall trend. As always, your mileage may vary.

WAYWARD SAMPLES

I enjoyed the article "Ain't It Grand!" that appeared in the February 2003 issue of **EM**. I'm working on a CD of gospel music, just vocal and piano. I found a piano sample with a nice, rumbling left-hand bass that is so important for creating an authentic gospel sound. However, I've run up against a problem.

In the middle-bass section of the piano library that I like best, one group of notes, starting with the E-flat below middle C and going down four or five notes, is particularly jarring—especially the E-flat. It seems to me that the E-flat is just too loud compared with the other notes around it. I opened the patch in Cubase and looked at the notes on a graph. When I tried to play the notes with the same Velocity, the E-flat spiked somewhat compared with the other notes.

Do you know of a possible fix for this problem? Any information would be appreciated.

Ernie Cox
via e-mail

World Radio History

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Ernie—I'm glad you enjoyed my article on sampled grand-piano libraries. As you can see, pianos are far more complex and problematic to sample than most people realize, and it's no surprise that sampled pianos have many of the same idiosyncrasies as their acoustic counterparts. Some libraries carefully retain the inconsistencies in the name of greater realism, while others blend or edit out problem notes to create a smoother overall sound.

Most developers try to hit that sweet spot between retaining an instrument's unique character and producing a library that records well in every register and in a variety of styles. As you discovered, however, one person's "character" is another person's "jarring note," which in part explains why there are so many piano libraries. Still, it's frustrating when an otherwise "perfect" library has a few notes that stick out.

Fortunately, there are many readily available tools for modifying samples, and they're all relatively easy to use. For example, if you're recording your piano part into a sequencer, you can simply scale down the Velocities of all of the E-flats with a single command. That's a quick-and-dirty solution that might get you by if you aren't performing live. If that doesn't work, why not just jump in and reedit the patch yourself?

Some high-end hardware samplers, like the Kurzweil K2500, and most software samplers, like Tascam GigaStudio and MOTU MachFive, let you adjust the Velocity response of individual notes. In the case of software samplers, it's especially easy to zoom in and view the separate samples and their Velocity levels for each multilayered note. (As the article points out, almost all grand piano libraries use two or more Velocity layers per note.) Sometimes the unpleasant sound comes from only one of several layered samples on a particular note. Once you identify the troublesome sample, you can remove it and extend the Velocity range of a neighboring sample layer up or down.

For example, if your E-flat's ff *sample layer sounds too harsh but the* mf *sample sounds fine, just delete the* ff *sample and let the* mf *sample extend into the higher Velocity range. This approach works well for eliminating clicks and buzzes that appear on a note but only at certain Velocities. If that doesn't work, you can always open the problem sample in an audio-editing program and lower the sample's overall amplitude or run the sample through an equalizer or other processor to take the edge off the sample and tone it down a bit. Then just return it to your favorite piano patch. If you're working with GigaStudio, spend a little time exploring the Instrument Editor section; you'll find that it's a powerful yet easy-to-use editing environment.—David Rubin*

JUST SAY NO

As an avid subscriber who suffers from E.A.D (Equipment Addiction Disorder), I have only two requests: more negative reviews and more ads. The world of magazine publishing walks a tightrope between delivering unbiased editorial to the readers while trying not to upset advertisers. **EM** does a fine job of this, but it would be in the best interests of advertisers to encourage deeper negative commentary.

Product reviews leave me asking, "Will a product do what I want for the money, or do I simply have to spend more money to get what I need?" Manufacturers do a pretty good job of pricing products based on their feature sets. Solid negative comments help me to decide the price point I should be looking at and also set up realistic expectations, which results in fewer returns at the store. A magazine that is afraid to print negative comments is less valuable to me when it comes time to make a purchasing decision.

Advertisers also tend to run advertisements for products that are doing well. An ad in **EM** tells me not only that the company believes in the product but that other musicians are buying the heck out of it as well. In turn, I read the ads as much as I do the editorial. There is a strong relationship between the number of ads that Steinberg has run and the fact that I now use Cubase VST/32 with an itch to upgrade.

Mark R. Henneges
Boating World magazine

Mark—Well, we certainly aren't going to invent more negative remarks! Seriously, we really do try to say what we think, so if you aren't seeing more negatives, that generally means the author didn't find more problems. We word our criticism carefully sometimes, but that's mostly out of a sense of fairness, and we try our best to make sure that our readers clearly understand our views. We strive to give you what you need to make a wise buying decision.

As for advertising, I agree wholeheartedly: I think all of the manufacturers in our industry should advertise in **EM** *much more often!—Steve O*

WE WELCOME YOUR FEEDBACK.

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WHAT'S NEW

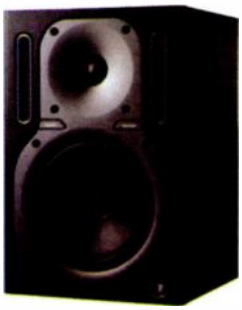
By Geary Yelton

BEHRINGER TRUTH STUDIO MONITORS

Behringer has announced three new close-field studio reference monitors: the B2031P ($289.99), B2030P ($229.99), and B2030A ($309.99). Sold only in matched pairs, all are two-way systems with linear frequency response and ferrofluid-cooled high-frequency drivers. Each long-throw woofer has a polypropylene diaphragm and die-cast aluminum chassis. According to Behringer, the monitors' linear phase optimization and balanced dispersion characteristics afford a large sweet spot.

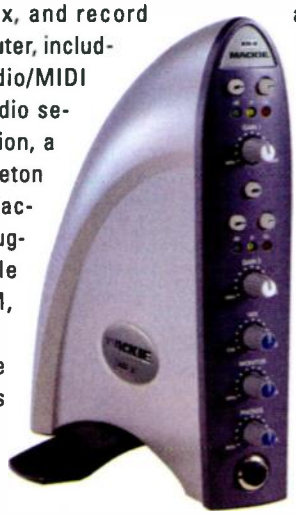
The B2031P is a passive version of the existing B2031 model. It handles a maximum 150W into 4Ω and has a stated frequency range from 55 Hz to 21 kHz. The B2031P has an 8.75-inch woofer and 1-inch tweeter, with a 2 kHz crossover frequency.

The B2030P, rated at 100W maximum into 8Ω with a range from 75 Hz to 21 kHz, is also passive. It has a 6.75-inch woofer, a 0.75-inch tweeter, and a 2.3 kHz crossover frequency. The active B2030A provides amplification rated at 35W for the highs and 75W for the lows, with a 2 kHz crossover frequency. Behringer USA; tel. (425) 672-0816; e-mail sales@behringer.com; Web www.behringer.com.



MACKIE SPIKE

The Mackie Spike Powered Recording System (Mac/Win, $419) is a new turnkey system for computer-based recording. Spike supplies hardware and software to track, mix, and record music with your computer, including the XD-2 USB audio/MIDI interface, a digital audio sequencer called Tracktion, a custom version of Ableton Live, and the Nomad Factory Warmer Phaser plug-in. Spike is compatible with ASIO 2.0, WDM, and Core Audio.



The XD-2 interface supports two channels of 24-bit, 96 kHz audio and 16 MIDI channels. It features low-noise mic preamps and two ¼-inch inputs that handle mic, line, or instrument levels. It also sports two ¼-inch balanced outputs for monitoring and stereo S/PDIF I/O. The XD-2 contains a SHARC DSP chip that handles four processing stages during tracking and mixdown: highpass and lowpass filter, compressor/limiter, gate/expander, and 4-band parametric EQ.

Tracktion, a cross-platform DAW from Raw Material Software Ltd., offers full automation and support for VST instruments and effects plug-ins. The number of tracks and effects is limited only by your computer's processing power. Built-in effects, such as reverb, chorus, delay, phase shift, and compression, are supplemented by bundled plug-ins from Maxim Digital Audio. Other features include waveform editing, ReWire support, pitch shifting, and time compression and expansion.

To use Spike with your PC, you'll need at least a Pentium/233 MHz, Windows XP, 64 MB of RAM, and 2 GB of hard-drive space. Mac users will require a minimum G3/233 MHz, Mac OS X 10.2, 128 MB of RAM, and 3 GB of hard-drive space. A USB port is also required for both platforms. Loud Technologies Inc.; tel. (800) 898-3211 or (425) 487-4333; e-mail sales@mackie.com; Web www.mackie.com or www.loud-technologies.com.

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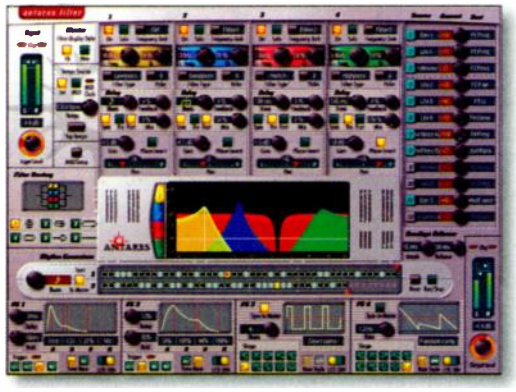

Antares is a developer you can always rely on for useful and innovative audio plug-ins. The company's newest offering, Filter (Mac/Win, $199), provides four stereo multimode filters with variable cutoff slopes. Filter emulates a bank of classic analog filters, each with lowpass, highpass, bandpass, and notch responses. You can route them in configurations that range from independent parallel filters to all four in series, with various combinations in between. For dynamic effects, Filter's modulation sources include four 6-stage envelope generators, four 10-waveform LFOs, four delay generators, two Rhythm Generators, and an envelope follower.

The four independent delays can function with no filtering at all, if desired. You can specify delay time—either in milliseconds (up to two seconds) or synchronized to tempo in fractions of a beat—as well as the delay's position relative to the filters. In fact, you can sync all time-based parameters to Filter's internal tempo or MIDI Clock, and virtually all parameters respond to MIDI control for full automation.

Filter supports RTAS, VST, and MAS in Mac OS 9 and OS X; and in Windows (98, 2000, ME, NT, or XP) it supports RTAS, VST, and DirectX. Antares Audio Technologies; tel. (888) 332-2636 or (831) 461-7800; e-mail info@antarestech.com; Web www.antarestech.com.

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▶ FXPANSION VST TO AUDIOUNIT ADAPTER (MAC)

If you're making the switch to OS X and sorely missing your favorite VST plug-ins in applications that support only Audio Units (AU), FXpansion's VST to AudioUnit Adapter ($75) will make your day. VST-AU Adapter provides an elegant solution to the problem by actually creating an AU version of each VST plug-in you feed it. Unlike other plug-in wrappers, it then steps out of the picture, leaving you a fully functional AU plug-in and a minimal (typically less than 0.1 percent) additional CPU hit.

Operating VST-AU Adapter is simple. The program needs to be run only when you have new VST plug-ins to convert. Options allow you to designate a destination for the new AU plug-ins, print extra diagnostic information just in case you encounter crashes when using the converter, reduce the host load time for converted plug-ins, and skip the conversion process on VST plug-ins that have already been converted. Reducing the host load time is optional because, though desirable, it could potentially cause problems with some hosts.

VST-AU Adapter converts both the older Carbon-CFM and newer Mach-O VST formats for OS X. It does not convert OS 9 or PC format plug-ins (according to the manufacturer, it "probably never will"). The program has been tested extensively on plug-ins from a range of manufacturers, including DSound, INA-GRM, LinPlug, MDA, Prosoniq, PSP, reFX, Steinberg, TC-Works, Waldorf, and Waves. I was able to convert a variety of plug-ins from reFX, Steinberg, LinPlug, and PSP Audio with no problems.

If you find you're tired of waiting for your favorite OS X VST plug-in to be converted to Audio Units, I can highly recommend VST-AU Adapter as a solution. Minimum system requirements are a Power Mac G3/266 MHz, Mac OS X 10.2, and 128 MB of RAM. FXpansion Audio UK; e-mail info@fxpansion.com; Web www.fxpansion.com.

—Len Sasso

▼ TASCAM SX-1LE

The latest digital audio workstation from Tascam is the SX-1LE ($3,750), which features a 32-channel mixer and a 16-channel hard-disk recorder. Based on the SX-1, the SX-1LE's standard features include 5.1 surround mixing, 128-track MIDI sequencing, full automation, and a built-in CD-RW drive.

The SX-1LE's 40-input, 8-bus digital mixer has 17 touch-sensitive, motorized 100 mm faders with 16 fader layers each. All channels provide dynamics processing, 3-band parametric EQ, and six aux-bus sends. The SX-1LE provides 16 phantom-powered XLR mic inputs with preamps, 16 TRS line inputs, 16 TRS inserts, and 16 assorted analog audio outputs. Two stereo S/PDIF inputs and outputs (with sampling-rate conversion) and 8-channel ADAT Lightpipe take care of digital audio I/O. If you need more I/O, three expansion slots let you install 24 additional inputs and outputs.

The SX-1LE records uncompressed 24-bit audio at 44.1 and 48 kHz. In addition to 16 physical tracks, 999 virtual tracks are dynamically allocated, and a 6-track stem recorder is available for mixing. A large graphic LCD facilitates editing of waveform, MIDI, and automation data. An XVGA output connects to an external monitor, and an Ethernet port connects to a computer or network. Attaching an external display gives the SX-1LE a user interface that provides an experience similar to working with a computer-based DAW; it uses a mouse, a keyboard, and two displays, but it also offers the advantages of a built-in digital mixer. The SX-1LE has one MIDI In and four MIDI Out ports, and it reads MTC and SMPTE time code. Tascam; tel. (323) 726-0303; Web www.tascam.com.

OmniStudio USB

The final word in USB recording

Based on the award-winning Omni Studio, the **OmniStudio USB** puts everything that you need for **computer-based audio and MIDI recording, monitoring and mixing** in one compact package. Two extremely high-quality **mic/instrument preamps** make it perfect for tracking and overdubbing guitars, bass and vocals–and four stereo aux ins accommodate the rest of your favorite gear. The **on-board mixer** includes effect sends and return, and drives a complete **direct monitoring system**. In fact, OmniStudio USB gives you more connectivity, power and flexibility than any other USB audio product available–yet it's as easy to use as it is to plug in. With rock-solid construction and next-generation USB drivers, OmniStudio USB is ready for anything you can throw at it.

audio/MIDI interface features

- 4-in/4-out audio I/O
- 2 mic/instrument preamps with phantom power and pad
- 2 line inputs*/4 direct outputs*
- 1-in/1-out MIDI I/O
- fits in standard 19" rack using removable rack ears

built-in mixer features

- 14-channel line mixer with effects send/return
- 4 stereo aux inputs routable to mixer or record inputs
- stereo monitor out with level control*
- stereo record out*
- zero-latency direct monitoring system
- 2 stereo headphone outputs with individual controls

* balanced/unbalanced operation

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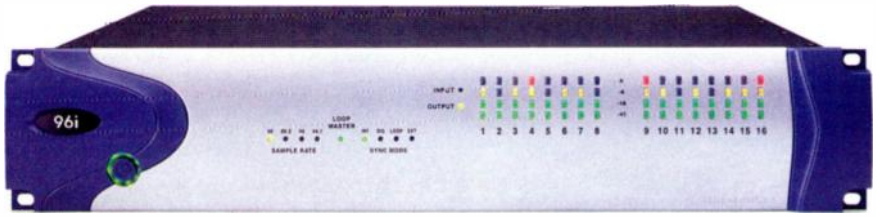

▲ DIGIDESIGN 96I I/O

The 96i I/O (Mac/Win, $2,195) is Digidesign's new 2U rackmount audio interface for Pro Tools|HD and Pro Tools|HD Accel systems. It is essentially the successor to the Digidesign 1622 I/O, which predates Pro Tools|HD, and is well suited for connecting third-party outboard gear. The 96i I/O is the most affordable Pro Tools interface offering 16 analog inputs and sampling rates as high as 96 kHz. It also provides two analog outputs, 24-bit stereo S/PDIF, and sync I/O ports. Its A/D and D/A converters are the same quality as those in the 96 I/O. A pair of expansion ports allow interconnection with other Pro Tools hardware; if 16 analog inputs aren't enough, you can connect as many as six 96i I/O units for 96 separate inputs.

All analog ins and outs are on ¼-inch TRS jacks that support balanced and unbalanced connections. To accommodate different signal levels, each input has software-adjustable level controls, and the output is switchable from –10 dBV to +4 dBu. Front-panel LEDs handle input and output metering, and additional LEDs indicate sampling rate and Sync mode. In combination with Pro Tools TDM 6.2 software, the 96i also functions as a virtual patch bay. Digidesign; tel. (800) 333-2137 or (650) 731-6300; e-mail prodinfo@digidesign.com; Web www.digidesign.com.

▼ AKAI MPC1000

Fifteen years after introducing the MPC60, Akai Professional has announced a new addition to its line of audio workstations: the MPC1000 ($995). The laptop-size unit is a 32-part polyphonic sampling drum machine with a 64-track MIDI sequencer. It has two multi-effects processors as well as compression and 4-band EQ on the master output. The MPC1000, which is smaller and less expensive than previous Music Production Centers, offers the same familiar user interface, full-size LCD, and 16 Pressure- and Velocity-sensitive drum pads as its predecessors.

New features include two Q-Link sliders to control tuning, filter cutoff, layer switching, and other real-time parameters. The MPC1000's USB port allows drag-and-drop data transfer to and from your computer, and a Compact Flash port reads and writes cards as large as 2 GB. You can upgrade the 16 MB of onboard RAM to 128 MB.

For analog audio, the rear panel provides two balanced inputs, four assignable mix outputs, and two main outputs, all on ¼-inch jacks. A pair of S/PDIF ports is included for digital audio. Two sets of MIDI In and Out ports allow 32-channel operation. Two footswitch jacks and a stereo headphone jack are located on the front of the unit.

The MPC1000 is fully compatible with all MPC2000XL data and with MPC4000 sequences and audio data. Akai Musical Instrument Corporation; tel. (817) 834-1900; e-mail info@akaipro.com; Web www.akaipro.com.

▼ TRIDENT AUDIO M-101 AND LDC-77

Trident Audio, a company known for producing high-end professional-audio gear, has introduced two large-diaphragm condenser microphones that are priced for the personal studio. The M-101 ($495) has a 1-inch diaphragm, a –20 dB pad, a low-frequency filter that rolls off at 100 Hz, and three switchable polar patterns: hypercardioid, omni, and figure-8. The stated frequency response is 20 Hz to 20 kHz, and the signal-to-noise ratio is –113 dB. The M-101's maximum SPL is rated at 135 dB at 1 kΩ.

The LDC-77 (pictured here; $550) is also a condenser mic with a 1-inch diaphragm. In addition to three switchable polar patterns and a –20 dB pad, the mic has a low-frequency filter that rolls off at 120 Hz, a frequency response of 20 Hz to 22 kHz, and a signal-to-noise ratio of –118 dB. The LDC-77 can handle a maximum SPL of 145 dB at 1 kΩ.

With electronics designed by John Oram and built from Chinese-made parts, the M-101 and LDC-77 are assembled and calibrated at the Trident factory in England. Each microphone comes with a shockmount, a wind cover, a cable, and a flight case. Alphabet Belmont Group Ltd. (distributor); tel. 44-1474-815-300 or (847) 530-8161 (in the United States); e-mail mics@oram.co.uk; Web www.oram.co.uk.

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Differentiating itself from standard computer I/O boxes which are typically based on a patch-bay paradigm, the Omega 8x4x2 USB I/O mixer is based on a mixer paradigm and includes input, output and mixing functions that support a variety of tracking/monitoring applications while requiring no additional mixing hardware. The I/O mixer is packed with professional features such as ultra-transparent, high resolution A/D converters, extremely low-noise mic preamps with 48-volt phantom power and active balanced line level inputs. MIDI and S/PDIF ports allow connection to a variety of digital equipment.

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Pro Tracks Plus is an easy-to-use, comprehensive 32-track recording suite that includes all the modules you'll need to track, edit, process, sequence and mix your masterpiece. Not only does it include intuitive non-linear editing, plug-in support, and acidized looping features, it contains a full featured MIDI sequencer with outstanding event editing and powerful automation features as well as soft synth support.

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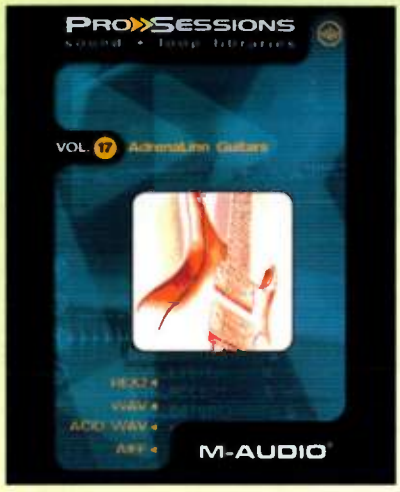

▲ M-AUDIO

Like all ProSessions libraries ($49.95 each), *Vol. 16 Alien Radio* and *Vol. 17 AdrenaLinn Guitars* include REX2, AIFF, and Acidized WAV files. *Alien Radio*, by Ma Ja Le's Paul Vnuk and Chris Short, is an impressive compilation of spacey textures and rhythms. The Atmospheres & Drones folder contains Skybells, Electric Lunar Loops, Glass Techtronics, and Theremin Scapes. Some of the best sounds are Strange Flutes; Cymbal Mutations, Transistor-Glitch Beats, and electronic guitar effects complete the collection.

AdrenaLinn Guitars, by Craig Anderton, offers rock guitar riffs and loops processed with a Roger Linn Designs AdrenaLinn. You get arpeggios, chords, pads, and rhythms—all in the keys of E and B♭. Anderton makes good use of the AdrenaLinn's delay, and 12 Weird Effects are aptly named. Ten unpitched rhythms range from traditional wah to "That's a guitar?" M-Audio; tel. (800) 969-6434 or (626) 445-2842; e-mail info@m-audio.com; Web www.m-audio.com.

▶ SONY PICTURES

Sony Pictures Digital recently bought Sonic Foundry and acquired the Loops for Acid product line in the deal. Three new discs ($59.95 each) got our attention.

Blip: The Glitch Electronica Standard Reference is a collection of "sound sculptures"—heavily processed audio from acoustic and electronic sources—by Carlos Archuleta and j.freed. *Blip* puts an assortment of rhythmic and aperiodic buzzes, electrical crackles, alien environments, snatches of odd poetry, and distorted musical sounds at your disposal.

On the other side of the spectrum is *Rhythm & Twang*, a disc of country music phrases. Fiddle player Jimmy Stewart and pedal steel guitarist Troy Klontz are the real standouts on this disc. The electric bass and guitar parts are good for creating loops, but the tasty fiddle and pedal steel riffs stand on their own. If your music needs the kick only a Nashville studio player can add, *R&T* is a real find.

Myths of Technology is a Premier Artist Construction Kit created by Nigel Ayers, founder of the longstanding underground industrial band Nocturnal Emissions. Its focus is avant-garde beats and textures; some are acoustic, and most are heavily processed. This grab bag of sounds has ethnic and electronic percussion loops, warped vocal timbres, mechanical atmospheres, echoing drones, and guitars that sound like anything but guitars. Sony Pictures Digital Inc.; tel. (800) 577-6642 or (608) 204-7680; e-mail md-customerservice@sonypictures.com; Web http://mediasoftware.sonypictures.com.

▼ DISCOVERY FIRM

Three new titles from the Discovery Firm provide Acidized WAV and REX2 files. *Alma Flamenco* ($55) is a two-disc set of traditional strums, runs, and rhythmic backings played on guitar and percussion—primarily castanets, handclaps, and bongos. Spanish phrases are sung and shouted enthusiastically by individuals and groups. Disc two contains audio samples good for preview purposes.

Breakbeat Ammo Massive ($38) includes drum 'n' bass and hip-hop loops. The drum 'n' bass category (all at 170 bpm) features 42 drum loops, 12 bass loops, and loops from sources such as female vocals, synth pads, strings, and trumpet. The hip-hop category (at various tempos) offers 61 drum tracks and adds loops of harp, organ, sax, flute, and scratching.

The Caribbean-flavored world-music collection *Reggae One Way* ($38) offers drum loops, instrument loops, and sound effects. Over 50 drum loops range in tempo from 54 to 149 bpm; most are drenched in reverb. Electric guitar patterns, arpeggios, and licks are supplied along with bass, organ, percussion, flute, and combo loops. Synths provide most of the sound effects; the rest are percussion hits and loops, car horns, vocal noises, and so on, and most are heavily processed. Discovery Firm, Inc.; tel. 81-11-623-6663; e-mail overseas@discoveryfirm.com; Web www.discoveryfirm.com. ●

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By Scott Wilkinson

Diamonds Are a Chip's Best Friend

Moore's Law states that the number of transistors in a microchip doubles every 18 to 24 months. However, it seems apparent that Moore's Law cannot be maintained forever. One of the most significant barriers to continued miniaturization is the increasing heat generated by cramming ever more circuit elements into a given amount of space. Today's microprocessors can reach 200° Fahrenheit; if they get much hotter, they start failing.

Diamonds aren't just for engagement rings anymore.

One solution is to make chips from a material that is more heat resistant than that of conventional semiconductors. One material under serious consideration is diamond, a form of pure carbon. In addition to being the hardest known substance, diamond exhibits the highest thermal conductivity, allowing it to remain undamaged even in the presence of temperatures that would melt silicon. Of course, natural diamonds are much too expensive for such applications, but two companies have perfected different techniques for creating diamonds in the laboratory.

Gemesis (www.gemesis.com) simulates the conditions under which natural diamonds are formed. Using a technique first developed in Russia, a diamond seed is placed at one end of a ceramic growth chamber, while graphite (also pure carbon) is placed at the other end with metal solvents in between. The chamber is then compressed within a spherical apparatus, achieving a pressure of 58,000 atmospheres at the center. At the same time, an electric current heats the graphite, causing it to atomize. The carbon atoms are drawn to the cooler end of the chamber, where they bond to the diamond seed. Three days later, a sizable diamond emerges.

Apollo Diamond (www.apollodiamond.com) uses an approach called chemical vapor deposition (CVD). Diamond wafers are placed in a low-pressure chamber filled with a special gas, which is ionized into a plasma. That allows carbon atoms to precipitate out of the plasma cloud and deposit onto the wafer seeds, building up layers of diamond at a rate of half a millimeter per day. That technique, more than a decade old, has been used to coat surfaces with microscopic diamond crystals, but no one has been able to create large single crystals until now, thanks to Apollo's discovery of the correct combination of temperature, pressure, and gas composition.

Because of these advances, the projected cost of cultured diamonds is around $5 per carat, meaning that cost is no longer a roadblock to using diamond microchips. In addition, the crystal structure of cultured diamonds is much more consistent than natural stones, making them better suited for large-scale computer applications.

The biggest obstacle is controlling the diamond's electrical characteristics. Natural diamonds are not conductive, but both Gemesis and Apollo have discovered a way to "dope" the crystal lattice with boron atoms, which forms a *p*-type semiconductor with an excess of "holes" compared with the density of electrons. In June of this past year, scientists from the U.S. Navy, France, and Israel announced that they had found a way to invert the polarity of boron, allowing it to form an *n*-type semiconductor, which is the opposite of *p*-type. As a result, transistors based on *p-n* junctions are now possible, and diamond microchips are not far behind.

Japan is allocating $6 million per year to develop this technology; in fact, Nippon Telegraph and Telephone (NTT) recently demonstrated a prototype chip operating at 81 GHz. What does this have to do with music? Anything that advances computer technology in general will apply to electronic music, so we could start seeing diamond microchips in music products soon. However, I wouldn't recommend giving one to your fiancée instead of an engagement ring. ❀

COURTESY GEMESIS CORP

Gemesis intends to finance its research into diamond semiconductors by selling cultured gems, such as these yellow diamonds, to the jewelry market.

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PRO FILE

By Matt Gallagher

Random Musings

Random Touch's third CD release, *Hammering on Moonlight* (Roadnoise Productions, 2002), is graced with complex, evolving sound sculptures and spirited musical conversations. Although the improvisational duo's music could be considered free jazz, it incorporates many varied elements. Christopher Brown cites Jimi Hendrix, the Grateful Dead, and Traffic as early influences. "At the same time, we were into the so-called 20th Century classical tradition," he adds. "We also loved John Coltrane, Herbie Hancock, and Miles Davis's wilder electronic stuff. We let all those mingle."

