

**Roland MC-909, Mackie Control, and 7 more reviews**

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September 2003

## SEVEN DEADLY SYNTHS

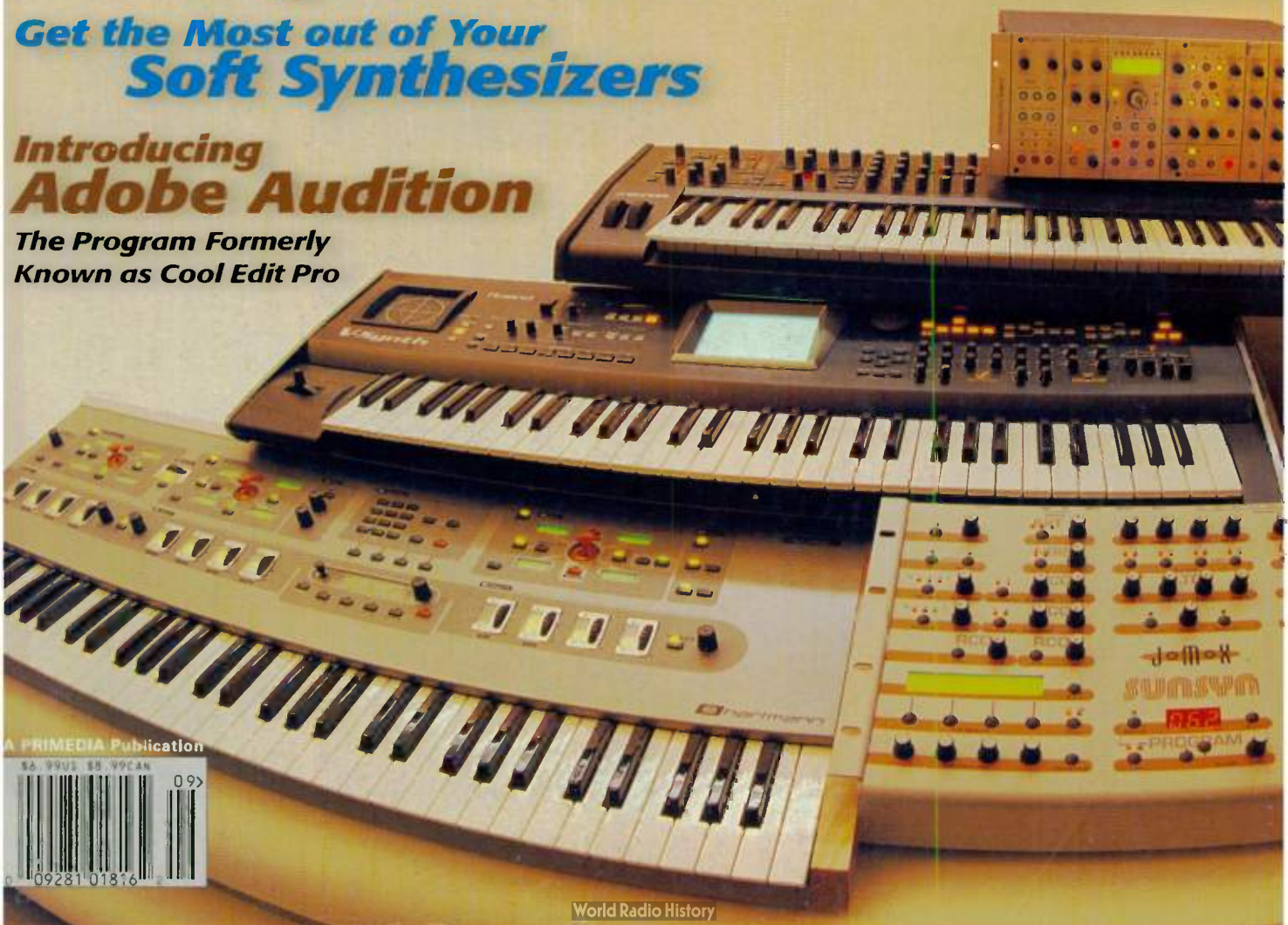
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# I N S I

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*By JJ Jenkins*

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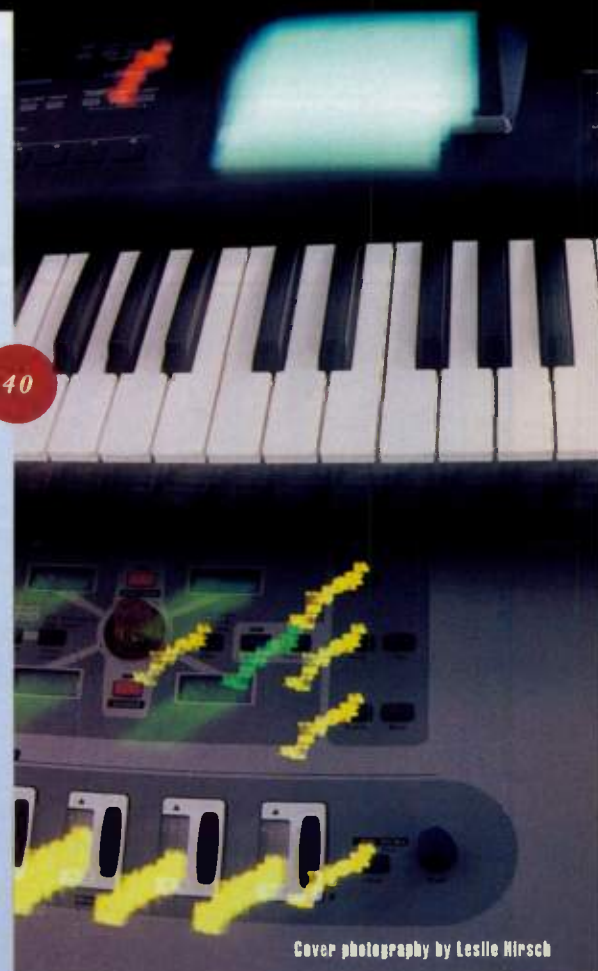
EM's resident synthesizer guru investigates seven of the coolest, most desirable keyboard synths and sound modules on the planet: the Access Virus kc, Hartmann Neuron, Jomox SunSyn, Novation Supernova II, Roland V-Synth, Studio Electronics Omega 8, and Waldorf Q+. We discuss each instrument's features, sounds, voice architecture, and user interface to give you a clear picture of its personality.

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*By Jon Rose*



Cover photography by Leslie Hirsch



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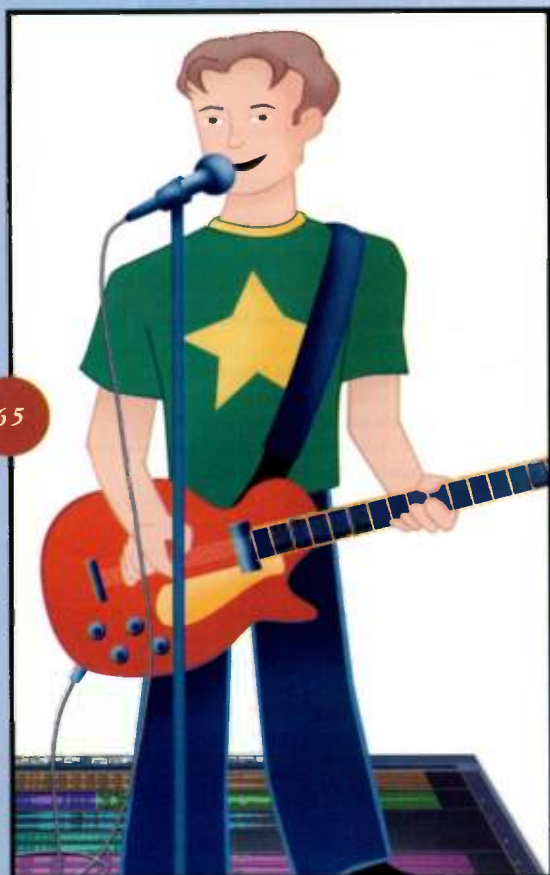
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## When Times Get Tough

**W**hen the economy is in high gear, it's easy to stick with best business practices and carefully considered risks. But when times get tough, you may become pressured to make deals you normally wouldn't. Of course, when money is tight, it is prudent to consider some compromises. Beware, though, of crossing the fine line between prudence and desperation—you could well do long-term damage to your business and your reputation, and you might not be able to recover when the economy does.

Companies and individuals can respond to hard times in a variety of ways—some wise, and some dangerous. One dangerous response is to get so aggressive that you become unpleasant and even undesirable to do business with. For example, one company pulled its ads in an issue because it didn't win an Editors' Choice Award. That sort of knee-jerk thinking does not build positive business relationships for the long haul.

Another danger is sacrificing long-term interests to gain short-term advantages. For example, a company might lay off specialized staff to meet budget goals, but if it goes too far, it will lack the talent to move forward when the economy recovers.

Furthermore, in hard times, people are tempted to do things they would normally consider unethical or immoral. For instance, would you produce a soundtrack for a porn project if you had moral objections to porn? What if your financial picture was dire and the pay was good? It's gut-check time.

In magazine publishing, the pressures to take unethical actions can be quite direct. Sometimes a hard-pressed advertiser demands that we run only positive coverage of its products. The pressures can also be subtle. In the past year, revenues have been down for all of the music-tech magazines, resulting in budget cuts. In that context, if a manufacturer pulls its ads because of a lukewarm product review, the result could be further cuts and even layoffs for us. The advertiser doesn't even have to say anything; with some companies, we know the threat is there. Some magazines give in to such pressures, although they won't admit it. We simply won't do it, no matter what the repercussions might be.

It ought to be gut-check time for manufacturers who generate these pressures, too. A well-targeted, credible magazine is an important advertising vehicle, and if advertiser-imposed economic pressures reduce a magazine's ability to maintain quality, people will eventually quit reading the magazine. That means the advertiser will lose an important way to reach potential customers.

Here, it is important to remember that a down economy actually presents a good opportunity to reinvest in your company, so you will be competitive when the crunch ends. It's also a time to think creatively, to find fresh marketing and sales approaches that don't cost a lot of money.

Whether you are operating a studio, a band, a magazine, or a widget factory, the bottom line is not just the number on the spreadsheet. It also includes doing business in a sensible, ethical, and just way. Yes, times are tough; let's use that as incentive to draw on our creativity and to find our inner strength so we can stay the course.



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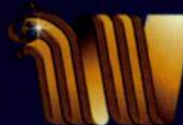
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was chosen by many labels and by the DVD Forum is to allow backward compatibility. It's a DVD. I've produced more than 50 titles, and I assure you that they play in all DVD players, including PCs.

For more on the first two points, see a presentation I gave last year: [www.smr-home-theatre.org/surround2002/technology/page\\_07.shtml](http://www.smr-home-theatre.org/surround2002/technology/page_07.shtml).

Craig Anderson  
DVD Development  
Craigman Digital, Inc.

*Author Brian Smithers replies: Craig—You raise a number of issues that are worthy of consideration but entirely beyond the scope of a "Square One" column. Your assertions about "major errors" really constitute major points of contention in the SACD/DVD-Audio format war, and I stand by my column as an accurate and reliable introduction to DSD and SACD.*

*Your point about the "relaxing" of Nyquist (antialiasing) filters at higher sampling rates is correct, although the idea that such filters are completely unnecessary depends on your definition of "brickwall." At 24 bits*

*and 96 kHz, an antialiasing filter must have a slope of 144 dB per octave, which is much shallower than is required at 16 bits and 44.1 kHz (about 96 dB per semitone). But compared with the filters used in equalizers and crossovers, it's still a brickwall. You assert that such filters maintain "perfect phase correlation," but then you question the quality of the shallower 43 dB-per-octave filter used in SACD players with respect to phase-correlation effects.*

*You are correct about the noise floor and noise-shaping filter of DSD, but given the introductory scope of the article, I addressed only dynamic range, which is indeed 120 dB.*

*Regarding recordable SACDs, Philips's public statement is this: "It is essential that the SACD format can be written on a recordable disc in professional studio applications."*

*As for nonaudio enhancements, the fact that producers have yet to take advantage of those extras means nothing. Many early SACD titles—and even some first-generation players—didn't support surround. But the format did, and eventually producers and manufacturers got on the bandwagon.*

*On the subject of DVD-Audio's compatibility, a DVD may contain DVD-Audio material, DVD-Video material, or both. If it contains both, as many discs labeled DVD-Audio do, a DVD-Video player that does not support DVD-Audio will find the DVD-Video material and play it instead of the DVD-Audio material. The disc can be made compatible, but the format is not. You also refer to compatibility with "legacy" DVD players as though only ancient players had issues with DVD-Audio. The vast majority of DVD players on the market cannot play the DVD-Audio portion of a disc.*

### ROLL YOUR OWN

**M** P3s of my compositions sound fine on my hard drive. But when I upload them to a music-promotion site, the sound quality is degraded. Aside from encoding at a higher number of kilobytes—some of these Web sites limit files to 128 KB each—is there anything I can do to improve the sonic quality for streaming? Does it make a difference if I save the original audio as a WAV file and then encode to MP3, versus saving the audio directly from

my DAW as an MP3? Your expertise is appreciated!

Bob  
via e-mail

**EM Web administrator Dan Cross replies:** Bob—It's best to perform all encoding on your own computer, rather than let a music-promotion service automatically change your MP3's bit rate. Some online articles provide tips on getting the best quality out of your MP3s.

A good tutorial on MP3 creation is at [www.teamcombooks.com/mp3handbook/16.htm](http://www.teamcombooks.com/mp3handbook/16.htm). The "MP3 and Internet Audio Handbook" is available at [www.teamcombooks.com/mp3handbook/MP3\\_Handbook.htm](http://www.teamcombooks.com/mp3handbook/MP3_Handbook.htm).

A much more advanced tutorial for PCs, which involves using Cdx and an open-source (free) Lame encoder, is at [www.execulink.com/~robin1/a\\_encode.html](http://www.execulink.com/~robin1/a_encode.html). Lastly, Angry Coffee's tutorial "How to Encode MP3s" ([www.angrycoffee.com/tutorials/mp3/encode.html](http://www.angrycoffee.com/tutorials/mp3/encode.html)) discusses the differences between CBR and VBR and includes a video presentation.

### ERROR LOG

**August 2003,** "Table of Contents," p. 8: "Master Class: All Over the Map" was written by Marty Cutler, not Mary Cutler.

**August 2003,** "Production Values: the Groove Is Out There," pp. 32 and 36: "Ciccarelli" should be spelled "Chiccarelli."

**Personal Studio Buyer's Guide, 2004,** p. 124: RealTraps, manufacturer of Wood Panel Bass Traps (reviewed in this issue of *Electronic Musician* on p. 141) and MiniTraps, was inadvertently omitted from the PSBG's "Sonic Treatment" category. Information on RealTraps' product line is available from the company: RealTraps; tel. (866) 732-5872 or (860) 210-1870; e-mail [sales@realtraps.com](mailto:sales@realtraps.com); Web [www.realtraps.com](http://www.realtraps.com).

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2 mic/line inputs w/ preamps

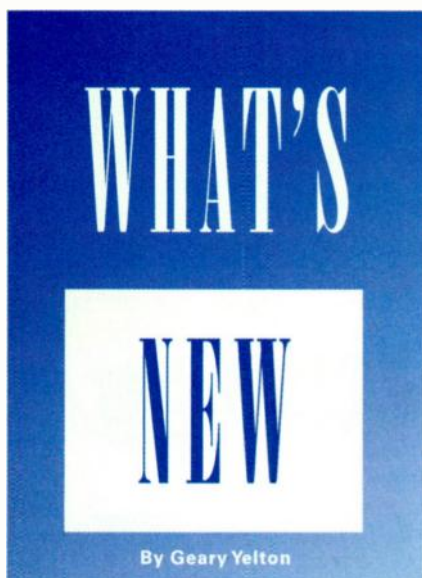
dimensions: 6 in x 1.75 in x 9.25 in

weight: 2.95 lbs



**M-AUDIO**

[www.m-audio.com](http://www.m-audio.com)

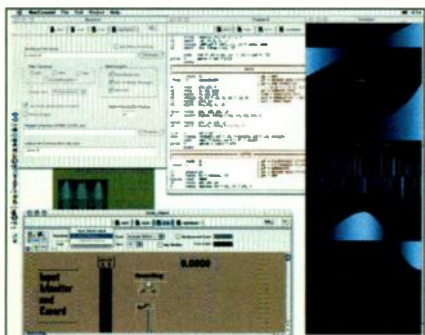


## ▼ CSOUNDS MACCSOUND

A new development environment for Csound is available for Mac OS 9 and OS X. MacCsound (freeware) provides a front end for controlling Csound instruments and signal processing. According to Matt Ingalls, its developer, MacCsound combines the original Unix program's power and flexibility with the user-friendly look and feel of a typical Macintosh application.

With MacCsound, you can build a GUI for any Csound creation. The graphics editor lets you design and modify control and display objects, and the text editor offers op-code syntax highlighting and formatting.

MacCsound can play back 32-bit multi-channel AIFF-, AIFC-, WAV-, and SDII-format audio files with user-programmed effects plug-ins. Mac OS X features include support for Core Audio and CoreMIDI. Csound; Web <http://csounds.com/matt/MacCsound>; e-mail [matt@sonomatics.com](mailto:matt@sonomatics.com).

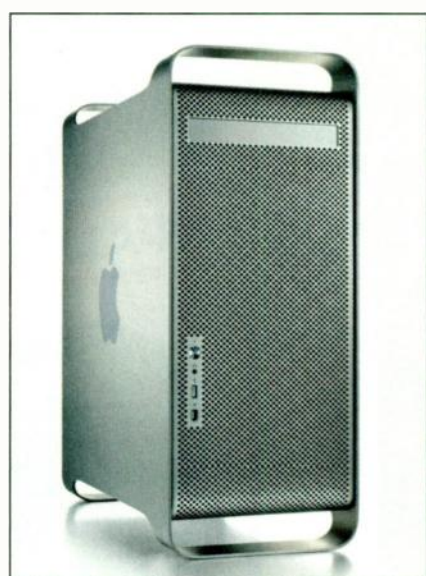


## ▼ APPLE COMPUTER POWER MAC G5

Apple Computer has introduced its next generation of desktop machines, the Power Mac G5. The G5 comes in three models: 1.6 GHz with an 800 MHz front-side bus (\$1,999), 1.8 GHz with a 900 MHz bus (\$2,399), and dual 2 GHz with a 1 GHz bus (\$2,999). All contain the new PowerPC G5 processor, developed by IBM and featuring true 64-bit architecture—a first for personal computers. The G5's high-bandwidth CPU, in combination with high-speed 128-bit memory, ATA controllers that support 150 Mbps throughput, and a bus speed that's almost six times as fast as the G4's, results in a computer that's considerably faster than previous models. (According to Apple, that makes it the fastest desktop computer on the market.)

The G5 has an anodized aluminum enclosure that maximizes airflow while minimizing noise. Apple claims that it's twice as quiet as any desktop G4, making it ideal for studio use. It's also the first Mac to ship with both digital and analog audio I/O, featuring 48 kHz, 24-bit A/D/A converters and optical S/PDIF connectors.

The 1.6 GHz model comes standard with



COURTESY OF APPLE

256 MB of DDR333 RAM (expandable to 4 GB), an 80 GB hard drive, and three PCI slots. The two other models come with 512 MB of DDR400 RAM (expandable to 8 GB), a 160 GB hard drive, and three high-speed PCI-X slots. All three G5s include a SuperDrive DVD-R/CD-RW optical drive and 512K of Level 2 cache. Apple Computer; tel. (408) 996-1010; Web [www.apple.com](http://www.apple.com).

## ▼ ROLAND MV-8000

The MV-8000 Production Studio (\$2,695) packs a lot of features into a luggable desktop device. The MV-8000 combines sampling, sequencing, effects, and CD burning in an instrument that's suited to both studio and onstage use. You can program beats and trigger audio phrases with its 16 large pads, which respond to Aftertouch and Velocity, and edit performance data using an icon-based user interface. The MV-8000's sequencer offers 16 mono audio tracks and 128 MIDI tracks, as well as the ability to synchronize audio to tempo. Rather than recording directly to its internal 40 GB hard disk, the MV-8000 records to RAM (the standard 128 MB is expandable to 512 MB) first and

then saves the audio data to the drive.

The sampler can load a variety of file formats, including Akai MPC 2000/4000 from CD-ROMs or floppy disks. It also reads Roland S-700, WAV, and AIFF files, and you can import audio directly from audio CDs. It even reads Acid files and calculates the bars and tempo.



The MV-8000's user-sampling features include a pair of phono inputs for sampling directly from a turntable. Four effects processors deliver 24-bit reverb, chorus and delay, and COSM-based multi-effects. Onboard mastering tools are available for use before burning a CD or exporting a stereo

WAV file to your computer. Roland Corporation U.S.; tel. (323) 890-3700; Web [www.rolandus.com](http://www.rolandus.com).



# THE NEXT GENERATION OF INSPIRATION



We probably could have rested on our laurels and just done a minor repackaging of the incredibly successful Motif Music Production Synthesizers.

Instead we started from scratch developing the core of our newest synth from the ground up. The heart of the Motif ES is a brand new tone generator chip featuring 128 notes of polyphony, new filter algorithms and massive DSP power. To compliment all this sonic power, the ES has the largest and most musical wave ROM ever featured in a workstation keyboard. New features like Phrase Factory™ with over 1700 arpeggios, Mega Voice technology and Real Time Loop Remix makes it easier than ever to create great tracks. Its advanced Integrated Sampling Sequencer lets you add audio tracks into your songs. The latest in digital technologies including support for 512 MB of DIMM Sample RAM, USB storage hosting and 2nd generation mLAN computer connectivity guarantee future expandability. We added bigger and better knobs, sliders and transport controls, even a ribbon controller. In fact, ES might stand for Every Suggestion we ever heard for improving Motif.

And when we were done developing all this cool cutting edge technology there was nothing left to do, but give this brand new beast a name. Try as hard as we could, there was no better name for the most powerful synth workstation on the planet than Motif.



[www.motifator.com](http://www.motifator.com) [www.yamahasyth.com](http://www.yamahasyth.com)

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- **Expanded System** — 128 Notes Polyphony, 175MB\* ROM, 8 dual insert effects, 16 three band part EQs, two system effects plus master effects
- **Emulative Sounds** — Mega Voice technology and new triple strike piano
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- **Expressive Synthesis** — New synth engine with enhanced filters and envelopes
- **Extensive Sequencing** — 226,000 note sequencer with pattern and song modes, includes Phrase Factory with over 1700 arpeggios and Real Time Loop Remix
- **Efficient Storage** — USB hosting and SmartMedia™ storage
- **Expansion Slots** — New affordable mLAN option and 3 PLG slots
- **Extended Support** — Supports Mackie and Logic control protocols for integrating with software DAWs

\* when converted to 16-bit 8-megabyte



## ► KORG ELECTRIBE MX

The most recent addition to Korg's popular series of desktop electronic music machines is the ElectrIBE MX (\$850), the most sophisticated member of the ElectrIBE family and the first with backlit LCDs. Korg calls the ElectrIBE MX's most surprising feature ValveForce: it comprises two vacuum tubes located at the output stage to impart analog distortion without an external preamp.

The ElectrIBE MX also introduces Korg's Multi Modeling Technology (MMT), which combines analog modeling and wave-shaping with PCM sounds. The synthesis architecture provides 16 oscillator algorithms, a resonant multimode filter, and three stereo effects processors. The multi-timbral ElectrIBE MX plays five synth parts,

nine drum parts, and two accent parts simultaneously. The MX can also process external audio and sync to any rhythmic source. Ample front-panel controls facilitate real-time editing, and you can enter performance data using a slider and ribbon controller.

The sequencer in the ElectrIBE MX stores 192 factory patterns and 256 user patterns, each containing synth program data and note data. The device supports real-time and step recording, and you can assign 16 patterns to the step buttons to trigger playback in real time, as well as record and edit knob movements in as many as 24 Motion Sequences for each



pattern. You also can chain patterns together to create as many as 64 songs, each with a maximum length of 128 steps. The ElectrIBE MX can save pattern and song data on SmartMedia cards. Korg USA, Inc.; tel. (516) 333-9100; Web [www.korg.com](http://www.korg.com).

## ▼ DIGITECH VX400

One of DigiTech's most recent contributions to music technology is the Vx400 Modeling Floor Processor (\$399), a unique vocal pedalboard that doubles as



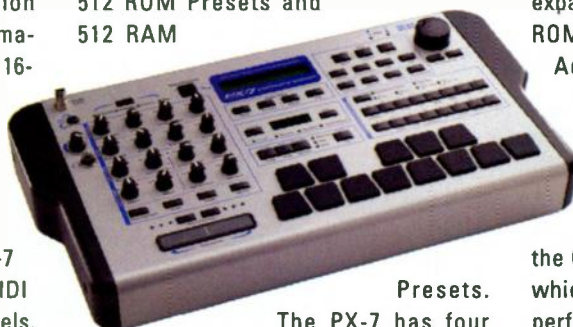
a computer audio interface. The Vx400 is a full-featured vocal-effects processor with three footswitches and an expression pedal, and it provides four channels of analog audio I/O, 24-bit A/D/A converters, and a USB port for computer connectivity. Onboard memory stores 40 factory presets and 40 user presets. Its mic-modeling presets emulate 16 different microphones, and vocal character presets range from Overdrive and Grunge to Monster and Chipmunk. In addition to compression and 3-band EQ, the Vx400's effects include chorus, vibrato, pitch shift, delay, and reverb.

The Vx400 has a 1/4-inch guitar input, two 1/4-inch line inputs, and an XLR input with a mic preamp. The outputs include two 1/4-inch jacks, two balanced XLR jacks, and a 1/8-inch stereo headphone jack. The USB port provides two-way data transfer for recording audio and for controlling DAW functions such as record, playback, and track arming. The USB also offers access to an onboard drum machine that plays more than 30 patterns. Pro Tracks (Win), a multitrack recording application developed in collaboration with Cakewalk, is included. DigiTech; tel. (801) 566-8800; e-mail [customer@digitech.com](mailto:customer@digitech.com); Web [www.digitech.com](http://www.digitech.com).

## ► E-MU PX-7 COMMAND STATION

The newest in E-mu's series of Command Stations is the PX-7, which focuses on drum and percussion sounds. The PX-7 is a hybrid drum machine that combines a pattern-based 16-track sequencer with a 128-note synthesizer. You can record by real-time, step, or grid-note entry using the PX-7's 13 Velocity-sensitive pads, 16 programmable knobs, a data dial, and a touch strip. The PX-7 records and plays back 32 internal MIDI channels and 32 external MIDI channels. The unit's mixdown feature enables you to condense as many as 16 MIDI chan-

nels into one as many times as you need to. To help get your creative juices flowing, 90 groove sequences supplement 512 ROM Presets and 512 RAM



Presets.

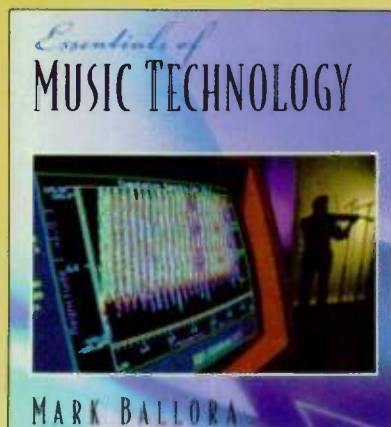
The PX-7 has four SIMM sockets, one of which contains a newly developed sound ROM that

provides 32 MB of acoustic and electronic drum and percussion samples. Like the other Command Stations, the PX-7 is expandable by means of additional sound ROMs that range from Beat Garden to Advanced Orchestra. The PX-7 also has a 20-bit S/PDIF output, 50 filter types, 512 song locations, and a maximum of 32 synchronized arpeggiators.

The PX-7 includes version 2.0 of the Command Station operating system, which offers enhanced sequencing and performance capabilities. E-mu Systems; tel. (831) 438-1921; e-mail [info@emu.com](mailto:info@emu.com); Web [www.emu.com](http://www.emu.com).



## GET SMART ▲▲▲▲



### ▲ PEARSON EDUCATION

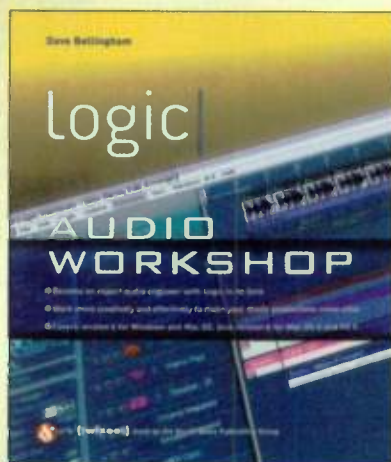
**M**ark Ballora's *Essentials of Music Technology* (\$39.33) provides detailed information on the basics of audio, recording equipment, and studio practices. The author touches on dozens of subjects related to producing music using modern technology, including mixing, microphones, and effects processing, as well as MIDI instruments and controllers, sampling, and soft synths. His explanations of MIDI encompass its concepts, connections, language, and applications. Ballora also discusses related issues such as acoustical perception, digital filtering, binary and hexadecimal numbers, and data storage.

Readers of all levels have something to gain from *Essentials of Music Technology*, though different chapters appear to be aimed at completely different audiences. For instance, "Introduction to Computers" seems to assume that you might never have used one, but later sections on digital audio include a lot of mathematical formulas and complex graphics. Consequently, the book might serve best as a general reference on audio technology rather than as an introductory textbook. Its many technical diagrams and tables reinforce its value as a reference source. Pearson Education; tel. (201) 236-7000; e-mail [communications@pearsoned.com](mailto:communications@pearsoned.com); Web [www.pearsoned.com](http://www.pearsoned.com).

### ▼ AMSCO PUBLICATIONS

**I**n his book *Logic Audio Workshop* (\$40), author Dave Bellingham explains the practical applications of Emagic's DAW as it relates to recording and editing audio. Written as a tutorial to accompany Emagic's reference manual, the book is ideal for people just starting out or anyone who wants to dig deep into Logic's audio capabilities. Lots of practical tips and tricks are presented, especially in regard to mixing and arranging. A supplementary CD-ROM contains example audio files and other materials to support the text.

Specific chapters focus on selecting



audio hardware, optimal setup, and working in various Logic windows. Bellingham investigates the Digital Factory, Audio Instruments, sample editing, automation, control surfaces, and Logic's bundled effects plug-ins. He discusses concepts such as latency and provides more than 15 pages on EQ. Although the focus is on digital audio, he also devotes several pages to MIDI, including how to select an interface, synchronization issues, drivers, and CoreMIDI for the Mac. He even addresses concerns of users with Creamware Pulsar XTC, Mackie UAD-1, or TC Works PowerCore DSP boards. *Logic Audio Workshop* looks like a valuable resource for anyone who uses

Logic at almost any level. AMSCO Publications; tel. (212) 254-2100.

### ▼ OSBORNE MEDIA

**A**lthough the title might lead you to believe that it's about making music with Windows, *Build Your Own PC Recording Studio* (\$29.99) applies equally to Macintosh users. Frequent **EM** author Jon Chappell begins by explaining the hardware and software that go into a computer-based studio, and then he tells you about everything you need to get started with recording, editing, mixing, mastering, and burning CDs.

Chappell details how to turn your computer into a desktop studio and suggests minimal and optimal setups. He offers advice on studio layout and acoustics and explains a computer's inner workings. He acquaints you with mics, mixers, monitors, instruments (both tangible and virtual), and MIDI and audio interfaces. He takes you on a step-by-step journey through the various stages of music production, from connecting the equipment through designing the CD packaging. Without taking sides, he even approaches the subject of whether you should use a Mac or a PC (and recommends both). Chappell wraps up with a discussion of studio maintenance and problem solving. McGraw-Hill/Osborne Media; tel. (510) 549-6600; Web [www.osborne.com](http://www.osborne.com).





# The Hit Factory's new studio occupies different dimensions.

With Logic 6 on every monitor.

Logic Platinum has long been an integral component of many productions in the best studios in the world, including The Hit Factory. Logic Platinum 6 channel strips, complete with sweet-sounding new channel EQs, a graphic FFT signal analyzer per channel, 8 EQ bands, track-based automation, and access to over 50 outstanding plug-ins, now take music production into new dimensions. "Many producers compose and arrange the entire song in Logic," says The Hit Factory's general manager, Zoe Trull. "Loading files and integrating with our studios is a breeze. The highly adaptable environment of Logic, with its individual screen sets, allows each producer to create their own familiar work surface — making the transition from the writing phase to the studio absolutely seamless." For large studios, such seamless integration within their recording environment is a deciding factor. Now with extensive support of TDM systems on the forward-looking Mac OS X platform, Logic Platinum 6 satisfies the exacting demands of even the biggest recording facilities. Other new features in Version 6, such as the Project Manager, Marquee Tool, Freeze, digital video playback via FireWire, and Video Thumbnail Track in the Arrange window have also been received with enthusiasm in the professional community. Add new dimensions to your music and audio production with Logic 6.

Technology with soul.





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ESIGLOM  
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LOG



## ▶ EVENT ELECTRONICS STUDIO PRECISION 8

The Studio Precision 8 is Event Electronics' flagship monitor speaker and the first of four new models. It comes in two versions: the passive PSP8 (\$799 per pair) and the biampified ASP8 (\$1,499 per pair). The Studio Precision 8 provides deeper, more accurate bass response than its predecessors, thanks to a new 8-inch woofer and dual linear-flow bass ports. A new 1-inch tweeter increases stereo imaging in comparison to Event's previous designs. According to the manufacturer, the high frequencies do not require any corrective EQ, and the tweeter's broad radiation pattern increases the size of the sweet spot. The high- and low-

frequency drivers both contain neodymium magnets, offering the advantages of lower distortion, higher output, and less weight.