Random Touch freely experiments with music, sounds, and expensive toys.

Brown and keyboardist James Day have played together since 1971 and launched Random Touch as a multimedia project. For *Hammering on Moonlight,* they collaborated with Joe Zymonas, who played a Chapman Stick, a Kurzweil K2000, a Zeta Music Systems Strados Crossover Bass, and Roland V-Drums. Their compositions often begin with interactive jams followed by overdubs, processing, and editing. "Many tracks are finalized before we've mastered some new piece of hardware or software," says Brown.

Brown and Day built a studio by demolishing the one-car garage on Brown's property and building a new room. "Our studio is a 500-square-foot space built to our specs. It has double walls and a double door, with about six inches of dead space between the inner and outer walls," Brown says. Their space accommodates guest musicians as needed for occasional soundtrack sessions.

It is outfitted with a Yamaha 03D digital mixer; a Mac G4/733; a Digidesign Pro Tools 24|Mixplus system with two 888-24 I/O audio interfaces; and outboard gear that includes a TC Electronic FireWorX multi-effects processor, a dbx 266XL compressor, and a Summit Audio TPA-200B Dual Tube Preamplifier. *Hammering on Moonlight* marks Random Touch's first foray into Pro Tools. "Our previous recordings had been two-track stereo," Brown says. "We used a Tascam DA-P1 [DAT recorder], and two tracks on *Hammering* were recorded on it."

They recorded most live sessions to eight tracks in Pro Tools. Brown played acoustic drums and percussion while Day played Alesis QS8 and Kurzweil K2500 and K2500R synths. Zymonas often coaxed guitarlike sounds from his Chapman Stick using a Line 6 Pod. "All of the vocals were dubbed in later," Brown adds.

One incident gave Brown an inspiring source of sounds. "I set up an Audix OM-5 behind the drum set and accidentally left it on," he says. "The [resulting] mono track offered a spacious version of the drums. I processed the mono track of the entire drum set using Waves UltraPitch and Digidesign Reso plug-ins, and found that it required less power than processing a duplicate of the primary tracks."

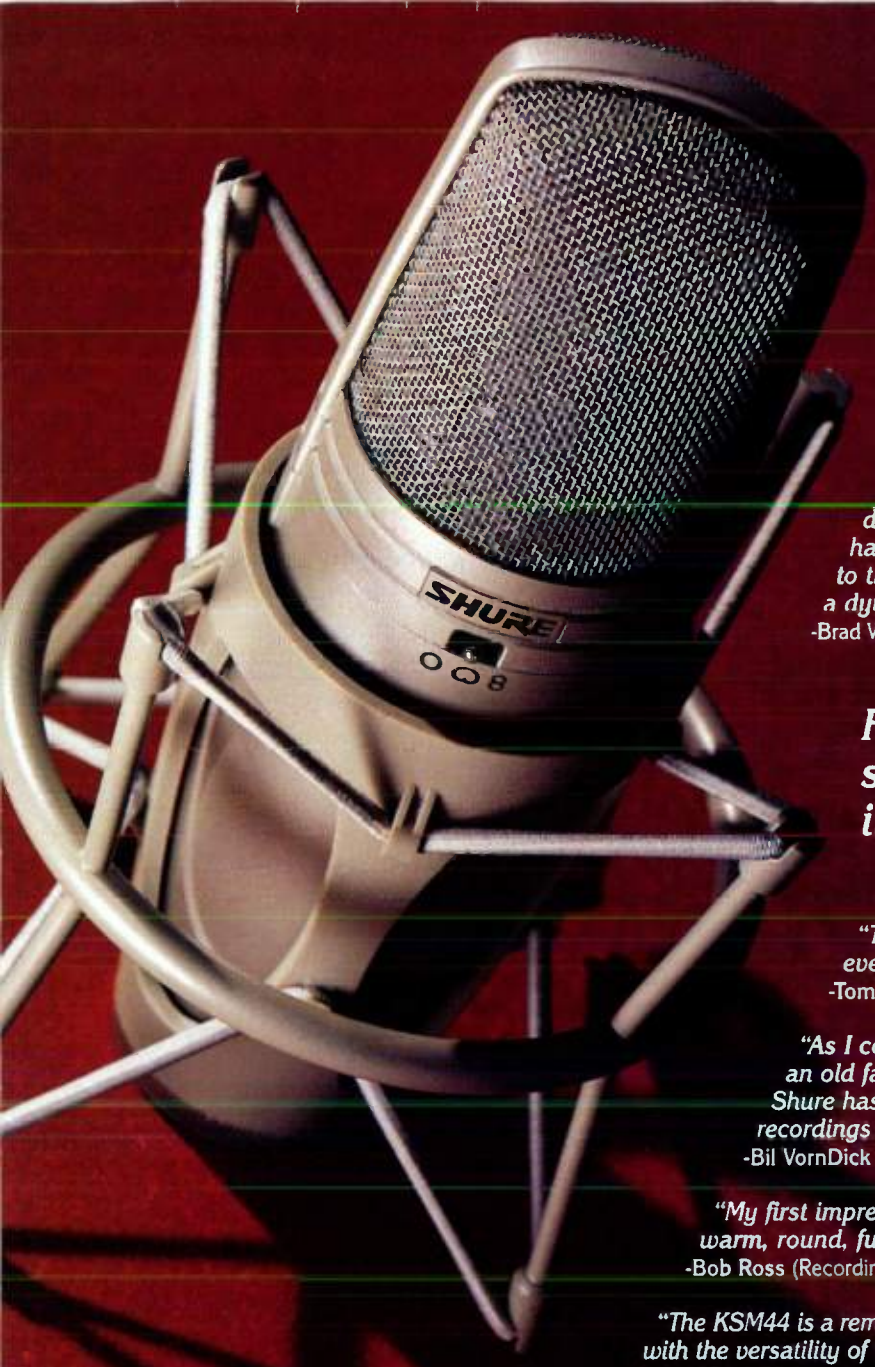
Random Touch further spiced up *Hammering on Moonlight* with overdubs of unprocessed samples of scrap metal being tossed around. "I put my favorite sounds into the K2500 and used my Zendrum [MIDI percussion controller] to trigger them," Brown says. They used the FireworX to mutate vocals, drums, and much more. "On track 2 ['Drunken Parade'], some of the handclaps ended up sounding like trumpets. We did a fair amount of that sort of stuff." They often applied finishing touches with TDM plug-ins such as Waves Gold Native bundle.

"We're currently getting radio play in Europe and South America," says Brown. "We've been making music without regard to commercial success. We've both had careers outside of this, so we haven't had to cater to any trends. We just like to play." ●

For more info, contact Roadnoise Productions, LLC; P.O. Box 1683, Crystal Lake, Illinois, 60039; Web www.randomtouch.com.

COURTESY ROADNOISE PRODUCTIONS

***Hammering on Moonlight*/Random Touch**



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"The KSM44 is a remarkable achievement. I am especially impressed with the versatility of this microphone and have yet to find its limits."
-**Steve Albini** (Nirvana, Page and Plant, PJ Harvey, ...)

"I was given the KSM44 prototype early-on, not knowing its intended purpose - so I tried it on everything. Guess what, it worked on everything!"
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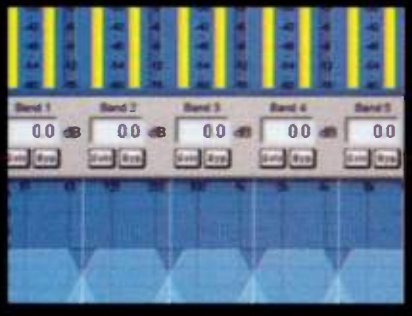

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Creative Looping

LAURA WILLIAMS

Give your loops a face-lift with these classic and modern techniques.

By Len Sasso

As a desktop musician, you've undoubtedly amassed a collection of audio files packed with loops of all types. The trouble is, unless you created them yourself, everyone else has the same loops. If you've used a particular loop in a piece of music, then heard it pop up somewhere else, you know the problem. Of course, not overusing canned audio files of any kind is the real solution, but you can also do quite a bit to spice up the loops and other audio files in your collection. In this article, I'll take you step-by-step through a number of tried-and-true techniques that go beyond just applying your favorite DSP effect.

Let's start with a brief look at the history of tape music and the various techniques employed by its pioneers. Why? Because applying tape-music techniques to the digital world can yield a number of interesting and not overly explored variations for your loop library. In fact, most of what I'll cover can be done with a sequencer and sample editor (the modern equivalents of tape) and without any DSP plug-ins.

THINK TAPE

As the word *loop* suggests, the use of loops in electronic music dates back to the earliest days of tape music. The first electronic music studio dedicated primarily to the use of tape techniques was opened in Paris in 1948 by Pierre Schaeffer. He and Pierre Henri, who joined a year later, pioneered many of the tape techniques that are the forerunners of sample-editing and digital-audio-sequencing techniques used today. Primarily, they recorded everyday sounds on tape and then cut and spliced them to form collages—a style they called *musique concrète*.

Creative Looping

FIG. 2: Different but compatible rhythm-guitar clips are looped on separate tracks. The clips on the bottom track are a 16th note shorter than those on the top track. As a result, the rhythmic interplay between the two parts shifts with each repetition of the loop.

Guitarist Les Paul, another early experimenter with tape techniques, is credited with inventing multitrack recording, tape echo, and sound-on-sound in the 1950s. Minimalist composers made extensive use of tape techniques beginning in the 1960s. In particular, Steve Reich's two speech-loop tape pieces *It's Gonna Rain* and *Come Out* introduced slowly shifting phase relationships between two tape loops of different lengths. John Lennon's *Revolution 9* (1968) is almost entirely a collage of clips and loops of sounds from the EMI sound archive. From the 1950s to the late 1980s, tape techniques played a major roll in virtually all styles of music.

In the world of tape there are only a few basic strategies. You can record sound and play it back. You can cut the tape up and splice the pieces together in a different order. You can play the tape backwards by reversing the reels and flipping them over. You can vary the speed (in the early days, speed could vary between two settings; now speed can vary continuously). You can dub the playback of one or more tape players onto another tape recorder. With multitrack recorders you can also dub some tracks to others on the same machine. And finally, you can play loops on one or more tape players. That opens the door to flanging as well as the shifting phase techniques just mentioned. All of those tape techniques can be replicated in digital-audio-sequencing and sample-editing software.

FIG. 1: Copies of the same audio clip are looped on two audio tracks. The clips on the bottom track are slightly offset in time as indicated by the shaded entries in the List editor. Each repetition of the loop has a slightly different timbre owing to phase cancellations caused by mixing the shifted and unshifted clips.

A CLEVER TURN OF PHASE

You most likely have an effects box or plug-in that offers flanging—a process that involves splitting a signal into two copies, slightly delaying one of the copies, and varying the delay time. Flanging was originally a real-time tape process (developed at the Abbey Road studio) in which an audio signal is recorded and played back simultaneously on two tape recorders. The term *flanging* refers to applying pressure to the flange of the feed reel on one of the recorders, thereby slowing it down and causing a slight delay in one of the copies. Varying the pressure varies the tape speed, producing the familiar whooshing sound associated with flanging.

Mixing two copies of the same audio file while slightly delaying one of them causes some frequencies to be attenuated while others are enhanced. That is the result of shifting the phase of the individual sine wave components of one signal with respect to the other. For example, if the delay causes a half wavelength shift at a particular frequency, that frequency will be cancelled entirely, whereas if it causes a full wavelength shift, that frequency will be doubled in level. Other amounts of shift cause varying degrees of attenuation or enhancement. If you don't vary the delay time, you'll get a coloration of the signal without the more noticeable motion associated with flanging.

Slightly delaying a loop and mixing it with a copy is easy in a multitrack audio program. Just put the loops on different audio tracks and nudge one of the loops slightly forward in time. It's a process that works well with atmospheres and ambient loops. Shifting the copy by a slightly different amount for each repetition of the loop adds slight timbral variations that make the loop more interesting without being obvious. Moving adjacent repetitions of the loop by different amounts produces a small gap or overlap, depending on which copy is moved more. That may be masked by the track playing the other copy of the loop, but if there's an audible problem, it's easily repaired by slightly adjusting the loop lengths or applying a short crossfade.

Fig. 1 shows an example created in Emagic Logic. The two tracks holding the individual loops are shown at the top; Logic's List editor (below) shows the amount of shift for each loop on the second track. The shifts are shown in *ticks* (often called pulses), which in Logic are 1/960 of a quarter note. At 120 bpm, which is the tempo of the example, a tick is roughly 0.5 ms. The shifts in Fig. 1 range from 2 to 20 ticks or 1 to 10 ms, which is pretty much the useful range for this process. To calculate the shift per tick in your sequencer, divide the tempo in bpm into 60,000, then divide the number of ticks per

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Creative Looping

note. Therefore, the phase shifts by a 16th note every four bars, and a complete cycle takes 256 bars (8.5 minutes at 120 bpm). As in the prior example, you can cull interesting four-bar loops from a rendering of the complete cycle. But in this case, you can also slice out a long loop from anywhere in the rendered file. Because the evolution is by 16th-note jumps rather than by a few milliseconds, longer selections don't slip out of phase. EM WEB CLIPS You can hear a 32-bar version in the audio example BoogiePhase.mp3.

BEYOND TAPE

A loop typically consists of a single audio file, but not necessarily. Software sequencers make it easy to group parts (audio or MIDI) from several tracks and then loop the group. That gives you much more latitude to introduce variations using DSP effects and automation on the individual tracks of the loop over longer periods of time than you have with a single repetition.

FIG. 5: Reaktor's Travelizer Ensemble lets you manipulate and automate grain playback for a variety of loops from a single audio file.

Fig. 3 and **Fig. 4** show a four-bar composite loop created in Propellerhead's Reason. Each of the pads of Reason's ten-pad sample player Redrum is used to play a loop or effects clip. All but one of the pads is routed to its own mixer channel, with the remaining pad, a rap-vocal loop, routed to the modulation input of a vocoder. The vocoder's carrier is supplied by a send bus from the mixer. Automation is used to create the carrier mix as well as to control the vocoder level in the mix. Delay, chorus, and reverb send effects are also used, with the delay return having its own mixer channel.

Fig. 3 shows the four-bar, 10-track loop in Reason's piano-roll style editor. The individual bars indicate gating of the Redrum pads, which were set up to play as long as the gate was held. The four-bar composite loop was made into a

group in the track view of the sequencer (not shown), and the group was then looped eight times to create the piece BellTree.mp3.

Fig. 4 shows the Reason rack with the sequencer's mixer-automation view at the bottom. Automation was used for channel levels, for muting the kick drum and hi-hat channels, and for the return of the phaser effect. Although the loop repeats every 4 bars, the automation spans the entire 32 bars.

Against the grain. Granular techniques are not usually described in terms of looping and slicing, but viewing them that way can help demystify the topic. Granular processing is essentially just sequencing *grains* (slices) of an audio file. One thing that sets granular processing apart from the techniques I've described so far, as well as from run-of-the-mill beat-slicing, is that the grains are extracted in real time. In other words, you don't first do the slicing and then later do the rearranging.

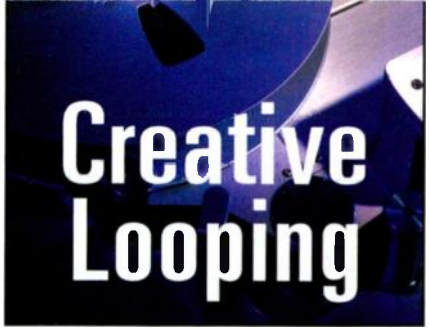
Another difference is that the grains are not necessarily played at their original speed. In essence, you have control of individual grain pitch and playback speed. The resequencing of the grains is often controlled by some repeating process such as an LFO or free-form contour generator. It's the repetitive nature of the grain sequencing that relates granular techniques to loop processing.

Granular synthesizers typically offer real-time control of four main parameters: grain location (within the audio file), grain size, grain density (the rate at which grains are triggered), and grain pitch (the speed at which the individual grain is played). There are often additional controls for smoothing (applying an attack-decay envelope to each grain), randomization of the four main parameters, and reverse playback (applied to individual grains).

Individual grain playback is typically not looped, but you can achieve the same thing by setting the grain density to match the grain size and leaving the grain location fixed. Ordinarily, grain sizes are kept very small (a few milliseconds or even a few samples), but that isn't a requirement. If you set the grain size to the entire audio file, for example, you can loop the audio file as a single grain. That's somewhat contrary to the spirit of granular processing, but using large grains—say, an eighth- or 16th-note long—can be very interesting.

When using tiny grains, the analogy to looping is affected by grain-location automation. The most obvious technique is to linearly vary the location forward in time—using a ramp-up LFO, for example. That allows the grain pitch to control the playback pitch while the LFO rate controls the playback speed, giving independent control of pitch and time. Beyond that, using a different LFO shape or a retriggering envelope generator allows you to construct all kinds of loops, with completely independent control of grain pitch and loop length. Using a step sequencer to control grain location is another possibility.

Granular synths are not that common and are most often part of more technical applications, such as Native



Instruments' Reaktor or Cycling '74's Max/MSP. If you have a granular synth, however, you have a potent tool for loop mangling. Granular DSP plug-ins are more common, but because they work in real time, they don't offer control of the most important loop-processing feature: grain location.

Fig. 5 shows Reaktor's Travelizer Ensemble, which comes in the Reaktor factory library. There are several other grain-player-based Ensembles in the Reaktor library, and you can, of course, build your own. The large *x-y*-controller on the right sets the grain location and size. LFOs are provided for modulating grain pitch and location. Resonator and feedback-delay effects are added at the end of the signal path. The audio example DalyTravels.mp3 is made entirely from loops created in Travelizer using a single speech clip (heard at the beginning).

EM WEB CLIPS

Almost any software that lets you graphically manipulate audio files can be used to create new loops from old. Sample-editing software typically allows you to cut, copy, paste, merge, insert, reverse, fade, and otherwise munge any selection within an audio file. Many let you destructively apply effects plug-ins to selections (rather than the whole file). Independent time-stretching, pitch-shifting, and formant-shifting are also often provided. Use those tools on different parts of a loop or different copies of the same loop pasted end to end.

Even with a basic digital audio sequencer, you can get a lot of extra mileage out of your loop library with the techniques described here. If you have more advanced tools, the possibilities are limitless. The trick is to keep the basics in mind, start simple, and let things evolve from there.

Len Sasso *can be contacted through his Web site at www.swiftkick.com.*

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LAPTOP AND DESKTOP

December is a joyful month for some, a difficult time for others. Fortunately, you can brighten your holiday season with the pleasure of giving. One great thing about musicians with personal studios is that we're suckers for cool or useful music gear, which opens up myriad gift possibilities for almost any budget. After all, as temperatures drop, overcast skies abound, and we hole up in our studios for the winter, new musical "toys" could be exactly what we need.

As always, the EM editors are watching out for your studio interests. This year's gift guide features hardware and books, each item for $250 or less—a few are even less than a C-note.

So settle in and check out our latest gift recommendations, and then treat yourself to a delightful shopping spree. You also could leave this issue where your significant other will see it, with the items you want clearly marked. At times like this, there is no point in being subtle! Happy holidays!

—Steve O

1 Use your laptop on the road with the **M-Audio MobilePre** (Mac/Win, $179), a bus-powered, 16-bit USB audio interface with zero-latency direct monitoring. The MobilePre offers mic and instrument preamps to cover all of your recording needs. And listening back is as easy as plugging in your powered monitors or headphones. Web www.m-audio.com.

2 **Edirol** packs a wealth of features into its **PCR-50** (Mac/Win, $250) USB keyboard controller, which can be powered by USB or an AC adapter. With 49 Velocity-sensitive keys, MIDI I/O, and plenty of knobs, faders, and buttons, the PCR is perfect for your desk or lap. Web www.edirol.com.

3 The **Contour Design ShuttlePro V.2** (Mac/Win, $129.95) is a USB controller designed for use with DAWs. The device combines a jog wheel, a shuttle wheel, and 15 programmable buttons, and it is ergonomically designed to fit comfortably under the hand. Web www.contourdesign.com.

4 The **Echo Digital Audio MiaMIDI** (Mac/Win, $249) is a 24-bit, 96 kHz PCI card with a MIDI I/O breakout cable. The card's ¼-inch 2-channel I/O is convenient to use, and the included drivers allow you to run audio and MIDI from multiple applications simultaneously. Web www.echoaudio.com.

Cheer

By Gino Robair

Photography by Bob Montesclaros

5 The **AKG K 171 Studio** ($139.95) are pro-quality, closed-back headphones that offer a high degree of external isolation and a wide frequency range: 18 Hz to 26 kHz. Web www.akgusa.com.

6–10 The **PreSonus MaxRack** ($129.95) holds six of the company's ½U processors. Shown here are the **TubePre** ($129.95) mic preamp, the **Comp16** ($129.95) compressor, the **EQ3B** ($129.95) 3-band parametric equalizer, and the **HP4** ($129.95) 4-channel headphone amplifier. Web www.presonus.com.

11 Priced for the personal studio, the **Studio Projects B3** ($199) is a large-diaphragm, multipattern condenser microphone with transformerless circuitry. With cardioid, omni, and figure-8 polar patterns, a lowpass filter, and a –10 dB pad, the B3 is suitable for use on vocals and instruments, or as a room mic. Web www.studioprojectsusa.com.

12 Although it's smaller than a CD jewel case and runs on two AA batteries, the **Korg ToneWorks Ampworks** ($179) puts 11 amp models, 11 cabinet models, and 11 effects right where you want them. You can also dial up an EQ setting or hit the Tap button to lock in the tempo. Web www.korg.com.

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23 **Auralex MoPads** ($29.95) help improve the sound of your monitors by decoupling them from their stands. The package includes four foam pads—two for each monitor—and four wedge inserts. Together they give you five positioning options. Web www.auralex.com.

24 The **Planet Waves Circuit Breaker** ($39.99) is a heavy-duty instrument cable with a button that mutes the signal going to your amp by shorting it to ground. This allows you to unplug your axe without that annoying—and potentially speaker-damaging—pop. Web www.planet-waves.com.

25 The **Furman Pluglock** ($50) may look like an ordinary power strip, but it's designed to hold five of that little inconvenience, the wall wart. The roadworthy Pluglock gets its name from the clamps situated over the sockets, which let you secure the wall warts using a coin or a screwdriver. Web www.furmansound.com.

26 If your studio combines pro-level and consumer gear, the **Rolls MB15 Pro-Match** ($80) will help you match their levels. The MB15 is a two-way stereo converter that changes –10 dB signals to +4 dB and vice versa. The device can also be used as a stereo line-level control for balanced signals. Web www.rolls.com.

27 Looking to get rid of those wall warts and 9V batteries? The 1.7-amp **Godlyke Power-All** ($45) powers as many as 20 9V effects from one supply. The kit includes an array of connectors, including a pair of battery-plug attachments for effects that don't have DC power jacks. Web www.godlyke.com.

28 ***Wouldn't It Be Nice: Brian Wilson and the Making of the Beach Boys' "Pet Sounds"*** by Charles L. Granata (Chicago Review Press, $15.95) is an in-depth look at the making of the group's most ambitious album. The book includes interviews with band members as well as the studio musicians known as the Wrecking Crew. Web www.ipgbook.com.

29 Part biography, part bass tutorial, ***Standing in the Shadows of Motown*** by Dr. Licks (Hal Leonard, $35) is a marvelous introduction to the work of legendary Motown bassist James Jamerson. The book includes transcriptions, exercises, and two CDs that will capture the attention of any musician who's interested in the Motown sound. Web www.musicdispatch.com.

30 ***Sessions with Sinatra: Frank Sinatra and the Art of Recording*** by Charles L. Granata (Chicago Review Press, $19.95) is a fascinating glimpse into the technology, music, and lifestyle of the Chairman of the Board. Plenty of candid photos are included, as well as examples of the sheet music. Web www.ipgbook.com.

31 ***Temples of Sound: Inside the Great Recording Studios*** by Jim Cogan and William Clark (Chronicle Books, $24.95) takes you into the rooms of Sun Studios, Motown, Stax, Chess, Sunset Sound, United Western Recorders, and Capitol Studios to meet the men and women behind the greatest hits of the 20th century. Web www.chroniclebooks.com.

32 ***Analog Days: the Invention and Impact of the Moog Synthesizer*** by Trevor Pinch and Frank Trocco (Harvard University Press, $29.95) tells the colorful history of Bob Moog's influential instruments, and of those from ARP, Buchla, and EMS. Web www.hup.harvard.edu. ❦

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On Top of His Game

No matter the studio or style, producer-engineer Joe Chiccarelli always gets killer sounds.

By Maureen Droney

One of the hardest-working engineer-producers around, Joe Chiccarelli is known for diversity, both in the projects he does and the places he does them. The week that I caught up with him for this interview was typical: on a break from recording Pink Martini in Portland, Oregon, he was at Capitol Studios in Hollywood, California, engineering a string date with first-call arranger David Campbell (Beck's father) for country superstar Tim McGraw.

Chiccarelli's discography reflects his eclectic taste. He has recorded mainstream pop with superstars such as Bon Jovi, Elton John, and U2; esoteric jazz with the Kronos Quartet; and alt rock with Hole, Beck, and Tori Amos. He has also worked with some of today's hottest Latin acts, including Café Tacuba and Juanés. He manages to find time for involvement with the Recording Academy, and was a key member of the committee that orchestrated the inaugural 5.1 surround telecast of the 2003 Grammy Awards.

It isn't surprising that so many kinds of artists like working with Chiccarelli. Although you might expect someone with the kind of credits that he has accumulated to be a jaded been-there-done-that type, he is just the opposite. He brings, along with his considerable experience, a youthful enthusiasm to all of his gigs. Plain and simple, he's a music junkie who has developed the wide-ranging talents he needs to feed his habit.

Another thing that's cool about this all-around nice guy is that he's generous about sharing his hard-earned knowledge. I took advantage of that, stopping in to chat as he finished up final details on the Tim McGraw string session.

PHOTO MAUREEN DRONEY

On Top of His Game

Moving around so much, monitoring is key. What types do you listen on?
I use Yamaha NS10s. I actually still use tissue on the tweeters, and no, I don't know what brand it is. I also have my Tannoy AMS10As, which I take everywhere.

You're working on a very old Neve 80-series console today. Is that your favorite desk?
Absolutely. With a console that good, your job gets a lot easier. Plus, the rooms here at Capitol are amazing. There are a few other places in L.A. like that—the great old studios. Honestly, when you're working on a board like that, in rooms that sound this good, it's hard to do anything wrong.

So a good room with a good console is a winning recipe.
It's interesting that the guys who built the classic rooms—Bill Putnam, Walter Sear, Allen Sides—didn't call themselves designers. They just knew the basics, like not having two parallel walls anywhere. I don't want to put anybody down, because there are a lot of great room designers today, but a room can be scientifically correct and still not sound good.

People get into all these weird angles and bass traps, and in the end you say to yourself, "Well, it sounds okay." But it lacks a little soul. Then you go somewhere else that's very basic: a bass trap in the back of the room, a little diffusion here, and it's like "Wow, this sounds really natural, and I can hear all the instruments!" The bottom line is there are some basic principles that, if followed, allow you to build good recording environments. Simple things like avoiding parallel walls and having a proper amount of high diffusion and adequate bass absorption. Some of the best recordings—from Motown sessions to U2 in a rehearsal room—weren't made in acoustically brilliant spaces. But they were places that had character and something magical that made the sound leap off the speakers and say, "Listen to me!" Of course *[laughs]*, there's also some luck involved in creating those spaces.

Speaking of good rooms, you just recorded most of trumpet-virtuoso Chris Botti's latest CD in a garage.
The way it came about, Chris had started writing songs for his new album with Everlast's keyboardist Keefus, who works with all sorts of people from Macy Gray to Dr. Dre. He and Chris wrote a track together on a Digi 001 system in Keefus's garage. They loved the vibe and decided that was where they wanted to record the album. So I brought in all my gear—my HD rig, tons of preamps, a little Trident 65 console from the '70s.

With everybody in one room?
Luckily, it's a two-car garage! They had put up sound board and were smart enough to get rid of all the angles around the ceilings. They put sound board from the wall to the ceiling to eliminate 90-degree angles. Probably it was something with the ceiling height and the angles, because there was just enough reflection that the room sounded alive and natural.

We had as many as five people playing at a time: up to three keyboard players

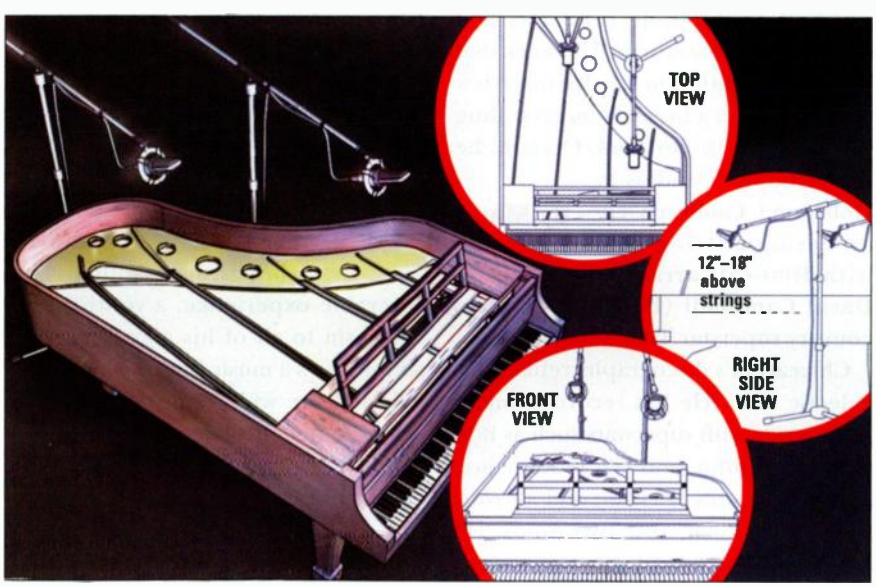

FIG. 1: This shows one of the piano-miking techniques that Chiccarelli used on the Chris Botti sessions. The signals from the two Audio-Technica 4047s were patched into a Focusrite ISA 428 preamp and then into Pro Tools.

FIG. 2: One of the mics that Chiccarelli likes to use for various instrument applications is the Sony C37A, an out-of-production tube mic.

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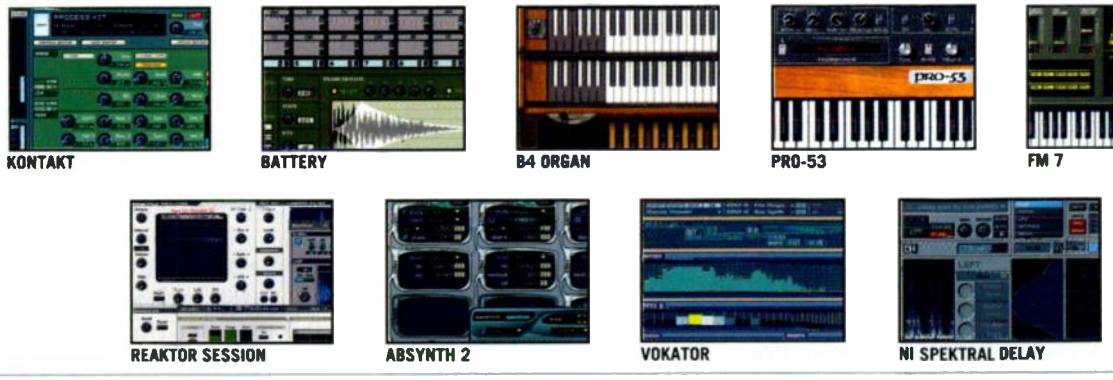

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(sometimes including acoustic piano); somebody programming beats; Chris on trumpet; and a standup bass player, who was in the bathroom miked with a tube U47. The bathroom is also where we put the guitar amp, miked with a Royer 121. We worked in the garage for a month and a half. I particularly loved that I could be at the console and just turn around and grab the trumpet mic to adjust it if I needed to.

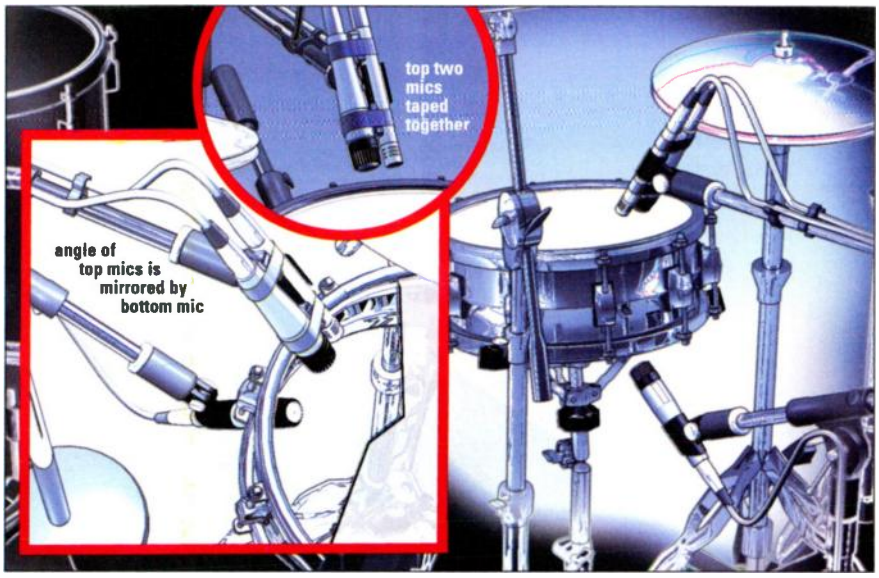

FIG. 3: Chiccarelli often uses a snare-miking technique that features three mics: a dynamic on the bottom, and two top mics—a dynamic and a small-diaphragm condenser—that are held together with gaffer tape and aimed at the same point.

Wait a minute. Trumpet is one of the world's loudest instruments. How could you record with it in the same room?

Well *[laughs]*, a lot of it was muted trumpet. We did the full-on trumpet parts primarily at Ocean Way Studios. There's no substitute for a great-sounding studio for instruments like fully open jazz trumpet—just think about all those Miles Davis albums. The trick with the garage was that you had to get used to the monitoring. Even though Keefus had done a great job of getting it to sound good, there were bumps and dips. You had to check the low end in many different spots in the room, and you had to listen at many monitoring levels.

The best thing about it was the vibe that happened when recording everybody together. Some of the best trumpet performances that we got were cut live with the band. We rarely used headphones; if the bleed was bad, we would just turn the monitors way down. But if someone wanted headphones, we had a Behringer HR 4700 ProXL Powerplay high-power headphone distribution amplifier, which worked really well.

What mic were you using on trumpet?

Mostly a Royer 121, which you wouldn't expect to work in that situation because it's bidirectional. You'd think there would be a lot of bleed into the back of the mic. I tried it because I've used Royers on trumpets before and they sound nice and warm. On some songs, Chris thought the Royer was a little too dark, so we ended up using a Neumann U 67. But overall, I liked the Royer, especially for muted trumpet, which can sometimes get a little nasty in the midrange. We also used a Sony C37A for some songs; I remembered it was Herb Alpert's favorite trumpet mic!

Did you compress the trumpet?

Overall, no. I don't like to compress trumpet unless the player's dynamics aren't good, which wasn't a problem with Chris. Compression compacts the sound and makes it tighter, so on one or two songs, where we wanted that type of sound, we used an old Teletronix LA2A.

You used outboard preamps, and the Trident console for monitoring?

For the trumpet I had my Martech MSS10, which I love. It's very open, and with the Royer it was a perfect combination. The Royer is warm and round, and the Martech is very open on the top.

I primarily used 1073 and 1095 Neves on the keyboards, acoustic bass, and guitars. I also used Brent Averill 312 API preamps and the new Focusrite

COURTESY JOE CHICCARELLI

Chiccarelli recorded much of Chris Botti's new CD in this garage-based studio belonging to keyboardist Keefus. Chiccarelli set up his rig in the room where the tracking took place, and though that made monitoring tricky, it enabled him to make quick mic-placement adjustments.

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US-224	2-in / 2-out	2 XLR mic, 2 ¼" TRS (bal./unbal.)	YUP	2 RCA (unbal.) + headphone	N/A	two S/PDIF	24 bit	1 x 16	GigaStudio & Cubasis VST	4 faders[2] + stereo master, Phones, Line, Jog and Transport	N/A
US-122	2-in / 2-out	2 XLR mic[1], ¼" TRS (bal./unbal.)	YEAH	2 RCA (unbal.) + headphone	two inserts	N/A	24 bit	1 x 16	GigaStudio & Cubasis VST	2 rotary input level controls, Line, Phones, Direct Monitor	

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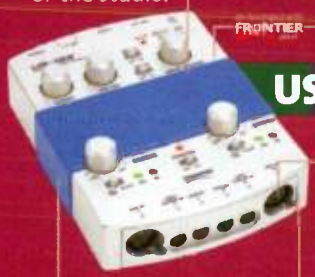

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When it comes to compressors, Chiccarelli has a number of favorites, including the Empirical Labs Distressor, which he refers to as "one of the best things made in the past ten years."

428—the one with the meters. It's a 4-channel preamp that's reminiscent of the sound of the old Focusrite 110s. I used that some of the time on trumpet, background vocals, guitar, and a lot on the acoustic piano.

Recording acoustic piano in that situation sounds difficult. Did you have the lid closed?

Actually, there was no lid! That particular piano—an old German baby grand—had a dark sound, but if you played in the right range and intensity it was fantastic. I used a pair of Audio-Technica 4047s into the Focusrites. That was the only thing we sometimes had to use headphones for. We had to keep the monitors superlow so they wouldn't bleed into it. But we were lucky; that piano sounded best if you didn't dig in to it too hard. When you really dig in to a short-string piano, you can hear how short the strings are. But if you're playing more softly—middle volume, middle register—a baby grand can sound like a bigger piano. That's how this one was.

How did you place the mics?

Usually, just one over the high strings and one over the low strings [see **Fig. 1**]. On some songs we did mono piano with a Blue Kiwi mic. On the lo-fi, atmospheric tracks we used an old Altec 633 mic through a Distressor. Miking the piano was another case where it was helpful for all of us to be in the room. You don't realize how often you run out into the studio to move a mic. I could just turn around, move the mics, and at the same time be listening to find the best spot.

Wasn't it difficult to separate out how it sounded in the room vs. how it sounded through the speakers?

You just got acclimated. That's something about mic positioning: when you get the right spots, the speakers disappear; the sound coming through the monitors becomes transparent, where everything sounds like it's in the room with you. Since everything *was* in the same room, I could jockey a mic around until it all felt clear. We were lucky that we got the polarity between the speakers and the microphones correct, so you could tell what was going on.

How did you do that?

By listening, watching for positive excursions on the speaker cones, and by being careful to keep our installation wiring correct.

You say you were lucky, but luck is a very small part of it. To get good results out of a nontraditional environment, you need to know what you're listening for.

I was lucky to come up in the early '80s, in what I call the "Steely Dan" era of recording. At that time, there were benchmarks of quality that everybody tried to match. In retrospect, I'd say it was the peak of analog recording, before everything got digital and overtweaked. Stuff was hi-fi, but natural. It came out of the '70s, an era with the British rock 'n' roll sound and the Los Angeles sound that had all those great engineers like Glyn Johns, Geoff Emerick, Al Schmitt, Elliot Scheiner. Engineers really mattered to artists and producers, and people strove to come up with sounds that were first class. I got to work as an assistant with all sorts of brilliant engineers.

Don't get me wrong. The developments of the past 15 years are great. I'm a Pro Tools addict. I love that everybody can get their hands on the same technology and create a sound that's unique and honest to them. But I know I was fortunate to get started when engineering was perhaps in its golden age.

Working with Frank Zappa was your big break. What did you learn from him?

Looking back, working with Frank was the perfect experience for me. At the time I had a pretty average, mainstream, pop/rock musical vocabulary—both as a listener and as an engineer. So to work with Frank, who was a genius and who had an attitude about making music that was so irreverent and outside the box, was the perfect education. Coming up when I did, I learned methods and rules and ways to make everything sound pristine and clean. Suddenly, I was working with this guy who was into "Throw all that stuff out and let's f**k it up! Let's patch seven compressors into each other and see what happens!" He opened a door that changed the kind of engineer I became.

He also taught me the importance of putting personality and character into things, and that even mistakes can help you do that. Like how Brian Eno would do a rough mix of a track and print it; then, when he put up the next song, he'd leave the faders as they were. Because maybe, all of a sudden, the bass guitar gets panned to the right and it sounds brilliant.

It's a way of jogging perspective.

Exactly. I like to be challenged, and I work hard to try new things: a different microphone, a different position for it, whatever. That's part of why I enjoyed the garage sessions with Chris and Keefus. In a new environment where you hear things in a fresh way, you also think differently and you do different things.

How did you get today's string gig?

David Campbell and I have worked together on a number of dates. The first time was when I was doing sessions for Beck, and he got his dad to do some arrangements. We got along and he liked the sound; since then he's called

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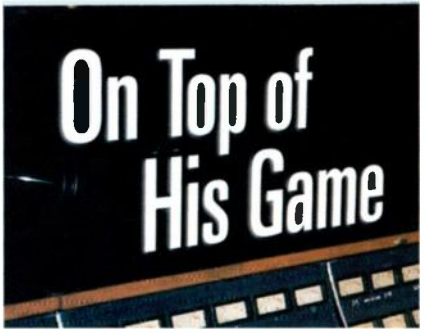

the accordion needed to blend in more with the woodwinds and become part of the whole sound, instead of poking out, as accordions are known to do. The C37, which is an old tube mic from the '60s that's a little soft in the midrange, helped it sit in the track nicely.

Do you generally use a lot of close mics on strings?

I do, but usually I end up with the ratio of the close mics to room mics at something like nine to one. With a good section, a good arrangement, and a good room, the close mics end up about 20 dB below the room mics. About 90 percent of the sound comes from the room mics. So placement of them is everything.

I use a setup that's kind of a weird permutation of a Decca Tree with an AKG C24 stereo mic and a pair of Neumann M50s. There are three mics, with one of them—in this case the C24—out in front of the other two by a little bit. With string recordings, the most important thing is finding the sound that pops right in the track that lets the strings speak but doesn't compete too much with the track. It's like finding their home. String dates are expensive; you don't have time to experiment. With the three mics, I can quickly size it up in the first pass, then adjust the blend.

For close mics, I'm lucky here at Capitol to have lots of 67s, tube 47s, and C12s. Those classic mics just have a tone; there isn't much new that beats them.

"Beats" being the operative word.

That's true. Royers sound great; Brauner and Sounddelux sound great. But if you're talking personality, some of those old mics just have a certain vibe.

What are some other string setups you've done?

I've done sessions where I baffled the strings off because the room was so reverberant that they were floating away—too cinematic and lush—so I had to dry it up a bit with baffles. Working with Jerry Harrison and the band Live we worked in this room but ended up using a mono RCA 44BX ribbon mic because the strings were sounding too nice. We put the one mic in front of the section, and we mixed that in to get a darker, honkier sound that helped it blend with the track. I've also used an old Shure bullet mic—real grainy and midrange—for a Bon Jovi track. Because of the distortion in the guitars, we had to add some scratch to the strings so that the tonal differences weren't so far apart.

Working in so many different kinds of rooms, what do you carry with you and rely on?

Preamps with a lot of character: Neves, APIs, Focusrite, Chandler, Daking. I also think it's good to have some superclean hi-fi-sounding preamps, like the Martech,

JOE CHICCARELLI: SELECTED DISCOGRAPHY

American Music Club, *San Francisco* (Warner Bros.,1996); producer

Beck, "Jack Ass (UK version)" (Geffen, 1998); mixer

Cafe Tacuba, *Reves/YoSoy* (Universal, 2000); mixer

Clem Snide, *Soft Spot* (Spin Art Records, 2003); producer

Elton John, *Songs from West Coast* (MCA Records, 2001); engineer

Rickie Lee Jones, *Evening of My Best Day* (V2 Records, 2003) mixer

U2, "Happiness Is a Warm Gun" (Island Records,1999); mixer

character for the bass drum.

I also bring my Monster mic cables with me. Good-quality cable makes an enormous difference, even down to a guitar cable. For vocals, I run the Monster cable from the mic to the preamp, then through the door into the control room if I need to, to keep the run as short as possible.

For compressors, I like standard LA2As, LA3As, 1176s, Joe Meeks; the old dbx 160s are my favorite electric bass limiters. Distressors, of course, are one of the best things made in the past ten years.

or Avalons, or even an inexpensive Sytek MPX 4A, which is a Jensen-type of design made in Chicago. It's good to have combinations; that's how you can instantly set your sounds apart. Maybe part of your drum kit goes through the hi-fi preamps and another part goes through the older, chunkier thing so that you can get air on the cymbals and an older, thick

Are there any new mics that you're excited about?

I like the Royer 121, obviously, and a lot of the Audio-Technica line sounds great. The new Shure KSM44 sounds really good. It has a different sound, a drier sort of top end that's a little more in your face. But I still use the a lot of the normal Shure SM57s, Sennheiser 421s, EV RE20s, AKG D12s, and C414s. I love the Sony C37As [see **Fig. 2**], but there aren't many out there.

Right now, everybody seems to strive to build mics that have a presence peak in them; everybody also thinks they have to have a superfast transient response. They think that if it's nice and bright, it must be good. The thing about the C37 is that it has a dip in the upper midrange, which, for a lot of instruments—like with the trumpet and accordion, and even for cymbals that can get a little brash or ugly in the upper midrange—chills them out in a nice way. And whatever tube is in it kind of compresses in a very gentle, slow way. That's great, because if everything on your record has a superfast, open top-end thing, it can sound like all noise. Mixing and matching

On Top of His Game

combinations is what makes it all work together.

It's always a puzzle to get 32 or 64 tracks of information down a little stereo bus and have it all be heard, and be meaningful. That's where the different characters come in. The old-school way where guys would listen in mono and move mics and use different mics for different colors is one way to get it—pushing and pulling things to give them a personality that will speak with its own voice and identity.

That's the crux of it: creating a unique voice. We all now have the same techniques and tools; the guy in the garage has the same Pro Tools system, the same Pro Tools mixer as the guys in the top studios. The playing field is now even, and the average person is coming out with tracks that sound really good. The next step is to take all this stuff and create musical experiences that are unique and that don't just sound like everybody's using the same plug-in. We need to marry a little more of the '60s aesthetic with today's ease of technology.

You've talked about miking strings, trumpets, and pianos, but what about snare drums? I'm sure our readers would like to know how you get your snare sounds?

When recording drums, I often use a multiple miking technique for the snare. This technique is rumored to be invented by Bob Clearmountain. It probably was—after all, he's the man responsible for bringing the now-standard NS10 into every control room.

When miking the snare drum, I use three mics: two on top and one on the bottom [see **Fig. 3**]. For the top mics, I usually use a Shure SM57 and a small diaphragm condenser, either a Neumann KM84 or an AKG 451EB—always with at least a –10 dB pad. The bottom mic is either a Shure SM57 or a Sennheiser 441. The novelty here is that the two top mics are gaffer-taped together and aimed at the same spot on the snare drum.

The mic capsules are time aligned for best phase and clarity. This simply means positioning them next to each other with their capsules aligned perfectly together. The way I check that is to talk into both mics, flip the phase at the console, and then talk into them to find the point where the signal cancels the most.

I use two mics to get the best of both worlds—the punch and midrange of the dynamic, and the air and top end of the condenser. Often when I'm mixing these mics together, I compress the condenser mic with a dbx 165A or a UREI 1176LN. That gives me a more exciting, punchy and finished, ready-to-mix snare drum sound. The amount of compression and the ratio of the blend between the mics varies from style of music and from song to song.

What are some projects of yours that are just out, or are about to be issued?

There's an album I produced for Peter Walker, a very interesting new artist from San Francisco. We enlisted some great musicians, including Jay Bennett [ex-Wilco], Joey Waronker [REM], Justin Meldal Johnson [Beck], and Steve Berlin [Los Lobos]. Peter's music is in the storytelling singer-songwriter genre and is all live-instrument based. We recorded very traditionally, live, in Los Angeles' Cello Studios' large room. This past year, I also mixed new albums for Ricki Lee Jones and Café Tacuba, and engineered for producer Pat Leonard on songs for a new Sony artist named Casey Stratton—very dramatic, sweeping, piano- and vocal-based songs.

Life is never boring for you, is it?

I wouldn't change a thing. As long as I'm surrounded with great music, I'm happy.

Maureen Droney, *whose engineering credits include projects for Carlos Santana, George Benson, John Hiatt, Whitney Houston, and Aretha Franklin, is the Los Angeles editor for* **Mix.**

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By Darin Stewart

Desktop musicians have an embarrassment of riches when it comes to software tools for making music. The proliferation of applications and plug-ins should allow you to piece together a suite of tools tailor-made for a variety of creative and commercial projects. Reality, however, doesn't always work out quite so neatly, even with the great power and versatility of MIDI.

The problem is that MIDI was designed to be a mechanism for sending and receiving musical event information, especially the explicit, quantifiable attributes of a performance. It is less than optimal for the richer set of attributes that many applications, such as notation and analysis programs, depend on. As a result, it's often difficult to get software from different vendors to play together nicely.

DMITRY PANICH

For example, a musician might select a best-of-breed sequencer to capture the nuances of a performance from a MIDI-equipped instrument. She wants to expand the arrangement, so she imports the MIDI file into her favorite notation program and manually fleshes out the score. So far, so good.

Next, she needs to send the file to her writing partner, but he has a different notation program. Because MIDI doesn't have any sense of beams, stems, ties, or other staples of music notation, it can't be used to move the score from one application to another. An adapter to convert the proprietary format of the original program to that of the second program must be used. Each time the collaborators exchange the file, this translation occurs and most likely introduces errors with each pass.

The day of the session arrives, and the final score must again be converted for the studio's software, and some

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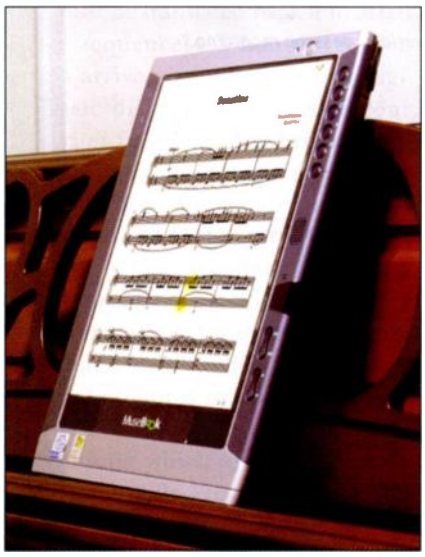

FIG. 2: AMuseTec's MuseBook Score relies on MusicXML for its combination of music-performance recognition and its automatic page-turning capability.

called "score-partwise" and where it can be found (www.musicxml.org/dtds/partwise.dtd).

The rest of an XML document is composed primarily of elements indicated by angle-bracketed tags such as <part-list> and </part-list>. Similar to HTML, this open- and close-tag pair indicates the beginning and end of a particular element—in this case, the part list. It also implies that elements may be nested within one another according to rules that are spelled out in the DTD.

In the MusicXML example, a <part-list> is made up of <score-parts> that consist of a <part-name>, and so on. An <attributes> element defines the information that is needed to interpret the rest of the marked-up song. That includes things such as key and time signatures and the base time unit as divisions of a quarter note. This is where semantic markup and the strength of XML really come into play.

As mentioned, MIDI has no concept of a note; it just has Note On and Note Off events. Rests don't exist but are inferred from the empty spaces between Note Off and Note On. This leads to ambiguities that can destroy the fidelity of a notation program. Likewise, MIDI makes no distinction between enharmonic equivalents; the F-sharp and G-flat above middle C are both MIDI Note Number 66. That leaves a notation program to make its best guess, often with mixed results. XML solves this problem by letting you explicitly indicate what you are encoding. A note (and all of its components) is described as follows:

```
<note>
  <pitch>
    <step>C</step>
      <octave>4</octave>
  </pitch>
  <duration>4</duration>
  <type>whole</type>
</note>
```

This fragment defines a single note in the XML-encoded song. The note has a pitch that is defined by a <step> of C in the current key signature (defined elsewhere in the example) and an <octave> of 4 indicating that the note is middle C. The note value may be altered by the key signature or by an <alter> tag indicating a sharp or a flat. Every note also has a duration that is based on divisions of a quarter note. The previous example, in 4/4 time, does not divide a quarter note at all so our whole note has a <duration> of 4 (4 quarter notes). Just to make sure that it's notated correctly we give it a <type> of "whole."

Including separate tags for duration and note type may seem overly verbose. At a surface level, the entire example may seem bloated, but that's part of the price paid for flexibility. For example, the way a song is notated may be very different from how it is performed. You may want to score a series of notes as straight eighth notes but want to give the notes more of a laid-back feel when performed. You could accomplish that by tagging the notes with a <type> of "eighth" and then playing with the <duration> value.

The potential verbosity of an XML score is alleviated somewhat by the use of *attributes*. Attributes can modify or extend the nature of any given element. For example, a well-placed attribute can help you know exactly where you are in a given work. The tag <measure number="1">, where "number" is the attribute, indicates that the chunk of XML we are about to look at describes a measure, and it happens to be the first one in the song.

This emphasizes one of the goals of XML encoding and how it bypasses the pitfalls of some past efforts: it is intended to be readable. The comprehensive tagging makes an XML-encoded score much more comprehensible to the average person than a shorter document crammed with acronyms and cryptic indicators. If disk space is an issue, compression can reduce XML files to the size of MIDI files.

Another benefit of XML is that it's free—something that might well ensure its adoption. All of the currently defined music DTDs and schemas are available under royalty-free licenses. As a result, they can be incorporated into existing and emerging products without paying a dime to their authors, and that's very appealing to software developers.

WHO'S DOING WHAT?

For XML to be truly useful as a music representation and an interchange mechanism, a standard must emerge. The ability to specify which DTD a program wants to see would seem to make that unnecessary, but in fact it makes the situation worse. Defining music-related DTDs seems to be the rage among both music and markup enthusiasts. A quick search of the Internet identifies more than 20 music-related DTDs, along with assorted schemas. Most are purely academic exercises or hobbyist tinkering, but a few are gaining momentum toward commercial viability.

Without significant consolidation of the field, each application must map its own capabilities to each markup scheme (in the form of a DTD) that comes its way. That eliminates most of the benefits of adopting XML in the first place. Fortunately, some leaders have started to emerge; the most ambitious is the Music Markup Language (MML) being developed by Jacques Steyn (www.musicmarkup.info).

MML is more of a comprehensive framework for music markup than a single DTD. Steyn has identified 12 modules for structuring and representing music; the Time and Frequency

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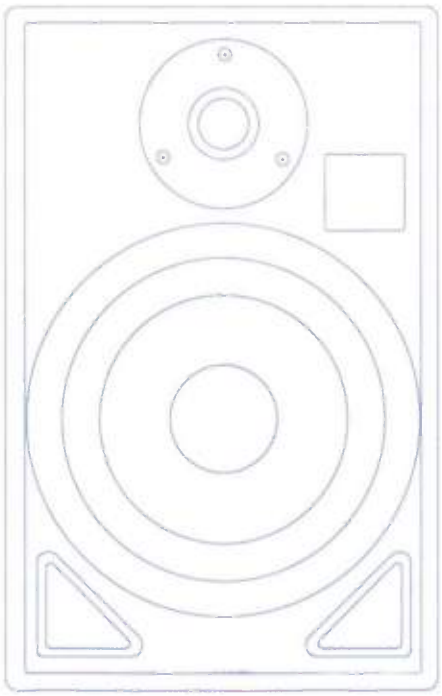

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RECORDING MUSICIAN

Low Volume, Fat Tone

Record great tube-amp sounds without blowing the walls out.

By Orren Merton

An apartment-based personal studio can present a number of logistical problems, none of which is more acute than the issue of loud sound levels in close proximity to your neighbors. If you're recording electric guitar, especially through a tube amp, it can be particularly dicey.

Tube amps generally get much of their tone from saturating their power section. When the volume is too low, though, you just can't get that saturation. But if cranking the amp isn't a viable option in your studio, then what do you do?

LAURA WILLIAMS

You could opt to forget the amp and record direct through a modeling processor. Because such devices create their sound digitally, they can achieve their tone at any volume and can be monitored through headphones, eliminating the volume problem entirely.