Rated at 200W for the low end and 80W for the high end, the active ASP8 contains the most powerful amplifier available from Event. The amp is based on a toroidal transformer for decreased electrical and mechanical noise. Controls include continuously variable low and high trim knobs, continuously variable input sensitivity, and



an 80 Hz highpass filter switch. Inputs are balanced XLR and 1/4-inch jacks. Event Electronics; tel. (805) 566-7777; e-mail info@event1.com; Web www.event1.com or www.eventelectronics.com.

## ▼ LINPLUG RM IV VSTI DRUM MACHINE

The latest plug-in from LinPlug Virtual Instruments is RM IV (Mac/Win, \$149), a drum machine that combines analog percussion synthesis with sampling. RM IV is the successor to RM III, and it comes bundled with more than 170 drum

kits ranging from synthesized electronic drums to multisampled studio kits (including around 2,500 samples). RM IV provides 18 Velocity-sensitive pads for triggering 11 Audio Generator Modules. Its modular design provides ten percussion synthesis algorithms that produce sounds that span the decades. The sampler module automatically turns off unused modules to conserve computer resources. It supports multisamples with Velocity layers and crossfades, with audio resolution as high as 32 bits.

RM IV offers the same AHDSR-controlled multimode filter used in LinPlug's synth plug-ins. Innovative features include an effi-

ciently designed edit window that minimizes mouse clicks, a compressor tailored for percussion sounds, and a six-by-six modulation matrix. LinPlug says that RM IV can open LM-4, CM-505, RM2, and RM III kits, as well as AIFF and WAV samples.

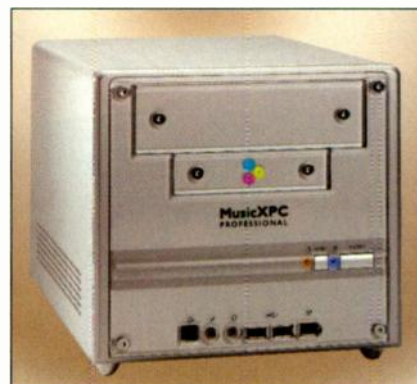
Unlike most LinPlug products, RM IV is available only on CD-ROM, and the price includes free worldwide shipping. For the Mac, RM IV requires OS X and at least a G3/400 MHz. For the PC, you'll need a minimum Pentium/400 MHz and Windows 95. Both platforms require a VST host application, 1 GB of disk space, and at least 16 MB of available RAM (though the largest kits require 512 MB). LinPlug Virtual Instruments, GmbH; e-mail support@linplug.com; Web www.linplug.com.



## ▼ MUSICXPC PROFESSIONAL

Musicians who desire a computer built especially for music applications have a new alternative—the MusicXPC Professional (Win, \$1,599), the first product from Canadian manufacturer MusicXPC. Designed for audio production, the Professional is a modified version of the Shuttle XPC computer, powered by a 2.8 GHz Pentium 4 with a 533 MHz front-side bus and 512 MB of DDR333 RAM (expandable to 2 GB). The MusicXPC is lighter and quieter than most desktop computers, thanks to a small form factor, an aluminum chassis, and a heat-pipe cooling system that minimizes the need for fans.

MusicXPC optimized the Professional for musicians by developing a customized BIOS (Basic Input/Output System) and by turning off Windows XP services that are unnecessary for audio applications. The computer's I/O includes optical S/PDIF, an 1/4-inch mic input, an 1/4-inch headphone output, 100 Mbps Ethernet, four USB ports, and three FireWire ports. Among its other standard features are 80 GB and 120 GB ATA133 hard drives, a 48x40x8 DVD/CD-RW combo drive, and one PCI slot. The MusicXPC also ships with a full-size keyboard and an optical mouse. Windows XP is preinstalled. The MusicXPC Professional is available exclusively at



music retailers. MusicXPC; tel. (416) 646-0900; e-mail neil@musicxpc.com; Web www.musicxpc.com. ●



# Musical Fingerprints

**S**ongwriters and performers have always faced the challenge of protecting their intellectual property, especially in the Internet era of peer-to-peer (P2P) file sharing. One solution is to embed digital watermarks into the audio data to identify copyrighted material, but many believe this results in audible artifacts that intrude on the intended sound.

Audible Magic Corp. ([www.audiblemagic.com](http://www.audiblemagic.com)) is taking a different approach that adds nothing to the sound. Using algorithms developed by Muscle Fish ([www.musclefish.com](http://www.musclefish.com)), now a division of Audible Magic, the content-based identification (CBID) system analyzes a segment of audio to determine its unique characteristics, including loudness, pitch, brightness (high-frequency content), and harmonicity (the degree to which the sound's timbre conforms to the harmonic series).

The most important analysis parameters are called *mel-filtered cepstral coefficients* (MFCCs), which describe the shape of the harmonic spectrum as perceived by the human auditory system. The audio signal is divided into short segments and passed through a Fast Fourier Transform to derive the harmonic power spectrum of each segment. That spectrum is then processed by a *mel filter*, which warps the spectrum according to the human auditory response as determined by decades of psychoacoustic research. Finally, the mel-filtered spectrum is subjected to a discrete cosine transform, which results in what is called a *cepstrum* ("spectrum" with the first four letters reversed) consisting of multiple coefficients that represent the mel-adjusted shape of the original spectrum (see Fig. 1).

The Audible Magic system focuses on the midrange frequencies and cepstral coefficients because they are the most important in identifying an audio signal. Further, the midrange coefficients are relatively immune to changes caused by equalization, dynamic compression, data compression, and time scaling.

*Identify any  
audio signal by  
its unique sonic  
signature.*

The system is claimed to be 98 percent accurate, even in the face of such processing.

This technique allows any piece of audio to be identified by its unique MFCC "fingerprint," facilitating a number of important applications. In particular, any audio data can be compared with other audio data to determine if they are identical, which is one way to detect copyright infringement without adding watermarks. Toward this end, Audible Magic maintains a database of 3.7 million North American songs

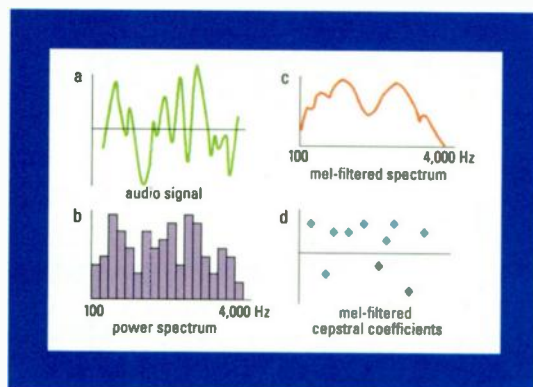
and other copyrighted material, to which 10,000 new titles are added every week by the RIAA, major record labels, and SESAC, a performing-rights organization much like ASCAP and BMI. The company is also introducing a song-registration program that will accept material from independent and unsigned artists, as well as smaller labels, and add it to the database.

One application, called RepliCheck, lets a CD manufacturer compare the tracks of a new CD with the database to see if the material is stolen. The system is surprisingly fast, taking only two minutes to check a full-length CD against the entire database. RepliCheck can be installed on a conventional Windows PC with an Internet connection.

Another antipiracy application is called network traffic monitoring, which can be used by P2P hosts and network operators at schools, businesses, and ISPs to block unauthorized transfers. The same type of system also works to track royalties and broadcast content.

Another application is SoundFisher ([www.soundfisher.com](http://www.soundfisher.com)), which lets you search an audio library for items that sound like a specified file. Here, the files are not identical but share certain sonic characteristics, as reflected by their cepstral coefficients and other acoustic features.

This is just the tip of the iceberg for Audible Magic's CBID system. I predict a bright future for this technology. Who knows—the song it keeps from being pirated could be your own. ☼



**FIG. 1:** Audible Magic's CBID system converts an audio signal (a) into a power spectrum (b), applies a mel filter (c), and converts the result into cepstral coefficients (d).

# SPECTRASONICS

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## Balancing Act

**P**roducers Jez Colin (a bassist) and Matt Cooper (a drummer and keyboardist) have a wealth of album credits to their names. Colin, based in Los Angeles, has remixed songs by Björk, Maxwell, Sade, and Stevie Wonder. Cooper, based in London, records for U.K. label Dorado Records under the name Outside, and writes and tours with Incognito and David Sylvian. In 1998 Colin and Cooper forged a partnership as The Latin Project.

The Latin Project's debut, *Nueva Musica* (Electric Monkey Records, 2003), presents an intriguing fusion of programmed dance music with live performances of South American musical styles. "We figured there's no point in [simply] doing a programmed record, because we bring other things to the table," says Cooper.

They recorded *Nueva Musica* in Los Angeles, London, and Rio de Janeiro. All sessions eventually ended up in Colin's Mac G4/867, which runs a Pro Tools|24 Mix3 system. Colin and Cooper cowrote nine of the album's ten tracks, programming synth and drum parts. "We created a solid direction together, and then explored details in our respective studios," Colin says.

"We both have Akai samplers, so a lot of the basic tracks were created using those," Colin adds. They also drew sounds from an E-mu E6400 Ultra and racks of synths. Colin also uses Ableton Live and Propellerhead Reason. "All MIDI is done in [Steinberg] Cubase 5.1, and all audio in Pro Tools," Colin says. "I sync Pro Tools and Cubase internally by sending MIDI Time Code through the IAC bus in OMS."

Although their music has a sampled feel, Colin and Cooper used no sample libraries. They played their own instruments and collaborated with a bevy of guest artists including Junno Homrich and Robbie Nevil. "Balancing the live and programmed elements is very difficult," Cooper says. "Most guest musicians played along to

### *The Latin Project*

*blends electronic*

*production and*

*live performance.*



an embellished version of the basic song idea," Colin says. "But sometimes we deliberately stripped away our programming to leave room for the musician to perform, rather than fit in." In other instances, a performance shaped a track. "On 'Lei Lo Lai' and 'En Fuego,' the first element that went down was the acoustic guitar," says Colin. "We treated the performance almost like a sample, and then built the track around it."

Colin recorded a few guest musicians in his studio, while the duo recorded most acoustic tracks in the RecRoom—a commercial studio in Los Angeles. "The RecRoom has a Pro Tools rig, so we transferred our sessions onto a removable SCSI drive and recalled them there," Colin says. "[Engineer] Giorgio Bertuccelli has a great-sounding baby grand piano, drum booth, and live room for horns and percussion. We used all his mics and preamps."

The Latin Project's quest for balance extends to their choices in analog and digital gear. "A lot of our recordings first passed through tube-mic pres and compressors to get as warm a sound as possible," Colin says. "By contrast, most drum programming was recorded into Pro Tools through a solid-state interface—the Focusrite ISA430—for sounds that have attack and punchiness."

"I like to experiment sonically with musical elements after I've recorded them into Pro Tools," Colin says. "But to maintain the integrity of the original instrument, it's important to record its fundamental character really well. If the punch and the tones aren't there, then you won't have as much fun. It's important to select the right type of front-end recording gear for a particular instrument. That also gives you a diverse sonic palette when you listen back to the mix." 🎧

For more information, contact Electric Monkey Records; e-mail [info@electricmonkey.com](mailto:info@electricmonkey.com); Web [www.electricmonkey.com](http://www.electricmonkey.com).



*Nueva Musica/The Latin Project.*



# The New Standard in Desktop MIDI Keyboard Controllers

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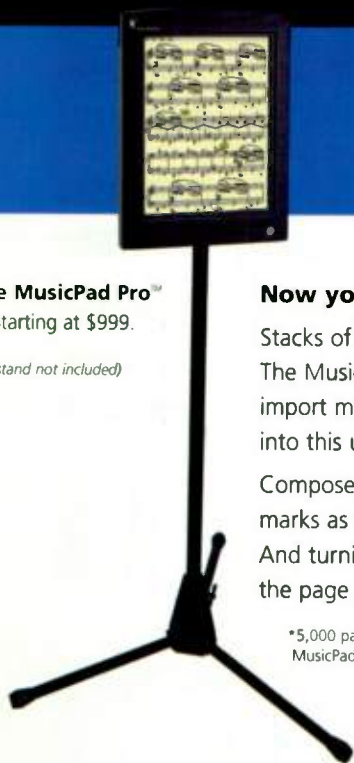


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# Masters on Mastering



LAURA WILLIAMS

**An inside  
look from  
three top  
mastering  
engineers.**

**M**any recording musicians will gladly talk your ear off on subjects like what their favorite mic preamp is, how they get the most realistic kick-drum sound, and what the best-sounding monitors are; but if you ask them about mastering, you're likely to get a healthy dose of silence. That's because for many, the mastering process is shrouded in mystery. A finished mix gets sent to the mastering facility and returns to you shiny, polished, and bathed in that new-car smell. But how did it get that way? And what exactly does the mysterious man behind the curtain do?

Understanding mastering is increasingly important these days, as an ever-growing number of musicians release CDs independently and must decide whether to invest in the services of a professional mastering engineer or to attempt to do it themselves. (The former is highly recommended.)

To help demystify the subject, I contacted three esteemed mastering engi-

neers who generously took time from their busy schedules to discuss their craft.

## THREE MASTERS

Steve Hall is chief mastering engineer at Future Disc in Hollywood, California. He recently mastered the Beach Boys' *Pet Sounds* DVD-A for surround release and has done albums for a long list of top-name artists, including Al Jarreau, Alanis Morissette, George Harrison, and Madonna, along with many film-soundtrack albums, such as *The Matrix*.

Award-winning mastering engineer

Bob Ludwig is president of Gateway Mastering and DVD in Portland, Maine.

He recently remastered the entire Rolling Stones catalog for hybrid SACD (Super Audio Compact Disc; to learn more about the format, see "Square One: A Better Mousetrap" in the May 2003 issue of *EM*). Ludwig's credits would fill this magazine; a small sampling includes Steely Dan, Reba McEntire, Nirvana, Pearl Jam, the Foo Fighters, and Bruce Springsteen.

**By JJ Jenkins**

# Masters on Mastering

Stephen Marcussen is the owner of Marcussen Mastering in Hollywood, California, and his client list includes Paul McCartney, the Rolling Stones, Stevie Wonder, Barenaked Ladies, Michelle Branch, and Dwight Yoakam.

## LET THERE BE LIGHT

I started by asking the three engineers to shed a little light on the fundamentals. "Basically, mastering is balancing, equalizing, compressing, and just trying to get the most out of a musical performance," says Hall. "It's smoothing out all the rough edges to make a polished, finished performance." The idea, he explains, is to make it as musical and exciting to listen to as possible.

In the course of their work, mastering engineers have to do all kinds of sonic doctoring, including matching levels from song to song; adding shimmer to the top and punch to the bottom; adjusting the levels of individual instruments by using precise EQ (remember, they're working with a mixed

master); goosing up the overall loudness; and much more. To become a successful mastering engineer requires not only intelligence, talent, and excellent ears, but also a great deal of experience.

"Mastering is an interesting profession, because there's no substitute for experience" says Marcussen. "You can be a mastering engineer with 18 months of experience, but you're really still a babe in the woods. Every day in mastering offers a different set of issues. When I first started mastering, getting the ball rolling seemed to take forever. I was learning the craft." There is indeed a lot to learn, especially considering that mastering engineers typically must be able to handle projects in many different genres of music that have diverse sonic requirements.

Certainly a heavy-metal record and a traditional jazz album ought to sound quite different. But how, specifically,

does one approach these varied styles? "When I am doing classical—and to some degree, jazz—recordings," says Ludwig, "I am usually trying to create as dynamic a sound as possible, more like an acoustic 'photograph' of an event that actually took place somewhere. With grunge and heavy metal, high compression may be appropriate. I would point out that many artists say they've experimented, trying to get their mix to sound loud, but it never sounds as loud yet open as a good mastering engineer can make it. These are tricks of the trade you won't find published anywhere!"

## HOT, HOT, HOT

Everybody wants their disc to sound great, but it seems that nowadays a lot of people equate "best" with "loudest." That puts a lot of pressure on mastering engineers to compress their masters heavily so that they can achieve as hot a level as possible.

According to Ludwig, however, this is anything but a healthy development. "This horrible trend started about eight years ago, with the invention of digital-domain 'look-ahead' compressors," he



Stephen Marcussen, owner of Marcussen Mastering, enjoys mastering in part because it allows him to use both his technical expertise and his creativity.



Gateway Mastering and DVD's Bob Ludwig is concerned that some people's practice of making masters as loud as possible can detract from the musicality of the final product.





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# Masters on Mastering

says. "First was the German Junger compressor, then the Waves stuff, and the most infamous of all, the TC Electronic Finalizer, a great piece of gear that's often misused. I'm so glad these devices didn't exist when the Beatles were making their music. Never in the history of the human race have people been exposed to sounds as compressed as in the past few years.

"It's a losing battle for musicality," Ludwig laments. "To me, it's a fact that highly compressed music is tiring to the ear and doesn't make you want to listen to something over and over again. Could this be one of the reasons for the record industry's demise?

"The problem is that many artists, producers, and A&R people are very short-sighted," he continues. "If you take a new recording and compare eight bars of a piece that's been mastered by four different engineers, often the loudest one sounds immediately the most impressive to the listener. Hardly anyone listens to 40 or 50 minutes of the whole recording and decides how the total musical experience was for them. Radio play used to be an excuse, but levels now are radically high, and it can be proven that the high levels make them more difficult to broadcast. Just ask Bob Orban, who makes many of the compressors used in FM stations around the world."

So what's the trick to keeping the natural dynamics? "That's the creative part of mastering" says Marcussen, "and I try to fit the creative part into the competitive part today. I was working with a client yesterday, and we had a situation where we had an extremely dynamic song sandwiched in between two songs that were far from that. And when you master, the goal is that each song comes in and hold its own.

"We had a piece that was literally a whispered vocal that went into a huge chorus," he continues. "It was one of

those things where I had to go ahead and manipulate the level, the rides, the moves, the this, the that, and the other to make the song loud enough—while keeping some honesty to the dynamics of the song. It just becomes an issue of trying to work within the guidelines that are set up. Fortunately, yesterday's project was a project that was a loud record but didn't have to be the loudest record in the world. So it gave me a little more room to work with to give the illusion of level and dynamics."

▼

**"The more bass you  
put on a CD, the less  
apparent level you're  
going to have."**

**—Steve Hall**

Hall sees it this way: "There are a few labels that just want you to make it hot. That's basically their request. Obviously any competent mastering engineer is going to do that. Most of the labels pretty much let you do your thing. They figure you know what you're doing if you've been doing it for 20 years or more."

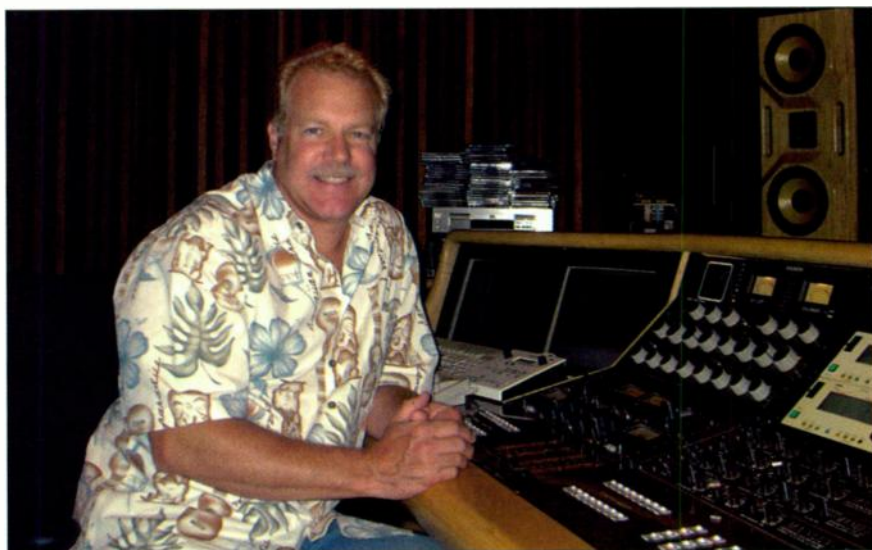
## GETTING TO THE BOTTOM

Another controversial issue for mastering engineers is bottom end. Everybody wants lots of bass, but how much is too much, and at what point are subsonics a problem?

"It depends on the material, for the most part, and what it's going to be used for," says Hall. "Obviously we put a lot more bass on club stuff that we're doing—12-inch singles and things like that." But Hall brings up an interesting conundrum.

"The more bass you put on a CD, the less apparent level you're going to have, because you must leave room for the midrange. So in other words, if the bass is way up, the midrange and everything else is obviously going to sound down in comparison. Chances are that even on a small speaker system, your product's not going to sound quite as loud as it could if there was less bass. But sometimes I roll things off at 20 cycles [Hz], or 17 or 18 cycles, or somewhere around there. Sometimes I go a little higher depending on what's going on, because nowadays everything's coming in on digital, so basically you have a frequency response that goes down to DC, and you sometimes have things that need to be trimmed on the bottom.

"The other problem," he says, "is that you don't want the CD crapping out on



Steve Hall of Future Disc warns against overcompressing a mix, which can cause problems the mastering engineer cannot fix.





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# Masters on Mastering

people's boom boxes. You have to think of the small speaker and the people that are trying to play their CD. If their speakers are farting, then obviously you've gone over the top."

Marcussen agrees, and he adds, "If you have something that has a really luxurious low end—as I like to call it, something that goes really deep and is appropriate—I try to get it to a place where it's not going to break up on smaller systems. In the mastering world, and I think I can speak for all mastering engineers, we all like to think that we all have high-resolution systems that are pretty extended and pretty real and

true, so it's hard to get something to blow up in a mastering room." However, there are areas to watch out for.

"In some cases," says Marcussen, "especially with synthesized drums and whatnot, there is so much low end that it just doesn't translate to the car or to the boom box. So I try to keep the low end reasonable to the project, but also so it will fit in the general play-back arena. There are times where somebody will say, 'We really want that 28-inch bass drum to flap,' and that's not necessarily going to work on a computer speaker. So long as everybody has a heads-up on that issue, it works fine. But in trying to please everybody, I try to not let too much stuff through that could potentially destroy someone's stereo. There's no rhyme or reason to putting a 10-cycle or a 50-cycle filter on everything. But if something's got a low-end problem

and I put a filter in, I try to keep the intended impact and just trim what I need to."

"Most clients want an appropriate bass," says Ludwig. "For some projects, like club mixes or rap music, deep bass may be the thing. For other music, too much low end clouds the crucial vocal. One problem we get is band members complaining that the amount of bass that can be achieved will bottom out their car systems too easily. This is the most common complaint that results in less extreme low end. If a rolloff is necessary, it is always done to taste, so it might be at 20, 30, or 40 Hz. Many of today's pop radio stations seem to roll off low bass, perhaps because these stations are in competition with each other and too much low end makes their compressors work too hard, making them less apparently loud than other stations."

## MASTERS OF SURROUND

When mastering engineers are asked to work on a surround-sound project, their jobs get more complicated.

"There are a lot more things to worry about," says Steve Hall. "You worry about the balance of the surround channels and balance on the center channel and how that's relating to the whole front-center image. You're also concerned—if you're using an LFE [subwoofer] channel—about how that relates and how it mixes down to a bass-management system." (Bass-management systems determine how much low-frequency content gets sent to the subwoofer channel.) "It becomes much more complex than just doing a standard stereo project."

However, Hall says that improved technology has made mixing in surround less problematic than it used to be. "The tools that we had early on in the game were pretty crude," he recalls, "and for the most part, they were always being pushed to their limit. Now those tools are be-

coming more and more perfected. It's making the job a lot easier."

"Surround is much more costly in equipment and time," adds Bob Ludwig. Compared to mastering CDs, he says, "the amount of latency, time code, and sampling-rate conversions involved in the surround world are much more of an issue." To deal with such challenges requires specialized gear. "I just finished installing an 8-channel, state-of-the-art analog surround console. We have six channels of two brands of equalizers and we have special analog compressors that are modified with external voltage control to maintain the correct soundstage; 'soundstage' meaning the width of the sound being presented to your ears. Even now, in 2003, there are precious few multichannel sampling-rate converters."

The number of surround projects—both new releases and reissued classics—is increasing. "For the past month I've probably done a surround project a week," says Stephen Mar-

cussen. Despite the added complexity, Marcussen finds surround projects easier in some ways. "The recordings I've been working on have been released previously as records or CDs and have been remixed for the surround format. When you have five speakers as opposed to two to put the same number of instruments in, it's a little more relaxed. Everything's not fighting for the same space, because it can get spread around a little more."

However, he does add this caveat: "The thing that I really try to not do is make loud 5.1s. I've done a few where the producer or artist requested them to be aggressive, and in hindsight, if they had been a decibel or two quieter, I think that they would have been better. The one thing that I try to do is keep it a little more natural and not so in-your-face—because if you had stuff jacked up the way we do the 2-track stuff, but coming out of five speakers, I think it wouldn't be a satisfying listening experience."



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## DON'T TRY THIS AT HOME

In addition to their considerable expertise, top mastering engineers also bring to bear an arsenal of specialized audio tools. "We have six different kinds of analog playback electronics," says Ludwig. "It's that important to me. I feel that playing back the tape with

the appropriate electronics does a lot of the mastering sound for you and is a crucial starting point. We have Studer electronics, Ampex electronics, ATR-Services tube electronics, Cello Class A electronics, Tim da Paravicini's Esoteric Audio Research tube amps, and most recently the famous Aria pure discrete Class A electronics that were used in the Rolling Stones hybrid-SACD reissues."

Hall adds, "I use a TC Electronic System 6000 sometimes. I use Weiss EQ1s and Weiss DS1s for digital applications. For workstations, I use Sonic Solutions

HD, which is improving all the time. And then there are other times when we've gone totally analog. We just finished, several months ago, the Beach Boys' *Pet Sounds*. We brought in additional Sontec equalizers and some Esoteric Audio Research big tube compressors, and did the whole thing in an analog pass, which is a totally different ball game from what I normally do for surround. But back when we were doing vinyl, everyone had an equalizer and a console and a compressor, and that was pretty much what we used. Nowadays you need many different tools for

## ADVICE FROM THE TRENCHES

Independent musicians who are pressing their first disc or just on a tight budget may not be able to take advantage of the benefits that a major mastering facility can offer. Still, there is a lot you can do to properly prepare your project for its final stage. I asked Paul Elliott, mastering engineer at The Soundlab at Disc Makers (one of the largest American manufacturers of independently released CDs) to describe some common pitfalls to avoid when preparing a project for duplication.

### Do you get many projects from artists who have already done their own mastering?

We do get a good number of people who are doing it themselves. They go out and get an all-in-one type of box and feel they can master the music themselves. We're dealing with people that don't really have a large budget, so they are cutting corners in this way. When it gets to us, sometimes the damage is already done, and they're hoping that we can improve it. We sometimes are trying to undo what's been done.

### You deal with vinyl in addition to CDs. What are some of the differences from a mastering standpoint?

For vinyl, your phasing is much more important. You can't have stuff out of

phase on a record, because your needle's going to be jumping out of the groove. Out-of-phase bass content—mainly kick and bass—is more problematic in causing cutter-lift, which causes the cutter head to lift off the record.

### What about vinyl and the loudness issue?

There's still a push with vinyl to be just as loud as everything else. But depending on how many songs there are on a side, we have to worry about how much bass and how much volume we can give a record. There are a number of different rules to follow.

### Do you have any advice for artists submitting their projects (both CD and vinyl) for mastering?

My advice generally is that it's a good thing to have another set of ears listening to the music and giving opinions and making some decisions on it. They can take a step back and look at it from a different perspective. Have a mastering engineer or someone other than yourself or the studio engineer who recorded it listen to your mixes. Occasionally, artists or engineers will do their own thing, and then they'll send

it in, and they'll want feedback. Usually, what I end up talking to them about is getting the best out of each track.

### Can you elaborate on that point?

Take some time to get each individual element to sound as good as possible. Use good musicians, good mics, good snares, and so on, to get good sounds. Then you're building with quality material to start with. There's that old saying about fixing it in the mix. The same thing happens here. People say "fix it in the mastering." It's not going to work out that way; there is a ceiling to what mastering is going to do for your project. Start with high standards for every detail, and the end result after mastering will be something you can be very proud of.



Paul Elliott

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# Masters on Mastering

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Marcussen's large collection of gear includes digital processors from Weiss, TC Electronic, dbx, and Waves; Manley and SSL compressors; a Sonic Solutions DAW; and Studer 820 and Ampex ATR 102 2-tracks.

## MAKING LIFE DIFFICULT

What makes a mastering engineer's work more difficult? One major cause of trouble is too much compression or preprocessing used during the mix-down phase of the project.

“The one problem that's pretty hard to fix,” says Hall, “is when somebody

comes in with material that's already pretty well slammed. It doesn't usually leave us much room to work when something's already compressed and, basically, totally annihilated. You can do some subtle EQ, but you're pretty much locked in at that stage of the game.”

Marcussen agrees. “When people work on workstations,” he says, “they have a tendency to use some of the plug-ins a little too enthusiastically, which doesn't leave much room at the back side for mastering. So, if you come in with something pretty loud and pretty blazing, it just makes it more difficult to solve a problem that needs to be fixed.”

The best way to make things go smoothly at the mastering phase is to come in with well-crafted mixes. “For me, the biggest problem is that often there isn't enough time spent riding vocal levels so you can hear all the words properly,” says Ludwig. “Once that is achieved, it's important to print

that carefully balanced vocal at several different levels. The second item is that our ears love analog. Great-sounding digital recordings can be done, but I think it takes a little more expertise and care to achieve that than with older analog techniques. There are more pitfalls with latency and overload headroom to observe. Many professional analog equalizers sound amazing; there are many digital equalizers that sound horrible. Great ones are out there, but buyer beware!”

Ludwig adds, “Use your ears. Try to get it as perfect in the mix as possible. Having said that, if someone is insecure and feels that they need extra compression, use caution. Most recording compressors are great for mixing but don't really make good mastering compressors. Once you put compression into the mix, there is no way to take it off. If you aren't sure, a much better plan is not to do much compression and let the mastering engineer take care of it.”

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## READY TO GO

I also asked the experts to offer their advice for those looking toward a career in mastering.

"Make sure it's the kind of thing you want to do," says Marcussen. "Mastering is a great business to be in from my perspective, but it doesn't have the buzz of being in the recording studio, where you're there when the track is cut and the magic of the track comes together. It's a little more technical than being in the recording studio. The nice thing for me is that it's a 50-50 split between technical expertise and the creative side."

However, be ready for some serious pressure. "It's a pretty intense world to work in," Marcussen says. "There's a tremendous amount of responsibility. It is the final stage. From here it goes to manufacturing. So you really want to dot your *is* and cross your *ts* properly."

Ludwig stresses the importance of a mastering engineer having a musical perspective. "For me, it's essential for an engineer to be a musician as well," says Ludwig. "All of our engineers at Gateway Mastering and DVD play an instrument and have at least a four-year degree from a school that specializes in making music as well as recording and producing, such as the University of Massachusetts at Lowell or the Berklee College of Music in Boston."

In addition to the right training and background, having the right workspace and the right gear is key, according to Ludwig. "The next most important thing is to have a fantastic monitoring system—as all your judgments will be based on this—having a great, acoustically perfect-as-possible room to put them in. For me, it means the room needs to be rather large in order to have as few bass eigentones as possible." (Eigentones are acoustical resonances or standing waves in an enclosed space. They are caused by parallel surfaces, and they typically can muddy the sound or create bass frequencies in the room that are not in the recording.)


Finally, you must have the right approach. "Don't go overboard with com-

pression," Hall emphasizes. "I know that there are a lot of people that slam the crap out of stuff, and it's pretty unfortunate. It basically takes the music right out of the music, and you end up with something that's so right in your face, you can't even appreciate listening to it—or you don't want to listen to it twice."

Ludwig sums it up this way: "Do no harm. For most of the recordings I work on, great mix engineers and pro-

ducers have spent lots of time trying to get it right in the first place. I honor what they send me and try only to add any additional musicality my ears hear that can be enhanced in the mixes." Words to live by.

*JJ Jenkins is a San Francisco Bay Area producer, musician, and songwriter. He performs with the band Ariel and is the coauthor of Crazy Campsongs ([www.crazycampsongs.com](http://www.crazycampsongs.com)), a book of humorous songs.*



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# 7 DEADLY Synths

By Geary Yelton

**A**t the heart of most recording studios, alongside the multitrack recorder, mixer, mics, and monitors, you'll find a synthesizer—often more than one. It might be an 88-note weighted keyboard controlling a stack of MIDI modules or a portable USB keyboard linked to a laptop stuffed with the latest soft synths, but the ultimate in prestige and convenience is a top-of-the-line synthesizer. Many studio owners aspire to own pro-level recording gear that will attract well-heeled clients to book time at their facilities, and one object that's sure to impress potential customers is a first-rate synth with all the bells and whistles.

The premise for this article was simple: to select and evaluate the most desirable, drool-worthy electronic instruments, synthesizers that are undeniably objects of technolust. Coming up with a list wasn't difficult; all I had to do was look around and see what excited me. The first hurdle was narrowing the field to just seven candidates.

When I discussed the idea with the other **EM** editors, we decided to exclude instruments that we'd already covered more than once in the magazine. We've published several reviews and a Master Class on the Korg Triton and its various manifestations, and the Yamaha Motif and Kurzweil 2600 are also in danger of overexposure. Last year, we ran a review of the Swedish-made Clavia Nord Lead 3, and I wrote about its rackmount counterpart, the Nord Rack 3 module, in the August 2002 synth roundup, "Analog Supermodels." We considered the monophonic Moog Voyager but decided that it warrants a full review (stay tuned). Thus, my initial list was whittled down to seven.

## THEN THERE WERE SEVEN

The next challenge was acquiring all seven instruments at the same time. A few were very scarce but nonetheless very sought after. In some cases, their manufacturers simply hadn't caught up with demand, much less produced spare units to send to reviewers. Weeks into my quest for the seven deadly synths, I began to fear that I would need to revise my list. But with patience, perseverance, and persistence, I finally got my hands on every synth on my A-list—even two rare, rackmountable, analog boutique models, the Jomox SunSyn and the Studio Electronics Omega 8. The remainder reads like a wealthy rock star's shopping list: the Hartmann Neuron, the Waldorf Q+, the Novation Supernova II Pro-X, the Access Virus kc, and the Roland V-Synth.