Amp modelers do a good job of getting usable amplike sounds. But as many guitarists and tone aficionados will tell you, modelers cannot yet convincingly emulate many of the more subtle interactions between tube amps and guitars. The effect of the tubes' heat on the interplay of the amp's components is one example; the change in the amount of distortion that results when you turn down your guitar's volume is another. Real tube junkies will also tell you that the "push-pull" effect—when the amp "breathes" differently depending how you play—is inspiring, and again, modelers can't simulate that yet. Tube-amp aficionados and bands that pride themselves on an interactive, organic guitar sound will likely be satisfied only with the real thing.

But can a tube amp be tamed for the home studio? Even a 50W half-stack is loud enough to get you evicted,

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tubes might not be something you want to do. Power-tube adapters cost anywhere from $50 to $150.

VARIACS

A variac, or Variable AC transformer, is not actually an audio-related device at all—rather, it's a testing unit for hardware. Its intended purpose is to test how electronic equipment will fare at different wattages. Variacs were originally used in audio rigs to regulate voltage in older or poorly wired buildings, to make sure that the equipment always saw the proper amount of power. However, adventurous guitarists discovered that if they reduced the output of the variac, from the normal 120V in U.S. AC power to about 90V, the power tubes would run at a lower voltage, saturate more quickly, and run at a slightly lower volume. Thus the tradition of using hardware-store variacs to reduce power and make an amp run hotter was developed.

The jury is out on whether using a variac in this way will damage your amp. The general consensus is that it will wear out your tubes more quickly and perhaps wear internal components faster. Some amps, however, are designed with a High/Low Power switch, which is a type of variac switch built in to the amp. These do not damage the amp at all, and unlike hardware variacs, they can often cut the power rating in half. For a low-wattage amp putting out less than 10W RMS, a variac power switch could bring the amp down to less than 5W, which is almost microwattage amp territory. Variacs generally cost $200 or more.

FIG. 3: Because it produces only 0.1W RMS of power, the Nano Head from Z.Vex Effects can be turned up to achieve the sort of blistering power-section saturation that would produce excruciatingly loud volume levels in a higher-wattage amp.

MICROPOWER TUBE AMPS

Another option for getting a real tube-amp sound at low volume is to get a tube amp with an extremely low power output. Such low-wattage amps are fully functional and are capable of powering a 4×12 speaker cabinet, but with a power rating of below 2W RMS. The most popular microamp used to be the now-discontinued Cream Machine by Hughes & Kettner. Z.Vex Effects and Gerhart Amplification are two current manufacturers of microamps.

To make more sense of this, it's helpful to understand the relationship between watts and volume. You need to decrease the wattage of a guitar amp by a factor of ten to reduce the perceived volume by half. That means the amp that sounds half as loud as a 100W amp isn't a 50W amp; it's a 10W amp. And for an amplifier to sound half as loud as a 10W amp, it would need to be a 1W amp. In truth, the wattage ratings tell you less about volume and more about how many speakers an amp can power and how powerful those speakers can be.

What can a tube amp offer when it puts out less than 10W? Zachary Vex, whose company Z.Vex Effects makes the 0.1W RMS Nano Head (see Fig. 3), says that "there's a very distinct texture-character difference between listening to a tiny amp blowing its brains out at full volume and an attenuated big amp." With an amp pushing less than ten watts, it's very easy to get that power-tube saturation at lower volume, so you can max it out without blowing out the windows and killing small animals.

There are some drawbacks to using microwattage tube amps. You may want an amp with more power for use at rehearsals or gigs. And don't forget that you are limited to the sounds your amp is capable of. Microwattage amps have enough headroom to take pedals in front of them. But other than that, if you don't like the amp's natural sound, there's not much you can do. Microwatt-tube-amp prices start at about $400.

SPEAKER OPTIONS

Does your guitarist's 100W Marshall half-stack sound more powerful than your 100W Marshall 2×12 combo? That's because our perception of volume is influenced by how many speakers are being used—so a 100W amplifier pushing a 4×12 cabinet will seem louder to us than that same amp pushing a 2×12 cabinet. That means another way to reduce the perceived volume of an amp is to use a 2×12 or even 1×12 cabinet instead of a 4×12. You'll loose some of the fullness of a

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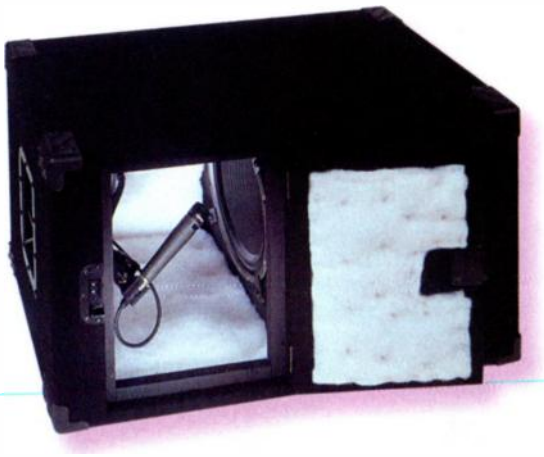

FIG. 4: The SSC-1 from Demeter is a guitar isolation box, which features a built-in speaker and mic stand, surrounded by a sealed, soundproof casing.

4×12, but the reduction in perceived volume will be significant.

Some companies, such as Randall and Demeter, make isolation boxes consisting of a single 12-inch guitar speaker in a soundproof and sealed box with a microphone arm on the inside and a cable jack on the outside to connect the microphone to your recording equipment.

The Randall Isolation 12C mounts a Celestion V30 horizontally, whereas the Demeter SSC-1 (see **Fig. 4**) mounts an Eminence 80W speaker. (An unloaded version of the SSC-1 is available as well.) These types of boxes muffle the sound enough that you can hold a conversation over the top of a raging guitar amp. Isolation boxes are more efficient than simply shoving a speaker cabinet in the closet and covering it with pillows, but they still don't capture the sound of speakers breathing in a room. While this is a recording solution, it won't help you if you want to hear your natural amp tone for rehearsing or jamming. And be careful not to turn your amp up too high and blow out the speaker. Guitar-speaker isolation cabinets start at about $500.

LET THE TUBES TELL

Each of the solutions I've outlined has advantages and drawbacks. The trick is to find the approach that works and sounds best for you. Although these methods are not as quiet as recording direct—you'll probably still have to refrain from recording those nu-metal chug riffs at 3 a.m.—you clearly have quite a few options for producing authentic tube-amp sounds at apartment-friendly volumes.

Orren Merton *is a consultant, musician, and pro-audio writer who has bothered the neighbors far less since discovering how to manage his amp volume.* *Thanks to Ed DeGenaro, Gary Gerhart, Andy Marshall, Ted Weber, and Zachary Vex for help with this article.*

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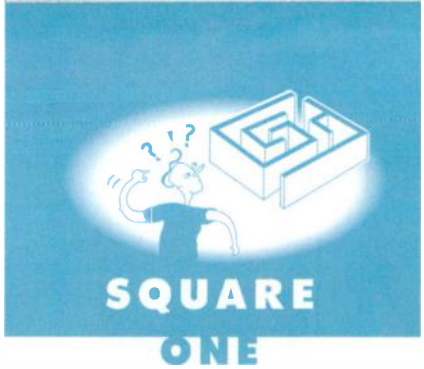
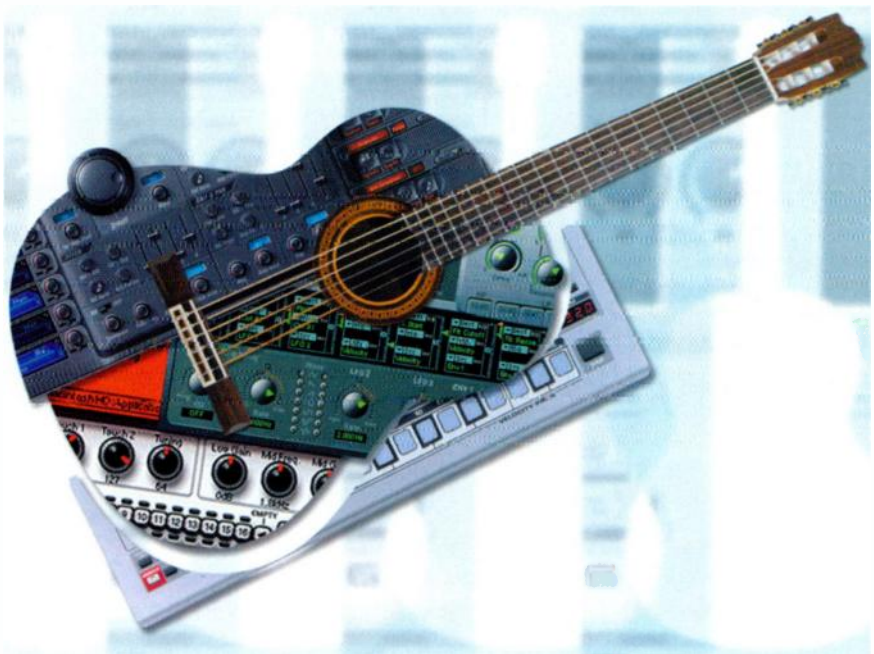


Sample Solutions

Meet the most versatile instrument in the production studio.

By Jim Aikin

What would you like to sound like today? No matter what you answer, your wish can come true—and more easily than you may expect. The magic tool is a type of musical instrument called a *sampler*. Samplers are a mainstay in just about every type of music production, from hip-hop to film soundtracks. A musician with a sampler and a few good CD-ROMs containing professional sound libraries can lay down ultrarealistic drum, bass, and guitar tracks or simulate a full symphony orchestra. If you're new to the idea of sampling, this column will put you on the fast track.



MIKE CRUZ

In a sampler, digital recordings of actual sounds can be played from a MIDI keyboard (or from a sequencer into which MIDI notes have been recorded). When you press a key, the recording assigned to that key plays back. A sampler can hold many recordings at once and give you instant access to all of them. For example, an entire drum kit might be laid out with a different drum sound (kick, snare, and so on) assigned to each key.

Originally, digital samplers were hardware-based instruments. Models like the Akai S1000 series and the E-mu Emulator were found in many studios. These days, new hardware instruments such as the Korg Triton, the Roland MC-909, and the Kurzweil K2600, which combine sampling with other musical functions, are widely used (see **Fig. 1**). But in the past few years, software samplers such as Tascam GigaStudio and Native Instruments Kontakt have taken over a large segment of the market. Many software samplers can run as standalone programs and as plug-ins in a host sequencer.

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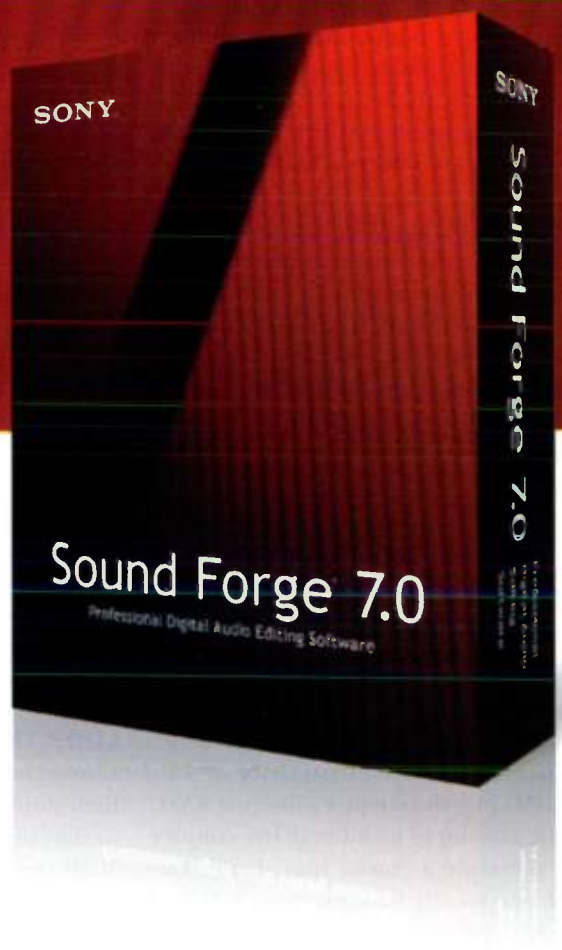

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Though there are some important differences between hardware and software samplers, they're more alike than they are dissimilar. Except where noted, the concepts I'll discuss in this column apply equally to both.

BASIC CONCEPTS

Samplers use the type of digital recording that is used on CDs. I'm not aware of any samplers that can play back MP3 or other consumer-type digital audio, because the fidelity of those formats isn't high enough to meet musicians' production needs.

The two most important specs in sampling are *sampling rate* and *bit resolution*. Most samplers can record at the CD-standard sampling rate of 44.1 kHz (44,100 hertz, or cycles per second), and many can sample at higher rates. Similarly, CD-standard 16-bit resolution is the minimum for recording, and many samplers can record 24-bit audio, which provides better fidelity. Though many professionals prefer to use software samplers because of their 24-bit, 96 kHz sampling, a fast computer is required, as is extensive hard-disk space for storing samples. For many musical purposes, 16-bit, 44.1 kHz sampling is all you'll need.

Before individual samples (recordings) can be played by a sampler, they have to be loaded from "permanent" storage (such as a hard drive or CD-ROM) into the sampler's internal RAM. The amount of memory in the sampler is therefore a crucial spec. Early samplers typically had less than 1 MB of memory, but today most units can be expanded to 128 MB or more. As a rule of thumb, one minute of monaural, 16-bit, 44.1 kHz audio occupies just over 5 MB of memory (see the sidebar "RAM and Sampling Time" for more information).

Some software samplers sidestep the RAM requirements by streaming long samples from the computer's hard drive in real time. If you're using a software sampler, you can assign many gigabytes of samples to the keyboard at once. However, the software sampler has to store the first part of each sample in RAM in order to be able to respond instantly when you play the keyboard, so you'll still need plenty of memory.

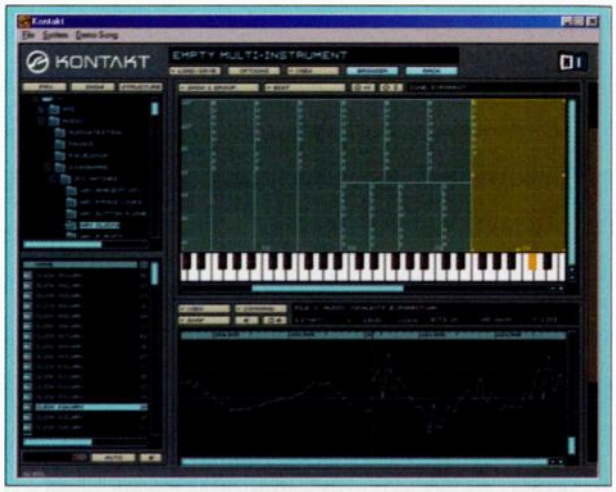

FIG. 2: Software samplers such as Native Instruments Kontakt, shown here, have a number of advantages over hardware-based units, including the ability to assign samples to different key ranges graphically (top right). The loop editor is shown at bottom.

Using a hardware sampler's memory efficiently can be a challenge. You might need to create custom presets containing only the samples needed for a given project, or you might have to shorten long samples, convert stereo samples to mono, and so on. Software samplers avoid many of these concerns.

LOOP THE LOOP

Instead of playing a sample once and then stopping, a sampler can be set up so that the sample assigned to a given MIDI key will continue to play over and over for as long as you hold the key down. This is called *looping*. In fact, looping is so common that there's a special term for not looping: samples that play once and stop are said to be in *one-shot mode*.

The first generation of samplers used looping as a way to expand their very limited memory. You could record a 1-second segment of a violin section holding a sustained note, for example, and then loop the sample. When the sample was played from the keyboard, the loop would create the illusion that the violin section was sustaining its tone for as long as you might need it musically.

For this trick to work, the loop-start and loop-end points need to match sonically (see **Fig. 2**). Otherwise, the loop sounds bumpy rather than smooth because there is a discontinuity in the sound each time the loop starts over. Most samplers are equipped with an array of tools for creating smooth loops. With *crossfade looping*, for instance, the end of the loop is crossfaded with the beginning, thus smoothing out the transition. Your sampler may also have a command for finding *zero-crossings*, which are points where the sample has (momentarily) zero energy. Placing the loop-start and loop-end points at zero-crossings doesn't guarantee smooth loops, but it can help.

Now that samplers have enough memory to play long samples without looping, the technique of sample looping is more often used for playing phrase

FIG. 1: Hardware samplers, such as the Korg Triton Studio, have long been favored by musicians. In the past few years, software-based samplers have become increasingly common.

"Four Major Labels Came to See Me Because I Joined TAXI"

Lizard McGee -- TAXI Member

Most musicians never get a chance to meet an A&R person in the flesh. I had A&R guys from Columbia, Dreamworks, Maverick and Hollywood all come to see my band, Earwig, play live.

I spent the next day hanging out with one of them at his house. I played more songs, and we talked one-on-one for hours.

All this happened as a direct result of becoming a member of TAXI.

Ironically, I almost didn't join. Like so many other people, I didn't know a lot about TAXI, and I wondered if it was really legitimate. It just sounded too good to be true.

But I spoke with a few friends who were already members, and they explained how TAXI worked. It made sense.

I began to think about not only getting my music to record labels and publishers, but also pitching my songs to TV shows and movies to make some extra money with my music.

So, I joined, and it's already paying off big-time. Earwig is building a huge buzz because of all the contacts we've made through TAXI.

We haven't signed a deal yet, but we've definitely penetrated the so-called "inner circle" of the music industry. And that's exactly where you need to be to get yourself signed.

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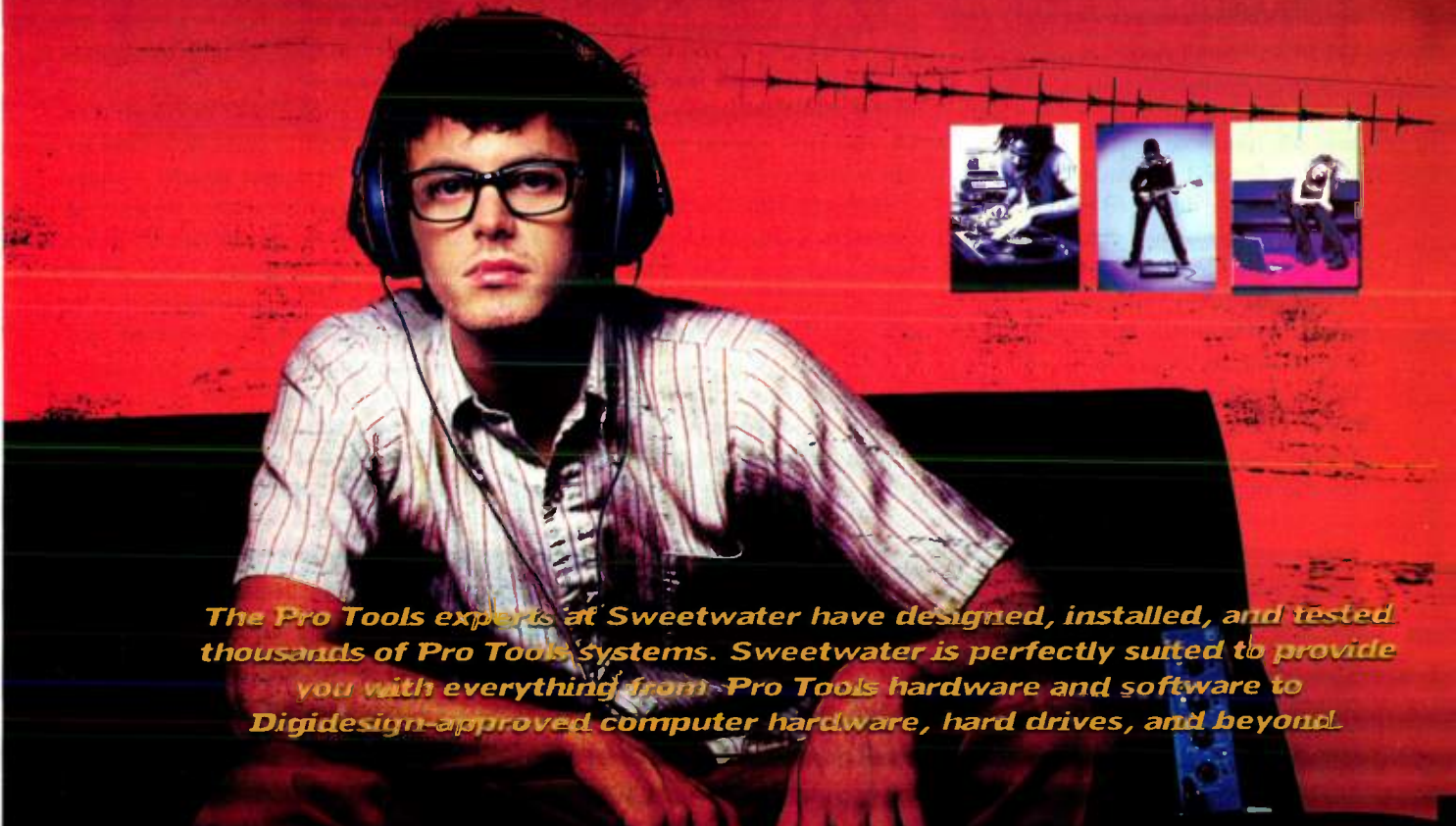

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ROLL YOUR OWN

Usually, when you first turn a sampler on, it won't make any sound at all. To play music with it, you have to load or create one or more samples. There are two ways to get sounds into a sampler: by loading them from permanent storage and by doing your own recordings. The latter process is called, naturally, *sampling*. The exact procedures differ from one sampler to another; consult your owner's manual for specifics.

Ironically, most software-based samplers don't have any facilities for recording new samples. You'll need to capture the sound onto your computer's hard drive using another piece of software, such as an audio editor or a multitrack recorder. Once the audio file is on the drive, you'll be able to load it into the sampler. Most hardware samplers, however, can make their own recordings, usually from a mic, line, or digital input on the front or rear panel.

As with any type of digital recording, you want to get the input (the sound to be recorded) as hot as possible short of distortion. Your sampler will have input metering with which you can check the level of the signal. You may need to preallocate a certain amount of memory to the recording process before you start.

After the sample is recorded, the sampler will probably ask you what root key you'd like to assign it to. It will then assign the sample to the keyboard, ready to be played. But before you can use it musically, you'll want to trim off (*truncate*) the start and end of the sample. A properly truncated sample won't use any more precious memory than it actually needs.

After truncating the sample, you'll need to save either the sample itself or the preset, which may contain numerous samples and other types of data, to permanent storage. Unlike a synthesizer, a sampler can't store its sounds in a battery-backed RAM buffer for instant availability; The sounds have to be stored on a floppy disk (if they're extremely short) or to an internal or external hard disk.

The magic tool is a type of musical instrument called a sampler.

DREAM MACHINE

A sampler can be a wonderful musical tool. If you use sound-library CDs, though, there's some risk that your sampled music will sound a lot like everyone else's. To make music that's truly your own, you'll need to explore the features of your sampler and learn to use them creatively. Once you get started, you'll find there's no end to the possibilities!

Jim Aikin *has been sampling strange household noises since he brought home that brand-new Akai S900 (750 KB of RAM, floppy drive storage only) back in 1987.*

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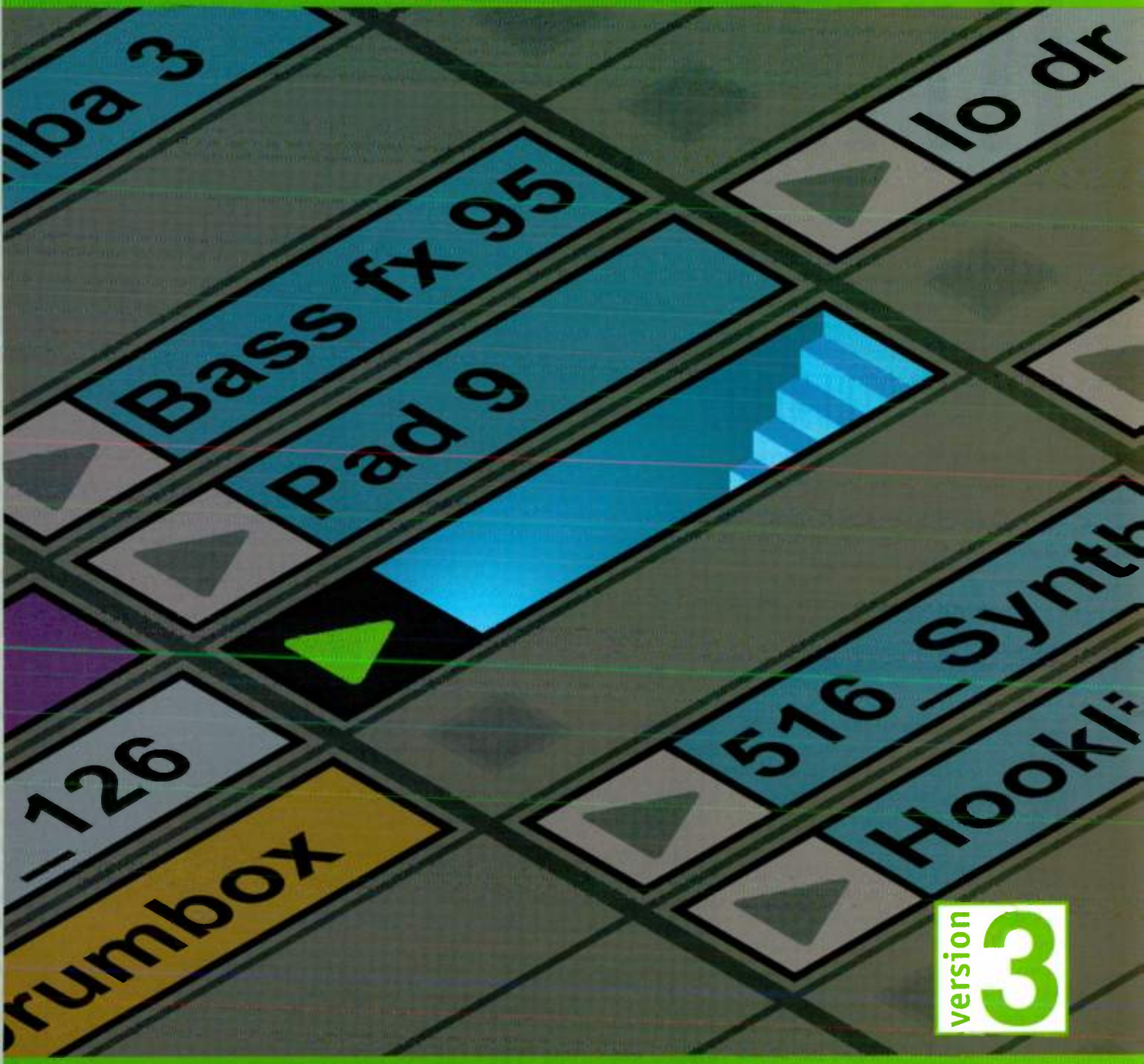

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REVIEWS

NATIVE INSTRUMENTS

REAKTOR 4.03 (MAC/WIN)

A brand-new look for a best-selling sound-design toolkit.

By Dennis Miller

Native Instruments has established itself as one of the premier suppliers of unique and powerful synthesis, sampling, and live-performance tools. Reaktor 4, the latest version of the company's flagship program, keeps that tradition going. Reaktor's huge number of modules makes it an excellent resource for designing sounds and virtual instruments of all types, and the vast number of user-created Ensembles proves that the program is alive and well in studios throughout the world.

Reaktor 4 is a major upgrade and includes enhancements in many areas. Among these are a newly designed user interface, improved Snapshot (preset) support, graphical sample-map editing, multiple levels of undo, and an updated Ensemble library. In addition, there are a number of new and enhanced sound-generating and interface Modules, as well as new Modules that support the display of graphics and even animation.

FIG. 1: Reaktor's Panel view offers controls for manipulating synth and sampler parameters.

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PC1x

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88 note weighted action with aftertouch
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one ROM expansion slot

And in a move that will certainly make many users happy, the hardware dongle is no longer needed to run the program. Instead, a standard challenge-and-response authorization is used.

We've covered Reaktor on several occasions, so I'll focus here on the main new features. Because there have been so many changes, I'll give only a brief overview of the program before jumping in to the new stuff.

IN THE TOOLSHED

Reaktor is a modular virtual-instrument builder and sound-design toolkit that provides nearly unlimited flexibility in the arrangement and configuration of its many dozens of components. You can build a synth that incorporates a large number of wave types simultaneously or create a sample player that can chop a sound into individual samples and even freeze playback on a single sample. There are numerous preconfigured effects you can use in your designs, or you can build your own using Reaktor's raw materials (delay lines, all-pass filters, and the like).

FIG. 2: Reaktor 4's new Browser window toggles between several views. The Modules shown here can be dragged directly into the Structure window for inclusion in an Instrument.

Reaktor components fall into four main categories. Modules are the smallest program elements and don't do much on their own. When combined with other Modules, though—an oscillator, a filter, and an amp, for example—they become functional devices. Next come Macros, which often contain a group of Modules encapsulated in a single "device" (an effects rack, for example) that can be reused at will. Instruments are fully working designs that can be played under MIDI control or that might include sequencers, allowing them to run automatically. Finally, Ensembles are the largest program layer and can include one or more Instruments.

Reaktor's interface includes a work area for configuring your designs and, new in version 4, a Browser that can toggle between a number of displays (more in a moment). Structure windows show the block diagrams of your devices, and Panel windows are where you manipulate the actual controls (knobs, sliders, and so on) of your soft instruments (see **Fig. 1**).

PLUG IT IN

Like its predecessors, Reaktor 4 runs as a standalone application on both PC and Mac and as a VSTi plug-in (with automation) under every major host platform. It also works as a DXi under Windows, and it supports Audio Units and CoreAudio under OS X, OMS under OS 9.x, and RTAS under Windows XP and Mac OS X. A number of below-the-surface improvements enhance its performance as a plug-in, and you can now load as many instances of the plug-in as your processor will allow. (The previous limit was four.)

Users of Reaktor 3 can upgrade to version 4.0 at no cost, but they don't get the new Ensemble Library or any documentation. Those run an additional $79 (or $19 if you purchased 3.0 after January 17, 2003), and they must be ordered from the manufacturer's Web site. To be fair, the company had intended to give a free upgrade only to version 3.3, which was never released, so the opportunity to download 4.0 at no charge is actually quite generous.

Minimum System Requirements

Reaktor 4.03

MAC: G4/733 MHz; 512 MB RAM

PC: Pentium III/700 MHz; 256 MB RAM

BUILDING BLOCKS

Building virtual instruments is much easier now that a new Instrument, complete with AudioIn and AudioOut modules, is inserted by default (though I usually end up removing the AudioIn). Locking and Unlocking Panels is also a snap now that a dedicated icon for that purpose appears directly on the Panel interface. That is a huge time-saver, because Instrument controls (knobs, sliders, and the like) still appear layered on top of one another in the Panel when you first add them to your design (you must Unlock the Panel before you can move them around). It would be nice if Reaktor could automatically arrange the controls somehow or at least place them side by side rather than on top of each other.

Some of the Modules now have "adaptive" inputs. For example, in previous versions, you had to choose among separate 2-, 3-, 4- and other-input mixers, but now the single Mixer Module lets you input as many sources as you need. When you first load the Mixer you only see a single input (and a level control), but if you hold down the Control key (or the Apple key on the Mac) while you drag an output to the Mixer icon, it will expand to accept the signal. The same feature is available with the Relay, Router, and Selector Modules.

You can still insert Modules or Macros into a design by using the right-mouse-button menus, but the new Browser makes the process even easier (see **Fig. 2**). The Browser can work as a traditional Explorer-style display and show, for example, all the WAV files on a single drive. But you can also use it to display the Modules, Macros, and

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Instruments, because all of the inputs in this collection have been normalized to a range of –1 to +1. That means you don't have to scale the particular signal that you are sending to a Macro to fit whatever range that Macro might need.

The Macros in the collection sound great—just listening to some of the example Ensembles that use them gives you an idea of the range they cover. The three-oscillator Green Matrix, for example, is one of several Ensembles built entirely from Classic Modular elements. Its myriad parameters could keep you busy for an entire afternoon (check out the example Green matrix.mp3 at the EM Web site).

The Building Blocks group is an even larger set of design tools. These run the gamut from waveshapers (Cubic Shaper, Linear Shaper, Wave Fold, and Wave Wrap, for example) to prebuilt FM-synthesis devices (with and without filters and feedback components) to display elements (a level meter and signal and clipping indicators).

ENSEMBLE PERFORMANCE

Reaktor's new Library is a fantastic collection of sound-generating and -processing devices that is practically unrivaled. The Library, which is well documented in the printed Instrument Guide, includes synthesizers, samplers, effects, and even a few tools intended for live looping and beat-munging. Though several of the instruments were available in previous incarnations, those have been souped up with the latest components, and the rest are totally new.

Among the most unusual Ensembles is GrainStates, contributed by user Martin Brinkman. This device has a Grain Cloud Sampler Module at its core and a sequencer that sequences through eight "scenes." Each scene has an *x*-*y* controller for adjusting grain position and length in real time, and each offers a unique effect (delay, envelope, and so forth) and a transposition parameter. The instrument can produce an amazing range of granulated, sliced, and diced sounds (though I recommend lowering the Delay Feedback value to allow for more "clarity" in the output). Listen to the file grainstates.mp3 at the EM Web site for an example of this Ensemble.

The SteamPipe is another one of my favorites—Reaktor is getting very good at producing physically modeled instruments, and this is one of the best examples. SteamPipe's 44 presets range from Flute to Water Drum to Glockenspiel and highlight a wide range of metallic and membrane sounds. Bowed Bell and SteamPipe are especially noteworthy, and SteamGhost would come in handy wherever a haunting, ambient effect might be needed. Some examples are online at the EM Web site.

There are four Ensembles in the sequenced-synth category—each offers a

maze of controls for tweaking. You can easily change the source input to Vierring—choices are Live, Oscillator Mix, Sampler, and Single Pulse—and drawing control data on the panels for the Modulation and Filter parameters as the instrument plays is just too easy. By changing the maximum value of Modulation 1's Length parameter to 128 (in the Properties window), I was able to create patterns with more rhythmic variety than some of the presets. Check out the EM Web site for some examples.

The Effects group also has a lot to offer. Fusion Reflections is a workshop on diffusion—its 25 presets model a large number of real (Stadium) and virtual (Liquid Room) sonic environments. I tested it by substituting a Sampler Module for the Live input and was very impressed with the level of control the instrument provides (and the animated displays are fun to watch). SpaceMaster is a powerful and versatile 2 channel reverb with 38 presets of its own, and Banaan Electrique is a "multi-effects box" that provides an amp simulator, reverb, dual delay, chorus, phaser/flanger, stereo compressor, and tremolo on a single screen.

IN THE STACKS

Reaktor 4's online users' library has been significantly enhanced and now gives you much more information about an Ensemble or Instrument before you download it. You can see a screen shot of an Ensemble's Panel, check to see how many times it has been downloaded, and read reviews and ratings written by other users. A search function lets you look for terms that users have included in their descriptions, and you can quickly access the newest 20 or 100 uploads to the library. You still must download files one at a time, and there is no sign yet of a promised batch-converter utility that will convert all of your custom Reaktor

PRODUCT SUMMARY

Native Instruments

Reaktor 4.03 (Mac/Win)
modular software synthesizer
$499
upgrade from 3.0
free

FEATURES	4.5
EASE OF USE	3.5
QUALITY OF SOUNDS	5.0
VALUE	5.0

RATING PRODUCTS FROM 1 TO 5

PROS: Enormous library of included Modules for building custom instruments. Ability to employ a wide range of synthesis and sampling techniques. Extensive collection of user-contributed examples available online.

CONS: Manual needs enhancement. Additional sampling-configuration features needed.

Manufacturer

Native Instruments
tel. (866) 556-6487 or (323) 467-5260
e-mail sales@native-instruments.com
Web www.native-instruments.com

3.0 Ensembles to Reaktor 4.0 format.

Not much has changed in the way of documentation. As before, there is a printed manual that includes a few getting started tutorials, but no online help. The first manual I received had some major gaps in the index—be sure you get an updated copy if you buy it. Even the new version has some serious omissions—many more terms should be included in the index and some of the Module descriptions are just plain confusing. Fortunately, a number of expert users offer valuable assistance in the Reaktor forum at the Native Instruments site. There's also an online FAQ with answers to many common questions. Though you can get information about various program components if you have Show Hints enabled (assuming the author of the currently loaded Ensemble has provided them), that won't get you any help when you pass the Tips icon over the main menu items that appear along the top of the screen.

FOR REAL

I tested Reaktor 4.03 on a dual-Pentium III/1 GHz computer with a MOTU 2408mkII audio interface and on a Pentium 4/2.8 GHz laptop with an Echo Indigo I/O PC Card interface. On both systems, I ran it standalone and as a DXi plug-in under Sonar 2.2 XL. The sound in both environments was outstanding, but of course, results will vary depending on the audio system you're using. I was also a little surprised that even with the program's new Multiple Undo command, some functions can't be undone (changing the transpose function in the Sample Editor, for example).

▼

The program is alive and well in studios throughout the world.

Yet despite that and the few other shortcomings, some of which are probably inevitable for a product of this size and scope, Reaktor is a massively powerful tool set for a wide range of users. Its appeal reaches well beyond the dance and trance crowds on into the realms of performance art, computer music, sound design, and, to be honest, any form of electronic music making you can think of.

If you're a current Reaktor 3 user, the free upgrade is a no-brainer. If you're not yet hooked on Reaktor, try out the demo and see if you can resist the urge. My guess is that you will succumb to the pleasures of what is easily the most powerful and productive graphical software-synthesis and sampling toolkit around.

EM *associate editor* **Dennis Miller***'s synth hardware sits idle, as his computer has taken over nearly all music-making tasks.*

"Brilliant!"

Tony Romano, Front of House, Diana Krall

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Larry Cumings,
Grammy Award Winning Engineer, David Grisman Quintet

"The SCX-25 is my go-to mic for acoustic guitar. It adds a gentle presence boost that makes any acoustic sound better, and its lack of proximity effect makes the bass more natural than other mics I have used."
John Gatski, PRO AUDIO REVIEW

"Two SCX-25s in a Baby Grand and my work is done! There's just nothing else like it."
Pat Lucotorto, Audio Engineer, The Tonight Show

"My First choice on Grand Piano. Easily one of the finest acoustic guitar mics ever! The size and unique design make them very camera-friendly. I love them for the sound... television directors love them for their looks."
Vaughn Shaw, Audio Producer, Live from the Bluebird Café

"What you hear is what you get. Not only is it the best sounding piano mic available, the shape, size and mount allow you to get right on top of the soundboard."
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"I have miked dozens of bands at recent bluegrass festivals with just one mic—the SCX-25. The band's response is always the same—they can't believe the tremendous sound that comes out of a microphone with such a small footprint."
Paul Knight,
Knight Sound Systems

"I honestly think the SCX-25 is one of the best mics available, and destined to become a classic."
Dennis Leonard, Supervising Sound Editor, Skywalker Sound

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ANDREW GILCHRIST, ENGINEER, ANI DIFRANCO

"I put a pair of SCX-25 mics in Diana's piano in July 2001 and they haven't come out since. These are the best piano mics I have ever heard—Brilliant!"
Tony Romano,
Front of House, Diana Krall

"I license piano samples to major keyboard companies like Emu and Ensonic. In what I do, every note is like a mastered CD. It is painstakingly hand crafted and has to be perfect. I have chosen the SCX-25 mics simply because they produce better source material."
William Coakley, Sound Designer, PERFECT PIANO SERIES

"These in need of an excellent piano mic need look no further. As an overhead drum mic, it provides a transparent and full-sounding presentation that is up there with the best. It's also a great choice for a sizable range of vocal recording duties."
Richard Salz,
ELECTRONIC MUSICIAN

"On Merle's current CD we recorded Willie and Hag with a pair of SCX-25s in the middle of the band to get a "live" feel—and the vocals sounded great."
Lou Bradley, Engineer/Producer, Merle Haggard

"I essentially just set the mics up, bring up the fader... and just sit back and enjoy the mix!"
Pete Horne, Horne Audio

"It behaves like a mic twice its size, a condenser with solid highs but no excessive top, and with a robust midrange and upper bass range that belie its visual appearance."
Marty Peters,
RECORDING MAGAZINE

"Having played the roles of artist, engineer, and producer, there is a fine balance between the technical and the artistic side of music. I find that the SCX-25 has really helped to bridge that gap as it faithfully reproduces vocals and acoustic guitar regardless of the style or content of the music."
Phil Keaggy, legendary guitarist

"...destined to become a classic."

Dennis Leonard, Supervising Sound Editor, Skywalker Sound

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ROLAND

VARIOS (MAC/WIN)

This phrase manipulator and more has all the bells and whistles.

By Len Sasso

Roland's proprietary VariPhrase technology was first introduced in the VP-9000, a sample-playback module that processed audio data using innovative techniques (see the May 2001 issue). VariPhrase works by analyzing an audio file for pitch, time, and formant information, and then encoding that information in a proprietary format it can manipulate.

The VariOS is a rackmount DSP host processor that brings VariPhrase to the desktop. As its name indicates, the VariOS is an open system implementation, allowing you to integrate VariPhrase processing with other digital audio software. The VariOS hardware module handles the actual processing, freeing your computer for other audio tasks. The VariOS can also be configured as an analog-modeling synthesizer and comes with software emulations of vintage Roland instruments.

The accompanying V-Producer software allows you to construct 6-track songs directly, to create VariPhrase-processed audio files, and to create Standard MIDI Files (SMFs) to control the VariOS hardware from your digital audio sequencer. V-Producer is your window into the world of sonic wizardry: it allows you to manipulate pitch, time, and formants on a timeline. It also lets you apply synthesizer-like processing on a per-file basis, but you can apply different timeline processing to separate instances of the same audio file at different positions on V-Producer tracks.

WHY HARDWARE?

Pitch shifting, time stretching, and beat slicing are available in a variety of software products. You probably have no-frills versions integrated into your digital audio sequencer, sample editor, or loop-playing software. The VariPhrase system will do all those things, but its virtuosity lies in applying pitch, time, and formant changes in real time during the playback of a phrase. It allows you to change the timbre, timing, and pitch of individual notes within a melodic phrase in different ways for different repetitions of the phrase. It also integrates beat-slicing and slice-sequencing functions and allows you to change the slicing in real time.

Because all the processing is done in the hardware, the VariOS requires only a fairly modest computer configuration—a relatively low-cost laptop, for example. Although processor requirements are relatively light, a good dose of RAM is recommended for running V-Producer. You can use the VariOS by itself in live performance after you create and save Performances in its 32 MB of built-in flash ROM or on PC memory cards. You can also use VariOS-generated sound files in other audio hardware or software (a sample player, for instance).

Minimum System Requirements

Roland VariOS

MAC: G3/233 MHz; 192 MB RAM; Mac OS 9.0.4 (OS X compatible); USB port

PC: Pentium/500 MHz; 128 MB RAM; Windows 98/2000/ME/XP; USB port

The VariOS is a bright red, single-rackspace unit with hands-on controls, a backlit LCD, a headphone output, and a PC Card slot on the front panel (see **Fig. 1**). Three knobs let you manipulate pitch, time, and formant in real time, and pressing the Volume knob plays a preview of your changes. A Value knob, in combination with the Menu button and two Cursor keys, navigates the pages displayed in the LCD.

In addition to MIDI In and Out ports, the rear panel supplies a USB port for connecting to your computer (see **Fig. 2**). Analog audio jacks include a pair of ¼-inch inputs with a Level trim knob and a mic/line switch, as well as two Direct outputs and two Main outputs, also on ¼-inch jacks. Optical and coaxial S/PDIF ports provide outputs for digital audio, too.

On my Apple PowerBook G4, installing V-Producer and connecting the VariOS was fast and painless in both OS 9 and OS X. Install the software and any necessary drivers (such as OMS or FreeMIDI under Mac OS 9), plug the VariOS into a USB port with the hardware turned off, power up the hardware, and the VariOS will appear on your desktop much like a hard drive. The one caveat is that you can't read from or write to the device directly, and attempting to do so could cause damage. Even with the clear warning in the manual, that might be a fairly easy mistake to make.

The VariOS and V-Producer will work their magic on audio files in AIFF and WAV format, both of which V-Producer automatically converts to the proprietary VariPhrase format. The VariOS comes with a 250 MB library of VariPhrase-formatted samples. The library

FIG. 1: The Roland VariOS combines hardware and software to perform complex audio-processing tasks while taking the load off your computer.

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cakewalk

leans heavily toward bass, drums, and guitar, but with a smattering of flute, strings, and vocals thrown in. In addition, libraries of VariPhrase-formatted samples in a variety of vocal and instrumental categories are available on Zip disks from Roland for $125 each (see "Phrases on Demand" at www.emusician.com for details).

In this review, I'll concentrate on using the V-Producer software to set up the VariOS hardware. With the exception of loading and saving audio and MIDI files to your hard drive, though, you can make all the same settings directly on the VariOS using its front-panel controls and two-line LCD. You can accomplish the real-time phrase processing that's available in V-Producer's 6-track sequencer directly using MIDI, though V-Producer makes some of those processes easier.

FIG. 3: V-Producer's Load Wave Files window contains a file browser, an audio-file list for the selected directory, and a list of files to be analyzed and loaded into the VariOS.

A SONG OF SINGING

The first step in using the VariOS is to load audio files with the V-Producer software. V-Producer can load files in three formats: AIFF, WAV, and VariPhrase (VPW). As I indicated earlier, V-Producer automatically analyzes AIFF and WAV files for pitch, time, and formant information. At the same time, it beat-slices the file and saves a copy to your hard drive in VariPhrase format. Conveniently, you can specify whether the analyzed files are placed in the same location as the originals or in a separate directory.

V-Producer's Load Wave Files window is divided into three panes (see **Fig. 3**). The top left pane shows all your hard drive directories in a nested tree (Windows-Explorer style). When a directory is selected, any eligible files it contains are displayed in the top right pane. You can play selected files using the button with the speaker icon or, if you check the Auto Play checkbox, have them play automatically when you select them. Clicking the Add button places the file in the Load List (bottom pane). For AIFF and WAV files, the type of pitch and formant analysis as well as the suggested tempo are displayed and can be changed in the Load List. VariPhrase files have their analyses already built in. (In any case, the files can be reanalyzed after they are loaded.)

V-Producer offers three methods for analyzing audio files: Solo, Backing, and Ensemble. Solo is intended for melodic material such as solo voices and lead instruments. Backing is primarily for percussion, and Ensemble is for chordal and ambient material. Solo is the only method that incorporates formant information and therefore the only one that allows you to adjust both formants and pitch without a formant change. The Ensemble and Backing methods produce noticeably better pitch shifting for pitched and unpitched material respectively.

EM WEB CLIPS The MP3 example EnSoBa illustrates the different analysis methods on solo, chordal, and percussive material.

After you select files to load in V-Producer, click on the Load button to initiate the analysis and transfer the files to the VariOS. Loading a large collection of files can take a while; a fuel-gauge-style display pops up to show the progress. When you save a V-Producer song, the sound-file locations (or optionally the sound files themselves) are saved so that you don't need to go through the file-selection and -analysis process again. The load time remains about the same, however.

Setting sample-playback parameters. Once phrase samples are analyzed and loaded into VariOS memory, you can play them with incoming MIDI or arrange them on tracks in V-Producer's 6-track sequencer. How they respond

FIG. 2: The VariOS's rear panel provides ports for analog and digital audio and MIDI, as well as a USB port for connecting to your computer.

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to MIDI and how they can be manipulated on V-Producer tracks is determined by the VariOS's Sample Edit parameters, which you can set up most conveniently in V-Producer's Sample Edit screen (see **Fig. 4**). You can also set them up using the VariOS control panel and LCD.

The first step is to decide whether to map the sample across the MIDI keyboard as a phrase, in which case notes correspond to pitches, or as a groove, in which case notes correspond to individual slices—drum hits, for example. In addition to the Keymap mode, two other note-related decisions need to be made: the Key Assign mode (Solo or Poly) and the Play Back mode (Retrigger, Time Sync, or Step). Solo mode (not to be confused with the Solo analysis method I described earlier) allows one note to play at a time and gives later notes priority. In Poly mode, multiple notes can play, which means several pitches (if you choose Phrase keymapping) or slices (with Groove keymapping) can sound at the same time.

The Play Back mode controls retriggering and is only relevant for Phrase keymapping. When set to Retrigger, each new note starts the phrase over from the beginning. When set to Time Sync, legato playing—in which new notes are played before existing ones are released—affects only pitch and does not retrigger the phrase. Staccato playing does retrigger the phrase. When set to Step, each new note plays the next slice of the audio file. That's a best-of-all-worlds solution: your timing controls the groove while note selection controls pitch.

FIG. 5: Vari Track is V-Producer's 6-track phrase sequencer. Individual regions (called Frames) can be MIDI-recorded or dragged to the tracks from the Sample List. You can edit Frames in the PhraseScope or GrooveScope editor.

▼

The note-editing scheme is both intelligent and flexible.

The remaining sample-playback settings control parameters such as fine-tuning, Velocity, amplifier, portamento, pan, and LFO settings. Two settings—Robot and Formant Control—apply only to files analyzed using Solo method. When Robot is turned on, the original pitch information is ignored and MIDI notes set the pitch rather than setting a pitch-shift offset. The result sounds robotic. Formant Control makes the formants follow the keyboard; it's turned on by default and usually results in pitch shifting that sounds more natural.

V-Producing your song. Once you've loaded and set up some samples, you can create a song in V-Producer's Vari Track window by dragging samples from the Sample List or by recording MIDI (see **Fig. 5**). When recording, incoming MIDI plays the sample selected in the Sample List, using the Keymap mode chosen for that sample. Whether by recording or dragging, you wind up with regions, called Frames, containing MIDI data that plays the target sample. You can drag the Frames to different locations as well as copy them. You can also edit the data in the Frames using the PhraseScope or the GrooveScope, depending on the Keymap mode chosen for the sample.

A graphic view of the audio data being played appears in the top pane of the PhraseScope. Beneath that is piano-roll-style display for editing MIDI note positions and lengths. Located at the bottom is a graphic editor for pitch bend, time stretch, formant shift, level (called dynamics), and Velocity; you make edits there by selecting a region and dragging vertically. Three curves are provided for controlling the shape of the change, and you can combine those with different region

FIG. 4: Set up sample-playback parameters in the Sample List (left) and Sample Edit window (right). You can play the selected sample in the Sample List directly, and you can drag it to any V-Producer sequencer track.

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When you create a Frame by dragging a sample from the Sample list, V-Producer creates a legato sequence of notes at the root pitch, with note divisions corresponding to the sample slices. Because the notes are legato, the Frame will play the full sample rather than retriggering it for each note. The note-editing scheme is both intelligent and flexible. You can resize a note from either end, and the adjoining note will be automatically resized to preserve the legato. You can move a note up or down to transpose the pitch of that section of the sample. You can create new notes with a pencil tool, and they will add harmony or steal the voice, depending on the Key Assign mode. The same features apply for recorded Frames except that, as you would expect, the notes are only legato if played that way.

The GrooveScope has two panes. One shows a graphic of each slice at the position where it will be played; the other is a display that's exactly the same as in the PhraseScope. You can move slices vertically (changing which slice plays) or horizontally (changing when the slice plays), and you can create and delete slices at will. If the sample's Key Assign mode is Poly, you can stack several slices vertically. You can turn quantization off or set its grid from one bar to a 64th-note triplet, and slices can be quantized after the fact with 0 to 100 percent accuracy. There's even a Randomize feature for shuffling any selection of slices.

FIG. 6: VariOS 303 is a virtual version of the classic Roland TB-303 Bass Line synth.

Manipulating grooves and phrases is extremely fast and intuitive in V-Producer, whether you played them or dragged them into place. The 6-track limitation is a bit restrictive, but considering all the real-time processing that the VariOS hardware has to do, it's not unreasonable. Careful planning will allow you to get around that limit by bouncing tracks to your digital audio sequencer. V-Producer makes that process easy by letting you simultaneously bounce its six tracks to separate audio files.

V-Producer includes a 6-channel mixer with send buses for built-in chorus, reverb, and a multi-effects processor with 40 effects based on various combinations of EQ, compression, distortion, and delay. Each channel has sends to all effects; the multi-effects processor has sends to the chorus and reverb; and the chorus has a send to the reverb. Unfortunately, mixer automation is not possible in V-Producer, so you'll have to bounce the audio or control the VariOS from other software to get that feature.

THE MANY FACES OF VARIOS

Under the hood, the VariOS is a high-powered synthesis engine, and VariPhrase processing is only one of its tricks. By loading other software front ends, you can turn the VariOS into a synthesizer of virtually any description, and Roland clearly intends to take

VariOS Specifications

Sound Engine	VariPhrase sample playback; analog-synthesis modeling
Polyphony	(14) notes
Multitimbral Parts	6
Analog Audio Inputs	(2) balanced ¼" TRS
Analog Audio Outputs	(2) balanced ¼" TRS main; (2) balanced ¼" TRS direct; (1) ¼" stereo headphone
Digital Audio Outputs	optical S/PDIF, coaxial S/PDIF
Other Connectors	MIDI In, Out; USB; IEC AC
Sampling Frequency	44.1 kHz
Data Format	16-bit linear
A/D/A Conversion	24-bit
Internal Processing	32-bit (floating point) sound generation; 24-bit (fixed point) effects
Sample RAM	46 MB
Flash RAM	32 MB
Effects	chorus; reverb (9 presets); multi-effects (40 presets)
Nominal Input Level	line –18 dBu; mic –43 dBu
Nominal Output Level	main +4 dBu; direct +4 dBu
Display	16-character × 2-line backlit LCD
Dimensions	1U × 8.75" (D)
Weight	4.25 lb.

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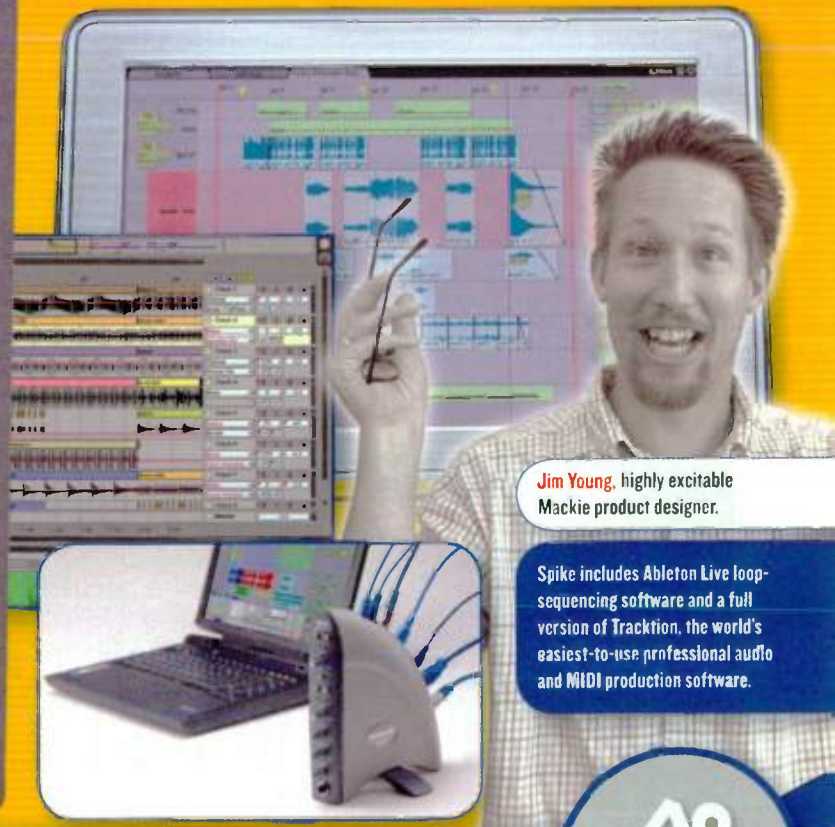

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advantage of that possibility. To that end, the company has released two examples you can download at no cost from its Web site.