PHOTOGRAPH BY LESLIE HIPSCH



The seven synths I chose have plenty of similarities. The five that aren't true-analog modules employ subtractive synthesis with a combination of analog modeling and sampled wavetables. Most have multi-effects processing, at least one arpeggiator, a vocoder, and the ability to process external audio. All but the two modules have five-octave keyboards. All seven have front panels studded with knobs and buttons, multimode filters, extensive modulation routing, and a price tag over \$2,500. Four are German-made, one is British, one is Japanese, and one was designed and manufactured in the United States.

#### ACCESS VIRUS KC

Access Music manufactures four synthesizers with virtually identical sound engines and capabilities. All are descendants of the Virus A and subsequent Virus B analog-modeling synths. The series now comprises the five-octave keyboard Virus kc (\$2,595), the three-octave keyboard Indigo 2 (\$2,595), the tabletop Virus C (\$1,995, reviewed in the August 2003 issue), and the Virus Rack XL (\$1,495). The Virus Rack Classic (\$945), yet another variation, has half the polyphony of the others, and Indigo TDM (\$795) is a plug-in version for Pro Tools users. I chose the top-of-the-line kc model as the deadliest Virus.

The Virus kc is lovely to look at, with 32 high-quality knobs, 35 square buttons, and 69 indicator LEDs (see Fig. 1).



FIG. 1: With a five-octave keyboard, the Virus kc is at the top of Access's synthesizer line. Like all the current Virus models, it's a virtual-analog synth with frequent operating-system upgrades.



FIG. 2: The Hartmann Neuron is this year's darling of the electronic-music world. It features a unique user interface and unprecedented hands-on control of instrument modeling parameters.

All the controls are grouped onto just less than half the front panel, all within easy reach of your left hand. The Virus's liquid crystal display shows 32 hard-to-read black characters on a dark red background. Like that of all the other keyboards I tested, the Virus's action is semiweighted, but it feels like the best of the bunch. On the rear panel are ¼-inch jacks for six assignable outputs, two audio inputs, a sustain switch, an assignable footpedal, and stereo headphones, as well as MIDI In, Out, and Thru ports. Digital audio I/O is not an option.

In addition to the external audio inputs, the Virus's sound sources are three oscillators, a suboscillator, and a noise generator with three colors. Each of the three oscillators produces a waveform that's continuously variable from sawtooth through pulse, and 64 other wave-shapes are available, including sine and triangle. Sync, FM, and ring modulation are provided. The Virus's polyphony maxes out at 32 dynamically allocated notes, but any Program that uses the third oscillator reduces polyphony by about one-third. Consequently, most sounds use only two oscillators.

The Virus has two versatile resonant filters, each offering lowpass, highpass, bandpass, and bandstop response. Four

routing modes determine their slopes and whether they're in series or parallel. In Split mode, for example, oscillator 1 is routed to filter 1 and the others to filter 2, and both filters have a 12 dB-per-octave slope. The filter section's Saturation stage is always downstream from filter 1. It imparts a sound, ranging from warm overdrive to hard clipping, to each voice individually. In addition to altering any sound's harmonic spectra, it's capable of reducing bit depth and sampling rate. Certain Virus sounds owe their particular character in large part to Saturation.

The two envelope generators (EGs) are standard ADSR, but the sustain stage has an additional Time parameter that you access from the Edit menu or by using a shortcut. A mixer combines signals from the oscillators, noise generator, and ring modulator. Two soft knobs located below the LCD change the values of whatever parameters appear in the display; most factory Programs provide one or two different real-time parameters for the soft knobs.

The LFOs/Mod section offers extensive modulation routing, and you can morph LFO waveforms from one shape to another. The three LFOs can sync to the master clock or to MIDI Clock, either of which also drives the arpeggiator. The arpeggiator supplies 64 factory patterns, most of which are oriented for 4/4 time. For additional time signatures, you can divide the arpeggiator's clock into subdivisions of the master tempo. In either Single or Multi mode, you can play as many as 16 arpeggiators at the same time.

The Virus's sound is rather distinctive and very flexible, evolving from ethereal to punchy at the twist of a knob. I'd



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# 7 DEADLY Synths

never mistake it for a real analog synth, but it's one of the finest-sounding virtual analogs. Although its subtractive-synthesis architecture is similar to analog, a handful of extra features contribute to the Virus's characteristic flavor. The Virus holds as many as 1,024 Programs. All Program locations are user-programmable, but only two of the eight Banks are RAM-based. The remaining six, like the operating system, are programmed into flash ROM. As it ships from the factory, four Banks are filled with factory Programs; the remaining memory contains a demo song, which you can delete. You can easily replace what's in memory by playing a Standard MIDI File (supplied on CD-ROM) into the Virus and pressing the Store button. The CD-ROM also contains a Virus-specific version of Emagic SoundDiver (Mac/Win). Plenty of Virus Programs to suit almost any style of music are also available from the Access Music Web site and many other online sources.

You can update the Virus's operating system the same way you replace Program Banks: by playing a MIDI sequence. The latest version, OS6, adds a feature called Pure Tuning, Access's adaptive tuning technology that analyzes chords in real time and retunes each note for perfect intonation. By

overcoming some the compromises of equal-tempered tuning to eliminate beating between notes, the Virus can play distorted sounds in chords that ring out with unusual clarity. OS6 also bestows dozens of new command shortcuts and the latest arpeggiator patterns. Access Music has an admirable history of providing free system updates that extend the Virus's capabilities. Any buyer of a Virus can be pretty sure that it will do more in a couple years than it could when it was new; you have to like that!

## HARTMANN NEURON

High on the desirability scale is the most expensive synth on the list, the Hartmann Neuron (\$4,995). It's also the most unconventional design, as evidenced by its outward appearance (see Fig. 2). Its striking elegance invites you to sit down and play. The Neuron has only 9 traditional knobs, but it has dozens of buttons and indicator LEDs, 5 joysticks, 13 backlit LCDs, and 14 wheels with LED ladder displays. All knobs and wheels are of the infinite-rotation variety. You switch on the power by pressing a huge illuminated orange button on the rear panel, which is otherwise unoccupied. When the power is on, you hear the whisper of fans cooling the internal 20 GB hard drive.

A beautiful pale wood panel covers the Neuron's right side. All its connections to the outside world are grouped on the left panel: six analog outputs, two analog inputs, a pair of coaxial S/PDIF ports, a stereo headphone jack, three control-pedal ports, three MIDI ports, USB, and an IEC power socket. The USB port enables connection to external hard drives and CD burners as well as computers. The six unbalanced 1/4-inch outputs are assignable, and they're labeled as outputs for 5.1 surround sound.

You control pitch bend and modulation with a self-centering, translucent orange



FIG. 4: The Supernova II Pro-X is Novation's flagship analog-modeling synth. It offers a profusion of front-panel controls, including 136 buttons that light up when they're active.

plastic joystick, which feels just a bit fragile for such duties. Additional left-hand controllers are the Master Volume knob, an assignable Control knob, and an assignable wheel. You can easily reach all four without lifting your hand.

The Neuron's appearance isn't its only remarkable feature; its sound and architecture are likewise out of the ordinary. The Neuron resynthesizes sampled sounds and then lets you select from a list of Models. You sculpt the sound by manipulating whatever parameters appear most suitable for it; exactly what parameters are available depends on the Model you select. Because the choice of parameters depends on the nature of the sound itself, many of the front-panel controls are, by necessity, reconfigurable.

The Neuron is organized into sections that correspond to traditional synthesizer modules. Nonetheless, Neuron users will need to learn a new nomenclature that reflects Hartmann's fresh approach to sound synthesis. Instead of oscillators, the Neuron has Resynators, and the filter and insert effects are lumped together in a section called Silver (because, Hartmann says, they add "a lustrous shine"). Some of the name changes seem unnecessary: the LFO is called Mod, and ADSR EGs are called Shapers—so much for standardization. Your first stumbling block in learning the Neuron, then, is acquiring a new vocabulary.

Changing the name of the oscillators makes the most sense, because the Resynators do much more than simple oscillators. They are the sound source and its environment, as well as direct access to parameters you use to change their various characteristics. The modeled sound source is called the Scape,

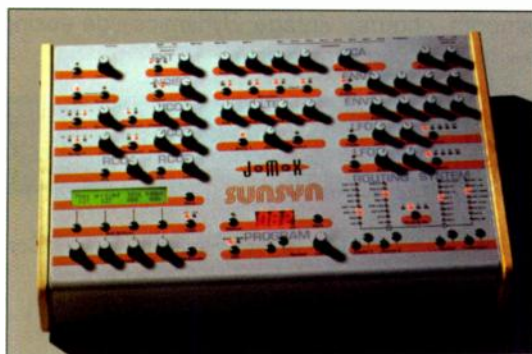


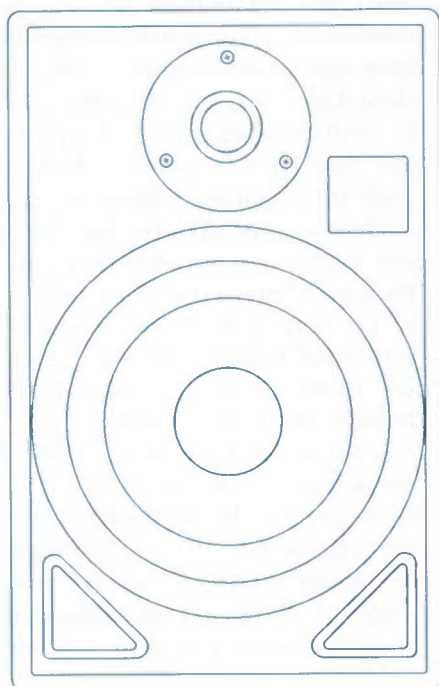
FIG. 3: The Jomox SunSyn is a true-analog synth module with extras such as external audio processing, digital wavetables, and four independent filter poles.



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# 7 DEADLY Synths

which corresponds to resonating strings or vocal chords, for example. Controlling the Scape allows you to govern the attributes that form a sound. The environment from which the sound origi-

nates is the Sphere; this might be a violin body, a singer's chest and throat, or the room in which a sound occurs. Because using computer modeling to re-create a stringed instrument is so different from using it to re-create, say, wind and rain, each Model's Scape and Sphere have a different set of parameters.

The Neuron allows you to manipulate the characteristics of the Scape and Sphere in real time, using buttons and joystick controllers, called simply sticks.

The sticks are shaped so that you can grab them either with your forefinger and thumb or with only a fingertip. In the corners surrounding the sticks are four LCDs that show a parameter name and its three-digit value. The parameters at opposing corners are opposite characteristics, such as Simple and Complex, SmallBdy and LargeBdy, or MtrSoft and MtrHard. They can also be opposite ends of the same spectrum, such as 000StrTensn and 127StrTensn.

You can record your stick movements to modify parameters in real time and then play them back as a sequence. More often, you'll use an ADSR envelope to modulate parameter values. A button press quickly switches the four displays from Scape to Sphere parameters, and a Parameter Level button switches among three parameter sets for each. Located between the two Resynators is the Blender, which lets you fade from one Model to another, so you can morph from a Hammond B-3 to a bell, for instance, or even from crickets to fire. You can control the transition manually with the Blend wheel or automate it with a Shaper.

The section labeled Silver comprises a resonant multimode filter and two multi-effects processors. As with the Resynators, you control four reassignable Silver parameters with a stick. At least the filter parameters are familiar: cutoff, resonance, mix, and feedback. Accessing the filter menu lets you specify whether the filter type is lowpass (with a choice of three slopes), highpass, or bandpass. Silver's effects are divided into Frequency and Time types. Frequency effects include EQ, compression, distortion, ring modulation, and the like. Time-based effects are stereo spread, delay, phaser, flanger, and chorus. You can use Silver's stick to control an effect's two most important parameters in real time. You can also use it to control panning when the Neuron is in Surround mode.

As I mentioned previously, the three Shapers are ADSR EGs. As with other synths, one envelope normally controls filtering, another controls amplitude, and the third is assignable. For more complex contours, you can combine two Shapers to create an envelope with four

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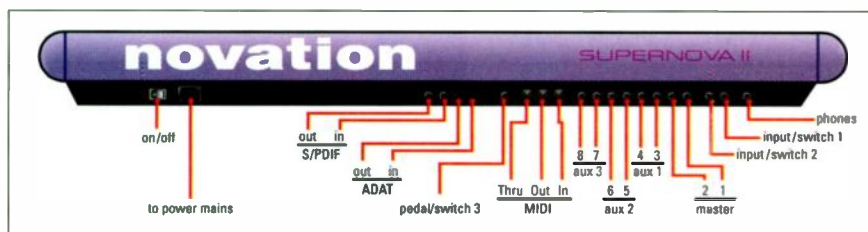
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**FIG. 5: Analog audio I/O, MIDI ports, control jacks, and a power connection populate the back of the Supernova II. If only digital audio I/O were available!**

levels and four time values. You control each stage's value with wheels on the control panel. Although fine-tuning envelope values with the wheel is easy, I usually prefer sliders; I seldom need to tweak attack time, for instance, by only a millisecond. (Envelope times aren't calibrated in milliseconds, though, but in a range of values from 0 to 127.) Flanking each Shaper wheel is an LED ladder that lets you conveniently view envelope values at a glance. You can control envelope depth with Velocity or Aftertouch.

The section labeled Effects applies

delay and reverb to the Neuron's outputs. The stereo delay has a tempo tap function for matching delay time with tempo. The reverb is definitely of the highest quality I've ever heard in a synthesizer, and it's in large part responsible for the sumptuousness of many of the Neuron's factory sounds.

The Neuron ships with 286 included Models, with enough locations for 512. They run the gamut from Ambientpad and Tapestring to Paper and Exhaust; instrumental Models range from Tuba to Telecastr. As I mentioned, each

Model has a different set of parameters; one level of the B-3 organ Model, for example, provides the parameters Warm or Cold and Planar or Tubular for the Scape. You can also create your own Model using the included ModelMaker software (Mac/Win). The selected Model also determines the Neuron's polyphony, which maxes out at 24 notes.

The Neuron is 4-part multitimbral and has memory locations for 1,000 sounds, though it currently ships with only 190. Whenever you select a sound, it takes about a second to load—sometimes more and sometimes less, depending on its length and complexity. Many of the sounds are steeped in atmosphere—unidentifiable sources with gradual attacks, awash in heavy reverb. Other than a few acoustic guitars, synth basses, electric pianos, brass instruments, and string ensembles, emulative sounds are in short supply, but I don't mind leaving those duties to other synthesizers. Most of the Neuron's

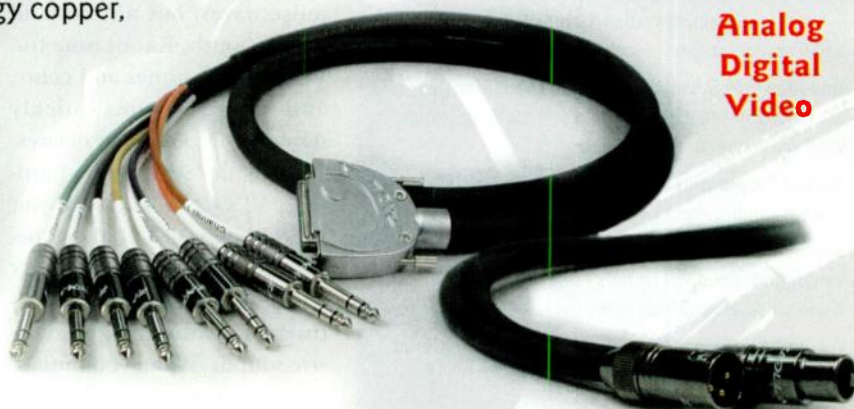
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# 7 DEADLY Synths

sounds are subtly beautiful and even awe-inspiring. They sound electronic, yet very organic in nature. **EMWEB GLOSS** The Neuron really is like no other instrument I've ever heard.

## JOMOX SUNSYN

The SunSyn (\$3,495) is an authentic analog synth module from German manufacturer Jomox. With wooden side panels attached, it's a tabletop model, but you can remove the panels to mount it as a 6-rackspace device (see Fig. 3). The SunSyn is 8-note polyphonic and 8-part multitimbral, so each voice can act as an independent monosynth. Each completely programmable voice has two analog voltage-controlled oscillators (VCOs), two digital Ramp-Controlled Oscillators (RCOs), a pink-and-white-noise generator, a multimode voltage-controlled filter (VCF), a stereo

voltage-controlled amplifier (VCA), two discrete analog ADSR EGs, and two digital LFOs. The SunSyn's analog routing matrix allows you to repatch the signal flow by simply pressing buttons.

All connectors are located on the rear panel (or on top when it's rackmounted). The SunSyn has two inputs, eight individual outputs, two main outputs, and a stereo output for headphones. Except for the three MIDI ports, PC Card slot, and IEC power socket, all are balanced 1/4-inch jacks. The inputs accept both audio signals and control voltages.

As it should on any synth worth its salt, the front panel's logical layout makes the SunSyn's architecture easy to grasp. A backlit, yellow green, 2-line-by-24-character LCD reveals program and parameter names and data, and a large three-digit LED shows program numbers and parameter values when you turn any of the 40 knobs. Most of the parameters hidden in menu pages pertain to the arpeggiator, MIDI, and global setup (though the arpeggiator is not yet implemented). You can easily access those with the Page and Menu buttons, four soft buttons, and four corresponding soft knobs. All of the other section have dedicated knobs, buttons, and indicator LEDs.

The VCOs generate either sawtooth or variable-width pulse waves, but not both simultaneously. Knobs tune the VCOs in semitones and cents, and Range buttons quickly transpose frequency by octaves. Pressing the Sync button hard-syncs VCO 2 to VCO 1. If you press Restart, VCO 1 always begins at a zero crossing when it's triggered—an important feature for synthesizing percussive sounds. When you initiate the auto-tune procedure by pressing the Sync and Restart buttons simultaneously, its



**FIG. 6:** The Roland V-Synth has a touch-sensitive pad and a touchscreen display that provide ample tactile control. The V-Synth harnesses VariPhrase technology to manipulate samples in real time.

progress is detailed in the main display.

The RCOs play short samples stored in flash ROM, each exactly 256 samples long, contained in one of seven tables called Wavesets. Each Waveset is a 16-bit, 44.1 kHz WAV file comprising 248 consecutive waves. You can choose individual waves or several consecutive waves from the RCO menu and play them in a loop, either forward or in reverse, to create distinctly digital timbres. You can play the RCOs either with or without the VCOs, and you can sync the RCOs to the VCOs to increase their timbral complexity. (That gets especially interesting when you modulate one audio oscillator with another.)

You can't sample audio though the SunSyn's inputs, but Jomox sells a CompactFlash card with a PC Card adapter (approximately \$67) on which you can copy monophonic WAV files from your computer. When you place the card/adapter combination in the SunSyn's card slot, it converts your audio data to Wavesets. The company also has plans to post downloadable Wavesets on its Web site. The SunSyn accepts cards as large as 64 MB that contain any number of Wavesets.

The SunSyn's filter offers a unique, fully configurable design with four cascaded poles. You can specify the number of poles to produce a 6, 12, 18, or 24 dB-per-octave slope. By changing the cutoff frequency of each pole independently, you can even produce responses in between those settings. No matter how many poles you select,

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# 7 DEADLY Synths

resonance is always applied to all four poles, so it self-oscillates as it would on a 24 dB-per-octave filter. You can switch any pole from lowpass to highpass and combine them for bandpass response. You can also manually transpose from one set of filter parameters to another by programming two filter Scenes and turning the Morph knob. The sound and flexibility of the SunSyn's filter are quite remarkable.

One unique aspect of the SunSyn is its Routing System, which lets you push buttons to quickly redirect signals as if you were repatching a modular synthesizer. New routings are stored as part of a program. Two sources, from a selection of 16, are sent to a choice of 8 destinations. The depth of the signal is controlled by one of eight Modifiers. One Modifier, called the Control Element, is an assignable MIDI controller, such as the mod wheel or Aftertouch. The Routing System serves as the SunSyn's modulation matrix, and it allows you to reroute oscillator signals for frequency, amplitude, pulse-width, cross-, and ring modulation.

External audio inputs are normally routed to the VCF and the VCA for processing, but you can also insert them into the Routing System to modulate internal audio or control signals. An envelope follower converts audio signals to control voltages. The filter's flexibility makes it ideal for processing audio signals in the studio.

Several planned features haven't been implemented yet. The arpeggiator is

under construction, and voice allocation in Multi mode needs work. In addition, a few MIDI settings are still missing, so a number of enhancements are forthcoming. Jomox plans to address these concerns by the time you read this.

The SunSyn stores 256 Single Sounds and 128 Multi Programs, all of them user-programmable. From the factory, over two dozen Single Sounds and all of the Multi Programs are blank. I also noticed that some of them have identical names, even though they're obviously different sounds; apparently, no one bothered to rename them when they were edited.

I was very impressed by the quality, utility, and versatility of the factory programs. Thanks to its well-implemented architecture and the efforts of some obviously talented programmers, the SunSyn sounds awesome. **EMWEB CLIPS** Because I often prefer the sound of analog modeling to the real thing (heretic that I am), I consider that to be no small accomplishment. Pads, leads, basses, electronic effects—the SunSyn puts a great collection of malleable analog sounds at your disposal. In fact, the SunSyn is the best-sounding polyphonic analog synth I've heard in years.

## NOVATION SUPERNOVA II PRO-X

The only British entrant in the lineup, the Supernova II is Novation's flagship synth. It comes in three keyboard models that vary only in polyphony: the standard 24-note Supernova II (\$2,999), 36-note Supernova II Pro (\$3,299), and 48-note Supernova II Pro-X (\$3,499). All three are also available in rackmount models, and all but the Pro-X model can be upgraded for additional polyphony. The Pro-X, of course, is the deadliest of all.

The Supernova II is an analog-mod-

eling synth all the way—very straightforward and very powerful. It's an 8-part multitimbral instrument with seven simultaneous effects per part, and all 56 effects remain active in multitimbral mode. The arpeggiator is one of the most sophisticated you'll find, and matrix modulation offers 130 possible routings for extreme flexibility. On-board memory is sufficient to store 1,024 user-rewritable Programs, 512 multitimbral Performances, and 400 Drum Programs. For quick access, you can store 128 Programs, Performances, and arpeggiator patterns as Favourites. Featuring a 42-band vocoder, versatile filters, and extensive tempo synchronization, the Supernova II is a top-notch performance instrument.

With 43 knobs, 8 sliders, and 136 illuminating buttons, the Supernova's front panel wins the prize for supplying so much immediate, hands-on, real-time control (see Fig. 4). Whenever you turn a knob or move a slider, the complete parameter name and its value are shown in bright blue letters on the 2-line-by-20-character fluorescent display, which is easy to read from any angle. The Supernova has another convenience I was pleased to see on a five-octave keyboard: a pair of octave buttons that light up when they're engaged, located exactly where they should be, just above the pitch-bend and mod wheels.

On the rear panel are two master outputs and six assignable outputs arranged in pairs (see Fig. 5). All are unbalanced ¼-inch jacks that handle +4 dB signals. Two balanced ¼-inch audio inputs double as control inputs, and a third control input is also present. When you aren't processing external audio through the Supernova, that gives you enough control inputs for three footswitches or pedals for additional real-time control. Alongside the three usual MIDI ports and an IEC socket is an unused expansion port.

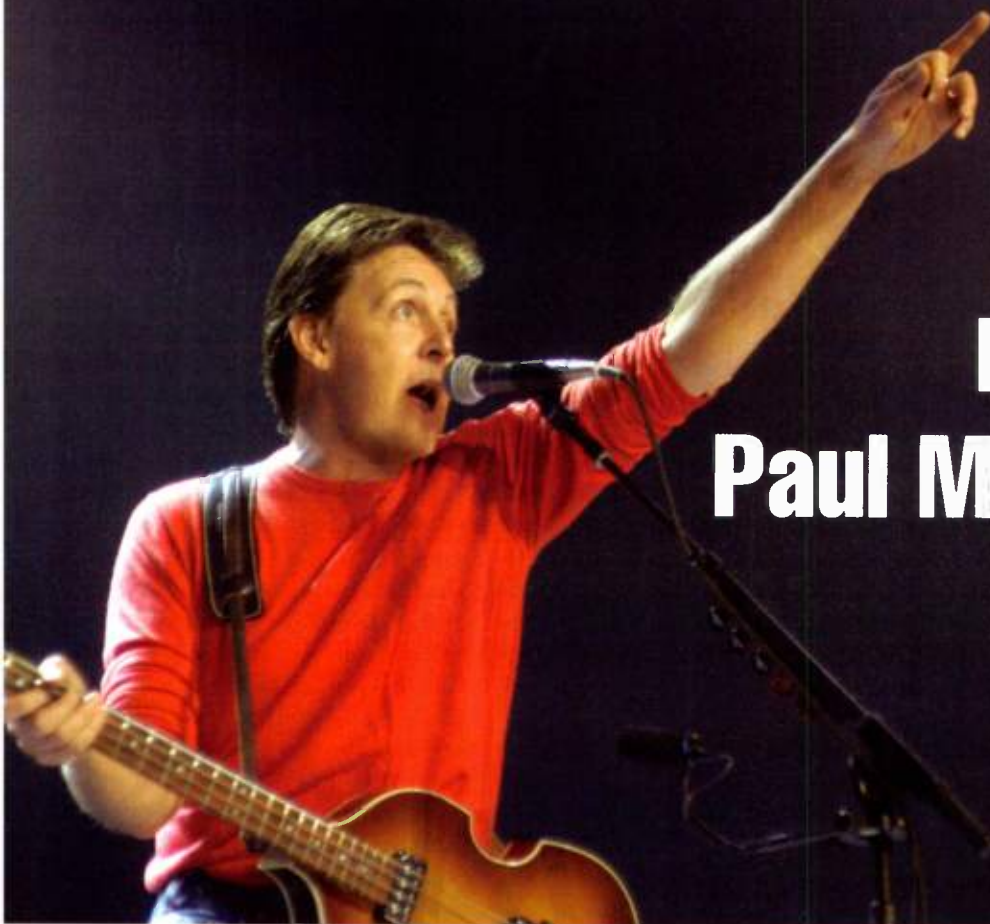
Each voice provides three oscillators and a noise generator. Each oscillator offers variable-width pulse, sawtooth, and double sawtooth waves, and you can select external audio as an oscillator source. A unique Hardness parameter has the effect of smoothing the



**FIG. 7:** The V-synth's audio ports include two ¼-inch inputs with a mic/line switch, two ¼-inch main outputs, a ¼-inch stereo headphone output, and both optical and coaxial S/PDIF. In addition, two ¼-inch Direct Outs carry the same signals as the two Main Out jacks, though untouched by the internal effects processor.



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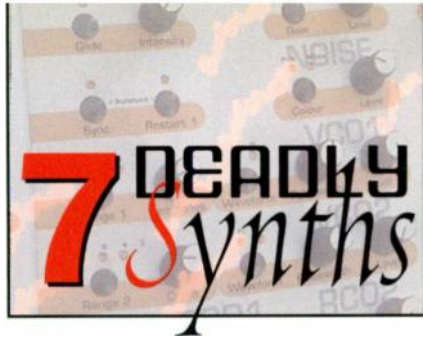
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waveforms to emphasize the fundamental frequency, and you can modulate Hardness with two of the three ADSR generators, the two LFOs, the mod wheel, or any simultaneous combination. When you engage the double sawtooth, a single voice can produce the sound of six oscillators. With full 48-note polyphony, then, the Supernova II Pro-X has all the impact of 288 simultaneous oscillators. Oscillator sync, ring modulation, and FM are always available at the touch of a button.

Dedicated buttons in the filter section offer three resonant responses—lowpass, bandpass, or highpass—each with a choice of three slopes: 12, 18, or 24 dB-per-octave. When you press the Menu button, however, you'll discover that nine dual filter types are also on hand, each producing the effect of a pair of filters in series or parallel. You can modulate the cutoff frequency or resonance depth with the mod wheel, LFOs, or EGs, but when you enable dual-filter types, they modulate the spacing between the two cutoff frequencies instead of resonance. Overdrive provides a warm saturation effect.

The Supernova's arpeggiator is one of the most comprehensive I've seen. Going way beyond the typically limited palette of patterns, it offers 384 user patterns and 256 factory patterns, half of them monophonic and half polyphonic. Patterns have a maximum length of 64 steps, and because you can vary each step's gate time and tie steps together, the Velocity-sensitive arpeggiator functions very much like an analog sequencer. For instant Tangerine Dream, just set up a complex pattern and modulate it by triggering notes on the keyboard.

Effects are another area where the Supernova really shines, if only for the sheer number that you can use at the same time. You can turn on seven simultaneous effects (including EQ) for

each Program. All but one effect has a dedicated section on the front panel with enough knobs and buttons for meaningful real-time control: 2-band EQ (simple Bass and Treble knobs), distortion, pan, delay, reverb, and chorus/flanger/phaser. Pressing the effects section's Special button accesses various menus for setting the comb filter effect.

The Supernova II's sound is like that of all Novation synthesizers: wonderful. So many oscillators in combination with a proprietary filter design results in obscenely lush, fat timbres. The quality and variety of the factory Programs is most impressive. The onboard sounds are an excellent balance of leads, pads, basses, and electronic effects. Acoustic emulations are scarce, but if you're searching for analog-like sounds with a digital edge, the Supernova II will do the job admirably. One final note: as this article was going to press, Novation informed **EM** that it was discontinuing production of the Supernova II.

## ROLAND V-SYNTH

You can always count on Roland to advance the state of electronic music technology. The V-Synth (\$2,695) is the latest in a long line of inventive designs that have kept the company close to the forefront for decades. The V-Synth is Roland's first fully DSP-based synth, and it incorporates some of Roland's best ideas into an instrument with groundbreaking sound creation and performance capabilities. Outstanding features include user sampling, a user-programmable arpeggiator, and unique controllers for real-time expression.

The V-Synth is an analog-modeling and sample-playback synthesizer. It offers 16 multitimbral parts (under external sequencer control) and a maximum 24 notes of polyphony, a number that varies with the load placed on the sound engine. You can reconfigure the V-Synth's architecture by selecting among three Structure types that define the routing of two oscillators, two

COSM (Composite Object Sound Modeling) processors, a modulator (a mixer that provides oscillator sync, FM, and ring modulation), and a time-variant amplifier (TVA). Reconfiguring synth voices is nothing new, but this is the first time that Roland has dedicated so many front-panel buttons to rearranging the building blocks of sound.

All the basics are covered, but their organization is a little unorthodox. For example, each oscillator encompasses four EGs and an LFO, and you can replace any of the 300 factory waveforms with user samples. The COSM processors provide various filters—lowpass, highpass, bandpass, notch, peak, sideband, and comb—as well as waveshapers, effects, and dynamics. The reverb, chorus, and multi-effects are separate from the effects provided by the COSM processors.

The V-Synth's front panel isn't particularly dense, but it is well organized. The first two things you'll notice about the V-Synth are its large touchscreen and its bull's-eye-like Time Trip pad (see Fig. 6). All the performance controls are to the left of the display, and Patch-programming controls are to its right. All analog and digital audio ins and outs are located on the back panel, along with a PC Card slot, IEC power socket, and ports for MIDI, USB, two foot-pedals, and a sustain switch (see Fig. 7).

The V-Synth's backlit, 320-by-240-pixel display responds to the slightest touch (Roland recommends that you use only your finger). Whenever possible, V-Synth parameters are presented graphically. You can point to an on-screen object to select it and drag to change its value. If you'd rather, of course, you can use the front-panel cursor buttons and Value dial.



**FIG. 8:** The Studio Electronics Omega 8 provides a 1/4-inch stereo output and a 1/4-inch trigger input for each voice.

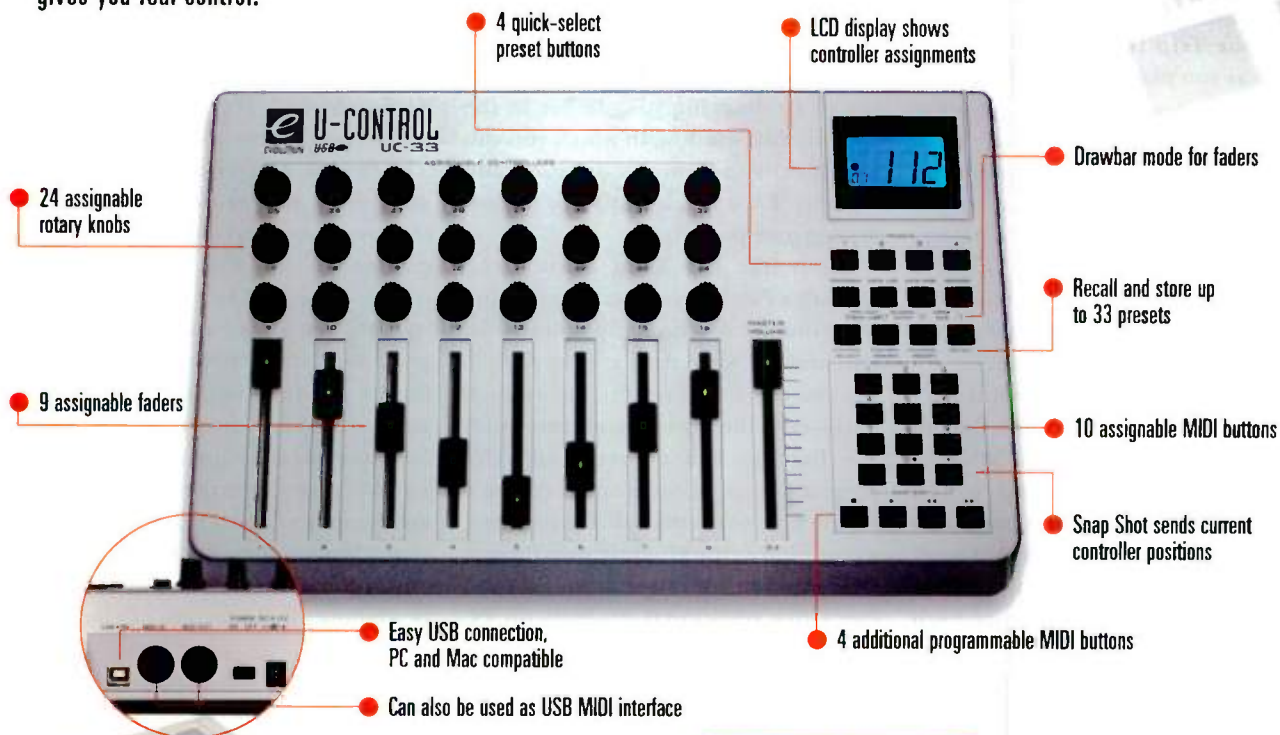


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Like any x-y controller, the Time Trip pad can control a variety of assignable destinations. When you press its Time Trip button, you can use it to modify VariPhrase time parameters without affecting pitch. Press your finger on the pad to freeze a sound's playback in time, looping the portion you've selected, and then manually scrub backward or forward through its content. The effect of such manual control over wave content is hard to describe; suffice it to say that Time Trip is great for warping sounds as you play them.