VariOS 303 starts with an exact emulation of Roland's TB-303 Bass Line synth, complete with the same sounds and 16-step pattern sequencer (see **Fig. 6**). From there it adds a slider screen for easier step-sequence programming and five digital multi-effects—compressor, distortion, equalizer, chorus, and feedback-delay—which work in series.

VariOS-8 is a virtual combination of the Roland Juno and Jupiter series of polysynths (see **Fig. 7**). It follows the typical analog model, offering a couple of multiple-waveform oscillators, lowpass and highpass filters, and an LFO and envelopes for modulation. From there, it adds the intermodulation between the oscillators and three effects: chorus, reverb, and a multi-effects processor with ring modulator, EQ, pitch shifter, phaser, and delay line, all connected in series. The oscillators and filters are modeled after those in the original synths, and the sound is both authentic and tasty.

You can install the add-on synths in the VariOS's flash ROM or separately on plug-in memory cards. When they are in ROM, you select the VariOS personality when you power up, but you can switch personalities by first quitting the software and then power-cycling the VariOS. The two synths are nice additions, and they definitely whet your appetite to see what Roland has in mind next.

PLAYS WELL WITH OTHERS

Although V-Producer is specifically designed for the kinds of editing useful for VariPhrase processing, you can use the VariOS as a standalone sound generator driven by a MIDI controller or other MIDI software—your digital audio sequencer, for example. The MIDI implementation is extensive and provides support for all the standard MIDI controllers. If you want to really get into it, you can address every VariOS parameter using SysEx messages.

The VariOS can play as many as six different phrases using the first six MIDI channels. You can also assign a MIDI channel (the default is 16) for controlling global parameters. The phrase for each channel is selected using a MIDI Program Change. Once samples are loaded into the VariOS, you can do the rest of the setup on its control panel, but if you're using your sequencing software, it's easier to run V-Producer simultaneously. V-Producer has windows for assigning MIDI controllers to each of the PhraseScope controllers as well as for setting up MIDI Pitch Bend, Mod Wheel, and Aftertouch. Once you've set up the VariOS, you can use your sequencer's automation features just as you would the PhraseScope or GrooveScope. You can save songs, and hence setups, on PC Cards or in the VariOS's user memory, in which case you won't need V-Producer to access those setups and their samples.

Another way to work with MIDI, and a very convenient way to get a feeling for how to control the VariOS, is to import SMFs of V-Producer songs. V-Producer exports 6-track SMFs containing all the note and controller information you've created in the PhraseScope or GrooveScope.

Because the VariOS has two stereo audio output buses as well as coaxial and optical digital outs, you have several options for piping VariOS audio back into your digital audio environment. For songs created in V-Producer, you have the additional option of rendering each track or the final mix as WAV files.

The combination of V-Producer and the VariOS provides an excellent-sounding, easy-to-use, highly flexible tool for phrase manipulation and beat slicing. Except for loading the VariOS's sample memory, its extensive MIDI implementation makes it fully functional without V-Producer, which means you can haul it to the gig or studio without your computer. The included sample library is a nice starter set, but you'll undoubtedly want to expand from there. The VariOS is not cheap, but the price seems reasonable considering the processing that's going on inside. Doing the same high-quality job using computer software is not much cheaper and not nearly as convenient. ●

PRODUCT SUMMARY

Roland
VariOS (Mac/Win)
DSP engine
$1,499

FEATURES	4.5
EASE OF USE	4.5
QUALITY OF SOUNDS	4.5
VALUE	4.5

RATING PRODUCTS FROM 1 TO 5

PROS: Easy to set up and learn. Integrates easily with MIDI devices and software. Excellent sound quality.

CONS: Can't load samples directly without accompanying software. No mixer or effects automation.

Manufacturer
Roland Corporation U.S.
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FIG. 7: VariOS-8 realistically emulates Roland's classic line of Juno and Jupiter polysynths.

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RØDE

NT1-A

A versatile and quiet studio mic at a great price.

By Rob Schrock

I have to admit that I've become a fan of Røde microphones over the past few years. Why? Because the engineers at Røde consistently deliver professional-sounding products at extremely affordable prices. I've previously reviewed the NTV and NTK microphones, and I've used several other models on various recording sessions. Røde mics have always performed admirably.

When a pair of NT1-As arrived for review, I was genuinely excited. I had already heard about the new design and manufacturing techniques Røde used with this model, and I was anxious to hear them in action.

OUTSIDE AND IN

The nickel-satin-finished casing of the NT1-A gives it a look reminiscent of a Neumann U 87. Although it's solid to the touch, the NT1-A weighs surprisingly little. Like other Røde mics, it has a gold dot at the top of the casing near the capsule that indicates the side that should face the sound source. Like most condensers, it requires external phantom power.

There are no pads or highpass filters built in to the NT1-A. By eliminating these features and settling on a single pattern, Røde has been able to focus on building a great-sounding large-diaphragm condenser mic that remains affordable. Every NT1-A also ships with a zip pouch and a well-constructed shockmount.

When I received the NT1-As, I started using them immediately for recording vocals and guitars and I haven't looked back since. I have yet to find an application where these microphones don't sound good.

MATCHED SET

I produce The Coppolas, who are female twins with powerful voices. In the past I've tried several different large-diaphragm condensers on them, and while I've gotten excellent sounds, I've always had to be careful because the sheer volume of their voices would occasionally overload the mics' electronics.

I tried the NT1-As on the twins, and not only did the mics sound excellent, but I had no overload problems whatsoever. As a result, the NT1-A is my new mic of choice for the twins' vocals. I've used the NT1-As on other loud sources like percussion and electric guitar, too, and never had problems with overload.

I've been using the NT1-A on another female singer I produce, and the mic fits her voice like a glove. We both preferred the NT1-A to a U 87 for her voice because it didn't emphasize the midrange as much. But the NT1-A doesn't just sound great on females; I used it for a coming-attractions-style voice-over with a male voice. By getting the talent really close to the grill and angling the mic away to minimize plosives, I was got that "voice-of-God" sound with no problem.

INSTRUMENT TALES

You can never have enough good-quality large-condenser mics in the studio. Over the past few months, I've used the NT1-As for percussion, acoustic guitar, and guitar amps. To capture the bottom end of an ashiko (a type of long, wooden African hand drum), I placed the NT1-A about six inches from the ground and facing up, with a small-diaphragm AKG condenser aimed at the top head. The NT1-A provided plenty of bottom-end frequencies that were later carved with EQ to fit into the finished track.

The NT1-A sounded gorgeous on acoustic guitar. I placed the microphone about a foot back from the body—pointed roughly at the sound hole—and combined that with a small-diaphragm condenser pointed toward the 15th fret (roughly where the neck meets the body). The NT1-A has a pretty wide sweet spot and is a bit forgiving with placement, which proved handy when I had to duplicate the setup a few days after a recording session and punch in a guitar chord that had been changed. I realized later that I had placed the NT1-A about four inches closer to the neck than when I had originally set up, but the punched guitar matched the original performance flawlessly.

While cutting electric guitars, I used the NT1-A on the Vox and Marshall combo amps that I use in my recording

The Røde NT1-A is an ultraquiet, affordable, large-diaphragm condenser mic that's great on many sources, from vocals to percussion.

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MUSICIANS FIRST

rig. I usually track guitars through a pair of Shure SM57s permanently mounted to the rig, but I used the NT1-As when I was looking for bright and punchy clean sounds. Not only did they sound great, but their light weight and solid shockmounts made tweaking their positioning a breeze.

ART OF NO NOISE

Røde has completely redesigned the original NT1's electronics for the NT1-A. The company says its modern mechanized production techniques reduce manufacturing costs even as the company's engineers continue to refine their designs. Talk about refinements: the NT1-A's self-noise spec is 5 dBA, which is one of the lowest for *any* microphone. That's incredible for a mic that costs a fraction of what most quality studio condensers do.

The extremely low self-noise makes the NT1-A a great candidate for sessions that utilize a lot of large-condenser mics, such as dynamic orchestral recording dates. Unfortunately, I did not get a chance to use the NT1-A in that type of setting, but I sense that it would perform extremely well. Even in pop recording sessions, I really appreciate how quietly the NT1-A performs

PRODUCT SUMMARY

Røde Microphones
NT1-A
large-diaphragm condenser mic
$349

AUDIO QUALITY	4.5
VALUE	5.0

RATING PRODUCTS FROM 1 TO 5

PROS: Extremely quiet. Balanced frequency response from 20 Hz to 20 kHz. Sounds great on a wide variety of voices and instruments. Can handle very high SPL sources. Includes shockmount. Affordable.

CONS: No built-in pad or filters. Cardioid pattern only.

Manufacturer
Røde Microphones
tel. (877) 328-7456
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GRACE DESIGN

LUNATEC V3

A high-quality mic preamp and A/D converter for field recording.

By Rudy Trubitt

I do most of my recording outside the comfortable confines of the studio, so it's especially important for me to have gear that not only sounds good, but is easy to use and reliable. Until recently, my primary field rig consisted of a Sony TCD-D8 DAT recorder, a Grace Design Lunatec V2 mic preamp, and either a Shure VP88 stereo mic or a stereo pair of Schoeps mics.

I'm very fond of the now-discontinued V2, so I jumped at the chance to try out its replacement, the Lunatec V3. For an extra $200, the V3 is essentially a V2 with a high-resolution A/D converter (24 bits with a maximum sampling rate of 192 kHz).

PLUG AND GO

The V3 is simple to operate. Plug in your mic (or mics) and an external battery or AC adapter, and connect the appropriate outputs to your recorder. Turn the unit on using the front-panel switch and, if needed, turn on the 48V phantom power too. Press the Fs Select switch for half a second to cycle through the various sampling rates (44.1, 48, 88.2, 96, 176.4 and 192 kHz). Another switch, labeled ANSR, enables dither, which is recommended if your recorder captures only 16 bits.

Point your mics and check the 8-segment LED meters for level. Turn the 5 dB-per-click detented gain controls to get in the ballpark, then fine-tune using the dual trim controls. Rumble a problem? Each channel has a two-position low-cut switch. Engage as needed and off you go.

DIGITAL DILEMMA

As easy as using the V3 sounds, I had one major hurdle to overcome when approaching this review: how could I test the unit's high resolution in the field when my portable recorders were only good to 16-bit, 48 kHz? Several midpriced (under $3,000) high-res field recorders had been announced, but none were shipping in time for this review.

There were two reasons I couldn't use a laptop. First, my working style in the field requires walk-about mobility. And then there's digital I/O—or lack thereof. USB isn't fast enough for high-res audio, and my white Apple iBook has no slot for a digital I/O PC Card. (I also worried that delicate proprietary connectors would be involved in such an approach.) I ultimately came up with DIY solution, but before I describe that beast, I'll take a closer look at what the V3 has to offer.

UNDER CONTROL

The V3's front panel is cleanly laid out and provides easy access to all controls. I particularly like the stepped gain controls (see **Fig. 1**). If I have to make a sudden and significant level adjustment while recording, the even 5-step increments can easily be offset during post-production editing. For making small adjustments, the V3's trim knobs allow subtle and precise changes, as they provide only 0 to +10 dB change across their full range of travel.

The rear panel of the V3 (see **Fig. 2**) is chockful of connectors: a threaded coaxial-barrel DC power input, two XLR mic inputs, two analog XLR outputs, one S/PDIF RCA out, a BNC word-clock output (no word-clock in) and two XLR-3 AES/EBU digital outputs. However, accessing the crowded rear-panel jack field's connectors with your fingers isn't so easy. In cold conditions, my gloves would definitely have to come off if I needed to reseat S/PDIF or DC power cables.

And what's the reason for *two* AES/EBU outputs? For recording live concerts, the V3's analog, S/PDIF, and two AES digital outputs are all simultaneously active and could conceivably drive four independent recorders at once. But more importantly, the dual AES outputs are used in tandem for the system's highest sampling rates.

Here's the deal: at rates of up to 96 kHz, the single 3-pin XLR digital outputs carry duplicate signals—the left and right channels of the stereo pair. At 176.4 and 192 kHz, the digital audio can be split into two mono signals, with each cable carrying a single channel. This is referred to as "dual-wire" transmission. Most current high-res recorders use this approach for digital I/O. The unit can also operate in single-wire 176.4 and 192 kHz mode. In this mode the AES/EBU outputs transmit stereo data simultaneously. Single-wire and dual-wire modes are selected with an internal jumper. Short cable lengths are recommended for higher rates.

Popping the lid reveals a tidy circuit board stuffed with components. The preamp section is described as "instrumentation grade," and I'd agree that it's a very accurate and clean-sounding device. The A/D section is mounted on a separate circuit board that can easily be removed by service

FIG. 1: The Lunatec V3's front-panel controls include stepped gain knobs that increase or decrease level in 5 dB increments, facilitating post-production level matching.

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FIG. 2: The V3 has dual AES/EBU digital outputs, a S/PDIF output, a BNC word-clock out, and balanced XLR analog I/O.

personnel should a future upgrade become available.

DITHERING HEIGHTS

Grace Design's dither system, called ANSR, uses a filtered low-level analog noise source rather than software-generated noise. (Software-generated noise is said to be less random in nature.) You should engage ANSR if you are feeding a device that only captures 16 bits—there's no separate word-depth setting on the V3. I must confess that I have yet to develop a strong preference for either dither algorithm. Because there's no easy way to evaluate ANSR's individual contribution to the overall system, I'll just say that the end result is excellent.

The V3 has a number of circuit-board jumpers, which control a range of options. Digital I/O can be configured for consumer or professional format, and for the previously mentioned single- and dual-wire AES modes. Internal –20 dB pads can be switched with jumpers when recording +4 dBu line-level sources; consumer line levels can be recorded without pads when the mic preamp is set to minimum gain.

Filter slopes (6 or 12 dB per octave) and two cutoff frequencies (in the range of 50 to 125 Hz) can be preset for each channel individually. The V3's front-panel three-way switches let you select a flat setting or either of two low-cut-filter frequencies for the left and right channels independently. I like to use steep slopes and low cutoff frequencies so that if there is too much wind or handling noise I can engage a sharp rumble filter at as low a frequency as possible, leaving the mid-bass region alone. If that doesn't solve the problem, I can flip the filter to the second setting, raising the cutoff frequency for a more extreme low cut.

WALK ON THE MID SIDE

The V3 has a middle-side (M-S) decoder, which is also enabled by internal jumpers. This is a must for me because my primary mics are a pair of Schoeps—usually CMC-6 bodies with CK-5 capsules—that I use in M-S configuration. (For more on M-S recording see "More Than the Sum" in the June 2003 issue of EM; text available at www.emusician.com.) When the decoder is enabled, the left level control sets the overall level of the mono "mid" signal to both channels, while the right varies the width of the stereo image.

Grace did a custom modification for my V2 preamp a few years ago, bringing the M-S decoder to a front-panel on-off switch. The V3 appears to have space for a similar modification, although it's not a standard "price list" item offered by the company. It is, however, extremely convenient if you do M-S recording.

The unit requires either 6 or 12 VDC from a battery pack or AC adapter (neither of which is included with the V3). For this review, I was provided an Eco-Charge system, including a BP-50 sealed gel-cell battery and a model 66-A smart charger.

The V3's power consumption is not insubstantial, ranging from 600 mA with the phantom power and A/D section turned off to 1 amp with everything on. In practice, a paperback-size gel-cell will run the V3 for four to six hours. A low-battery LED indicator illuminates conservatively early, giving you plenty of time to finish what you're doing before changing battery packs.

BUILD IT AND IT WILL RECORD

How does the V3 sound in real field-recording conditions? To answer that question, I built my own luggable computer for the test. This lunch-box-size, 12V, battery-powered PC is based on a VIA Mini-ITX motherboard and a Mini-Box.com 12V power-supply board. In the system's single PCI slot, I installed an M-Audio Audiophile 2496 card (good up to 24-bit, 96 kHz resolution). The entire system fits in a hefty shoulder bag.

For software, I chose Syntrillium's Cool Edit Pro 2.1 (now Adobe Audition) and its convenient hardware controller, the Red Rover. The Red Rover is a transport box the size of a paperback book, with a text display and enough knobs and buttons to let me run Cool Edit Pro without a computer screen.

After some configuring of Windows 98SE, I was able to turn the computer

Lunatec V3 Specifications

Analog Audio Inputs	(2) balanced XLR
Analog Audio Outputs	(2) balanced XLR
Digital Audio Outputs	(2) AES/EBU, (1) S/PDIF
Phantom Power	48V
Power	external 6 or 12 VDC (not included)
Dimensions	8.3" (W) × 1.7" (H) × 5.5" (D)
Weight	2.6 lb.
A/D CONVERTER	
Dynamic Range	110 dB (44.1–192 kHz, A weighted)
Total Harmonic Distortion + Noise	–101 dB (44.1–192 kHz, –3 dBFS, 22 Hz–20 kHz bandwidth)
Frequency Response	20 Hz–82 kHz (Fs 192 kHz, +0.1/–0.4 dB)
MIC PREAMP	
Total Harmonic Distortion + Noise	0.0011% (@ 20 dB gain +20 dBu out)
Frequency Response	6 Hz–250 kHz (@ 60 dB gain –3 dB)
Maximum Output Level (balanced)	+25 dBu
Maximum Output Level (unbalanced)	+19 dBu
Crosstalk	–109 dB (either channel)

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on and—after a minute or two—automatically have Cool Edit Pro running with the Red Rover ready to record—with no QWERTY keyboard or computer display required. Using this system, I was able to make numerous field recordings that exercised the V3's high-resolution capabilities.

THE GREAT OUTDOORS

I recorded an assortment of natural soundscapes, close-up diesel locomotives, miscellaneous Foley sounds, and a mostly acoustic jazz quartet. Briefly put, the V3 doesn't have a sound. Rather, it simply passes the mic signal as is. My experience with the V3 has been the same as with my V2. It's clean, robust, and transparent. It does what it's designed to do and does it well, and that inspires confidence in the field.

The V3's rendering of the acoustic jazz combo had great depth and transparency. In a comparison with the A/D in my admittedly lower-end Sony TCD-D8 DAT Walkman, the V3 delivered noticeably more high-frequency detail and overall brightness when both A/Ds were operating at 16-bit, 44.1 kHz. The low end it reproduced was solid and uncolored.

In the Sierra Nevada, I recorded a dawn chorus of birds, cows, and a passing freight train at 24-bit, 88.2 kHz. The results were clear and smooth. At one moment, I actually forgot I was wearing headphones.

I laid a pair of Shure SM57s alongside a railroad track to capture the grunt of a slow-moving diesel locomotive. In this case, 24-bit, 88.2 kHz resolution was overkill because the dynamic mics, their placement, and the sound source itself offered little in the upper frequency ranges. However, recordings of a bird singing and of small metallic objects—such as an ⅛-inch drill bit dropped on a concrete floor—produced a rich series of high-frequency harmonics. Using my Schoeps mics, I gathered audio at frequencies as high as 40 kHz when using a sampling rate of 88.2 kHz.

EM WEB CLIPS

I am interested in these ultrasonic

PRODUCT SUMMARY

Grace Design
Lunatec V3
mic preamp and A/D converter
$1,695

FEATURES	4.0
EASE OF USE	4.5
AUDIO QUALITY	5.0
VALUE	4.0

RATING PRODUCTS FROM 1 TO 5

PROS: Superior sound. Excellent build quality. Dependable performance. Stepped gain controls. AES/EBU and S/PDIF digital outputs. Built-in M-S decoder.

CONS: External battery pack required. No digital optical output. Internal jumpers not labeled on unit.

Manufacturer
Grace Design
tel. (303) 443-7454
e-mail info@gracedesign.com
Web www.gracedesign.com

ranges for sound-design purposes. I can't reliably hear a difference between 44.1 and 88.2 kHz recordings when playing the sounds at normal speed. But stretch things down two or four octaves and the high-frequency differences become very apparent. Tiny drill bits become iron bars, then church bells. The "slow-motion" versions of the 88.2 kHz sounds have a lot more natural edge and definition, although there is also an extra octave of ultrasonic noise mixed with the desired signal. My experiments are still preliminary, but I hope to mine many riches from these high-res recordings.

EM WEB CLIPS

THE RESOLUTION

So what's not to like about the V3? It does lack certain convenience features found on some other mic preamps designed for field use, such as a slate mic, a tone generator, a switchable limiter, and a dedicated headphone output. But adding those would complicate the operation of the device; I like its simplicity.

A FireWire output would be a welcome addition, making the V3 suitable for laptop use without a PC Card for digital audio. The A/D is on a removable daughter card, which allows the possibility of a FireWire or other similar upgrade, but the company has made no official announcement to indicate that upgrades are forthcoming.

An optical output would also be convenient for working with consumer-oriented gear. You can get by without one by using a coaxial-to-optical converter, such as the Fostex COP-1, but then you have another little box to deal with.

The V3's metering is excellent for music recording, but the lowest level LED illuminates at only –27 dB below full scale. When recording quiet ambiences, it would be nice to be able to meter across a larger window of the V3's wide dynamic range. Peaks of 0 dBFS are held indefinitely (they are cleared with a button press), but it would be handy to have a peak-hold function that let you choose peak values other than zero as well.

Finally, there are quite a few internal jumpers sprinkled across the circuit boards. While the manual identifies the function of each, printed documents aren't always handy in the field. I'd like a silk-screened legend on the inside of the lid, so when you popped the top the instructions would be staring you in the face.

This is a great piece of gear. It's not cheap, but it's a solid value. Did I mention the five-year transferable warranty? If you don't own great mics, I'd suggest spending money there first. But I'm making space in my field bag for a V3 alongside my V2, because I've bought the review unit. Four-channel field recording, anyone?

Rudy Trubitt *is a field recordist and sound designer in the San Francisco Bay Area. Visit him on the Web at www.trubitt.com.*

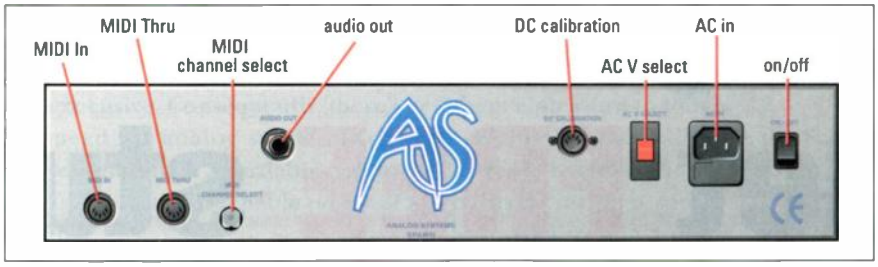

FIG. 2: On the Spawn's rear panel, you'll find its main monophonic output, MIDI jacks, and a slot to set the MIDI channel, but no footswitch inputs.

of those waveforms by filtering the square wave. You can apply waveform modulation (such as pulse-width modulation) without a patch cord using a bidirectional Mod knob; turning it left of center adds modulation from the LFO's triangle wave, and turning it right adds modulation from the envelope generator (EG).

Tuning of the VCO is handled with a single knob and a three-position switch labeled –2/0/W. The –2 and 0 settings are octave selectors, and W means *wide*. When the switch is in the left or center position, the knob has a range of just over an octave in each direction. When W is selected, the knob sweeps the frequency from subaudio to sounds only your dog can hear. You can modulate pitch with the LFO using another bidirectional knob; turning it left gives you triangle-wave modulation (for vibrato), and turning it right yields square-wave modulation.

The Spawn VCO's tuning was stable, and it tracked the keyboard adequately across several octaves. (However, that was not the case with the external VCO in the Integrator rack Analogue Systems sent me; when tuned correctly to a low C, the Integrator was almost a half step sharp when I played the C four octaves up.)

Along the bottom of the VCO module are three input jacks, each with its own knob. One jack is for a 1V-per-octave signal from an analog keyboard; its associated knob controls Glide rate. The second input is for pitch modulation (from the envelope or an external module, for instance), and the third is for waveshape modulation. The Amount knobs for these two jacks are bidirectional.

Spawn Specifications

Sound Engine	analog subtractive synthesis
Synthesis Architecture	VCO, resonant lowpass VCF, VCA, ADSR EG, voltage-controlled LFO, noise generator, modulation VCA
Analog Outputs	(1) ¼" monaural main out; (12) ¼" audio and CV outputs in analog sections; (10) CV outs in MIDI Routing section
Analog Inputs	(15) ¼" audio and CV
Control Voltage Standard	1V per octave
MIDI-to-CV Conversion	gate (single or multiple triggering), trigger, S-trig, key played (×2), Velocity, Aftertouch, mod wheel, breath controller, expression controller
Power	100–120V, 60 Hz or 220–240V, 50 Hz (switchable); IEC connector
Dimensions	2U × 8" (D)
Weight	6 lb.

In the VCO section's center, a row of minijacks provides some important functionality. Applying a rising-edge voltage to the Sync In jack causes the VCO to start a new wave cycle, enabling hard-sync effects if you have a second VCO lying around. Four jacks in the middle provide access to a separate Mod (modulation) VCA, with which you can set up such effects as mod-wheel control over LFO amount. A VCO Out jack permits flexible routing options.

I like the sound of the Spawn's VCO; it is smooth, with lots of presence. All the same, having only one oscillator is a definite limitation, because many of the richer sounds in the analog world are created by detuning two oscillators from one another.

HIGH-CLASS LOWPASS

The VCF is strictly lowpass and always operates with a 24 dB-per-octave slope. It will squeal very satisfactorily at high resonance settings. Its tone was a little cleaner and less beefy than some analog filters I've heard, but I found I could fatten it up in a truly nasty way by cranking up the resonance and then applying the VCO's audio output to the filter's modulation input. It's tough to do that kind of trick with most digital simulations of analog.

The filter has two bidirectional Amount knobs for controlling cutoff with the LFO (triangle or square wave) and EG. The VCF also provides inputs and Amount knobs for a second audio signal and another modulation input. Four additional jacks are located in the middle: three provide outputs for the suboscillator, the noise source, and the VCF itself; the fourth is an unattenuated 1V-per-octave CV input, suitable for having the filter track the keyboard.

At the two o'clock position, the oscillator signal input level knob is labeled O/D, but the overdrive introduced was so subtle that I had trouble hearing it at all. The VCA's input from the filter has

PRODUCT SUMMARY

Analogue Systems
Spawn
analog synthesizer
$995

FEATURES	3.0
EASE OF USE	4.0
QUALITY OF SOUNDS	3.5
VALUE	3.5

RATING PRODUCTS FROM 1 TO 5

PROS: Real analog sound. Very patchable, but useful default routings require no patching. Makes a good MIDI interface/expander for any analog synth system, yet fully functional as a standalone unit.

CONS: No memory. Only one oscillator and one envelope generator. MIDI channel selector is on rear panel.

Manufacturer
Analogue Systems/Sweet Noise (distributor)
tel. (818) 980-6983
e-mail info@sweetnoise.com
Web www.analoguesystems.co.uk or www.sweetnoise.com

the same feature—but again, after compensating for the added gain introduced by cranking the knob all the way to 10, I wasn't entirely sure I heard any overdrive.

MODULATION GENERATION

Experienced analog programmers might be concerned that the Spawn has only one ADSR generator, which has to do double duty controlling both filter cutoff and the VCA. How can it produce filter sweeps if the note always fades out at the bottom of the sweep? Not to worry—the VCA's Envelope knob lets you choose either linear or logarithmic control. By turning it in the linear direction, you get a good full-bodied sustain, even as the filter responds with a sweep during the decay. Of course, having only one envelope still presents some limitations. For example, you can't specify a gentle VCA attack coupled with a quick filter attack.

The EG has a three-position switch for choosing Gated Repeat, Auto Repeat, or normal ADSR mode. The repeat modes are useful for creating tremolo effects, though you can obtain similar results by patching an LFO output into the EG's Trig (trigger) input jack.