Another noteworthy controller is the twin D Beam, which detects up, down, left, and right movements when you wave your hand over it. You can use the D Beam to control all the same parameters you can control with the Time Trip pad. In addition, two Assignable Control knobs are conveniently placed on the control panel's left side.

The V in V-Synth refers to Roland's VariPhrase technology. In 1999, Roland introduced VariPhrase with the VP-9000, an innovative sampler and sound processor that could manipulate audio data in new and exciting ways. Although the VP-9000 was a disappointment in the marketplace (owing to its high price), Roland knew the technology was a winner. Luckily, VariPhrase was passed down to subsequent instruments such as the V-Synth. VariPhrase lets you change any sound's pitch, time, and formant, independently and in real time.

With the time-expansion and -compression capabilities of VariPhrase, you can easily adjust a sampled sound to fit tempo. Transposing formants lets you extend a sample's pitch range much farther than normal, without unwanted artifacts such as munchkinization.

The V-Synth can work its VariPhrase magic on your original samples, too. To that end, the V-Synth contains 50 MB of RAM, which is not user-expandable. You can delete any or all of the 30 MB of factory samples to make room for your own. If you store your samples in the 10 MB of onboard flash RAM, they can load instantly. The PC Card slot allows additional storage; with a CompactFlash adapter, you can store gigabytes of data.

The V-Synth's arpeggiator lets you create original patterns with a maximum length of 32 steps. You enter notes by step-time or real-time recording or by dragging your finger in the Pattern Edit window, in which you can also specify each note's duration and Velocity. Each Patch can store its own arpeggiator pattern.

Much like the Korg Karma, the V-Synth's Patch presets make good use of its unique real-time capabilities. All Patches and wave data are rewritable, but you can always restore the original data—even the preset waveforms—with the Factory Reset command. The largest chunk of memory is called a Project; it contains all the Patches, waves, and settings. Only one Project resides in the V-Synth at a time, but you can store additional Projects on PC cards. In addition, you can exchange data with your computer by means of the V-Synth's USB port.

The Roland V-Synth is one of the two most flexible synthesizers in the lineup. Most of the factory sounds are designed to show off its performance capabilities, and the V-Synth is all about real-time expression. As with most of the synthesizers in this article, acoustic emulations are in the minority; however, I was tremendously impressed by many of the

V-Synth's electronic timbres. To download additional Patches, or just to check out the V-Synth in greater detail, visit [www.v-synth.com](http://www.v-synth.com).

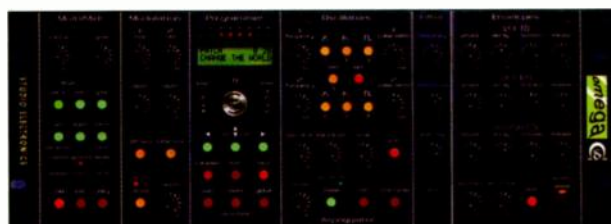
## STUDIO ELECTRONICS OMEGA 8

The American-made Omega 8 is the most straightforward and traditional synthesizer of the bunch. That's no surprise considering its lineage: Studio Electronics got its start modifying Minimoogs, Prophet-5s, and Oberheim SEMs, retrofitting them for MIDI and stuffing them into rackmount modules. Ten years ago, Studio Electronics turned to making its own synthesizers using the same circuit designs as classic analog models.

The Omega 8 comes in four built-to-order models that vary in their polyphony: 2-voice (\$2,295), 4-voice (\$2,995), 6-voice (\$3,795), and the standard 8-voice (\$4,495). For the purposes of this article, only the 8-voice model would do. The Omega 8 offers true analog sound generation and processing, including discrete integrated oscillator and filter circuits.

The Omega 8 is a 4U rackmount module that has a ¼-inch stereo output and a ¼-inch trigger input for each voice, as well as ¼-inch left, right, and mono master outputs (see Fig. 8). It doesn't have a separate output for headphones, and because the three master outputs are mono, you'll need an adapter to use stereo headphones with those. Although any of the individual outputs will drive headphones in stereo, you can hear only one voice.

The Omega 8's front panel contains a 2-line-by-16-character backlit LCD, 33 knobs, and 35 round buttons, most of which illuminate to indicate their status. Controls are divided into logical sections that reveal the instrument's traditional orientation: Oscillators, Filter, Envelopes, Modulation, Arpeggiator, Programmer, and Multi/MIDI (see Fig. 9). For deeper timbre-shaping capabilities, most sections have an Edit button that accesses appropriate pages in the Programmer section. The same infinite-rotation encoder that changes displayed parameter values selects Patches. When you turn any other



**FIG. 9:** The Omega 8 is a true-analog, 4-rackspace synth module with eight independent voices and multitimbral capabilities.



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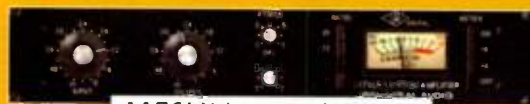
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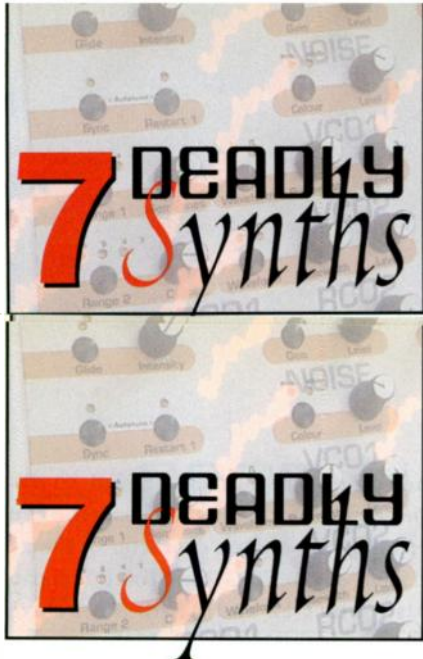
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In most respects, the Q+ is identical to the much less expensive Waldorf Q (\$2,995). The *plus* refers to two significant features: real analog filters and dynamic voice management. Among the filter types, two choices are analog 12 dB lowpass and analog 24 dB lowpass. Because the Q+ has only 16 such filters, polyphony is reduced when you select them—to either 16 notes for one filter or 8 notes for both filters. When you put the filters in series, you can achieve a remarkable 48 dB-per-octave filter slope to produce sounds that most synths just can't. When the Q+ is in Multi mode, you can regain lost polyphony by mixing in Instruments (individual programs) that don't use the analog filters.

where you also set their Velocity response and initial delay times. Either LFO can modulate 3 of 14 destinations and generate 6 basic waveforms. The arpeggiator is very basic, offering up, down, up-and-down, and random modes.

Real analog filters give Q+ timbres an opulent presence that just isn't possible with analog modeling, because they're physical hardware rather than emulations modeled in software. (The Utility menu even contains a Tune Filters command.) Considering that the filter is the circuit most responsible for an analog synth's warmth and character, that plus is a big one.

Dynamic voice allocation is a scheme for increasing polyphony by using the instrument's CPU efficiently. When any part of the sound engine—whether it's an oscillator, filter, effects, or whatever—is unused by an Instrument, the processor recovers the cycles that it would have consumed and uses them to increase polyphony. Consequently, less complex sounds yield as many as 100 simultaneous notes, according to Waldorf.

The Q+ provides four EGs per voice, each with four rather interesting and useful modes in addition to the standard ADSR. ADS1DS2R has an ad-

Being a built-to-order item, the Omega 8 can be customized to suit your needs and pocketbook. In addition to choosing the number of voices, you can specify the color and even order specialized front-panel graphics—for a

justable attack level, as well as a second decay and sustain that follows the first. Loop SIS2 is identical, but it loops between the first and second sustain as long as you hold a note. Loop All is also identical, but it loops through all stages when you hold a note. In One Shot mode, which is intended for percussive sounds, it doesn't matter how long you hold a note; the sustain stage is simply a breakpoint between the decay and release.

Although the Q+ has eight effects processors, each Instrument is limited to just two simultaneous effects. The first four Instruments determine the effects in Multi mode. The variety of effects, though not terribly extensive, includes the usual reverb, phaser, flanger, and the like. One type, called Five FX, is a combination of sample and hold, overdrive, ring mod, chorus, and delay.

An unusual feature of the Q+ is Xphorm, which morphs between two

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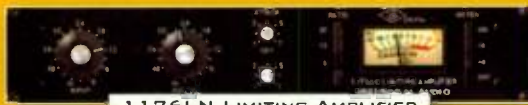
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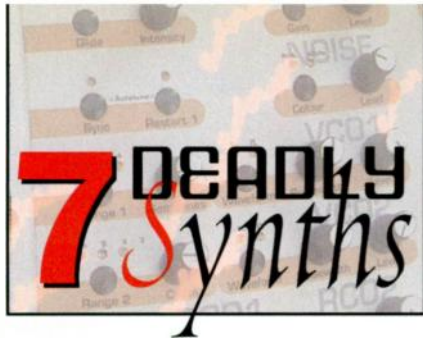


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knobs, however, their values are not reflected in the display, so you must rely on your ears and their positions.

The Omega 8 is classic analog in almost every respect. Each voice has two VCOs, a suboscillator, a noise generator, three EGs, two LFOs, a stereo VCA, and a choice of two VCFs. The VCOs generate sawtooth, triangle, and variable-width pulse waves, all of which you can turn on at the same time for a really huge sound. You can sync the two oscillators or route VCO 2's signal to modulate VCO 1, filter cutoff, or both.

Because the VCOs are analog circuits, they're subject to frequency drift. An auto-tune routine, initiated with a button labeled Accu-Tune, is mercifully quick. However, several times I encountered an irritating bug: one or two of the voices consistently tuned a half-step low. To solve the problem, I put the synth in 8-voice Unison mode and played a low note before engaging auto-tune—a solution suggested by the extremely sparse operation manual. Incidentally, you can apply Unison mode to play two, four, six, or eight voices with each note.

Although each voice of the Omega 8 has two filters (expandable to four), you can select only one filter at a time, so you can't place them in series or parallel. The standard complement is one 24 dB-per-octave Minimoog-style lowpass filter and another that re-creates the 12 dB-per-octave multimode filter found in the Oberheim OB-X. The original Oberheim filter let you sweep continuously from one response to the next; the Omega 8's OB filter gives you a discrete choice of lowpass, highpass, bandpass, or band-reject modes.

The first two EGs are hardwired to control the VCF and VCA, and the third is assignable to 1 of 19 destinations. They look like simple ADSR generators, but you can access two additional decay stages in their corresponding Edit page,

where you also set their Velocity response and initial delay times. Either LFO can modulate 3 of 14 destinations and generate 6 basic waveforms. The arpeggiator is very basic, offering up, down, up-and-down, and random modes.

In Multi mode, you can assign each voice to play a different Patch. Voices can be layered or split and played on the same or different MIDI channels. One uncommon Multi mode is called Prepared, which plays sounds either in unison or alternately on the same MIDI channel; that is, every note can play a different Patch. The Omega 8 doesn't save the edits you make to single Patches in Multi mode.

The Omega 8's *raison d'être* is its sound, filling the soundscape with thick, luxurious analog timbres. Although most of the Patches are best suited for conventional keyboard duties (especially if they're funk-oriented), the Omega 8 supplies several interesting electronic timbres and effects. If real analog sounds are what you crave, the Omega 8 shouldn't disappoint. Two banks of 128 factory Patches in ROM and two banks of 128 user Patches in RAM add up to 512 memory locations, but Studio Electronics usually leaves the user banks blank. The Omega 8 also stores 128 user-programmable Multis. One nice feature is that sounds load instantly when you turn the rotary encoder. The Omega 8 is unusually quiet for an analog polysynth, too.

Being a built-to-order item, the Omega 8 can be customized to suit your needs and pocketbook. In addition to choosing the number of voices, you can specify the color and even order specialized front-panel graphics—for a price. Two additional filters are available, either for one voice at a time or in packs of eight. One design duplicates the lowpass filter on the Roland TB-303 (\$119 each, \$900 for eight), and the other is a re-creation of the ARP 2600's multimode filter (\$129 each, \$975 for eight). If you want an old-fashioned analog synthesizer that's tailored to your needs, Studio Electronics can build one for you.

## WALDORF Q+

The Waldorf Q+ (\$4,500) certainly qualifies as one of the world's most desirable synths. Its respectable lineage can be traced to Wolfgang Palm's legendary PPG Wave, and its designer is the same Axel Hartmann who designed the Hartmann Neuron. The ruby-red Q+ is a top-of-the-line instrument that combines analog-modeling synthesis with wavetable scanning. Its outstanding features include a 25-band vocoder; a 32-step, analog-style sequencer; a 16-slot modulation matrix; and a user-programmable arpeggiator.

The rear panel has two main audio outputs, four assignable suboutputs, a stereo input, two footpedal inputs, and a control input that accommodates one or two footswitches, all on ¼-inch



**FIG. 10:** The Waldorf Q+ differs from the original Q in that it has 16 real analog lowpass filters and dynamic voice management, which produces as much as 100-note polyphony.



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jacks. One of the main outputs works with stereo headphones. An RCA jack provides coaxial S/PDIF out. Three MIDI jacks, a RAM card slot, and a

two-prong socket for an AC cable are also around back.

On the front panel, 58 dedicated knobs are augmented by 39 buttons, a data wheel, a 2-line-by-20-character LCD, and dozens of indicator LEDs (see Fig. 10). The only knob that isn't of the infinite-rotation variety is the Volume control. Two assignable buttons are conveniently located just above the pitch-bend and mod wheels. The

Power/Panic button isn't a simple on/off switch; instead of merely pressing it, you hold it for two seconds to power down.

Because each section has dedicated knobs and buttons, the front panel's layout illustrates the Q+ architecture: three oscillators, a noise generator, two filters, three LFOs, four EGs, and two effects processors per voice. In addition to sawtooth, variable-width pulse,

## Seven Deadly Synths Specifications

Synth	Access Virus kc	Hartmann Neuron	Jomox SunSyn
<b>Retail Price</b>	\$2,595	\$4,995	\$3,495
<b>Sound Engine</b>	analog modeling	physical modeling	analog; wavetable scanning
<b>Keyboard</b>	(61) keys; Velocity, Channel Aftertouch	(61) keys; Velocity, Channel Aftertouch	none
<b>Maximum Polyphony</b>	(32) notes	(24) notes	(8) notes
<b>Multitimbral Parts</b>	16	4	8
<b>Program Memory</b>	(1,024) RAM Programs; (128) RAM Multi	(1,000) Instruments; (512) Models	(256) RAM Single; (128) RAM Multi
<b>Analog Audio Inputs</b>	(2) ¼"	(2) ¼"	(2) ¼"
<b>Analog Audio Outputs</b>	(6) ¼" assignable; (1) ¼" stereo headphone	(6) ¼" assignable; (1) ¼" stereo headphone	(2) ¼" main; (8) ¼" individual; (1) ¼" stereo headphone
<b>Digital Audio I/O</b>	none	(1) coaxial S/PDIF in; (1) coaxial S/PDIF out	none
<b>MIDI</b>	In, Out, Thru	In, Out, Thru	In, Out, Thru
<b>Other Connections</b>	(1) ¼" switch; (1) ¼" CV pedal; AC	(1) USB; (2) ¼" switch; (1) ¼" CV pedal; AC	(1) PC Card slot; AC
<b>Display</b>	(1) 2-line × 16-character LCD	(1) 2-line × 16-character LCD; (12) 11-character	(1) 2-line × 24-character LCD
<b>Effects</b>	(6) simultaneous per part; (96) simultaneous in Multi mode; delay/reverb	delay; reverb; (2) multi-effects	none
<b>Vocoder</b>	32-band	none	none
<b>Arpeggiator</b>	(16) simultaneous; (64) preset patterns	none	pending
<b>Sequencer</b>	none	none	none
<b>Left-hand Controllers</b>	(1) pitch-bend wheel; (1) mod wheel	(1) pitch-bend/mod joystick; (1) assignable wheel; (1) assignable knob	none
<b>Dimensions</b>	38.39" (W) × 4.41" (H) × 13.82" (D)	37.50" (W) × 4.00" (H) × 17.86" (D)	6U × 5.75"
<b>Weight</b>	28.66 lb.	38.58 lb.	26.40 lb.



triangle, and sine waveforms, two of the oscillators provide wavetables containing 128 Alt waves. You can sync the oscillators, which can also produce frequency and ring modulation. Like the Access Virus, the Q+ features its own brand of adaptive tuning technology called HMT, which retunes chords in real time for improved intonation.

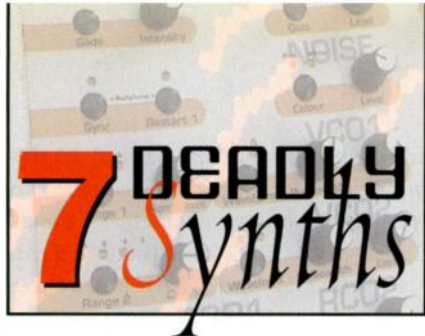
As the maker of the Microwave series of synths, Waldorf has considerable ex-

perience at wavetable synthesis. You can assign the mod wheel or an LFO to modulate the Alt wavetables, or specify that each note play a different wave. If you prefer, you can trigger different waves from the same note by varying Velocity values. You can also supplement each wavetable with a square-wave suboscillator.

Two identical multimode filters offer a variety of resonant response types. In

addition to its normal 12 and 24 dB-per-octave slopes, the lowpass type can emulate the unique character of the 24 dB-per-octave PPG Wave filter. You can also select 12 and 24 dB-per-octave slopes for the bandpass, highpass, and notch (band-reject) types. Yet another type, comb filtering, passes all frequencies to create special effects such as polyphonic flanging or emulating certain acoustic sounds.

Novation Supernova II Pro-X	Roland V-Synth	Studio Electronics Omega 8	Waldorf Q+
\$3 499	\$2 695	\$4 495	\$4,500
analog modeling	analog modeling; VariPhrase PCM; user sampling	analog	analog modeling; wavetable scanning
(61) keys; Velocity, Channel Aftertouch	(61) keys; Velocity, Channel Aftertouch	none	(61) keys; Velocity, Channel Aftertouch
(48) notes	(24) notes	(8) notes	(100) notes
8	16	8	16
(1,024) RAM Programs; (512) RAM Performances; (400) Drum Programs	(512) RAM Patches	(256) ROM Patch; (256) RAM Patch; (128) RAM Multis	(300) RAM Programs; (100) Multis; (20) Drum Maps
(2) ¼" (double as switch inputs)	(2) ¼" mic/line (switchable)	none	(1) ¼" stereo
(2) ¼" main; (6) ¼" assignable; (1) ¼" stereo headphone	(2) ¼" main; (2) ¼" Direct; (1) ¼" stereo headphone	(3) ¼" main; (8) ¼" stereo individual	(2) ¼" main (1 stereo); (4) ¼" assignable
none	(1) optical S/PDIF in; (1) optical S/PDIF out; (1) coaxial S/PDIF in; (1) coaxial S/PDIF out	none	(1) coaxial S/PDIF out
In, Out, Thru	In, Out, Thru	In, Out, Thru	In, Out, Thru
(1) ¼" switch or CV pedal; AC	(1) PC Card slot; (1) USB; (1) ¼" switch; (2) ¼" CV pedal; AC	(8) ¼" trigger; AC	(1) RAM card slot; (2) ¼" CV pedal; (1) ¼" switch; AC
(1) fluorescent 2-line × 20-character	(1) 320 × 240-pixel touch-sensitive LCD	(1) 2-line × 16-character LCD	(1) 2-line × 20-character LCD
(7) simultaneous per part; (56) simultaneous in Performance mode	chorus; reverb; multi-effects	none	(8) multi-effects, (2) per voice
42-band	none	none	25-band
(128) mono presets; (128) polyphonic presets; (192) mono user locations; (192) polyphonic user locations	(1) user pattern per Patch; 32-step max.	(1) preset pattern per Patch	(1) user pattern per Program; (15) ROM patterns; 16-step max.
none	none	none	32-step; (100) user patterns
(1) pitch-bend wheel; (1) mod wheel	(1) pitch-bend/mod lever; (1) pad; (1) twin D Beam; (2) assignable knobs	none	(1) pitch-bend wheel; (1) mod wheel; (2) assignable buttons
40.00" (W) × 4.50" (H) × 13.00" (D)	41.63" (W) × 4.38" (H) × 15.69" (D)	4U × 15.13"	38.86" (W) × 4.72" (H) × 13.78" (D)
22.00 lb.	28.94 lb.	20.00 lb.	17.63 lb.



In most respects, the Q+ is identical to the much less expensive Waldorf Q (\$2,995). The *plus* refers to two significant features: real analog filters and dynamic voice management. Among the filter types, two choices are analog 12 dB lowpass and analog 24 dB lowpass. Because the Q+ has only 16 such filters, polyphony is reduced when you select them—to either 16 notes for one filter or 8 notes for both filters. When you put the filters in series, you can achieve a remarkable 48 dB-per-octave filter slope to produce sounds that most synths just can't. When the Q+ is in Multi mode, you can regain lost polyphony by mixing in Instruments (individual programs) that don't use the analog filters.

Real analog filters give Q+ timbres an opulent presence that just isn't possible with analog modeling, because they're physical hardware rather than emulations modeled in software. (The Utility menu even contains a Tune Filters command.) Considering that the filter is the circuit most responsible for an analog synth's warmth and character, that plus is a big one.

Dynamic voice allocation is a scheme for increasing polyphony by using the instrument's CPU efficiently. When any part of the sound engine—whether it's an oscillator, filter, effects, or whatever—is unused by an Instrument, the processor recovers the cycles that it would have consumed and uses them to increase polyphony. Consequently, less complex sounds yield as many as 100 simultaneous notes, according to Waldorf.

The Q+ provides four EGs per voice, each with four rather interesting and useful modes in addition to the standard ADSR. ADS1DS2R has an ad-

justable attack level, as well as a second decay and sustain that follows the first. Loop SIS2 is identical, but it loops between the first and second sustain as long as you hold a note. Loop All is also identical, but it loops through all stages when you hold a note. In One Shot mode, which is intended for percussive sounds, it doesn't matter how long you hold a note; the sustain stage is simply a breakpoint between the decay and release.

Although the Q+ has eight effects processors, each Instrument is limited to just two simultaneous effects. The first four Instruments determine the effects in Multi mode. The variety of effects, though not terribly extensive, includes the usual reverb, phaser, flanger, and the like. One type, called Five FX, is a combination of sample and hold, overdrive, ring mod, chorus, and delay.

An unusual feature of the Q+ is Xphorm, which morphs between two

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sounds by interpolating between all continuous parameters. You can manually control the Xpformation using either the mod wheel or Aftertouch. Other synth designers have implemented similar capabilities with varying degrees of success, but Waldorf had the wisdom to limit morphing to a sensible set of parameters, including mixer levels and pan; filter routing, cutoff, resonance, drive, pan, and modulation depth; LFO speed, delay, and fade; envelope rates and levels; and oscillator pitch, pulse width, glide, and modulation depth.

The Q+ stores 300 single Programs and 100 Multis, as well as 20 Drum Maps and 100 step-sequencer patterns. Q+ sounds are rich, widely varied and wonderfully animated. Most of them lean toward electronic timbres, as they do in most analog-modeling synthesizers. Plenty of sounds are available from various sources, and the Q+ can receive sound dumps from the Waldorf MicroQ. With so many programming and performance possibilities, I can't imagine anyone ever growing tired of the Q+.

### THE SEVEN-SYNTH ITCH

Variety will always be the spice of life, and all seven synths have their own personalities. Still, they have more similarities than differences. Every keyboard in the lineup has a semiweighted action; I've played a lot more synthesizer than piano, so that's what I'm most accustomed to. Although all of them are perfectly fine, the Virus kc's keyboard was my favorite overall. I realize that keyboard preference is purely subjective, but I liked the action on the Virus and the V-Synth better than the others. The Virus and the Supernova also have the advantage of textured black keys.

The Q+ had my favorite pitch-bend and modulation wheels; they have a responsive feel and assignable buttons conveniently located just above them. I wish that every MIDI keyboard had other controls you could reach with your left hand while still touching the pitch-bend and mod controllers. The left-hand controls on the Hartmann are convenient, but the joystick feels too

lightweight. I've always loved Roland's expressive left-hand lever, though I wish you could pull it toward you for negative modulation; still, it provides all the functionality of a pair of wheels. I was disappointed that none of the synths have ribbon controllers, but the V-Synth's Time Trip pad is in a class by itself.

In terms of real-time, front-panel control, every instrument is outstanding. The Waldorf's infinite-rotation knobs take some getting used to, as do the

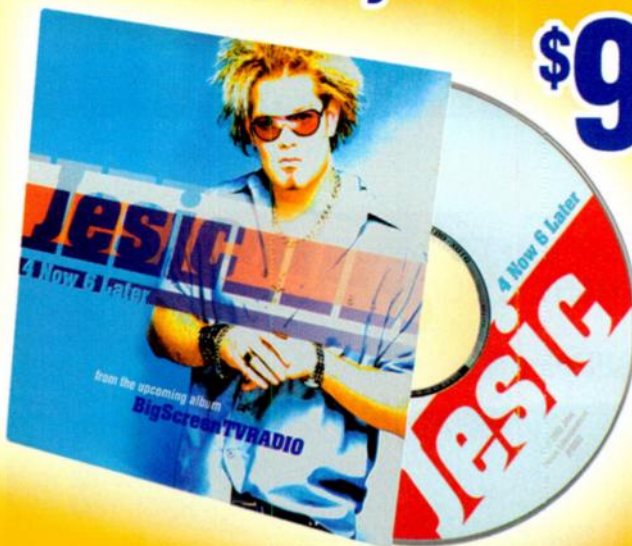
Hartmann's sticks and wheels. The Roland's huge, touch-sensitive LCD puts it way out front in the display department, though the Hartmann's many displays give you almost as much information at a glance.

The most important criterion for judging any musical instrument, of course, is its sound. There's no surprise here: all seven sound excellent. Without exception, any one of them would be a valuable asset in any sound

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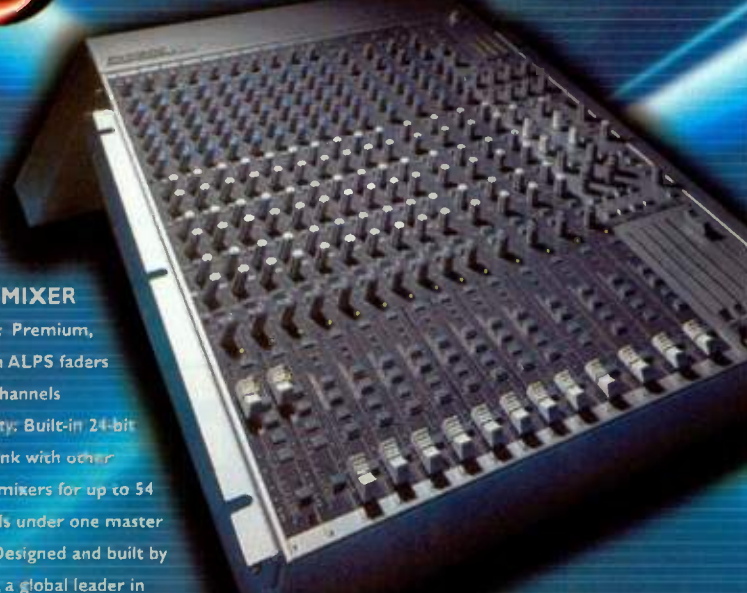
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### THE ENVELOPE, PLEASE

I could happily spend months playing and programming any of these instruments. My favorites, however, were the Hartmann Neuron and the Roland V-Synth. Both offer a flexibility and depth of expression that are unprecedented in electronic instruments. The real-time control capabilities of the Neuron's sticks and the V-Synth's pad, combined with such sophisticated means to make sounds you've never heard, catapult those synths into the realm of instruments you can play with finesse and nuance. If you can afford it, you can't go wrong with the Neuron, though the V-Synth is an amazing value.

I also fell in love with the Jomox Sun-Syn. It's versatile, well designed, and easy to use. It's well worth the price, and it sounds fantastic. If I were shopping for an old-fashioned analog synth with modern conveniences, I'd look no further.

In describing my experience with these synths, I've only touched the surface. Any one of them is so deep that it would take thousands of words to describe in detail. All are worthy of a complete review, as well as your consideration.

All seven synths are stars for many good reasons: they offer great programming depth, abundant real-time performance features, and spectacular sound. If you find yourself within arm's reach of any of them, you owe it to yourself to open your ears and give it a try. You'll hear exactly how far electronic musical instruments have come. Each of them is a wonder of 21st-century technology, and all of them should be considered deadly.

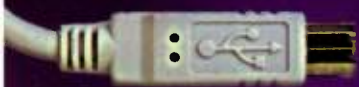
*Associate editor Geary Yelton lives in Charlotte, North Carolina. He has been playing and programming synthesizers for 30 years and reviewing them for EM for 18 years.*



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# Passing the Audition

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MIKE CRUZ

Inside tips  
on the  
program  
formerly  
known as  
Cool Edit Pro.

When Adobe Systems recently purchased Syntrillium Software's technology assets, a new era began to unfold for Cool Edit Pro. By the time you read this, the name likely will have already changed: Syntrillium's Cool Edit Pro has become Adobe Audition.

Changes in Adobe's release of the software under its new moniker are primarily cosmetic. The direction that Adobe plans to go with Audition is not yet clear; for now, though, the software remains a stand-alone audio application, and its basic functioning has not changed. Because it would be impossible to explore all of Audition's features in a single article, this Master Class will focus on using the program for recording and mixing music. Audition is relatively simple to use and intuitive enough for novice users, but there's far more to

it than immediately meets the eye. (Take a look at the sidebar "Audition Overview" if you are not already familiar with the program.)

## RECORDING SETUPS

Seasoned recordists can readily adapt and apply their knowledge to Audition. For the less experienced, a little logical thinking on your part can determine a workable session layout for the Multitrack view (the Edit view is designed for destructive stereo editing). Shortcut keys for the various functions are real time-savers, so use them! Press Alt + K to change or add keyboard shortcuts. Fully displaying all toolbars can save lots of time (right-click in the Toolbar area for options). The button icons for the toolbars are fairly descriptive, and hovering the mouse over them can remind you of designated shortcuts.

By Jon Rose

# Passing the Audition

**Live recording in stereo.** Even if you're recording a stereo pair of microphones (or a mixer feed), you should still use the Multitrack view for live recording. The Edit view limits your recording time to however long it takes your chosen resolution to reach 4 GB, and that could spell disaster in a live situation. In the Multitrack view, audio is automatically divided among multiple temporary files, so hard-disk space is the only limiter. After you stop recording, drop in cue markers (F8) between songs or at other logical points. (If you "baby-sit" the computer during the show, drop in your cues on the fly.) Then drop a cue at the beginning and at the end, and press Alt + 8 to open the Cue List. Highlight all of the cues and choose the Merge function, which converts them to ranges (see Fig. 1). Using the Batch function (its dialog box is self-explanatory), save your selections as separate files, and you have a viable work-around for size limitations on audio files.

Set Audition's temporary directories for your fastest, largest drives (press F4 and then find the System tab). If you have only one drive available for recording, don't even define a secondary temp directory. Many people misinterpret the term *reserve value*—that is

the disk space the program *won't* use, so don't set it to some huge value and expect to record for long periods!

**Live recording using multiple channels.** Assuming you have a multi-I/O audio card in your computer (or two or three, as I do), you can feed your computer lots of channels. Be certain, though, your system is optimized in advance. Test your disk-bus throughput.

Will it *simultaneously* support as many channels as you want it to? Don't wait until the gig to find out!

Lay out sessions that make sense to you. Define conventions and stick to them, particularly if you're going live for the first time. You can easily reorder your tracks by right-clicking and dragging the Track Properties areas up or down in the Multitrack view, but that can waste session time and cause missed takes. Now, some might safely ignore this advice and be just fine without it. But since recording and mixing is how many of us feed ourselves . . .

Time is money. Clients get impatient and testy, even when they aren't paying for setup and downtime, and shows are a one-chance proposition. Create several different session templates for different types and sizes of projects and keep them handy. Lay out a generalized session and save it as the default session in the File menu. Choose the sampling rate and bit depth that you'll use to record, though—this information is saved with Audition's sessions. Whatever sampling rate you choose, use the highest bit depth that your audio card allows and mix using 32-bit, floating-point files for little or no degradation to the audio.

Zippping up and down through the mix with a modern, scroll-wheel-equipped pointing device

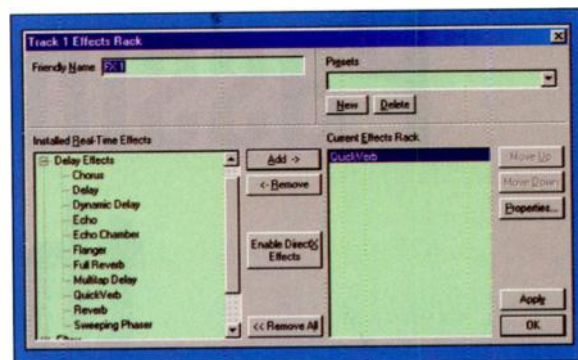
is effortless; but wasting time trying to find a particular track isn't. Practice getting around in your new session layouts, and do that before the gig, too.

**In the studio.** Always spend adequate time obtaining good cue mixes for your talent. If they don't have an adequate cue, they can't give their best performance. Seasoned musicians and speakers might be able to work with almost anything (not that they'll like it), but most people like a wet (affected) cue mix to get into a comfortable sonic space, especially when wearing cans (headphones aren't exactly a natural way to listen!). Take the time to get this right—if you've worked on the performer's side of the mic, you already understand the value in this.

External cue mixing almost always necessitates a multiple I/O audio card, a mixer, and outboard gear, but if you don't have multiple I/O, you can work out some parts of your cue mixes directly in Audition. For a decent-sounding reverb that won't overtax your CPU, open an Effects Rack, expand the Delay Effects list, highlight and add the QuickVerb to the Rack, and press Apply (see Fig. 2). Adjust the reverb's parameters, lock the effect (to take the load off your CPU), and you're ready to roll.

Too many people discount the usability of the track EQ. Highlight a track and press Alt + 5. These 3-band parametric track equalizers are fast and easy to use and are valuable in final mixing, too.

To use a dynamically unruly track in a cue mix, insert a compressor/limiter



**FIG. 2:** Effects are added to tracks by using the Effects Rack in the Multitrack view. QuickVerb, in the Delay category (shown here), uses less CPU power than other reverbs and still sounds decent.

Label	Begin	End	Length	Type	Description
Cue 1	0:00:266	0:02:390	0:02:122	Basic	
Cue 2	0:02:399	0:09:153	0:06:754	Basic	
Cue 3	0:09:153	0:13:508	0:04:354	Basic	
Cue 4	0:13:508	0:18:929	0:05:421	Basic	
Cue 5	0:18:930	0:24:706	0:05:776	Basic	
Cue 6	0:24:706	0:29:328	0:04:622	Basic	
Cue 7	0:29:328	0:31:965	0:02:637	Basic	
Cue 8	0:31:965	0:34:038	0:02:132	Basic	
Cue 9	0:34:038	0:36:704	0:02:666	Basic	
Cue 10	0:36:704	0:39:548	0:02:843	Basic	
Cue 11	0:39:548	0:42:481	0:02:932	Basic	
Cue 12	0:42:481	0:47:280	0:04:799	Basic	
Cue 13	0:47:280	0:50:568	0:03:288	Basic	
Cue 14	0:50:568	0:52:612	0:02:044	Basic	

**FIG. 1:** Using the Merge function, which converts sets of cues into ranges, and the Batch function, which allows file saving, you can create a series of individual files from a list of cues in the Cue List.



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# Passing the Audition

your mouth. Open your mouth and close up the back of your throat with your tongue. Move your tongue all around, listening carefully. The mouth and glottal noises you hear are common with inexperienced singers and speakers and can happen with professional talent when they're a bit dry or tired. You can clean up these high-frequency glitches using the same method I used for the click, but now for the unorthodox tidbit: because you can select an area up to 5,000 samples wide when using the Fill Single Click option, sometimes you can quickly surround and reduce the lower-frequency glottal noises, too! With a quiet passage in which the voice is prominent or there is only speech (and gating might therefore be too obvious), using this trick along with some clever editing and EQ might be your best bet.

Noise reduction is too involved to address thoroughly here; in general, however, experiment with the Spectral Decay setting and don't try to cut the noise too deeply (keep in mind that

getting good results always depends on the material you're working with). Carefully select your noise profiles. A quiet concert recording that has air-handler noise in the background can certainly be improved, but be careful that your reverb tails don't disappear into digital artifacts! You might even try reversing a waveform and applying the noise reduction that way.

## LET'S GO SWEEPING

Some folks have never worked with a quality hardware equalizer, and many more don't yet have a trained ear. Audition's Parametric Equalizer is a powerful tool for finding frequency-related problems, and by following these steps, you can make it work for you (watch carefully!). You'll need to grab the file **honkguitar.mp3** from the **EM Web site** to try this one at home.

As you'll notice, this file is a short acoustic-guitar track with a slightly honky sound. Load the file into the Edit view, highlight the track, and open the Parametric Equalizer. (We won't be

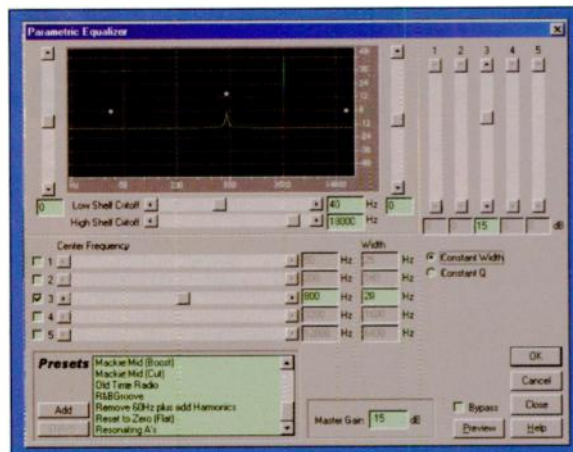


FIG. 5: Creating a sweepable peak with the Parametric Equalizer is a useful way to identify problem frequencies.

using any of the sliders directly adjacent to the graph.) Select the Reset To Zero (Flat) preset in the Presets list. In the middle of the screen on the left, click on box 3 to enable that filter—a new dot appears on the graph. We're about to raise the volume of a narrow band of frequencies, so before doing anything else, type "-15" (minus 15) into the Master Gain value field (bottom center) or reduce your monitor level considerably. This EQ is an Infinite Impulse Response (IIR) filter, which can ring or feed back. Now, to the right of the graph, drag slider 3 upward roughly +15 dB and note the

## AUDITION OVERVIEW

If you aren't a current Audition owner, here's a short summary of the main features of the program. Adobe Audition, which runs on Windows 98 SE and later versions, is largely the same as Cool Edit Pro, version 2.1, and has the same three primary pillars of functionality: a wave editor for manipulating mono and stereo tracks, a multitrack interface for recording and mixing combinations of as many as 128 stereo and mono tracks, and a collection of processing algorithms, including more than 45 built-in effects as well as audio restoration and mastering tools.

Audition supports up to 32 recording and playback devices and can record at 24- and 32-bit resolution at 96 kHz, 192 kHz, and higher sampling rates. The program also

supports DirectX effects plug-ins (but not DirectX instruments), and it works with WDM (and, of course, MME) drivers. Acid-like looping and loop-based composition tools, including session tempo- and key-matching, are integrated into Audition. It can read and write standard loop-file formats and supports a compressed-loop format for smaller file sizes, making possible fast online loop exchanges.

Audition is not a MIDI sequencer, but it can play MIDI files inserted into multitrack sessions, and it can act as a SMPTE master or slave in synchrony with a software or hardware sequencer or other SMPTE device.

Audition has a variety of other features, such as automatic silence detection

and deletion, tempo detection, scripting and batch-processing capability, and timed recording, whereby you can set the software like a VCR to begin recording at a specific time for a set period. There's also support for more than 20 audio file formats and several data-analysis displays that update in real time, including frequency analysis and spectral analysis.

Audition should work with any Windows audio interface or sound card, and it also supports several hardware controllers, including the Tascam US-428 and US-224, Mackie Control, Event EZbus, and Syntrium's Red Rover. You can download a fully functional copy of Audition from [www.adobe.com/audition](http://www.adobe.com/audition).



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# Passing the Audition

graph. Next, enter the value "40" in the third filter's Q parameter field (marked Width). Observe the graph—our filter got narrower (see Fig. 5). Click on the Constant Width radio button and the Q value should change to a frequency range of about 20 Hz.

Now click Preview to loop your selection. Here's the fun part: in the Center Frequency area, sweep the third slider *slowly* back and forth with the mouse. The filter peak we've created will exacerbate the honky part of the guitar. Congratulations, you've just identified your problem frequencies. Slowly reduce the level slider, listening carefully as you pass zero. A slight cut should help, but you might need to increase the filter's width.

This procedure allows easy location and mitigation of many such problems. When you're comfortable using this technique, you can safely grab points on the graph with the mouse and move them around. After some practice, try sweeping your filter with a cut instead of a boost to obtain this result directly. It's not as easy to hear this way, but it's a great training tool for your listening skills.

## UNLEASHING CREATIVITY

Audition is loaded with effects and processors, and a thorough exploration of the subject would require another entire article—the list of parameters is just too vast. Experimentation is often the best approach, but I'll give a few suggestions to get you going.

**I want to be affected.** Upon installing Audition, you'll need to enable DirectX effects by choosing Effects/Enable DX in the Edit view menu. When you add a new effect, be sure to use the Refresh Effects List menu option. To check if effects are enabled, go to the Multitrack view, open an Effects Rack, and look for the big DX-enabler button in the middle of the dialog—if it's not there, effects are already

enabled. Remember, Audition supports DX effects, but *not* DX instruments.

Even the fastest machines can't run more than a few instances of the Full Reverb effect, which is probably the most processor-intensive of them all. Locking an effect will reduce CPU load, and you can always Unlock an effect and adjust it or insert something else.

You can build your own multiband compression in Audition. Use the Frequency Band Splitter in the Multitrack view and apply appropriate compressors on the resultant tracks, or just stack several band-limited compressors in an Effects Rack.

Route several tracks to a bus to apply a common effect or overall compression (complex projects can benefit from buses). Bus functionality and routing could be improved in Audition (you can't route a bus to another bus, for example), but it's still rather useful.

Play with the Dynamic Delay and the Stereo Field Rotate effects—they're a real kick. Or try building your own multivoice chorus and applying it very sparingly to background vocals. Nice!

**Mix it up.** The Mixer window gives you a lot of manipulative power, all in one area. Expand the Mixer with the Show/Hide buttons to show as much or as little of its functionality as you need. If you click and drag on the top-left corner of the (undocked) Mixer window off to the lower right of your desktop, it'll leave just the Master volume visible in a handy, out-of-the-way spot.

Envelopes are powerful tools for fine-tuning loudness, panning, effects, and tempo parameters over time. Enable and Show the Volume envelopes, drag their endpoints down halfway (-6 dB) to give yourself some working room, and then raise the track volume by 6 dB to compensate, if necessary.

Sometimes a crossfade just can't be accomplished properly unless you zoom closely and draw your own envelopes, so go for it. Clicks caused by gaps between waveblocks can be

## TEN QUICKTIPS

1. Remember to right-click everywhere. Many areas have context-sensitive pop-up menus that save lots of time. Keep in mind that there can be three or four ways to get to some of Audition's functions.

2. A modern pointing device with a scroll wheel is an extremely powerful tool in Audition and allows you to move around in your sessions effortlessly. Scrolling through large numbers of tracks, scrolling along the timeline, or zooming in and out both horizontally and vertically is as simple as hovering the mouse in these areas and rolling the wheel.

3. Most of the windows are undockable and movable. Arrange your desktop any way you like.

4. Use the Time-Lock button on the Toolbar to lock newly recorded waveblocks in time. It's very easy to inadvertently nudge a track with a pointing device. If the track is only a few milliseconds off, you could waste lots of time looking for this problem later!

5. Need to make all your tracks the same loudness? In Edit view, try out the Group Waveform Normalize function, which analyzes and adjusts a group of files to the same apparent loudness using their RMS values.

6. You can drag-and-drop effects right onto a waveblock (in either Edit view or Multitrack view) from the Organizer window (Alt + 9) for quick, easy access to the effects' dialogs.

7. Control + P opens the File Header/ID tag window where you can enter creation information for your WAV and MP3 files.

8. Need a visual representation of spectral activity? Open the Frequency windows in Edit view (under the Analyze menu). Frequency Analysis has four Hold snapshots available for comparison purposes. If you need to do some discrete FFT analysis, you can export your audio's FFT data to a text file using Copy Data To Clipboard.

9. Need to check for mono compatibility? Check out the Phase Analysis window, also in Edit view. It can show your signal in a Mid-Side view, as well as Left/Right.

10. Audition has advanced looping capabilities built right in, with thousands of free loops available online at [www.loopology.com](http://www.loopology.com).

Does all this stuff just raise more questions? Try searching the Knowledge Base and Help areas at [www.syntrillium.com/common/search](http://www.syntrillium.com/common/search) (and put a check in the Forums box, too).





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## Passing the Audition

easily smoothed with Volume envelopes. Usually you'll need only a few milliseconds of fade at their edges.

Don't forget to use effects and Wet/Dry envelopes in conjunction with track effects to make dramatic temporal changes (a good companion for that Stereo Field Rotate effect).

**You're surrounded.** Cool Edit Pro 2.1 added the Multichannel Encoder, and it's still part of Audition. You need Windows Media 9 Runtime and at least Windows 98 SE to use the WMA multichannel encoder, so download and install Media Player 9 from Microsoft if needed. Just in case you're running anything older, DirectX 8.0a or above is also required, as is an audio card that has a working multichannel Direct-Sound device driver.

Although a handful of users will be ready for 5.1 surround, most probably won't be. The changeover to 5.1 is still in progress, and many audio cards don't quite support it (device driver problems are also still common). Things are improving, though, so do some research and ask questions before you buy any new computer audio hardware.

If you're already mixing 5.1, take care with your bass management and pay attention to your stereo fold-down mixes.

Even check in mono—you never know where your mixes may end up being played, and broadcast processors can mangle them.

### TAKE ME TO YOUR MASTER

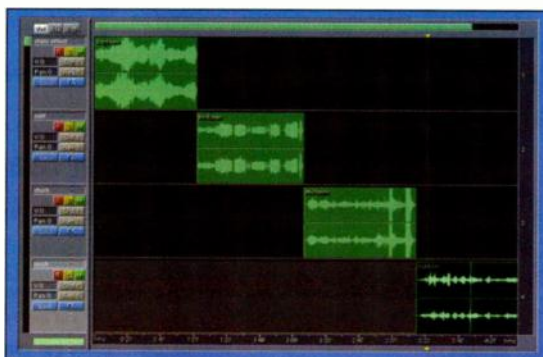
Mastering in Audition can be approached in many ways, depending on the material. Some users find it easier to work primarily in the Edit view; others compile and master their mixes by arranging the segments of a recording sequentially in the Multitrack view (see Fig. 6). The advantages of that tack include being able to use effects and processors, such as the stacked band-limited compressors I mentioned previously, as well as providing quick and easy access to every element of the project. And the Edit view is still only a button (F12) away if you need it.

Of course, well-mixed audio segments, whether music, voice, or what have you, really shouldn't need much in the way of mastering. But when you're satisfied with your track-to-track balance and any desired processing, select all waveblocks and mix down the entire project, which will drop you into Edit view. Hopefully you've been working at 32-bit, so you'll need to convert to 16-bit (and maybe downsample) for CD (press F11 to access the Convert Sample Type dialog). Add your CD track cues, merge everything into ranges in the Cue List, batch everything out to separate files, and you'll be ready to fire up your favorite CD-writing software.

I hope you've enjoyed this brief survey of recording and master-

ing in Audition. Check out the sidebar "Ten Quick Tips" for some additional useful pointers. And keep your eyes out for even more developments in the Audition world. No doubt the folks at Adobe have some exciting tricks up their sleeves!

*Jon Rose is a musician, engineer, and producer currently based in Oregon. He records and mixes a wide variety of music and voice projects with Audition.*



**FIG. 6:** Laying out the segments of a project sequentially on successive tracks can be useful when mastering a project. Among other benefits, all tracks and processing are easily accessible.

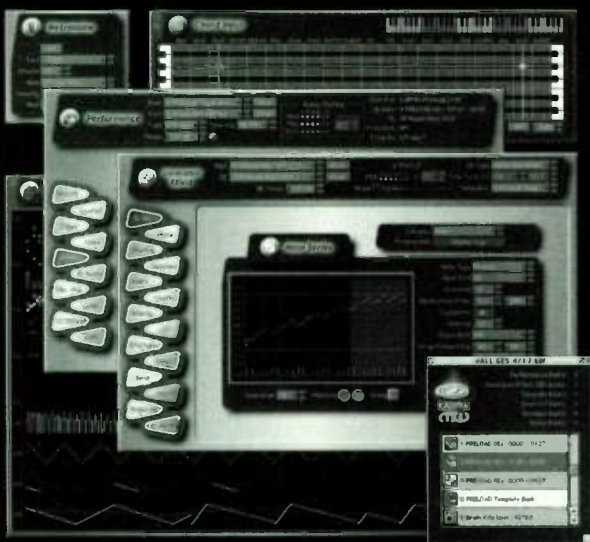




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# Soft Touch

*Get the show on the road with your laptop and software instruments.*

By Len Sasso

The time has arrived. With a reasonably powerful laptop computer and an affordable collection of software instruments, you can easily take your studio on the road. And with suitable MIDI controllers and an audio interface, you can even take your portable studio onstage.

Software synthesizers come in a con-

fusing array of formats, but they have a lot in common under the hood. In this column, I'll cover the basic things you'll need to know when choosing and using a software instrument. I'll also point out some important features and certain potential trouble spots that you should be aware of as you assemble your system.

## TO PLUG OR NOT TO PLUG

Software instruments come in two types: standalone and plug-in. Standalone instruments are excellent—perhaps even preferable—for live performance. That's because they take complete control of the interaction with the drivers for your MIDI and audio interfaces, and this often results in lower latency. Plug-in instruments are often a better choice for desktop composition because they don't require intermediary software (such as Propellerhead's ReWire) for communication with your digital audio sequencer. It's not uncommon for a software instrument to come in both types, and in some cases the plug-in simply provides input and output to the standalone instrument.

Some plug-ins are native, which means they rely on the computer's processor for their operation; others require separate DSP hardware. Examples of the latter include Digidesign's TDM



**FIG. 1:** In Steinberg's Cubase SX, software instruments are inserted into a virtual VST instrument rack (top right). The instrument's control panel can be opened for editing (center), and the instrument's output appears at a channel strip in Cubase's Mixer (lower left). MIDI for playing and automating is directed to the instrument through a MIDI track (top left).



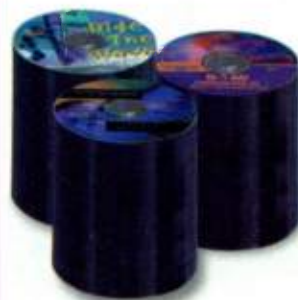
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World Radio History

systems, TC Electronic's PowerCore, Creamware's Pulsar, or Mackie's Universal Audio Device (UAD). I'll concentrate on native formats here, but many of the same considerations apply to proprietary systems.

Native plug-ins come in several formats, but from a practical standpoint, your choices are limited by which host software you use (see the table "Plug-In Instrument Support"). Perhaps the best-known plug-in format is Steinberg's Virtual Studio Technology instrument (VSTi), which is supported by a number of hosts. On the PC, the other main choice is Microsoft's DirectX instrument (DXi), which is used by Cakewalk's Sonar among others. Some PC hosts support both formats. On the Mac side, in addition to VSTi, you'll encounter Mark of the Unicorn's MOTU Audio System (MAS), Digidesign's Real Time Audio Suite (RTAS), and for OS X users, Apple's Audio Units (AU). Because MOTU now supports Audio Units, MAS will probably fade away as OS X takes over the Mac world.

## RACK 'EM UP

The first task in using a software-instrument plug-in is to get it installed and accessible to the desired host. That business is usually handled automatically by an installer that is supplied with the plug-in. It's important, however, to know where the installer puts the plug-

in. VSTi and DXi plug-ins are typically placed in a folder in the same directory as the host application, and you can often sidestep a second installation for a different host by copying the plug-in to a new location. MOTU Digital Performer and Digidesign Pro Tools plug-ins reside in folders inside the System's Extensions folder. In Mac OS X, all plug-ins live in shared library folders where they are accessible to all of the appropriate hosts.

Software instruments are handled differently by different hosts. Some hosts (Steinberg Cubase SX and Cakewalk Sonar XL, for example) have an instrument rack into which you insert instrument plug-ins (see Fig. 1). Once a plug-in is in the rack, it becomes available to sequencer tracks as a MIDI destination and an audio source, meaning that MIDI tracks can send their data to the instrument, and the instrument's output can be directed to an audio channel.

Other hosts (Emagic Logic and MOTU Digital Performer, for example) require you to add the plug-in as an insert in an audio track, or more precisely, as an insert in the mixer channel strip for that track. In Logic, MIDI and automation data reside on the audio track, and the audio output of the instrument is managed by the track's channel strip. In Digital Performer, a separate MIDI track is used to route

MIDI and automation to the instrument, and the instrument's audio output appears at the channel strip for the audio track.

ReWire, though not really a plug-in format, gives you another way to use software instruments with a host application. In that context, the host becomes the ReWire master (which is always launched first), and the standalone software instrument becomes the ReWire slave. Outputs from the software instrument appear

as audio inputs to the host, and when supported, MIDI can be transferred in both directions (see Fig. 2).

## LATENCY

Minimizing the latency of a software instrument (which determines its responsiveness to input from an external MIDI controller) is often a complex process. The greatest influence on latency is the audio buffer size. That setting determines how much audio is stored by the audio-interface driver before the audio is sent to the output. Large buffer sizes reduce the processor load; small buffer sizes reduce the latency. How to set the buffer sizes depends on your audio interface and the quality of its software drivers.

The computer's built-in audio drivers for all but the fastest laptop systems (and for many desktop systems, as well) seldom produce acceptable results. You should therefore plan to use a separate audio interface. Your MIDI interface and drivers may also affect latency, especially when intermediary software such as OMS or FreeMIDI is needed for routing MIDI from the host to the plug-in. That's the case with MAS and RTAS plug-ins as well as when linking standalone software instruments to a host.

## AUTOMATION

Automation is an important consideration when working with software instrument plug-ins. It lets you save and reproduce various parameter changes (such as volume and pan) that occur during playback and mixing. For software instruments, automation capability may also include any or all of the instrument's front-panel controls. If and how each of the controls is implemented depends on both the host and the plug-in.

Automation comes in two forms: real-time automation, which typically involves some form of MIDI control, and after-the-fact automation, which is usually accomplished by graphically editing previously recorded MIDI automation (or by entering new automation data).

MIDI control allows sliders, knobs, and buttons on hardware MIDI devices (such



FIG. 2: The outputs of Propellerhead ReWire slave devices appear as inputs to the ReWire master device. In Cubase, activated inputs (green LEDs) appear as mixer channels (left).





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as control surfaces and keyboards with assignable controls) to change a software instrument's settings. All hosts pass standard MIDI control data such as Mod Wheel, Pitch Bend, and sustain pedal to software instruments; but not all hosts pass along all the other MIDI controllers.

That might be because the host may use some MIDI controllers for other purposes—MIDI volume and pan for control of the mixer channel strip, for example. Another reason is that the host may reserve blocks of controllers for other plug-in slots on the same channel—for instance, to control other effects plug-ins.

Even if all MIDI data is passed to the software instrument, the software instrument may not provide access to all of its controls. The host manual's automation section will generally tell you which MIDI data is passed to software instrument plug-ins, and the software instrument's manual will usually have a table of MIDI controller assignments. Many software instruments have a MIDI-learn function for freely assigning any MIDI controller to any software instrument parameter, and some instruments even sense the type of MIDI controller being used—endless rotaries or 14-bit controllers, for example.

Plug-In Instrument Support							
Host	VSTi	DXi	AU	MAS	RTAS	Proprietary	ReWire
BIAS Deck	•					•	
Cakewalk Sonar		•					•
Digidesign Pro Tools Free					•		
Emagic Logic			•			•	•
Image-Line Fruityloops	•	•				•	•
MOTU Digital Performer			•	•			•
Steinberg Cubase SX/SL	•					•	•
Synapse Audio Orion	•	•				•	•

If you have an appropriate MIDI controller and can set up MIDI control of a software instrument, you can program and edit at least some settings using MIDI. Beyond that, automation requires that you be able to record those changes. That amounts to recording incoming MIDI data, and it's done in exactly the same way as when you record MIDI notes to be played by the software instrument.

The situation becomes more complex, however, when you must modify existing automation. Unlike punch-in replacement for notes, in which all notes between the punch points are replaced, with automation the host has to sense which control data to replace.

Some hosts offer sophisticated options for doing that; others expect you to manually edit out the automation you don't want. Some hosts don't provide for that at all and delete all existing automation when a new recording is initiated.

Another way to record automation is by changing the software instrument's onscreen controls. The software instrument determines what data is sent to the host; some send everything, others send nothing. The host determines how and where the data is recorded, but all hosts provide for that in some way. As with MIDI, replacing existing automation is handled in various ways.

The third method for entering and editing automation data is manually, using one of the host's MIDI editors. Often there is a graphic editor that displays the automation data as points connected by lines. You can typically add points, move them around, and sometimes even change the curve of the lines connecting them.

One thing to note about the point-and-line format is that it can generate a huge amount of MIDI data. The lines represent smooth transitions between the points, and entering a few points can result in a lot of automatically generated MIDI messages to create the transition. Multiply that by the number of controls being automated, and you can quickly clog the MIDI pipeline.

Other editor formats that can be useful in editing automation include a time-stamped list in which individual points can be edited numerically and a bar-chart display that shows individual events and allows you to change their

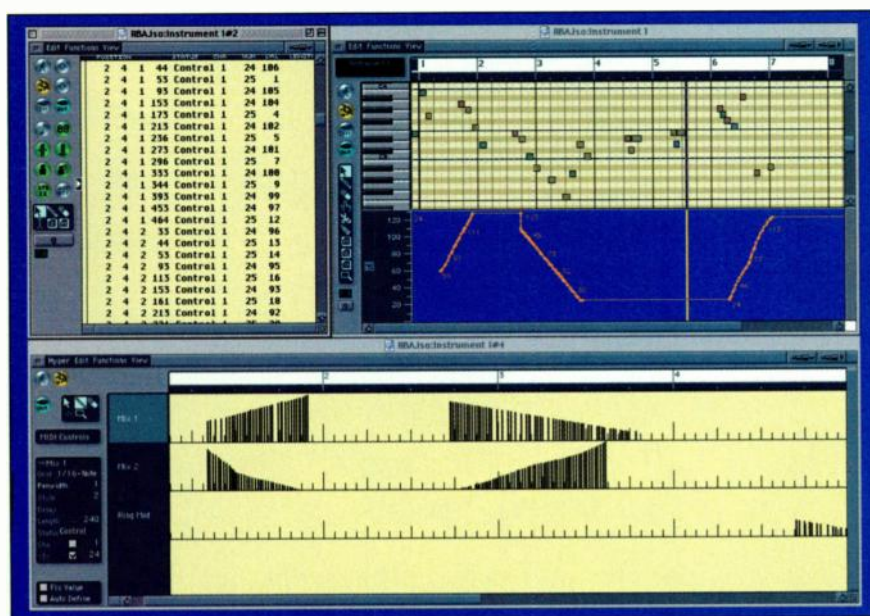


FIG. 3: Most software instrument hosts let you view and edit automation in several ways. Logic is typical in providing a list of MIDI messages (top left), a graph (top right), and a bar chart with several editing tools (bottom).



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contour without adding data (see Fig. 3). Editors that are combined with a MIDI transformation processor (as in most sequencers) can be very useful when editing automation. For example, they could let you thin, quantize, scale, and offset automation data without having to deal with individual events.

## RENDERING

Unless you plan to restrict your use of software instruments to live perform-

ance, you'll want to record each instrument's output, and you'll most likely want to do that within the same computer. That process, called *rendering*, is available in most software-instrument plug-in hosts and is often built in to some instruments.

The rendering process can be handled in a number of ways. Some hosts make you record all notes and automation before rendering to audio, whereas others let you render on the fly. Most

hosts feature offline rendering, which produces an audio file from one or more tracks of your song much more quickly than it takes to play it. Rendering saves processor power because playing back an audio file demands significantly less of your processor than playing a software instrument.

Logic has introduced a new twist on the rendering front called *freezing* that renders an audio or software instrument track to a temporary audio file, then deactivates the original track and all its effects. Freezing tracks that you're not actively working on enormously reduces processor load, greatly stretching the track count of a laptop studio. Undoubtedly by the time you read this article, other hosts will be offering this feature, but if yours does not, you can accomplish the same thing by rendering then putting the rendered audio file on a new track and deactivating the software instrument (without deleting its MIDI data).

For standalone software instruments, the situation is slightly different. You either need to use an intermediary (such as ReWire) to pipe the software instrument's audio into your audio recording software, or you must use the software instrument's built-in recording features if it has them. The latter method is less convenient and requires sample-accurate MIDI synchronization, but it's often the only choice. And for recording on the fly, it might be preferable.

Although I've left the details for you to sort out for your particular software, you should now have a pretty good overview of what is possible with software instruments, how to get the most out of them, and what problems you might encounter. The number and variety of software instruments is enormous, and many high-quality products are free while others are very inexpensive. They may not yet replace all the hardware instruments in your studio, but they can certainly add to your collection, and for working on the road, they are indispensable.

Len Sasso can be contacted through his Web site at [www.swiftkick.com](http://www.swiftkick.com).

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# Music Licensing for Indies

***Learn to play the TV and film music game like the pros.***

By Skip Adams

**I**n the July 2003 issue of *Electronic Musician*, ("Working Musician: Reel Money"), I discussed how to successfully promote your music to the right television and film professionals. Skill and determination in pitching your music are essential to your success, but pitching is only the first half of the game when it comes to licensing your music for film and television. The match is won or lost in the second half

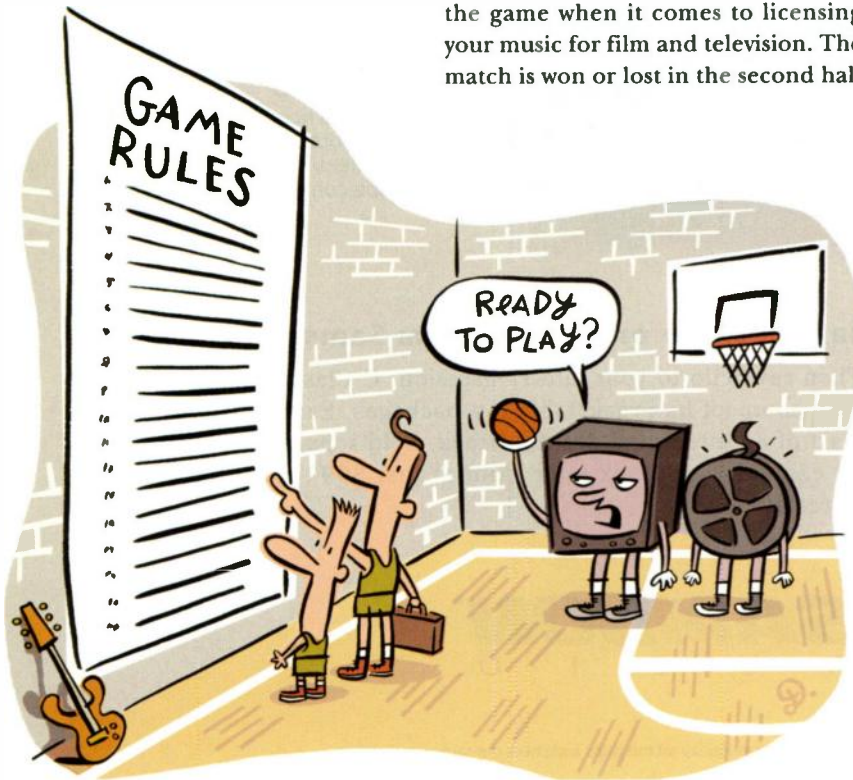
of the licensing game, the business half.

Because you are probably a *music* person rather than a *music business* person, no one will expect you to understand the ins and outs of the business in the way that a music attorney or publisher does. However, any publisher or music supervisor contacting you about your music will expect you to have a working knowledge of the licensing process, which means that you'll need to understand the language of licensing and of the agreements used.

You will also need to know who owns what as far as your songs and masters are concerned, and in the end, you'll need to understand how to set up the arcane machinery that gets you paid. To help you sort out those details, I've put together this guide to music licensing for the independent musician. With some work and study on your part, you'll be well prepared when the phone rings.

## **GET YOUR ACT TOGETHER**

If a music supervisor or coordinator is interested in using one of your songs in a show, your first contact will be a phone call asking for permission to do so. Of course, you'll say yes, but what will you say when they start asking the hard questions such as, Who owns the







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sync rights? The master rights? What are the splits? Let's look at an example phone call; from it you'll discover what you need to learn.

"Hi, this is Bob Klempf, music coordinator with *My Mother the Dog* on ABC. We heard your song 'Love Me Like a Horny Poodle' and would like to license it for an upcoming episode of the show. Is that okay with you? Great! Okay, so who are the writers? Affiliations? What are the splits? Who are the publishers? Affiliations? What are those splits? Who controls the master? Who controls sync? And, by the way, we have \$500 per side for this. Is that okay? Where do I send the agreements?" You may not be asked all these questions right out of the gate, but for the sake of what can be learned from this example, let's take it apart.

**Who wrote and publishes the song?** You should be able to name all the writers of the song; their performing-rights affiliations; their percentage of participation, or the *splits*, in the song; as well as their contact information and social

security numbers (or tax ID numbers).