The Spawn's LFO is modest and unassuming. It has simultaneous outputs for square wave, triangle wave, and positive- and negative-going sawtooth waves. You can set its Rate knob from about 0.2 Hz up to 25 Hz or so. You can also control the LFO's rate with a CV input, which is calibrated in a linear way rather than as 1V per octave. Considering the rather spartan module lineup of the Spawn, I wish the

THE FRENCH CONNECTION

The Spawn's MIDI features are robust enough that you may never need a real analog keyboard, but Analogue Systems' French Connection keyboard ($1,995) is still worth a look (see Fig. A). In addition to the spring-loaded joystick (very nice) and lack of Velocity response (not so nice), it has one feature you won't find on any MIDI keyboard: mounted on a strip at the front of the keys is a finger-size brass ring that you can freely move from left to right across the keyboard's almost four-octave range, thanks to a long piece of black string and an ingenious system of hidden wheels. By throwing a couple of switches at the keyboard's left side, you can play monophonic lines using this ring (and a left-hand thumb button for sending gates) instead of the keyboard. History buffs might recall that this type of finger-operated pitch controller was introduced in 1928 on an electronic instrument from France called the Ondes Martenot (hence *French* in the name).

FIG. A: The French Connection, also from Analogue Systems, is an analog keyboard controller that borrows performance features from the Ondes Martenot.

Nailing the precise pitches in an equal-tempered scale by moving the ring takes practice, but the French Connection makes pitch control a little easier by providing a row of raised and lowered bumps on a strip beneath the ring. The bumps line up with the keys, giving you tactile as well as visual feedback. There's always some portamento (glide) between notes, but you can control the glide rate in expressive ways. Wiggling your finger gently back and forth produces vibrato directly, at a rate and depth that you can control intuitively to shape your phrases. In the MIDI world, only the Clavia Nord Lead gives you such direct tactile control over vibrato.

LFO could do double duty as a second audio oscillator, but given the limited range and the linear CV input, that's not an option.

MIND OVER MIDI

The awkwardness of the channel selection process notwithstanding, the Spawn's MIDI features will give it a strong appeal. Front-panel jacks offer MIDI-to-CV outputs for the keyboard's control signal (two jacks, in case you want both the filter and the oscillator to track the keyboard), gate, Velocity, Aftertouch, the mod wheel or lever (CC1), breath controller (CC2), and expression controller (CC11). Two trigger outputs are also available—one providing a rising edge and the other a falling edge (that's an S-trig, for you analog maniacs). You can choose single or multiple triggering, but the keyboard response is always low-note priority.

With a switch labeled Internal/Isolated, you can detach the MIDI signals from the internal synth. That function is extremely useful, as it lets you use the Spawn as a MIDI interface for the analog modules of your choice while keeping the MIDI data away from the Spawn's internal operations.

In addition to the obvious internal routings (such as MIDI keyboard to pitch), the Spawn lets you route mod-wheel data to the oscillator's Mod VCA. Two patch cords are still required to patch the desired modulation source to that input and the VCA output to the oscillator's pitch-mod input (or wherever). Once you've set this up, though, your MIDI keyboard's mod wheel will add vibrato.

The Spawn lacks a separate output for MIDI Pitch Bend data; instead, the keyboard control voltage tracks pitch bends, and bend depth is always plus or minus 1 octave. Such a setup is handy in the sense that it doesn't require you to use up the oscillator's pitch-mod input for bends, but the absence of control over the bend depth is rather troublesome. Given that you can't adjust bend depth, I would have preferred an interval of plus or minus a whole step, which is better for playing leads.

SPAWN TO KING 4

The Spawn's patchability makes it a great expander for any analog synth system, especially one that uses mini-jacks. Its MIDI features make it a good choice as a standalone bass or lead synth. The single-oscillator sound isn't as meaty as I'd like, but routing the output through an outboard chorus or delay line will thicken it up. The Integrator Comb Filter module will also do the job, and with attitude to spare.

Although analog purists certainly won't mind, busy studio players might be bothered by the fact that the Spawn has no memory for storing patches, and that the knobs don't transmit or respond to MIDI data. But then, a violin doesn't have those features either. Like a violin, the Spawn is a real musical instrument. Some effort is required to play it well, but the effort will pay off with a variety of expressive tone colors. ●

DEVINE MACHINE

DEVINE MACHINE 1.0 (WIN)

Loop workstation software for Windows.

By Peter Freeman

Devine Machine Software's Devine Machine is a loop-manipulation tool that gives users unprecedented control over multiple loops in real time. Because it doesn't fit neatly into any existing category, I can't refer to it as a sequencer or a simple beat-munger. Its developers call it a "loop workstation," which seems an appropriate designation.

Devine Machine, which functions as both a standalone application and a VST instrument, does two main things. First, it allows you to play and manipulate up to eight mono or stereo, 16- or 32-bit drum/rhythm loops (WAV format only) in real time by letting you determine the order of the loop slices on the fly. The individual transient "hits" of the loops are detected automatically when loaded, but you can easily fine-tune the slice points at the sample level. Each of the loops can have its own independent pitch, distortion, filter, level, pan, and delay setting; changes to these settings update nearly instantaneously.

Next, Devine Machine's Live Loops mode lets you trigger loops that are assigned to MIDI notes while up to eight synchronized loops run in the background. However, this is not simply dumb sample triggering (though that is possible). You can choose to trigger loops live and have them always start in the same position in the bar as the currently playing loops, so that whatever loops you trigger are always "musically relevant" to what's going on.

GET SET

As of this writing, Devine Machine is available only as a Web download, though that may change by the time you read this. The program requires at least a Pentium II/500 MHz processor, but a Pentium 4/2 GHz is recommended. The download includes two separate versions of the program, one to support ASIO, the other, MME.

Minimum System Requirements

Devine Machine 1.0

Pentium II (or AMD equivalent)/500 MHz; 256 MB RAM; Windows 98/2000/XP

I tested Devine Machine on a Sony Vaio Pentium 4/2 GHz PC with 1 GB of RAM and plenty of disk space. I used the ASIO version of the program with my Steinberg Nuendo (actually an RME Hammerfall) Digi 9652 card running under Emagic's Logic 5, Steinberg's Cubase SX, and Image-Line Software's Fruityloops Pro 3.56.

IN LIVING COLOR

Devine Machine's brightly colored main interface is a single fixed-size window that provides access to a variety of different work areas. When the program first loads, you'll find basic controls for loop selection, start/stop, and relative volume for each of up to eight loops. Although the waveform displays of up to four of the currently loaded loops that appear around the top perimeter of the window represent a rather novel design concept, they are not particularly crucial to the program's operation (see **Fig. 1**).

In the standalone version of the program, the top of the program window offers standard menus: File, Edit, Track, Pattern, Song, Options, and Help. In the VSTi version, these are hidden, but you can call them up by right-clicking anywhere in the lower half of the window.

At the center of the main window are two buttons labeled Pattern and Song. These are Devine Machine's two main modes, though the terms don't have the meaning you might assume. Song mode, which loads by default, lets you control which loops (and variations thereof) play in real time. Pressing the Tab key (or clicking on the Pattern button) "flips down" the editing screen and brings you into Pattern mode, where detailed loop manipulation takes place. Devine Machine continues to play as you move among its various editing screens.

FIG. 1: Devine Machine's main window displays waveform views of up to four of the currently loaded loops and toggles between Pattern and Song modes. Additional controls, including Start and Stop buttons, appear along the bottom of the window.

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In Song mode, you have access to six work areas: Levels, Sample, Record, Live Loop, Options, and Bank Manager. Levels gives access to an animated level meter for each of the eight tracks: click and drag on a track's indicator to adjust its level. The Sample display is for adjusting the currently selected sample's loop point (only the end of the loop is adjustable).

The Record button brings up a sampling display where you can record mono or stereo 32-bit WAV files directly into Devine Machine. I rarely had occasion to use this, as I was working with samples from my existing library, but it's a handy inclusion. The Options screen gives access to a variety of setup parameters, such as the Live Loop MIDI channel and the Remixer/Panner, and the Bank Manager is used for the function its name implies. (I'll cover Live Loops later.)

LET IT FLOW

Pattern mode offers six more work areas, some of which have their own subwindows. The most important of these areas is the Incarn window, which has three working modes of its own: Flows, Drums, and Synth. Flows, which appears by default when you enter Pattern mode, is for rearranging and manipulating the individual segments of a loop either by drawing freehand or by drawing on a quantized grid (from quarter notes to 64th notes, depending on the current Snap quantization value). You can reverse or repeat individual segments and easily make scratching or scrubbing effects.

Like the other windows, Flows displays time from left to right (*x*-axis) and the position in the current loop from bottom to top (*y*-axis; see **Fig. 2**). A diagonal line from the lower left to the upper right of the window (which is drawn automatically) will play the loop's segments in their original order. By clicking anywhere on the screen, you can make the segment that is found at the vertical position you clicked sound at any point in time. Basic editing is as simple as that: drawing on the screen enables you to create just about any imaginable variation of a loop.

However, your options extend much further than that. Devine Machine also allows you to independently alter pitch, lowpass- or highpass-filter cutoff and resonance, distortion, delay (with regeneration), and volume, for each preset, using the same method. I'll describe some of those features in a moment.

ON DRUMS

Drums mode is Incarn's second main editing mode. Here, loop slices are represented as colored blocks on a grid much like the piano-roll editor in a sequencer (the color and length of each block is determined in the Region Editor screen, described later). By moving blocks around, you can change the actual drum sound that plays at each point in the loop.

Working in Drums mode is easy. As in Flows mode, the slices in your loop appear arranged diagonally across the screen when you first access Drum mode. One way to begin is by clicking in any of the grid squares to "paint in" new blocks. This allows you to create an entirely new pattern from the slices of the current loop.

Another option is to start in the Region Editor, then return to the Drums screen and fine-tune or edit the results. The Region Editor is home to the program's Drum Coloring feature, a very cool capability that I haven't seen elsewhere. On the Region Editor page, directly below the horizontal Region Editor itself, there is a grid of six rows spanning the length of the loop. These are labeled Main, BD, Sn, HH, Perc, and MSC (see **Fig. 3**). By clicking in the appropriate grid square under the slice you want to label, you can "tell" Devine Machine which instrument (bass drum, snare, hi-hat) is actually sounding during each slice of the loop. (The developer reports that an upcoming version of Devine Machine will be able to detect the drum sound automatically.)

What's the point? Basically, once Devine Machine knows the specific instrument sounds you're using in a loop, it can use that same set of instruments to "play" other loop patterns (you have to do the coloring on both loops). In other words, you can "re-orchestrate" your loops by having the instruments of one play the pattern of another.

Drum Coloring is tremendously useful and time saving. It makes it quite easy to make multiple loops play the same actual pattern without the usual process of manually slicing (or Recycling) loops and then importing MIDI files into a sequencer and editing the sequences to match.

The Region Editor screen also lets you fine-tune the individual transient slices of a loop so the program knows precisely where each beat is located in the sample. This feature, which is functionally similar to Steinberg's Recycle, is extremely fast—just click on the small box under each slice, and the display takes you to the approximate start of that slice in the waveform display. A yellow vertical line marking the precise start point appears, and if you drag the yellow line left or right to the desired point and release the mouse, the display automatically jumps to the beginning of the next slice. (Auto-jump can be disabled if desired.) Conveniently, loop-slice information (region, location, and color) is stored within a unique database file, so the program remembers this information even if you move the original file to another drive or rename it.

FIG. 2: The Flows screen, found in Pattern mode, displays individual loop segments arranged on a two-dimensional grid. You can rearrange segments by drawing directly on the grid.

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chromatic tuner	yes	yes	yes	yes	yes
drum machine	yes	yes	yes	yes	yes
expression pedal	yes	yes	yes	optional	optional
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When you're done in the Region Editor, press Ctrl+D, and you're returned to the Drums mode screen. Devine Machine automatically creates the colored blocks on the grid that will play the slices of the current loop in their original order. The block colors correspond to the ones you chose (representing the kick, snare, and so on) in the Region Editor. This is highly convenient as a starting point, and I quickly made it part of my normal Devine Machine work flow.

IN EFFECT

After working with the Flows and Drums mode screens and getting your loop reordered the way you want it, Devine Machine's effects are a good place to go. The windows for manipulating Distortion, Filtering, Delay, Panning, Pitch, and Level are all similar to the Incarn graph, but with one main difference: because you're changing effects parameters over time, lines drawn higher in the window represent higher parameter values, and lower ones represent lower values. It's very intuitive once you get used to the general process of working with the graph interface.

Devine Machine's effects themselves are not parameter-heavy and seem intended primarily for broad strokes rather than fine detail. This is not a criticism so much as an observation. In practice, the effects are quite serviceable and, used with one another and with the loop-reordering process, can be very effective.

Other nifty and unusual MIDI-controlled real-time effects are mapped to the MIDI key range an octave below the Live Loop keys. These features, which affect the program's eight core loops, include momentary repeat keys for "stuttering" effects and a mod-wheel-controlled lowpass filter and ring modulator.

The repeat keys grab a piece of whatever patterns are currently playing and repeat it as long as they are held down. The length of the piece is determined by which key you're holding. When you release the key, the program resumes playback immediately from the place in the bar that it has advanced to while you held the key down (the clock runs in the background even during the repeating process). So in effect, you never stop playback no matter how many momentary repeats you create.

The Low Pass Filter effect (activated by holding down the B1 key) maps the mod wheel to cutoff frequency, and though resonance is fixed, the filter can still be useful (it happens to sound quite good). The Ring Mod (accessed using MIDI key A1) is similarly limited—the only control is mod-wheel mapped to modulator frequency—but useful nonetheless.

Finally, there's the rather confusingly named Realtime Remixer/Panner effect, which uses the mod wheel to control panning and to grab a random slice of whatever's currently playing (it's different every time). This effect uses the grabbed data to create momentary unpredictable rhythmic effects. The Realtime Remixer/Panner effect is more of a happy-accident generator than anything else—you never know exactly what you're going to get, but it's often something interesting.

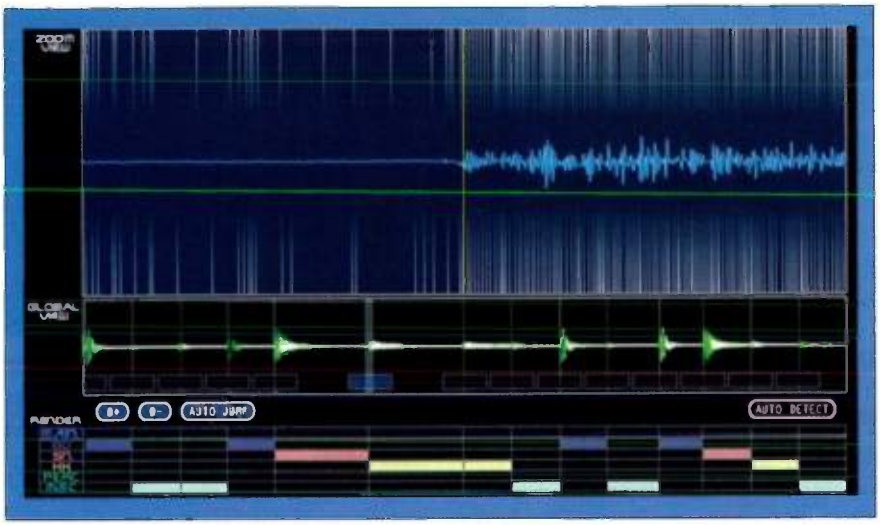

FIG. 3: Devine Machine's Region Editor is where you specify what instrument (such as snare or bass drum) is playing in each segment of a loop (bottom). You can also manipulate slice points manually on the waveform display (top).

LIVE LOOPS

Devine Machine's eight simultaneous loops and their associated editing capabilities are only half of the story. The other main feature is the Live Loop screen, which lets you assign up to 24 additional loops to a two-octave MIDI key range for use as a live-performance tool (see **Fig. 4**). These loops can be triggered at any time and, if the Devine Machine transport is running, will always trigger in sync with the current bar position. (You can override that feature if you want them to trigger freely as they would in a conventional sampler.)

For each Live Loop key, you have control over the quantization of the trigger sync (that is, whether it will align the triggered loop to the nearest playing quarter, eighth, or 16th note, or not at all) and whether or not the loop will be added to the mix or replace all other sound momentarily. There are also individual Level and Pan controls for each loop. In addition, a handy two-stage (AR) envelope is available for each Live Loop key, so you can determine whether a triggered loop will start and end instantly or fade in or out.

ON DECK

The program allows you to group two sets (called Decks) of four simultaneous

Quick Picks

BLUE MICROPHONES

The Ball

By Karen Stackpole

Blue Microphones' first dynamic mic, the Ball ($279), takes a novel approach: it adds a phantom-powered Class-A amplifier to the output stage. The discrete output amplifier maintains a consistent 50Ω load, which, Blue says, results in a more consistent and accurate frequency response than typical dynamic mics provide. The balanced impedance also helps maintain sound quality over long cable runs.

Not a Softball

The Ball was created for use on loud sound sources—guitar and bass amps, drums, and percussion—onstage and in the studio. I used it in both types of setting and on a wider variety of sources (drum set, percussion, acoustic and electric guitar, upright and electric bass, cello, flute, tuba, and vocals) through several makes of preamp (including a Focusrite Green One preamp, a Mackie VLZ mixer, and a Studer D950 console).

The Ball can handle SPLs of 162 dB; the cardioid polar pattern's off-axis rejection is intended to maximize separation in live situations. The mic's frequency range is 35 Hz to 16 kHz, and it has a presence boost at the top end, which is unusual in a dynamic mic: the boost peaks at +5 dB between 7 kHz and 8 kHz and drops off sharply around 11 kHz.

The Ball's shape isn't the only thing that makes it unique; Blue added active electronics to the mic to improve its frequency response.

The mic's low-end response, while not terribly beefy, is tight and defined. The frequency curve shows a rise at 125 Hz, a slight dip between 250 Hz and 500 Hz, and a downward slope below 100 Hz. Blue says the low-end response was designed to bring out the tonal subtleties of certain kinds of sources, such as the small-size kick drums used in jazz and hip-hop settings.

A nonresonant ABS plastic shell with radial ports carved into the address side houses the mic's electronics. The LED above the logo indicates the presence of phantom power. The XLR jack is on the rear of the mic, and the swivelmount stand adapter, at the bottom of the mic, gives you a 45-degree range of motion up and down.

Bass Ball

The Ball provided plenty of punch and sounded great on toms and snare. It captured the tonality of the drums along with the defined attack from the sticks. It also sounded fantastic on hand drums, where the presence peak accentuated the crisp sound of fingertips on the skins while presenting plenty of body from the drums. However, for my tastes, it didn't have quite enough juice in the low end for tracking kick drum.

The Ball excelled at miking electric bass and clean electric guitar. In fact, the Ball gave a true representation of how the bass amp really sounded in the room. In this application, the Ball had better definition in the low end than my EV RE20 and a crisper top end than my Sennheiser MD 421. The mic's top-end brightness proved a bit much for distorted guitar sounds.

Unfortunately, the performance of the mics I received was sometimes marred by the presence of radio frequency interference (RFI) while tracking acoustic instruments. (It didn't happen in my studio, but in places where RFI is inherent.) At times, when I increased the preamp's gain to get a decent signal to tape, the track became haunted by the ghost of an oldies station. Although the Ball sounded rich and defined on upright bass and cello, I couldn't get the Beatles and Aretha Franklin out of the signal path. At one point, while recording a tuba during a concert, I abandoned the Ball for a dynamic mic with better RF protection.

Ball Bearings

The Ball was easy to use and place with several exceptions. Due to the mic's bulbous shape and the swivelmount's placement and limited range of motion, I had difficulty positioning the Ball on bass drum, toms, and snare drum. The Ball's profile made it difficult to place the mic between a rack tom and hihat to get at the snare drum, for example.

A full-range ball-socket mount, positioned at the rear of the mic, would make the going a bit easier. As it is, positioning the mic inside a kick drum requires either a gooseneck or taping the mic to a short stand.

Play Ball

Positioning quibbles and RFI issues notwithstanding, the Blue Ball would make an excellent addition to any mic collection. It sounds fantastic on percussion, electric bass, and electric guitar. And in its price range, the Ball is a real bargain.

Overall EM Rating (1 through 5): 3.5

Blue Microphones; tel. (805) 370-1599; e-mail blue@bluemic.com; Web www.bluemic.com

ROLAND

VK-8M

By Nick Peck

The VK-8M ($995) is a 3.75-pound tabletop organ module that's part of Roland's VK ("Virtual Tone Wheel") line of Hammond-organ simulators. At about 9 inches wide and 11 inches deep, this desktop unit won't take up a lot of your studio real estate, and it gives you real-time performance control that's difficult to equal with a software organ plug-in.

The VK-8M's intelligent layout puts all the important knobs and buttons where you can easily grab them. The controls are big and easy to see, and there are plenty of useful LED status indicators. The casing is metallic gray with wood side panels.

Wheels and Bars

The most important controls on any tonewheel organ are the drawbars. The VK-8M has one set of nine drawbars (not four sets

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This example uses the Control Sequencer's output for pitch and the Gate Sequencer's output for gates, applying a fixed Velocity to each note. You could use another Control Sequencer for Velocity, if you like. In more complex setups, the Control Sequencer can generate MIDI continuous controller messages for automation.

Paint by Numbers

Numerology supplies a variety of other modules for specific purposes. The Four Track module combines four 16-step control sequencers that you can use simultaneously for polyphonic sequencing, or you can string them together to make two 32-step sequences or one 64-step sequence. Its matching Multiple Note Output module routes the four sequences to separate MIDI outputs. The Drum Seq module holds two sequences, each with a maximum length of 32 steps. Each sequence plays a single pitch (meaning a single drum sound), and the module generates a Velocity value and a gate at each step. Drum Seq has its own output routing, so no other module is required.

In addition to sequencing notes, Numerology provides modules that transmit MIDI CC, Pitch Bend, and Program Change messages. Two specialty modules, Signal Processing and Mixer/Scope, allow you to combine and numerically modify the outputs of other modules and monitor the results. The Dual LFO module generates control signals in sine, square, sawtooth, or triangle waveform patterns, either free-running or synchronized to tempo. You can route the Dual LFO's output to any other module's input or to any AU plug-in using the Parameter Modulation module. A Fader Box module has 16 sliders you can assign to individual MIDI CC messages.

You connect modules using drop-down menus, and you can connect just about any output to any input. That might sound a little dangerous, but it's very nice to be able to assign pitch values to control Velocity, for example, perhaps after some processing with a Signal Processing module.

Numerology also lets you build step sequencers that run simultaneously. Each sequencer, called a Group, has its own rack and its own presets containing all the settings for the modules in the Group. In addition to the Modules view, in which you create Groups and their presets, a Mixer view offers a channel strip representing each Group and a Tracks view with a timeline track for each Group. The Mixer strips allow you to select presets, mute and solo any Group, and send MIDI Volume messages to the Group's outputs. The Track view is a kind of metasequencer for Group preset changes, and it even allows you to loop subsequences of preset changes. You can go a bit loopy keeping track of everything, but you're unlikely to run out of options. The online file NumeroUno.mp3 is an example of a multitrack Numerology sequence.

On the Level

Without a doubt, Numerology takes step sequencing to a new level. It is complex, but once you've built a couple of different step-sequencer Groups and used the Track and Mixer views a few times, it will become almost second nature. The ability to save your step-sequencer configurations and multiple presets means you don't have to reinvent the wheel each time you want to generate a new sequence. Try the demo and listen to some of the MP3 examples on Five12's Web site. If step sequencing is your bag, you'll probably like what you hear.

Overall EM Rating (1 through 5): 4.5

Five12; tel. (505) 341-2660; e-mail info@five12.com; Web www.five12.com

M-AUDIO

Ozone

By David Battino

With the Ozone ($399.95), M-Audio has added an audio interface to its popular Oxygen 8 MIDI controller, delivering both audio and MIDI I/O with a single USB connection. That makes the Ozone the first keyboard controller of its kind.

View from the Top

The Ozone offers the same unweighted, 25-key, Velocity-sensitive keyboard and handy MIDI features as the Oxygen 8, including dual MIDI Outs (one for the computer and one for the keyboard), an assignable slider, and eight great-feeling knobs. The slider can send Aftertouch, although the keyboard can't. You can program any knob to transmit any Control Change on any MIDI channel and store 40 knob assignments, which ought to be more than enough for most users. I found programming the controllers to be awkward; you have to switch the keyboard into Data mode then play a series of keys with misaligned labels. However, the bright display shows each value as you enter it as well as the current value of the controllers in Performance mode.

The remaining five knobs control audio functions: mic and line monitor level, mic and line gain, and headphone level. I wish the audio knobs were farther from the MIDI knobs, because I constantly grabbed the wrong one. A knob for the main output level would have been useful, too.

Two LEDs show signal strength. A Monitor/Record button mixes the aux input and the computer's output to the Ozone's outputs or routes the aux input to the computer for recording. Because the inputs are connected to the outputs in hardware, there's no monitoring latency. As with other USB audio interfaces, when both inputs and outputs are enabled, the Ozone's sampling rate is capped at 48 kHz (to accommodate USB's bandwidth limitation). Disabling either the inputs or the outputs lets you raise the rate to 96 kHz. ASIO and DX drivers are included.

Behind the Scenes

On the Ozone's back panel are jacks for power, USB, MIDI Out, sustain pedal, headphones, left and right audio output, stereo aux input, mono line input (all unbalanced), and XLR mic input. The jacks are labeled in nearly unreadable silver on

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silver, which I'd like to see changed. Thanks to its preamp, the line input can accept a guitar or high-impedance mic signal. You even get switchable phantom power, an unexpected feature for a low-cost unit. The phantom-power switch is tiny, but I doubt most users need to switch phantom on and off repeatedly during a session.

Unlike the Oxygen 8, which can run on batteries or USB power, the Ozone must be powered by a wall-wart adapter. According to M-Audio, using an AC adapter allowed the company to incorporate higher-quality audio converters than would otherwise be possible, so the company sacrificed portability in return for superior sound quality. It would be great if M-Audio found a way to offer a battery-powered version with good sonic quality for users who want true portability.

Holes in the Ozone

Using the Ozone, I got great sound on a G4 PowerBook under both OS 9 and OS X. Audio programs occasionally had trouble finding the Ozone under the older operating system, but I have experienced that with other interfaces, too. The sonic improvement on a Pentium III laptop running Windows 2000 was dramatic. Normally, that PC sounds pinched and hissy, and it clicks when I move the cursor, but with the Ozone, the music was clear and full, and the headphone output provided plenty of volume. However, whenever I set the latency value to Very Low and played audio, the computer blue-screened. (I had no crashes with higher latency settings.)

A friend and I also used the Ozone on a 1.5 GHz Athlon laptop running Windows XP. After disabling the computer's power-management software (which was causing some crackling), we successfully recorded several backing tracks in Sonic Foundry Vegas. During a subsequent series of seminars on computer-music production, however, Windows repeatedly refused to recognize the Ozone and cut off the sound. According to several USB audio experts I consulted, Windows XP—incredibly—often fails to recognize USB devices when they're connected to a different port than the one on which they were installed. An M-Audio tech recommends installing the software for *each port*. This is clearly an ongoing issue with Windows XP and not M-Audio's fault, but I wish M-Audio had mentioned it in the manual.

Back in my studio, I noticed an intermittent hiss in the Ozone's left output. The first unit I received didn't work at all, so both Ozones I received from the company were defective, which was frustrating.

Out of Thin Air

The Ozone blazes a new trail in the perilous frontier of USB audio. Duplicating all of the Ozone's features with separate devices would be awkward and expensive, and it includes nice touches such as auxiliary inputs and phantom power. But clearly, M-Audio needs to improve its reliability and documentation. I'd also like to see some of the ergonomic problems

(especially the hard-to-read labels and poorly spaced knobs) addressed. These are significant drawbacks that mar an otherwise promising product.

That said, the price is excellent, and the audio quality is impressive. Although its portability is limited by its dependence on AC power, the Ozone is nevertheless an efficient space-saver. The Ozone certainly isn't a home run for M-Audio, but if it makes the aforementioned improvements, it could have a solid hit.

Overall EM Rating (1 through 5): 2

M-Audio; tel. (800) 969-6434 or (626) 445-2842; e-mail info@m-audio.com; Web www.m-audio.com

GRM

GRM Tools ST (Mac/Win)

By Peter Freeman

France's INA-GRM has been producing innovative sound-processing software for a number of years. Starting in the 1990s with their original GRM Tools standalone application and continuing to more recent TDM plug-ins, they've earned a reputation for creating powerful and imaginative products. The new GRM Tools ST (VST $399, RTAS/HTDM/AS/VST bundle, $549) is the latest installment in the evolution of their sound-shaping offerings.