The same goes for the publishing information. If you haven't assigned your publishing to anyone else (a professional music publisher, for instance) then you are, by default and by law, the publisher. Typically, you will own the same percentage of publishing rights as your writer does. If you are the sole writer, then you are also the sole publisher. If you are 50 percent writer, then you probably own 50 percent of the publishing, and so on. Notice I said "probably"? There are always exceptions to this rule because the splits aren't always about an equal division of labor, and there are as many ways to divide the pie as there are pies.

In any case, you must know exactly who owns what percentage of the writer's share and of the publisher's share, because inquiring minds will want to know. The best tack to take is to make a written agreement with your co-writers, preferably *before* you write the song. But whether it happens before or after, the agreement doesn't need to be

complicated; it just needs to spell out the basics of who owns what.

While you're at it, put a paragraph in the agreement that states who has the right to represent the song for film and TV licensing. Horror stories abound about licensing deals that started out fine but went south because various details weren't tended to. Establishing, in writing, what the splits are and who will represent the film and TV rights will settle these issues up front. I highly recommend hiring an attorney to help you with this. Ultimately, the cost of having a good agreement will seem low compared with the potentially high price of having either no agreement or a bad one; so get some help on this and obtain it in writing.

**Who controls the master?** If you are the sole writer and performer on the recording and have paid for it yourself, then you control the master. In any other scenario, the ownership and control of the master is a matter of opinion—and opinions differ. Settle it now, or it may come down to a court

## RANDOM WISDOM FROM THE PROS

Below are edited excerpts from interviews I conducted with some of the top music attorneys and executives in film and TV. Here is a condensed version of what advice they would give to indie musicians who want to license their music for film or TV.

**Evan Greenspan** (owner of one of the biggest music-clearance companies in the country, EMG Inc., and past president of the California Copyright Conference): The good news is that the media world is expanding and, along with it, so is the need for more and more music. The bad news, however, is that music budgets are simultaneously contracting. That presents an opportunity for independent musicians, if they can provide high-quality music that fits smaller budgets.

**David Grossman** (senior vice president of Television Music, Paramount Pictures): Don't be penny-wise and pound-foolish. Hire someone who understands the business of licens-

ing for television, or learn for yourself, so that you don't blow a deal asking for something that is outside the industry practice. Make the process as easy for producers as possible so that they want to do more business with you in the future. Understand the terminology. Look at the long-term benefits of the relationships that you're trying to create, rather than looking at them only as a short-term win.

**Sindee Levin** (attorney, music publisher, president of the American Mechanical Rights Association): From start to finish, keep your correspondence and interactions simple and easy. If you're not a lawyer, don't act like one. Be organized and prepared. Have all the information that is about you, your cowriters, and the owner(s) of the master at hand. If you're the contact person, make sure that all of your partners agree that you are the one designated to make the deal. Frequently, shows are looking at several songs for a given spot, so the easier you make it for them, the

better the chance is that they will go with yours. When you're a top songwriter, you're allowed to be difficult. But for now be easy to deal with.

**Steve Winogradsky** (top music attorney, 20-year music-licensing veteran, president of the Winogradsky Company): To get your performance royalties, you and your song have to be registered with your PRO. It's amazing how many times I'll get a call from a big artist who says, "My song was used on a TV show, but I haven't gotten any money from [my PRO]." Then I'll ask if they're a member of [a PRO], and they'll say "Well, no." Either that, or they haven't registered the song. The PROs are not mind readers. You have to tell them who you are, what you're doing, and what you own. And if they find your song, they'll pay you for it.

More excerpts from these interviews and others can be found online at [www.globalgraffiti.com/EM.htm](http://www.globalgraffiti.com/EM.htm).



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deciding for you. If you are part of a band, or if someone else has invested money in the recording, you should have a written agreement with those parties defining their interest and involvement in it. As with the publishing, decide who will represent the master for film and TV.

Furthermore, any additional sidemen or singers on your recording should sign a waiver releasing you from any future financial obligation to them. And don't forget your business with the recording studio, either. Pay them in full, get a receipt, and be certain about the nature of anything you sign. Once again, it is a good idea to get an attorney to help you in these matters, and don't skimp. You spent thousands on your equipment and on recording, packaging, and promotion. Spend a few more bucks on some good agreements; it will pay you back many times over. Once you have templates for your agreements, you can use them over and over again.

## MORE GROUNDWORK

You need to do a few more things before your business house is completely in order. First, you should copyright

your music. The copyright laws provide protection to writers, but without requiring the immediate expense of registering your songs with the U.S. Copyright Office. In fact, copyright law says that your copyright "exists from the moment the work is created." However, an official copyright registration has many legal advantages, so I recommend getting one. To save money, you can register dozens of songs at once as a collection and then extract them individually if need be. For more information, refer to the U.S. Copyright Office link in the sidebar "Linking to Success."

Second, if you want to get your share of performance royalties, and if you are not already a writer member of a performing-rights organization (PRO) such as ASCAP, BMI, and SESAC, you should become one. Here is how it works: television broadcasters pay fees to the PROs for the right to use music written by PRO members. Whenever a show is mixed or airs, all the music used is entered into a log called a *cue sheet* by the music supervisor or editor. Once the show airs, that cue sheet is sent to the PROs, and they enter all the data from it into their databases. At certain times

during the year, each PRO does an accounting of all broadcast performances, and then issues performance royalty checks to its member writers and publishers of all the songs that appeared on the cue sheets. If you aren't a member of a PRO, you won't get paid; it's that simple. To see an example of a cue sheet, go to the special page on my Web site, [www.globalgraffiti.com/EM.htm](http://www.globalgraffiti.com/EM.htm). (For more on performance rights organizations, see "Working Musician: Play Rights" in the April 2003 *EM*.)

Just as important, if you don't have an official publisher or it is your choice to publish yourself, you should form a publishing company. You don't need a corporation or a brick-and-mortar business, but you do need to have a name that is registered with your PRO, and a business bank account. The reason for this is that every song, as far as the law and the PROs are concerned, has two separate parts: the writer's half and the publisher's half. You may be registered with your PRO as the writer, but if you aren't also registered as the publisher you won't get paid for half of your royalties! Furthermore, your PRO will be writing a separate check under the name of your publishing company; so if you don't have a company bank account, you won't be able to deposit the check. Consult your bank to determine how to set up your account. As for the PRO's part, they require that you fill out some application forms and clear the name you want for your company. That process can take some time, so get on it. Contact your PRO for details on how to start the process. (For more on forming a business, see "Working Musician: Going Legit," in the February 2002 issue.)

Once you are registered with a PRO as both a writer and a publisher, you are ready to register your songs. You can register songs on the PROs' Web sites, but paper registration is still a viable alternative. Contact your PRO for the proper forms or to sign up for its Web-based song-registration service. A complete and proper registration is essential to getting all the royalties that are coming to you. These royalties can be substantial, so don't neglect this important aspect of your business operations.

## GREENSPAN'S RULES FOR GETTING PAID

President and owner of EMG Inc., Evan Greenspan, is a music-clearance specialist and an industry veteran who has a client roster ranging from Garth Brooks and Robert Altman to Coca-Cola and the Academy Awards telecast.

**1. Become a member of a PRO.** In order to get into the royalty pipeline, you need to be a writer member of a PRO. Also, if your songs aren't handled by a publisher, form a publishing company and register it with your PRO. Every dollar that comes into a PRO is split in half: one part goes to the writer and the other goes to the publisher's share. To get 100 percent of your performance income, you must be registered as both.

**2. Register your songs with your PRO.** You won't get paid if your PRO

doesn't know that you are the writer or the publisher of a song that was used in a show.

**3. Be "findable."** If your PRO does not know where to send your check, or if your address information is incorrect, you won't get paid. I can't tell you how many situations we have handled in which a writer fought tooth and nail for his 15 percent of a song, and yet now can't be found! So, make yourself findable to everyone who might have money for you.

**4. Make sure you get a cue sheet.** A cue sheet is like an invoice to the PROs. It contains the information that the PROs use to determine which songs were used, who wrote and published them, and how much to pay you.



# Total Integration



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# 01x

**mLAN MIXING STUDIO**



The key ingredient to getting paid is the cue sheet, as mentioned earlier. If your song is used in a network televi-

sion show, chances are that the cue sheets will be sent to you automatically. In any case, you should ask for them

and follow up if you don't receive them in a timely fashion. Once you get the cue sheets, check them to make sure that the information regarding you, your songs, and your publishing company is correct. If there is a discrepancy, contact the show right away and ask them to fix it. That is very important because your PRO relies on the information contained in these forms to determine who gets paid and how much. Once you've straightened out any problems, submit the cue sheets to your PRO along with your song registration. Here is a quick side note: there is some small controversy over who should submit cue sheets, but the bottom line is that anyone who has either a legal responsibility or a financial interest in having them submitted should do so. The first reason for you to take on this task is to be certain that they are submitted, which sometimes they are not. The second reason is to verify that the information on them is correct, which sometimes it is not.

Last, a new, but controversial, method of broadcast licensing, called *direct licensing*, is becoming increasingly popular with broadcasters. This method bypasses the PROs altogether and attempts to obtain the broadcast license directly from the rights holder (you). Essentially, the intent is to *buy out* your performance rights *for only that use* and pay you a lump sum instead of paying you through your PRO in the form of performance royalties. If that possibility is brought up in your negotiations, you should consult an attorney for advice, because the way this is handled will permanently impact your performance royalties for that use.

## SYNC & MASTER-USE LICENSES

Once your song is going to be used, you'll find yourself doing business with the legal and royalty departments of the show or film. You'll receive one or more documents, all of which you must read, and some of which you must sign. They'll be about as interesting as the user agreement in a software installation, but don't blindly click the Next button—what's written on those pages could impact your rights, and your income, for a long time.

## LINKING TO SUCCESS

### Performing-Rights-Organizations Links

#### ASCAP

[www.ascap.com](http://www.ascap.com)

#### BMI

[www.bmi.com](http://www.bmi.com)

#### SESAC

[www.sesac.com](http://www.sesac.com)

### People Links

#### EMG Inc.

[www.clearance.com](http://www.clearance.com)

Especially useful is the Clearance FAQ.

#### Michael Kakuk, Esq.

[www.kakuk.com](http://www.kakuk.com)

Kakuk provides great information about how to organize your business.

#### Sindee Levin, Esq./AMRA

[www.amermechrights.com](http://www.amermechrights.com)

Levin is a lawyer, a publisher, and the president of the American Mechanical Rights Association.

#### The Winogradsky Company

[www.winogradsky.com](http://www.winogradsky.com)

You'll find some very helpful information about both the TV and film side as well as the composer's side of the music-licensing game.

### Reference Links

#### Global Graffiti

[www.globalgraffiti.com/EM.htm](http://www.globalgraffiti.com/EM.htm)

This is Skip Adams's Web site, which includes a special section that refers to this article. You can check out a sample license agreement, a sample cue sheet, additional interviews, and more.

#### U.S. Copyright Office

[www.copyright.gov](http://www.copyright.gov)

Great information, downloadable forms—a gold mine.

#### **Music Law: How to Run Your Band's Business**

By Richard Stim (Nolo Press, 2003)

Advice and lots of contracts from a reliable source. This book and other legal reference books available from Nolo Press at [www.nolo.com](http://www.nolo.com).

#### **Kohn on Music Licensing**

By Al Kohn and Bob Kohn (Aspen Law & Business, 2002)

You can order this book on [www.kohnmusic.com](http://www.kohnmusic.com), which also has extensive links and information on licensing.

#### **All You Need to Know About the Music Business**

By Don Passman (Simon & Schuster, 2000)

Passman's book comes highly recommended by many professionals and is available at [www.donpassman.com](http://www.donpassman.com).

#### **Music, Money & Success**

By Todd Brabec and Jeffrey Brabec (Schirmer Books, 2002)

If you really want to know the truth, read this book. Also, check out the Brabecs' site, [www.musicandmoney.com](http://www.musicandmoney.com).





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**REMIX™**

As the owner of the master and the publisher of the song, you are guaranteed a certain *bundle of rights* by law. Because you own all the rights, anyone who wishes to use your song must first obtain your permission. A film or TV show needs to borrow only a couple of those rights from you: the right to use the actual recording (your master), and the right to use the underlying composition that the master is based on (your song). Those are two distinct things. The permission you give them to use the master is tendered in the form of a contract called a *master-use license*. The permission you give them to use the song itself is tendered in the form of another contract called a *synchronization license*. Both these licenses can be combined into one agreement if the publisher and master owner are one in the same. That will most likely be your circum-

stance, so I'll confine my discussion to that scenario.

The first document you're likely to get, particularly with television, will be a faxed one-page deal memo, or confirmation letter. It describes in very broad terms the important points of the agreement, such as the fees, the rights they need, the length of the agreement, and other details you discussed in your phone conversation. TV shows use confirmation letters a lot because they don't have the time to churn through the entire licensing cycle before their air date, yet they must have something in writing that is a binding promise from you. Before you sign such a document, make sure it describes what you discussed and agreed to over the phone. If it doesn't, or if you're unsure, call the contact named on the sheet and work it out. Be friendly and plead ignorance if you

must, but don't hesitate to deal with it.

Now it is time for a reality check. Just because a show has asked to use your song doesn't mean it's going to wind up on the air or on the screen. Many things can happen between that phone call and the air date to kick your song out of the mix, so relax until you're contacted again. Don't call and bug the music supervisor about what's going on with your song. He or she will contact you when it's good to go. At that point, the more formal license will begin to make its way through the labyrinth of the studio legal department, eventually finding its way to you. Once you've signed the license and returned it to them, you still need to wade through more bureaucracy before you get a check. In fact, don't be surprised if it takes three to six months for your check to arrive. That's just the way it is, and everyone goes through it.

## TERMS OF THE TRADE

**All-in:** Industry slang that means both the sync and the master-use rights are included in the deal. "Are you saying the fee is \$500 per side, or \$500 all-in?"

**Assignment:** The transfer of rights from one party to another. That is something you might do with a publisher, but *never* in the context of placing your music in a show.

**Control vs. ownership:** As the writer of a song, you are its *owner*. However, *control* over what happens with the day-to-day business of your song may be assigned to someone else, such as a publisher or administrator. In the case of film and TV licensing, giving control to a single entity (for example, a band member or a publisher) will make it much easier for a production to do business with you. Such an arrangement should be in writing.

**Cue sheet:** A written log of all the music used in a film or television production. The cue sheet is the reference that your PRO will use to determine how much you're owed in performance royalties.

**Direct licensing:** Normally broadcasters

pay the PROs a licensing fee to use their members' songs. Direct licensing bypasses the PRO and attempts to make the deal for your performance rights directly with you. The advantage is that you don't have to wait for the money. The disadvantage is that you gamble with your future performance income. Bad idea.

**License (master use or sync):** The agreement between you and the production that allows them to borrow your song for their show. You are called the *licensor* and the production is the *licensee*. These agreements are typically nonexclusive and time limited, and they closely define what can and can't be done with the song or master.

**Master-use right:** As the owner of a master recording, you have the right to decide who can use that recording and under what terms and conditions. That right is the master-use right.

**PRO:** Performing-Rights Organization, such as ASCAP, BMI, and SESAC. These membership-based organizations are authorized by their members to represent their interests to the broadcast industry. A PRO's primary

function is to negotiate and collect licensing fees from broadcasters and then distribute what they collect to the membership.

**Side:** Industry slang for the rights needed to license a song. The sync right is one side, and the master-use right is the other. Getting "\$500 per side" means getting \$500 for the sync right and \$500 for the master-use right.

**Sync right:** The sync right is one of the rights in the *bundle of rights* that is guaranteed to creators of music by the U.S. Copyright laws. If you haven't assigned your publishing to anyone else, you are the writer and the publisher. As the publisher, you have the last word as to who may synchronize your song in a *timed relationship* to a moving picture, and under what terms and conditions. To learn more about your bundle of rights, go to the U.S. Copyright Office link in the "Linking to Success" sidebar and click on Copyright Basics.

**Split:** Industry slang for percentage. If you share the ownership of a song evenly with another writer, the split would be 50/50. "What are the splits on writer and publishing?"



To help you through the generalities of licensing agreements, I've posted an example of one on my Web site, along with some helpful commentary, at [www.globalgraffiti.com/EM.htm](http://www.globalgraffiti.com/EM.htm). For the specifics of your agreement, you'll need to consult with an attorney. But you've already signed off on the big points of the license in the confirmation letter, so you just need to compare the two documents and make sure that their points jibe.

Don't take anything for granted until you have dealt with a number of licenses. Even though TV networks can usually be counted on for a pretty standard and customary agreement, that isn't always the case with the film and TV business as a whole. For instance, some independent and low-budget filmmakers and TV producers may know even less than you do about licensing. Therefore, you must be on your guard against nonstandard agreements that could adversely effect you,

such as accidentally assigning your publishing or master rights to them!

The best approach is to continue your education and consult with a professional whenever you are unsure of what you're being asked to sign. Some great books are available, and most attorneys won't charge you an arm and a leg just to look over your license, so avail yourself of those sources. I've provided some helpful Web links and resources in the sidebar "Linking to Success" that will help you find ways to expand your knowledge of the subjects covered here.

Finally, be aware that not just any attorney will do. One who isn't experienced in this business can do you more harm than good. An entertainment lawyer doesn't necessarily know music licensing for film and TV or the norms for doing business with Hollywood film studios and network broadcasters. To delegate this work with confidence, make sure the attorney

you choose has a track record in this specialized field.

## IT'S A WRAP

While many independent bands and singer-songwriters are getting their songs into films and TV shows, remember that talent and persistence will take you only part of the way. Spend some time learning the business of your art, and you can proceed the rest of the way with confidence.

*(Please note: Nothing I've written in this article, or by anyone I've quoted, should be interpreted as legal advice. You should always consult with a qualified attorney regarding your particular situation.)*

*Skip Adams is a music publisher in Venice Beach, California, specializing in placement for film and television. He would like to thank Evan Greenspan, David Grossman, Michael Kakuk, Sindee Levin, Steve Winogradsky, and Jacqueline Woolf for their help with this article.*

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# REVIEWS

## ROLAND

MC-909

*A great-sounding and versatile dance/hip-hop workstation for studio and stage.*

By Jim Aikin

Some electronic instruments offer instant gratification, but not much depth. Some have features galore, but they're balky and difficult to use in a live setting (or even in the studio). Once in a while, however, a product comes along that sounds great and offers an amazing amount of musical power, while also being so smoothly designed that you could take it onstage and lay into it the way Eric Clapton lays into his guitar.

The Roland MC-909 is just such a device. The flagship of Roland's line of Sampling Grooveboxes, the MC-909 is aimed straight at the dance, R&B, and hip-hop market. Its mouth-watering array of features includes full-featured sampling, a 16-track pattern/song sequencer, a turntable emulation slider, twin D Beam (infrared sensor) hands-free controllers, versatile effects, a USB port for archiving your sonic creations on a computer, and a whole lot more. I didn't have a chance to test the MIDI control of a V-Link-compatible video system, but if synchronized video is part of your live shows, you should check this feature out.

The tone generator is highly programmable, and the sequencer is a quick and effective tool for creating multitrack mixes in the studio. The MC-909 can do just about anything an

94	Roland MC-909
104	Sibelius Software Sibelius 2.1 (Mac/Win)
110	Mackie Designs Mackie Control
114	Novation KS4
122	Studio Projects VTB1
126	Quick Picks: LinPlug Virtual Instruments VST Modular Synthesizers (Mac/Win); Big Fish Audio <i>Phat Beats from the Box</i> ; AKG K 271 Studio; RealTraps Wood Panel Bass Traps



FIG. 1: With its healthy complement of knobs, sliders, and buttons, Roland's MC-909 sampling workstation is ideal for stage work, and it's easy to use in the studio too.



# This Is One Rumour You Can Believe.

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The Rumour is the "nice" box, featuring a comprehensive set of Kurzweil's finest reverbs and reverb variations, including gated, reverse, and reverb/compression combinations, along with Kurzweil's unique LaserVerb™, and chorus/flange+delay+reverb combinations.



The Mangler is the "nasty" box, focusing on effects other than, but not excluding reverb. These include chorus, flanger, phaser, tremolo, rotary speaker, panner, delay, filters, LaserVerb™, Pitcher™, synth trigger, ring modulation, distortion and compression effects, and many combinations.

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[www.kurzweilmusicalsystems.com/html/rumour-mangler.com](http://www.kurzweilmusicalsystems.com/html/rumour-mangler.com)

World Radio History

aspiring producer on a budget might need. It wouldn't be my first choice for recording and editing vocals, but you can even do that if you need to. And it's light enough that you can tuck it under one arm and take it on a gig. Don't be fooled by the relatively modest price tag; the MC-909 is a monster.

## FIRST IMPRESSIONS

It's obvious a lot of thought went into the front-panel design of the MC-909 (see Fig. 1). The buttons are clearly labeled, and all of the important functions are only one click away, which is ideal for live performance. The big LCD provides lots of useful information. And while the manual is not perfect, basic operations are explained in a clear, step-by-step style. After only a few minutes, I started to feel at home.

The factory patterns are inspiring and show just how radio-ready the MC-909 can sound. A number of dance and hip-hop/R&B styles are represented. There's even some reggae. In addition to 215 multitrack patterns (mostly four or eight bars in length) the unit ships with 440 single-track patterns (drum beats, special effects, and so on), which you can copy into your own patterns or trigger in performance by assigning them to the RPS (Realtime Phrase Sequencer) sets.

You can expand the MC-909's internal memory up to 128 MB with SmartMedia cards, and the sample memory is expandable to 272 MB. Need more? The MC-909 can communicate with your computer via USB (see Fig. 2). You can offload your samples to the computer's hard drive (cheaper than storing them on SmartMedia), and you can update the MC-909 by downloading the latest operating system. The MC-909 won't communicate with Windows 98 ma-

chines, but it's ready to go with Windows 2000, ME, and XP, and with Macintosh OS 9 and OS X.

The external audio input on the MC-909 can be used for sampling, and it can also process another signal in real time through the MC-909's effects. The left input can be switched to mic level. Although the rear panel has the usual stereo headphone jack, the MC-909 has no cue mix button, so there's no way to audition its output in your headphones on-stage without sending it to the main outs.

The MC-909 is a real musical instrument, not just a studio tool (though you can certainly use it in the studio). It has numerous features that let you change your mix or arrangement without stopping playback: synthesizer knobs and sliders, an interactive mixer with eight sliders and 16 track buttons, two D Beam sensors, a turntable emulation slider, and a bank of 16 Velocity-sensitive pads that can be used for several tasks.

Although the instrument has a song mode, in which patterns are chained together, you could easily play whole live shows using only pattern mode. You can jump to the new pattern of your choice without interrupting playback, switching either at the end of the current pattern or immediately. Individual tracks within the pattern can be muted and unmuted on the fly, making it easy to drop out the kick and add a snare fill, add some chords or a lead line to the mix, and so on.

And that's only the beginning. Let's dive straight into the performance features and then look at the music programming side.

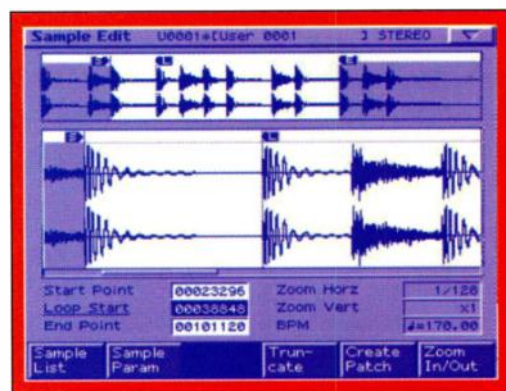


FIG. 3: The MC-909's large waveform display offers a variety of tools for trimming and looping samples.

## TURNTABLE EMULATION

Located on the right side of the panel, the large Turntable Emulation slider is perfectly positioned to be played with a flick of the fingers. It has a light but easy-to-feel center detent, so you can easily return to normal playback position. You can't actually scratch with the slider, because the 909 can't play sounds backwards. But you can push or pull the pitch or the tempo by itself or do both together. The slider can also be assigned to send Control Change messages such as Modulation and Pitch Bend.

Tapping the dedicated Hold and Push buttons is equivalent to instantly moving the slider to the top or bottom of its travel. These buttons are good for special effects, and can be tapped quickly to line up the MC-909 with a beat coming from a turntable or other non-syn-cable source. The maximum depth of the slider can be set from  $\pm 1$  bpm to  $\pm 200$  bpm. The slider can also be used as a MIDI modulation controller.

## ON THE BEAM

The dual D Beam controllers on the MC-909 emit infrared light. When you hold your hand above one of the controllers, the light bounces off your palm and is reflected back. It's then sensed by the D Beam, which lets you change the current sound by waving your hands in the air. The two D Beams are positioned about a foot apart; that's ideal for playing one with each hand.

The D-Beams have four modes of operation: Solo Synth, Cutoff/Resonance, Turntable, and Assignable. The modes



FIG. 2: In addition to its USB port, the MC-909's rear panel sports an array of I/O options, including MIDI, analog audio, and optical and coaxial S/PDIF.



## Drum Series I

Get ready for the drums of your dreams. Recorded at famous Blue Jay Studios near Boston, all drums and all cymbals are **Stereo** and make heavy use of **Multi-Velocity Samples**. Separate snare samples for left hand and right hand included. **Studio kits, Small Ambient kits, Rock Ambient kits,**

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## Silk Road

Sonic Implants Silk Road CD captures authentic melodic and percussion instruments native to the Middle Eastern leg of this illustrious trade route. **Instruments were performed by Middle Eastern musicians** and utilizing methods and techniques innate to centuries of musical

tradition. Featuring a vast array of multi-sampled instruments, the CD also includes **Percussion Loops and Melodic Improvisations**.

"Sonic Implants should be commended for providing a high-quality sample collection of these exotic instruments"  
-KURZWEIL LAUNCHPAD

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keymaps, slow, fast and stopped rotor variations. This is a **B3 with character and grit**; what it really sounds like after it's been played through and gigged a lot.

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velocity samples from soft to loud to make you sound like a pro.

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-ELECTRONIC MUSICIAN

CD-ROM \$99  
Gigasampler, EXS, Kontakt, Akai, Kurzweil, Soundfont

## Amps&Pickups

Sonic Implants guitars and basses are unlike any you've heard. **Awesome sonic quality**, sampled tones, chords, mutes, harmonics, upstrokes, downstrokes, effects, and more, for incredibly **authentic guitar tracks**. Bases include downpicks and uppicks, slaps, finger tones, amped sounds and direct

sounds; with so much variety you'll find anything you need here.

"Much attention went into programming the various formats. Each takes advantage of the effects and envelope capabilities of the hardware or software sampler for its format, which is where the character lies."  
-ELECTRONIC MUSICIAN

CD-ROM \$149  
Gigasampler, EXS, Kontakt, Akai, Kurzweil, Soundfont

## African Percussion

From the spiritual beat of Africa comes a sample library unlike any other. Sonic Implants African Percussion loads up your sonic palette with no less than **34 unique African drums, shakers, bells and mallet instruments**. An incredible collection recorded at Blue Jay Studios through an

SSL console. Partial list includes Bass, Boba, Djembe, Gome, Kaganu, Keppisu, Kidi, Koboto, Dpanlogo, Sogo, Totodzi, Talking and Surdu drums; Aloxe, Axatse, Caxui, Egg, Maracas and Shekare shakers; Gankogui, Kenken, Toke bells; Nigerian Logdrums and much more. Stereo samples, natural ambience, heavily multi sampled with up to 4 velocity samples per instrument.

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Gigasampler, EXS, Kontakt, Soundfont

## Amps&Pickups 2

Continuing in the tradition of Sonic Implants' fine line of guitars and basses, a huge new **2 CD collection of classic instruments** with all the fidelity, playability, and realism you've come to expect from the Sonic Implants name. Over a gigabyte of Guitar & Bass Classics!

The 2 CDs include: **Rickenbacker 330 6-String Guitar**, **Fender Telecaster Guitar**, **Rickenbacker 4003 Bass**, and **Fender Precision Bass**. A **HUGE selection of playing styles** including down & up picks, down & up strums, multi-velocity tones, mutes, hammer-ons, plucked tones and a giant selection of chords - Major, Minor, Dom7, Sus4, 7Sus4, and Add9 chords. Tons of programming variations for ultimate playability!

CD-ROM \$229  
Gigasampler, EXS, Kontakt, Soundfont

## Strings MINI

Still a very full featured library, Symphonic Strings MINI weighs in at a hefty 7 CD-ROMs (4 for Soundfonts). A reduced rendition of the full blown collection, budget composers can now get access to the **best string library on the market for only \$449**. Upgrades to the full version available. Visit website for demos and details.

CD-ROM \$449  
Gigasampler, EXS, Kontakt, Soundfont

## Strat & Fuzz

Widely regarded as the **best sampled Strat available**. Features Seymour Duncan pickups through a Fender Vibrolux amp, multi-velocity mutes, tones and chords so dynamic they pop right off your fingers and onto your guitar tracks. **Creamy Fuzz** Guitar features a custom built Strat through a Mesa Boogie, with FullTone SoulBender and FullDrive2 pedals to create a very soulful tone.

"This is the best sampled Strat sound I've ever heard...it doesn't just sound real, it plays real...there is a difference!"  
-BRAD LYONS *Sweetwater Product Specialist*

CD-ROM \$79  
Gigasampler, EXS, Kontakt, Soundfont

## Symphonic String Collection

More than a year in the making, and involving the talents of an outstanding team of musicians, engineers, and Sonic Implants' own sound designers, the Symphonic String Collection is truly a **state of the art sample library**. Recorded by 2001 Emmy award engineer Antonio Oliari and RIAA award engineer John Bono, and featuring members of the Boston Ballet Orchestra and Boston Pops, the library has been designed for the utmost in **expressiveness and realism**. Rich multi dynamic instruments with a natural ambience intact make it a joy to create with. The Full collection comes on 20 CD-ROMs (or 3 DVDs), and includes **16 different articulations**, up to 4 velocity levels, down bow and up bows, release samples, loops on all sustained instruments, plus a huge variety of string effects. CD-ROM or DVD \$995 Gigasampler, EXS

"Sonic Implants' String Collection is a library of choice. Comprehensive, versatile, and impressive."  
-HANS ZIMMER, Academy Award winning Composer

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-MICHAEL RICHARD PLOWMAN, Composer -NOVA, PBS, TNT, 20th Century Fox

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-ED LIMA, Composer -Electronic Arts, Sierra Publishing

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are selectable from a front-panel button; each mode has a few parameters that you can edit in advance. The D Beams can be switched on or off individually, but the Mode button affects both.

In Solo Synth mode, the D Beams work together as a sort of theremin. The left one affects the volume of a sustaining tone, and the right one affects its pitch. The D Beams aren't appropriate for playing complex melodies, but at the very least, you're set for that Beach Boys medley. In Cutoff/Resonance mode, the D Beams control the filter cutoff and resonance of the sound being played by the currently selected part. This mode is probably most useful for mainstream dance music effects.

In Turntable mode, the D Beams duplicate the functions of the Turntable Emulation slider; it's showy, but you're not gaining any new functionality. The Assignable mode is more powerful: each D Beam can output all sorts of different data, ranging from MIDI Control Change and Pitch Bend messages to

arpeggiator octave transpositions, start/stop (duplicating the functions of the transport Play and Stop buttons), and mute/unmute-all-parts commands. Being able to start and stop the music by waving your hands over the instrument goes beyond showy: it's a little spooky.

### PADDED CELL

Positioned along the front edge of the top panel, 16 rubbery-textured pads have various uses for performing and editing. First and foremost, they're a keyboard for triggering whatever sound is assigned to the currently selected part. The pads wouldn't work too well for playing a live lead line, but they're fine for throwing in percussion and chord chops. Octave Up and Down buttons are handily positioned at the left end, as is a Hold button, which performs the same function as a sustain pedal. Most people will probably stand when they use the MC-909 in performance, so not having to horse around with a sustain pedal is an advantage.

(In any case, the MC-909 has no sustain pedal input.)

The pads have several uses besides triggering single notes. You can use them to call up the next pattern that you want to hear during playback; simply tap the Pattern Call button in the lower left corner of the panel. You can name and store up to 50 of your own pattern sets, each containing a selection of 16 patterns. The setup parameters for each pattern (track level, track mute/unmute status, and so on) can be different from those stored in the pattern itself. This feature adds another dimension of performance power. For instance, you can use Pattern Call to switch among three or four different mixes for the same pattern. Sadly, your Pattern Call performance can't be recorded into the sequencer.

Having Velocity-sensitive pads is nice. If you prefer a uniform sound, you can set the pads to a fixed Velocity at the global level. When tapped lightly, the pads don't always trigger, and there are no Velocity response curves, so you can't adjust the pads' sensitivity to your touch. The assumption seems to be that you'll be playing loud music and will just want to smack the suckers. Makes sense to me.

Instead of Pattern Call, you may want to hit the RPS button and use the pads to trigger 1-track patterns (bass lines, drum fills, and so forth), which will be layered into the currently playing pattern. If the sequencer is in Play mode, the start time of the RPS pattern can be quantized, so you don't need to worry about rhythmic train wrecks.

You can name and store up to 50 RPS sets, and the MC-909 even has a separate RPS mixer, so you can latch several RPS patterns and then blend them using the sliders. Like normal parts, individual RPS tracks can be retuned in half-steps during playback using the mixer. It wouldn't be very practical to transpose an entire song to a new key using this method, but it works well for turning a drum track into a bunch of low-pitched crashing and crunching noises.

### MIXER CONTROLS

All 16 tracks have their own Mute buttons that light up if music is recorded

## MC-909 Specifications

<b>Analog Inputs</b>	(2) unbalanced 1/4" (left input can be switched to mic level)
<b>Analog Outputs</b>	(2) 1/4" mix; (4) 1/4" direct; (1) 1/4" stereo headphone
<b>Digital Audio I/O</b>	(1) optical S/PDIF; (1) coaxial S/PDIF
<b>Other Connectors</b>	MIDI In, Out; USB
<b>Sampling Resolution</b>	16-bit
<b>Sampling Rate</b>	44.1 kHz
<b>Sample RAM</b>	16 MB, expandable to 272 MB
<b>Polyphony</b>	64 notes
<b>Sequencer Tracks</b>	16
<b>Sequencer Resolution</b>	480 ppqn
<b>Song/Pattern Memory</b>	50 songs, 50 steps per song; 655 factory patterns; 200 user patterns, up to 998 measures per pattern
<b>Synthesizer Features</b>	4 tones per patch; 2 LFOs; 3 envelopes; 768 factory patches; 72 factory rhythm sets
<b>Arpeggiator</b>	128 factory presets; 128 user presets; up to 32 steps; 2 levels of 8th- and 16th-note swing, 10 up/down modes
<b>Performance Features</b>	2 D Beam infrared sensors; Turntable Emulation slider; 8 multifunction mixer faders; 16 Velocity-sensitive pads; tap-tempo button
<b>Data Storage</b>	SmartMedia, computer via USB
<b>Computer Operating Systems Supported</b>	Mac OS 9 and OS X; Windows 2000, ME, XP
<b>Dimensions</b>	19.4" (W) × 4.5" (H) × 15.0" (D)
<b>Weight</b>	13.25 lb.



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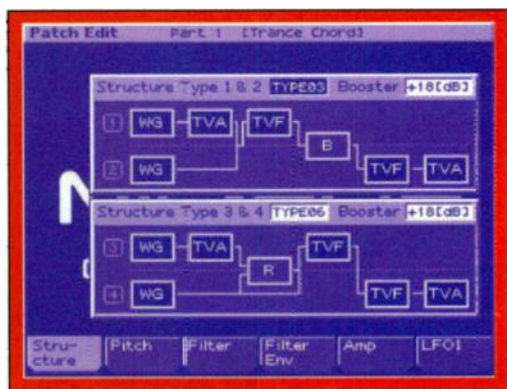


FIG. 4: Extensive patch-editing capabilities are provided through the MC-909's front-panel display.

in the track and blink if the track is muted. Because tracks can't be named, it's a good idea to get in the habit of always recording similar sounds in the same track. That's how the factory patterns are set up with the kick drum in 10, snare in 11, and so on. Once you get used to the layout, cutting instruments in and out of the mix is a snap.

Normally, when you switch to a new pattern during playback, the MC-909 mutes and unmutes tracks according to the data stored in the pattern. You can override this setting by tapping the Play button a second time, which activates the Mute Remain feature. When Mute Remain is active, you can segue to a new pattern and retain the existing mute/unmute status of each track.

The MC-909 offers quick shortcuts for muting all tracks, unmuting all tracks, or toggling all muted tracks to unmuted and vice versa. If you've muted all the tracks for a surprise break, it would be nice if you could return to the previous mute setup with a quick command, but you can't. After muting all the tracks, you have to choose between unmuting them all or unmuting single tracks by hand. Fortunately, it's easy to do: press eight buttons at once, and all eight tracks unmute instantly.

## ARPEGGIATOR

Programmable arpeggiators are an important resource for dance and electronic styles, and the MC-909 doesn't disappoint in that area. You can program up to 128 of your own arpeggiator

patterns. The patterns can be up to 32 steps in length and can include rests, ties, and chords. The details of pattern programming are not too well documented, but after only a couple of minutes of head-scratching I was able to come up with some cool grooves.

Note Velocities are recorded into the arpeggio patterns, and both eighth-note and 16th-note swing are supported. You can set up the instrument so your arpeggios always start on bar lines. Drum sets can be used as a

sound source for the arpeggiator, so you can improvise a constantly changing beat just by grabbing a bunch of pads. Also, the Chord Memory feature interacts well with the arpeggiator. Instead of playing chords on the pads, you can create one-finger chords in advance (up to 128 voicings can be stored) and then arpeggiate them.

## SAMPLING

The MC-909 has nearly all of the features you'd hope to see in a hardware sampler, including a nice big waveform display (see Fig. 3). Utilities such as normalizing and truncating are provided. The stock unit has only 16 MB of sample memory, but as mentioned, you can expand it to 272 MB. You can sample external sounds or resample the 909's own audio stream, assign your samples to the performance pads, and use the full array of patch programming features to sculpt the tones.

While resampling a bass track that I had recorded into a pattern, I found a significant bug. When tracks contain recorded knob moves, the knob moves add nasty gargling noises to the sample. Many MC-909 owners will want to record filter sweeps into their tracks, so that isn't good. However, there's not often a reason to resample a pattern, so it's not a deal breaker. I alerted Roland to the problem and was told that it would be fixed in the next operating-system update (which

should be available by the time you read this).

If you have a computer, you can load WAV or AIFF files into the MC-909. Keep in mind that computer backup is necessary if you install 256 MB of sample RAM, because the contents of sample RAM are lost when you power down, and the largest SmartMedia card can hold only 128 MB. (Also, because you can't hot-swap SmartMedia, you won't have any backups of your SmartMedia files.)

With either an imported file or one you've sampled, you can use the Auto Chop feature to detect transient peaks the way Propellerhead ReCycle does. You can then assign each hit within the loop (up to a maximum of 16 per loop) to a new rhythm set suitable for recording your own beats. The sample split points located by Auto Chop can be manually edited, and you can audition the edits while you're making them, so there's no guesswork. Not too many hardware samplers are that smart.

## SYNTH CONTROLS

The most important tone controls for real-time interaction (filter cutoff and resonance, envelopes, LFO 1 rate and depth, and so on) are all laid out on the left side of the panel. Each synth patch in the MC-909 can use up to four independent tones (such as waveform or filter), so before grabbing the knobs it's important to glance at the Tone Select and Tone Switch buttons. The red LEDs in these buttons tell you which tones you're hearing, and which tones

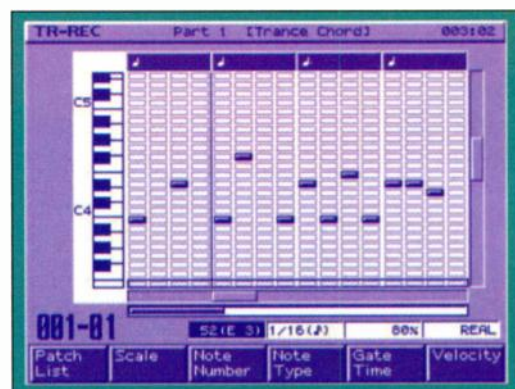


FIG. 5: Creating new patterns is a breeze with the MC-909's simple piano-roll display.



you'll be editing with the knobs. By pressing several Tone Select buttons at once, you can make the knobs active for any combination of tones.

You'll also need to glance at the Part Select/Mute buttons in the Mixer section. In Select mode, only one of these buttons glows. It tells you which of the 16 parts (tracks) the synth knobs are active for. Only one part can be selected at a time; if you need to make sonic changes in several parts at once, you must record the data into the pattern.

A deeper level of patch editing is available in the LCD (see Fig. 4). Here you can set the modulation depths for two LFOs per tone, edit four rates and five levels (not just ADSR values) for the envelopes, choose Velocity zones for the individual tones, and more. The MC-909 boasts 693 waveforms, several filter modes, and 10 different signal routing structures, with which you can do tricks like put two filters in series on a single tone and ring-modulate two waveforms.

You can even morph between LFO waveforms—a feature I've never seen before. And of course, the LFOs can sync to the master clock. Add the ability to do Velocity crossfades between drum sounds for smooth changes in the snare or hi-hat, and it's clear the MC-909 is one powerful synthesizer.

The chief difference between sound programming in the MC-909 and in a conventional synth is that the effects are programmed and assigned at the level of the pattern or song, not within the individual sound programs. The assumption seems to be that you'll most likely be using the MC-909 multitimbrally to play a number of sounds at once, so assigning effects to individual sound programs would only get confusing.

### EFFECTS

The MC-909 has four programmable effects: a reverb, a compressor/EQ, and two multi-effects (labeled MFX). For the multi-effects, you can choose from

38 different algorithms, including chorus, phasing, auto-wah, enhancer, auto-pan, rotary speaker, lo-fi, and a 16-step tempo-based slicer. The distortion and overdrive sound fairly crisp and digital; the algorithms include tone coloring and an amp simulator as parameters, so you can get quite a variety of distorted tones. The reverb is quite rich and smooth, even with long decay times.

The effects can be routed in series or parallel, and each of the 16 parts (tracks) can be sent to any of the four effects inputs or routed dry to the main output. Parts can also be sent to Direct Out 1 or 2, so you can apply external effects if you need to.

Each effect can be switched on or off with its own dedicated front-panel button. There are also three knobs for playing the effects in performance. One of the knobs chooses the effect type, and the other two are assigned to useful parameters. You can switch the knobs from one effect to another without having to

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VTB1 Variable Tube Mic-Pre

open a menu. When they're assigned to the compressor, because there's only one type, the knobs control attack time, release time, and threshold.

Speaking of compressors, the MC-909 also has a mastering multiband compressor. The attack and release knobs are in their own section of the panel, along with a couple of switches. Other controls are tucked away in a page in the LCD. This compressor is global for the instrument, and its settings are not

stored with individual patterns or songs. As a way of fattening up the bass, boosting the highs, or giving your mix more presence, it's a great asset.

## SEQUENCING

Recording your musical ideas into MC-909 patterns is almost as easy as falling down (see Fig. 5). Patterns can be up to 998 measures long, though for most of us 8 measures is probably plenty. After laying down a part, you can switch to a

new track and record another part without interrupting the recording process. If you want to practice a part before recording it, you can go into Rehearsal mode, again without stopping, and then record the part when you're ready.

During real-time recording, drum-machine-style scoop-out erasure is available. You can even switch in and out of Quantize-on-Input mode during recording, so you could get a tight hi-hat track with a loose triplet on one beat, for example. Two step-recording modes are also available.

Patterns can be chained together into songs, and each pattern in the song can have its own track-mute setup, so one pattern can be used in many ways. Song mode is pretty basic, though. Once you've entered a step with some track mutes, you can't go back and edit the mute settings. Songs can't be programmed with tempo changes (though you can use the slider to change the tempo manually during song playback). Variable-length song-section looping,

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## PRODUCT SUMMARY

### Roland

MC-909

sampling workstation

\$1,795

FEATURES	4.0
EASE OF USE	5.0
AUDIO QUALITY	4.0
VALUE	4.5

## RATING PRODUCTS FROM 1 TO 5

**PROS:** Very well-designed panel for interactive performance. User sampling with beat splitting. Large LCD. Good-sounding effects, including multiband mastering compression. Programmable arpeggiator. Computer interface for data storage.

**CONS:** Touchpads don't respond reliably to light taps. No Undo command. Windows 98 not supported for file archiving with USB. No Tempo track in Song mode.

## Manufacturer

Roland Corporation U.S.

tel. (323) 890-3700

Web [www.rolandus.com](http://www.rolandus.com) or

[www.mc-909.com](http://www.mc-909.com)



which is useful for live performance, is available but with some restrictions. There's no full-length song track for recording controller sweeps or extended solos.

Pattern editing could be beefed up as well. All edit commands operate on regions defined by bar lines; you can't define regions with bar:beat:tick precision. Although you can erase all of the Control Change, Aftertouch, or Pitch Bend data from a track without affecting the notes, you can't specify one particular Control Change type to erase (filter cutoff, for instance). Fortunately, there's a work-around. Knob moves are always recorded in Overwrite mode, so if you decide you want to get rid of a knob sweep, simply go into Record mode, put the knob where you want it, and leave it there until the end of the pattern is reached.

Each track in each pattern can be assigned to play an internal sound, external MIDI, or both. Because this assignment is done at the pattern level rather than globally, you can easily sequence external synths with the MC-909 and only use them in the patterns where you need them.

#### PACKS A PUNCH

Overall, I was thoroughly impressed with the MC-909. It sounds great, it's easy to use, and it offers a level of music-making power that only a couple of years ago would have cost three times as much. Sampling, a 64-voice synth, an arpeggiator, a sequencer, USB, digital audio I/O—all that and a pseudo-theremin too!

The sequence-editing area could use a few enhancements, and I'm not too fond of the feel or response of the Velocity Pads, but considering the value of the instrument as a whole, those are minor quibbles. It's especially cool that Roland has a vision of how electronic instruments can be used in performance. Why should turntablists and guitar players have all the fun?

*Jim Aikin writes about music technology for a variety of publications and Web sites. He has been known to bust a move, but only when he gets a pebble in his shoe.*

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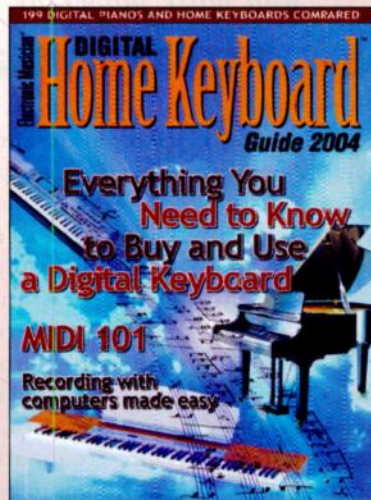
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# SIBELIUS SOFTWARE

## SIBELIUS 2.1 (MAC/WIN)

*A popular notation  
program gets even smarter  
and more powerful.*

By Brian Smithers

In an effort to speed up and simplify the creation of scores and parts, most music-notation programs use their built-in "intelligence" to make assumptions about layout, transpositions, instrument characteristics, and many other musical elements. If the assumptions fall neatly into line with your needs, they can indeed make your life easier. In my experience, however, the assumptions frequently require complex work-arounds to get the results that I'm after.

When I was introduced to Sibelius in its original incarnation, I was impressed

with its version of intelligence, even though I was stymied by a few of its assumptions. I'm pleased to report that version 2.1 comes even closer to the ideal balance between being smart and being flexible.

### ON THE DISC

Sibelius comes on a dual-platform disc so you can install it on either a Macintosh or Windows computer. In fact, you can install it on both, but it will only be fully functional on one computer at a time. The program uses a simple challenge-and-response copy-protection system that allows you to authorize only one machine—but with a twist. An unauthorized version of Sibelius lets you open and print scores and parts, but it doesn't let you save your work. You could therefore do most of your work on your notebook but still print from your office desktop. If you need to do some serious work on your desktop, you can simply transfer your authorization from one computer to the other. Doing that the first time is a bit of a pain if the two machines aren't in the same room, but the transfer authoriza-

**Minimum System Requirements**  
**Sibelius 2.1**  
**MAC:** Power Mac G3; Mac OS 8.6  
(OS X compatible)  
**PC:** 486 CPU (Pentium II recommended);  
Windows 95

tion numbers ordinarily don't change, making subsequent transfers easier.

Installation on my Windows XP machine was as simple as it could be, and I was up and running in just a few minutes. When I started the program for the first time, it recognized my simple MIDI setup and asked me to test it.

### ON THE PAGE

Sibelius always presents your scores in page-layout view (see Fig. 1), so data entry and layout are inextricably linked. The upside of this arrangement is that you don't have to switch between views; the downside is that watching the page reformat itself with each change can distract you from your focus on data entry. It's fine with me as a composer, but as a copyist I sometimes find it troublesome.

On the program's main page, a small gray overview called the Navigator graphically represents the pages in the score. A white rectangular overlay in the Navigator corresponds to the currently visible part of the music. You can drag the overlay around to reveal other parts of the score, or you can simply click where you want the view to go. You can also click and drag directly on the score itself to move it where you need it. If you prefer navigating with the computer keyboard, the Home and End keys move the score to a previous or later page; the Page Up and Page Down keys move you higher or lower on the current page.

Sibelius's onscreen Keypad (in the lower right) is one of the program's best features. It provides access to five sets of notes and symbols that you can select from your computer's numeric keypad (or onscreen with the mouse). It's an efficient system, as you will see in a moment. Above the Keypad, six collapsible Properties panels keep



FIG. 1: Sibelius is always in page-layout view, and reformatting occurs as you enter data. The Keypad in the lower right lets you select the rhythmic value or symbol. The Navigator has been relocated from its customary lower left corner to the upper right. Note the wood-grain "desktop" and crumpled "paper" look of the score.



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03

numerous layout options and other parameters close at hand. Changing the lyric font or assigning alternate note heads, for example, is quick and easy with these panels.

Sibelius takes the prize for offering the cleanest desktop; it lets you move or hide (but not resize) the Navigator, Keypad, and Properties panels. In addition, you can hide the menu bar, tool bar, and even the title bar, leaving only the score onscreen. That's the way I prefer to work, with nothing coming between me and my score. If I really need to retrieve the Properties panels, I can use a keyboard shortcut to call them up and then hide them again. The menus reappear when you move your mouse to the top of the screen or when you use the appropriate keyboard shortcuts to open them.

Another unique feature in Sibelius is its use of paper and desk textures to spice up the user interface. In an effort to combat the boring (and arguably fatiguing) black-on-white display in most notation programs, Sibelius lets you select from numerous wood grains, marbles, and similar textures for your desktop and combine them with various other textures ranging from cotton to parchment for your score "paper." (Both options draw from the same set of textures, so you could

have wood-grain paper if you really wanted to.) You can turn the textures off completely if they bog down your video or offend your sensibilities.

## DATA ENTRY

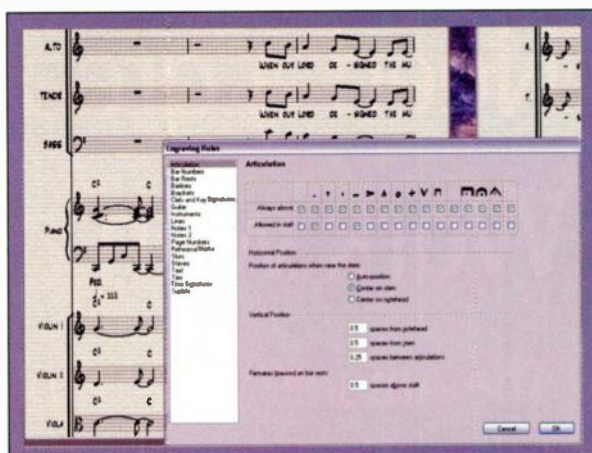
Like any first-rate notation program, Sibelius offers a variety of methods for entering notes and other information into your score. The simplest is to choose notes and symbols from the onscreen Keypad with the mouse and

then place the notes and symbols on the score by clicking in the desired location. If you use this method past your first ten minutes with the program, though, you're wasting time and missing one of the best features of Sibelius.

A far more efficient way to work is with your right hand on your actual numeric keypad and your left hand on the alphabet keys. Working that way, you can choose a rhythmic value with your right hand and a pitch with your left; each note is entered as soon as you press the letter key that corresponds to the pitch name. The onscreen Keypad

controls five layers of symbols, starting with the most common rhythmic values and including articulations, beaming controls, and accidentals from double sharps to quarter tones. Other functions, such as repeats, slurs, glissandi, and pedalings are available with single-letter shortcuts. It's an extraordinarily efficient method and the best justification I've ever had for buying an external keypad for my laptop.

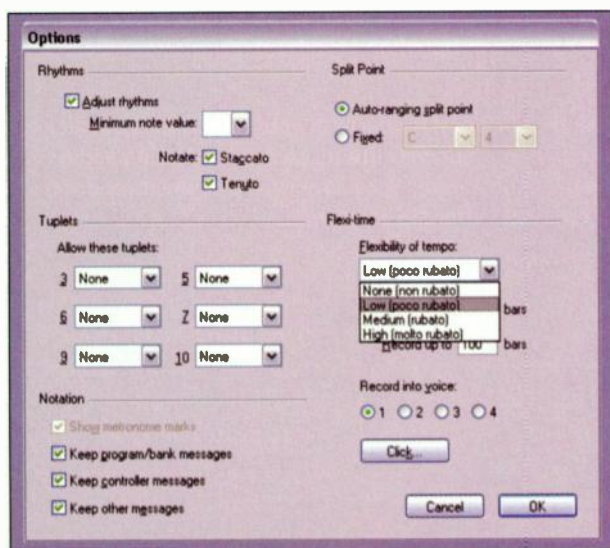
Moving your left hand to a MIDI key-



**FIG. 3:** House Styles can be saved and recalled to make quick changes in every aspect of score appearance, from font to line thickness and object spacing.

board makes adding accidentals and chords even easier. Of course, once you have your MIDI keyboard fired up, you'll be tempted to try real-time note entry. Sibelius makes that easy with a function called Flexi-time (see Fig. 2). In Flexi-time mode, Sibelius actually follows your tempo, allowing you to speed up for simple passages and slow down for complex passages. If that sounds too good to be true, let me assure you that it works quite nicely. Once you become accustomed to manipulating the tempo, you can really bend it to your whim. I did, however, run into a bit of a snag on my laptop using the built-in software synthesizer. The latency of the instrument made Flexi-time think I was playing consistently behind the beat, so it kept slowing down to accommodate me. With a hardware synth that wasn't a problem.

Although Sibelius applies an extraordinary amount of intelligence to your scores, I found that it sometimes allows objects to overlap. If I force a large number of bars onto a single system, I naturally expect to have to adjust some object spacing manually, but sometimes even the default spacing leaves a sharp overlapping a quarter note or lyrics bumping into each other. Spacing problems were frequent only with lyrics (because spacing follows the notes, not the text), but the occasional overlap of notes and accidentals should never be allowed to happen.



**FIG. 2:** Flexi-time actually lets the metronome follow the tempo of real-time MIDI input. You can speed up for simple passages and slow down for more technical passages.





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## ● MACKIE CONTROL



FIG. 2: The Mackie Control's spartan rear panel provides single MIDI In and Out ports along with two footswitch jacks and an External Control pedal jack.

**Nuendo (PC).** I took the Mackie Control for a test drive with a PC running Nuendo 1.61. After installing the appropriate version of Nuendo, I plugged in the MIDI cables and got down to work within minutes. I put the system through its paces with ease: I recorded audio, scrubbed it back and forth, zoomed in and out, panned, and executed all the other basic DAW commands without any problems. I especially liked the plug-in editing, which was intuitive and smooth.

I assigned EQ to a track, hit the track Select button and the EQ button, and the EQ plug-in window popped up on-screen. All the salient parameters were mapped to the rotary controls. Pressing the Flip button moved the EQ parameters to the eight faders, which made for a really musical processing experience. Overall, the coupling between Nuendo and the Mackie Control felt clean, natural, and responsive.

**Digital Performer (Mac).** Next, I plugged the Mackie Control into an Apple G4 running Digital Performer 3.11. Just as with Nuendo on the PC, the basic operations, such as transport controls, fader levels, and pan positions, worked as advertised.

Many of Digital Performer's functions, such as bringing forward the three primary windows and toggling on and off options such as Overdub mode, Count-off, and Click worked fine. Others, such as vertical zoom, worked in some modes but not all. Some operations rely on various modifier buttons that change the functionality. For example, for the Cycle and Punch buttons, pressing the button with no modifiers sets the start point. Adding Shift sets the end point; adding Control toggles the mode on and off.

I also found that the EQ and Dynamics buttons didn't bring up dynamics or

### Mackie Control Specifications

Number of Channels	(8) track faders, (1) master fader
Faders	(9) 100 mm Penny and Giles long-throw touch-sensitive motorized faders
Displays	2-line LCD, 2-character LED Assignment display, 10-character LED elapsed-time/current-position display
MIDI I/O	(1) In, (1) Out
Other Connectors	(2) 1/4" foot-switch, (1) 1/4" external control
Power	100–240V at 50/60 Hz line-lump 12 VDC transformer
DAWs Currently Supported	Mac: Digidesign Pro Tools; Emagic Logic Audio and Logic Platinum; MOTU Digital Performer; Steinberg Nuendo, Cubase SX, and Cubase SL. Win: Cakewalk Sonar; Digidesign Pro Tools; Magix Samplitude and Sequoia; RML Labs SawStudio; Steinberg Nuendo, Cubase SX, and Cubase SL; Syntrillium Cool Edit Pro.
Dimensions	17.4" (W) × 3.8" (H) × 17.5" (D)
Weight	14.5 lb.



## PRODUCT SUMMARY

### Mackie Designs

Mackie Control  
MIDI control surface  
\$1,299

FEATURES	4.0
EASE OF USE	3.0
DOCUMENTATION	2.0
VALUE	4.0

#### RATING PRODUCTS FROM 1 TO 5

**PROS:** Provides 100 mm motorized touch-sensitive faders. Robust and complete feature set with good implementation across multiple platforms. Expandable system to fit your needs and budget.

**CONS:** No numeric keypad. Some aspects of the user interface design may be a bit unintuitive.

### Manufacturer

Mackie Designs Inc.  
tel. (800) 898-3211  
e-mail sales@mackie.com  
Web www.mackie.com

EQ plug-ins for editing the way they did in Nuendo; they had other functions unrelated to the names on the labels. I was able to edit EQ parameters (in the ParaEQ plug-in) by holding down the Edit button, selecting the appropriate plug-in for that track, and pressing the rotary knob. That process never brought the plug-in window up on the screen, though. (According to MOTU, that's because Digital Performer doesn't force you to use dedicated EQ and dynamics in every channel strip. The program lets you choose the desired plug-in on only the tracks where they're needed.) All in all, Steinberg's implementation of the Mackie Control provided a more intuitive experience than MOTU's.

### BOOK LEARNIN'

The documentation for Mackie products is usually pretty good; in this case, however, Mackie has dropped the ball. The unit ships with a four-page "Quick-Start Guide" that offers three pages of legalese and return information and one page of instructions on how to wire the Control into your studio.

Mackie's idea is to have the DAW manufacturers write separate manuals covering the Control's interactions with their software. However, much of the basic functionality of the Control is the same across all systems, and that material should have been included in a user manual that accompanies the product, leaving the DAW manufacturers to write about their specific implementations.

The quality of the documentation from the different manufacturers was inconsistent. For example, Steinberg's manuals for Cubase and Nuendo were thorough and well written. MOTU's Digital Performer 3 documentation consisted of a brief six-page draft with many mistakes, although the documentation for Digital Performer 4 was much more extensive, with graphics and descriptions of general as well as specific controls. (The newer documentation is now available for Digital Performer 3 users on MOTU's Web site.)

### UNDER CONTROL

The Mackie Control is a fine piece of hardware. Its design and functionality are first-rate, the faders feel great, and the feature set is impressive. The price is reasonable for a controller of this depth, and the availability of additional expander modules allows for a custom-built virtual mixing system of any size.

The potential weak point in this product is that Mackie must rely on each DAW manufacturer to create a robust interface for the Mackie Control. Nevertheless, if you're looking for an inexpensive and expandable control surface for your studio, I'd definitely take this product into consideration. I would, however, try it (as I would just about any other control surface that I've seen) before buying it. If possible, spend a few hours running a Mackie Control with your favorite DAW to see how you like it. If the operation feels smooth and intuitive, then feed your mouse to the cat and say hello to a much more enjoyable mixing experience.

*Nick Peck creates sound for film and games and still lugs his Hammond and Leslie to jazz gigs. Send him an e-mail at [nick@perceptivesound.com](mailto:nick@perceptivesound.com).*

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# NOVATION

KS4

*Sync out loud with this  
bright new K.*

By David Battino

**N**ovation is clearly on to a good thing with its "liquid" analog-synthesis modeling. In the past two years, the British manufacturer has rolled out the single-rackspace A-Station; the functionally identical two-octave K-Station keyboard; and now the KS4, KS5, and KS-Rack synthesizers. (V-Station, a software version of the K-Station, is also available.) All four K instruments feature solid construction; an intuitive layout with plenty of knobs; lush sound; and surprisingly low prices.

Compared to the K-Station (reviewed in the November 2002 issue of *EM*), the KS range adds a significantly enhanced synthesis engine, better interfacing, and some ingenious programming features. Most significant is Hypersync, which synchronizes the arpeggiators, LFOs, and effects. Because the KS-series instruments are four-part multitimbral (the K-Station produces only one sound at a time), Hypersync makes it easy to whip up some insane polyrhythms, with everything pulsing in sync.

To boost the KS-series' rhythmic power further, Novation included sampled

drum sounds that can be mapped to individual notes to form drum kits. Version 2 of the KS operating system (free from Novation's Web site) adds a new arpeggiator mode called Drum that plays drum grooves with a maximum length of eight bars. The 33 drum patterns (mostly house and trance styles) are fixed, but they make the KS-series fun to jam with.

## K BY K

The four-octave KS4 and five-octave KS5 differ only in number of keys and price (\$1,399 versus \$1,499). The six-space KS-Rack, which is identical minus the wheels and keyboard, lists for \$999—just \$100 more than the K-Station. You can also use the KS-Rack as a tabletop sound module. For this review, I tested a KS4 and will focus on its improvements over the K-Station.

One very welcome enhancement is the two-line LCD, which displays Program names and categories (see Fig. 1). (The K-Station shows Program numbers only, and Novation has no plans to add naming capabilities.) Pressing the two Select buttons beneath the display switches among the 24 sound categories, which include Arpeggio, Bass, EP/Clav, Soft Lead, Strings, and six User slots. (The K-Station has no such grouping feature.) Hit the adjacent By Category button, and the Up and Down buttons and Data knob will select sounds from the current category only. Oddly, the **EMWEB** Vocoder category has no **CLIPS** factory presets, although the vocoder has been boosted from 12 to 16 bands

and sounds quite smooth and detailed.

The clicking I complained about when switching patches in the K-Station has been cleaned up in the K4, but I still heard it when switching between certain patches—for example, from Performance 134 (World Com) to 133 (Mr & Mrs Gurner). Sadly, I also heard obvious clicks when I exceeded the instrument's polyphony or adjusted the delay time.

The KS4's lightly weighted keyboard feels more substantial than the K-Station's, and it adds pressure sensitivity. The keyboard action gave me sufficient control, even though it has only two Velocity curves—Soft and Hard.

Nearly every part of the KS4 synthesis engine—oscillators, filter, LFOs, and so on—has more parameters than those on the K-Station, but fortunately, the KS4 also has more knobs and buttons to adjust them. Only the mixer knobs are pressed into double duty with a Shift button. That one-knob-to-one-function design makes the KS4 easy to operate, which is something I really liked about the K-Station. For deeper editing, you call up menus at the panel's bottom right.

## I/O SILVER

With six effects for each of its four multitimbral parts *and* a vocoder (that's 25 simultaneous effects!), the KS4 doesn't need a lot of individual outputs for external processing, but it has four (see Fig. 2). You can route each Part to any output or in stereo to outputs 1 and 2 or 3 and 4. Unlike the K-Station, the KS4 has sustain- and expression-pedal inputs. A headphone jack, a trio of MIDI ports, and a monophonic audio input round out the back panel. And the KS4 replaces the K-Station's wall wart with an internal power supply.

I was pleasantly surprised by the KS4's construction quality and heft. The case is metal with plastic endcaps, and the knobs, though not bolted to the panel, feel solid. The four sliders in the envelope section, however, feel a bit fragile. Although the knobs turn with enough resistance to make them easily controllable, some knobs would benefit greatly from being detented. The smooth knob response is fine when you're adjusting a single parameter such as filter cutoff,



FIG. 1: With its metallic silver case, 29 knobs, and bright blue display, the Novation KS4 looks as elegant as it sounds. The Hypersync feature, however, makes it jump up and dance.



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but it's not good for selecting discrete values such as waveform shape. Conversely, I was constantly bamboozled by the effects section—one of the few areas that uses buttons for incrementing and decrementing values—because those buttons are arranged horizontally whereas the seven LEDs that indicate the current effect are stacked vertically.

## BETTER OSCILLATE

Like the K-Station, the KS4 offers three oscillators per voice as well as a noise source and the ability to route an external audio signal through the signal path. Novation's unique doubling feature (described in the K-Station review) allows you to detune each main oscillator with itself for an even thicker sound. The polyphony has been boosted from 8 to 16 notes, and 28 new waveforms complement the original sine, triangle, sawtooth, and variable pulse. The new waves, credited to sample developer Ilio, sound more like single cycles of sampled waveforms than the extended recordings in typical sample-playback instruments. Consequently, the KS4 can generate complex sounds that retain an appealing analog flavor and are more realistic than a traditional analog synth, but more organic than a rompler.

The new percussion samples, which make up 15 of the 32 waveforms, are all looped. With a fast envelope you can transform them into straight drums, but



I whipped up an amazing raspy lead by using a kick-drum sample as a tone source and transposing it up until the rhythm blended into a ragged, woody tone. The percus-

sion samples are all short and sound electronic; you get the TR-808 and -909 staples as well as some burly kicks and snappy snares. Because each note in a drum kit is actually a complete KS synthesizer voice, though, those 15 waveforms go a long, long way. (You can use the other waveforms for drums, too.)

Unfortunately, all drums in a kit share the same effects settings—including panning—so you can't make a kit with a dry kick and an echoing snare, or even pan the hi-hat to the side without moving everything else in the kit. I came up with some work-arounds, such as mapping the mod wheel to reverb level and flicking it up and down on alternate beats, and running the drums through a panning delay to spread them out in stereo, but that limitation was frustrating. You *could* run an entire drum kit to the individual outputs for external processing, but there's no way to assign specific drums in a pattern to individual outs. (However, the KS4 supplies three kits that contain only kick, snare, or hi-hat.)

## AN LFO NEVER FORGETS

A new button in the mixer section allows you to modulate the levels of the three oscillators, noise source, ring modulator output, and external input with the two LFOs or the two-stage FM envelope. Because the routings are hardwired with LFO 1 controlling four of those six destinations and pitch, that design is not the most flexible, but it is straightforward. I crafted some bubbling, animated patches by setting LFO 1 to a rhythmic waveform and LFO 2 to sweep the filter and pulse

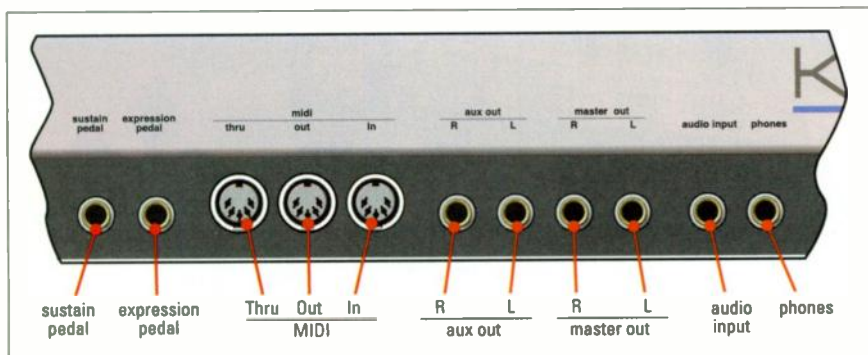


FIG. 2: The KS4 has four individual outputs that can also be addressed in stereo pairs. The mic/line input can feed the synthesizer voice, effects, or 16-band vocoder.