There are four plug-ins in the ST (Spectral Transform) package: Contrast, Freq Warp, Shift, and Equalize. All are frequency-domain processors that provide powerful ways to manipulate audio in real time. Under Mac OS 9, GRM Tools ST runs only as an RTAS plug-in; under OS X, there's support for RTAS, HTDM, and AudioSuite. VST support is available under OS X and in Windows XP.

First Partial

The Contrast plug-in works by dividing a signal into three separate frequency ranges according to amplitude: weak, medium, and strong. Each group can be adjusted over a huge volume range using sliders for radical effects like turning a sound "inside out" (details that were weak become strong and vice versa) or for subtle but unusual adjustments to make something sound "not quite normal" but still familiar.

Equalize is a one-third octave, 31-band graphic EQ. It offers –96 dB to +12 dB of cut/boost for each band, as well as some useful tools to manipulate groups of bands for interesting results. One such tool is the Elastic String, which lets you create smooth EQ curves using multiple bands with a single gesture. Another is the now familiar SuperSlider, a feature common to all GRM plug-ins. It lets you quickly interpolate between presets with a single slider, either manually (by dragging) or over a user-specified time interval.

FreqWarp is a conceptually simple but novel plug-in that lets you remap the frequency content of a signal using a transfer function (basically an *x*-*y* graph where the *x*-axis is the original frequency and the *y*-axis is the output frequency). In practice, you use breakpoints to manipulate the "transfer line," which controls what

Quick Picks

GRM Tools ST is a unique set of four plug-ins that process a sound's spectrum in unusual ways. The Contrast plug-in splits a sound into three frequency bands, each of which can be altered independently.

incoming frequencies will be transposed to what outgoing frequencies. For example, you could create a line that would send all frequency information at 4 kHz up to 8 kHz and anything at 100 Hz up to 300 Hz, and so forth. This amounts to spectral rearrangement of sounds in near-real time, with a reasonably simple and elegant interface.

Finally, Shift allows you to use frequency scaling and/or frequency shifting to transpose or transform a sound. Using its 2-D controller (a variant of an *x-y* controller), you can transpose a sound by dragging up and down and transform by dragging left and right. Even though these two basic functions aren't new in themselves, the pairing of them on a single controller does allow for some fresh and interesting possibilities.

In Use

As with any shiny new processing toy, I felt the urge to try the ST plug-ins on a whole bunch of different sound sources, from individual drum tracks to guitars to vocals. The overall verdict: rad! What I really liked about these plug-ins was the fact that they are frequency-domain based, not time-domain based, so it's possible to retain clarity even if there's radical deconstruction and reconstruction going on.

Also, very subtle to very extreme effects are possible, and the results vary widely depending on what's being processed. This takes things beyond the realm of "here's a nice flavor that I'll quickly get sick of and not want to use any more" into the "I wonder what they'll do to *this* type of sound?" arena. This is most welcome indeed.

I really liked these plug-ins. GRM always has a knack for making very musical-sounding tools that have their own specific sonic "footprint" or character, and these are no exception. The plug-ins employ some intensive calculations, so the latency factor is substantial (but nothing that can't be cured with a little track-shifting after the fact). I haven't heard this range of sounds from other plug-ins, largely because the GRM Tools aren't simply "me-too" versions of well-established effects. Rather, they attempt to open up some fresh possibilities, and I think they've thoroughly succeeded. I recommend them highly.

Overall EM Rating (1 through 5): 4.5
GRM/Electronic Music Foundation (distributor); tel. (888) 749-9998 or (518) 434-4110; e-mail grmtools@emf.org; Web www.grmtools.org

BIG FISH AUDIO

Brush Artistry

By Marty Cutler

Brush-kit samples have been included in sound sets for quite some time, but they are considerably more difficult to program than standard drum kits. The variety of articulations you can achieve with brushes on a snare can be bewildering, especially for nondrummers.

To address this problem, Big Fish Audio has released *Brush Artistry* ($99.95), a two-disc set of audio tracks and 16-bit, 44.1 kHz Acidized WAV files. The collection features the work of Pat Campbell, who has worked with Willie Nelson, Tom Waits, Oranj Symphonette, and the Tin Hat Trio.

Brush Artistry's eclectic mix targets swing, bossa nova, country, and backbeat-oriented pop. Campbell provides a useful variety of individual hits: an assortment of brushed-snare articulations such as taps, drops, and swishes; snare hits sampled at three dynamic levels; sticked and brushed toms and cymbals; and kicks. However, the collection's main focus is on grooves, and most of the groove activity is on the snare drum. Campbell replicates his performances at a variety of tempos, but you can also use the Acidized WAV files to

fine-tune tempos with a minimum of time-based artifacts.

You'll Swing for This

Brush Artistry is weighted in favor of swing styles, and Campbell swings hard. Each folder at a given tempo contains a single Groove file, with two-beat and four-beat variations that often have the same snare pattern. Consequently, there is little in the way of variation.

In the swing folders, the orchestration is restricted to kick, snare, and an occasional hi-hat; I would have appreciated more varied cymbal work within the grooves themselves, but the Fill sections—which usually include an intro, a mid-song fill, and an ending—provide additional cymbal and snare color. The swing files are rather conservative and seem more suited for pop, folk, and rockabilly applications than jazz. For example, the collection could really use some contemporary bebop stylings, where the kick plays something other than downbeats and the snare provides off-beat hits and accents. But most of the variety in this collection comes from fills, and the single viable fill in each folder isn't enough to create a convincing bebop rhythm bed.

The Jazz Waltz files offer a bit more variety in the snare patterns, but the kicks rarely hit on anything but one, two, or three. To alleviate the repetitiousness of the kick patterns, you can use the snare-only loops in conjunction with the individual hits or another set of drum samples. That's a nice feature, but with only one snare loop per group, you have few options. The addition of a few snare-only fills would be nice.

The Ballad files have a nice laid-back, lazy feel. However, the eighth notes are too even to be called swing, which is how their folders describe them.

Brush Around the World

The four Bossa Nova folders fare much better, with delicate brush strokes, crisp sidestick work, and foot-closed hi-hats. The side sticks have a rather long reverb tail, whereas the rest of the kit possesses minimal room ambience; given the difficulty of processing individual instruments in a stereo file, the reverb is a nice touch.

The snare-only tracks in many of the Country folders could be useful for enhancing guitar and mandolin rhythm parts. The 140 and 160 bpm files in the Country 4 folder, for example, would be great for uptempo bluegrass and country-rock tracks.

The 6/8 offerings have a nice swing to them, including one that resembles the groove of Steely Dan's "Babylon Sisters." Unfortunately, the 6/8 performances provide only a single full-kit loop and one snare-only loop for each tempo. The same is true for the bulk of the Backbeat folder and all of the Groove files. A fill or two for each of these would be a welcome addition.

Different Strokes

My main gripe with *Brush Artistry* is that it spreads itself too thin. By attempting to shoehorn so many styles into a single CD, it gives short shrift to most of them. Multiple CDs holding more variations per style or a single stylistically focused CD would have helped mitigate this collection's tendency toward repetition.

Still, given the scads of "slamming," highly processed drum-loop sample CDs, *Brush Artistry* is a welcome relief. Campbell maintains a strong pocket throughout, offering subtlety and drama as needed. As befits Campbell's skills, the recording is high quality and captures the nuances of his brushwork in great detail. I hope Big Fish Audio is encouraged to release more specialized and focused projects in this vein. ●

On Big Fish Audio's *Brush Artistry*, Pat Campbell provides a wealth of tasty brush work, offering swing, Latin, and country feels.

Overall EM Rating (1 through 5): 3

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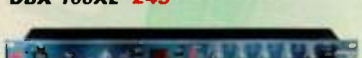

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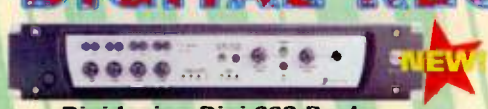

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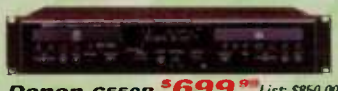
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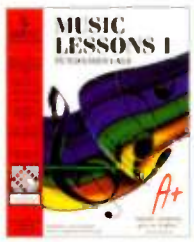

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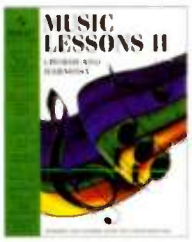

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Run DP4, MachFive and a world of third-party plug-ins on the fastest personal computer ever

MOTU
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Power Mac G5

The world's fastest personal computer

Your all-native MOTU desktop recording studio just got bigger. A LOT bigger. The new Power Mac G5 is like doubling your studio's square footage, and then adding several additional floors stocked from top to bottom with virtual gear. Run more virtual instruments, more plug-in effects, more tracks, more busses, more processing, more everything than you ever thought possible. Yes, it's time to bask in the glory of your MOTU native studio. Starting at just $1999, the G5 Tower transforms DP4 into a production powerhouse.

Digital Performer™ 4.1 and MachFive™

Maximize your studio with MachFive and a world of MAS and AU plug-ins

Digital Performer Version 4.1 is now shipping with virtual instrument tracks and support for Audio Unit (AU) plug-ins, the new standard plug-in format for Mac OS X. Dozens of plug-ins are already available, with dozens more appearing on the scene every month. Enjoy unprecedented universal compatibility and interoperability with a G4- or G5-driven Mac OS X experience, thanks to Digital Performer's full adoption of all Mac OS X audio and MIDI standards. Now add MachFive, the new universal sampler plug-in. Consolidate your Sample Cell, Giga, Kurzweil, Akai and other sample libraries and put them at your fingertips in MachFive.

Trilogy™ — Total Bass Module™

The world's first Electric, Acoustic and Synth Bass Instrument

Trilogy is an awesome triple-threat plug-in instrument that integrates a custom three gigabyte core library of hundreds of brand new acoustic, electric, and synth Bass sounds with a powerful user interface. Create your own sounds! Produced by Eric Persing, it overflows with earthshaking, cone-blowing, subsonic sound. "True Staccato" for realistic repeated notes, Minimoog™ style legato triggering, multimode resonant filters for both independent layers. $349 for MAS and Audio Units.

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"Best reverb ever."
— Resolution Magazine, March 2003

audio ease

Altiverb™ sampled acoustics processor

The ultimate 'must have' reverb plug-in for DP4 on G4/G5 systems

Showered with acclaim since its debut, this legendary reverb plug-in is now shipping for your DP4 and OS X desktop studio running on a Power Mac G4 or G5. Breath the unsurpassed realism of real acoustic spaces into your mix: halls, cathedrals, studio rooms — in stereo and quad (surround) configurations. Download a constantly growing library of world-class acoustic spaces, at no extra charge, such as LA recording studios, historic French cathedrals, and world-class European concert halls. You can even sample your own spaces. The critics say:

"Altiverb is quite possibly the best-sounding reverb available, bar none."
— Pro Audio Review, Nov. 2002

"Hands down the most natural-sounding reverb plug-in around."
— EQ Magazine, January 2002

"Altiverb Produced results that eclipsed anything I'd heard before."
— Sound on Sound, May 2002

"Altiverb is flat-out the densest and smoothest native reverb I've ever heard. Moreover, it out-performed an assortment of hardware reverbs I had on-hand for comparison." — Electronic Musician, October 2002

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Digital Performer 4 interactive training

Cool School Vol. 6.1 DP Basics, Vol. 9 DP4, Vol. 10&11 Plug-ins

Check out the latest Digital Performer 4 and plug-ins interactive training products from Cool Breeze Systems. If you prefer the "show me" style of learning, then the Cool School Interactus training environment is for you. CSi products include hours of concise, well thought out movie tutorials with "before and after" audio examples, software click-state simulations, a huge DAW-related glossary, and built-in quizzing. Beware: you may dig it.

Antares Auto-Tune™ 3 and Filter™

Two new MAS plug-ins for DP4 — a classic and something new

Antares brings two essential plug-ins to your DP4 mix. The legendary Auto-Tune is the "Holy Grail" of pitch correction. The all-new Filter™ plug-in delivers filter effects like you've never heard!

Native Instruments B4

This virtual instrument classic is now available for DP4 as an AU

The B4 is another classic keyboard from the 20th century which Native Instruments brings into the studio and onto the stage of the 21st century. The B4 is a complete virtual tonewheel organ, capable of reproducing in authentic detail the sound of the legendary B3 organ and rotating speaker cabinet, including tube amplification and distortion. Beneath the attractive, photo-realistic vintage-looking graphics operates an up-to-date audio engine, with perfect sound and lots of options for fine-tuning, all with full MIDI automation. This instrument is a must-have for every DP4 studio. Includes a full set of 91 tonewheels, photo-realistic graphics in the original look, full MIDI automation and many options for easily fine-tuning the sound.

Mackie Control Universal & Extender

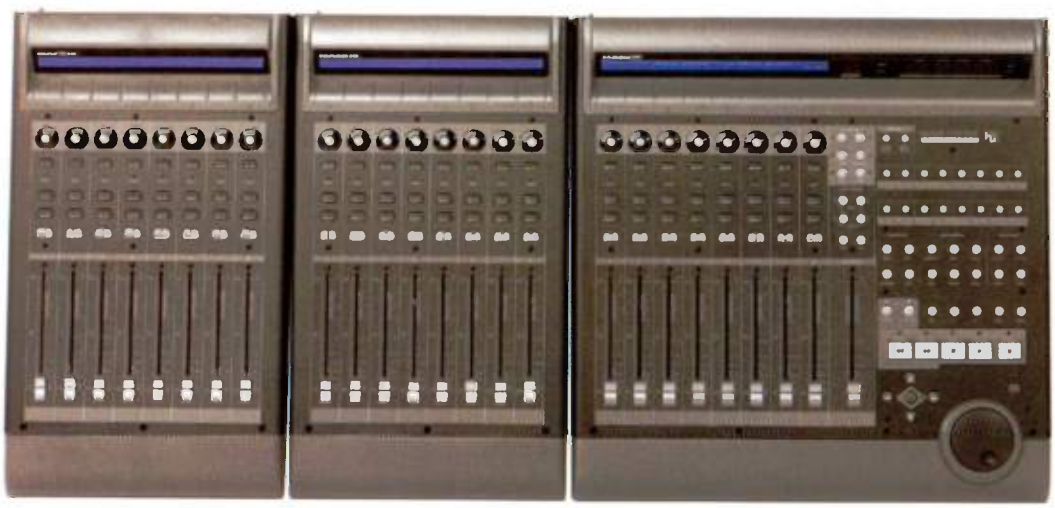
Automated hands-on control for the DP4 studio

Imagine the feeling of touch-sensitive, automated Penny & Giles faders under your hands, and the fine-tuned twist of a V-Pot™ between your fingers. You adjust plug-in settings, automate filter sweeps in real-time, and trim individual track levels. Your hands fly over responsive controls, perfecting your mix — free from the solitary confinement of your mouse. Mackie Control delivers all this in an expandable, compact, desktop-style design forged by the combined talents of Mackie manufacturing and the MOTU Digital Performer engineering team. Mackie Control brings large-console, Studio A prowess to your Digital Performer desktop studio, with a wide range of customized control features that go well beyond mixing. It's like putting your hands on Digital Performer itself.

Mackie UAD-1 Powered Plug-ins

Accelerated effects processing for DP4

Install a UAD-1 card in your Mac and then run dozens of sophisticated effects plug-ins inside Digital Performer without bringing your Mac to its knees. What's the secret? UAD-1 is a custom DSP-equipped PCI card. 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 a growing list of powered plug-ins, including Nigel, a complete palette of guitar tones combined with every effect a guitarist could ever need. Authentic vintage sounds include the Pultec Program EQ, a stunningly realistic recreation, and the1176LN Limiting Amplifier and Teletronix LA-2A Leveling Amplifier, two more analog classics reborn inside Digital Performer. Apply liberally with host CPU cycles to burn.



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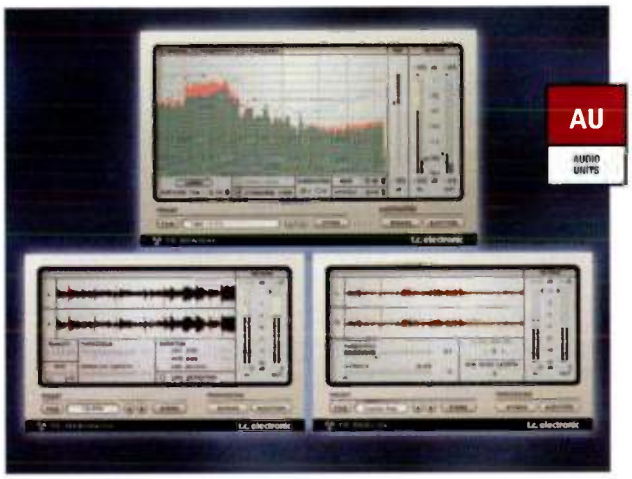
TC Electronic Restoration Suite

Ground-breaking audio restoration plug-ins for DP4

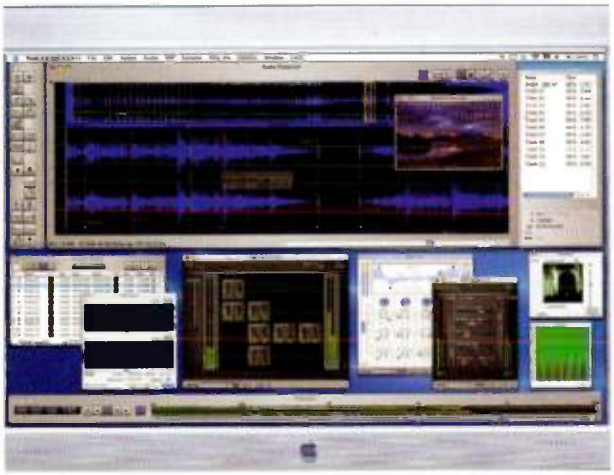
TC Electronic revolutionizes audio restoration with the new Restoration Suite for the PowerCore platform. Powerful, fast and easy to use, this bundle of hi-end restoration plug-ins provides descratching, denoising and declicking for the most critical applications in audio restoration. The descratching algorithm, based on a collaboration between TC Electronic and Noveltech from Finland, employs a breakthrough first-to-market technology and delivers incredible results. Both the Denoiser and Declicker plug-ins are based on TC's many years of experience in the field of restoration, now with extended functionality. Restoration Suite is one of the first hybrid plug-ins, utilizing CPU and PowerCore DSP processing at the same time to combine the best of both worlds for optimal sound quality and best real-time results.



BIAS Peak 4 — 4 Is More

The ultimate waveform editing companion for DP4 and MachFive

Burns redbook CD's directly. Reads/writes MP3, MP4(AAC™), 24 bit WAVE & more. Batch process dozens or even thousands of files. Ultra fast waveform editing now even faster. Launch directly from DP4. Unlimited undo/redo with graphic edit histories. Unique DSP and looping tools like the stunning new sample based ImpulseVerb™, Change Duration envelope, Harmonic Rotate, Bit Usage graph, Grid Markers from Tempo, plus Repair Clicks, Loop Tuner™, Loop Surfer™, Guess Tempo™, Duplicate, and more. Improved Region Cross-fade Editor and new Content Drawer. Hot swap real-time effects using Peak's included Vbox™ SE VST matrix. Supports Audio Units and Core Audio. Optimized for Mac OS X, multi- processors, and the Altivec G4 Velocity Engine. Includes new Squeez™ pro compressor/limiter, Freq™ EQ, and more.



Glyph Technologies GT 308

Ultimate backup and storage for your MOTU desktop system

The Glyph Technologies GT 308 is the perfect all-in-one storage and backup solution for the MOTU desktop studio. A 3U rack-mount eight-bay enclosure, the GT 308 comes with up to six hot-swappable GT Key FireWire drives, perfect as target drives for multitrack audio recording, storing your MachFive soundbank folder or temporary archiving of your DP4 projects. The right-hand expansion bays offer options of AIT backup, SCSI hot-swap receivers, DVD-R/RW and/or CD-R/RW. Like other GT Series solutions, the GT 308 features QuietMetal™ for ultra-quiet performance and Glyph's Integrity™ FireWire hot-swap technology to ensure the best reliability and performance. Included with the GT 308 is the GT 051, a tabletop hot-swap enclosure that makes content more portable and expansion easy.

ADAM Audio P11A Studio Monitors

Two-way shielded active monitors for your MOTU studio

With groundbreaking innovation in electro/acoustic transducers, no-compromise design, superior materials and the same A.R.T. (Accelerated Ribbon Technology) folded ribbon tweeter found in all ADAM monitors, ADAM's P11A two-way shielded active monitors deliver your mix with astonishing clarity. Connect a pair to the main outs of your MOTU 828mkII FireWire audio interface — or any MOTU I/O — to hear your mixes with unique imaging and outstanding transient response at a very attractive price point. Europe's "Keyboards" magazine held a studio monitor shootout between no less than 25 professional monitor systems, and the ADAM P11A's came out at the top of the heap. One listen, and you'll be hooked, too!

By Larry the O

Pay You Back with Interest

It can't be the money, because you probably won't earn much. It isn't an easy ride, either; in fact, it can be heartbreakingly difficult—and even just heartbreaking. So where's the return on investment? Why do any of us in this business of creating music and sound keep doing it?

Many of us feel that we have no other choice: we can't *not* do it. I struggled for many years trying to figure out how to explain to my mother why I put myself through all the grief that playing in a band can and does generate. One day, I finally hit on it by telling her that it was really more a calling than a profession. That made a little more sense to her.

But what can call so strongly that it overcomes material, and sometimes common-sense, considerations? Although many of us got into music and sound in order to get all the attention and to partake in the abundant sex (!), actually staying in the music business for an entire career demands greater motivation.

Clearly, the answer is rooted in some kind of spiritual payoff rather than in hard logic. Playing music or making a beautiful recording, or sculpting a perfectly integrated mix somehow lets me express something of the glimpse of life that I have seen, and in so doing, it lets me touch, or at least hear, the divine. If that sounds a little religious to some people, then so be it. However it sounds, that is what I get out of it. One can achieve moments of true perfection when doing these things, even if sometimes it is the perfection of being human and flawed.

However you want to describe the sensation, it is impossible to experience such a feeling without having strong emotions about it, and therein lies the agony as well as the ecstasy. These emotions run incredibly deep and range from the unbridled joy of Bach to the confessional and redemptive power of the blues, and from the release of rage in punk or Beethoven to the inspirational power of devotional music.

But while the final result is capable of providing powerful resolution simply by serving as an outlet, the process can be dark and laden with pain. A classic example can be seen when a musician must turn control of his or her work over to someone else. It could be a producer chosen by a label, an ignorant client insisting on poor mix decisions, or a band's interpretation of a song that is quite different from what the songwriter actually had in mind. Because of the emotional investment, these changes can alter and even destroy the shining vision a musician or engineer originally had for his or her work. And the more the level of emotional investment, the more that hurts.

This subject comes up repeatedly in any pursuit involving even a shred of artistic intent. And each time I consider ways of coming to terms with it, I find the answers are hard to implement.

One tactic is to be totally in control: have your own studio, play all of the instruments yourself, and be the producer as well as the artist. That approach can definitely work; however, it requires taking on a tremendous creative, emotional, logistical, and financial load—and more. It cuts out the substantial energies and synergies that multiple contributors can bring to a project.

Another approach is to loose your grip on the emotional investment. That might mean a Zen sort of letting go, in which you release your attachment to what you had in mind and go with the flow. Sometimes it may be necessary to just care less so that rebuffs can't hurt as much. This can work, but caring less is an extremely slippery slope, even though it is sometimes the only workable solution.

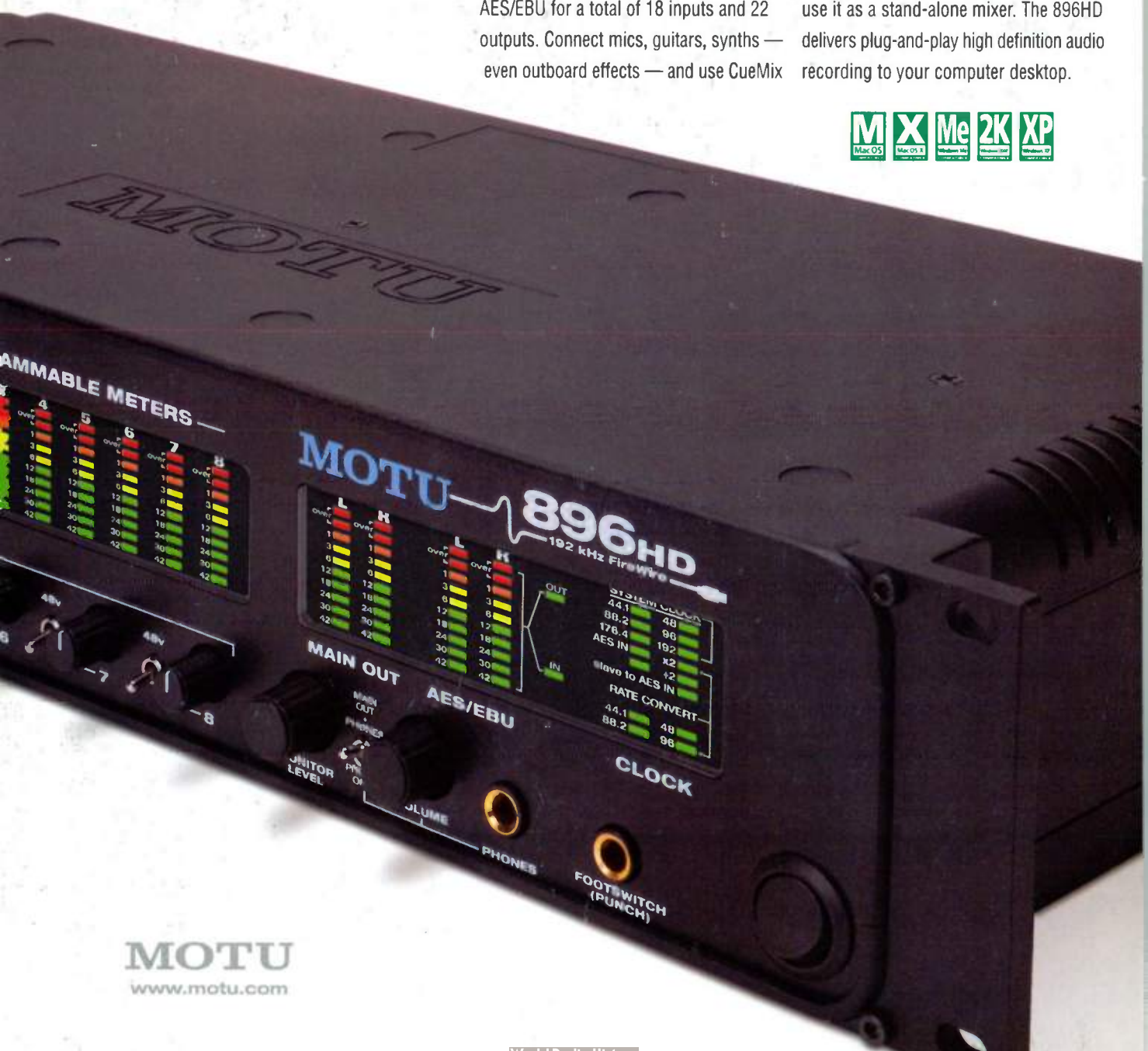
However you come to terms with it, it is crucial that you recognize your emotional investment and that you attempt to understand its depth. Doing that will position you to make appropriate choices. If you can make the right choices, then your investment can pay off in the long run, with interest.

Contributing editor **Larry Oppenheimer** *is a musician, engineer, and sound designer whose San Francisco–based company, Toys in the Attic, provides a variety of musical and audio services.*

Introducing the 896HD

192kHz FireWire Audio Interface with CueMix DSP™

Turn your computer into a powerful 24-bit, 192kHz digital audio workstation with eight channels of pristine analog recording and playback. The 896HD gives you eight mic inputs, ADAT digital I/O and stereo AES/EBU for a total of 18 inputs and 22 outputs. Connect mics, guitars, synths — even outboard effects — and use CueMix DSP™ on-board mixing to monitor live inputs, create send/return loops to outboard gear or program a separate headphone mix. Control your entire mix with included software, then disconnect your 896HD and use it as a stand-alone mixer. The 896HD delivers plug-and-play high definition audio recording to your computer desktop.



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