## PRODUCT SUMMARY

### Novation

KS4

analog-modeling synthesizer  
\$1,399

FEATURES	3.5
EASE OF USE	4.0
DOCUMENTATION	4.0
VALUE	3.5

#### RATING PRODUCTS FROM 1 TO 5

**PROS:** Lush sound. Brilliant multitimbral editing. Six simultaneous effects per Part. Detailed vocoder. Hypersync. Simple programming.

**CONS:** Exceeding polyphony and changing Programs can cause clicks. No individual send levels or panning for drum sounds. Can't transmit MIDI Clock. Arpeggiator stutters when controls are changed during drum-pattern playback. Manual needs work.

### Manufacturer

Novation E.M.S. Ltd./eblitz Audio Labs  
(distributor)  
tel. (805) 258-1465  
e-mail eblitzaudiolabs@cox.net  
Web www.novationmusic.com

width. The filter, incidentally, now has highpass and bandpass modes. It drips with goodness; that must be the "liquid" sound Novation refers to. I really like the sound of this synth.

Whereas the K-Station has just 4 LFO waveforms, the KS4 offers 32, as well as the ability to run them in unipolar (positive-only) mode. The manual (which is unindexed and crawling with typos) doesn't list the waveforms. Some of the more interesting ones are the quantized sample and hold, which pings between high and low values with a random rhythm; several that play chromatic or major scales (or even arpeggiated seventh chords) when the LFO is in unipolar mode and the depth is set to 30; and a handful with envelope shapes. When you press the adjacent One Shot button, a selected LFO becomes an envelope with up to 12 stages—great for adding unusual transients to the beginning of notes, particularly at faster speeds.



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World Radio History

The KS4 also provides a selection of nine Morse-code-like rhythmic LFO patterns. I briefly amused myself by holding a chord and modulating the filter cutoff with the LFO patterns while juicing the cutoff knob with my other hand, but the rhythms were so square that I soon lost interest. For an instrument with so many tempo-syncing features, it's disappointing that there's no swing control.

## SYNC AND BE MERRY

The KS4's arpeggiator improves on the K-Station's rudimentary one by adding the Drum mode as well as 32 rhythms you can apply to the basic pitch sequences (up, down, up-and-down, order played, random, and chord). Some of the rhythms do have a swing feel, but I thought most of them sounded awkward,

and you can't make your own arpeggio patterns. However, once you twist the Hypersync dial, nearly all is forgiven. Hypersync instantly synchronizes the arpeggiators, LFOs, and effects to the current tempo, with assignable rhythmic subdivisions for each parameter.

The KS4 has 16 rewritable Hypersync setups, each with 16 parameters (see Fig. 3). Hypersync Preset 4, for example, sets the chorus rate to a quarter note, the pan sweep to four bars, the delay time to an eighth note, the pitch LFO rate to quarter notes, and the filter LFO rate to one bar. You can specify rhythmic subdivisions and send levels for each of the tempo-based effects (delay, chorus, EQ, and panning); the rate and delay of the LFOs; the left-to-right time ratio of the delay taps; the type of chorusing

(though the display mysteriously toggles between Room and Chamber); and the EQ's center frequency and modulation depth. When you like what Hypersync is doing to the current sound, a few clicks will save the Program or Performance with the new rhythmic settings.

## MULTITIMBRAL OPERATION

The feature that most impressed me is the way the KS4 handles Performance editing. On most multitimbral synths, you create multitimbral Performances (aka Combis) by layering monotimbral Programs. That forces you to remember which Programs make up each Performance; if you delete or alter a Program, all the Performances that use it will change. Worse, few synths have enough effects to faithfully duplicate all the original Programs in a multitimbral context, so you have to make hard choices about which effects to keep.

On the KS4, each Program in a multitimbral Performance retains its arpeggiator and all six of its effects. (Only one vocoder can be active.) When you edit a Program from within Performance mode, the KS4 creates a new version of the Program in a hidden area of memory. Consequently, you never have to worry about keeping Programs linked to Performances. That scheme also makes Performance editing far more powerful. When you create a Performance on most multitimbral synths, you can specify levels, panning, note range, and Velocity range for each Program—and that's about it. On the KS4, you have immediate and risk-free access to *every* parameter. I could easily set up wheel-driven crossfades between Programs and scale specific controller response.

If you've visited EM's Web site, you might have heard the audio loops I created with the K-Station and layered in Ableton Live to simulate a multitimbral performance. I was able to dump my K-Station patches (also on the Web site) into the KS4 and quickly re-create those painstaking productions to play back in real time.

I then created a Performance with four arpeggiators and gobs of synced effects and LFOs. Next I used MIDI to connect a Korg MicroKorg to the KS4 and let it

## KS4 Specifications

Sound Engine	analog-synthesis modeling, sample playback
Software Version Reviewed	2.0.00
Audio Inputs	(1) unbalanced 1/4" mic/line
Audio Outputs	(4) unbalanced 1/4"; (1) 1/4" stereo headphone
Keyboard	49-note, semiweighted; Velocity- and pressure-sensitive
Polyphony	(16) notes
Multitimbral Parts	4
Program Memory	(400) RAM locations (200 are blank)
Performance Memory	(100) RAM locations (50 are blank)
Drum Map Memory	(4) RAM locations (2 are blank)
Oscillators	(3) with hard-sync, FM, ring modulation; 32 waveforms (27 with doubling effect)
Additional Sound Sources	noise (4 types); external audio input
Filter	(1) resonant lowpass/bandpass/highpass; switchable 2- or 4-pole
Envelope Generators	(1) amplitude ADSR; (1) modulation ADSR (controls filter cutoff, pulse width, and pitch); (1) AD (controls FM and Osc 3 level)
LFOs	(2) with tempo sync, delay, 32 shapes, and one-shot mode; LFO 1 controls pitch and Osc 1 level, noise, ring mod, and external input; LFO 2 controls filter, pulse width, and Osc 2 level
Effects	delay, reverb (6 types), chorus/phaser, distortion, shelving EQ, pan (all available simultaneously per part); vocoder (applied to single part)
Arpeggiator	7 types × 32 patterns; Drum mode (33 patterns); 64–191 bpm or external sync
Controllers	(29) knobs; (4) sliders; (1) pitch wheel; (1) mod wheel
MIDI	In, Out, Thru
Dimensions	33.5" (W) × 3.7" (H) × 11.8" (D)
Weight	16.5 lb.





DAVID BATTINO

**FIG. 3:** Turning the Hypersync knob instantly locks as many as 16 parameters to a common tempo. Here, delay time is set to a dotted eighth, chorus rate is set to a 16th, EQ sweep is set to ten beats (2½ bars), and pan sweep is set to 12 bars.

rip. The combination of the Korg's master arpeggiator and the KS4's four slave arpeggiators blasting through my quad speaker system with synchronized echo was outrageous; it was like a one-finger rave. Although the KS4's tempo knob tops out at 191 bpm, the KS4 happily followed the Korg all the way up to the

smaller keyboard's maximum of 300 bpm. It even stayed in sync as I maniacally torqued the Korg's tempo knob.

When I tried to return the favor by clocking the MicroKorg with the KS4, however, I was shocked to discover that the KS4 doesn't transmit MIDI Clock; it only slaves to it. To play your K-Station grooves into a sequencer, you must drive the KS4 from the computer. Onstage, that one-way sync limits your interfacing options. I also found that twisting knobs while a drumbeat was playing caused the groove to flam and hiccup.

### AS CLEAR AS K

With its rich, clear sound; simple interface; extensive tempo sync; and accessible price, the KS4 is a good choice if you're looking for expressive analog-like timbres and rhythmic inspiration. The basic onboard drum patterns (and limited drum mixing) won't put workstations out of business, and the clicking and flamming are disappointing, but I

keep coming back to the KS4 for its sound and ease of use. It's so easy to dive in and create your own timbres and then lose yourself playing them; to me, that's what synthesizers are all about.

In the analog-modeling realm, the KS4 has some tough competition from the Nord Lead 2. But the Nord lacks effects, a vocoder, and Aftertouch, and its display has only three digits. Korg's MS2000 costs several hundred less but is only four-note polyphonic, which limits the types of music you can play, and it's skimpy on effects. The upcoming Alesis Ion may be the KS4's closest competitor, but it wasn't yet shipping as I wrote this. If virtual-analog synths make your mouth water, you'll find a lot of choices, but Novation's "liquid" modeling KS4 is a very tasty instrument.

*David Battino is hard at work on Crank It Up to 1, a how-to book about digital music production based on tips and insights from top artists. More at [www.crankitupto1.com](http://www.crankitupto1.com).*

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# STUDIO PROJECTS

VTB1

*This low-cost preamplifier  
is surprisingly  
flexible.*

By Richard Alan Salz

**D**espite the fact that it's only half a rackspace wide, Studio Projects' VTB1 does not have what you would call a minimalist design. The variety of features in this innovative mic preamp is almost unmatched at its price point. The VTB1 contains a vacuum tube, but I wouldn't call it a tube-based preamp; like many of its low-budget competitors, it's a solid-state device that includes a tube to provide some interesting coloration variations. If you prefer, you can dial the tube completely out of the signal path using the front-panel Tube Blend control.

## LOOKS LIKE A CB RADIO

Visually, the VTB1's exterior is rather unimpressive, but it feels solid enough. Its well-built enclosure is made of steel, and the knobs and switches feel sturdily mounted. Under the hood, it features such niceties as a ceramic tube socket, perfectly flowed solder joints, consistent length of component leads, and thick circuit boards. Like other Studio Projects gear, the VTB1 was designed in the United States and built in China.

On the unit's front panel, buttons for

48V phantom power, Line In, highpass filter (HPF), meter select (input or output), and polarity reversal (Pol Rev) are each accompanied by an LED to indicate their status (see Fig. 1). A five-segment LED meter displays input and output levels. The Line In button selects the high-impedance instrument input, also on the front panel. Three conveniently detented rotary pots control Input Gain, Tube Blend, and Output Level.

The VTB1's rear panel sports a 12 VAC power-supply input, an XLR balanced out, a ¼-inch TRS line out, a ¼-inch TRS insert, a Mic Impedance button, and an XLR mic in (see Fig. 2). Because the VTB1's rear panel provides balanced XLR and ¼-inch TRS outputs, simultaneous output is possible, which is useful for sending signals to an amplifier and a mixing board at the same time, for example.

Although the unit lacks a dedicated power switch, a blue glow (from an LED near the tube) emanates from the perforations in the front panel when the included wall-wart power supply is plugged in.

## ON-THE-JOB TESTING

When I began using the VTB1, I was recording a hard-edged nu-metal project with several synths. During the inevitable lulls in tracking, I substituted the Studio Projects preamp for the other preamps I was using, including a Peavey VMP-2, a D.A.V. Electronics Broadhurst Gardens No. 1, and the on-board preamps in my Neotek IIIc console.

First up were bass guitar tracks. I favor a lightly compressed, direct-injected bass to anchor the rest of the instruments, especially for dense music.

## PRODUCT SUMMARY

### Studio Projects

VTB1  
microphone preamp  
\$229

FEATURES	4.0
EASE OF USE	3.0
AUDIO QUALITY	3.0
VALUE	4.0

RATING PRODUCTS FROM 1 TO 5

**PROS:** Rich in features. Interesting colorations. Versatile metering. Very good direct injection.

**CONS:** No clean sounds. Tube is hard to replace.

### Manufacturer

Studio Projects  
tel. (310) 373-9129  
e-mail sales@pmiaudio.com  
Web www.studioprojectsusa.com

The bass player and I initially used a Radial JDI direct box feeding the Peavey preamp to record a Warmoth Gecko five-string bass. It was a great-sounding combination but too clean, so we plugged the bass directly into the preamp's high-impedance input. That sounded quite a bit tougher, so we printed the track using that setup. Switching to the VTB1 yielded a similar but slightly rougher sound that the bassist preferred. I found that the best method for determining the correct amount of tube blend was to turn up the control until I began to hear undesirable artifacts and then ratchet it down a click or two.

Bass tracks in the can, the band and I moved on to synth tracks, recording a combination of Minimoog, Realistic



FIG. 1: The VTB1's almost primitive appearance only hints at its versatility. An instrument input and most controls are located on the front panel.



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MG-1, Chroma Polaris, and Yamaha RM1x. We used the onboard Neotek preamps to achieve the cleanest sound. The VTB1 didn't do so well on synth tracks. As I later confirmed with the manufacturer, using the front-panel instrument input as a line stage is not recommended. The VTB1 can't handle a high (or medium-high) signal level without producing some pretty massive clipping. Still, if you want to give a track the sound of something about to blow up (in a Nine Inch Nails sort of way), I encourage you to try routing line sources through the VTB1.

One of the VTB1's more innovative features is its selectable input-impedance switch. As far as I am aware, you won't find another mic preamp anywhere near the VTB1's price that includes this feature. However, I didn't find it especially useful. It might be effective for ribbon microphones that have problems driving a high-impedance load. The control appeared to accentuate or attenuate the brightness of microphones such as the Audio-Technica AT4040 and beyerdynamic M 88 TG, which is certainly a valid way to effect a tonal change without reaching for the EQ (or moving the microphone).



FIG. 2: Most of the VTB1's ins and outs are located on its rear panel, along with a switch for selecting mic impedance.

For recording vocals, I brought out the Sennheiser MD 421—a great choice when you're dealing with a singer who screams. The microphone sounded much too clean through the D.A.V. preamp and through the stock Neotek preamps, leaving us with a choice between the VTB1 and the Peavey VMP-2. Not surprisingly, the VMP-2 presented a larger, smoother, more clearly defined image. Although we chose that signal path for the lead vocal, we relied on the VTB1 for some of the background vocals, occasionally driving it into rampant-distortionland by turning the Tube Blend knob most of the way up. By comparison, with the knob turned all the way down, the VTB1 sounded rather flat and uninteresting.

Drums provided a bit more of a challenge than the VTB1 could handle, unless you're looking for tightly compacted sounds that aren't representa-

tive of the source instrument. Just for fun, I recorded an extra track with a Shure 514B (a CB-radio-style, push-to-talk dynamic microphone) through the VTB1, with the Tube Blend turned way past mildly distorted. We didn't end up using the track, but there was definitely more than a little bit of the Tchad Blake thing going on. Forget about using the VTB1 on kick or snare; it just doesn't have the headroom to do those instruments justice.

The general consensus among the band members was that the VTB1 is great for tracks that need more edge or dirt, and I agree. The VTB1 is probably one of the last preamps I would reach for if I were recording a string quartet, but for aggressive music (especially for nasty-sounding vocals), it's a great box.

## IN THE LIGHT OF DAY

Especially in light of its low price, the VTB1 is an intriguing product. It could almost be viewed as an exercise in determining how many features you can stuff into a half-rackspace box that retails for less than \$250. On the one hand, it's incapable of passing a clean signal unscathed, but most studios already have preamps (either external or as part of a console) that are capable of that kind of output.

On the other hand, the VTB1 can produce some grungy (but controllable and repeatable) sounds that would be difficult or impossible to produce using a standard mic preamp. If you're in the market for a colored preamp with attitude, and you need a unit that can double as an excellent direct box (especially for bass guitar), the VTB1 is certainly worth an extended listen.

*Richard Alan Salz is a producer, engineer, and composer living in southern Vermont.*

## VTB1 Specifications

<b>Amplifier Type</b>	tube/solid-state hybrid
<b>Tube Type</b>	12AX7
<b>Inputs</b>	(1) balanced XLR (mic); (1) balanced 1/4" TRS (line)
<b>Outputs</b>	(1) balanced XLR; (1) balanced 1/4" TRS
<b>Insert</b>	(1) unbalanced 1/4" TRS
<b>Metering</b>	5-segment LED
<b>Input Impedance</b>	300 or 2,000Ω (mic); 1.5 MΩ (line)
<b>Output Impedance</b>	100Ω XLR; 300Ω TRS
<b>Frequency Response</b>	20 Hz–20 kHz (+0, –0.5 dB)
<b>Maximum Preamp Gain</b>	+60 dB mic; +30 dB line
<b>Total Harmonic Distortion</b>	<0.0015%
<b>Noise</b>	–20 dBu mic; 0 dBu line (at +15 dBu output)
<b>Phase Response</b>	<15 degrees
<b>Highpass Filter</b>	75 Hz, 18 dB/octave
<b>Phantom Power</b>	48V
<b>Power Supply</b>	12 VAC wall wart
<b>Dimensions</b>	8.5" (W) × 1.5" (H) × 5.0" (D)
<b>Weight</b>	2.9 lb.



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premium synths are not cheap, if you're not already covered in those categories and you're looking for versatility and quality, they definitely deserve a look.

**Overall EM Rating (1 through 5): 4.5**

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## BIG FISH AUDIO

### Phat Beats from the Box

By Gino Robair

.....

**F**our well-known New York City artists—Kenny Mohammed, the Human Orchestra; Omri Anghel, the Human Beat; Baba; and Hesh—provide the vocal percussion collected on the 2-CD *Phat Beats from the Box* (audio and data, \$99.95). Although Mohammed is the best known of the vocalists outside of New York (having appeared on *The Tonight Show with Jay Leno* and MTV), Baba and Omri Anghel contribute the majority of the tracks, and in that sense are the main force here. However, all four artists contribute top-notch performances.

### Hand to Mouth

All of the sounds in the collection are created using various combinations of the voice, lips, tongue, nose, throat, and chest. Some-

times the performer cups his hands around the mic and his mouth to get a little extra bass using the proximity effect. A bit of studio trickery is also used on occasion, such as distortion and pitch processing for bass and horn lines, which helps give certain sounds a larger-than-life character. Some tracks even include post-production stereo processing and echo, often to good effect.

The audio disc offers 48 tracks divided into 16 sections, each in its own style and tempo. The data disc adds two more style/tempo folders; for the most part it includes the same material as disc one but as 24-bit, 44.1 kHz Acidized WAV files. An additional data folder, Single Sounds Bank, contains all of the individual samples from the audio disc—bass drums, snares, cymbal hits, hi-hats, effects, percussion, and “raps n scratches.” This is the place to begin if you want to create multi-layered setups in your sampler.

Each style/tempo section on the audio disc begins with a demonstration track showing how the sounds can be used together. Next come the individual elements themselves, presented as a track of loops followed by a track of samples. An audible click is inserted between each loop phrase to help delineate the loop's end. The click is an especially handy reference for loops that include large silences.

The collection's tracks range in tempo from 75 to 184 bpm; compelling rhythms are provided at each tempo. Some have a natural swing that is irresistible.



match instruments from different styles, start with the Single Sounds Bank or you may end up with two different files with the same name. On a similar note, I wish the booklet offered a list of the sounds used in each style on the audio disc, so I don't have to pop the data disc into my computer and poke through the files there.

The sounds I found most difficult to work with were the spoken-word exclamations. If you're looking for shouts of “New York City,” “work it,” or “do you want it, un hunh,” you've come to the right place. I found myself slicing out and grafting consonants from some of the words onto the beginnings of loops to add emphasis, and I was satisfied with the results.

### Can't Touch This

If this collection sounds like it's meant merely for use in rap or hip-hop projects, guess again. The organic-sounding beats and one-shots lend themselves to any style of music, and I found it easy—and exciting—to surround the vocal-based sounds with real and synthesized percussion.

*Phat Beats from the Box* is a thoroughly enjoyable collection that offers a nice range of styles and tempos. So enjoyable, in fact, that I sometimes play the audio disc in the background while I'm working at the computer. When was the last time you did that with a sample library? I would recommend *Phat Beats from the Box* to anyone interested in unique sounds, regardless of genre.

**Overall EM Rating (1 through 5): 5**

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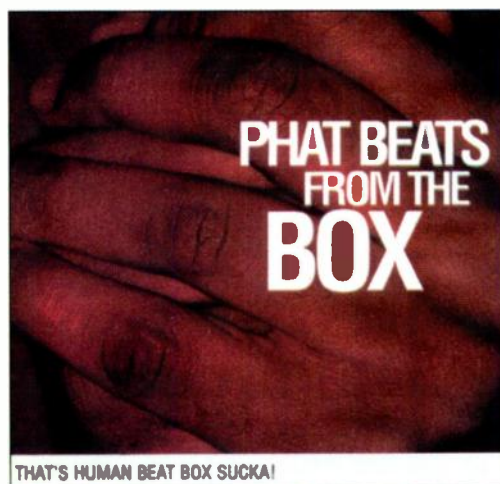
## AKG

### K 271 Studio

By Michael Cooper

.....

**A**KG's remarkable new K 271 Studio (\$249) headphones have a closed-back design that isolates your ears from ambient noise and prevents bleed into nearby microphones. This makes the K 271 Studio an excellent choice for recording-studio, DJ, and broadcast applications.



Big Fish Audio's *Phat Beats from the Box* is an outstanding collection of human-beatbox sounds spanning a number of styles and tempos.

### Shout Out

My favorite elements include the many synthlike basses and lead lines (which often include realistic-sounding filter effects) and Mohammed's vinyl-scratching sounds and bass effects. Many of the percussion sounds have an uncanny resemblance to the real thing. In that respect, Anghel's tom fills in All Day are exceptional.

My only gripes about the collection are minor. First, the naming convention for the WAV files is generic. For instance, each Samples folder lists the bass drums numerically: bd01.wav, bd02.wav, and so forth. If you plan to mix and



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The versatile AKG K 271 Studio headphones are designed for use in studio, stage, broadcast, and DJ applications.

Mixing and mastering engineers will appreciate the K 271's extended frequency response, cited to be 16 Hz to 28 kHz. However, no tolerances are given for this specification, because the exact performance depends on how tightly the headphones seal to the listener's head, among other considerations.

A switch in the unit's headband mutes the audio when you remove the K 271 from your head completely, providing additional insurance against unwanted bleed into mics. Singers will be happy to know that you can still wear one headphone cup over an ear and place the other cup against the back of your head without the mute switch engaging.

AKG is so confident in the K 271 Studio's durability that it provides a generous two-year parts-and-labor warranty and promotes the headphones for stage use. The K 271 Studio's 3-meter cable, which uses a locking mini-XLR to connect to the earpiece, is detachable for easy replacement in the field. The cable uses 99.99 percent oxygen-free copper wiring and features gold-plated plugs at both

ends. I especially liked that these headphones come ready for use with both pro and consumer gear: the supplied, gold-plated 1/8-inch-stereo-female-to-1/4-inch-stereo-male adapter screws onto the cable's stereo miniplug connector, making it compatible with professional TRS headphone-amp outputs.

Without the cable, the K 271 Studio weighs only 8.5 ounces. It was designed with comfort in mind: the self-adjusting leatherette headband and gimbal-type earcup suspension help the headphones hug your ears securely without making you feel like your head is in a vise.

### The Sound of Music

Like the other headphones in AKG's Professional Studio line, the K 271 Studio incorporates the company's new XXL transducers and patented Varimotion diaphragms. According to AKG, these diaphragms are thinner and more elastic near the outside perimeter and thicker in the center, and are therefore less prone to resonance. This design purportedly produces greater bass response, accurate mids, and detailed highs.

In fact, the K 271 Studio sounds fantastic, exhibiting phenomenal transient response, high-frequency detail, high- and low-frequency extension, midrange clarity, and excellent imaging. Listening to numerous mixes in a variety of styles through a Benchmark DAC-1 D/A converter—a DAC noteworthy for its well-defined bottom end—the K 271 Studio's reproduction was very tightly focused, crystal clear, and remarkably detailed.

Using the DAC-1, I also compared the K 271 Studio with my Audio-Technica ATH-M40fs headphones. AKG's cans offered more detailed highs, clearer mids and upper bass, and tighter overall bass. In contrast, the ATH-M40fs offered substantially louder—though not necessarily more extended—bass and a more midrange sound. I wish the K 271 Studio offered a tad more level in the bass band, but only if this were possible without compromising the headphones' open and revealing quality. Nevertheless, the K 271 Studio has quickly become my favorite

reference headphone set for mixing and mastering.

The K 271 Studio worked great in recording sessions, especially those involving delicate acoustic instruments and vocals. With a sensitivity rating of 91 dB SPL/mW, the K 271 Studio is louder than my Fostex T20 headphones but not nearly as loud as the ATH-M40fs. If you have a reasonably powerful headphone amp, the K 271 Studio should give you all the volume you need when tracking.

### Music to My Ears

It's hard to find headphones that sound natural and unhyped and reveal the detail you need for critical applications. But these cans deliver. The AKG K 271 Studio is arguably the most versatile set of headphones in the company's Professional Studio line.

Although they are somewhat expensive, you definitely get what you pay for. If you're looking for a versatile, rugged, and comfortable set of headphones that sound outstanding, do yourself a favor and check out the K 271 Studio.

### Overall EM Rating (1 through 5): 4.5

AKG Acoustics U.S.; tel. (615) 620-3800; e-mail [akgusa@harman.com](mailto:akgusa@harman.com); Web [www.akgusa.com](http://www.akgusa.com)

## REALTRAPS

### Wood Panel Bass Traps

By Jon Chappell

Many musicians misguidedly spend thousands of dollars on esoteric electronic equipment to make up for the sonic deficiencies of their studio, when the problems may in fact lie in the acoustical properties of the room. For the musician or recordist looking to tackle sound problems at the source, RealTraps manufactures a line of acoustically engineered bass-trap panels (\$479 to \$599 each) that provide efficient bass-frequency absorption and tame the most common problem-frequencies plaguing personal studios.

### Setting the Trap

RealTraps are flat panels that have an exposed wooden surface. The attractive





**RealTraps panels can reduce standing-wave problems in any studio and are much more efficient for low-frequency absorption than foam or tubular solutions.**

birch veneer on the front of each has a thin coating of polyurethane that protects it from dings but preserves the natural, unfinished look. The panels' sides are white pine, and the backs, which face the wall, are made of compressed fiberboard. The front surface is designed to vibrate sympathetically at low frequencies, and rigid fiberglass sealed within the frame dampens the panel's vibrations. The front panel reflects midrange frequencies from about 500 Hz upward.

The panels come in a variety of sizes; my review units were 7.5 feet tall and 2 feet wide and ranged from 2.5 to 5.5 inches thick. RealTraps classifies the panels as Sub-Bass, Low-Bass, and High-Bass. Each size features a different center frequency—60 Hz, 90 Hz, or 180 Hz—with a gradual rolloff slope that makes the panels effective over a range of frequencies.

The panels have angled fronts, which helps reflect mid- and high-frequency waves away from the original sound source (such as your monitor speakers). Experimenting with the different panel sizes and adjusting their angles allowed me to change the acoustic properties of the room to fit my needs.

Despite their solid construction, I could move and mount the panels easily by myself. Each panel has beveled mounting bars attached to its back that allow you to quickly install it on any wall. Simply mount the corresponding bar on the wall using

drywall anchors or woodscrews set into the wall studs, then slide the panel into place. (RealTraps also makes MiniTraps, a smaller and less expensive set of panels that hang on the wall like pictures and provide midrange as well as bass absorption.)

### Riding Herd on the Low End

I have a typical home studio—a 10-by-12-foot room with hard parallel walls that is a veritable breeding ground for standing waves. Before I installed RealTraps, I noticed drastic differences in the loudness of bass frequencies depending on where I was in the room. For example, a 100 Hz sine wave could be twice as loud in one spot and sev-

eral times softer in another.

When I installed the RealTraps on the walls in front of and to the side of my Mackie HR824 close-field monitors, I immediately noticed a difference in how bass frequencies behaved in the room. The panels improved the room's frequency response by reducing the standing-wave artifacts, and they took up a mere five inches of floor space from the back and side walls. Although the panels work by absorbing bass and reducing direct reflections, the net effect is a truer picture of the bass throughout the room, which has helped me for mixing and tracking.

### The Trap Family

Although I've attempted several DIY solutions for bass management, such as 2-by-4-foot framing with foam or fiberglass fill, the results were always less than satisfactory. Similarly, store-bought foam panels and tubes have been only marginally successful in my room.

However, the RealTraps panels were very effective, making my room's low-end response more consistent and predictable. Thanks to their efficiency, RealTraps panels require less wall space than foam solutions. And they looked a whole lot better, too. ☺

### Overall EM Rating (1 through 5): 4.5

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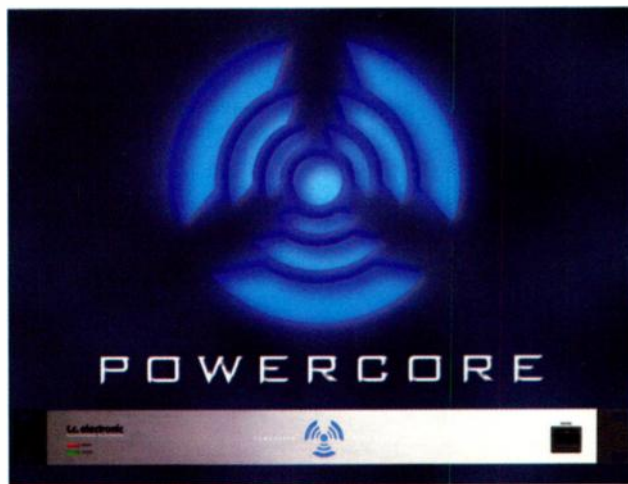
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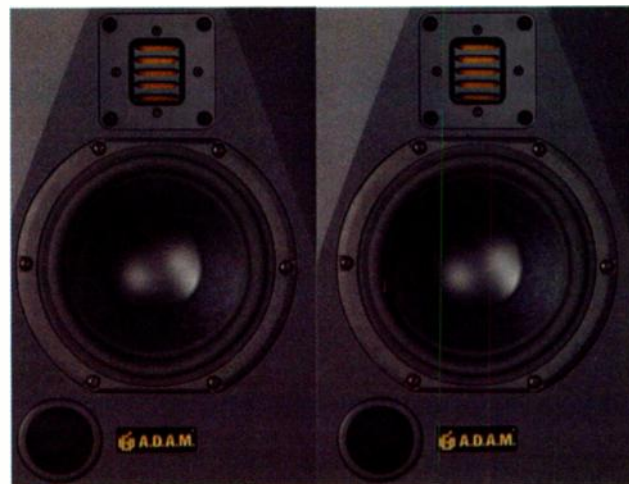
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I've actually heard claims about synthesizers (hardware and software) and other products that are very similar to that last statement. At the time I heard them, I said to myself, "Self, that's just piffle!" And, of course, it is.

Software is the soft white underbelly here; it will always need upgrading, at the very least. But developers also will continue to create juicy new products having capabilities that will first be desired, then acquired, then required. To the degree that your studio or rig is software based, you must figure on an ongoing expense stream just to keep it sufficiently current.

That is not to say, however, that you need to go for every upgrade or decent replacement that comes along. The bottom line on equipment value is how useful the product in question is to you. No matter if it's new or old, if you use it a lot and it gives you what you need, it is worth retaining. Many people still try to run Digidesign Sound Designer II and Opcode Studio Vision—two programs that, for all intents and purposes, shuffled off this mortal coil years ago. Clearly, some people find these tools useful enough that they would unquestionably purchase an upgrade should the opportunity be presented.

There will always be some new tools providing "Oh my god—it even bakes my sweaters for me!" functionality, and they will justify your parting with some hard-earned filthy lucre. Similarly, there will always be those tools that would be nice to have but that you can't quite see dropping the bucks for.

Hardware, interestingly, can sometimes maintain its value longer than software. Emulations of classic compressors have gotten quite good at capturing the essence of the original. The authentic analog hardware,



however, often has that last little bit of magic that initially set everyone raving about them. I don't see too many people dumping their LA-2As on the market, and I keep a Mac Centris 650 running just as a chassis for a Lexicon NuVerb card because, as good as plug-in reverb has gotten, NuVerb sounds better than most of them and doesn't tax the CPU.

On the other hand, some old Tapco mixer somewhere was just laid to rest last year when a control surface took over the mixing duties.

In my "O"-pinion, the best candidates for retaining value over time are transducers. Properly cared for, a good micro-

phone or speaker remains for many years as useful as when it was first purchased. Technological advancement happens, but the rate of change is much slower for transducers than for software. That's because the laws of physics, which don't seem to change all that quickly, rule more directly and heavy-handedly over information transmission. Energy conversion is a tricky business, especially when carrying information, and the result is that each designer's vision of transduction produces a different sound. Character shows itself as the most compelling sonic reason for choosing one transducer over another. And as long as we live in the analog world, we are going to be dealing with transducers as the first link in many signal chains.

So, is it forward to the past? Stock yourself only with the good old stuff that will still be around in five years? Or should you stay on the cutting edge and bite the bullet on upgrades and, eventually, replacement? There simply is no right answer to those questions. The answer to them all depends, obviously, on what type of work you're doing. My advice is to make sure to recognize where value really lies for what you do. Don't think that you'll never need to buy another computer, any more than you'd think you'll never buy more nose-hair trimmers. Of course, if you use good mustache scissors for a nose-hair trimmer, you're set for life. ☺



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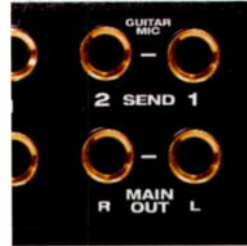
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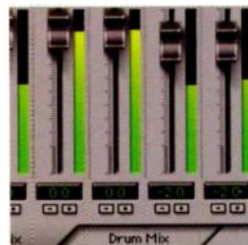
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